

Chapter 7

Physical and Metabolic Characteristics of Persons with Diabetes

Catherine C. Cowie, PhD, MPH, and Maureen I. Harris, PhD, MPH

SUMMARY

This chapter presents national and community-based data on physical and metabolic characteristics of persons with diabetes. The primary data sources are the 1989 National Health Interview Survey (NHIS), a household interview survey of a representative sample of persons age ≥ 18 years; the 1976-80 Second National Health and Nutrition Examination Survey (NHANES II), which included a representative sample of the U.S. population age 20-74 years who were administered a household interview, a physical examination with certain clinical and laboratory tests, and an oral glucose tolerance test (OGTT) to detect undiagnosed diabetes; and the 1982-84 Hispanic Health and Nutrition Examination Survey (HHANES), which included Mexican Americans, Puerto Ricans, and Cuban Americans age 20-74 years from certain regions of the U.S. and employed methods similar to those used in the NHANES II.

By definition, persons with non-insulin-dependent diabetes mellitus (NIDDM) have much higher fasting plasma glucose levels (mean in undiagnosed NIDDM=132 mg/dl) than persons with impaired glucose tolerance (IGT) (mean=98 mg/dl) and persons with normal glucose tolerance (mean=91 mg/dl). Similar trends are found for 2-hour plasma glucose levels (means of 262, 161, and 97 mg/dl, respectively). Self-reported frequency of urine glucose and high blood glucose in the past 6 months was reported more frequently in younger than in older persons and in NIDDM than in insulin-dependent diabetes mellitus (IDDM); fully 27% of persons with NIDDM age 18-44 years reported urine glucose or high blood glucose always or most of the time.

A family history of diabetes is more frequent in NIDDM than other groups. Based on NHANES II data among persons age 20-54 years, a parental history of

diabetes was reported in 46.6% of those with a medical history of NIDDM, 24.7% of persons with undiagnosed NIDDM, 30.1% of IGT, and 17.6% of persons with normal glucose tolerance; based on 1989 NHIS data, the percent was similar for adults with IDDM (16.4%) and nondiabetic persons (17.3%).

Mean body mass index (BMI) is highest in persons with NIDDM, followed by those with IGT, and persons with normal glucose tolerance. Among persons with NIDDM, the frequency of obesity (BMI ≥ 30) is much higher in women (46.6%) than in men (20.9%), and is markedly high in non-Hispanic black women (69.5%). Between 1976-80 and 1989, mean self-reported BMI increased in persons with NIDDM, particularly in non-Hispanic white women (26.9 to 28.6, a 6.3% increase). Central obesity is also more evident in persons with NIDDM and IGT compared with persons with normal glucose tolerance.

In general, mean blood pressure is as high in persons with undiagnosed NIDDM and IGT as in persons with a medical history of NIDDM, but lower in persons with normal glucose tolerance. Based on NHANES II data, the prevalence of hypertension ($\geq 160/95$ mmHg or antihypertensive medication) in persons age 65-74 years is ~ 60% in NIDDM, 50.7% in IGT, and 38.3% in persons with normal glucose tolerance. Based on 1989 NHIS data, the prevalence of self-reported physician-diagnosed hypertension in persons age 45-64 years is 63.7% in NIDDM and 25.4% in nondiabetic persons. The prevalence of self-reported hypertension in persons with previously diagnosed NIDDM was similar in 1976-80 and 1989. Among persons with NIDDM and self-reported physician-diagnosed hypertension, 76.3% said they were taking antihypertensive medication, 86.7% were restricting salt intake, 57.8% were engaging in physical exercise, and 70.2% were losing or controlling their weight.

Compared with nondiabetic persons, persons with NIDDM have higher mean total cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides, and lower mean high-density lipoprotein (HDL) cholesterol. A high proportion of NIDDM patients have abnormal concentrations of lipoproteins. Among persons with NIDDM, the prevalence of total cholesterol ≥ 240 mg/dl is 37.4% in men and 43.7% in women; the respective rates in NIDDM men and women are 30.9% and 43.8% for LDL cholesterol ≥ 160 mg/dl, 27.6% and 11.4% for HDL cholesterol < 35 mg/dl, and 13.9% and 22.2% for fasting triglycerides ≥ 250 mg/dl.

Parity is greater in persons with NIDDM than in non-

diabetic persons. Among women age ≥ 50 years, 39.6% of NIDDM and 29.7% of nondiabetic persons have ≥ 4 children. The frequency of babies ≥ 9 lbs. at birth is also higher in women with NIDDM. Except at youngest ages, a slightly higher percent of nondiabetic persons smoke (26.1%) than do diabetic persons (20.1%). Likewise, the percent drinking any alcohol is higher in nondiabetic (67.2%) than in diabetic persons (46.6%). Excellent or very good health status was reported in 64.9% of nondiabetic persons age ≥ 18 years, but only in 19.5% of persons with NIDDM. The participation rate in leisure-time physical activity is lower in diabetic than in nondiabetic persons.

• • • • •

INTRODUCTION

This chapter describes the physical and metabolic characteristics of persons with diabetes and is based primarily on three data sources. The first source is the 1989 NHIS, which is described in detail in Chapter 6. The second data source is the 1976-80 NHANES II¹, which included a sample of the general U.S. population age 20-74 years (n=15,357) that was representative of the United States by age, sex, race, geographic region, and level of income. Data from the NHANES II have provided national estimates of the prevalence of diabetes and IGT^{2,3}. Household interviews were conducted to obtain demographic and medical history information, including whether subjects had a medical history of physician-diagnosed diabetes. Seventy-seven percent of the interviewed sample participated in a physical examination that included certain clinical and laboratory tests. Data on examined participants are similar to those from the 1976 NHIS (for which the 96% response rate approximates true population values) on > 70 health-related variables^{2,4}. Examined persons are also similar in distribution to the total U.S. population according to age, sex, race, income, and geographic region². A representative half-sample of examined participants (excluding persons with previously diagnosed diabetes) were eligible for an OGTT. This test was administered according to recommendations of the National Diabetes Data Group (NDDG)⁵. Subjects fasted overnight for 10-16 hours; a fasting venous blood sample was taken; 75 g of glucose (Glucola, Miles/Ames) was ingested; and a venous blood sample was taken 2 hours later. Plasma glucose was measured using a microadaptation of the national glucose oxidase reference method⁶. The OGTT was completed by 66% of eligible subjects. Persons who received the OGTT

differed little or not at all from the total NHANES II interviewed sample without a medical history of diabetes with respect to age, sex, race, income, obesity, family history of diabetes, and a number of other demographic, clinical, and medical history factors^{2,3,7}.

Using World Health Organization (WHO) criteria⁸, individuals who received the OGTT were classified by their plasma glucose values as having undiagnosed diabetes (fasting plasma glucose ≥ 140 mg/dl and/or 2-hour glucose ≥ 200 mg/dl; n=192), IGT (fasting plasma glucose < 140 mg/dl and 2-hour glucose 140-199 mg/dl; n=532), or normal glucose tolerance (fasting plasma glucose < 140 mg/dl and 2-hour plasma glucose < 140 mg/dl; n=2,990). Of 756 examined participants who reported a medical history of diabetes, 18 appeared to have IDDM based on age at diagnosis < 30 years, continuous use of insulin since diagnosis, and BMI (weight in kg divided by height in m squared) < 27 for men and < 25 for women. These subjects were excluded from analysis. The remaining 738 subjects and all persons with diabetes detected by OGTT during the survey were considered to have NIDDM. Of the 738 subjects with a medical history of NIDDM, 544 subjects were examined. To provide estimates that are representative of the U.S. population, data were weighted by the inverse of the participation rate of study subjects according to age, sex, race, income, and region.

The third major data source is the HHANES, conducted in 1982-84⁹. In this survey, people in three Hispanic groups were studied: Mexican Americans in the southwestern United States (California, Arizona, Colorado, New Mexico, and Texas; n=3,928), Puerto Ricans in the New York City area (New York, New Jersey, and Connecticut; n=1,519), and Cuban Americans in the Miami, FL area (Dade County; n=1,134). The HHANES used methods virtually identical to the

NHANES II, including a standard 75-g 2-hour OGTT given after an overnight 10-16 hour fast, according to NDDG recommendations. WHO criteria were used to classify persons as having undiagnosed diabetes (for all ethnic groups combined, n=70), IGT (n=192), or normal glucose tolerance (n=1,042). A medical history of diabetes was reported in an additional 423 individuals, of whom one person had probable IDDM; of the remaining 422 persons with a medical history of NIDDM, 356 persons were examined. Sampling weights were also applied to these data to provide estimates representative of the total Hispanic group of each region.

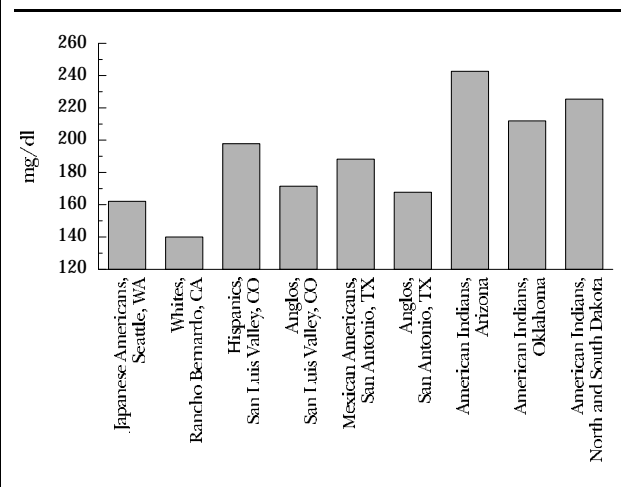
In addition to these national surveys, this chapter includes information provided by principal investigators of several community-based diabetes investigations. These include studies of diabetes in whites in Rancho Bernardo, CA¹⁰; Japanese Americans in Seattle, WA¹¹; Hispanics and non-Hispanic whites in San Luis Valley, CO¹² and San Antonio, TX¹³; and Native Americans in Oklahoma, Arizona, North Dakota, and South Dakota¹⁴. (See Chapters 32, 33, and 34 for more detailed discussions of diabetes in these ethnic groups.)

BLOOD GLUCOSE

Data on fasting and 2-hour post-challenge plasma glucose were not obtained for persons with diagnosed diabetes in the national surveys. However, this information was collected in several community-based studies on diabetes. Figures 7.1 and 7.2 show mean fasting and 2-hour post-challenge plasma glucose by race/ethnicity for women with previously diagnosed diabetes in community-based studies¹⁰⁻¹⁴. Mean fasting glucose is highest in Native American groups (212-242 mg/dl), followed by Hispanic groups in San Luis Valley, CO and San Antonio, TX (188-198 mg/dl). Mean fasting glucose is lowest in white women in Rancho Bernardo, CA (140 mg/dl). For mean 2-hour plasma glucose in women, levels are highest in Pima Indians (356 mg/dl), followed by Japanese Americans in Seattle, WA (336 mg/dl), and Hispanics in San Luis Valley, CO and San Antonio, TX (332-334 mg/dl). Similar to fasting values, 2-hour glucose is lowest in whites in Rancho Bernardo (219 mg/dl). Data in men and data on plasma glucose levels in newly discovered diabetes in these community studies are presented below in the section titled "Comparison of National and Community-Based Study Data."

Fasting plasma glucose values are shown by age in Figure 7.3 for persons age 20-74 years in the 1976-80

Figure 7.1
Mean Fasting Plasma Glucose in Women with Previously Diagnosed NIDDM in Community-Based Studies

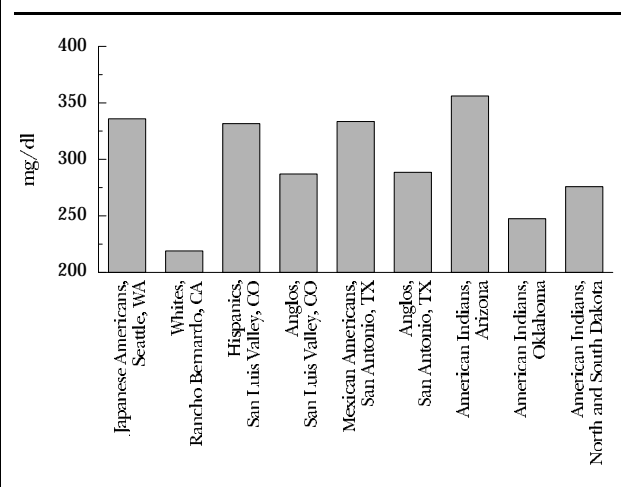


See Appendices 7.46-7.48 for further details.

Source: References 10-14

NHANES II, excluding those with diagnosed diabetes for whom glucose values were not determined. At each age, mean plasma glucose and the values corresponding to the 10th, 50th (median), and 90th percentile of the entire distribution are shown. Mean fasting glucose for age 20-74 years combined is 90 mg/dl. Fasting glucose rises slightly with increasing age and is somewhat higher for those in the 90th percentile (100 mg/dl at age 20-44 years versus 112 mg/dl at age 65-74 years). Two-hour post-challenge

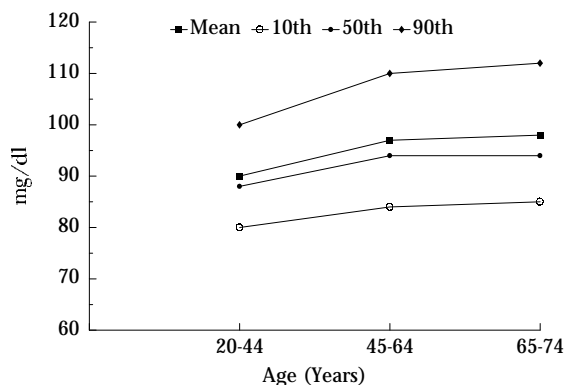
Figure 7.2
Mean 2-Hour Plasma Glucose in Women with Previously Diagnosed NIDDM in Community-Based Studies



See Appendices 7.46-7.48 for further details.

Source: References 10-14

Figure 7.3
Means and Percentiles of Fasting Plasma Glucose in Persons Without a Medical History of Diabetes, U.S., 1976-80

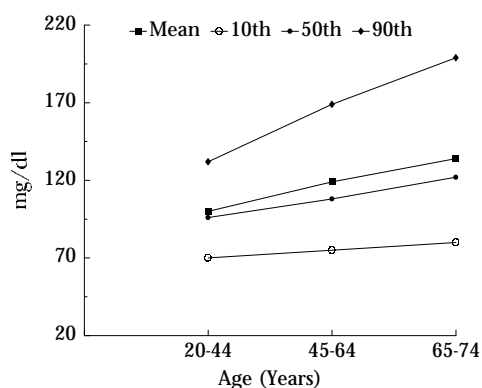


Individuals with a medical history of diabetes were not asked to fast and thus their plasma glucose could not be determined. Plasma glucose was measured in the morning after an overnight 10-16 hour fast. See Appendix 7.1 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

plasma glucose values are shown in Figure 7.4. For age 20-74 years combined, mean 2-hour glucose is 109 mg/dl. Two-hour glucose rises slightly with age, particularly for persons in the 90th percentile of the distribution (132 mg/dl at age 20-44 years versus 199 mg/dl at age 65-74 years). Detailed tables of plasma glucose values by race, sex, and age are found in Appendices 7.1 and 7.2. There are no striking trends by sex or race: fasting values are slightly higher in men than in women, but 2-hour values are slightly

Figure 7.4
Means and Percentiles of 2-Hour Plasma Glucose in Persons Without a Medical History of Diabetes, U.S., 1976-80



Individuals with a medical history of diabetes were not asked to fast and thus their plasma glucose could not be determined. Plasma glucose was measured at 2 hours after a 75-g oral glucose challenge given in the morning after an overnight 10-16 hour fast. See Appendix 7.2 for further details.

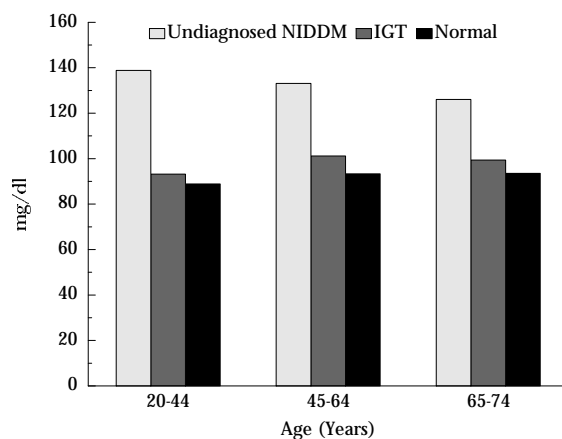
Source: 1976-80 Second National Health and Nutrition Examination Survey

higher in women; Cuban Americans have somewhat higher values than the other race/ethnic groups.

Mean fasting plasma glucose is compared by diabetes status in Figure 7.5. By definition, persons with NIDDM have much higher fasting glucose levels than the other groups (overall mean in undiagnosed NIDDM=132 mg/dl), whereas levels in persons with IGT (mean=98 mg/dl) and normal glucose tolerance (mean=91 mg/dl) are similar. There is little difference by age. Trends by diabetes status for mean 2-hour plasma glucose (Figure 7.6) are similar to those for fasting values except that 2-hour glucose is more intermediate in persons with IGT (e.g., overall mean of 262, 161, and 97 mg/dl in undiagnosed NIDDM, IGT, and normal glucose tolerance, respectively). Mean fasting and 2-hour glucose values are shown by diabetes status in further detail by sex and race in Appendix 7.3. There are few differences by sex. The most substantial difference by race is found among persons with undiagnosed NIDDM, where levels are highest in Cuban Americans (141 and 280 mg/dl for fasting and 2-hour values) and lowest in non-Hispanic blacks (128 and 253 mg/dl for fasting and 2-hour values).

In the 1989 NHIS, diabetic persons age ≥ 18 years were queried as to the frequency of urine glucose and high blood glucose during the previous 6 months. These data are shown in Figure 7.7. Both urine glucose and high blood glucose were reported less frequently in

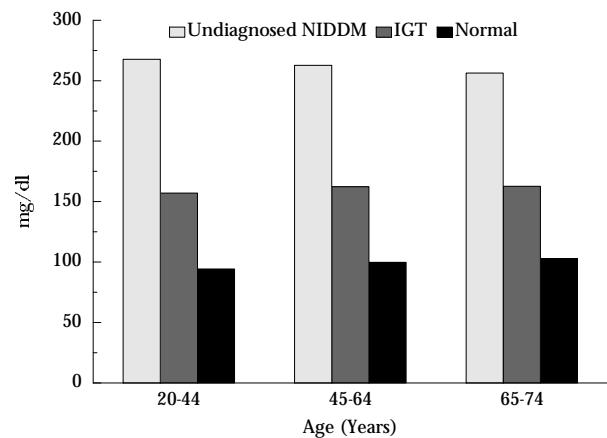
Figure 7.5
Mean Fasting Plasma Glucose, by Diabetes Status, U.S., 1976-80



IGT, impaired glucose tolerance. Individuals with a medical history of diabetes were not asked to fast and thus their plasma glucose could not be determined. Plasma glucose was measured in the morning after an overnight 10-16 hour fast. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria⁸. See Appendix 7.3 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

Figure 7.6
Mean 2-Hour Plasma Glucose, by Diabetes Status, U.S., 1976-80



IGT, impaired glucose tolerance. Individuals with a medical history of diabetes were not asked to fast and thus their plasma glucose could not be determined. Plasma glucose was measured at 2 hours after a 75-g oral glucose challenge given in the morning after a 10-16 hour fast. Diabetes status was based on World Health Organization criteria⁸. See Appendix 7.3 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

persons with IDDM than with NIDDM (15.6% versus 22.1% for high blood glucose). The frequency decreased with older age. Fully 27% of persons with NIDDM age 18-44 years reported urine glucose or high blood glucose always or most of the time. Appendices 7.4 and 7.5 present these data in further detail.

Data from the 1989 NHIS on the presence of urine ketones in the past 6 months are shown in Appendix 7.6. The majority of persons stated that they were not

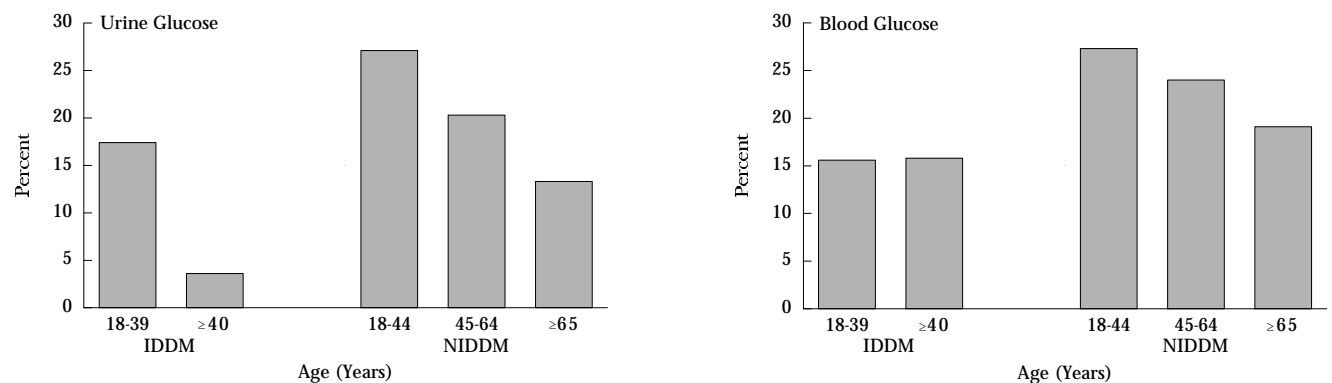
tested (48.5% of IDDM and 54.1% of NIDDM) or did not know if they were tested (8.1% of IDDM and 27.8% of NIDDM) for urine ketones.

FAMILY HISTORY OF DIABETES

A history of diabetes in parents and siblings was ascertained in the 1976-80 NHANES II. Family history of diabetes is reported much more frequently in persons with a medical history of NIDDM than in all other groups (Figure 7.8). For example, at age 20-54 years, 46.6% of those with a medical history of diabetes report that they have a parent with diabetes, compared with 24.7% of those with undiagnosed NIDDM. The lower frequency in the latter group may contribute to the delay in diagnosis of NIDDM. Persons with IGT have a higher frequency of a family history of diabetes (e.g., 30.1% at age 20-54 years have a diabetic parent) than persons with normal glucose tolerance (17.6%). Among those age 20-54 years with undiagnosed NIDDM, women report a parent having diabetes more frequently than men (36.0% versus 8.8%), while men report a sibling having diabetes more frequently than women (22.3% versus 9.9%) (Appendix 7.7). Clear patterns by race are not evident. A maternal history of diabetes generally was reported more frequently than a paternal history among persons with NIDDM (e.g., 21.4% versus 4.5% for undiagnosed NIDDM age ≥ 55 years) and IGT (15.4% versus 3.3% at age ≥ 55 years).

