Serum Cholesterol Levels of Persons 4-74 Years of Age

by Socioeconomic Characteristics

United States, 1971-74

Serum cholesterol levels are presented and discussed by annual family income, education, and urbanization status for persons aged 4-74 years and by geographic region for adults aged 18-74 years in the United States, 1971-74. A comparison is made by income and education with serum cholesterol levels of adults of similar ages in the United States, 1960-62.

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SERUM CHOLESTEROL LEVELS OF
PERSONS 4-74 YEARS OF AGE
BY SOCIOECONOMIC CHARACTERISTICS

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INTRODUCTION

This report contains estimates of the total serum cholesterol levels of persons aged 4-74 grouped by socioeconomic characteristics from the first Health and Nutrition Examination Survey of 1971-74. Previous reports presented and analyzed serum cholesterol levels in the United States grouped by age, sex, and race.[1,2] This report carries the analysis further by considering selected measurable socioeconomic characteristics. The Health Examination Survey, a major program of the National Center for Health Statistics, was established by the 85th Congress in 1956 to determine the health status of the U.S. population.[3] The programs of the Health Examination Survey are designed to collect data by direct examination of probability samples of the civilian noninstitutionalized population of the United States; the data include measures of nutritional status as well as an assessment of health and medical care needs.

The first Health and Nutrition Examination Survey began in April 1971 and was completed in October 1974. Of the 28,043 persons selected in the national probability sample to represent 194 million persons aged 1-74 years in the civilian noninstitutionalized population, 20,749 persons or 74 percent were examined. Among those aged 4-74 years for whom serum cholesterol determinations were made, 19,005 persons were examined out of a probability sample of 25,928 selected to represent a population of 184 million. This number represents an unadjusted response rate of 73 percent.

The nutrition examination consisted of a general medical examination by a physician who screened for nutritional deficiencies, a skin examination by a dermatologist, and an oral examination by a dentist. Body measurements were taken by a trained technician; a dietary interview consisted of a 24-hour recall and a food frequency questionnaire; and numerous laboratory tests were performed on whole blood, serum, plasma, and urine. Additional information on the Health and Nutrition Examination Survey operations and sampling design is available.[4]

In this report, the total serum cholesterol values are analyzed with respect to age, sex, race, annual family income, education, urbanization, and geographic region. Furthermore, the adult serum cholesterol levels (18-74) from the Health and Nutrition Examination Survey are compared with those of the first Health Examination Survey, 1960-62.

SERUM CHOLESTEROL

COLLECTION AND STORAGE —
HES AND HANES

A blood specimen was collected from each nonfasting Health Examination Survey (HES) examinee in a 15-cm^3 Sheppard-Keidel tube. The tube was kept at room temperature for a minimum of 1 hour after venipuncture and then refrigerated for a minimum of 6 hours to ensure a good clot. The blood clot was freed gently from the tube, and the tube was centrifuged for 20 minutes. An aliquot of 1 cm^3 of serum was transferred to a prenumbered serum vial and frozen. The accumulated vials were placed in styrofoam containers, packed with dry ice, and shipped to the Lipid Standardization Laboratory of the former Communicable Disease Center (CDC), Public Health Service, Atlanta, Ga., twice a week.

A blood specimen was collected from each nonfasting Health and Nutrition Examination Survey (HANES) examinee and stored in three 15-cm^3 vacuum tubes, which were then kept at room temperature for 20-30 minutes. A blood clot was gently rimmed from each tube, and the tubes were centrifuged for 10 minutes at 2,400 r/min. The serum from the three vials was pooled, mixed thoroughly, and distributed in 3-cm^3 aliquots to prenumbered vials. Within 1 hour of venipuncture, these serum vials were placed in the freezer. Daily accumulations of vials were placed with ample dry ice in styrofoam shippers and sent to the Atlanta CDC laboratory, no thawing occurred in transit. On arrival, the vials were stored at $-20°C$. Multiple assessments were performed on each 3-cm^3 vial of serum. The serum eventually used for the cholesterol assessment was tested at CDC for iron, iron-binding capacity, and magnesium determinations. The remaining serum in each vial was refrigerated and then packed in dry ice for shipment to the CDC Lipid Laboratory at Chamblee, Ga. The serum remained frozen at $-20°C$ until analyzed for cholesterol content. Thawing and freezing the serum do not affect the determinations of cholesterol content by competent extraction methods.[5]

CHOLESTEROL DETERMINATION—
HES AND HANES

Serum cholesterol determinations also were made for HES examinees at CDC by using a modified ferric chloride technique. A comparative study of methods to determine cholesterol levels at the CDC during the Health Examination Survey showed that when compared with the reference method of Abell, Levy, Brodie, and Kendall,[6] the ferric-sulfuric method in use overestimated the cholesterol concentration. Therefore, the data in the HES report presented here are the original ferric chloride values reduced by a factor of 7.6 percent to approximate the determinations of Abell et al.[7] All serum cholesterol determinations for HANES examinees were made in the Lipid Standardization Laboratory of the Center for Disease Control (CDC). The analytical method was based on that of Abell et al.,[7] but it was modified for a semiautomated production line. The method, described in detail by Eavenson et al.,[8] was made possible by the development of a relatively stable Liebermann color reagent and was designed for automatic pipetting units.

The Lipid Laboratory at CDC compared the results obtained from the semiautomated method with those obtained from the reference method of Abell et al.[7] To examine the bias of the semiautomated method, data were obtained from pools of sera analyzed by the reference method and by the semiautomated method. In 1972, for pools ranging from 134 to 343 mg/100 ml, an average positive bias of 4.07 percent for the semiautomated method was found when compared with the standard method; for 1973-74 the corresponding figure was a positive bias of 4.9 percent. The weighted average bias was 4.5 percent. In this report, serum cholesterol data are presented with a reduction of 4.5 percent to approximate determinations by Abell et al.[7] and to make them comparable to HES Cycle I data.

FINDINGS

Both to confirm visual impressions and to examine the relationship between socioeconomic status and serum cholesterol levels, two statistical tests (Bonneferroni when more than one test was implied and Z for comparison of means between HES and HANES) were used as described in appendix I.

Unless otherwise stated, the findings discussed in this section of the report are based on observed differences in the mean serum cholesterol levels grouped by socioeconomic status.

ANNUAL FAMILY INCOME

Children and Youths

Age.—The distribution of the mean serum cholesterol levels by age, sex, and annual family income is presented in table 1.

Among children and youths aged 4-17 years, the mean serum cholesterol levels showed irregular patterns across income levels for each of the three age categories: 4-5, 6-11, and 12-17 years. Children aged 6-11 years had the highest mean serum cholesterol levels at each income group followed by children aged 4-5 years with youths aged 12-17 years having the lowest level for most income groups. As family income increased from less than $4,000 to $15,000 or more per year, the mean serum cholesterol levels of children and youths aged 4-17 years were stable with a narrow range from 166.9 to 168.4 mg/100 ml. This range represents the largest change between any two income groups. This small difference can probably be attributed to sampling variations signaling no real income effect on the cholesterol level.

Sex and age.—Among boys aged 4-17 years, those aged 6-11 years generally had the highest mean cholesterol levels followed by boys aged 12-17 years with those aged 4-5 years having generally the lowest levels across income groups. Boys aged 4-5 years showed the largest difference in the mean levels between those with an income range of $4,000-$6,999 and those with an income range of $15,000 or more per year by

10.3 mg/100 ml. The mean level of boys aged 6-11 and 12-17 years generally increased with small differences in the mean levels as income increased. The mean serum cholesterol for girls aged 4-17 years generally showed the same trends as those shown for boys. Girls aged 6-11 years had the highest mean cholesterol levels of the three age categories across each income group except the $4,000-$6,999 range. This income group had a slight increase in the mean serum cholesterol level with age: from 165.5 mg/100 ml at age 4-5 years to 168.3 mg/100 ml at age 12-17 years. Overall, for girls aged 4-17 years, the mean levels were generally comparable as income increased. Nevertheless, the observed levels for girls were higher at each income group than for boys except for those whose family income was between $4,000 and $6,999, at this level the mean cholesterol values were practically the same (figures 1 and 2).

Age, sex, and race.—The mean serum cholesterol levels showed distinct patterns for white boys over the three age categories of 4-5, 6-11, and 12-17 years by family income (table 2 and
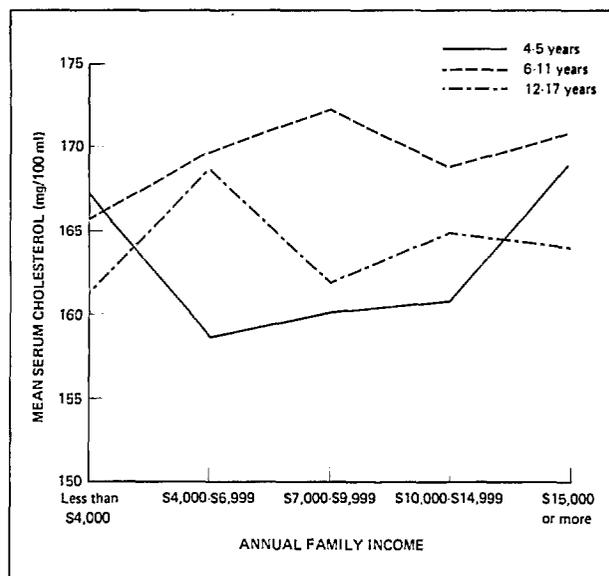
Figure 1. Mean serum cholesterol levels of boys aged 4-17 years, by annual family income and age: United States, 1971-74

figure 3). A large decrease in the mean levels is observed across groups with less than $4,000 and the $4,000-$6,999 range for white boys aged 4-5 years; the mean level increased but did not reach the peak of the lowest income group. The greatest difference in the mean (although nonsignificant), 13.4 mg/100 ml, occurred be- tween the lowest and the $7,000-$9,999 income groups for white boys aged 6-11 years. Despite an increase of 9.0 mg/100 ml between the first two income groups for white boys aged 12-17 years, no real change occurred as income increased. Overall, the mean serum cholesterol level showed small observed differences and no real differences among income groups for white boys aged 4-17 years.

For black boys, the mean serum cholesterol levels were generally higher than those for white boys (table 2 and figure 4). Only two age-income groups of black boys had lower mean serum cholesterol levels than white boys—those aged 4-5 years with family incomes less than $4,000 and those aged 6-11 years with family incomes between $7,000 and $9,999. The mean level for black boys aged 4-5 years increased with no consistent pattern across income groups. The pattern for black boys aged 6-11 and 12-17 years were the same across each income group; however, the observed mean levels for those aged 6-11 years were higher at each income group. Overall, the mean level for black boys aged 4-17 years generally increased with an increase in family income.

The mean serum cholesterol levels of white and black girls are shown in table 3. The mean levels of white girls aged 4-5 years showed
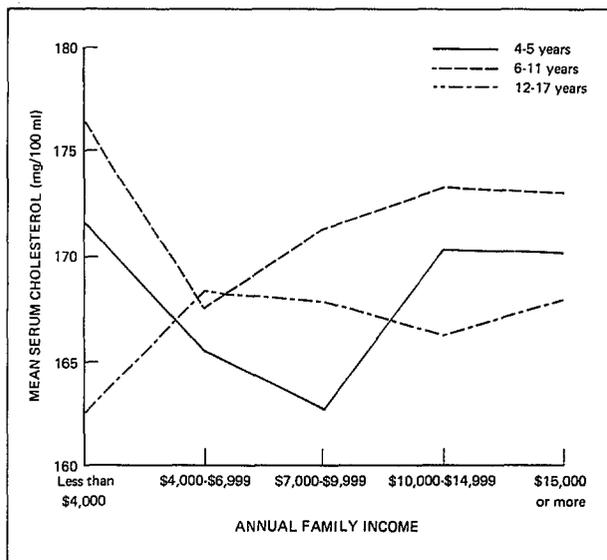
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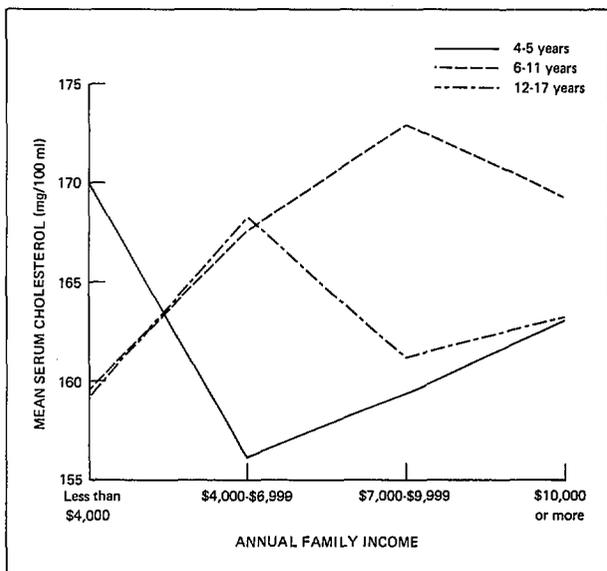
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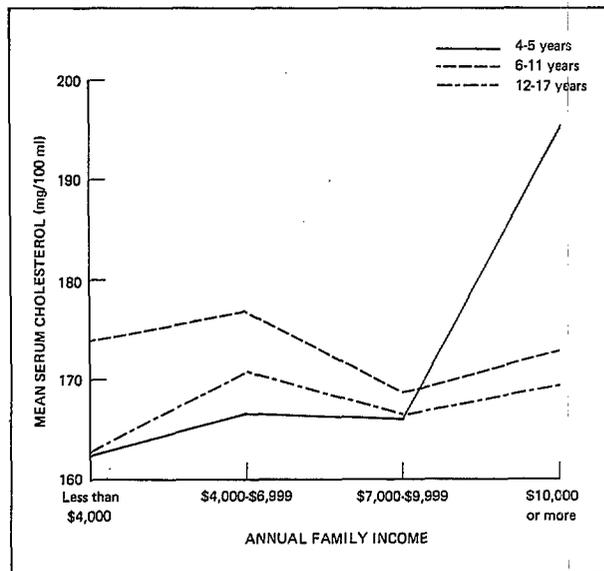
Figure 4. Mean serum cholesterol levels of black boys aged 4-17 years, by annual family income and age: United States, 1971-74

observed differences as large as 9.2 mg/100 ml between the lowest and the $7,000-$9,999 income levels, but these differences were not found to be significant. As shown in figure 5, the mean levels for white girls aged 6-11 and 12-17 years displayed directly opposite patterns across each income group. The fluctuation in the mean level appeared to be random with no real difference in the mean as income levels increased. Overall, the mean cholesterol level increased but not significantly over each income group for white girls aged 4-17 years from 165.0 mg/100 ml for those with a family income of less than $4,000 to 169.4 mg/100 ml for those with a family income of $10,000 or more per year. The observed mean levels for white girls were generally higher than those for white boys but generally were lower than those for black boys across each income group.