Parental history of diabetes was also ascertained in the 1989 NHIS. The proportion reporting a parental history of diabetes was of a similar order of magnitude for

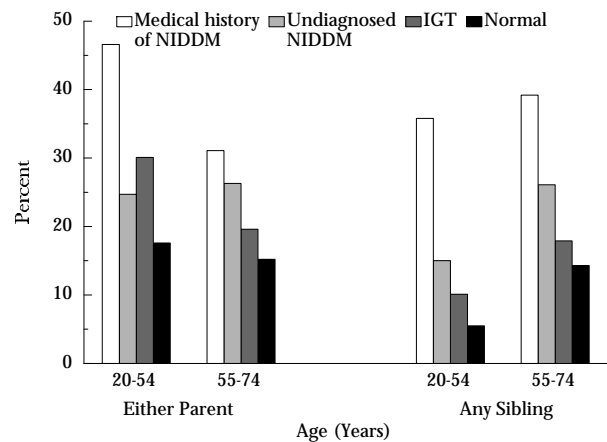
Figure 7.7
Percent of Diabetic Persons Who Reported Having Urine Glucose or High Blood Glucose Always or Most of the Time During the Past 6 Months, U.S., 1989



Data are self-reported and based on self-testing or testing by physicians or others. See Appendices 7.4 and 7.5 for further details.

Source: 1989 National Health Interview Survey

Figure 7.8
Percent of Persons Age 20-74 Years with a Family History of Diabetes, by Age and Diabetes Status, U.S., 1976-80

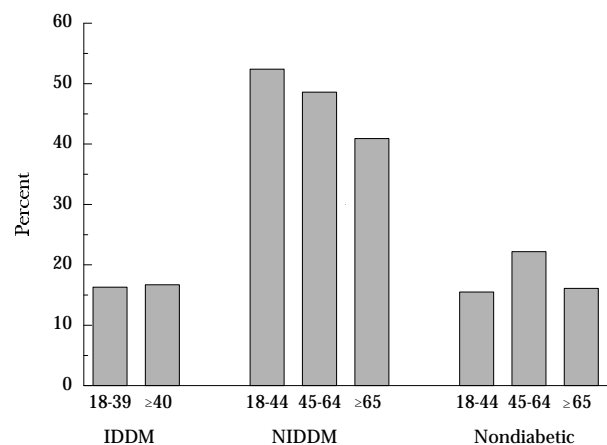


IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.7 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

persons with IDDM (16.4% overall) and nondiabetic persons (17.3%), and was much lower than the percent of NIDDM with a parental history (45.4%) (Figure 7.9). Among those with NIDDM, a parental history of diabetes decreased slightly with age (52.4% at age 18-44 years versus 40.9% at age ≥ 65 years). Persons with IDDM reported a paternal history of diabe-

Figure 7.9
Percent of Persons Age ≥ 18 Years Who Have a Diabetic Parent, by Age and Diabetes Status, U.S., 1989



See Appendix 7.8 for further details.

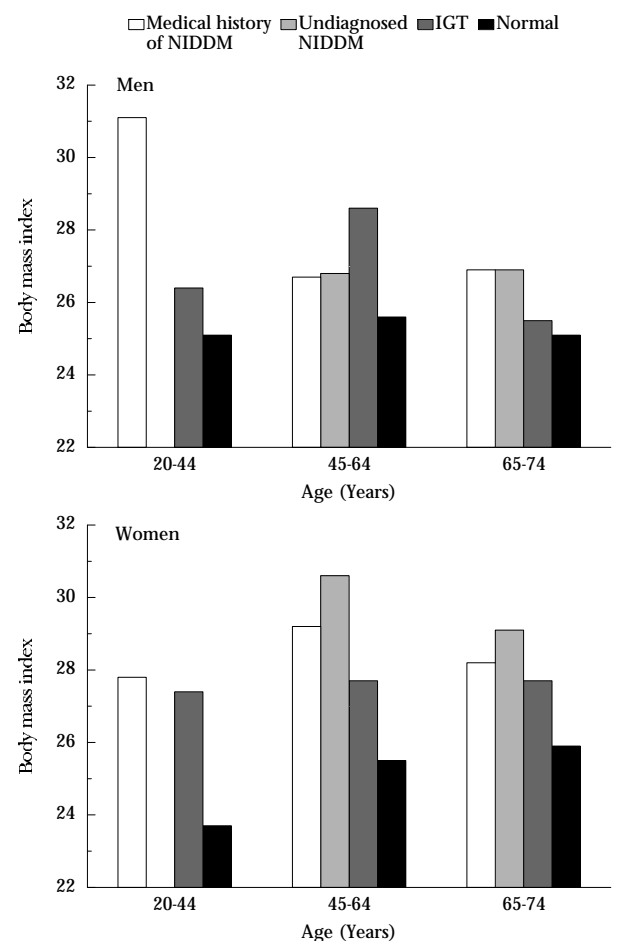
Source: 1989 National Health Interview Survey

tes more frequently than a maternal history (9.1% versus 3.5%), whereas persons with NIDDM more frequently reported a maternal history (24.7% versus 10.0%) (Appendix 7.8). There were minimal differences by sex or race. Parental history of diabetes in persons with NIDDM is compared in community-based studies in the section below titled "Comparison of National and Community-Based Study Data."

BODY MASS AND OBESITY

Figure 7.10 shows mean BMI calculated from measured height and weight for men and women based on the 1976-80 NHANES II. In both sexes, BMI is higher in persons with NIDDM than in persons with normal

Figure 7.10
Mean Body Mass Index in Men and Women, by Diabetes Status, U.S., 1976-80



IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.9 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

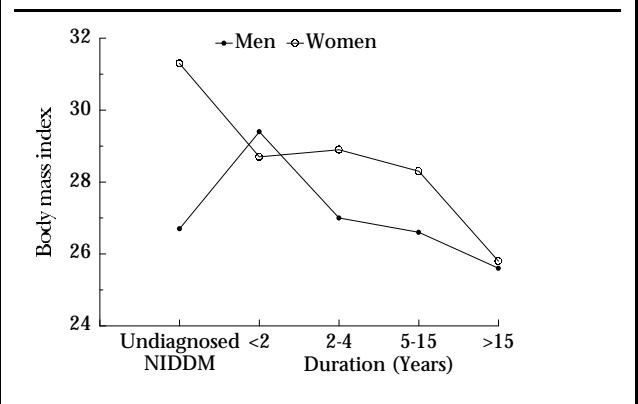
glucose tolerance and generally higher than that in persons with IGT. BMI is also higher in persons with IGT than in persons with normal glucose tolerance. For age 20-74 years, BMI is 28.1 in persons with a medical history of NIDDM, 29.5 in undiagnosed NIDDM, 27.4 in IGT, and 24.8 in persons with normal glucose tolerance. In most groups, BMI is higher in women than in men. Figure 7.11 shows mean measured BMI for persons with NIDDM according to race, based on the NHANES II and HHANES. Among those with a medical history of NIDDM, a higher BMI is found in non-Hispanic blacks (29.8), Mexican Americans (30.2), and Puerto Ricans (29.3) than in non-Hispanic whites (27.8) and Cuban Americans (26.4). Among persons with undiagnosed NIDDM, blacks have the highest mean BMI (31.9 versus 27.9-29.0). More detailed estimates of BMI are given in Appendix 7.9. Data on mean BMI in persons with NIDDM in community-based studies are presented in the section below titled "Comparison of National and Community-Based Study Data."

Figure 7.12 shows mean BMI according to sex and duration of diabetes in non-Hispanic whites. Except for men with undiagnosed diabetes, in whom BMI is low, BMI decreases with increasing duration of diabetes. The decline is not apparent in other racial/ethnic groups (Appendix 7.10).

The percent of persons with NIDDM who are obese,

Figure 7.12

Mean Body Mass Index in Non-Hispanic Whites with NIDDM Age 20-74 Years, by Duration of Diabetes, U.S., 1976-80



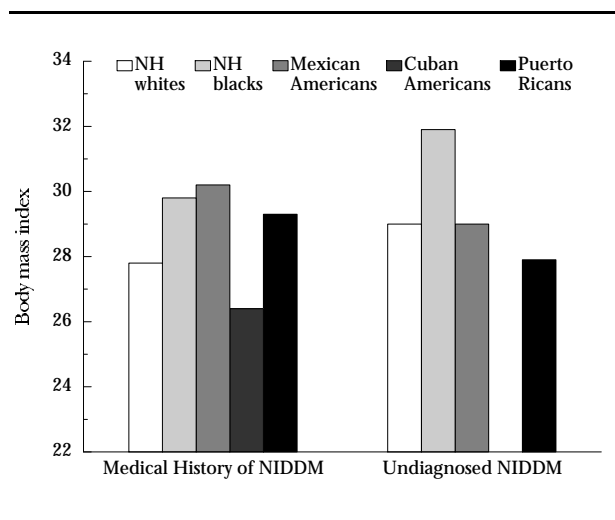
Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.10 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

defined as having a BMI ≥ 30 , is shown in Figure 7.13 by race and sex. The frequency of obesity is much higher in women (overall, 46.6%) than in men (20.9%) and is markedly high in non-Hispanic black women (69.5%) and lowest in Cuban-American women (29.6%). Among NIDDM men, the percent obese is highest in Mexican Americans (29.6%) and Cuban Americans (28.3%), and lowest in Puerto Ricans (11.0%). Appendix 7.11 shows more detailed estimates of obesity. In non-Hispanic whites, the per-

Figure 7.11

Mean Body Mass Index in Persons Age 45-64 Years, by Race and Diabetes Status, U.S., 1976-80 and 1982-84

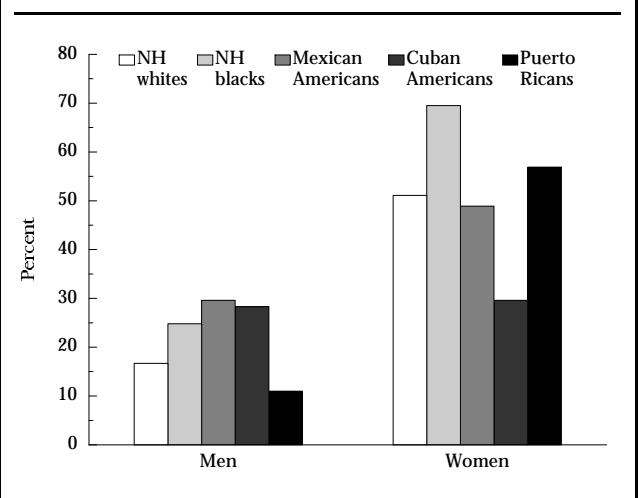


Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.9 for further details. NH, non-Hispanic.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Figure 7.13

Percent of Persons with NIDDM Age 45-64 Years with Body Mass Index ≥ 30 , by Sex and Race, U.S., 1976-80 and 1982-84



See Appendix 7.11 for further details. NH, non-Hispanic.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

cent with BMI ≥ 25 increases slightly with age; however, the percent with BMI ≥ 30 and ≥ 35 decreases dramatically with age. In other race/ethnic groups, a pattern is less clear. Data on obesity in persons with NIDDM in community-based studies are presented in the section below titled "Comparison of National and Community-Based Study Data."

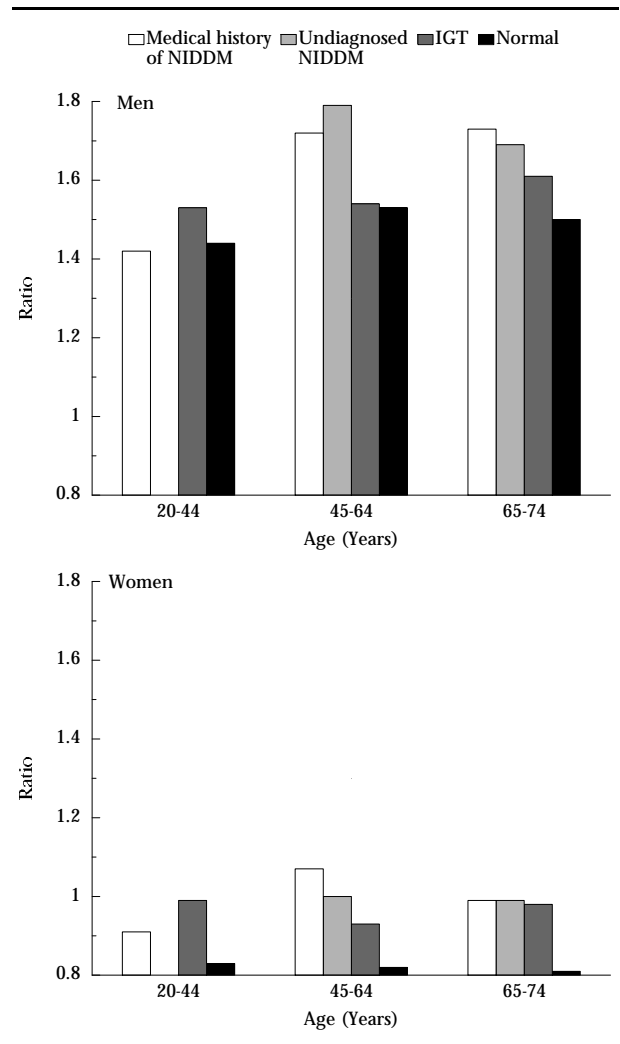
Mean measured and self-reported BMI are shown for persons with a medical history of NIDDM in Appendix 7.12 based on data from the 1976-80 NHANES II and the 1982-84 HHANES. Almost without exception, measured BMI is higher than self-reported BMI. At age 20-74 years, mean measured BMI is 28.1, 4.1% higher than the self-reported BMI of 27.0. Women underreport BMI more than men (27.2 versus 26.6 in men and 28.7 versus 27.2 in women). Mexican Americans and Cuban Americans underreport BMI less than other race/ethnic groups, whereas non-Hispanic blacks underreport the most. Patterns by age are not particularly evident.

Self-reported BMI in persons with a medical history of NIDDM increased between 1976-80 and 1989 from 27.0 to 28.3, an increase of 4.8%. The increase was found in non-Hispanic whites (26.7 to 28.1) and non-Hispanic black women (28.9 to 30.0), but not in non-Hispanic black men or Mexican Americans in whom there was a decrease (Appendix 7.12). An increase in BMI was particularly evident in non-Hispanic white women (26.9 to 28.6, a 6.3% increase). The increase in mean self-reported BMI in persons with NIDDM is similar to the increase in mean measured BMI for the general population age 20-74 years between 1976-80 (mean BMI=25.3) and 1988-91 (mean BMI=26.3), a 4% increase¹⁵. Overweight prevalence (defined as having a BMI of ≥ 27.8 in men and ≥ 27.3 in women) in the general population increased 8% during this period¹⁵.

CENTRAL OBESITY

Subscapular-to-triceps skinfold ratio was available in the 1976-80 NHANES II and the 1982-84 HHANES as a measure of central obesity. This is shown according to sex, age, and diabetes status in Figure 7.14. A more central obesity is evident in persons with NIDDM and IGT, compared with persons with normal glucose tolerance. Appendix 7.13 provides more detailed estimates. For all adults, the ratio is substantially higher in men (1.47-1.70) than in women (0.82-1.02). A pattern by age is not apparent. Data on central obesity including waist-to-hip ratios in persons with NIDDM in community-based studies are presented in the sec-

Figure 7.14
Mean Subscapular-to-Triceps Skinfold Ratio in Men and Women, by Diabetes Status, U.S., 1976-80



IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.13 for further details.

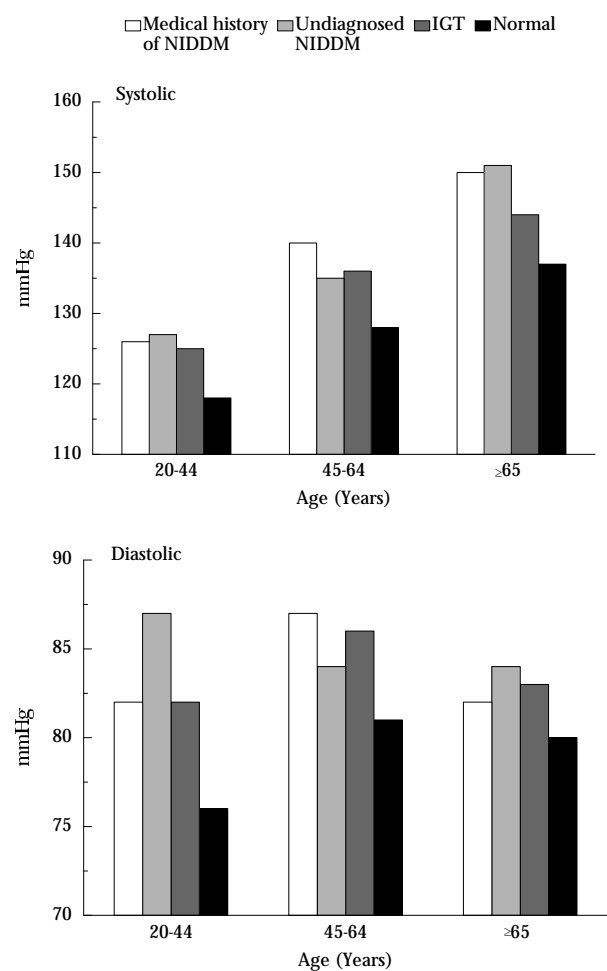
Source: 1976-80 Second National Health and Nutrition Examination Survey

tion below titled "Comparison of National and Community-Based Study Data."

BLOOD PRESSURE, HYPERTENSION, AND ANTIHYPERTENSIVE TREATMENT

In all age groups, for both systolic and diastolic blood pressures, mean blood pressure is higher in persons with NIDDM (both medical history and undiagnosed) and IGT than in persons with normal glucose tolerance (Figure 7.15). In general, mean blood pressure is as high in persons with undiagnosed NIDDM and IGT as in persons with a medical history of NIDDM. For

Figure 7.15
Mean Systolic and Diastolic Blood Pressure, by Diabetes Status, U.S., 1976-80

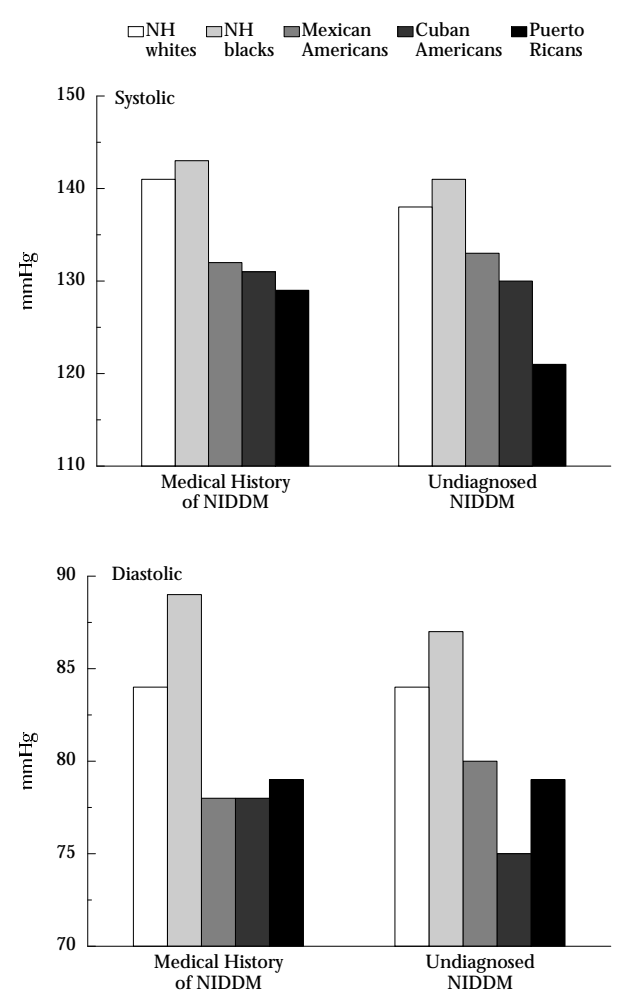


IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.14 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

example, at age 45-64 years, mean systolic blood pressure is 135 mmHg in persons with undiagnosed NIDDM, 136 mmHg in IGT, and 140 mmHg in persons with a medical history of NIDDM. Systolic blood pressure increases with age (e.g., 126 to 150 mmHg in medical history NIDDM age 20-44 years versus ≥65 years). A difference by sex is most evident among persons with normal glucose tolerance, with women having lower blood pressure than men (e.g., systolic, 119 versus 126 mmHg; diastolic, 76 versus 81 mmHg) (Appendix 7.14). Both in persons with a medical history of NIDDM and undiagnosed NIDDM, mean blood pressure is highest in non-Hispanic blacks, followed by whites, compared with other race/ethnic groups (Figure 7.16); systolic blood pressure is 143 mmHg, 141 mmHg, and 129-132 mmHg in these

Figure 7.16
Mean Systolic and Diastolic Blood Pressure in Men and Women with NIDDM Age 20-74 Years, by Race, U.S., 1976-80 and 1982-84



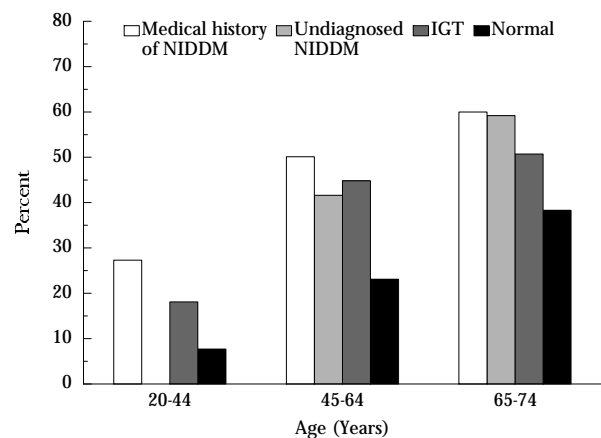
Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.14 for further details. NH, non-Hispanic.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

groups, respectively. Data on mean blood pressures in persons with NIDDM in community-based studies are presented in the section below titled "Comparison of National and Community-Based Study Data."