Large differences in mean serum cholesterol levels were observed by age across income groups for black girls. The mean level of black girls aged 4-5 years as shown in figure 6 decreased rapidly across the first two income groups, but then increased rapidly from 163.1 mg/100 ml at the income range of $4,000-$6,999 to 182.8 mg/100 ml at the income range of $7,000-$9,999 and then continued to increase to 188.7 mg/100 ml at the highest income group of $10,000 or

Figure 6. Mean serum cholesterol levels of black girls aged 4-17 years, by annual family income and age: United States, 1971-74

more per year. The mean pattern for black girls aged 6-11 showed a generally decreasing trend with the lowest income group having the highest mean serum cholesterol level. The mean serum cholesterol level increased consistently across each income group from 166.1 mg/100 ml at the lowest income level to 188.3 mg/100 ml at the highest income group for black girls aged 12-17 years. Despite these large observed differences none were statistically significant. Overall, the mean serum cholesterol levels of black girls aged 4-17 years decreased slightly between the first two income groups and then increased across the remaining income groups. Black girls aged 4-17 years generally had the highest mean serum cholesterol levels of the four race-sex groups and they were followed by black boys. White boys had the lowest mean serum cholesterol levels. Among black and white girls aged 4-17 years, those with a family income of $10,000 or more per year had the highest mean serum cholesterol levels.

Adults

Age.—The mean serum cholesterol levels of adults aged 18-74 years by age, sex, and annual family income are presented in table 1. The mean patterns by age showed little if any change

Figure 5. Mean serum cholesterol levels of white girls aged 4-17 years, by annual family income and age: United States, 1971-74

as income increased. As shown in table 1, the mean serum cholesterol levels generally increased with age and appeared to be unaffected by income level. Overall, the cholesterol level for adults aged 18-74 years showed no significant change between income groups as the level of income increased.

Sex and age.—The mean serum cholesterol level of males generally increased as income increased within each age group. As depicted in figure 7, observed differences in the mean levels among income groups for each age were generally small, however, a few large differences (e.g., 12.8, 12.4, 21.0, and 12.4 mg/100 ml for age groups 18-24 years between income groups of $10,000-$14,999 and $15,000 or more; 35-44 years between income groups less than $4,000 and $10,000-$14,999; 45-54 years between income groups $4,000-$6,999 and $15,000 or more; and 65-74 years between income groups $4,000-$6,999 and $7,000-$9,999, respectively) were associated with relatively large standard errors and were not statistically significant (table III, appendix I).

Overall, males aged 18-74 years did show a significant increase in their mean serum cholesterol levels from 207.4 to 217.7 mg/100 ml as

income increased from less than $4,000 to $15,000 or more per year.

The mean serum cholesterol levels for females by age across income groups are shown in figure 8. In the younger age groups (under age 45), the mean levels decreased at almost every income level; however, the reductions were not significant. The mean levels for females in age groups 45 and above showed larger differences among income groups, and the trend in the mean level, particularly for those aged 45-54 and 65-74 years, was opposite that for younger females. Females aged 65-74 years showed statistically significant increases in the mean levels between the lowest and the highest income groups and between the $7,000-$9,999 range and the highest income group. Overall, an inverse relationship was observed between the mean serum cholesterol and income levels for females aged 18-74 years. As income increased, the mean cholesterol level of females aged 18-74 years declined significantly from 221.3 to 210.8 mg/100 ml.

Race, sex, and age.—The mean serum cholesterol levels for white and black males aged 18-74 years grouped by age and annual family income are presented in table 2. The mean serum choles--terol levels showed no consistent patterns as in-


Figure 7. Mean serum cholesterol levels of males aged 18-74 years, by annual family income and age: United States, 1971-74
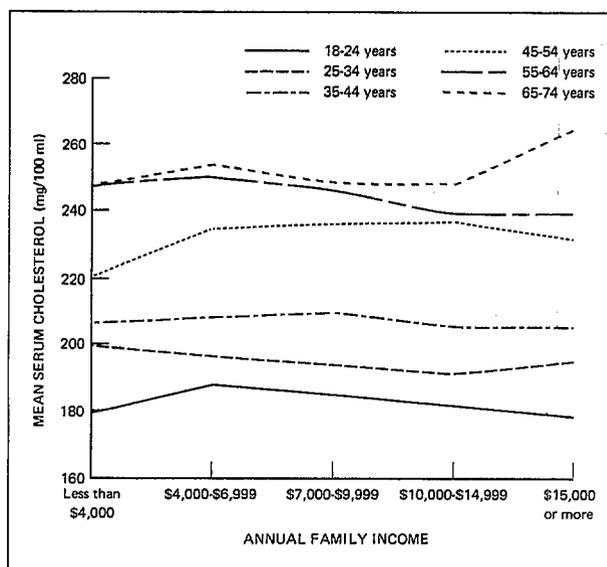

Figure 8. Mean serum cholesterol levels of females aged 18-74 years, by annual family income and age: United States, 1971-74

come increased within each of the six age groups. Generally, the highest cholesterol levels were found at the highest income group for white males over age 35; however, the differences in these means and means at other income levels were not statistically significant. No real differences were found among the means in the younger age groups as income increased; however, the overall observed mean level of white males aged 18-74 years did increase from 207.1 mg/100 ml at less than $4,000 to 214.7 mg/100 ml at $10,000 or more per year.

Black males younger than age 45 showed generally increasing mean serum cholesterol levels across income categories except for those in the youngest age category of 18-24 years. Marked differences of 28.9 and 21.2 mg/100 ml occurred between those with family incomes of less than $4,000 and $4,000-$6,999 and $7,000-$9,999 and $10,000 or more per year for those aged 18-24 and 25-34 years, respectively, and 33.9 mg/100 ml between those with incomes of less than $4,000 and $7,000-$9,999 per year for black males aged 35-44 years. These large observed differences may be associated with large sampling errors that resulted from the relatively small number of cases upon which these means are based (appendix I, table VII, and appendix III, table XVIII).

The mean level of black males aged 45-54 years decreased across each income group. The mean level of black males aged 55-64 years generally increased with income while black males aged 65-74 years showed small differences in their mean levels as income increased. Overall, mean serum cholesterol levels for black males aged 18-74 years showed no significant change as income levels increased.

Black males aged 18-74 years generally had lower mean serum cholesterol levels than white males aged 18-74 years had at each income group.

The mean serum cholesterol levels of white and black females aged 18-74 years are presented in table 3. The mean levels for white females aged 18-24 years increased rapidly between the lowest two income groups and then decreased consistently across the remaining income groups. The mean patterns for white females aged 25-34 and 55-64 years were the same across each income group. As income in-

creased, the mean serum cholesterol levels decreased steadily across each income group; however, the decline was generally faster in the age group 55-64 years. Mean serum cholesterol levels of white females aged 35-44 years increased from 206.4 mg/100 ml at less than $4,000 to 210.6 mg/100 ml for those with income ranges between $7,000 and $9,999 per year and then decreased to a mean level below that of the lowest income group. For those aged 65-74 years, the mean level generally increased with an irregular pattern as income increased. Overall, for white females, as income increased from less than $4,000 to $10,000 or more per year, the mean serum levels showed an inverse relationship and decreased significantly from 223.7 mg/100 ml to 209.7 mg/100 ml, respectively, a decrease of 14.0 mg/100 ml between the lowest and highest income groups.

The mean level for black females aged 18-24 years increased consistently at each income group; the opposite was true for those aged 25-34 years. Black females in the other age groups showed no consistent patterns in their mean cholesterol levels as income increased. Overall, the mean serum cholesterol levels of black females aged 18-74 years generally decreased as income increased. Across the income levels black females had generally lower mean serum cholesterol levels than white females had. The differences in the mean levels between the races for females aged 18-74 years generally decreased as income increased.

EDUCATION

Children and Youths

Age.—The mean serum cholesterol levels of children and youths aged 4-17 years grouped by educational level of the head of the household, sex, and single year of age are presented in tables 4 and 5. For children aged 4-5 years, the mean serum cholesterol levels remained about the same as the educational level of the head of household increased. The pattern of mean levels for both children aged 6-11 and youths aged 12-17 years generally increased as the educational level increased. Overall, for children aged 4-5, 6-11, and youths aged 12-17 years, the observed mean levels increased by 1.0, 3.1, and 5.3 mg/

100 ml, respectively, between the lowest and highest education levels.

Sex and age.—The mean serum cholesterol levels for boys aged 4-5 years generally increased as educational level of head of household increased. No change was observed in the mean level of boys aged 6-11 years as the educational level increased. The differences were small enough to be attributed to sampling variations. The mean serum cholesterol levels for boys aged 12-17 years increased slowly across education categories from 161.8 mg/100 ml for those whose heads of households had less than 9 years of education to 167.1 mg/100 ml for those with heads of households with 13 years or more education. The mean serum cholesterol levels for boys are shown in figure 9 by education and age.

The mean serum cholesterol level of girls aged 4-5 years showed no real change as educational level increased from its lowest to highest level. The mean serum cholesterol level of girls aged 6-11 years generally increased across educational levels. The pattern for girls aged 12-17 years showed an irregular but generally increasing pattern as educational levels increased. The greatest difference in the mean level, 7.4 mg/100 ml, occurred between those whose head of household had 9-11 years of education and those whose head had 13 years or more of education (figure 10). No statistically significant difference was found between the means for the 4-5, 6-11, or 12-17 age groups across the educational levels.

Race, sex, and age.—The mean serum cholesterol levels for white boys generally increased with an increase in the educational levels of the heads of households for the 4-5, 6-11, and 12-17 age groups; however, no significant differences occurred in the mean levels. Overall, white boys aged 4-17 years showed no real change in the mean level between the lower two educational levels; a slight increase in the mean level was observed between the categories 12 years and 13 years or more of education; the greatest difference in the mean level, 4.3 mg/100 ml, occurred between the educational levels of 9-11 years and 13 years or more. The mean serum cholesterol levels of black boys aged 4-17 years showed no consistent pattern as the educational level increased. Those black boys whose head of household had 9-11 years of education had the lowest mean serum cholesterol levels, and those whose household head had less than 9 years of education had the highest, however, the mean levels for less than 9 years and 12 years of education of head of household were practically the same.
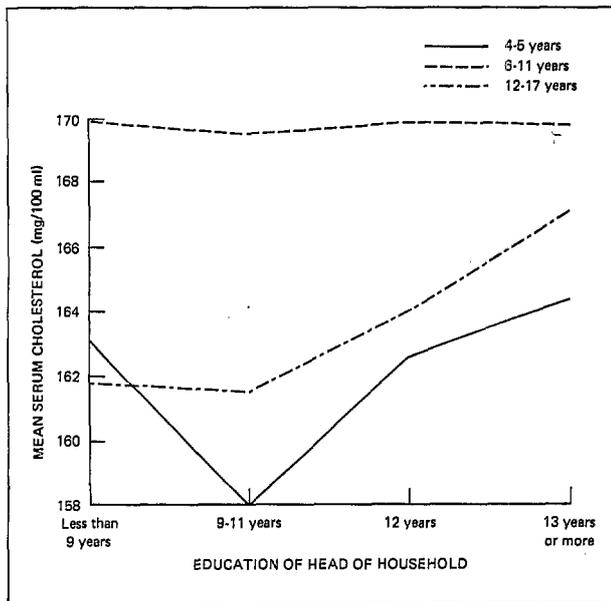
Figure 9. Mean serum cholesterol levels of boys aged 4-17 years, by education of head of household and age: United States, 1971-74
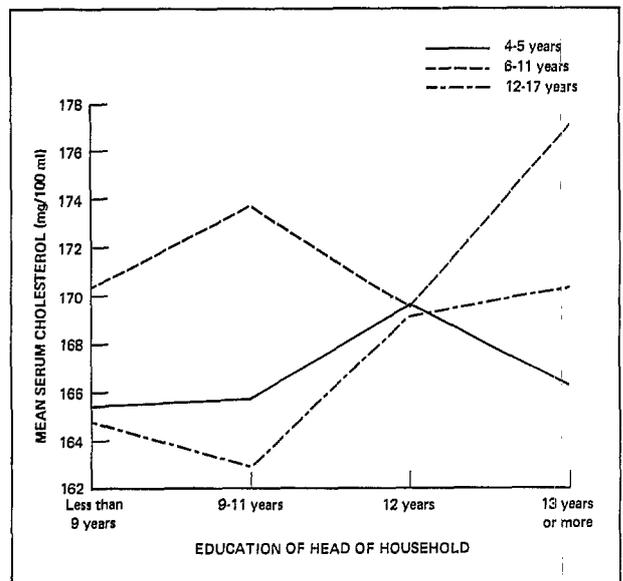
Figure 10. Mean serum cholesterol levels of girls aged 4-17 years, by education of head of household and age: United States, 1971-74

White boys aged 4-17 years had consistently lower mean serum cholesterol levels at each educational level than black boys had (table 7).

The mean levels for white girls generally showed the same patterns as did the levels for white boys in the 4-5, 6-11, and 12-17 age groups as the educational level increased. However, girls aged 12-17 years showed significantly higher mean levels for those whose head of household had 13 years or more of education than those whose head of household had 9-11 years of education. Overall, the mean levels of white girls aged 4-17 years generally increased across educational levels. The mean levels for black girls aged 4-17 years showed no change in the means between the lowest and highest educational groups. However, the levels increased between the first and second educational groups from 172.2 to 177.9 mg/100 ml and then declined to 172.1 mg/100 ml at the highest educational level (table 7).

Adults

Age.—The overall mean serum cholesterol levels of adults aged 18-74 years showed an inverse relationship with educational levels. As the level of education increased from less than 9 years to 13 years or more, the mean serum cholesterol level decreased significantly from 225.8 to 207.3 mg/100 ml. The distribution by education and age is presented in table 6.

Sex and age.—The patterns across the educational levels for each age group are shown in figures 11 and 12 for males and females. No significant reductions were found in the mean level for each age group as educational levels increased for males, but the opposite was true for females. Overall, both males and females aged 18-74 years showed statistically significant reductions in their mean levels—11.1 and 26.3 mg/100 ml, respectively.

Race, sex, and age.—As educational level increased from less than 9 years to 13 years or more, the mean serum cholesterol level of white males aged 18-74 years decreased significantly from 219.9 to 208.0 mg/100 ml. Black males aged 18-74 years showed a significant decrease in mean level from 217.4 at less than 9 years of education to 196.7 mg/100 ml at 12 years of education and increased to 210.6 mg/100 ml at 13 years or more of education. However, the

reduction between the lowest and highest levels was not significant. The distribution by educational level and age for white and black males is shown in table 8. The mean serum cholesterol levels of both white and black females aged 18-74 years decreased consistently across each educational level. The overall decline was most
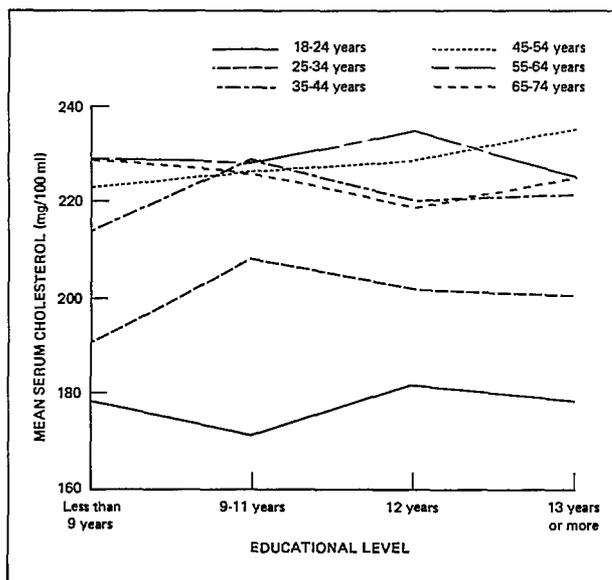
Figure 11. Mean serum cholesterol levels of males aged 18-74 years, by educational level and age: United States, 1971-74
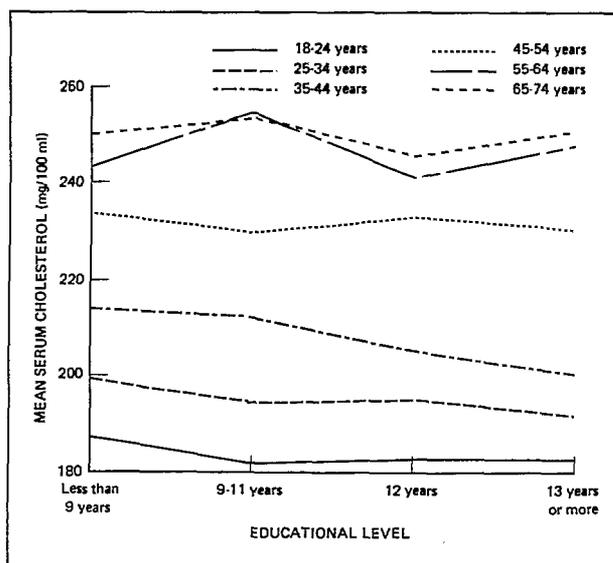
Figure 12. Mean serum cholesterol levels of females aged 18-74 years, by educational level and age: United States, 1971-74

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rapid between the lower two educational levels for both races. The mean decreased significantly by 26.5 and 28.7 mg/100 ml between the lowest and highest educational levels, respectively, for white and black females aged 18-74 years. At each educational level white females had consistently higher mean serum cholesterol levels than black females had (table 9).

URBANIZATION

Children and Youths

Age.—The mean serum cholesterol level of children and youths aged 4-17 years by urbanization status is shown in table 10. The mean levels for the three age groups, 4-5, 6-11, and 12-17 years, were consistently higher for those living in urbanized areas of one million persons than for those living in urbanized areas of less than one million persons. No real difference was found among urbanized and nonurbanized areas. Overall, the mean serum cholesterol level of children and youths aged 4-17 years was highest for children living in urbanized areas of one million persons or more and generally the lowest for those living in urbanized areas of less than one million persons; however, the mean difference between these two areas was not significant.

Sex and age.—The observed mean serum cholesterol level was higher for boys living in urbanized areas of one million persons or more than in urbanized areas of less than one million persons for each age category except 4-5 years. For nonurbanized areas, boys living in urban areas had consistently higher mean serum cholesterol levels at each age category than boys living in rural areas. For each age cagetory, 4-5, 6-11, and 12-17 years, boys living in rural areas had generally lower mean serum cholesterol levels than those living in any other areas (figure 13). Overall, boys aged 4-17 years living in urbanized areas of one million persons or more had the highest mean serum cholesterol level; however, no real difference in the mean level existed between these boys and boys aged 4-17 years living in any other area.

Girls aged 4-5, 6-11, and 12-17 years living in urbanized areas of one million persons or
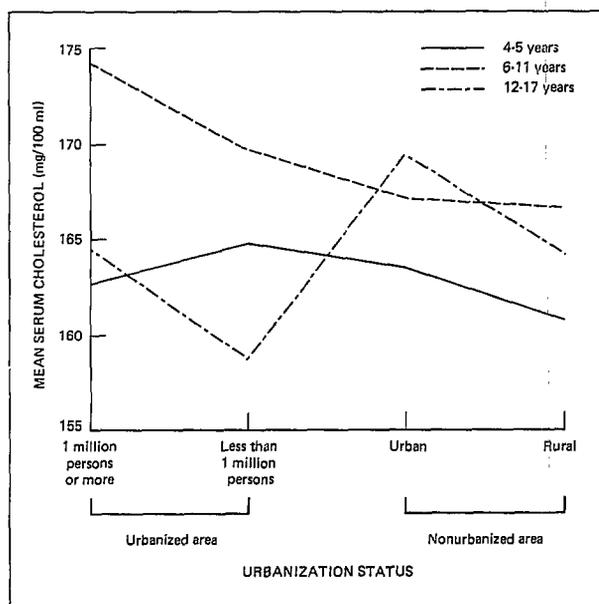
Figure 13. Mean serum cholesterol levels of boys aged 4-17 years, by urbanization status and age: United States, 1971-74

more had higher observed mean serum cholesterol levels than their cohorts living in urbanized areas of less than one million persons. The observed differences were relatively large for girls aged 4-5 and 6-11 years but almost negligible for those aged 12-17 years. For nonurbanized areas, the mean levels were generally the same for urban and rural areas for each age category (figure 14). Similarly to the pattern for boys aged 4-17 years the largest difference in the mean level occurred between girls living in the two urbanized areas. Overall, no real change occurred in the mean levels regardless of the residential area for girls aged 4-17 years. Thus, urbanization status was not an important factor affecting the mean serum cholesterol levels of of girls aged 4-17 years.

Race, sex, and age.—The mean serum cholesterol levels of white and black boys by urbanization status are presented in table 11. The observed mean levels for white boys aged 6-11 and 12-17 years were higher for those living in urbanized areas of one million persons or more than for those living in urbanized areas with less than one million persons. The opposite was true for white boys aged 4-5 years. The mean level for white boys aged 4-5 years showed no significant change between those living in urban (non-

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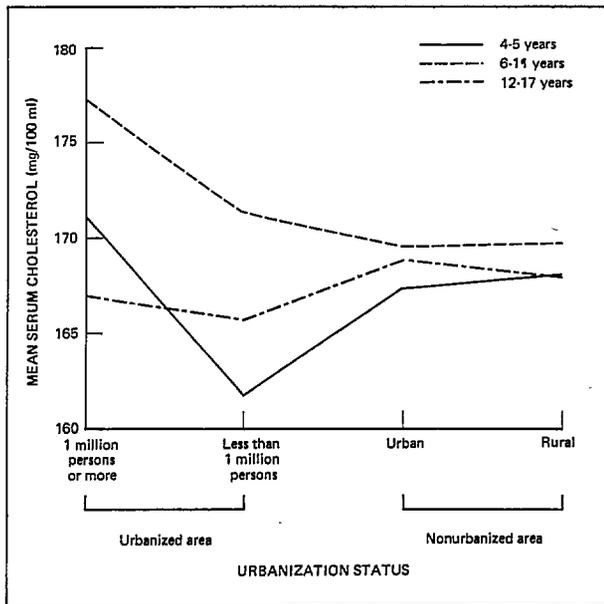
Figure 14. Mean serum cholesterol levels of girls aged 4-17 years, by urbanization status and age: United States, 1971-74

urbanized) areas and those living in rural areas. White boys aged 12-17 years living in urban areas had a higher mean serum cholesterol level than those living in rural areas. A significant reduction of 10.2 mg/100 ml occurred between white boys aged 6-11 years living in urbanized areas (one million persons or more) and those in rural areas. Overall, white boys aged 4-17 years living in urbanized areas of one million persons or more had the highest mean serum cholesterol level followed by those living in urban (nonurbanized) areas. White boys aged 4-17 years living in rural areas had the lowest mean cholesterol level. No real differences were found in the mean levels for white boys aged 4-17 years as urbanization status changed. The mean levels for black boys aged 4-5, 6-11, and 12 years showed no consistent trends as urbanization status changed from urbanized to rural. The mean levels for black boys living in nonurbanized areas were higher for those in urban areas for the age groups 4-5 and 12-17 years, and higher in rural areas for those aged 6-11 years. The overall trend for black boys aged 4-17 years was different from that for white boys aged 4-17 years. Black boys aged 4-17 years living in urbanized areas had the lowest mean serum cholesterol levels and those living in rural areas had the high-

est level. No significant changes occurred in the means as urbanization status changed for both black boys and white boys aged 4-17 years.

The mean serum cholesterol levels for white girls generally showed decreasing trends across the urbanization status categories for all the age groups except 12-17 years. For white girls living in urbanized areas, the mean levels were consistently higher for those living in areas of one million persons or more than for those living in areas with less than one million inhabitants for each age category. For each age category white girls living in urbanized areas of one million persons or more generally had higher mean cholesterol levels than those living in rural areas; however, the differences in the means were not significant. Overall, white girls aged 4-17 years living in urbanized areas of one million persons or more had the highest mean serum cholesterol level and those in urbanized areas of less than one million persons had the lowest. Black girls aged 4-5 years living in rural areas had the highest mean serum cholesterol level; in contrast, black girls aged 6-11 years living in rural areas had the lowest level. Urbanization status did not affect the mean cholesterol levels of black girls aged 12-17 years; their mean levels remained generally the same regardless of their place of residence. Overall, the mean serum cholesterol level for black girls aged 4-17 years decreased from 176.2 mg/100 ml for those living in urbanized areas of one million persons or more to 173.7 mg/100 ml for those living in rural areas (table 12). Mean differences by race were generally too small to suggest any significant relationship between urbanization status and mean serum cholesterol levels for girls aged 4-17 years.

Adults

Age.—For adults in the younger age groups 18-24 and 25-34 years, observed differences in the mean cholesterol levels were generally small as urbanization status changed. Of adults aged 35-44 years, those living in urban (nonurbanized) areas had the highest mean cholesterol level, and those living in urbanized areas of less than one million person had the lowest. Mean serum cholesterol levels of adults aged 45-54 years decreased from 236.3 mg/100 ml for those living in urbanized areas of one million persons or

more to 228.0 mg/100 ml for those living in urbanized areas, but with less than one million inhabitants; the mean remained at this level for those living in urban areas and then decreased slightly to 226.6 mg/100 ml for those living in rural areas. This urbanized-rural decline of 9.7 mg/100 ml was significant.

Adults aged 55-64 years living in urbanized areas of less than one million persons had higher mean serum cholesterol levels than persons of the same age living in any other area. As the level of urbanization changed from urbanized to rural areas, the mean serum cholesterol level of adults aged 65-74 years showed little if any observed difference until it reached its lowest level for persons living in rural areas (table 10). Overall, the mean serum cholesterol level of adults aged 18-74 years was highest for persons living in urbanized areas of one million inhabitants and lowest for those living in urban (non-urbanized) areas; however, this difference of 3.2 mg/100 ml was not large enough to show any real urbanization effect on the mean level for adults aged 18-74 years.

Sex and age.—The mean serum cholesterol levels for each level of urbanization status were higher for males than for females for age groups 25-34 and 35-44 years but generally lower for males than for females at every other age-urbanization group. The mean levels for each of the six age categories generally decreased as urbanization status changed from urbanized to rural areas for males except at age 25-34 years. Females showed relative small differences in the younger ages less than 45, but generally larger differences in ages 45 and over (figures 15 and 16). Overall, the mean level for males aged 18-74 years decreased slightly from 213.7 mg/100 ml for those living in urbanized areas to 210.4 mg/100 ml for those living in rural areas. For females aged 18-74 years, the mean level also showed a narrow band from 215.9 mg/100 ml for those living in urbanized areas to 213.6 mg/100 ml for those living in rural areas. These overall mean differences between urbanized and rural areas were not significant for either males or females aged 18-74 years.

Race, sex, and age.—The mean levels by urbanization status and age for white and black males are presented in table 11. For white and
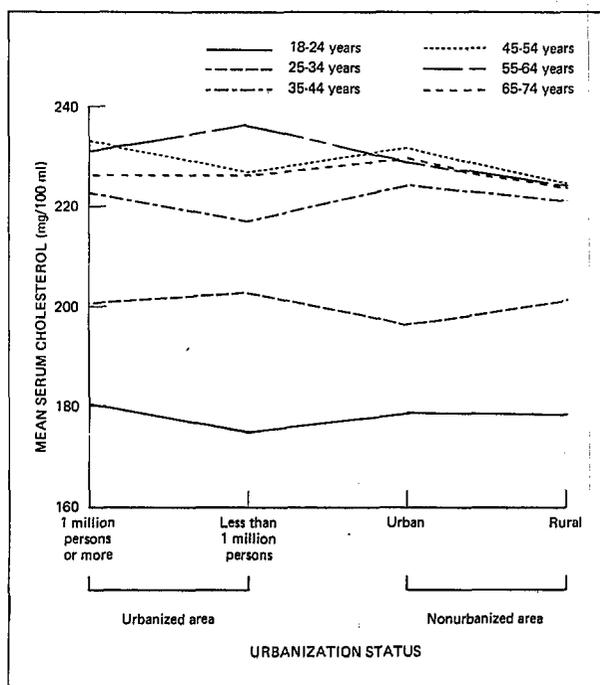
Figure 15. Mean serum cholesterol levels of males aged 18-74 years, by urbanization status and age: United States, 1971-74
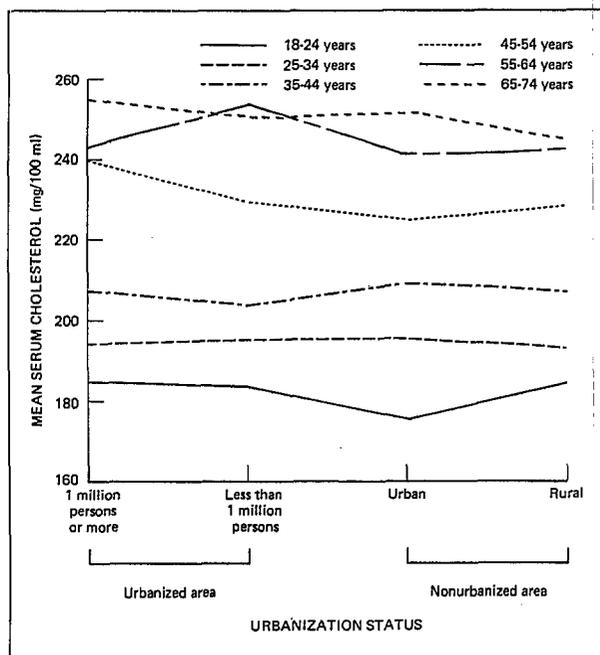

Figure 16. Mean serum cholesterol levels of females aged 18-74 years, by urbanization status and age: United States, 1971-74

black males aged 18-74 years, the mean serum cholesterol level generally decreased as the status of urbanization varied from urbanized to rural areas. Overall, the observed differences in the mean level ranged from 0.5 to 4.0 mg/100 ml for white males aged 18-74 years as the urbanization status changed; the differences for black males aged 18-74 years ranged from 0.3 to 9.3 mg/100 ml. The differences for both races were not significant. White males aged 18-74 years had higher mean serum cholesterol levels than black males had at every urbanization level except for those white males living in urbanized areas of less than one million persons.

As shown in table 12, the mean serum cholesterol levels for white females aged 18-74 years were higher than those for black females across every urbanization area except rural. The mean level for white females decreased slightly from 216.1 mg/100 ml for those living in urbanized areas of one million persons or more to 213.6 mg/100 ml for those living in rural areas. Differences in the mean levels across urbanization status for black females aged 18-74 years also were small. No real effect of urbanization status on the mean cholesterol levels for both white and black females aged 18-74 years is evident.

GEOGRAPHIC REGION

Age.—The observed differences in the mean serum cholesterol levels of adults aged 18-74 years were small for each age across geographic regions as shown in table 13. Overall, no statistically significant difference was found in the overall means for adults aged 18-74 years; however, adults aged 18-74 years living in the Northeast Region had a mean level of 216.2 mg/100 ml, and those in the other regions had generally similar mean levels of about 212 mg/100 ml.