Based on data from the NHANES II, trends by diabetes status in the prevalence of hypertension (defined using WHO criteria of ≥160/95 mmHg or use of antihypertensive medication) are similar to trends for mean blood pressure. For example, among persons age 65-74 years, prevalence of hypertension is 59.2%-60.0% in persons with NIDDM, 50.7% in persons with IGT, and 38.3% in persons with normal glucose tolerance (Figure 7.17). Prevalence increases with age in all

Figure 7.17
Percent with Hypertension, by Diabetes Status, U.S., 1976-80

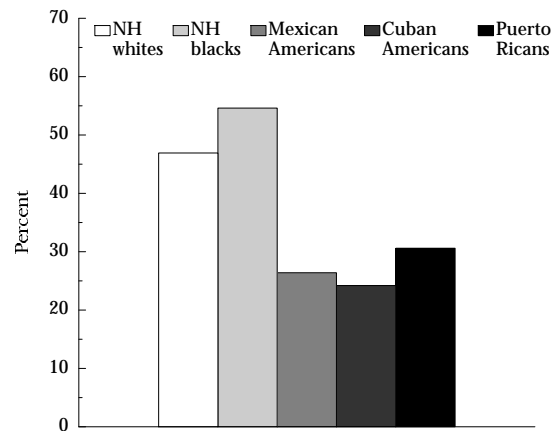


IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication. See Appendix 7.16 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

groups (e.g., among persons with a medical history of NIDDM, 27.3% at age 20-44 years versus 60.0% at age 65-74 years). Prevalence by race/ethnicity for persons with NIDDM is shown in Figure 7.18. Rates are higher in non-Hispanic whites and blacks than the three Hispanic groups, but Puerto Ricans at age 65-74 years have rates of hypertension as high as those in whites

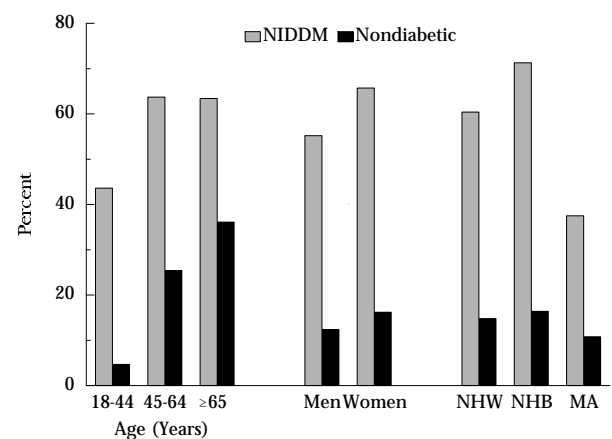
Figure 7.18
Percent with Hypertension in Persons with NIDDM Age 20-74 Years, by Race, U.S., 1976-80 and 1982-84



Hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication. See Appendix 7.16 for further details. NH, non-Hispanic.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Figure 7.19
Percent with Self-Reported Physician-Diagnosed Hypertension in Persons Age ≥ 18 Years, by Diabetes Status, U.S., 1989



NHW, non-Hispanic white; NHB, non-Hispanic black; MA, Mexican American. Data were obtained by self-response to questions about diabetes, self-response to a question about physician-diagnosed hypertension for persons with diabetes, and by self- or proxy response in a subsample of nondiabetic persons. See Appendix 7.17 for further details.

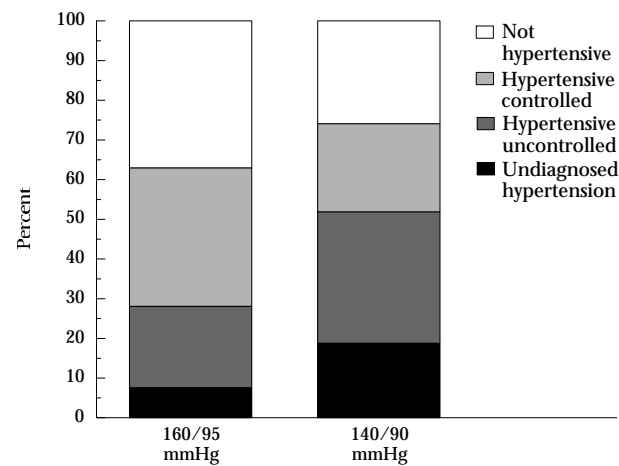
Source: 1989 National Health Interview Survey

and blacks (Appendix 7.15). Appendix 7.16 provides further details by race, sex, and age. Prevalence of hypertension is higher in women than in men with NIDDM, but lower in women than in men with IGT and those with normal glucose tolerance. Prevalence is highest in non-Hispanic blacks, followed by whites, among persons with NIDDM and normal glucose tolerance, and similarly high in these groups among persons with IGT. Data on the prevalence of hypertension in persons with NIDDM in community-based studies are presented in the section below titled "Comparison of National and Community-Based Study Data."

Self-reported prevalence of physician-diagnosed hypertension was obtained in the 1989 NHIS. As in the HANES, prevalence is substantially higher in persons with NIDDM than in nondiabetic persons (Figure 7.19). In those age 45-64 years, prevalence is 63.7% in NIDDM and 25.4% in nondiabetic persons. Hypertension prevalence rises with age (e.g., in NIDDM, 43.6% at age 18-44 years versus 63.4% at age ≥ 65 years) and is slightly higher in women (e.g., in NIDDM, 65.7% versus 55.2%). Among persons with NIDDM, prevalence is highest in non-Hispanic blacks (71.3%) and lowest in Mexican Americans (37.5%). The prevalence of hypertension in persons with IDDM is much lower than in persons with NIDDM (overall, 19.4% versus 61.3%); among persons with IDDM, it increases with age but does not differ by sex (Appendix 7.17).

Figure 7.20

Percent with Hypertension in Persons with NIDDM Age 20-74 Years, U.S., 1976-80

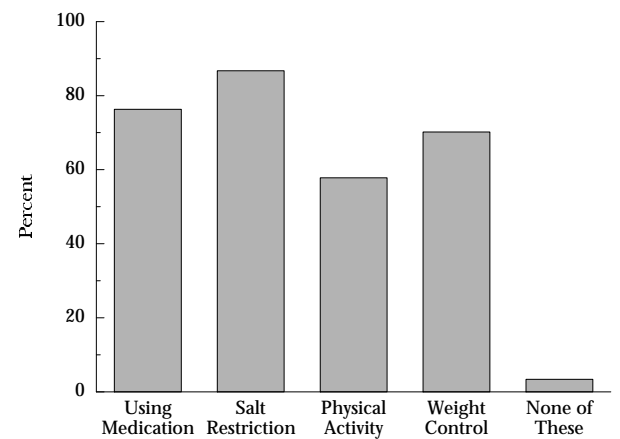


See Appendix 7.19 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey

Figure 7.21

Percent of Persons with NIDDM Age ≥18 Years with Self-Reported Physician-Diagnosed Hypertension Who Use Antihypertensive Treatment, U.S., 1989



Physician-diagnosed hypertension and antihypertensive treatment were obtained by self-response.

Source: 1989 National Health Interview Survey

Measured and self-reported prevalence of hypertension in 1976-80 and 1989 is shown in Appendix 7.18 for persons with previously diagnosed NIDDM. The prevalence of measured hypertension is lower than self-reported hypertension in 1976-80. Prevalence of self-reported hypertension was similar in 1976-80 and 1989.

Figure 7.20 classifies persons with NIDDM based on NHANES II and HHANES data in 1976-80 according to whether they report a history of physician-diagnosed hypertension and whether their blood pressure meets the WHO criteria for hypertension ($\geq 160/95$ mmHg) or the criteria for hypertension recommended by the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure ($\geq 140/90$ mmHg)¹⁶. Using the WHO criteria, 63% of persons with NIDDM have hypertension, about half (45%) of which is uncontrolled. Using the Joint Committee criteria, 74% have hypertension, and about two-thirds of these are uncontrolled. Appendix 7.19 provides details on hypertension status by race and age.

In the 1989 NHIS, among persons with NIDDM age ≥ 18 years who reported having physician-diagnosed hypertension, 76.3% said they were taking prescribed antihypertensive medication (Figure 7.21). In addition, 86.7% reported they were restricting salt intake, 57.8% said they were engaging in physical activity or exercise, and 70.2% reported they were losing weight or controlling their weight. Only 3.4% were doing none of these antihypertensive measures. Details are provided in Appendix 7.20. Use of antihypertensive medications increased with age (51.0% at age 18-44

years versus 80.9% at age ≥ 75 years), restriction of salt increased slightly in persons age ≥ 45 years (about 87%) compared with younger ages (76.3%), whereas physical activity and weight loss or maintenance as an antihypertensive measure decreased with age (physical activity—57.0% versus 48.2%, weight loss—68.5% versus 54.7% in ages 18-44 years versus ≥ 75 years, respectively). Differences by sex were not evident. Mexican Americans were least likely to be using antihypertensive medications (63.8%) and reportedly were most likely to be losing or maintaining their weight (81.4%), compared with other race groups; non-Hispanic blacks were somewhat more likely to be restricting salt intake (91.1%).

SERUM LIPOPROTEINS

Mean values from NHANES II and HHANES for total cholesterol, LDL cholesterol, HDL cholesterol, and fasting triglycerides are presented in Appendices 7.21-7.28. At age 20-74 years, mean total cholesterol concentration is higher in persons with NIDDM (232 mg/dl) and IGT (228 mg/dl), compared with persons with normal glucose tolerance (208 mg/dl); the difference is most striking in persons age 20-44 years (Appendices 7.21 and 7.25). Mean total cholesterol is higher in persons age 45-74 years (231-238 mg/dl) than in younger ages (195-213 mg/dl) regardless of diabetes status, is higher in women with NIDDM (238 mg/dl) than in men with NIDDM (223 mg/dl), and is

highest in non-Hispanic whites (236 mg/dl) and Puerto Ricans (227 mg/dl) with NIDDM compared with other race/ethnic groups (214-220 mg/dl).

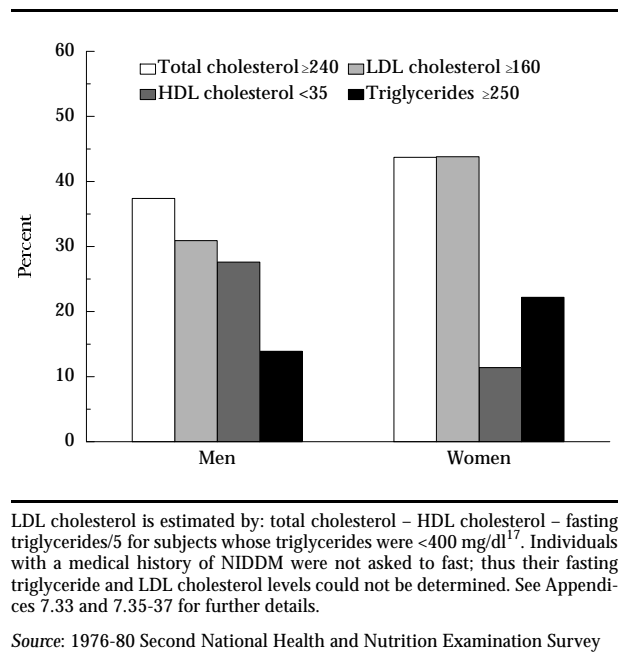
Mean LDL cholesterol concentrations show similar trends as total cholesterol by diabetes status and age (Appendices 7.22 and 7.26). At age 20-74 years, mean LDL cholesterol is 151 mg/dl in NIDDM and 135 mg/dl in persons with normal glucose tolerance. Mean LDL cholesterol is also higher in women with NIDDM (158 mg/dl) than in men with NIDDM (141 mg/dl) but is somewhat higher in men (139 mg/dl) than women (131 mg/dl) with normal glucose tolerance. Non-Hispanic whites and Puerto Ricans with NIDDM have higher mean LDL cholesterol (157-161 mg/dl) compared with other race/ethnic groups (125-140 mg/dl).

Mean HDL cholesterol concentration is somewhat lower in persons with NIDDM (46 mg/dl), intermediate in persons with IGT (48 mg/dl), and highest in persons with normal glucose tolerance (50 mg/dl), regardless of age, sex, or race/ethnicity (Appendices 7.23 and 7.27). Mean HDL cholesterol increases slightly with age, is substantially higher in women (49-55 mg/dl) than in men (42-45 mg/dl), and is higher in non-Hispanic blacks (48-55 mg/dl) compared with other race/ethnic groups (41-50 mg/dl).

Mean fasting triglyceride concentration is highest in persons with NIDDM (180 mg/dl), intermediate in persons with IGT (156 mg/dl), and lowest in persons with normal glucose tolerance (116 mg/dl) (Appendices 7.24 and 7.28). Mean triglycerides tend to increase with age and are lower in non-Hispanic blacks than in other race/ethnic groups. Data on mean lipid concentrations in persons with NIDDM in community-based studies are presented in the section below titled "Comparison of National and Community-Based Study Data."

The prevalence of abnormal lipid concentrations for men and women age 20-74 years with NIDDM, based on the NHANES II, is shown in Figure 7.22. Abnormal concentrations are defined according to the National Cholesterol Education Program (NCEP)¹⁸. Prevalence of total cholesterol ≥ 240 mg/dl is 37.4% for men with NIDDM and 43.7% for women; for the other three lipids, the respective rates in diabetic men and women are 30.9% and 43.8% for LDL cholesterol ≥ 160 mg/dl, 27.6% and 11.4% for HDL cholesterol < 35 mg/dl, and 13.9% and 22.2% for fasting triglycerides ≥ 250 mg/dl. Detailed data on dyslipidemia by age, sex, race/ethnicity, and diabetes status are shown in Appendices 7.29-7.37. Data on abnormal concentrations of lipids in persons with NIDDM in community-based studies are

Figure 7.22
Percent with Abnormal Lipid Concentrations (mg/dl) in Persons with NIDDM Age 20-74 Years, U.S., 1976-80

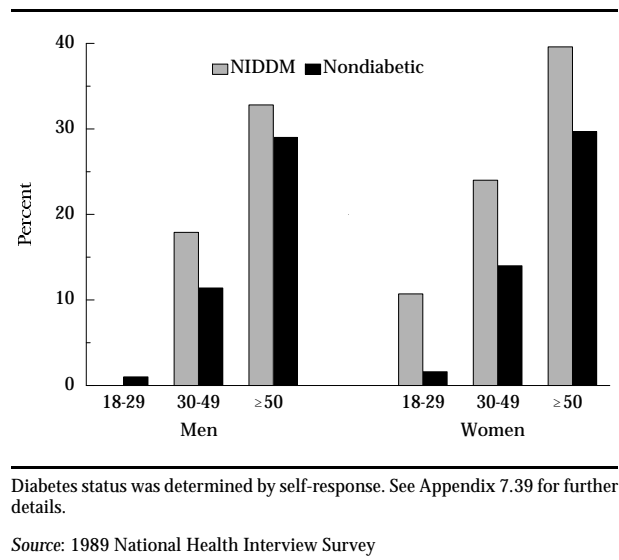


presented in the section below titled "Comparison of National and Community-Based Study Data."

PARITY

Parity is contrasted by age, sex, and diabetes status in Figure 7.23 based on the 1989 NHIS. Persons with

Figure 7.23
Percent of Persons with ≥ 4 Children, by Age (Years), Sex, and Diabetes Status, U.S., 1989



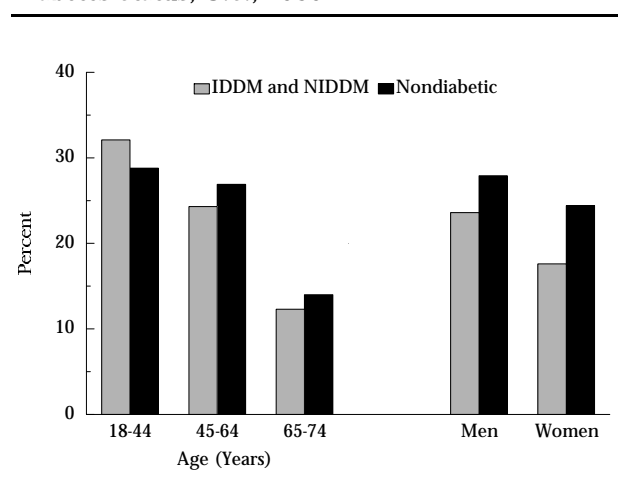
NIDDM report a higher frequency of ≥ 4 children than nondiabetic persons in every age and sex group. For example, in women age ≥ 50 years, 39.6% of NIDDM and 29.7% of nondiabetic persons have ≥ 4 children. Women with NIDDM report a higher frequency of ≥ 4 children than men (36.6% versus 17.9% at age ≥ 18 years). In both men and women with NIDDM, a higher percent of Mexican Americans report having ≥ 4 children (50.0%-67.8%), followed by non-Hispanic blacks (43.3%-49.1%) and whites (28.9%-34.3%) (Appendix 7.38). Further detail is given in Appendix 7.39.

Appendix 7.40 presents data on parity among women from the 1976-80 NHANES II. In these data, parity was also higher in women with NIDDM than in nondiabetic women, the mean number of children being 3.3 in women with a medical history of NIDDM, 3.6 in undiagnosed NIDDM, and 2.2 in women with normal glucose tolerance. Among non-Hispanic whites, the mean number of children was higher in women with IGT (2.8) than in women with normal glucose tolerance (2.2). The mean number of children was the same in 1976-80 and 1989 (Appendices 7.39-7.40) in women with a medical history of NIDDM (3.3) but decreased slightly in 1989 in nondiabetic women (2.2 to 2.0). Women with a medical history of NIDDM reported a higher mean number of babies ≥ 9 pounds at birth (0.8), followed by women with undiagnosed NIDDM (0.5), and by women with normal glucose tolerance (0.3). Among non-Hispanic whites, the mean number of babies ≥ 9 lbs. at birth was higher in IGT (0.4) than in women with normal glucose tolerance (0.3).

SMOKING

Except at age 18-44 years, a slightly higher percent of nondiabetic persons currently smoke than do diabetic persons (overall, 20.1% versus 26.1%) (Figure 7.24). The percent who smoke decreases with age (e.g., in persons with diabetes, 32.1% at age 18-44 years versus 12.3% at age ≥ 65 years) and is higher in men than in women (e.g., in diabetic persons, 23.6% versus 17.6%). Detailed data by age, sex, and race are presented in Appendix 7.41. The higher rate in men than in women is particularly prominent among non-Hispanic blacks with diabetes (34.5% versus 15.4%). Prevalence of smoking is similar by race. Among persons age 18-49 years, the prevalence of smoking is higher in NIDDM than IDDM, particularly among men (38.4% versus 29.2%) (Appendix 7.42).

Figure 7.24
Percent of Persons Age ≥ 18 Years Who Smoke, by Diabetes Status, U.S., 1989



Diabetes status was determined by self-response. See Appendix 7.41 for further details.

Source: 1989 National Health Interview Survey

ALCOHOL

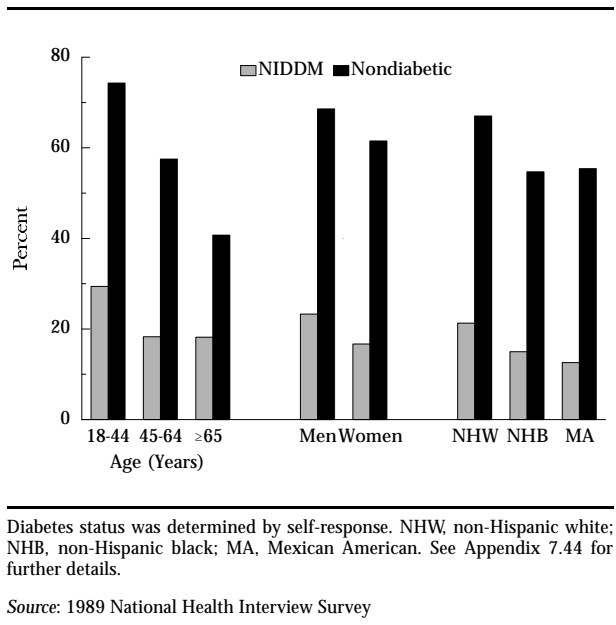
Self-reported information on alcohol intake was obtained in the 1976-80 NHANES II and 1982-84 HHANES. The percent drinking any alcohol was higher in nondiabetic (67.2% overall) than diabetic persons (46.6%), regardless of age, sex, or race (Appendix 7.43). The percent drinking alcohol decreased with age, particularly in nondiabetic persons (e.g., 72.3% at age 20-44 years versus 52.0% at age 65-74 years), was higher in men than in women (e.g., in diabetic persons, 63.8% versus 34.7%), and was somewhat lower in Mexican Americans compared with non-Hispanic whites and blacks (e.g., in diabetic persons, 36.0% versus 46.2% versus 38.9%, respectively).

HEALTH STATUS

Participants in the 1989 NHIS provided a self-assessment regarding overall health status when queried by interview; these data are shown in Figure 7.25 and Appendix 7.44 according to diabetes status. A substantially lower percent of persons with NIDDM reported excellent or very good health status compared with nondiabetic persons. At age ≥ 18 years, whereas 64.9% of nondiabetic persons reported excellent or very good health status, only 19.5% of persons with NIDDM reported this. Among persons with IDDM, 38.7% considered themselves in excellent or very good health. Excellent or very good health status

COMPARISON OF NATIONAL AND COMMUNITY-BASED STUDY DATA

Figure 7.25
Percent of Persons Age ≥18 Years Who Report Excellent or Very Good Health, by Diabetes Status, U.S., 1989



declined with age (e.g., in NIDDM, 29.4% at age 18-44 years versus 18.2% at age ≥65 years), was higher in men than in women (e.g., in NIDDM, 23.3% versus 16.7%), and was higher in non-Hispanic whites (21.3% in NIDDM) than in blacks (15.0% in NIDDM) and Mexican Americans (12.6% in NIDDM).