Sex and age.—The mean serum cholesterol levels were highest for males living in the Northeast Region at every age group except 65-74 years. Males living in the Midwest had the lowest levels for ages 18-34 years, the South for ages 35-64 years, and the Northeast for ages 65-74 years. Large differences in means of 13.5 and 15.6 mg/100 ml were observed for males aged

35-44 years between those living in the Northeast and the South, and for males aged 65-74 years between those living in the Northeast and the West, respectively. Despite the magnitude of these differences, they were not statistically significant. Overall, males aged 18-74 years living in the Northeast had the highest mean serum cholesterol level; those living in the Midwest had the lowest level. Males aged 18-74 years living in the Midwest and South had comparable mean serum cholesterol levels.

The mean patterns for females were different from those for males. The mean levels for females aged 18-24 years were generally the same for each region. Females aged 25-34 years living in the South had the highest mean level, and those living in the West had the lowest—an observed mean difference of 6.2 mg/100 ml. Females aged 35-44 years had comparable mean cholesterol levels for those living in the Northeast, South, and West. Those females living in the Midwest had a slightly higher mean level. A dichotomy exists for females aged 45-54 years. Those females living in the Northeast and Midwest had comparable mean levels, while those living in the South and West had similar levels. The largest mean difference between any two regions within either dichotomy was about 9 mg/100 ml. The mean levels for females aged 55-64 years were generally the same for each geographic region. Females aged 65-74 years living in the Northeast and West had the highest mean serum cholesterol levels while those in the South and Midwest had the lowest mean levels—the largest mean difference, 8.2 mg/100 ml, although not significant, occurred between those living in the Northeast and Midwest. Similar to males aged 18-74 years, females living in the Northeast had higher mean levels than females aged 18-74 years living in any other region. Unlike males aged 18-74 years, females living in the West had the lowest mean levels. Females aged 18-74 years living in the Midwest and South had comparable mean levels.

Race, sex, and age.—The distributions for white and black males by geographic region are shown in table 14. As shown in figure 17, among white males in the younger age groups 18-24 and 25-34 years, those living in the Northeast had the highest mean serum cholesterol levels;
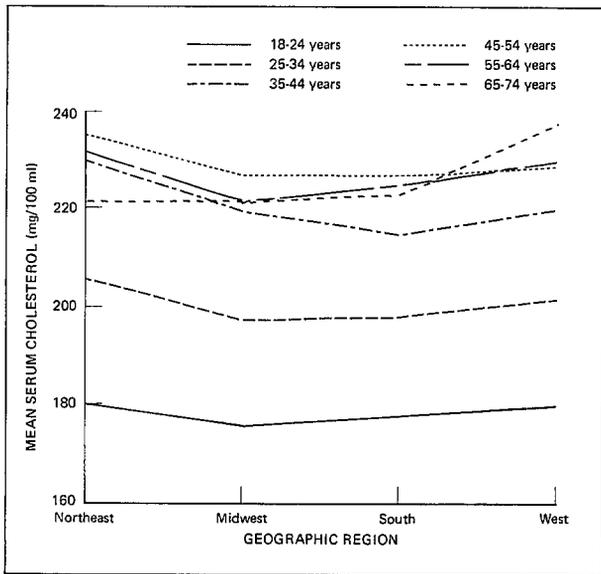
Figure 17. Mean serum cholesterol levels of white males aged 18-74 years, by geographic region and age: United States, 1971-74

those living in the Midwest had the lowest. The pattern changed for the next three age groups—35-44, 45-54, and 55-64 years. White males living in the Northeast showed the highest mean levels and their cohorts living in the South had the lowest levels. The mean levels for white males aged 65-74 years showed the same pattern across geographic regions as those for males aged 65-74 years. No significant changes occurred in the means among regions for any of the six age groups despite a few large observed differences. Overall, the mean level for white males aged 18-74 years was highest for those living in the Northeast and lowest for those living in the South; however, these means were not significantly different. Black males at each age category showed relatively large differences in the mean serum cholesterol levels among regions. The larger differences ranged from 8.7 mg/100 ml between black males aged 55-64 years living in the South and those living in the West to 37.5 mg/100 ml between black males aged 25-34 years living in the same two regions. These large observed differences are the result of a relatively small number of black males in some of these cells (appendix III). Black males living in the West had lower mean serum cholesterol levels than those living in any other region except for

black males aged 35-44 and 65-74 years (figure 18). The overall means for black males aged 18-74 years showed that those living in the South had the highest mean level and those in the Midwest had the lowest. Geographic location did not significantly affect the overall mean serum cholesterol levels of black males aged 18-74 years.

The mean serum cholesterol levels by age, race, and geographic region for females aged 18-74 years are presented in table 15. White females showed exactly the same mean level patterns by age across geographic regions as did females aged 18-74 years. As seen in figure 19, the mean differences by age are too small to show any real variation in the mean serum cholesterol levels as a result of geographic location. This finding is also true for the overall means for white females aged 18-74 years.

Black females showed generally the same variability in mean cholesterol levels as black males did. The differences in the mean levels for black females aged 25-34 years ranged from 14.7 mg/100 ml between those living in the Northeast and those living in the West to 37.5 mg/100 ml for black females aged 55-64 years between those living in the Northeast and those living in the Midwest (figure 20). Overall, black females
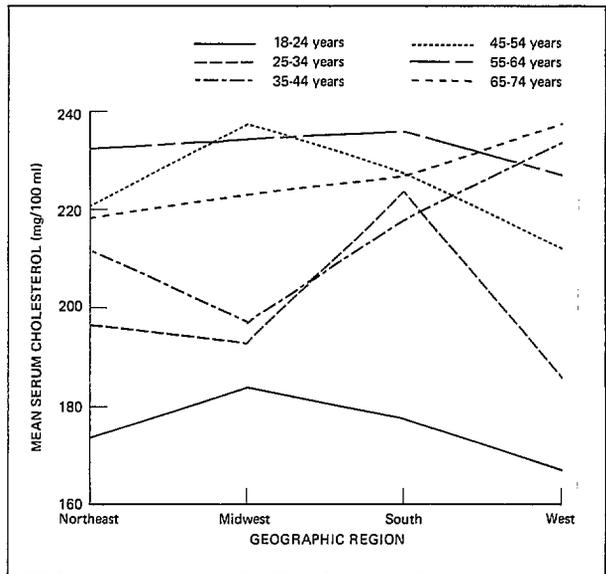
Figure 18. Mean serum cholesterol levels of black males aged 18-74 years, by geographic region and age: United States, 1971-74

Figure 19. Mean serum cholesterol levels of white females aged 18-74 years, by geographic region and age: United States, 1971-74

Figure 20. Mean serum cholesterol levels of black females aged 18-74 years, by geographic region and age: United States, 1971-74

aged 18-74 years living in the Midwest had the highest mean level and those living in the South had the lowest; the opposite was true for black males aged 18-74 years. Geographic region had no real effect on the mean serum cholesterol levels of black females aged 18-74 years.

COMPARISON OF HES AND HANES FOR ADULTS

Annual Family Income

Age.—Table 16 shows the distribution of the mean serum cholesterol levels for HES and HANES by age, sex, and annual family income. The mean serum cholesterol levels of adults aged 18-24 years were consistently higher for HANES than for HES at each income level. The differences were larger in the higher income groups. Adults aged 25-34 years had lower mean serum cholesterol levels for HANES than for HES at every income level except for the category of less than $4,000 per year. The mean differences between HES and HANES were largest in the lowest and highest income groups—7.5 mg/100 ml between the two groups with an income of less than $4,000 and 11.1 mg/100 ml between the two groups with an income of $10,000 or more per year; the latter difference was significant. The other income groups did not show any large differences in the mean levels between HES and HANES. The mean levels for adults aged 35-44 years were generally lower for HANES than for HES across income groups; the largest difference in the mean level, 7.4 mg/100 ml, occurred for those with an income of $10,000 or more per year. Adults aged 45-54 years showed no real change between HES and HANES as income increased. The mean levels for adults aged 55-64 years were higher for HANES in the lower two income groups (less than $4,000 and $4,000-$6,999) but lower for HANES in the upper income groups ($7,000-$9,999 and $10,000 or more). The mean levels between HES and HANES for adults 55-64 years with incomes of $10,000 or more differed significantly by 16.6 mg/100 ml. For adults aged 65-74 years, the mean serum cholesterol levels were lower for HANES than for HES at every income level except $4,000-$6,999. A large difference of 18.2 mg/100 ml occurred between HES and HANES for those whose annual family income ranged from $7,000 to $9,999 per year; this reduction, however, was not statistically significant.

Sex and age.—The mean serum cholesterol levels for males aged 18-24 years were higher for HANES than for HES at every level of
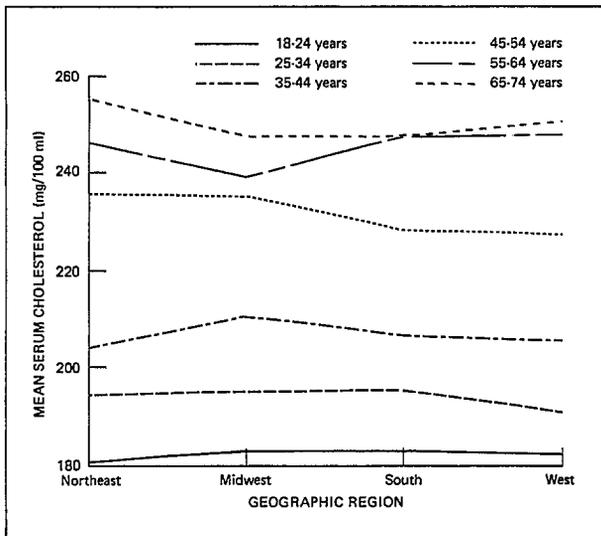
family income. As shown in figure 21, the mean differences varied across income with the largest differences between the two groups occurring in the lowest (less than $4,000) and highest ($10,000 or more) income groups. Males aged 25-34 years displayed the same patterns for HES and HANES as did adults of both sexes. However, the mean levels were generally higher for males aged 25-34 years than those for adults of both sexes of the same age for both HES and HANES. Males aged 35-44 years showed consistently lower mean levels for HANES than for HES across each income level; the mean differences between HES and HANES were largest in the higher income groups and diminished as income decreased. Males aged 45-54 years had higher mean serum cholesterol levels in the highest and lowest income groups for HANES than for HES, and lower mean levels for HANES than for HES in the middle income groups. The mean levels for males aged 55-64 years were higher for HANES for income groups less than $4,000 and $4,000-$6,999 and lower for HANES than HES for income groups $7,000-$9,999 and $10,000 or more. Males aged 65-74 years had lower mean serum cholesterol levels for HANES than for HES at every income level except for the category of less than $4,000 per year. At this income level, the means differed only by 2.1 mg/100 ml. Larger differences were observed as income continued to increase; however, these differences were not significant.

As previously observed for males aged 18-24 years, figure 21 shows that females aged 18-24 years had consistently higher mean levels for HANES than for HES at each income level. The mean levels showed little, if any, change at the smallest income group (less than $4,000); however, the difference in the means generally increased with a rise in family income. The largest observed difference of 14.5 mg/100 ml occurred for those with an income of $7,000-$9,999. The mean serum cholesterol levels for females aged 25-34 years consistently increased for HES but consistently decreased for HANES across income levels; consequently, HANES showed higher mean levels in the lower income groups and HES showed higher mean levels in the larger income groups. The observed means were 14.5 mg/100 ml lower for HANES than for HES for those who fell within the income group $10,000

or more followed by 10.5 mg/100 ml lower for HES than for HANES for those whose income was less than $4,000. Females aged 35-44 years had lower mean levels for HANES in the smallest and largest income groups and higher mean levels for HANES than HES in the middle income groups. The observed mean differences were larger for the extreme income groups than for the middle income groups; the largest observed difference between HES and HANES for females aged 35-44 years occurred for those with an income of $10,000 or more per year. Females aged 45-54 years had higher mean serum cholesterol levels for HANES at every income level except for the category of less than $4,000. The mean serum cholesterol levels showed generally small differences between HES and HANES for the first three income groups for females aged 55-64 years; however, for the group with an income of $10,000 or more per year, a significant reduction of 26.8 mg/100 ml occurred in the mean level. Females aged 65-74 years had a statistically lower mean serum cholesterol level for HANES than for HES for those with incomes of less than $4,000. No real reductions in the means were found between the two surveys at any other income group; however, the mean level for HANES was 14.4 mg/100 ml lower than that for HES females with an income of $7,000-$9,999.

Education

Age.—The mean serum cholesterol levels of adults aged 18-74 years for HES and HANES by educational level and age are presented in table 17. The mean levels were higher for HANES at all educational levels for adults aged 18-24 years than for HES. The largest differences in the mean levels between HES and HANES occurred for those with less than 9 years of education (10.7 mg/100 ml) and for those adults with 13 years or more of education (5.8 mg/100 ml). Those adults with 9-12 years of education had comparable mean levels. For adults aged 25-34 and 35-44 years, HES and HANES had generally the same mean cholesterol level across each educational level except for those adults with 13 years or more of education. The level for HANES was lower than the level for HES by 5.2 mg/100 ml for adults aged 25-34 years and by
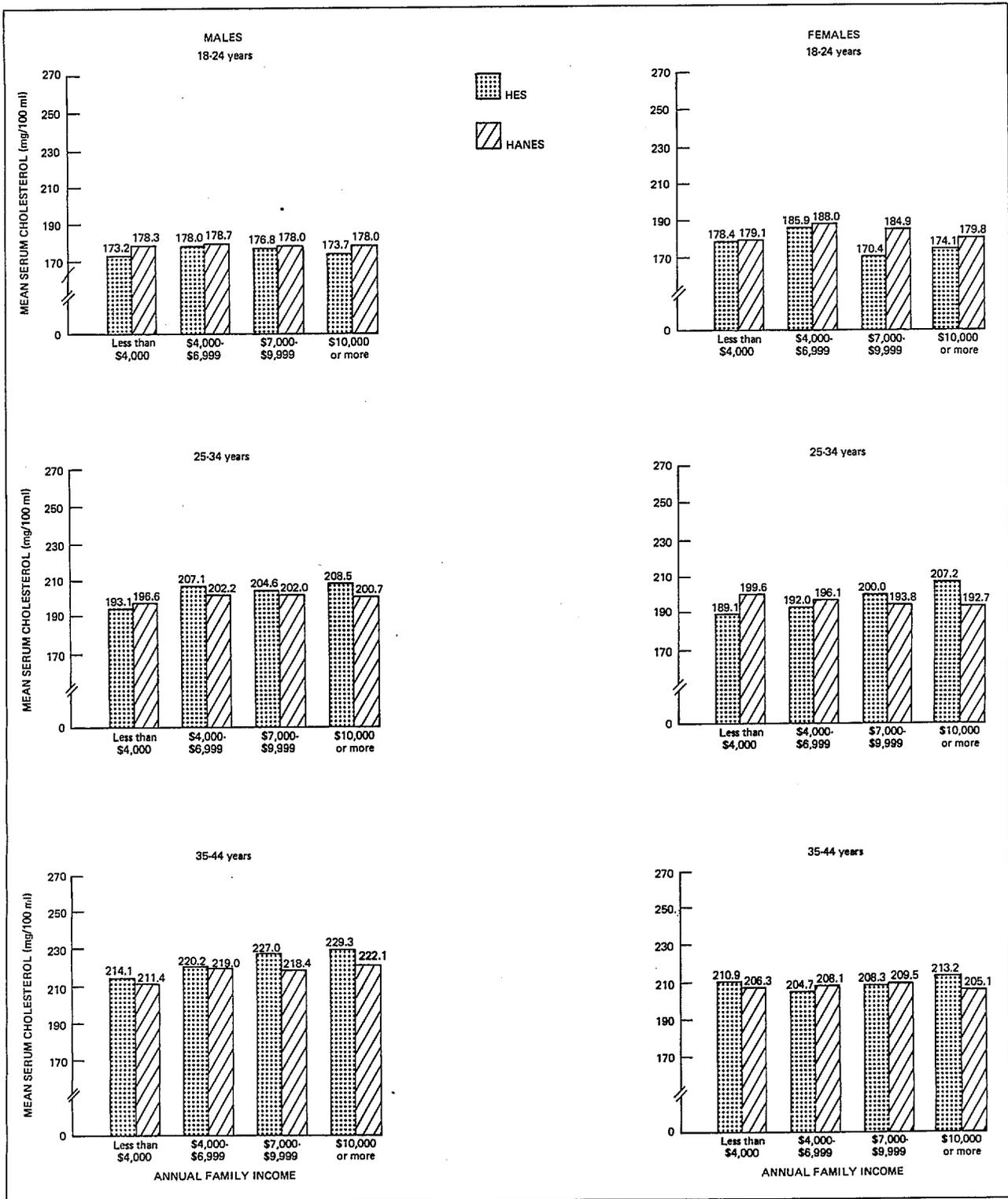
Figure 21. Mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population
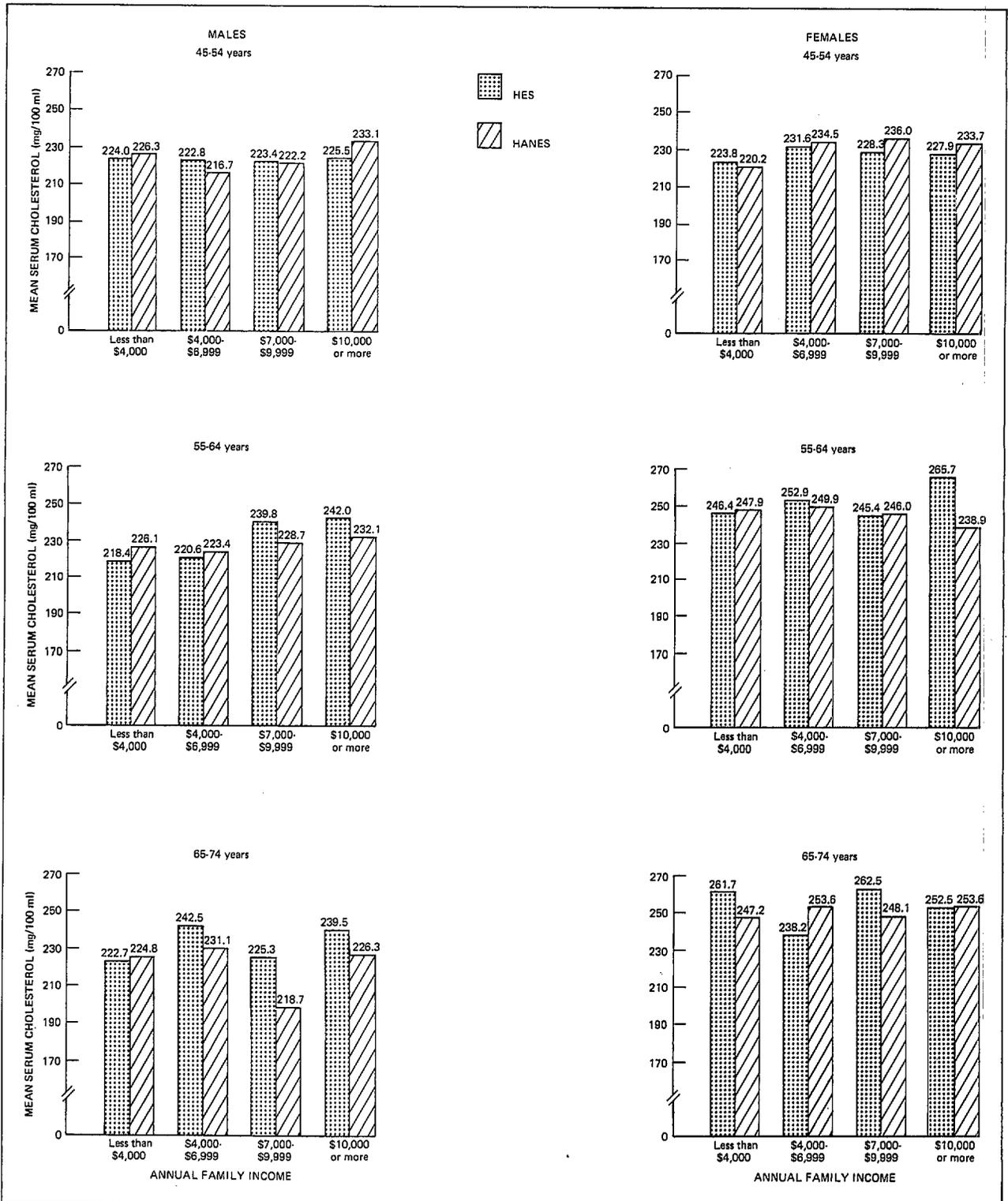
Figure 21. Mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population—Con.

9.7 mg/100 ml for adults aged 35-44 years in this educational category.

The mean levels for adults aged 45-54 years were slightly higher for HANES than for HES across each educational level. The mean differences were not significant. Adults aged 55-64 years had lower mean levels for HANES than for HES. The mean differences between HES and HANES were relatively small for adults with a high school education or less; however, a significant reduction of 17.8 mg/100 ml occurred between HES and HANES for those with 13 years or more of education. The mean level for adults aged 65-74 years showed a large difference between HES and HANES only for adults with 9-12 years of education. The HANES level for adults aged 65-74 years was significantly lower (15.6 mg/100 ml) than the HES level for this educational group.

Sex and age.—Males aged 18-24 years had slightly higher mean levels for HANES than for HES; however, the largest observed difference, 5.5 mg/100 ml, occurred for males with 13 years or more of education (figure 22). The opposite was true for males aged 25-34 years; the HES males had higher mean levels across educational categories. The HANES males aged 35-44 years had generally lower mean levels than HES males had across educational levels; however, these means were not statistically different.

Males aged 45-54 years for HANES had higher mean serum cholesterol levels than those for HES at every level of education. Those with 13 years or more of education showed the largest observed difference in the mean levels between HES and HANES—11.7 mg/100 ml. The mean levels for HANES males aged 55-64 years were higher for those participants with a high school education or less; however, the differences were not significant. A significant reduction in the mean levels occurred for males aged 55-64 years with 13 years or more of education between HES and HANES. The mean level for HES exceeded that for HANES by 14.1 mg/100 ml. The HANES males aged 65-74 years had generally lower mean levels than HES males across educational levels. The mean differences were comparable in the lower educational groups; however, in the highest educational group, the

HANES mean was lower than HES by 16.3 mg/100 ml.

As shown in figure 22, females aged 18-24 years had higher mean serum cholesterol levels for HANES at every level of education than for HES. A significant difference of 19.6 mg/100 ml occurred between HES and HANES for females aged 18-24 years with less than 9 years of education. The mean differences across the remaining educational levels were generally small. Differences in the mean levels between HES and HANES for females aged 25-34 years were generally small; however, the HANES means were higher for females with 12 years or less and lower for females with 13 years or more of education. Females aged 35-44 years showed consistently increasing trends in the mean levels for HES and a consistently decreasing trend for HANES as educational levels increased. Females with 13 years or more of education showed a significantly lower mean level for HANES than for HES.

Females aged 45-54 years had a lower mean level for HANES only for the higher educational level. The HANES females aged 55-64 years had lower means at every educational level than HES females of the same age had. The means differed by 17.7 mg/100 ml for those with 13 years or more of education. Females aged 65-74 years with less than 9 years of education showed a small difference in the mean level between HES and HANES—the opposite is true for the other educational groups. Those females with 9-12 years of education had a significantly lower mean level for HANES than for HES, and those with 13 years or more of education had a lower mean level for HES than for HANES; the mean differences between HES and HANES were 22.7 mg/100 ml and 14.6 mg/100 ml, respectively (figure 22).

Age, race, and sex.—The mean differences of adults by sex were generally the same as those for white persons, but a sufficient number of black persons aged 18-74 years were not available in the HES survey for a meaningful comparison. The mean differences for the four race-sex groups are not discussed in this report; however, the distribution of the means for white adults by annual family income or education, sex, and age is presented in tables 18 and 19.
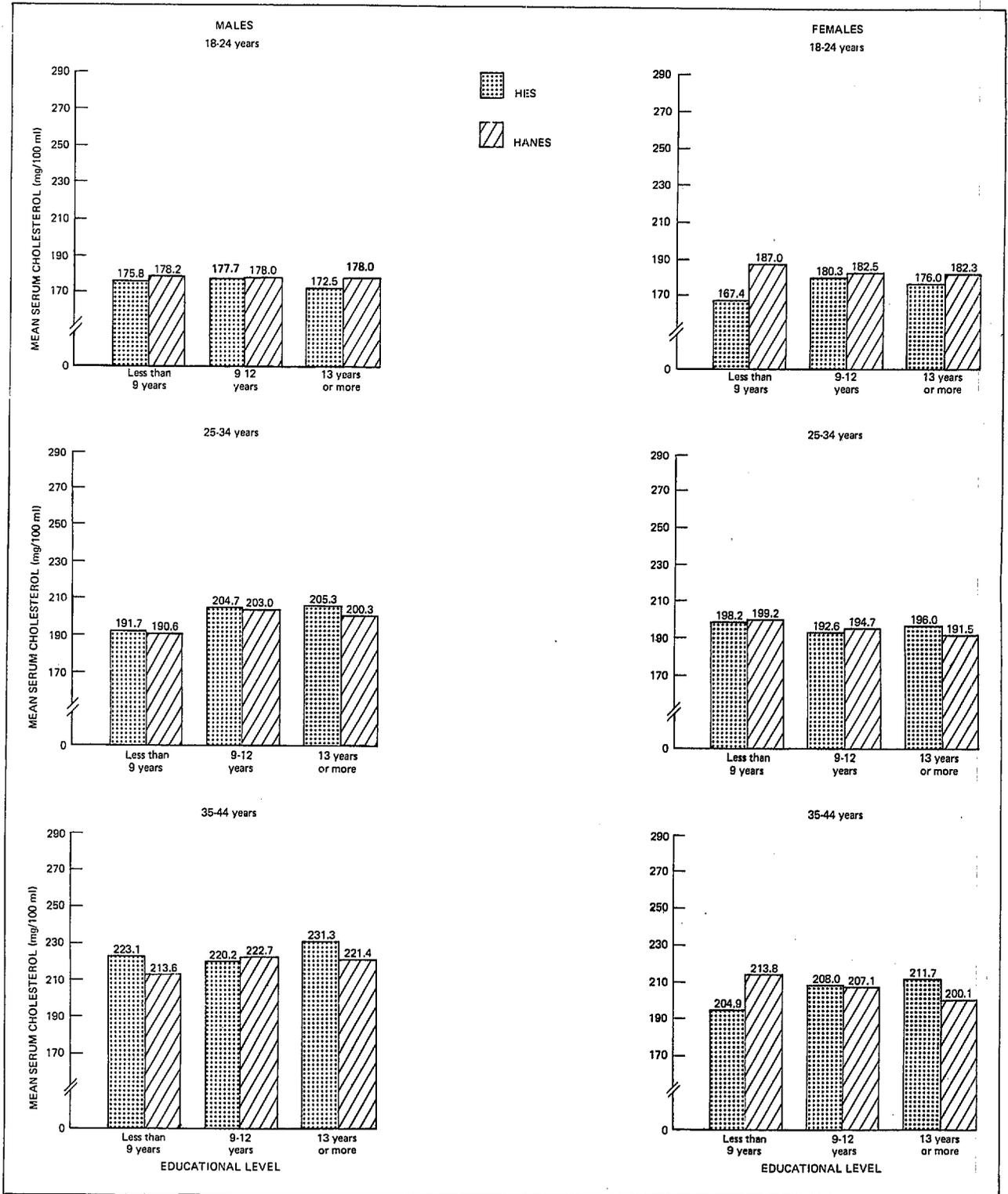
Figure 22. Mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population
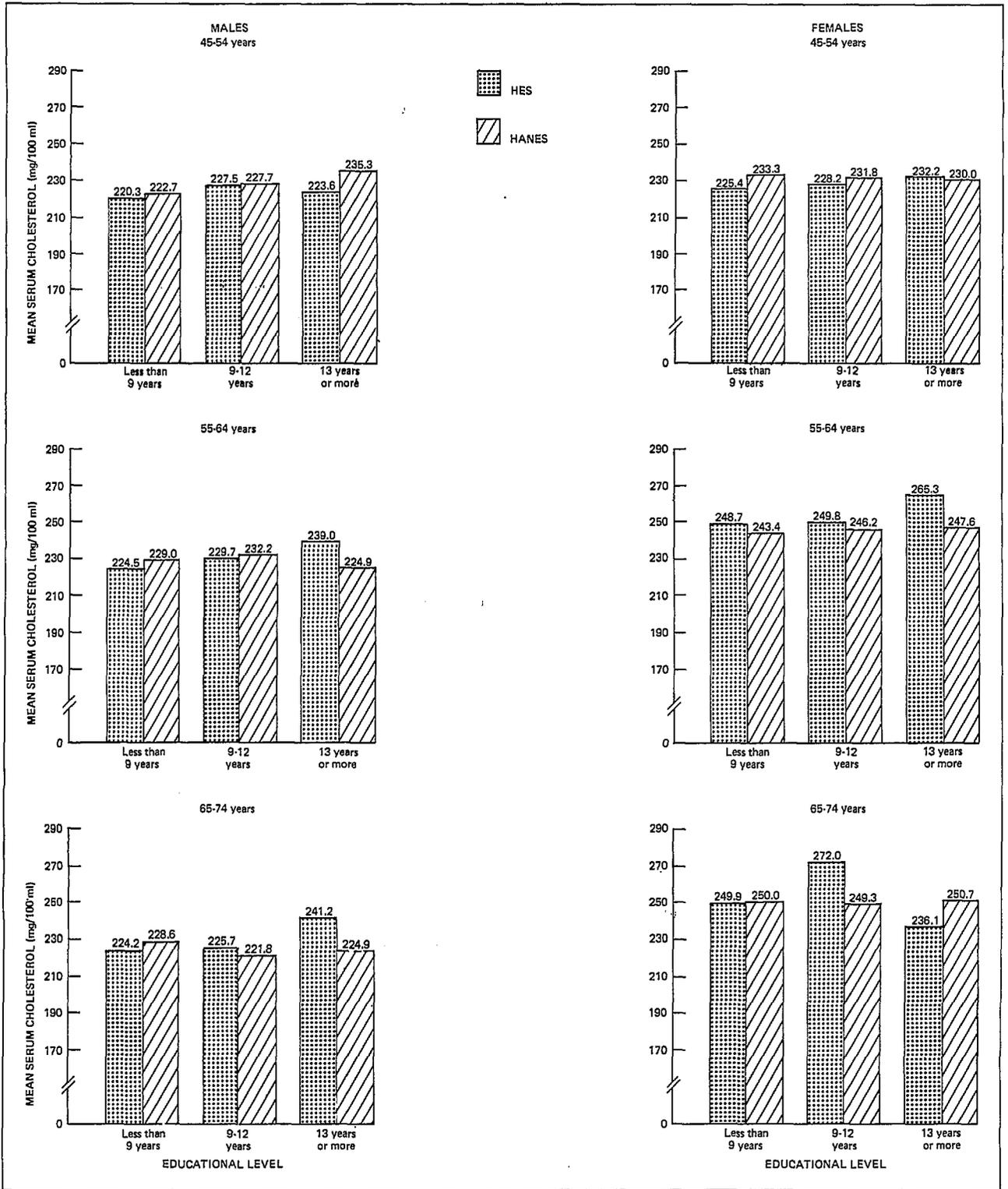
Figure 22. Mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population—Con.