Various physical and metabolic characteristics of persons with NIDDM in national and community-based data are compared in Appendices 7.46-7.48. Mean fasting and 2-hour plasma glucose in persons with previously diagnosed diabetes have been described in the section titled "Blood Glucose." Among previously diagnosed persons with diabetes, mean fasting insulin is highest in white men in Rancho Bernardo, CA (35 μu/ml) and lowest in Japanese-American men in Seattle, WA (15.0 μu/ml). Except for whites in Rancho Bernardo, mean 2-hour insulin levels in persons with previously diagnosed diabetes are consistently higher in women (73.6-116.7 μu/ml) than in men (49.2-87.6 μu/ml). Duration of diabetes is longest in Native Americans in Arizona (13-14 years).

Among persons newly discovered to have diabetes by an OGTT, no trends by race/ethnicity or sex in mean fasting and 2-hour plasma glucose are evident. Mean fasting insulin tends to be highest in Native American groups. Mean 2-hour insulin data were unavailable for Native Americans but were highest in Japanese Americans compared with the other race/ethnic groups.

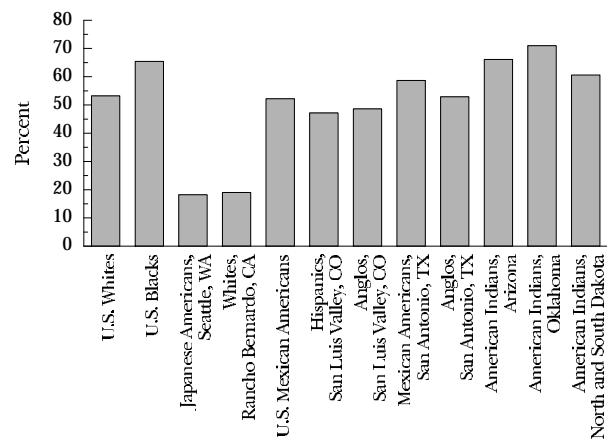
A parental history of diabetes in persons with NIDDM is reported much more frequently in Japanese Americans (57.1%-81.8%), Arizona Native Americans (62.3%-63.1%), and Oklahoma Native American women (61.7%), compared with other race/ethnic groups (20.2%-52.2%). Data on family history were unavailable in Mexican Americans in the HHANES and in San Antonio, TX.

PHYSICAL ACTIVITY

A special questionnaire on Health Promotion and Disease Prevention was administered to participants of the 1990 NHIS. The questionnaire was used to obtain information on self-reported leisure-time physical activity patterns in a representative sample of the U.S. population¹⁹. Persons with diabetes were less likely to have participated in physical activity than nondiabetic persons, particularly in regular exercise (Appendix 7.45). For example, the participation rate in regular exercise was significantly lower in diabetic than in nondiabetic persons at age ≥45 years (28.8 versus 35.5 at age 45-64 years, 26.1 versus 33.1 at age ≥65 years), among women (28.1 versus 38.2), and among whites (35.2 versus 41.8).

Except among Japanese Americans and whites in Rancho Bernardo, CA, mean BMI among persons with NIDDM is higher in women (30.4-33.7) than in men (26.9-32.7), and is highest in Native Americans (30.7-33.7) compared with other race/ethnic groups (24.8-32.1). Figure 7.26, which shows the percent of women with NIDDM who have BMI ≥30, concurs with the trends by race/ethnicity and sex: fully 60%-71% of Native American groups have this level of obesity. In addition, 65.4% of black women have this level of obesity. Among women, the percent obese is lowest in Japanese Americans (18.2%) and whites in Rancho Bernardo (19.0%). Except among whites in Rancho Bernardo, the percent with BMI ≥30 is higher in women than in men. Based on subscapular-to-triceps skinfold and waist-to-hip ratios, a more central obesity is evident in men than in women except in Native American groups (Appendices 7.46-7.48).

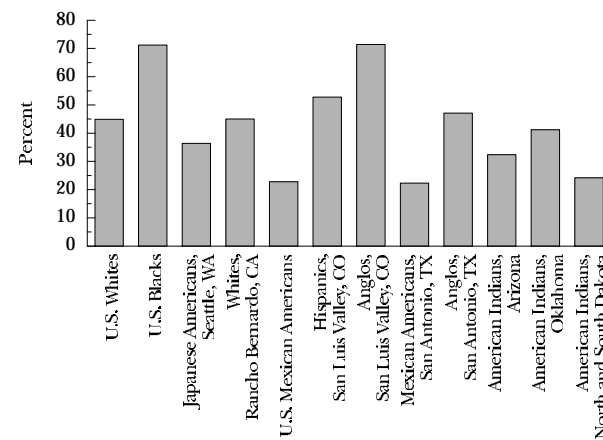
Figure 7.26
Percent with BMI ≥ 30 in Women with NIDDM in U.S. and Community-Based Studies



BMI, body mass index. See Appendices 7.46-7.48 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14

Figure 7.27
Percent with Hypertension in Women with NIDDM in U.S. and Community-Based Studies



Hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication. See Appendices 7.46-7.48 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14

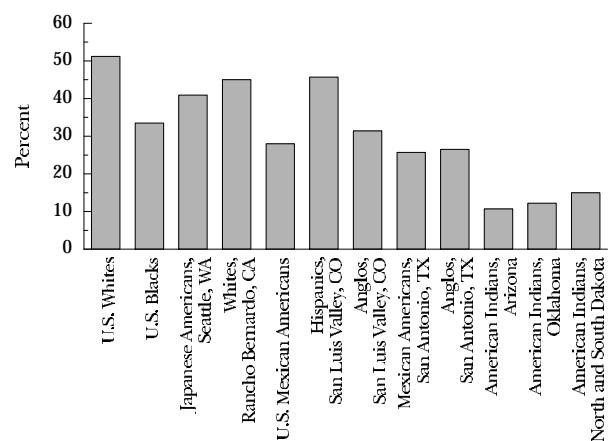
Mean blood pressure tends to be higher in men than in women with NIDDM, especially diastolic blood pressure (Appendices 7.46-7.48). Mean systolic blood pressure is highest in whites in Rancho Bernardo, CA (142-146 mmHg) and lowest in Dakota Indians (122.8-127.5 mmHg), whereas diastolic blood pressure is highest in blacks (88.9-89.0 mmHg) and lowest in Mexican Americans and Anglos in San Antonio, TX (71.9-77.6 mmHg). The prevalence of hypertension in NIDDM, defined as blood pressure $\geq 160/95$ mmHg or use of antihypertensive medication, is highest in black women (71.2%) and Anglo women in San Luis Valley, CO (71.4%) (Figure 7.27). Prevalence is lowest in black men (29.5%), in Mexican Americans in HHANES (22.8%-25.0%) and San Antonio (22.3%-25.8%), and in the Dakota Indians (24.2%-25.6%).

Mean total cholesterol concentrations are higher in women with NIDDM (184.1-246.9 mg/dl) than in men (181.1-226.9 mg/dl) (Appendices 7.46-7.48). Mean total cholesterol is highest in white women in NHANES II (246.9 mg/dl), in Rancho Bernardo, CA (235 mg/dl), and in Hispanic women in San Luis Valley, CO (244.3 mg/dl); it is lowest in Arizona (181.1-184.1 mg/dl) and Oklahoma (190.7-197.2 mg/dl) Native Americans. A trend by sex in mean LDL cholesterol concentration is not evident. Mean LDL cholesterol is highest in white women in the 1976-80 NHANES II (162.4 mg/dl) and lowest in Native Americans (100.4-118.7 mg/dl), particularly in Arizona (100.4-105.6 mg/dl). Women with NIDDM have higher mean HDL cholesterol concentrations (43.6-

63 mg/dl) than do men (37.8-55.4 mg/dl). Mean HDL cholesterol is particularly high in Japanese-American women (60.6 mg/dl) and in white women in Rancho Bernardo (63 mg/dl); mean concentrations are much more similar in all other race/ethnicity and sex groups. Mean fasting triglyceride concentrations are highest in Hispanic women in San Luis Valley (268.9 mg/dl) and in Anglo men in San Antonio, TX (276.6 mg/dl) and lowest in Japanese-American women (125.1 mg/dl) and black men (131 mg/dl); no trend by sex is evident.

Appendices 7.46-7.48 also provide information on the percent of persons with NIDDM having abnormal serum lipoprotein concentrations based on NCEP criteria¹⁸. These data for women are illustrated in Figure 7.28 and Appendices 7.49-7.51. The percent with total cholesterol ≥ 240 mg/dl and LDL cholesterol ≥ 160 mg/dl is higher in women than men (total: 10.7%-51.2% versus 5.4%-44.3%; LDL: 5.9%-49.9% versus 2.8%-34.3%), whereas the percent with HDL cholesterol < 35 mg/dl is higher in men than women (16%-53.1% versus 0%-25.7%); the percent with fasting triglycerides ≥ 250 mg/dl is not consistently different by sex. Among women with NIDDM, the percent with abnormal concentrations of total cholesterol (Figure 7.28) is highest both in whites in NHANES II (51.2%) and in Rancho Bernardo, CA (45%) and lowest in Native American groups (5.4%-16.9%). The percent of women with abnormal concentrations of LDL cholesterol (Appendix 7.49) is also different by race/eth-

Figure 7.28
Percent with Total Cholesterol ≥ 240 mg/dl in Women with NIDDM in U.S. and Community-Based Studies



See Appendices 7.46-7.48 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14

nicity, being highest in NHANES II whites (49.9%) and lowest in Native Americans (2.8%-9.6%). Among women, Anglos in San Luis Valley, CO are most likely to have abnormal HDL cholesterol concentrations (25.7%) (Appendix 7.50). However, this is not replicated in whites in other studies; indeed, the percent of women with abnormal HDL concentration is lowest among whites in Rancho Bernardo (1%) and among Japanese Americans (0%). The percent of women with abnormal triglyceride concentrations (Appendix 7.51) is highest in Anglos in San Luis Valley (37.1%) and lowest in Japanese Americans (4.5%) and Mexican Americans in HHANES (6.7%). Similar trends by race/ethnicity in abnormal lipid concentrations are found for men (Appendices 7.46-7.48).

Dr. Catherine C. Cowie is Senior Epidemiologist, Social and Scientific Systems, Bethesda, MD, and Dr. Maureen I. Harris is Director, National Diabetes Data Group, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, MD.

REFERENCES

1. National Center for Health Statistics: Plan and operation of the Second National Health Interview Survey 1976-80. In *Vital and Health Statistics*. Washington, DC, U.S. Govt. Printing Office, Ser. 1, no. 15, DHHS publ. no. PHS 81-1317, 1981
2. Harris MI, Hadden WC, Knowler WC, Bennett PH: Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in U.S. population aged 20-74 yr. *Diabetes* 36:523-34, 1987
3. Harris MI: Impaired glucose tolerance in the U.S. population. *Diabetes Care* 12:464-74, 1989
4. Forthofer RN: Investigation of nonresponse bias in NHANES II. *Am J Epidemiol* 117:507-15, 1983
5. National Diabetes Data Group: Classification and diagnosis of diabetes mellitus and other categories of glucose intolerance. *Diabetes* 28:1039-57, 1979
6. Gunter EW, Turner WE, Neese JW, Bayse DD: *Laboratory Procedures Used by the Clinical Chemistry Division, Centers for Disease Control, for the Second National Health and Nutrition Examination Survey (NHANES II), 1976-80*. Atlanta, GA, Centers for Disease Control and Prevention, 1981
7. Harris MI, Hadden WC, Knowler WC, Bennett PH: International criteria for the diagnosis of diabetes and impaired glucose tolerance. *Diabetes Care* 8:562-67, 1985
8. World Health Organization: *Expert Committee on Diabetes Mellitus, Second Report*. Geneva, Switzerland, World Health Organization, 1980. (Technical Report Series 646)
9. National Center for Health Statistics: Plan and operation of the Hispanic Health and Nutrition Examination Survey, 1982-84. In *Vital and Health Statistics*. Washington, DC, U.S. Govt. Printing Office, Ser. 1, no. 19, DHHS publ. no. PHS 85-1321, 1985
10. Barrett-Connor E: Personal communication from the Rancho Bernardo, CA Diabetes Study
11. Fujimoto WY: Personal communication from the Seattle, WA Japanese-American Study of Diabetes
12. Hamman RF: Personal communication from the San Luis Valley, CO Diabetes Study
13. Stern MP: Personal communication from the San Antonio, TX Heart Study
14. Lee ET: Personal communication from the Strong Heart Study of Native Americans in Oklahoma, Arizona, North Dakota, and South Dakota
15. Kuczumarski RJ, Flegal KM, Campbell SM, Johnson CL: Increasing prevalence of overweight among U.S. adults. The National Health and Nutrition Examination Surveys, 1960 to 1991. *JAMA* 272:205-11, 1994
16. National Heart, Lung, and Blood Institute: *The Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure*. Bethesda, MD, National Institutes of Health, 1993, NIH publ. no. 93-1088, 1993
17. Friedewald WT, Levy RI, Fredrickson DS: Estimation of the concentration of low density lipoprotein cholesterol in plasma without use of the preparative ultracentrifuge. *Clin Chem* 18:499-502, 1972
18. National Cholesterol Education Program: Summary of the Second Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel II). *JAMA* 269:3015-23, 1993
19. Ford ES, Herman WH: Leisure-time physical activity patterns in the U.S. diabetic population. Findings from the 1990 National Health Interview Survey Health Promotion and Disease Prevention Supplement. *Diabetes Care* 18:27-33, 1995

APPENDICES

Appendix 7.1

Means and Percentiles of Fasting Plasma Glucose (mg/dl) in Persons Age 20-74 Years Without a Medical History of Diabetes, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Mean	Percentiles						
		5th	10th	25th	50th	75th	90th	95th
All ages	93	78	81	85	91	97	105	112
20-44	90	77	80	84	88	95	100	105
45-64	97	81	84	89	94	101	110	119
65-74	98	82	85	90	94	102	112	125
Men	95	81	84	88	93	99	106	112
20-44	92	80	83	87	91	97	102	106
45-64	98	82	85	90	95	103	112	117
65-74	100	84	87	91	96	103	116	129
Women	91	77	79	83	89	95	103	111
20-44	87	76	78	82	86	91	97	102
45-64	96	81	83	87	93	99	108	120
65-74	97	81	84	88	94	101	112	122
Non-Hispanic whites	93	79	81	85	91	97	105	112
20-44	89	78	80	84	88	94	100	104
45-64	97	81	84	88	94	101	110	118
65-74	98	82	84	90	94	102	112	123
Non-Hispanic white men	95	81	84	88	93	98	106	113
20-44	92	80	83	87	91	96	102	105
45-64	98	83	85	90	95	103	112	119
65-74	100	83	88	91	96	103	115	125
Non-Hispanic white women	91	77	80	84	89	95	104	111
20-44	87	76	78	82	86	92	97	101
45-64	96	80	83	87	93	99	108	118
65-74	97	81	83	88	94	101	111	121
Non-Hispanic blacks	93	77	79	84	90	98	107	117
20-44	90	76	78	83	88	95	105	110
45-64	97	81	82	89	94	102	109	128
65-74	98	84	87	88	95	103	112	127
Non-Hispanic black men	95	78	82	88	93	100	108	111
20-44	94	78	79	87	92	99	108	117
45-64	96	77	82	89	96	102	108	109
65-74	98	85	86	90	96	101	104	153
Non-Hispanic black women	91	74	78	83	88	95	105	127
20-44	87	69	76	81	84	90	97	102
45-64	99	81	82	89	94	102	128	137
65-74	97	77	87	88	91	105	118	126
Mexican Americans	93	78	81	86	91	97	105	113
20-44	91	78	80	85	90	95	101	104
45-64	100	82	85	90	96	105	118	136
65-74	98	80	84	92	97	100	118	122
Mexican-American men	96	82	84	88	93	99	107	115
20-44	93	82	83	88	92	96	102	107
45-64	104	83	86	93	99	109	125	140
65-74	98	84	88	92	96	100	109	126
Mexican-American women	90	77	79	84	89	95	102	108
20-44	88	76	78	83	87	92	98	102
45-64	97	82	84	88	93	102	113	123
65-74	98	80	84	93	98	100	118	122

Appendix 7.1—Continued next page

Appendix 7.1—Continued

Race, sex, and age (years)	Mean	Percentiles						
		5th	10th	25th	50th	75th	90th	95th
Cuban Americans	98	83	86	90	95	102	110	122
20-44	93	82	85	87	93	99	103	106
45-64	103	85	88	92	97	105	122	137
65-74	107	91	92	94	103	106	137	157
Cuban-American men	103	85	88	92	98	105	122	137
20-44	95	85	86	90	93	100	103	110
45-64	111	90	91	96	102	114	137	169
65-74								
Cuban-American women	94	82	85	88	93	98	104	108
20-44	92	81	83	86	92	96	102	105
45-64	95	83	85	90	94	98	104	115
65-74	98	88	91	92	98	104	108	114
Puerto Ricans	95	79	81	88	94	100	108	115
20-44	92	79	80	85	92	97	103	107
45-64	102	84	88	92	99	108	118	130
65-74	100	83	84	91	97	104	109	133
Puerto Rican men	98	80	82	92	97	104	113	115
20-44	95	80	82	89	96	102	105	112
45-64	108	90	94	98	107	114	130	157
65-74								
Puerto Rican women	92	79	80	85	91	97	104	114
20-44	90	78	79	84	90	95	101	105
45-64	98	82	84	90	96	104	115	119
65-74								

In cells with no entry, the value is unreliable due to small sample size. Values are measured in the morning after an overnight 10-16 hour fast.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.2

Means and Percentiles of 2-Hour Plasma Glucose (mg/dl) in Persons Age 20-74 Years Without a Medical History of Diabetes, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Mean	Percentiles						
		5th	10th	25th	50th	75th	90th	95th
All ages	109	64	72	85	101	122	154	178
20-44	100	63	70	81	96	113	132	151
45-64	119	66	75	90	108	134	169	208
65-74	134	72	80	97	122	154	199	239
Men	107	62	69	84	99	120	149	172
20-44	97	60	67	81	94	111	125	144
45-64	116	62	71	88	107	132	165	191
65-74	134	72	79	96	120	153	206	242
Women	112	68	74	86	103	125	158	184
20-44	102	66	72	82	98	115	136	155
45-64	122	70	79	91	109	135	177	222
65-74	133	72	80	99	124	154	196	231
Non-Hispanic whites	108	63	71	84	100	120	153	177
20-44	98	63	69	81	95	110	127	146
45-64	118	65	74	89	107	132	169	206
65-74	132	70	79	95	120	152	195	232
Non-Hispanic white men	106	62	68	82	99	119	148	170
20-44	96	60	67	79	94	108	123	139
45-64	115	62	69	87	106	131	165	188
65-74	133	70	78	94	117	151	195	256

Appendix 7.2—Continued next page

Appendix 7.2—Continued

Race, sex, and age (years)	Mean	Percentiles						
		5th	10th	25th	50th	75th	90th	95th
Non-Hispanic white women	111	68	73	86	102	122	158	185
20-44	100	65	71	82	96	112	132	151
45-64	120	69	76	91	107	134	174	222
65-74	132	71	80	97	122	153	194	230
Non-Hispanic blacks	112	68	74	87	105	128	155	178
20-44	102	59	71	82	94	116	147	155
45-64	126	74	81	95	115	149	178	214
65-74	138	76	96	106	123	148	239	243
Non-Hispanic black men	108	59	71	84	101	123	151	175
20-44	95	54	68	83	91	108	127	141
45-64	123	74	78	99	116	149	166	213
65-74	140	76	98	106	127	155	242	242
Non-Hispanic black women	116	73	76	87	107	131	160	178
20-44	108	67	74	82	98	128	155	155
45-64	129	79	83	95	115	147	178	230
65-74	136	85	94	106	114	139	234	257
Mexican Americans	114	66	74	88	106	127	157	182
20-44	107	65	73	86	102	120	143	160
45-64	132	71	80	96	121	152	199	256
65-74	138	75	80	109	128	157	209	236
Mexican-American men	110	60	69	83	102	123	153	182
20-44	104	60	67	82	100	114	142	162
45-64	132	64	77	94	121	152	196	272
65-74	124	75	76	94	117	142	182	192
Mexican-American women	117	73	80	93	110	130	160	184
20-44	111	73	79	91	107	124	144	160
45-64	132	73	85	97	119	156	199	237
65-74	150	93	104	120	141	177	236	236
Cuban Americans	118	65	74	92	108	129	160	214
20-44	103	61	69	86	106	118	131	144
45-64	129	71	78	99	114	136	191	272
65-74	156	85	85	93	111	212	256	400
Cuban-American men	120	53	65	79	104	130	212	272
20-44	96	50	53	71	101	112	136	144
45-64	137	64	68	81	109	150	272	368
65-74								
Cuban-American women	116	76	84	99	111	129	150	169
20-44	108	74	78	94	107	118	129	150
45-64	122	86	96	102	119	132	160	178
65-74	134	84	94	100	111	155	171	256
Puerto Ricans	114	70	78	90	105	124	160	187
20-44	106	70	78	88	103	117	133	165
45-64	138	64	83	100	122	160	222	256
65-74	139	74	91	104	132	151	194	304
Puerto Rican men	118	60	71	93	108	125	168	218
20-44	108	60	71	93	108	117	139	168
45-64	148	57	61	95	124	172	256	336
65-74								
Puerto Rican women	112	76	81	90	104	122	159	172
20-44	105	74	80	88	102	114	127	159
45-64	132	83	91	101	120	158	173	217
65-74								

In cells with no entry, the value is unreliable due to small sample size. Values are measured at 2 hours after a 75-g oral glucose challenge in the morning after an overnight 10-16 hour fast.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.3

Mean Fasting and 2-Hour Plasma Glucose in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Fasting plasma glucose (mg/dl)			2-hour plasma glucose (mg/dl)		
	Undiagnosed NIDDM	IGT	Normal	Undiagnosed NIDDM	IGT	Normal
All ages	132	98	91	262	161	97
20-44	139	93	89	268	157	94
45-64	133	101	93	263	162	100
65-74	126	99	93	256	163	103
Men	131	100	93	261	160	95
Women	133	96	88	262	161	98
Non-Hispanic whites	133	99	91	264	162	96
Non-Hispanic blacks	128	93	91	253	157	97
Mexican Americans	136	98	90	260	159	99
Cuban Americans	141	105	94	280	158	100
Puerto Ricans	127	98	92	258	163	101

IGT, impaired glucose tolerance. Fasting values are measured in the morning after an overnight 10-16 hour fast. Values at 2 hours are measured after a 75-g oral glucose challenge. Diabetes status is based on World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.4

Percent of Diabetic Persons Age ≥18 Years Who Report Having Urine Glucose in Past 6 Months, U.S., 1989

Race, sex, age (years), and type of diabetes	Always/most of the time	Sometimes	Rarely/never	Not tested/don't know
IDDM	14.2	26.3	13.7	45.9
18-39	17.4	24.1	12.9	45.6
≥40	3.6	33.5	16.3	46.6
Men	14.0	26.7	11.8	47.6
Women	14.4	26.0	15.9	43.7
NIDDM	17.7	19.7	26.4	36.2
18-44	27.1	18.5	22.2	32.3
45-64	20.3	18.1	25.6	36.0
≥65	13.3	21.4	28.1	37.2
Men	19.5	19.7	25.9	34.9
Women	16.5	19.7	26.8	37.0
Non-Hispanic whites	16.8	17.0	26.2	39.9
Non-Hispanic blacks	17.7	26.3	31.0	25.0
Mexican Americans	23.5	20.9	22.1	33.5

Data are self-reported and based on self-testing and testing by physicians or others. Not tested/don't know includes persons who were not tested, persons who did not know whether they were tested, and persons who were tested but did not know the test results.