DISCUSSION

In this report, the mean serum cholesterol levels were analyzed regarding age, sex, race, and socioeconomic status. Studies[9-11] on the relationship between mean serum cholesterol levels and variables such as blood pressure, smoking, and dietary intake, as well as studies on the relationship between serum cholesterol and other heart disease variables were performed.[12-14] However, only a few publications, if any, discuss the relationship or effect of socioeconomic status on the mean serum cholesterol level. The serum cholesterol data herein were collected during the first Health Examination Survey of adults aged 18-74 years from 1960-62 and the first Health and Nutrition Examination Survey of persons aged 4-74 years from 1971-74. These data are cross-sectional and are representative of the entire United States noninstitutionalized population at two different time frames.

INCOME AND EDUCATION DIFFERENCES

No real effect of family income or education of head of household was found on the mean serum cholesterol levels of children aged 4-17 years; however, the mean levels generally increased as the level of income or education increased. No significant effects on the mean levels of boys or girls by income or education or for any of the four race-sex groups were found. The level of income appeared to be directly related to the serum cholesterol levels for adult males aged 18-74 years. Differences in the mean serum cholesterol levels were nonsignificant among income groups for each age; the largest mean levels for males aged 18-74 years generally occurred for those in the upper income groups, but the largest mean level for females occurred in the lower income groups for each age. Despite the positive relationship between income and the mean serum cholesterol level for males aged 18-74 years, females showed an almost consistent decline in their mean serum cholesterol levels as income increased. The decline was significant. Of the four race-sex groups, white females were the only group to show a significant reduction in the mean levels as income increased.

The relationship between education and serum cholesterol levels appeared stronger than that between income and mean serum cholesterol levels. Both males and females aged 18-74 years showed a significant reduction in their mean cholesterol levels as the level of education increased from less than 9 years to 13 years or more. The overall significant reduction in the mean serum cholesterol levels as education increased for males aged 18-74 years cannot be explained by reductions in the mean levels by age because no individual age group showed any significant reductions. Not only did males and females show significant reductions, but this finding was also true for all race-sex groups except black males. An interesting question subject to future research and analysis is "Why was the level of income only related to the mean serum cholesterol level of white females aged 18-74 years, and the level of education related to the mean level of all race-sex groups except black males?" Because of the small number of cases in the cells once cholesterol is cross-classified by age, sex, race, income, and education, no controlling on income or education was done in order to observe differences due solely to the other socioeconomic variables.

URBANIZATION AND REGIONAL DIFFERENCES

Urbanization status had no effect on the mean serum cholesterol levels of children aged 4-17 years. The mean levels of children living in urbanized areas were similar to those living in nonurbanized areas; however, the observed mean levels were generally higher for children living in urbanized areas. These trends were also indicative of the behavior of the mean serum cholesterol levels for both boys and girls aged 4-17 years in general, and of all race-sex groups. No effect of urbanization status on the mean serum cholesterol level of adults aged 18-74 years was observed. This statement was reinforced by find-

ing no statistically significant differences in the mean levels for both males and females aged 18-74 years living in urbanized and rural areas. Observed mean differences among urbanization groups by race for each sex were also small.

Adults aged 18-74 years living in the Northeast Region generally had the highest mean serum cholesterol levels; this finding was also true for both males and females aged 18-74 years. A comparison of the mean levels between the Northeast and South showed that males aged 18-74 years living in the South did not have statistically significant mean levels different from those living in the Northeast; a similar test for females aged 18-74 years yielded negative results. Black males aged 18-74 years had lower mean levels than white males for all regions except in the South. The pattern was not the same for black and white females. This finding for black males is contrary to previous findings[6] in which black males aged 18-74 years in the South had lower mean serum cholesterol levels than white males had.

COMPARISON OF HES AND HANES DATA

To compare HES and HANES data, similar response rates and laboratory techniques were necessary to determine the serum cholesterol values.

The HES sample had a response rate of 95 percent interviewed and 86 percent examined, and this is a highly representative sample of the civilian noninstitutionalized population of the United States. The corresponding rates for HANES were 95 percent for those interviewed and 70 percent for those examined. The lower examination rate in the HANES sample than in the HES sample might have biased the mean serum cholesterol levels downward because persons with higher serum cholesterol might be less likely to schedule an examination. This biasing was not the case, because an analysis of medical histories comparing the nonexaminees with the examinees indicated that no large differences occurred between the nonexamined group and the examined group. The 1971-74 data were di-

minished by 4.5 percent to make them comparable to the 1960-62 data, which were adjusted by 6.7 percent to approximate the reference method. The reference method eventually may be considered stable, but no pools of sera were analyzed in both study periods which would have ensured that a shift in the accuracy of this reference method did not occur because such pools were not available.

Comparing serum cholesterol levels over time is difficult because analytic techniques change and reference samples fluctuate. The serum cholesterol levels were measured by the same laboratory during both surveys. Because no serum cholesterol standard remains stable for 10 years, provisions could not be made in 1960-62 to ensure that subsequent cholesterol determinations would be completely comparable with the 1960-62 determinations.

The lowest mean serum cholesterol levels for males generally occurred in the lower income groups for both HES and HANES; however, for females, the lowest cholesterol levels occurred generally in the lowest income group for HES, but generally in the highest income group for HANES. Differences in the mean levels between the two surveys by income for males were generally largest in the older age groups, 55 and over, indicating that a general decrease occurred in the mean levels in the past 10 years; however, none of these reductions in the mean serum cholesterol levels between HES and HANES were statistically significant (table A). The largest reduction in the mean serum cholesterol levels for females occurred mostly at the highest income level; females aged 25-34 and 55-64 years at this income level showed a statistically significant reduction in their mean serum cholesterol levels. Females aged 65-74 years for income category $7,000-$9,999 showed a large reduction; however, it was not significant. In contrast, females aged 65-74 years with income less than $4,000 showed a statistically significant reduction between the two surveys (figure 23).

Both males and females aged 18-74 years generally showed the largest reductions in the mean levels between HES and HANES at the highest educational level (table A). Males aged 55-64 and females aged 35-44 years with 13

Table A. Differences in mean serum cholesterol levels of adults aged 18-74 years between Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, educational level, sex, and age: United States population

Sex and age	Annual family income				Educational level		
	Less than $4,000	$4,000-$6,999	$7,000-$9,999	$10,000 or more	Less than 9 years	9-12 years	13 years or more
Males	Difference in mean serum cholesterol in mg/100 ml						
18-24 years	5.1	0.7	1.2	4.3	2.4	0.3	5.5
25-34 years	3.5	[1]4.9	[1]2.6	[1]7.8	[1]1.1	[1]1.7	[1]5.0
35-44 years	[1]2.7	[1]1.2	[1]8.6	[1]7.2	[1]9.5	2.5	[1]9.9
45-54 years	2.3	[1]6.1	[1]1.2	7.6	2.4	0.2	11.7
55-64 years	7.7	2.8	[1]11.1	[1]9.9	4.5	2.5	[1]14.1
65-74 years	2.1	[1]11.4	[1]6.6	[1]13.2	4.4	[1]3.9	[1]16.3
Females							
18-24 years	0.7	2.1	14.5	5.7	19.6	2.2	6.3
25-34 years	10.5	4.1	[1]6.2	[1]14.5	1.0	2.1	[1]4.5
35-44 years	[1]4.6	3.4	1.2	[1]8.1	8.9	[1]0.9	[1]11.6
45-54 years	[1]3.6	2.9	7.7	5.8	7.9	3.6	[1]2.2
55-64 years	1.5	3.0	0.6	[1]26.8	[1]5.3	[1]3.6	[1]17.7
65-74 years	[1]14.5	15.4	[1]14.4	1.1	[1]0.1	[1]22.7	14.6

[1]Mean serum cholesterol level was lower for HANES than for HES.

years or more of education showed a statistically significant reduction in their mean serum cholesterol levels. Females aged 65-74 years with 9-12 years of education also had a statistically significant reduction in their mean levels. Males aged 65-74 and females aged 55-64 years with 13 years or more of education showed large reductions in the mean levels; however, these reductions were not statistically significant (figure 24). Findings on total serum cholesterol levels from other studies, such as the one from the Lipid Research Clinics (LRC),[a] tend to indicate a lower blood cholesterol level than reported herein.[15] One of the findings in this report is that lower cholesterol levels are more likely among the highly educated and higher income population; however, more specific multivariate tests are necessary to conclusively substantiate this finding. Nevertheless, these preliminary findings based on univariate measures indicate that the greatest reduction in the mean serum cholesterol levels between HES (1960-62) and HANES (1971-74) generally occurred at the highest level of income, $10,000 or more per year, and at the highest level of education, 13 years or more.

[a]The LRC findings are based on studies of plasma rather than of sera, which means that the LRC cholesterol levels are 2-3 percent lower.
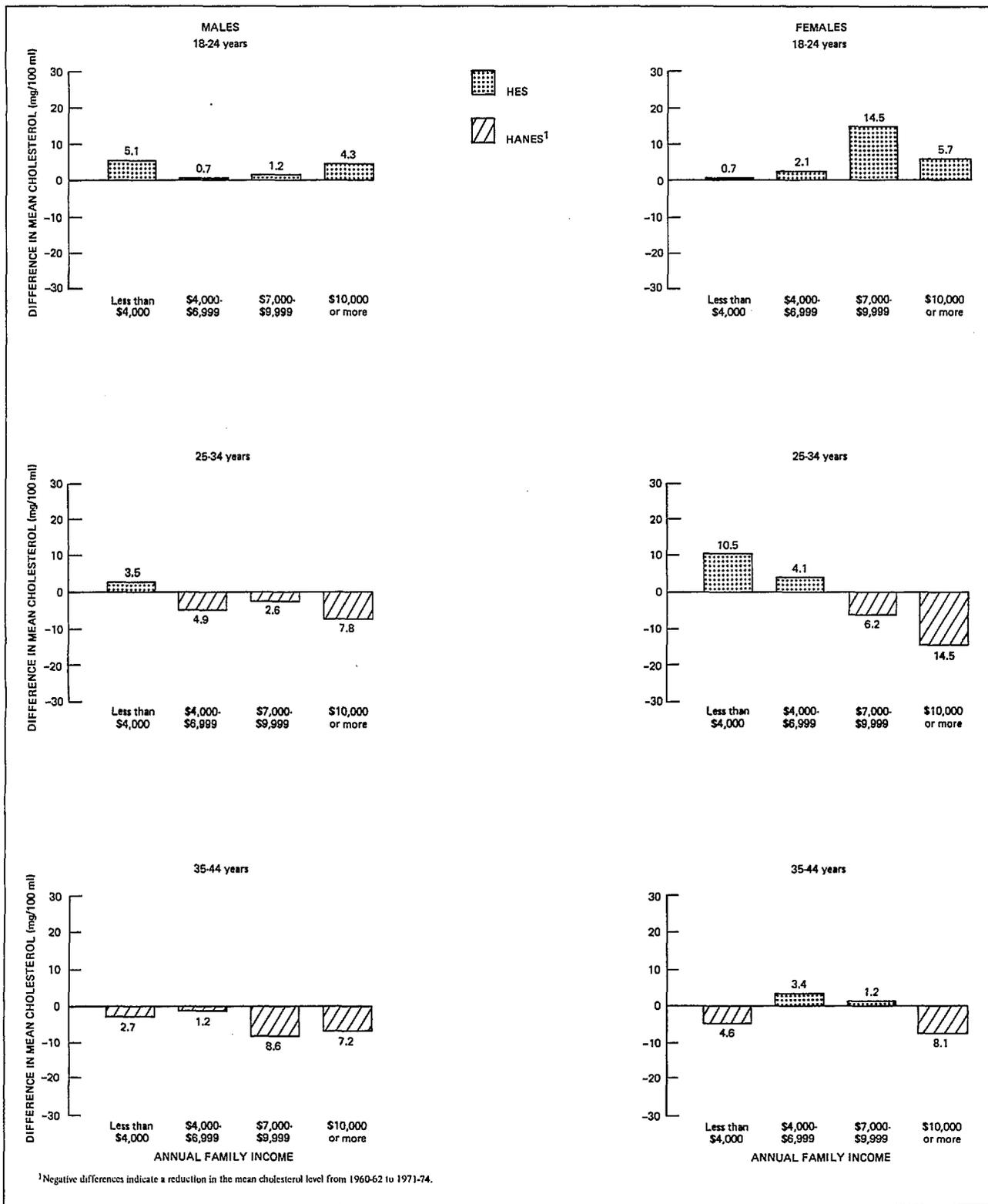
Figure 23. Differences in mean serum cholesterol levels of adults aged 18-74 years between Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population
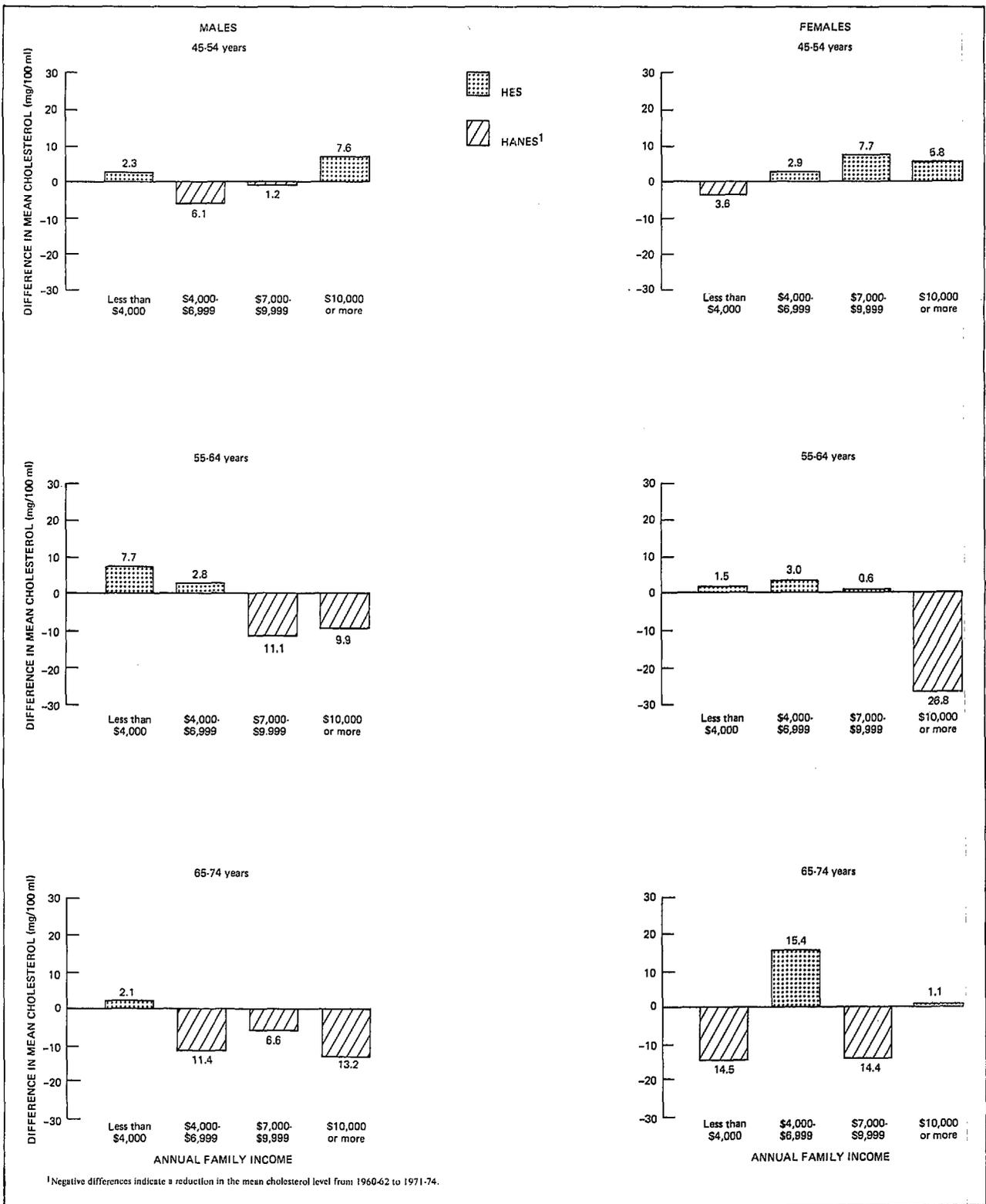
Figure 23. Differences in mean serum cholesterol levels of adults aged 18-74 years between Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population—Con.
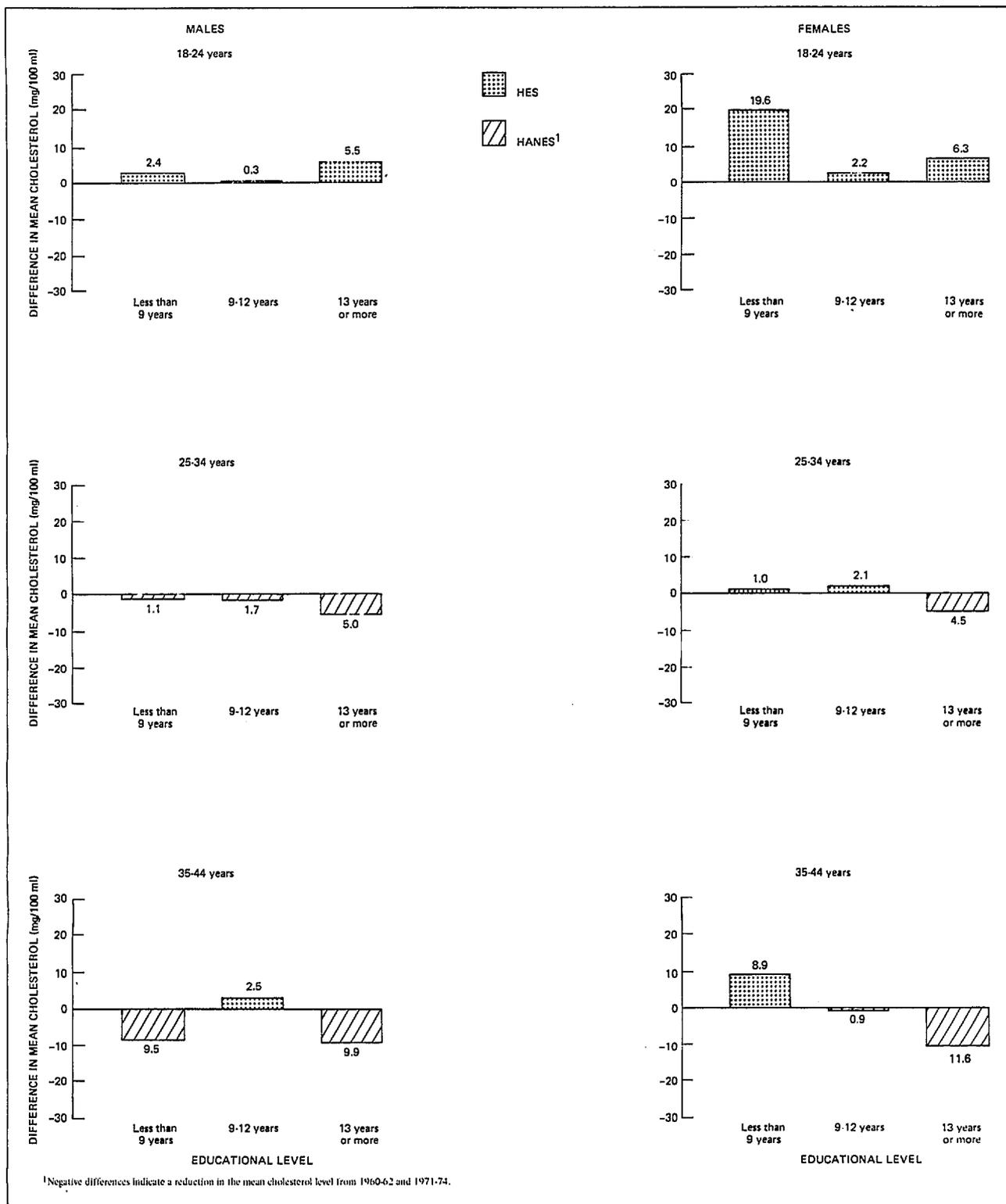
Figure 24. Differences in mean serum cholesterol levels of adults aged 18-74 years between Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population

Figure 24. Differences in mean serum cholesterol levels of adults aged 18-74 years between Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population—Con.

[1] Negative differences indicate a reduction in the mean cholesterol level from 1960-62 and 1971-74.
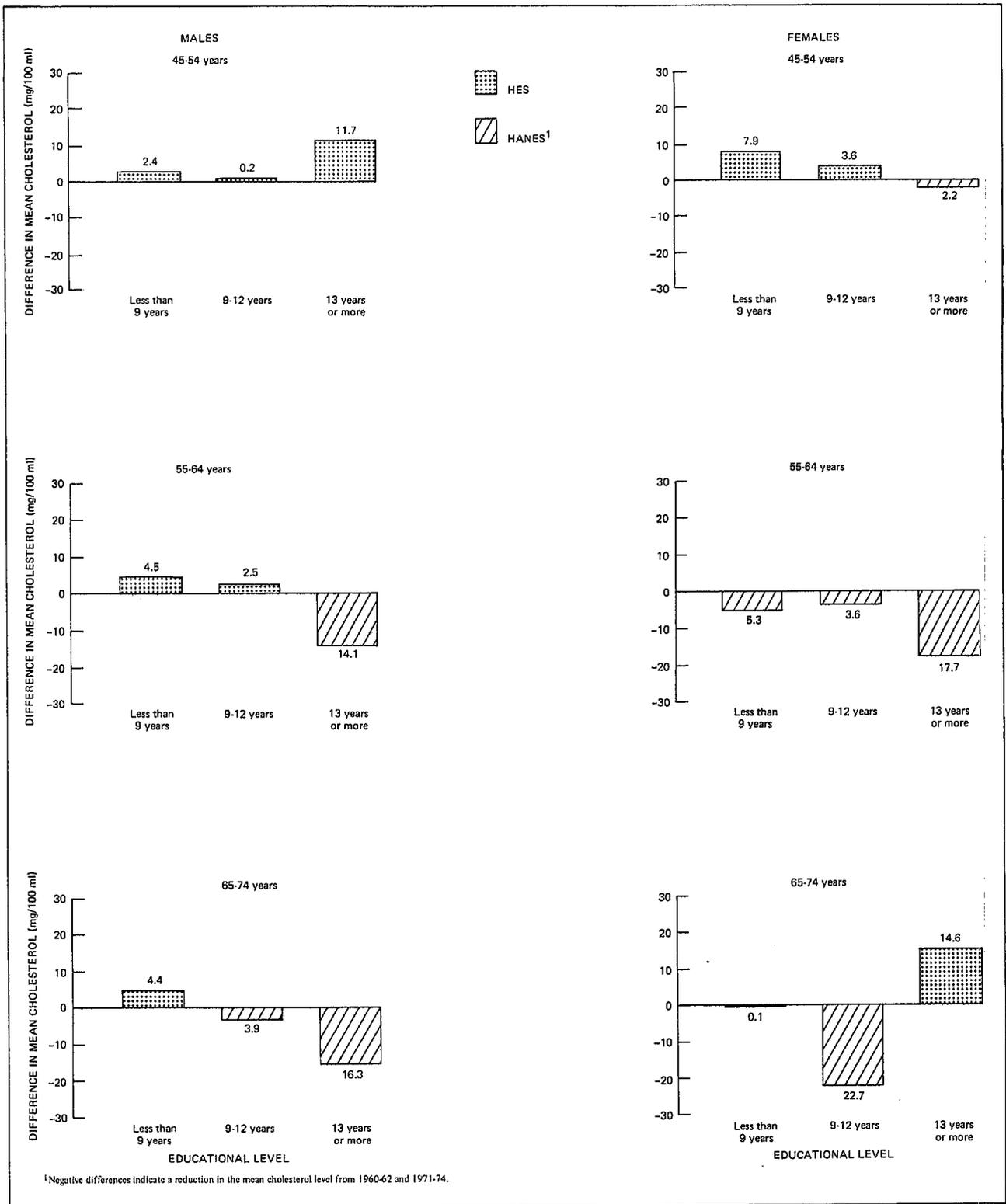
SUMMARY

In this report, the mean serum cholesterol levels of persons aged 4-74 years in the civilian noninstitutionalized population of the United States obtained by means of the Health and Nutrition Examination Survey of 1971-74 are analyzed by age, sex, race, and socioeconomic characteristics. Major findings are summarized as follows:

As income increased from less than $4,000 to $15,000 or more per year, the mean serum cholesterol levels of both boys and girls aged 4-17 years remained fairly stable; these trends were generally true by race and sex for children aged 4-17 years.

The mean serum cholesterol levels increased with an increased income for males aged 18-74 years but generally decreased for females aged 18-74 years. Similar patterns occurred by race and sex.

Males aged 18-74 years showed a statistically significant increase in mean serum cholesterol levels, but females aged 18-74 years showed a significant reduction as income increased from the lowest to the highest levels.

Children aged 4-5, 6-11, and 12-17 years showed no real differences in their mean levels as education of head of household increased. The same finding was generally true by sex and for each race-sex group.

The mean levels for both males and females aged 18-74 years were inversely related to educational levels. Males and females aged 18-74 years and each of the four race-sex groups except black males aged 18-74 years showed a significant and consistent decline in mean serum cholesterol level as educational level increased.

Urbanization status had no real effect on the mean levels of adults aged 18-74 and on the mean levels of children aged 4-17 years.

Mean differences were generally small for each sex and race-sex group.

No statistically significant difference was found in the mean cholesterol levels for either males or females aged 18-74 years between those living in rural and those living in urbanized areas.

Males aged 18-74 years living in the South and Midwest generally had the lowest serum cholesterol levels; females aged 18-74 years living in the West had the lowest levels. Similar patterns occurred for white adults by sex.

Males aged 18-74 years living in the Northeast showed no significant difference in the mean level from those living in the South. A similar situation occurred for females aged 18-74 years.

Black males aged 18-74 years living in the Midwest and West had the lowest mean levels and those living in the South had the highest levels. Black females aged 18-74 years living in the South had the lowest mean levels and those living in the Midwest had the highest.

Reductions in the mean levels between HES (1960-62) and HANES (1971-74) were generally greatest for those males aged 18-74 years with income of $10,000 or more per year; however, the differences were not statistically significant.

Females aged 25-34 and 55-64 years at the highest income level showed statistically significant reductions in the mean levels between HES (1960-62) and HANES (1971-74).

The mean serum cholesterol levels for both males and females aged 18-74 years generally showed the greatest reductions in the mean level at the highest educational level between HES (1960-62) and HANES (1971-74).

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LIST OF DETAILED TABLES

Table 1. Serum cholesterol levels of persons aged 4-74 years, by annual family income, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Annual family income									
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000-$14,999		$15,000 or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml									
4-17 years....................	166.9	31.9	167.7	31.4	167.4	32.1	168.0	31.9	168.4	33.0
18-74 years................	215.7	52.6	214.1	51.8	210.9	48.3	210.3	48.5	214.4	46.5
4-5 years...............................	169.2	36.0	162.2	31.7	161.3	31.9	165.7	30.0	169.6	29.1
6-11 years.............................	170.6	31.9	168.7	30.5	171.7	30.8	170.9	30.8	171.9	29.9
12-17 years............................	161.9	29.4	168.5	32.2	164.9	33.0	165.5	33.2	165.6	35.3
18-24 years............................	178.7	34.8	183.8	39.0	181.7	39.3	176.7	35.5	181.8	36.5
25-34 years............................	198.5	38.4	198.6	38.9	198.0	42.8	196.5	39.9	197.0	42.8
35-44 years............................	208.7	43.8	212.9	46.5	213.7	40.7	214.2	45.5	212.8	41.8
45-54 years............................	222.4	50.1	227.3	49.0	230.2	47.7	232.1	50.2	234.6	42.8
55-64 years............................	240.3	55.3	238.3	50.8	237.8	47.4	235.1	44.0	234.9	43.7
65-74 years............................	239.2	50.4	243.2	57.5	233.4	47.5	237.4	51.5	243.9	46.4
Males										
4-17 years	164.3	31.8	167.8	30.9	166.1	30.8	166.2	30.4	166.7	33.6
18-74 years	207.4	50.7	208.5	49.6	208.0	46.7	211.7	45.8	217.7	46.6
4-5 years...............................	167.2	37.4	158.6	30.8	160.0	30.6	160.7	29.7	168.9	24.6
6-11 years.............................	165.7	29.7	169.7	28.8	172.1	30.0	168.7	26.8	170.7	29.1
12-17 years............................	161.2	31.4	168.7	32.7	161.8	30.7	164.8	33.8	163.9	37.1
18-24 years............................	178.3	34.0	178.7	34.0	178.0	37.7	172.3	33.2	185.1	34.4
25-34 years............................	196.6	40.4	202.2	38.2	202.0	45.2	201.8	38.1	199.4	45.1
35-44 years............................	211.4	46.4	219.0	52.8	218.4	37.3	223.8	45.7	220.5	42.1
45-54 years............................	226.3	47.8	216.7	45.5	222.2	39.0	228.6	44.2	237.7	45.1
55-64 years............................	226.1	61.8	223.4	45.8	228.7	54.1	231.9	39.6	232.2	43.0
65-74 years............................	224.8	48.3	231.1	61.0	218.7	45.7	222.7	45.4	229.5	44.1
Females										
4-17 years	169.9	31.7	167.5	32.0	168.7	33.3	169.8	33.1	170.2	32.1
18-74 years	221.3	53.2	218.4	52.9	213.6	49.6	208.8	51.0	210.8	46.0
4-5 years...............................	171.6	34.0	165.5	32.2	162.7	33.3	170.3	29.5	170.2	33.0
6-11 years.............................	176.4	33.3	167.5	32.2	171.3	31.5	173.2	34.3	173.0	30.6
12-17 years............................	162.5	27.1	168.3	31.8	167.8	34.8	166.2	32.5	167.9	32.8
18-24 years............................	179.1	35.5	188.0	42.1	184.9	40.3	180.9	37.1	178.2	38.3
25-34 years............................	199.6	37.1	196.1	39.3	193.8	39.8	191.1	40.9	194.7	40.2
35-44 years............................	206.3	41.4	208.1	40.3	209.5	43.0	205.1	43.4	205.0	39.9
45-54 years............................	220.2	51.3	234.5	49.9	236.0	52.4	236.4	56.2	231.1	39.7
55-64 years............................	247.9	49.9	249.9	51.5	246.0	38.6	238.6	48.0	239.1	44.4
65-74 years............................	247.2	49.8	253.6	52.1	248.1	40.5	247.8	53.1	264.3	41.8