Source: 1989 National Health Interview Survey

Appendix 7.5

Percent of Diabetic Persons Age ≥18 Years Who Report Having High Blood Glucose in Past 6 Months, U.S., 1989

Race, sex, age (years), and type of diabetes	Always/most of the time	Sometimes	Rarely/never	Not tested/don't know
IDDM	15.6	44.8	29.4	10.1
18-39	15.6	47.9	29.9	6.6
≥40	15.8	36.3	28.1	19.9
Men	14.2	41.0	31.1	13.7
Women	17.2	49.0	27.7	6.2
NIDDM	22.1	28.4	33.9	15.6
18-44	27.3	35.5	23.5	13.8
45-64	24.0	28.0	34.0	14.1
≥65	19.1	26.9	36.5	17.5
Men	20.4	28.4	34.9	16.3
Women	23.3	28.4	33.2	15.2
Non-Hispanic whites	22.6	27.3	34.9	15.3
Non-Hispanic blacks	17.4	29.4	35.7	17.5
Mexican Americans	22.0	30.2	28.3	19.4

Data are self-reported and based on self-testing and testing by physicians or others. Not tested/don't know includes persons who were not tested, persons who did not know whether they were tested, and persons who were tested but did not know the test results.

Source: 1989 National Health Interview Survey

Appendix 7.6

Percent of Diabetic Persons Age ≥18 Years Who Report Having Urine Ketones in Past 6 Months, U.S., 1989

Race, sex, age (years), and type of diabetes	Positive ketones	Negative ketones	Tested but don't know results	Urine not tested	Don't know if tested
IDDM	11.4	29.0	3.1	48.5	8.1
18-39	11.2	32.2	1.9	49.7	5.0
≥40	11.9	19.2	6.7	44.9	17.4
Men	9.7	29.6	4.0	48.7	8.0
Women	13.3	28.3	2.0	48.3	8.1
NIDDM	4.9	9.9	3.4	54.1	27.8
18-44	13.6	17.3	1.7	52.3	15.2
45-64	5.7	11.3	3.4	52.8	26.8
≥65	2.1	6.8	3.8	55.6	31.7
Men	4.4	10.0	3.1	54.4	28.2
Women	5.3	9.8	3.6	53.8	27.5
Non-Hispanic whites	4.8	11.3	4.1	54.5	25.3
Non-Hispanic blacks	6.1	6.1	1.7	51.2	34.9
Mexican Americans	4.3	4.7	1.9	56.7	32.4

Data are self-reported and based on self-testing and testing by physicians or others.

Source: 1989 National Health Interview Survey

Appendix 7.7

Percent of Persons Age 20-74 Years with a Family History of Diabetes, by Diabetes Status, U.S., 1976-80

Race, sex, age (years), and diabetes status	Father only	Mother only	Both parents	Either parent	Neither parent	Any sibling
All persons	7.4	10.5	0.7	18.9	81.1	9.5
Age 20-54	8.2	9.9	0.8	19.2	80.8	6.5
Medical history of NIDDM	20.0	21.8	2.5	46.6	53.5	35.8
Undiagnosed NIDDM	13.7	11.0	0.0	24.7	75.4	15.0
IGT	6.1	22.0	1.5	30.1	69.9	10.1
Normal glucose tolerance	8.1	8.5	0.6	17.6	82.4	5.5
Age 55-74	5.0	12.3	0.5	18.0	82.0	17.7
Medical history of NIDDM	8.5	18.8	2.8	31.1	68.9	39.2
Undiagnosed NIDDM	4.5	21.4	0.4	26.3	73.7	26.1
IGT	3.3	15.4	0.9	19.6	80.4	17.9
Normal glucose tolerance	5.2	9.6	0.1	15.2	84.8	14.3
Men	7.2	9.5	0.7	17.5	82.5	8.9
Age 20-54	7.8	8.6	0.7	17.2	82.9	5.8
Medical history of NIDDM	15.8	21.4	2.5	41.2	58.8	36.7
Undiagnosed NIDDM	4.2	4.7	0.0	8.8	91.2	22.3
IGT	7.8	20.1	1.2	29.1	70.9	6.2
Normal glucose tolerance	7.7	7.6	0.7	16.0	84.0	5.1
Age 55-74	5.4	12.3	0.6	18.6	81.5	18.0
Medical history of NIDDM	8.4	13.9	3.7	26.9	73.1	35.4
Undiagnosed NIDDM	6.3	17.4	0.9	24.5	75.5	24.7
IGT	5.1	16.5	0.9	22.5	77.5	18.6
Normal glucose tolerance	5.1	10.4	0.2	16.0	84.0	15.5
Women	7.6	11.4	0.7	20.2	79.8	10.0
Age 20-54	8.6	11.1	0.8	21.2	78.8	7.2
Medical history of NIDDM	22.9	22.1	2.6	50.2	49.8	35.3
Undiagnosed NIDDM	20.6	15.5	0.0	36.0	64.0	9.9
IGT	5.1	23.3	1.8	30.7	69.3	12.5
Normal glucose tolerance	8.5	9.4	0.6	19.2	80.8	5.8
Age 55-74	4.8	12.3	0.4	17.6	82.4	17.5
Medical history of NIDDM	8.6	22.4	2.2	34.1	65.9	42.0
Undiagnosed NIDDM	3.4	24.0	0.0	27.4	72.6	26.9
IGT	1.7	14.5	0.9	17.0	83.0	17.3
Normal glucose tolerance	5.3	9.0	0.1	14.5	85.5	13.2
Non-Hispanic whites	7.4	10.3	0.6	18.6	81.4	8.9
Age 20-54	8.1	9.4	0.7	18.5	81.5	5.7
Medical history of NIDDM	23.6	23.4	0.0	49.1	50.9	32.1
Undiagnosed NIDDM	19.4	6.5	0.0	25.9	74.1	5.7
IGT	6.3	22.0	2.2	30.9	69.1	8.9
Normal glucose tolerance	7.9	8.2	0.6	16.9	83.1	5.0
Age 55-74	5.5	12.7	0.5	18.9	81.1	17.2
Medical history of NIDDM	7.5	19.9	3.1	31.4	68.6	38.3
Undiagnosed NIDDM	5.5	22.7	0.0	28.2	71.8	27.7
IGT	4.1	17.0	1.1	22.2	77.8	17.4
Normal glucose tolerance	5.7	9.8	0.2	15.8	84.2	13.8
Non-Hispanic blacks	5.1	10.6	1.4	18.6	81.4	12.6
Age 20-54	6.2	10.0	1.7	19.6	80.4	10.6
Medical history of NIDDM	3.1	13.2	8.1	24.4	75.6	53.9
Undiagnosed NIDDM	0.0	29.6	0.0	29.6	70.4	45.1
IGT	0.0	18.7	0.0	18.7	81.3	13.8
Normal glucose tolerance	7.5	7.9	1.8	19.3	80.7	7.7
Age 55-74	1.8	12.4	0.6	15.2	84.8	19.1
Medical history of NIDDM	10.0	16.7	2.5	31.4	68.6	43.1
Undiagnosed NIDDM	0.0	9.5	3.0	12.5	87.5	20.7
IGT	0.0	16.2	0.0	16.2	83.8	18.6
Normal glucose tolerance	1.1	11.0	0.0	12.1	87.9	13.7

IGT, impaired glucose tolerance. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey

Appendix 7.8

Percent of Persons Age ≥ 18 Years with a Parental History of Diabetes, by Diabetes Status, U.S., 1989

Race, sex, age (years), and diabetes status	Father only	Mother only	Both parents	Either parent	Neither parent	Don't know
All IDDM	9.1	3.5	1.7	16.4	83.6	2.1
18-39	7.3	4.7	2.3	16.3	83.7	1.9
≥ 40	14.1	0.0	0.0	16.7	83.3	2.7
Men	8.5	3.9	3.3	17.0	83.0	1.4
Women	9.6	3.1	0.0	15.7	84.3	2.9
All NIDDM	10.0	24.7	5.3	45.4	54.6	5.4
18-44	17.5	24.0	9.2	52.4	47.6	1.7
45-64	11.0	28.0	5.5	48.6	51.4	4.1
≥ 65	7.4	22.0	4.2	40.9	59.1	7.4
Men	8.1	23.5	4.2	41.5	58.5	5.7
Women	11.5	25.6	6.1	48.3	51.7	5.1
Non-Hispanic whites	10.8	24.2	5.1	44.7	55.3	4.6
Non-Hispanic blacks	8.1	27.2	5.2	47.9	52.1	7.4
Mexican Americans	7.4	23.9	6.7	42.5	57.5	4.6
All nondiabetic	5.9	8.2	1.0	17.3	82.7	2.1
18-44	6.0	6.8	0.9	15.5	84.5	1.7
45-64	7.1	11.3	1.6	22.2	77.8	2.3
≥ 65	3.7	8.4	0.4	16.1	83.9	3.6
Men	5.8	7.5	0.9	16.5	83.5	2.3
Women	6.1	8.8	1.1	18.0	82.0	2.0
Non-Hispanic whites	6.0	7.9	0.9	16.7	83.3	1.9
Non-Hispanic blacks	5.3	10.4	1.1	19.5	80.5	2.8
Mexican Americans	7.6	9.8	2.2	22.5	77.5	2.9

Source: 1989 National Health Interview Survey

Appendix 7.9

Mean Body Mass Index in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Medical history of NIDDM	Undiagnosed NIDDM	IGT	Normal
All ages	28.1	29.5	27.4	24.8
20-44	28.7	33.2	27.0	24.4
45-64	28.1	29.3	28.1	25.5
65-74	27.6	28.0	26.7	25.5
Men	27.2	26.9	27.3	25.2
20-44	31.1		26.4	25.1
45-64	26.7	26.8	28.6	25.6
65-74	26.9	26.9	25.5	25.1
Women	28.7	31.3	27.6	24.4
20-44	27.8		27.4	23.7
45-64	29.2	30.6	27.7	25.5
65-74	28.2	29.1	27.7	25.9
Non-Hispanic whites	27.6	29.5	27.4	24.7
20-44	26.8		27.1	24.3
45-64	27.8	29.0	27.9	25.3
65-74	27.6	28.0	26.9	25.5
Non-Hispanic white men	26.9	26.7	27.4	25.2
20-44			26.7	25.1
45-64	26.6	26.9	28.6	25.5
65-74	27.1	26.6	25.7	25.2
Non-Hispanic white women	28.2	31.3	27.4	24.2
20-44	26.5		27.3	23.5
45-64	29.0	30.0	27.2	25.1
65-74	27.9	29.3	27.8	25.8
Non-Hispanic blacks	30.4	30.0	28.9	25.7
20-44	34.9		27.5	24.8
45-64	29.8	31.9	31.2	27.8
65-74	27.8	28.3	26.3	26.4
Non-Hispanic black men	29.4		27.5	25.3
20-44				24.7
45-64	28.3		29.3	27.0
65-74	27.3		22.8	24.7
Non-Hispanic black women	31.0	31.4	29.7	26.0
20-44			27.5	24.8
45-64	30.4		32.9	28.6
65-74	28.5			27.4
Mexican Americans	29.8	29.9	28.4	25.7
20-44	31.3	31.9	28.7	25.4
45-64	30.2	29.0	28.3	27.2
65-74	26.9		26.5	26.1
Mexican-American men	28.7	29.7	28.0	25.6
20-44	31.5		28.3	25.4
45-64	28.0	28.0	27.7	26.8
65-74	27.1			24.4

Appendix 7.9—Continued next column

Appendix 7.9—Continued

Race, sex, and age (years)	Medical history of NIDDM	Undiagnosed NIDDM	IGT	Normal
Mexican-American women	30.6	30.1	28.7	25.8
20-44	31.1		29.1	25.4
45-64	31.6	30.0	28.9	27.5
65-74	26.7			28.2
Cuban Americans	26.6	29.2	29.9	25.6
20-44				25.0
45-64	26.4		30.8	26.4
65-74	26.6			25.5
Cuban-American men	27.1	29.2		25.2
20-44				25.1
45-64				25.6
65-74				23.8
Cuban-American women	26.4		31.7	25.9
20-44				25.0
45-64	25.8		33.1	27.0
65-74	26.0			26.8
Puerto Ricans	29.7	27.6	29.4	25.4
20-44	29.9			25.3
45-64	29.3	27.9	28.7	26.1
65-74	30.6			
Puerto Rican men	27.1		27.8	26.1
20-44				26.1
45-64	27.5			25.8
65-74				
Puerto Rican women	30.7		30.3	25.0
20-44	30.8			24.8
45-64	30.3		29.5	26.4
65-74	31.5			

IGT, impaired glucose tolerance. In cells with no entry, the value is unreliable due to small sample size. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.10

Mean Body Mass Index According to Duration of Diabetes in Persons with NIDDM Age 20-74 Years, U.S., 1976-80 and 1982-84

Race, sex and age (years)	Undiagnosed NIDDM	Duration of diabetes (years)			
		<2	2-4	5-14	≥15
All persons	29.5	30.2	28.6	27.7	26.1
Men	26.9	31.1	27.3	26.5	25.4
20-54	26.1		27.9	25.3	
55-74	27.4	28.8	27.0	27.3	25.9
Women	31.3	29.4	29.2	28.6	26.6
20-54	33.9	28.9	29.3	28.5	
55-74	29.8	29.9	29.0	28.6	26.6
Non-Hispanic whites	29.5	29.0	28.2	27.5	25.7
20-54	31.3	28.6	29.0	26.8	
55-74	28.6	29.3	27.7	28.0	26.1
Non-Hispanic white men	26.7	29.4	27.0	26.6	25.6
20-54				25.5	
55-74	27.2	29.0	26.8	27.4	26.2
Non-Hispanic white women	31.3	28.7	28.9	28.3	25.8
20-54	34.4		29.7	28.2	
55-74	29.6	29.5	28.3	28.4	26.1
Non-Hispanic blacks	30.0	33.8	31.7	28.6	30.0
20-54				27.6	
55-74	31.1		29.5	29.3	28.9
Non-Hispanic black men			30.5	27.4	
20-54					
55-74				27.7	
Non-Hispanic black women	31.4		32.3	29.4	30.1
20-54					
55-74	31.8			31.4	
Mexican Americans	29.9	30.3	30.8	28.9	29.7
20-54	30.6	31.7	32.7	30.4	29.9
55-74	29.0	28.3	28.8	27.9	29.5
Mexican-American men	29.7	29.6	30.5	27.3	
20-54	30.3		32.3	28.1	
55-74		28.5	28.8	26.6	
Mexican-American women	30.1	30.9	31.2	30.2	30.4
20-54		32.4	33.1	32.0	29.8
55-74	29.4	28.0	28.9	28.9	
Cuban Americans	29.2	27.6		26.1	
Puerto Ricans	27.6	30.8	28.4	29.8	29.5
20-54		29.3	28.9	31.9	
55-74			27.9	27.5	

In cells with no entry, the value is unreliable due to small sample size. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.11

Percent of Persons with NIDDM Age 20-74 Years with Obesity, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Body Mass Index		
	≥25	≥30	≥35
All ages	70.5	36.1	15.5
20-44	64.1	46.8	27.9
45-64	71.1	38.4	16.0
65-74	72.7	26.7	8.6
Men	63.3	20.9	7.4
20-44	51.3	40.9	23.3
45-64	62.0	16.9	6.3
65-74	70.0	18.9	2.7
Women	75.5	46.6	21.2
20-44	71.4	50.1	30.5
45-64	76.9	52.0	22.2
65-74	75.1	33.6	13.8
Non-Hispanic whites	69.9	35.2	15.6
20-44	67.2	46.5	29.8
45-64	69.1	37.2	16.6
65-74	72.3	27.6	8.7
Non-Hispanic white men	64.9	20.5	4.3
20-44			
45-64	63.4	16.7	5.5
65-74	70.2	20.8	2.5
Non-Hispanic white women	73.4	45.2	23.3
20-44	73.4	47.2	39.4
45-64	73.0	51.1	24.1
65-74	74.0	33.4	14.0
Non-Hispanic blacks	76.3	46.0	19.1
20-44	74.6	47.4	33.9
45-64	78.2	54.0	19.8
65-74	73.8	29.0	8.0
Non-Hispanic black men	65.1	26.4	16.8
20-44			
45-64	49.9	24.8	14.8
65-74	75.9	19.7	5.7
Non-Hispanic black women	83.7	58.8	20.6
20-44			
45-64	93.2	69.5	22.4
65-74	71.8	38.2	10.2
Mexican Americans	86.7	41.4	16.0
20-44	90.7	55.2	32.1
45-64	88.2	40.2	10.7
65-74	75.5	21.1	4.2
Mexican-American men	83.8	37.7	12.8
20-44	88.4	59.4	32.1
45-64	82.6	29.6	2.6
65-74	75.7	10.4	0.0

Appendix 7.11—Continued next column

Appendix 7.11—Continued

Race, sex, and age (years)	Body Mass Index		
	≥25	≥30	≥35
Mexican-American women	89.2	44.5	18.8
20-44	93.4	50.1	32.2
45-64	92.7	48.9	17.3
65-74	75.3	27.0	6.5
Cuban Americans	76.8	29.1	1.4
20-44			
45-64	72.3	28.5	0.0
65-74	83.5	22.0	0.0
Cuban-American men	83.3	25.0	0.0
20-44			
45-64	75.5	28.3	0.0
65-74			
Cuban-American women	64.0	37.2	4.3
20-44			
45-64	58.6	29.6	0.0
65-74	58.8	20.7	0.0
Puerto Ricans	76.9	33.7	10.8
20-44	84.1	31.7	18.2
45-64	74.6	32.7	8.9
65-74	76.6	42.0	8.5
Puerto Rican men	69.4	9.6	1.0
20-44			
45-64	70.2	11.0	1.1
65-74			
Puerto Rican women	81.8	49.6	17.3
20-44	85.6	37.5	21.6
45-64	79.6	56.9	17.7
65-74	81.9	48.6	9.9

In cells with no entry, the percent is unreliable due to small sample size. NIDDM includes both diagnosed and undiagnosed diabetes. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.12

Mean Measured and Self-Reported BMI in Persons with a Medical History of NIDDM, U.S., 1976-80, 1982-84, and 1989

Race, sex, and age (years)	Measured BMI		Self-reported BMI
	1976-80 1982-84	1976-80 1982-84	1989
All ages	28.1	27.0	28.3
20-44	28.7	27.5	29.6
45-64	28.1	27.3	29.3
65-74	27.6	26.1	27.7
≥75			25.9
Men	27.2	26.6	27.6
20-44	31.1	29.3	28.4
45-64	26.7	26.8	28.3
65-74	26.9	25.7	27.1
≥75			25.5
Women	28.7	27.2	28.9
20-44	27.8	26.9	30.4
45-64	29.2	27.7	30.3
65-74	28.2	26.5	28.2
≥75			26.1
Non-Hispanic whites	27.6	26.7	28.1
20-44	26.8	25.8	29.7
45-64	27.8	27.2	29.2
65-74	27.6	26.1	27.6
≥75			25.8
Non-Hispanic white men	26.9	26.4	27.4
20-44			27.9
45-64	26.6	26.7	28.4
65-74	27.1	25.8	26.9
≥75			25.2
Non-Hispanic white women	28.2	26.9	28.6
20-44	26.5	25.6	30.8
45-64	29.0	27.6	30.0
65-74	27.9	26.4	28.1
≥75			26.1
Non-Hispanic blacks	30.4	28.8	29.3
20-44	34.9	32.5	29.9
45-64	29.8	28.2	30.1
65-74	27.8	26.5	28.6
≥75			26.9
Non-Hispanic black men	29.4	28.6	28.1
20-44			29.4
45-64	28.3	28.4	28.0
65-74	27.3	26.5	27.7
≥75			27.1
Non-Hispanic black women	31.0	28.9	30.0
20-44			30.5
45-64	30.4	28.1	31.4
65-74	28.5	26.4	29.0
≥75			26.8

Appendix 7.12—Continued next column

Appendix 7.12—Continued

Race, sex, and age (years)	Measured BMI	Self-reported BMI	
	1976-80 1982-84	1976-80 1982-84	1989
Mexican Americans	29.8	29.1	28.1
20-44	31.3	30.9	27.7
45-64	30.2	29.1	28.8
65-74	26.9	26.8	26.5
≥75			
Mexican-American men	28.7	28.3	26.9
20-44	31.5	31.1	
45-64	28.0	27.8	26.3
65-74	27.1	26.3	27.6
≥75			
Mexican-American women	30.6	29.9	28.9
20-44	31.1	30.8	
45-64	31.6	30.2	30.5
65-74	26.7	27.5	25.7
≥75			
Cuban Americans	26.6	26.1	
20-44			
45-64	26.4	25.4	
65-74	26.6	26.7	
Cuban-American men	27.1	26.1	
Cuban-American women	26.4	26.2	
Puerto Ricans	29.7	28.3	
20-44	29.9	28.5	
45-64	29.3	28.0	
65-74	30.6	28.9	
Puerto Rican men	27.1	26.5	
Puerto Rican women	30.7	29.1	

BMI, body mass index. In cells with no entry, the value is unreliable due to small sample size. Sample from the 1976-80 Second National Health and Nutrition Examination Survey and the 1982-84 Hispanic Health and Nutrition Examination Survey includes persons age 20-74 years; sample from the 1989 National Health Interview Survey includes persons age ≥20 years. Measured BMI was calculated from measured height and weight; self-reported BMI was calculated from self-reported height and weight.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.13

Mean Subscapular-to-Triceps Skinfold Ratio in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Medical history of NIDDM	Undiagnosed NIDDM	IGT	Normal
Men	1.70	1.71	1.55	1.47
20-44	1.42		1.53	1.44
45-64	1.72	1.79	1.54	1.53
65-74	1.73	1.69	1.61	1.50
Women	1.02	0.97	0.97	0.82
20-44	0.91		0.99	0.83
45-64	1.07	1.00	0.93	0.82
65-74	0.99	0.99	0.98	0.81
Non-Hispanic white men	1.72	1.68	1.53	1.44
20-44			1.52	1.39
45-64	1.75	1.83	1.55	1.53
65-74	1.70	1.66	1.51	1.49
Non-Hispanic white women	0.95	0.96	0.93	0.79
20-44	0.85		0.93	0.78
45-64	0.98	0.99	0.90	0.80
65-74	0.95	0.98	0.98	0.81
Non-Hispanic black men	1.65		1.75	1.58
20-44				1.62
45-64	1.71		1.54	1.48
65-74	1.72		2.50	1.64
Non-Hispanic black women	1.20	0.91	1.10	0.98
20-44			1.13	1.00
45-64	1.24		1.06	0.96
65-74	1.24			0.87
Mexican-American men	1.76	1.87	1.89	1.62
20-44	1.64		1.82	1.60
45-64	1.82	1.98	2.09	1.76
65-74	1.79			1.54
Mexican-American women	1.13	1.04	0.99	0.94
20-44	1.46		1.01	0.94
45-64	1.03	1.04	0.99	0.97
65-74	0.97			0.83
Cuban-American men	1.63	1.72		1.55
Cuban-American women	1.01		1.15	1.04
Puerto Rican men	1.97		1.50	1.52
Puerto Rican women	1.10		1.10	0.95

IGT, impaired glucose tolerance. In cells with no entry, the value is unreliable due to small sample size. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic National Health and Nutrition Examination Survey

Appendix 7.14

Mean Systolic and Diastolic Blood Pressure in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

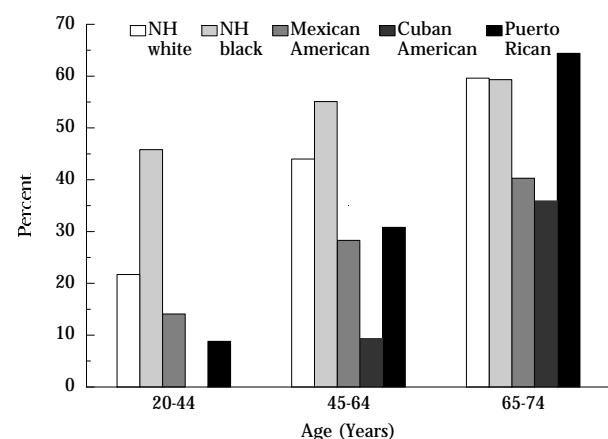
Race, sex, and age (years)	Systolic blood pressure (mmHg)					Diastolic blood pressure (mmHg)				
	Medical history of NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal	Medical history of NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	141	139	140	134	122	85	85	85	84	78
20-44	126	127	127	125	118	82	87	85	82	76
45-64	140	135	138	136	128	87	84	85	86	81
65-74	150	151	150	144	137	82	84	83	83	80
Men	142	139	140	139	126	86	85	86	87	81
Women	140	139	140	131	119	83	84	84	81	76
Non-Hispanic whites	141	138	139	135	122	84	84	84	84	78
Non-Hispanic blacks	143	141	142	130	124	89	87	88	83	79
Mexican Americans	132	133	115	125	114	78	80	72	78	72
Cuban Americans	131	130	117	125	116	78	75	73	78	72
Puerto Ricans	129	121	113	121	112	79	79	69	72	69

IGT, impaired glucose tolerance. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.15

Percent with Hypertension in Persons with NIDDM, by Age and Race, U.S., 1976-80 and 1982-84



Hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication. See Appendix 7.16 for further details. NH, non-Hispanic.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.16

Percent with Hypertension in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Medical history of NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	50.1	46.2	48.2	37.6	14.8
20-44	27.3		27.9	18.1	7.7
45-64	50.1	41.6	45.7	44.8	23.1
65-74	60.0	59.2	59.6	50.7	38.3
Men	48.0	37.3	42.9	47.1	14.3
20-44			45.1	31.5	9.9
45-64	47.7	30.9	40.3	54.5	20.0
65-74	46.1	46.0	46.0	48.8	29.2
Women	51.6	52.1	51.9	30.3	15.3
20-44	16.5		18.7	10.6	5.4
45-64	52.0	47.1	49.3	35.7	26.0
65-74	71.8	70.7	71.2	52.3	45.1
Non-Hispanic whites	46.5	47.4	46.9	37.7	13.8
20-44	22.0		21.7	16.6	7.2
45-64	43.8	44.2	44.0	44.5	20.6
65-74	59.8	59.4	59.6	49.9	36.6
Non-Hispanic white men	48.0	40.2	44.2	48.4	13.9
20-44				28.9	10.0
45-64	46.8	34.0	41.3	59.2	18.3
65-74	47.9	46.5	47.1	47.8	28.9
Non-Hispanic white women	45.3	52.0	48.8	28.9	13.6
20-44	11.2		7.5	8.4	4.4
45-64	41.0	49.3	45.8	30.8	22.8
65-74	69.5	70.9	70.2	51.4	42.4
Non-Hispanic blacks	66.9	39.7	54.6	37.4	24.1
20-44	41.0		45.8	23.8	11.2
45-64	79.8	26.1	55.1	46.5	48.7
65-74	60.8	57.7	59.3	62.6	56.3
Non-Hispanic black men	48.4		35.5	36.8	18.3
20-44					9.3
45-64	54.1		34.1	21.5	38.4
65-74	37.4		39.5	57.2	32.7
Non-Hispanic black women	78.4	52.6	66.9	37.7	29.1
20-44				16.9	12.9
45-64	91.6		66.3	68.5	57.9
65-74	89.4		78.3		69.4
Mexican Americans	32.9	17.7	26.4	18.6	5.4
20-44	14.0	14.3	14.1	0.0	2.1
45-64	35.2	19.1	28.3	35.9	18.2
65-74	48.4		40.3	56.4	22.0
Mexican-American men	27.7	26.9	27.3	21.5	5.4
20-44	16.4		15.9	0.0	2.5
45-64	26.3	36.4	31.3	44.3	17.7
65-74	40.5		40.5		20.2
Mexican-American women	36.9	8.4	25.6	15.6	5.3
20-44	12.3		12.1	0.0	1.7
45-64	41.3	0.0	25.8	27.0	18.6
65-74	56.7		40.1		24.1
Cuban Americans	33.1	18.7	24.2	17.5	10.8
20-44					1.1
45-64	30.2		9.3	28.7	20.6
65-74	52.1		35.9		45.3
Cuban-American men	17.7	11.5	12.8		14.1
20-44					0.0
45-64			6.8		29.5
65-74					

Appendix 7.16—Continued next page

Appendix 7.16—Continued

Race, sex, and age (years)	Medical history of NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
Cuban-American women	42.7		46.9	11.9	8.2
20-44					2.1
45-64	19.6		19.6		14.0
65-74	89.8		61.9		
Puerto Ricans	30.3	30.9	30.6	15.4	6.1
20-44	12.2		8.8		3.5
45-64	30.7	30.9	30.8	22.7	17.4
65-74	55.4		64.4		
Puerto Rican men	22.2		23.4	14.5	7.8
20-44					7.4
45-64	23.3		24.0		10.0
65-74					
Puerto Rican women	33.5		35.3	15.9	5.0
20-44	15.6		10.4		1.2
45-64	34.9		38.5	24.1	22.8
65-74	54.3		64.6		

IGT, impaired glucose tolerance. In cells with no entry, the data are unreliable due to small sample size. Hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.17

Percent with Self-Reported Physician-Diagnosed Hypertension in Persons Age ≥ 18 Years, by Diabetes Status, U.S., 1989

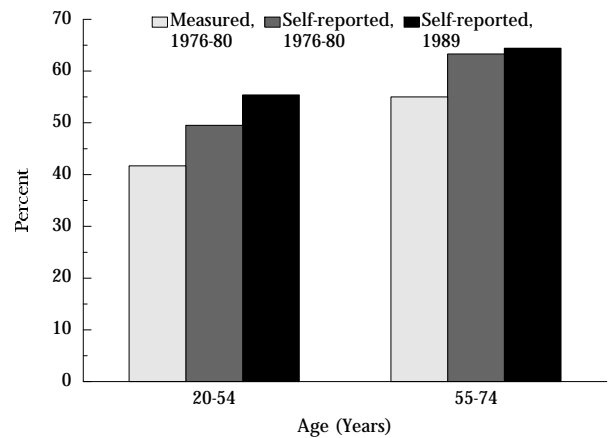
Race, sex, age (years), and diabetic status	Percent
All IDDM	19.4
18-39	16.1
≥ 40	29.4
Men	18.5
Women	20.5
All NIDDM	61.3
18-44	43.6
45-64	63.7
≥ 65	63.4
Men	55.2
Women	65.7
Non-Hispanic white	60.4
Non-Hispanic black	71.3
Mexican American	37.5
All nondiabetic	14.4
18-44	4.7
45-64	25.4
≥ 65	36.1
Men	12.4
Women	16.2
Non-Hispanic white	14.8
Non-Hispanic black	16.4
Mexican American	10.8

Diagnosed hypertension was obtained by self-response for persons with diabetes and by self or proxy response in a subsample of nondiabetic persons.

Source: 1989 National Health Interview Survey

Appendix 7.18

Percent with Measured and Self-Reported Physician-Diagnosed Hypertension in Persons with Previously Diagnosed NIDDM, U.S., 1976-80 and 1989



Measured hypertension is based on World Health Organization criteria, defined as a blood pressure of $\geq 160/95$ mmHg or use of antihypertensive medication.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1989 National Health Interview Survey

Appendix 7.19

Percent Distribution of NIDDM and Nondiabetic Populations Age ≥ 18 Years According to Whether a Doctor Previously Diagnosed Hypertension and Hypertensive Blood Pressure Level, U.S., 1976-80 and 1982-84

Race, age (years), and previously diagnosed hypertension status	NIDDM		Nondiabetic	
	≥ 160 systolic and/or ≥ 95 diastolic	≥ 140 systolic and/or ≥ 90 diastolic	≥ 160 systolic and/or ≥ 95 diastolic	≥ 140 systolic and/or ≥ 90 diastolic
All races				
Not told hypertensive, exceed level	7.6	18.8	4.8	13.4
Told hypertensive, exceed level	20.5	33.1	6.3	11.1
Told hypertensive, do not exceed level	34.9	22.2	15.5	10.7
Not told hypertensive, do not exceed level	37.0	25.9	73.4	64.8
Non-Hispanic whites				
Not told hypertensive, exceed level	6.2	16.6	5.0	13.8
Told hypertensive, exceed level	19.4	30.8	5.5	10.1
Told hypertensive, do not exceed level	36.4	24.9	15.7	11.2
Not told hypertensive, do not exceed level	38.1	27.7	73.8	65.0
Non-Hispanic whites, age 20-54				
Not told hypertensive, exceed level	7.2	13.3	4.2	11.7
Told hypertensive, exceed level	11.0	18.1	4.0	6.5
Told hypertensive, do not exceed level	37.3	30.2	12.6	10.1
Not told hypertensive, do not exceed level	44.5	38.4	79.3	71.7
Non-Hispanic whites, age 55-74				
Not told hypertensive, exceed level	5.7	18.4	7.5	19.7
Told hypertensive, exceed level	23.8	37.5	10.1	20.6
Told hypertensive, do not exceed level	35.9	22.1	24.9	14.4
Not told hypertensive, do not exceed level	34.7	22.0	57.5	45.3
Non-Hispanic blacks				
Not told hypertensive, exceed level	6.1	16.7	2.9	10.3
Told hypertensive, exceed level	24.2	44.5	14.2	20.9
Told hypertensive, do not exceed level	41.0	20.8	19.3	12.6
Not told hypertensive, do not exceed level	28.7	18.1	63.6	56.2
Non-Hispanic blacks, age 20-54				
Not told hypertensive, exceed level	12.0	22.8	1.6	8.6
Told hypertensive, exceed level	19.4	31.1	10.8	16.7
Told hypertensive, do not exceed level	41.0	29.2	18.2	12.3
Not told hypertensive, do not exceed level	27.7	16.9	69.4	62.4
Non-Hispanic blacks, age 55-74				
Not told hypertensive, exceed level	1.4	11.8	7.9	17.3
Told hypertensive, exceed level	28.1	55.0	27.9	38.2
Told hypertensive, do not exceed level	41.0	14.1	24.1	13.9
Not told hypertensive, do not exceed level	29.5	19.1	40.1	30.7
Mexican Americans				
Not told hypertensive, exceed level	4.0	16.0	1.0	5.3
Told hypertensive, exceed level	7.7	19.6	1.1	5.2
Told hypertensive, do not exceed level	34.7	22.8	17.7	13.6
Not told hypertensive, do not exceed level	53.7	41.7	80.2	75.9
Mexican Americans, age 20-54				
Not told hypertensive, exceed level	1.6	8.6	0.7	3.8
Told hypertensive, exceed level	6.0	17.2	0.7	3.1
Told hypertensive, do not exceed level	31.6	20.3	15.1	12.7
Not told hypertensive, do not exceed level	60.8	53.8	83.5	80.3
Mexican Americans, age 55-74				
Not told hypertensive, exceed level	6.2	22.8	3.4	16.4
Told hypertensive, exceed level	9.2	21.8	4.0	22.1
Told hypertensive, do not exceed level	37.6	25.1	38.3	20.2
Not told hypertensive, do not exceed level	47.0	30.3	54.4	41.3

Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.20

Percent of Persons with NIDDM Age ≥18 Years with Self-Reported Physician-Diagnosed Hypertension Who Use Antihypertensive Treatment, U.S., 1989

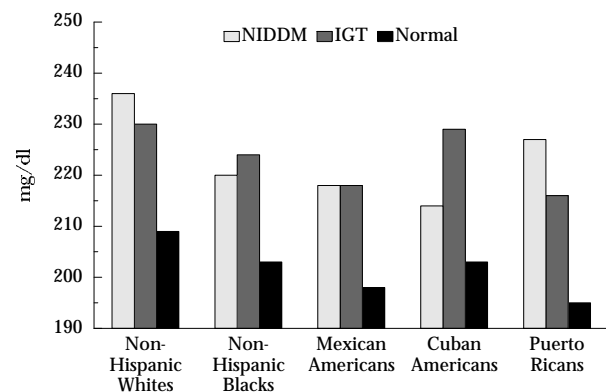
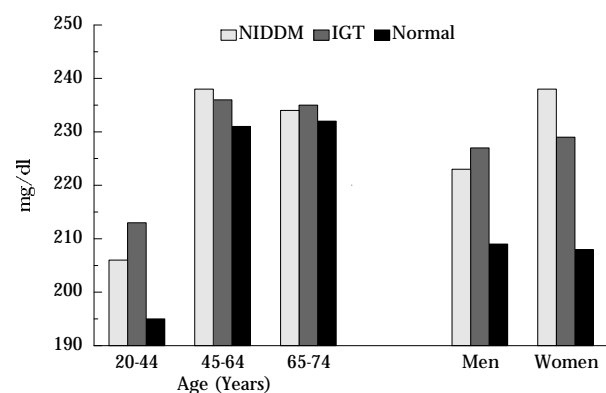
Race, sex, and age (years)	Using prescribed medication	Restricting salt intake	Physical activity or exercise	Losing or controlling weight	None of these
All ages	76.3	86.7	57.8	70.2	3.4
18-44	51.0	76.3	57.0	68.5	10.1
45-64	75.7	87.9	62.5	75.4	2.5
65-74	80.9	87.5	56.1	70.8	2.2
≥75	80.9	87.0	48.2	54.7	4.8
Men	75.6	84.8	61.3	69.7	3.1
Women	76.7	87.8	55.6	70.5	3.5
Non-Hispanic whites	75.7	85.6	57.3	69.2	3.7
Non-Hispanic blacks	81.2	91.1	59.5	72.9	2.4
Mexican Americans	63.8	83.1	63.2	81.4	0.0

Physician-diagnosed hypertension and antihypertensive treatment were obtained by self-response.

Source: 1989 National Health Interview Survey

Appendix 7.21

Mean Total Cholesterol in Persons Age 20-74 Years, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

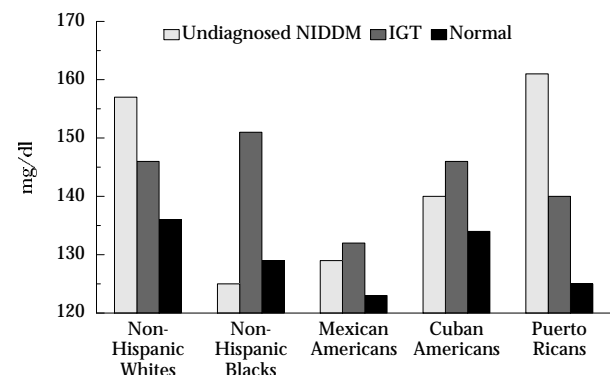
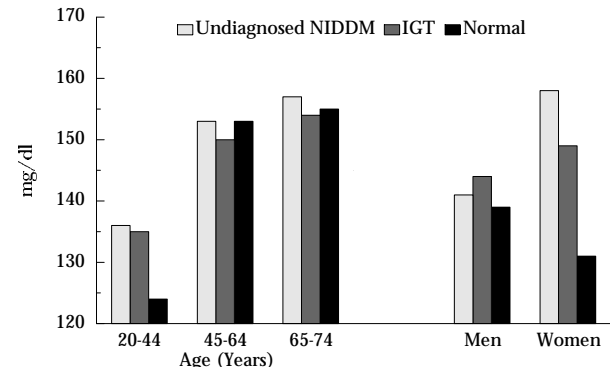


IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.25 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.22

Mean LDL Cholesterol in Persons Age 20-74 Years, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

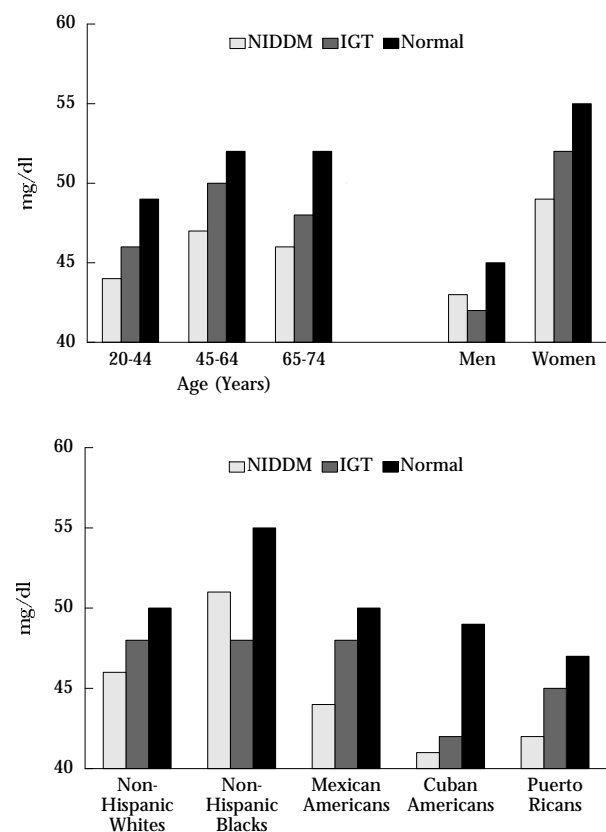


LDL, low-density lipoprotein; IGT, impaired glucose tolerance. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. LDL cholesterol is estimated by: total cholesterol - HDL cholesterol - fasting triglycerides/5 for subjects whose triglycerides were <400 mg/dl.¹⁷ Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride and LDL cholesterol levels could not be determined. See Appendix 7.26 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.23

Mean HDL Cholesterol in Persons Age 20-74 Years, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

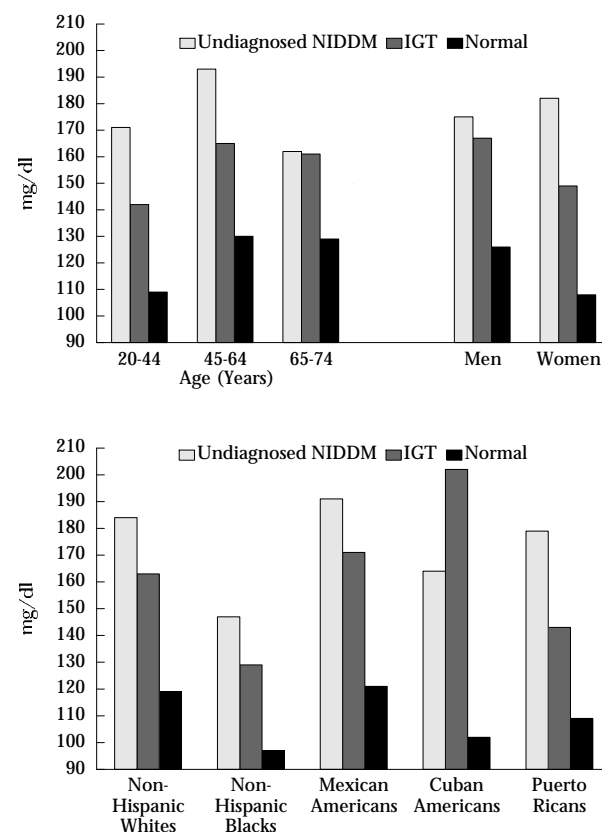


HDL, high-density lipoprotein; IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.27 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.24

Mean Fasting Triglycerides in Persons Age 20-74 Years, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84



Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride levels could not be determined. See Appendix 7.28 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.25

Mean Total Cholesterol (mg/dl) in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Diagnosed NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	228	236	232	228	208
20-44	194	217	206	213	195
45-64	236	240	238	236	231
65-74	230	238	234	235	232
Men	224	222	223	227	209
Women	231	245	238	229	208
Non-Hispanic whites	230	242	236	230	209
Non-Hispanic blacks	227	212	220	224	203
Mexican Americans	221	215	218	218	198
Cuban Americans	218	212	214	229	203
Puerto Ricans	218	240	227	216	195

IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.26

Mean LDL Cholesterol (mg/dl) in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Undiagnosed NIDDM	IGT	Normal
All ages	151	147	135
20-44	136	135	124
45-64	153	150	153
65-74	157	154	155
Men	141	144	139
Women	158	149	131
Non-Hispanic whites	157	146	136
Non-Hispanic blacks	125	151	129
Mexican Americans	129	132	123
Cuban Americans	140	146	134
Puerto Ricans	161	140	125

IGT, impaired glucose tolerance; LDL, low-density lipoprotein; HDL, high-density lipoprotein. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. LDL cholesterol is estimated by: total cholesterol - HDL cholesterol - fasting triglycerides/5 for subjects whose triglycerides were <400 mg/dl¹⁷. Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride and LDL cholesterol levels could not be determined.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.27

Mean HDL Cholesterol (mg/dl) in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Diagnosed NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	45	47	46	48	50
20-44	44	44	44	46	49
45-64	46	49	47	50	52
65-74	45	47	46	48	52
Men	42	44	43	42	45
Women	48	50	49	52	55
Non-Hispanic whites	45	46	46	48	50
Non-Hispanic blacks	49	54	51	48	55
Mexican Americans	44	43	44	48	50
Cuban Americans	46	39	41	42	49
Puerto Ricans	44	40	42	45	47

IGT, impaired glucose tolerance; HDL, high-density lipoprotein. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.28

Mean Fasting Triglycerides (mg/dl) in Persons Age 20-74 Years, by Diabetes Status, U.S., 1976-80 and 1982-84

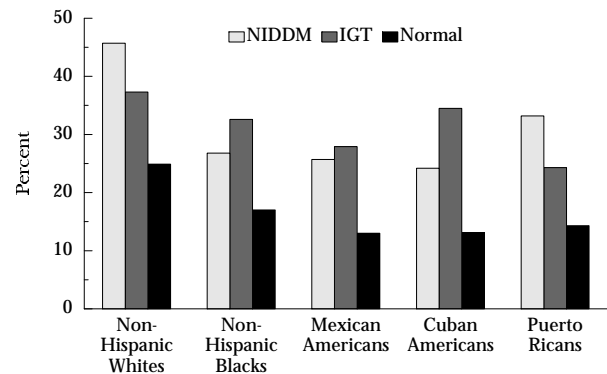
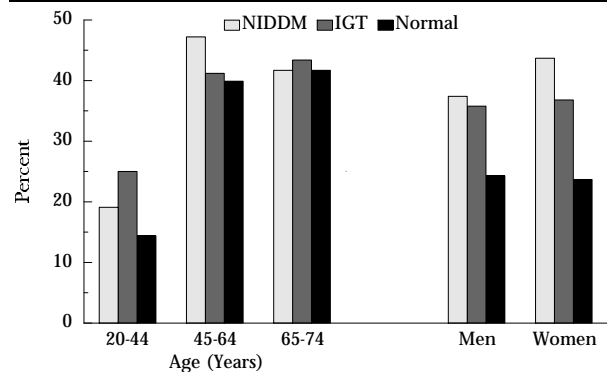
Race, sex, and age (years)	Undiagnosed NIDDM	IGT	Normal
All ages	180	156	116
20-44	171	142	109
45-64	193	165	130
65-74	162	161	129
Men	175	167	126
Women	182	149	108
Non-Hispanic whites	184	163	119
Non-Hispanic blacks	147	129	97
Mexican Americans	191	171	121
Cuban Americans	164	202	102
Puerto Ricans	179	143	109

IGT, impaired glucose tolerance. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Individuals with a medical history of NIDDM were not asked to fast, and thus their fasting triglyceride levels could not be determined.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Survey

Appendix 7.29

Percent of Persons Age 20-74 Years with Total Cholesterol ≥ 240 mg/dl, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

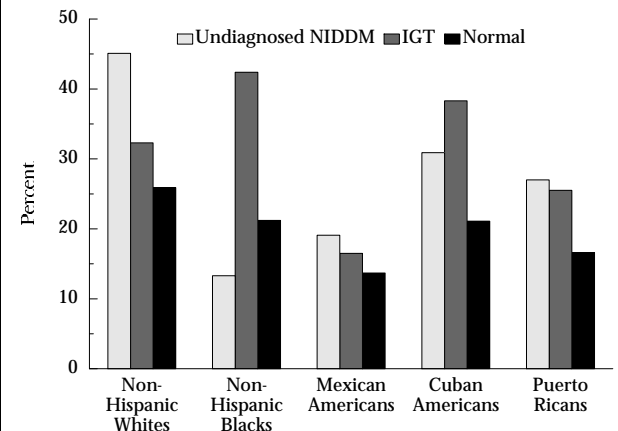
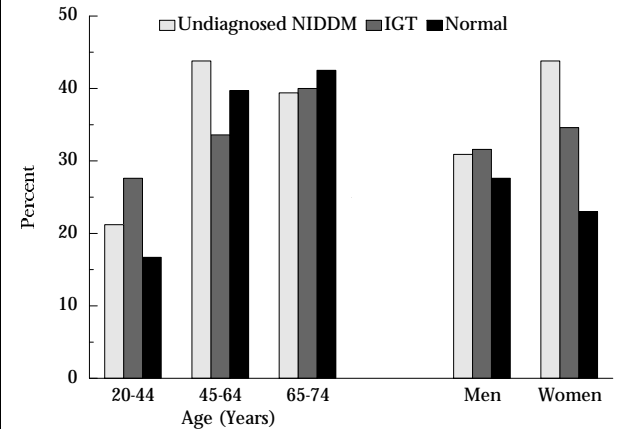


IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.33 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.30

Percent of Persons Age 20-74 Years with LDL Cholesterol ≥ 160 mg/dl, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

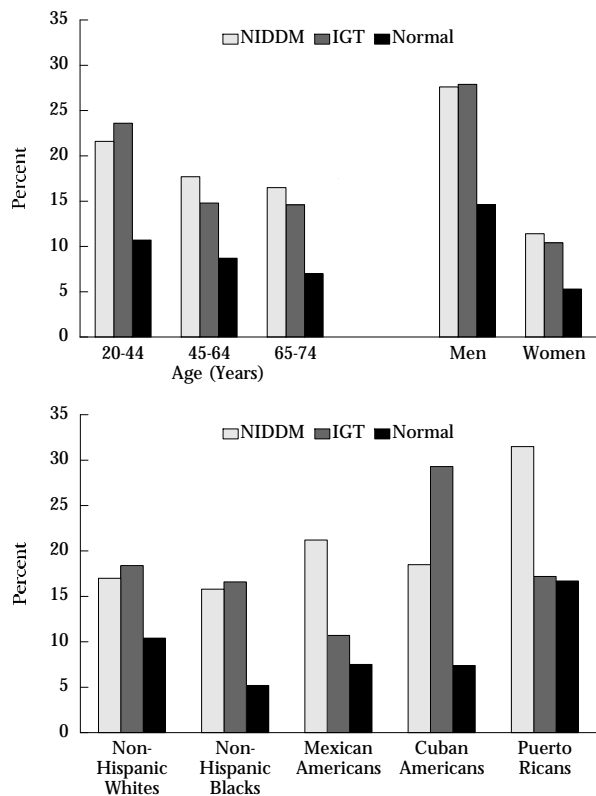


IGT, impaired glucose tolerance. LDL, low-density lipoprotein; HDL, high-density lipoprotein. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. LDL cholesterol is estimated by: total cholesterol - HDL cholesterol - fasting triglycerides/5 for subjects whose triglycerides were < 400 mg/dl.¹⁷ Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride and LDL cholesterol levels could not be determined. See Appendix 7.35 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.31

Percent of Persons Age 20-74 Years with HDL Cholesterol <35 mg/dl, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84

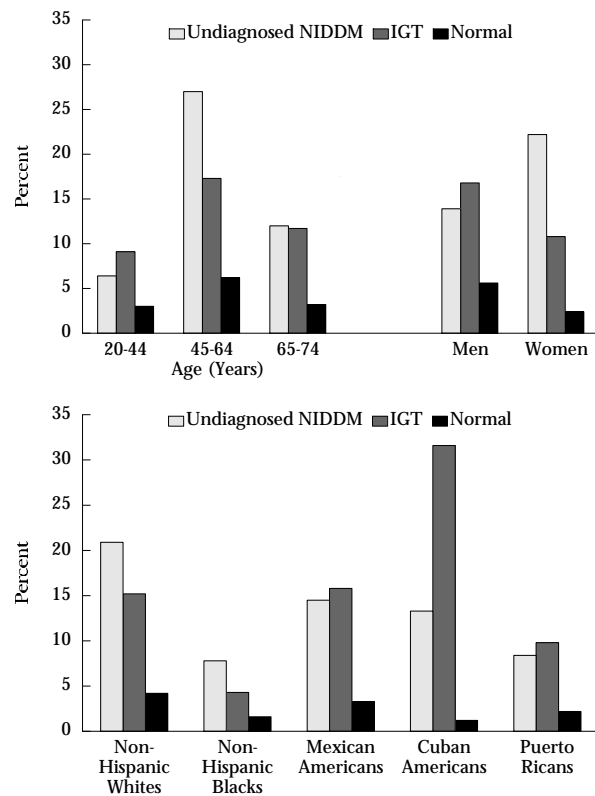


HDL, high-density lipoprotein; IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. See Appendix 7.36 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.32

Percent of Persons Age 20-74 Years with Fasting Triglycerides ≥250 mg/dl, by Age, Sex, Race, and Diabetes Status, U.S., 1976-80 and 1982-84



IGT, impaired glucose tolerance. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride levels could not be determined. See Appendix 7.37 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.33

Percent of Persons Age 20-74 Years with Total Cholesterol ≥240 mg/dl, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Diagnosed NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	36.1	46.1	41.1	36.3	24.0
20-44	11.5	26.3	19.1	25.0	14.4
45-64	43.0	51.3	47.2	41.2	39.9
65-74	36.3	47.0	41.7	43.4	41.7
Men	38.2	36.6	37.4	35.8	24.3
Women	34.6	52.5	43.7	36.8	23.7
Non-Hispanic whites	39.4	51.6	45.7	37.3	24.9
Non-Hispanic blacks	33.4	18.8	26.8	32.6	17.0
Mexican Americans	29.4	20.8	25.7	27.9	13.0
Cuban Americans	31.4	19.8	24.2	34.5	13.1
Puerto Ricans	26.5	41.7	33.2	24.3	14.3

IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.34

Percent of Persons Age 20-74 Years with Total Cholesterol \geq 200 mg/dl, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Diagnosed NIDDM	Undiagnosed NIDDM	All NIDDM	IGT	Normal
All ages	70.6	76.4	73.5	70.9	52.5
20-44	45.2	43.8	44.5	58.8	39.2
45-64	77.3	81.5	79.4	77.6	75.1
65-74	71.6	84.0	77.9	75.5	75.0
Men	68.2	64.4	66.3	69.1	53.0
Women	72.3	84.6	78.6	72.3	52.0
Non-Hispanic whites	72.8	83.3	78.2	73.3	54.1
Non-Hispanic blacks	68.3	55.5	62.5	69.0	45.2
Mexican Americans	63.4	62.6	63.1	68.1	47.9
Cuban Americans	53.7	65.0	60.6	78.9	49.2
Puerto Ricans	61.7	52.4	57.6	62.8	41.5

IGT, impaired glucose tolerance. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.35

Percent of Persons Age 20-74 Years with LDL Cholesterol \geq 160 mg/dl, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Undiagnosed NIDDM	IGT	Normal
All ages	38.5	33.4	25.3
20-44	21.2	27.6	16.7
45-64	43.8	33.6	39.7
65-74	39.4	40.0	42.5
Men	30.9	31.6	27.6
Women	43.8	34.6	23.0
Non-Hispanic whites	45.1	32.3	25.9
Non-Hispanic blacks	13.3	42.4	21.2
Mexican Americans	19.1	16.5	13.7
Cuban Americans	30.9	38.3	21.1
Puerto Ricans	27.0	25.5	16.6

IGT, impaired glucose tolerance; LDL, low-density lipoprotein; HDL, high-density lipoprotein. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. LDL cholesterol is estimated by: total cholesterol - HDL cholesterol - fasting triglycerides/5 for subjects whose triglycerides were <400 mg/dl.¹⁷ Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride and LDL cholesterol levels could not be determined.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.36

Percent of Persons Age 20-74 Years with HDL Cholesterol <35 mg/dl, by Diabetes Status, U.S., 1976-80 and 1982-84

Race, sex, and age (years)	Diagnosed NIDDM	Un-diagnosed NIDDM	All NIDDM	IGT	Normal
All ages	17.0	18.8	18.0	17.5	9.8
20-44	13.2	28.0	21.6	23.6	10.7
45-64	16.8	18.5	17.7	14.8	8.7
65-74	19.5	14.0	16.5	14.6	7.0
Men	24.6	30.1	27.6	27.9	14.6
Women	12.2	10.6	11.4	10.4	5.3
Non-Hispanic whites	17.2	16.9	17.0	18.4	10.4
Non-Hispanic blacks	14.4	17.2	15.8	16.6	5.2
Mexican Americans	16.6	27.4	21.2	10.7	7.5
Cuban Americans	6.9	25.3	18.5	29.3	7.4
Puerto Ricans	31.8	31.0	31.5	17.2	16.7

IGT, impaired glucose tolerance; HDL, high-density lipoprotein. Diabetes status was determined by medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Examination Survey

Appendix 7.37

Percent of Persons Age 20-74 Years with Fasting Triglycerides \geq 250 mg/dl, by Diabetes Status, U.S., 1976-80 and 1982-84

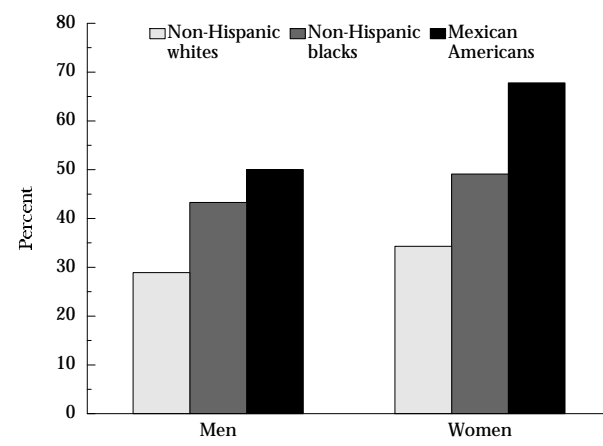
Race, sex, and age (years)	Undiagnosed NIDDM	IGT	Normal
All ages	18.9	13.3	3.9
20-44	6.4	9.1	3.0
45-64	27.0	17.3	6.2
65-74	12.0	11.7	3.2
Men	13.9	16.8	5.6
Women	22.2	10.8	2.4
Non-Hispanic whites	20.9	15.2	4.2
Non-Hispanic blacks	7.8	4.3	1.6
Mexican Americans	14.5	15.8	3.3
Cuban Americans	13.3	31.6	1.2
Puerto Ricans	8.4	9.8	2.2

IGT, impaired glucose tolerance. Diabetes status was determined by results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Individuals with a medical history of NIDDM were not asked to fast; thus their fasting triglyceride levels could not be determined.

Source: 1976-80 Second National Health and Nutrition Examination Survey and 1982-84 Hispanic Health and Nutrition Survey

Appendix 7.38

Percent of Persons with NIDDM Age \geq 50 Years Having \geq 4 Children, by Sex and Race, U.S., 1989



See Appendix 7.39 for further details.

Source: 1989 National Health Interview Survey

Appendix 7.39

Parity of NIDDM and Nondiabetic Persons Age \geq 18 Years, U.S., 1989

Race, sex, and age (years)	Percent distribution by number of children						Mean no. of children
	0	1	2	3	4	\geq 5	
All races							
NIDDM	13.5	13.4	21.7	17.6	11.1	22.8	3.1
Men	15.6	13.9	23.2	17.3	9.9	20.1	2.8
18-29							
30-49	19.8	20.7	30.3	11.3	6.5	11.4	2.0
\geq 50	14.6	12.1	22.2	18.2	10.7	22.1	3.0
Women	12.0	13.0	20.6	17.9	11.9	24.7	3.3
18-29	37.8	17.9	17.5	16.1	7.6	3.1	1.5
30-49	15.2	14.2	27.2	19.5	13.0	11.0	2.5
\geq 50	10.8	12.7	19.4	17.6	11.8	27.8	3.5
Nondiabetic	30.5	16.3	23.6	14.5	7.5	7.7	1.9
Men	35.0	15.7	21.8	13.5	7.2	6.9	1.7
18-29	73.2	15.0	8.3	2.5	0.8	0.2	0.4
30-49	24.7	18.8	29.7	15.4	6.8	4.6	1.8
\geq 50	15.0	12.3	23.1	20.6	13.3	15.7	2.7
Women	26.5	16.8	25.2	15.4	7.8	8.4	2.0
18-29	57.1	20.1	15.7	5.6	1.3	0.3	0.8
30-49	17.4	16.9	33.0	18.7	7.6	6.4	2.1
\geq 50	14.0	14.1	23.3	18.9	12.9	16.8	2.8
Non-Hispanic whites							
NIDDM	13.8	13.9	24.4	18.4			12.1
Men	15.4	14.1	26.2	17.8			10.7
18-29							
30-49	22.5	21.4	34.6	6.7			7.3
\geq 50	14.1	12.4	25.0	19.7			11.4

Appendix 7.39—Continued next page

Appendix 7.39—Continued

Race, sex, and age (years)	Percent distribution by number of children						Mean no. of children
	0	1	2	3	4	≥5	
Women	12.5	13.8	23.1	18.9	13.2	18.4	2.9
18-29	49.3	14.9	15.7	13.3	6.8	0.0	1.1
30-49	20.5	16.3	26.7	17.5	12.8	6.2	2.1
≥50	10.4	13.4	22.7	19.3	13.4	20.9	3.1
Nondiabetic	30.2	16.2	24.9	14.9	7.4	6.5	1.8
Men	34.1	16.1	23.1	13.9	7.0	5.9	1.7
18-29	74.0	15.3	8.0	1.9	0.6	0.2	0.4
30-49	24.9	19.2	31.9	15.7	5.3	3.0	1.7
≥50	15.0	12.7	23.8	20.9	13.8	13.8	2.6
Women	26.7	16.3	26.4	15.7	7.9	7.0	1.9
18-29	60.3	18.7	15.4	4.8	0.7	0.1	0.7
30-49	18.4	16.8	35.0	18.4	6.9	4.5	2.0
≥50	13.8	14.2	24.8	19.9	13.5	14.0	2.6
Non-Hispanic blacks							
NIDDM	14.8	14.3	16.1	12.3	8.2	34.4	3.8
Men	19.2	16.3	14.4	12.0	7.3	30.9	3.4
18-29							
30-49	18.9	23.2	12.1	20.0	7.7	18.1	2.4
≥50	18.8	14.0	15.7	8.2	7.4	35.9	3.8
Women	12.0	13.1	17.1	12.5	8.7	36.6	4.0
18-29							
30-49	6.9	7.7	33.1	22.6	17.2	12.6	2.9
≥50	13.4	13.9	13.5	10.1	6.8	42.3	4.2
Nondiabetic	30.3	19.1	17.1	12.6	8.2	12.7	2.1
Men	37.2	15.7	16.3	11.6	8.5	10.7	1.9
18-29	68.6	15.3	9.8	4.5	1.1	0.8	0.6
30-49	23.3	19.0	19.8	13.9	14.3	9.8	2.1
≥50	17.6	11.4	19.6	17.3	9.1	25.1	3.4
Women	24.8	21.9	17.8	13.4	8.0	14.2	2.3
18-29	46.6	27.0	12.9	8.8	3.5	1.3	1.0
30-49	13.0	20.9	25.3	17.8	10.6	12.5	2.4
≥50	16.7	17.3	12.3	12.0	9.3	32.3	3.6
Mexican Americans							
NIDDM	9.1	6.7	14.2	17.3	7.8	45.1	4.7
Men	8.3	6.2	17.7	22.5	9.6	35.7	4.1
18-29							
30-49							
≥50	7.3	8.2	7.8	26.7	12.6	37.4	4.5
Women	9.6	7.0	11.6	13.6	6.5	51.7	5.2
18-29							
30-49	7.5	22.9	31.3	16.0	7.5	14.8	2.9
≥50	10.1	2.8	6.4	12.9	6.2	61.6	5.8
Nondiabetic	27.4	11.0	19.4	16.7	8.1	17.3	2.5
Men	32.5	9.5	14.9	16.5	9.7	16.8	2.5
18-29	62.6	17.9	8.7	7.8	3.1	0.0	0.7
30-49	18.9	4.8	19.5	21.6	14.8	20.5	3.2
≥50	6.9	4.7	16.1	21.3	10.6	40.3	4.3
Women	22.3	12.4	23.9	17.0	6.6	17.8	2.5
18-2	40.2	17.7	29.5	9.4	2.2	0.9	1.2
30-4	12.2	10.2	22.3	24.2	10.0	21.2	3.1
≥50	5.1	5.2	13.6	15.6	8.1	52.3	4.6

In cells with no entry, the percent is unreliable due to small sample size. Diabetes status was determined by self-response.

Appendix 7.40

Parity and Number of Babies ≥ 9 lbs. Among Women with NIDDM, IGT, and Normal Glucose Tolerance Age 20-74 Years, U.S., 1976-80

Race, age (years), and diabetes status	Mean no. of children	Mean no. of babies ≥ 9 lbs.
All races		
Medical history of NIDDM	3.3	0.8
20-49	2.9	0.7
50-74	3.5	0.8
Undiagnosed NIDDM	3.6	0.5
20-49	4.0	0.4
50-74	3.5	0.6
IGT	2.9	0.4
20-49	2.8	0.1
50-74	2.9	0.6
Normal	2.2	0.3
20-49	2.0	0.2
50-74	2.8	0.5
Non-Hispanic whites		
Medical history of NIDDM	3.1	0.6
20-49	2.7	0.7
50-74	3.2	0.6
Undiagnosed NIDDM	3.2	0.5
20-49	3.2	0.4
50-74	3.2	0.5
IGT	2.8	0.4
20-49	2.9	0.1
50-74	2.7	0.6
Normal	2.2	0.3
20-49	1.9	0.2
50-74	2.6	0.4
Non-Hispanic blacks		
Medical history of NIDDM	3.6	1.0
20-49	2.9	0.3
50-74	4.0	1.5
Undiagnosed NIDDM	5.0	0.6
20-49	6.8	0.4
50-74	4.0	0.7
IGT	1.8	0.1
20-49	1.7	0.1
50-74	2.2	0.0
Normal	2.6	0.5
20-49	2.3	0.3
50-74	3.6	0.8

IGT, impaired glucose tolerance. Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria.

Source: 1976-80 Second National Health and Nutrition Examination Survey

Appendix 7.41

Percent of Diabetic (IDDM and NIDDM) and Nondiabetic Persons Age ≥ 18 Years Who Currently Smoke, U.S., 1989

Race, sex, and age (years)	Diabetic	Nondiabetic
All ages	20.1	26.1
18-44	32.1	28.8
45-64	24.3	26.9
≥ 65	12.3	14.0
Men	23.6	27.9
18-44	40.7	30.0
45-64	27.0	28.7
≥ 65	13.2	16.8
Women	17.6	24.4
18-44	25.3	27.6
45-64	22.0	25.4
≥ 65	11.8	12.0
Non-Hispanic whites	19.4	26.1
18-44	32.0	29.4
45-64	22.9	26.9
≥ 65	12.7	13.8
Non-Hispanic white men	20.6	27.6
18-44	38.6	30.1
45-64	22.5	28.4
≥ 65	12.4	16.1
Non-Hispanic white women	18.4	24.8
18-44	26.8	28.8
45-64	23.2	25.5
≥ 65	12.9	12.1
Non-Hispanic blacks	22.7	29.4
18-44	34.8	30.6
45-64	30.5	33.0
≥ 65	9.5	15.4
Non-Hispanic black men	34.5	34.6
18-44	44.4	34.8
45-64	45.4	39.3
≥ 65	14.9	23.1
Non-Hispanic black women	15.4	25.2
18-44	24.8	27.0
45-64	21.3	27.9
≥ 65	6.7	10.0
Mexican Americans	22.4	24.9
18-44	40.8	25.5
45-64	19.0	26.8
≥ 65	17.0	9.9
Mexican-American men	31.3	27.5
18-44	48.7	28.7
45-64	27.8	26.6
≥ 65	26.0	15.1
Mexican-American women	16.3	22.4
18-44	34.9	22.5
45-64	13.2	27.1
≥ 65	11.0	3.5

Source: 1989 National Health Interview Survey

Appendix 7.42

Percent of Persons with IDDM and NIDDM Age 18-49 Years Who Currently Smoke, U.S., 1989

	IDDM	NIDDM
Men	29.2	38.4
Women	23.7	26.8

Source: 1989 National Health Interview Survey

Appendix 7.43

Percent of Diabetic (IDDM and NIDDM) and Nondiabetic Populations Age 20-74 Years Who Drink Any Alcohol, U.S., 1976-80

Race, sex, and age (years)	Diabetic	Nondiabetic
All ages	46.6	67.2
20-44	46.8	72.3
45-64	50.3	62.0
65-74	39.9	52.0
Men	63.8	76.6
20-44	74.6	82.2
45-64	69.4	70.0
65-74	51.3	61.1
Women	34.7	58.5
20-44	31.9	63.0
45-64	38.1	54.3
65-74	29.5	45.0
Non-Hispanic whites	46.2	68.4
20-44	40.7	73.4
45-64	49.0	64.2
65-74	43.6	53.2
Non-Hispanic white men	65.4	77.5
20-44	82.2	82.7
45-64	70.1	72.5
65-74	54.3	62.0
Non-Hispanic white women	33.4	59.7
20-44	25.1	64.2
45-64	35.2	56.4
65-74	34.5	46.4
Non-Hispanic blacks	38.9	65.8
20-44	31.4	74.9
45-64	53.6	51.4
65-74	16.6	42.7
Non-Hispanic black men	46.1	79.2
20-44		85.6
45-64	55.8	71.3
65-74	24.5	56.4
Non-Hispanic black women	33.8	55.0
20-44		66.5
45-64	52.2	33.8
65-74	8.5	32.5
Mexican Americans	36.0	53.1
20-44	48.5	55.1
45-64	35.1	48.0
65-74	15.6	39.2
Mexican-American men	56.8	72.4
20-44	65.2	73.6
45-64	60.2	74.5
65-74	15.0	38.2
Mexican-American women	17.5	33.1
20-44	28.5	35.1
45-64	12.7	24.5
65-74	15.8	40.3

Diabetes status was determined from medical history and results of a 75-g 2-hour oral glucose tolerance test using World Health Organization criteria. Alcohol intake was obtained by self-response to a question regarding average alcohol intake in the previous 3 months.

Source: 1976-80 Second National Health and Nutrition Examination Survey

Appendix 7.44

Percent Distribution of IDDM, NIDDM, and Nondiabetic Persons Age ≥18 Years According to Self-Assessed Health Status, U.S., 1989

Race, sex, and age (years)	Excellent or very good	Good	Fair or poor
IDDM	38.7	40.6	20.8
18-39	42.0	37.1	20.9
≥40	28.6	50.9	20.5
Men	47.3	36.2	16.6
Women	28.8	45.6	25.6
NIDDM	19.5	30.5	50.0
18-44	29.4	27.1	43.5
45-64	18.3	31.9	49.9
≥65	18.2	30.1	51.7
Men	23.3	29.5	47.2
Women	16.7	31.3	52.0
Non-Hispanic whites	21.3	32.1	46.6
Non-Hispanic blacks	15.0	26.0	59.1
Mexican Americans	12.6	26.4	61.0
Nondiabetic	64.9	24.3	10.8
18-44	74.3	20.1	5.6
45-64	57.5	28.0	14.6
≥65	40.7	34.5	24.9
Men	68.6	21.7	9.6
Women	61.5	26.6	11.9
Non-Hispanic whites	67.0	23.2	9.8
Non-Hispanic blacks	54.7	27.6	17.7
Mexican Americans	55.4	31.2	13.5

Source: 1989 National Health Interview Survey

Appendix 7.45

Participation Rates in Physical Activity for Diabetic and Nondiabetic Adults Age ≥18 Years, U.S., 1990

Physical activity, race, and sex	Diabetic (%)	Nondiabetic (%)
Any exercise in preceding 2 weeks		
Age (years)		
18-44	77.7	76.3
45-64	61.8	69.8
≥65	52.1	61.5
Men	73.9	75.4
Women	65.0	69.5
White	69.1	73.0
Black	65.8	66.3
Regular exercise		
Age (years)		
18-44	39.6	45.7
45-64	28.8	35.5
≥65	26.1	33.1
Men	42.3	43.9
Women	28.1	38.2
White	35.2	41.8
Black	32.0	33.5

Source: 1990 National Health Interview Survey, Reference 19

Appendix 7.46

Values for Metabolic Variables in White, Black, and Japanese-American Subjects with NIDDM in U.S. Population Samples and in Community-Based Studies

	Age 40-64 years NHANES II		Age 40-64 years NHANES II		Age 40-64 years Seattle, WA		Age 50-74 years Rancho Bernardo, CA	
	White men	White women	Black men	Black women	Japanese- American men	Japanese- American women	White men	White women
Previously diagnosed diabetes								
Mean fasting plasma glucose (mg/dl)					196.0	162.1	141	140
Mean 2-hour plasma glucose (mg/dl)					360.5	335.9	251	219
Mean fasting insulin (μ u/ml)					15.0	22.6	35	20
Mean 2-hour insulin (μ u/ml)					49.2	103.8	106	86
Mean number of years since diagnosis of diabetes	7.5	7.2	6.8	7.1	7.1	6.6	12	8
Newly discovered diabetes								
Mean fasting plasma glucose (mg/dl)	144.8	137.4	110.7	146.6	122.3	128.8	123	119
Mean 2-hour plasma glucose (mg/dl)	283.8	264.6	213.1	289.9	234.7	271.9	233	246
Mean fasting insulin (μ u/ml)					19.5	20.6	18	14
Mean 2-hour insulin (μ u/ml)					153.3	140.4	103	109
All diabetic subjects combined								
Percent with self-reported history of diabetes in mother and/or father	30.8	42.9	20.2	36.1	57.1	81.8	30	28
Mean BMI	26.9	30.8	27.8	32.0	25.9	24.8	27.2	26.0
Percent with BMI \geq 25	64.4	73.8	56.7	85.7	55.1	63.6	75	53
Percent with BMI \geq 30	21.0	53.2	21.4	65.4	6.1	18.2	19	19
Percent with BMI \geq 35	5.6	27.9	12.8	23.4	0	18.2	3	6
Mean subscapular-to-triceps skinfold ratio	1.74	0.99	1.66	1.09	2.6	1.3		
Mean waist-to-hip ratio						0.87	0.93	0.82
Mean CT thoracic fat (cm ²)					100.8	180.2		
Mean CT subcutaneous abdominal fat (cm ²)					132.9	206.6		
Mean CT intra-abdominal fat (cm ²)					130.0	125.0		
Mean systolic blood pressure (mmHg)	136.8	136.0	138.9	139.0	141.7	137.9	146	142
Mean diastolic blood pressure (mmHg)	86.6	83.9	89.0	88.9	81.7	79.6	81	77
Percent with hypertension	44.6	44.9	29.5	71.2	57.1	36.4	56	45
Mean total cholesterol (mg/dl)	226.9	246.9	207.1	233.7	226.7	229.3	209	235
Mean LDL cholesterol (mg/dl)	138.4	162.4	121.0	140.0	135.9	143.6	125	141
Mean HDL cholesterol (mg/dl)	42.1	48.7	55.4	49.2	44.5	60.6	49	63
Mean fasting triglycerides (mg/dl)	200.9	187.5	131.0	154.9	221.8	125.1	189	156
Percent with total cholesterol \geq 240 mg/dl	44.3	51.2	16.1	33.5	36.7	40.9	21	45
Percent with LDL cholesterol \geq 160 mg/dl	34.3	49.9	8.7	23.9	24.5	36.4	13	33
Percent with HDL cholesterol $<$ 35 mg/dl	25.0	10.3	20.5	18.1	26.5	0	16	1
Percent with triglycerides \geq 250 mg/dl	21.5	25.3	0.0	14.1	24.5	4.5	22	15

NHANES II, 1976-80 Second National Health and Nutrition Examination Survey; BMI, body mass index; LDL, low-density lipoprotein; HDL, high-density lipoprotein; CT, computed tomography. Hypertension defined as systolic blood pressure \geq 160 mmHg or diastolic blood pressure \geq 95 mmHg or using antihypertensive medication; values for blood pressure includes values for subjects using antihypertensive medications; blanks indicate that data were not available. NHANES II subjects exclude Hispanics.

Source: 1976-80 Second National Health and Nutrition Examination Survey unpublished data; References 10 and 11

Appendix 7.47

Values for Metabolic Variables in Hispanic and Non-Hispanic Subjects with NIDDM in U.S. Population Samples and in Community-Based Studies

	Age 40-64 years HHANES		Age 40-64 years San Luis Valley, CO		Age 40-64 years San Luis Valley, CO		Age 40-64 years San Antonio, TX		Age 40-64 years San Antonio, TX	
	Mexican- American men	Mexican- American women	Hispanic men	Hispanic women	Anglo men	Anglo women	Mexican- American men	Mexican- American women	Anglo men	Anglo women
Previously diagnosed diabetes										
Mean fasting plasma glucose (mg/dl)			191.8	197.8	184.0	171.5	181.9	188.2	162.8	167.7
Mean 2-hour plasma glucose (mg/dl)			309.8	331.6	299.5	287.0	326.8	333.5	308.0	288.5
Mean fasting insulin (μ u/ml)			21.8	24.5	22.7	26.2	24.6	29.8	25.7	26.6
Mean 2-hour insulin (μ u/ml)			87.6	98.7	79.3	116.7	57.6	78.5	52.2	73.6
Mean number of years since diagnosis of diabetes	6.8	8.0	7.6	7.7	6.0	9.1	6.6	10.1	8.8	9.9
Newly discovered diabetes										
Mean fasting plasma glucose (mg/dl)	141.6	125.2	164.6	143.4	125.5	165.3	155.2	151.6	161.8	120.5
Mean 2-hour plasma glucose (mg/dl)	268.1	260.1	269.2	267.0	244.3	280.2	295.0	289.6	298.4	235.3
Mean fasting insulin (μ u/ml)			19.2	23.6	25.2	22.7	22.2	28.0	19.8	23.8
Mean 2-hour insulin (μ u/ml)			101.4	108.2	105.3	84.4	98.9	139.4	84.1	151.3
All diabetic subjects combined										
Percent with self-reported history of diabetes in mother and/or father			43.5	46.9	37.3	37.5				
Mean BMI	28.0	31.4	27.6	30.4	29.0	31.1	29.7	32.1	28.6	31.3
Percent with BMI \geq 25	83.0	94.0	74.0	84.9	83.0	82.9	83.1	87.4	81.3	79.4
Percent with BMI \geq 30	27.4	52.2	31.5	47.2	35.8	48.6	41.9	58.7	25.0	52.9
Percent with BMI \geq 35	3.2	22.8	2.7	17.9	9.4	31.4	14.5	26.7	9.4	23.5
Mean subscapular-to-triceps skinfold ratio	1.89	1.15	1.74	1.19	1.77	1.02	1.93	1.32	1.72	1.33
Mean waist-to-hip ratio			1.00	0.91	0.99	0.91	0.98	1.00	0.98	1.16
Mean systolic blood pressure (mmHg)	134.5	131.0	134.1	136.8	134.5	134.8	132.0	129.4	132.2	129.6
Mean diastolic blood pressure (mmHg)	83.6	77.1	82.5	79.8	81.1	77.7	75.9	73.4	77.6	71.9
Percent with hypertension	25.0	22.8	45.2	52.8	49.1	71.4	25.8	22.3	31.3	47.1
Mean total cholesterol (mg/dl)	220.3	224.5	206.6	244.3	207.2	220.8	215.7	218.8	216.2	221.4
Mean LDL cholesterol (mg/dl)	132.5	127.5	126.3	148.2	132.6	123.3	138.0	137.7	137.9	138.0
Mean HDL cholesterol (mg/dl)	43.2	46.6	41.2	47.1	40.1	43.7	38.0	43.9	39.6	44.4
Mean fasting triglycerides (mg/dl)	197.9	185.0	212.4	268.9	186.1	246.0	262.4	198.5	276.6	212.6
Percent with total cholesterol \geq 240 mg/dl	27.9	28.0	22.2	45.7	15.1	31.4	20.2	25.7	18.8	26.5
Percent with LDL cholesterol \geq 160 mg/dl	18.1	20.8	16.7	33.0	18.8	18.8	23.4	25.7	21.9	29.4
Percent with HDL cholesterol $<$ 35mg/dl	20.6	16.6	27.8	15.2	40.4	25.7	48.4	22.3	53.1	20.6
Percent with triglycerides \geq 250 mg/dl	12.9	6.7	27.8	35.2	17.0	37.1	33.9	22.3	31.3	20.6

BMI, body mass index; LDL, low-density lipoprotein; HDL, high-density lipoprotein; HHANES, 1982-84 Hispanic Health and Nutrition Examination Survey. Hypertension defined as systolic blood pressure \geq 160 mmHg or diastolic blood pressure \geq 95 mmHg or using antihypertensive medication; values for blood pressure includes values for subjects using antihypertensive medications; blanks indicate that data were not available.

Source: 1982-84 Hispanic Health and Nutrition Examination Survey unpublished data; References 12 and 13

Appendix 7.48

Values for Metabolic Variables in Native American Diabetic Subjects in the Strong Heart Study, Age 45-64 Years

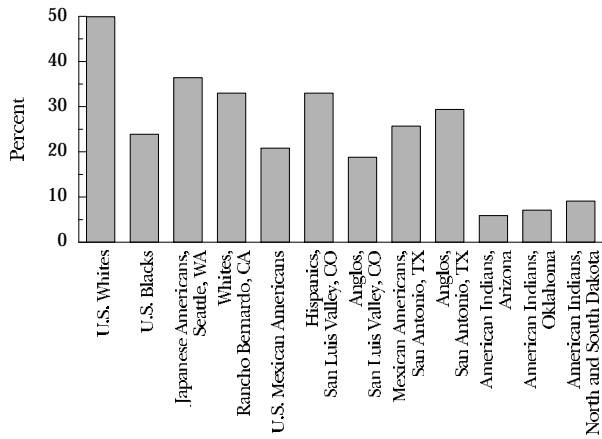
	Arizona		Oklahoma		South Dakota/North Dakota	
	Men	Women	Men	Women	Men	Women
Previously diagnosed diabetes						
Mean fasting plasma glucose (mg/dl)	221.1	242.6	197.4	211.9	210.9	225.4
Mean 2-hour plasma glucose (mg/dl)	341.9	356.1	298.6	247.4	297.1	275.8
Mean fasting insulin (μ u/ml)	23.5	29.7	24.1	29.4	21.6	26.5
Mean number of years since diagnosis of diabetes	13.0	14.0	9.0	10.8	7.9	9.0
Newly discovered diabetes						
Mean fasting plasma glucose (mg/dl)	154.0	164.7	168.5	156.2	149.7	149.5
Mean 2-hour plasma glucose (mg/dl)	257.1	287.8	254.9	256.2	256.0	262.5
Mean fasting insulin (μ u/ml)	30.0	32.3	29.0	29.6	26.5	27.2
All diabetic subjects combined						
Percent with self-reported history of diabetes in mother and/or father	62.3	63.1	47.0	61.7	52.2	48.9
Mean BMI	31.2	33.4	32.7	33.7	30.7	31.9
Percent with BMI \geq 25	85.2	89.1	93.4	94.5	90.0	90.6
Percent with BMI \geq 30	48.4	66.1	64.7	71.0	56.3	60.6
Percent with BMI \geq 35	20.1	35.8	28.7	40.3	12.5	26.0
Mean waist-to-hip ratio	0.97	0.96	0.98	0.94	1.01	0.96
Mean systolic blood pressure (mmHg)	131.2	131.0	134.8	130.0	127.5	122.8
Mean diastolic blood pressure (mmHg)	81.6	76.6	83.3	76.9	80.3	74.8
Percent with hypertension	39.4	32.4	41.9	41.2	25.6	24.2
Mean total cholesterol (mg/dl)	181.1	184.1	190.7	197.2	203.9	203.9
Mean LDL cholesterol (mg/dl)	100.4	105.6	115.5	115.5	118.2	118.7
Mean HDL cholesterol (mg/dl)	43.0	43.7	38.9	44.4	37.8	43.6
Mean fasting triglycerides (mg/dl)	190.5	173.5	179.9	179.4	224.7	197.6
Percent with total cholesterol \geq 240 mg/dl	6.7	10.7	5.4	12.2	16.9	15.0
Percent with LDL cholesterol \geq 160 mg/dl	2.8	5.9	9.6	7.1	8.1	9.1
Percent with HDL cholesterol $<$ 35 mg/dl	29.3	20.7	39.5	16.4	34.4	21.7
Percent with triglycerides \geq 250 mg/dl	16.6	15.7	18.0	16.8	23.1	21.5

BMI, body mass index; LDL, low-density lipoprotein; HDL, high-density lipoprotein. Hypertension defined as systolic blood pressure \geq 160 mmHg or diastolic blood pressure \geq 95 mmHg or using antihypertensive medication; values for blood pressure includes values for subjects using antihypertensive medications. American Indian tribes are: Arizona—Pima, Maricopa; Oklahoma—The Seven Tribes (Apache, Caddo, Comanche, Delaware, Fort Sill Apache, Kiowa, Wichita); North Dakota/South Dakota—Oglala Sioux, Cheyenne River Sioux, Devil's Lake Sioux.

Source: Reference 14

Appendix 7.49

Percent with LDL Cholesterol ≥ 160 mg/dl in Women with NIDDM in U.S. and Community-Based Studies

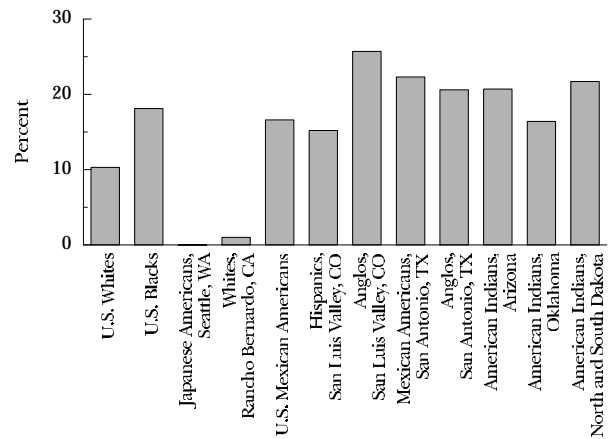


LDL, low-density lipoprotein. See Appendices 7.46-7.48 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14

Appendix 7.50

Percent with HDL Cholesterol < 35 mg/dl in Women with NIDDM in U.S. and Community-Based Studies

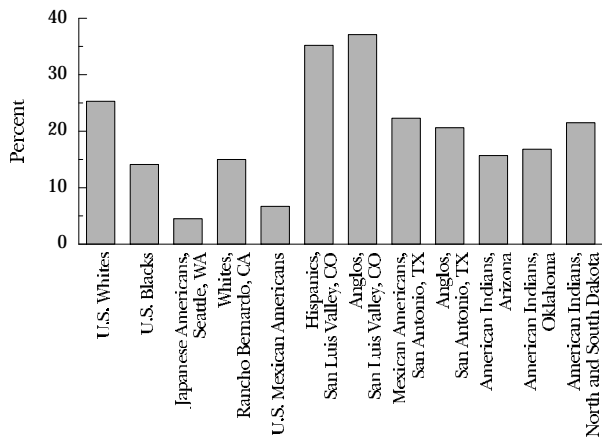


HDL, high-density lipoprotein. See Appendices 7.46-7.48 for further details. Rate in Japanese American women in Seattle, WA was 0%.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14

Appendix 7.51

Percent with Serum Triglycerides ≥ 250 mg/dl in Women with NIDDM in U.S. and Community-Based Studies



See Appendices 7.46-7.48 for further details.

Source: 1976-80 Second National Health and Nutrition Examination Survey, 1982-84 Hispanic Health and Nutrition Examination Survey, and References 10-14