Table 2. Serum cholesterol levels of males aged 4-74 years, by annual family income, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White males	Serum cholesterol in mg/100 ml							
4-17 years	161.1	30.4	166.3	29.7	166.1	31.5	165.7	30.7
18-74 years	207.1	51.7	208.9	48.5	208.1	46.8	214.7	46.1
4-5 years	170.0	43.3	156.1	28.7	159.3	30.8	163.1	27.3
6-11 years	159.5	27.1	167.5	27.1	172.9	30.9	169.3	27.1
12-17 years	159.2	26.7	168.2	32.1	161.1	31.0	163.2	33.9
18-24 years	176.1	33.3	182.3	34.6	178.6	38.5	178.0	34.9
25-34 years	198.1	37.1	201.7	38.3	202.9	45.2	199.5	38.9
35-44 years	219.7	44.1	219.6	53.8	216.2	35.0	221.9	44.0
45-54 years	222.5	52.8	214.0	44.9	221.5	39.7	233.8	44.9
55-64 years	226.4	64.0	220.0	37.3	229.2	55.1	231.7	41.4
65-74 years	224.1	48.3	232.0	62.3	218.9	45.9	226.4	44.9
Black males								
4-17 years	167.6	33.2	173.3	34.2	167.2	26.2	172.7	39.7
18-74 years	210.8	47.9	206.3	56.6	206.0	46.8	210.8	53.1
4-5 years	162.4	27.9	166.5	35.4	165.9	28.9	195.1	29.6
6-11 years	174.0	31.4	176.8	32.6	168.5	22.8	172.8	40.8
12-17 years	162.8	35.6	170.7	35.5	166.3	28.5	169.3	39.1
18-24 years	190.0	36.0	161.1	24.4	169.3	27.1	183.9	23.5
25-34 years	196.1	48.8	205.6	36.7	195.4	46.1	216.6	65.2
35-44 years	196.7	47.0	215.8	47.2	230.6	48.1	211.9	43.7
45-54 years	231.4	39.3	228.5	46.4	228.3	33.1	209.6	41.7
55-64 years	223.2	51.5	245.6	77.6	225.4	39.2	243.8	50.3
65-74 years	229.3	48.0	222.6	45.5	220.3	41.5	222.4	41.6

Table 3. Serum cholesterol levels of females aged 4-74 years, by annual family income, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White females	Serum cholesterol in mg/100 ml							
4-17 years	165.0	28.7	166.6	31.7	167.3	32.9	169.4	32.6
18-74 years	223.7	54.6	218.6	53.2	214.0	49.8	209.7	48.8
4-5 years	169.3	35.0	166.4	35.0	160.1	32.3	168.9	30.8
6-11 years	170.9	29.8	166.1	32.9	170.4	30.6	173.2	32.9
12-17 years	158.0	23.0	167.1	29.3	166.4	34.8	166.0	32.2
18-24 years	178.0	35.3	188.3	42.8	184.6	40.8	178.3	37.0
25-34 years	199.9	37.6	195.1	39.0	193.4	39.9	192.7	40.7
35-44 years	206.4	41.1	209.1	40.6	210.6	43.8	204.5	40.3
45-54 years	219.1	54.6	228.6	48.9	236.3	52.8	234.5	49.0
55-64 years	250.8	50.0	249.2	52.3	244.3	37.3	238.8	46.6
65-74 years	247.1	50.3	253.7	52.7	248.5	43.9	253.3	50.2
Black females								
4-17 years	175.2	33.8	169.5	32.2	176.2	35.4	181.9	33.1
18-74 years	214.1	47.3	217.8	52.3	211.2	46.4	210.0	44.2
4-5 years	175.3	32.1	163.1	22.4	182.8	35.2	188.7	25.3
6-11 years	182.4	35.8	169.5	27.7	177.2	36.1	172.8	31.7
12-17 years	166.1	29.1	171.9	38.2	174.2	34.8	188.3	34.3
18-24 years	182.0	36.0	183.5	37.5	192.5	31.0	199.2	39.1
25-34 years	199.4	36.5	199.1	40.7	196.8	39.2	195.3	40.1
35-44 years	209.1	42.4	206.3	37.0	203.5	36.9	211.2	45.7
45-54 years	223.7	39.5	264.0	43.0	231.7	45.9	221.5	41.0
55-64 years	236.0	47.7	259.2	46.6	267.4	50.3	262.2	24.2
65-74 years	247.6	46.1	257.8	42.7	239.5	55.5	264.7	41.2

Table 4. Serum cholesterol levels of children aged 4-11 years, by education of head of household, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Education of head of household							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
4-5 years	164.3	29.6	162.1	30.6	165.9	34.0	165.3	30.2
6-11 years	170.1	30.1	171.6	28.9	169.7	32.1	173.2	29.9
4 years	163.9	28.7	162.8	31.3	164.7	28.0	167.5	28.7
5 years	164.7	30.4	161.3	30.0	167.2	39.1	162.8	31.6
6 years	160.0	26.2	168.8	24.2	166.9	26.3	166.6	35.8
7 years	166.9	32.4	172.0	29.0	164.5	28.4	169.5	25.9
8 years	177.2	26.2	171.0	30.5	168.4	29.8	174.6	25.9
9 years	173.1	31.2	178.1	30.1	173.2	36.8	177.1	29.7
10 years	172.8	24.8	170.6	25.4	175.8	36.5	172.3	28.7
11 years	171.1	33.0	168.6	31.5	167.6	29.5	178.1	30.9
Boys								
4-5 years.............................	163.1	29.0	158.0	26.5	162.6	33.8	164.4	29.2
6-11 years...........................	169.9	29.9	169.5	28.1	169.9	29.3	169.8	27.0
4 years	162.1	24.3	162.0	23.8	163.7	28.5	164.2	28.8
5 years	164.1	33.0	154.1	28.3	161.4	38.8	164.7	29.6
6 years	153.3	21.5	164.4	24.1	163.6	24.7	164.4	29.4
7 years	171.5	28.0	165.9	28.3	168.1	25.3	168.0	26.6
8 years	171.1	25.8	167.5	30.5	161.1	26.2	167.5	22.4
9 years	176.9	30.8	173.4	29.9	171.0	39.9	174.8	26.4
10 years	169.2	29.0	170.5	22.8	180.7	25.4	165.5	17.9
11 years	170.7	33.3	174.0	31.2	169.6	25.3	180.2	34.8
Girls								
4-5 years.............................	165.4	30.0	165.7	33.6	169.6	33.9	166.2	31.2
6-11 years...........................	170.3	30.3	173.7	29.5	169.5	34.7	177.0	32.3
4 years	165.5	32.0	163.5	36.7	165.9	27.3	172.3	27.8
5 years	165.2	27.8	168.1	29.9	173.0	38.7	161.2	33.0
6 years	166.0	28.4	174.0	23.3	169.6	27.3	168.8	41.2
7 years	161.7	36.1	177.9	28.5	161.3	30.5	172.1	24.4
8 years	183.5	25.1	174.4	30.2	175.2	31.3	184.3	27.1
9 years	166.5	30.8	182.1	29.7	175.5	33.2	178.7	31.7
10 years	174.5	22.3	170.6	28.4	169.5	46.4	179.2	35.2
11 years	171.5	32.6	164.1	31.0	164.7	34.4	176.0	26.2

Table 5. Serum cholesterol levels of youths aged 12-17 years, by education of head of household, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Education of head of household							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
12-17 years	163.3	30.5	162.1	32.0	166.6	32.2	168.6	37.4
12 years	168.8	28.5	166.4	32.5	169.8	25.0	174.0	41.9
13 years	164.7	29.8	154.8	24.0	164.5	39.1	170.0	42.3
14 years	161.6	32.2	167.0	31.2	162.5	33.4	165.1	34.3
15 years	162.9	29.6	170.6	43.7	165.0	29.2	166.1	34.6
16 years	157.8	29.9	158.1	26.6	168.3	30.1	169.4	34.3
17 years	165.0	31.5	156.4	26.0	170.1	33.3	167.0	34.8
Boys								
12-17 years...	161.8	30.8	161.5	35.0	164.0	32.0	167.1	37.6
12 years	165.8	26.5	169.4	35.1	170.8	24.3	183.2	53.2
13 years	164.1	33.2	158.9	28.7	169.0	47.4	167.2	32.8
14 years	163.3	33.1	172.4	41.0	155.3	34.1	163.3	34.5
15 years	153.1	30.3	164.8	51.4	160.5	22.3	166.6	31.7
16 years	160.4	31.2	156.7	25.0	164.5	23.7	163.0	34.3
17 years	161.0	28.9	150.8	23.9	163.8	30.0	160.7	31.2
Girls								
12-17 years...	164.8	30.1	162.9	28.5	169.1	32.3	170.3	37.1
12 years	173.2	30.6	162.3	27.9	168.5	25.7	165.0	23.2
13 years	165.3	26.0	150.4	16.5	160.2	28.8	172.0	47.9
14 years	159.7	31.2	163.7	22.8	169.1	31.4	167.8	33.8
15 years	169.1	27.5	175.1	36.1	170.4	34.8	165.6	37.6
16 years	156.0	28.7	160.2	28.7	171.4	34.1	175.3	33.2
17 years	169.7	33.7	162.8	26.8	175.9	35.0	178.5	37.8

Table 6. Serum cholesterol levels of adults aged 18-74 years, by educational level, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Educational level							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	225.8	50.8	214.7	50.5	209.5	47.3	207.3	48.2
18-24 years	182.4	33.8	176.4	35.3	182.2	39.1	180.1	36.2
25-34 years	194.9	37.9	199.4	42.0	198.0	39.9	196.4	43.4
35-44 years	213.7	42.4	219.0	45.3	211.2	42.2	213.0	44.0
45-54 years	227.6	45.5	228.0	45.8	231.2	50.7	232.9	44.1
55-64 years	236.0	52.8	243.6	48.5	238.4	40.6	234.9	48.7
65-74 years	240.1	52.4	243.4	53.3	234.2	48.0	240.4	51.7
Males								
18-74 years...	219.2	51.2	211.2	47.2	209.7	44.4	208.1	48.2
18-24 years	178.2	28.6	171.1	29.5	181.5	35.8	178.0	37.0
25-34 years	190.6	35.0	208.0	45.9	201.7	36.6	200.3	46.6
35-44 years	213.6	41.8	228.7	47.3	220.1	42.0	221.4	45.0
45-54 years	222.7	45.3	226.3	40.8	228.6	47.4	235.3	42.1
55-64 years	229.0	57.6	228.1	41.4	234.7	39.6	224.9	46.1
65-74 years	228.6	53.3	226.0	46.7	218.7	48.4	224.9	49.7
Females								
18-74 years...	232.6	49.5	217.5	52.8	209.4	49.2	206.3	48.2
18-24 years	187.0	38.2	181.9	39.7	182.7	41.3	182.3	35.3
25-34 years	199.2	40.2	194.2	38.4	194.9	42.1	191.5	38.3
35-44 years	213.8	43.1	212.0	42.4	205.1	41.3	200.1	39.2
45-54 years	233.3	45.1	229.6	50.3	232.7	52.5	230.0	46.3
55-64 years	243.4	46.1	254.6	50.1	241.1	41.1	247.6	49.0
65-74 years	250.0	49.4	253.5	54.3	245.4	44.4	250.7	50.5

Table 7. Serum cholesterol levels of children and youths aged 4-17 years, by education of head of household, race, sex, and age—mean and standard deviation: United States, 1971-74

Race, sex, and age	Education of head of household							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
WHITE	Serum cholesterol in mg/100 ml							
Boys								
4-17 years	163.7	30.1	163.4	27.7	166.0	31.6	167.7	32.0
4-5 years	161.6	28.5	157.1	22.6	161.2	34.3	164.0	28.7
6-11 years	167.7	30.1	168.8	26.5	169.7	29.7	170.3	26.6
12-17 years	161.1	30.1	159.6	28.8	163.8	32.2	166.3	37.2
Girls								
4-17 years	165.0	30.0	165.2	28.0	168.5	33.0	172.6	35.0
4-5 years	162.9	30.3	164.0	33.8	168.1	33.2	165.3	32.2
6-11 years	169.2	29.5	170.7	28.1	169.5	34.3	176.4	33.1
12-17 years	162.4	30.0	160.1	24.9	167.5	31.6	171.1	37.0
BLACK								
Boys								
4-17 years	170.0	31.7	165.6	35.0	169.6	28.5	168.6	38.0
4-5 years	167.0	30.0	161.1	33.4	174.1	27.1	178.5	38.6
6-11 years	176.5	29.0	172.2	33.3	172.1	25.9	160.3	28.9
12-17 years	164.2	33.3	160.2	36.1	165.9	30.7	175.9	44.3
Girls								
4-17 years	172.2	29.9	177.9	34.7	177.2	37.1	172.1	30.5
4-5 years	175.1	26.9	170.7	30.6	182.6	36.6	170.3	25.1
6-11 years	173.6	32.4	183.5	32.0	169.2	37.6	185.1	22.4
12-17 years	170.5	28.0	173.4	37.5	184.1	35.0	150.4	36.1

Table 8. Serum cholesterol levels of males aged 18-74 years, by educational level, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Educational level							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White males	Serum cholesterol in mg/100 ml							
18-74 years	219.9	51.5	212.0	46.8	210.6	44.4	208.0	47.8
18-24 years	179.0	30.7	169.6	29.6	182.9	35.6	177.8	37.2
25-34 years	190.9	36.2	206.4	42.2	201.9	36.7	199.5	44.3
35-44 years	217.7	40.6	230.7	44.0	219.3	42.1	220.8	45.4
45-54 years	221.6	46.2	226.9	41.2	229.2	47.6	235.5	42.3
55-64 years	228.4	56.8	229.1	41.4	234.7	39.7	223.6	46.3
65-74 years	228.9	54.3	225.4	46.9	219.2	48.8	225.6	49.7
Black males								
18-74 years	217.4	49.1	205.9	49.6	196.7	42.9	210.6	61.7
18-24 years	178.6	23.0	179.3	26.8	173.1	35.5	179.4	33.6
25-34 years	188.7	28.6	212.0	56.2	199.0	35.1	213.7	76.6
35-44 years	201.8	42.9	218.4	60.8	231.3	41.7	207.9	35.4
45-54 years	229.8	40.0	220.6	36.8	217.1	44.1	227.4	39.7
55-64 years	232.1	62.5	205.8	34.2	225.6	17.5	*272.7	*38.5
65-74 years	228.5	46.1	234.5	45.5	202.6	37.1	210.4	46.6

Table 9. Serum cholesterol levels of females aged 18-74 years, by educational level, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Educational level							
	Less than 9 years		9-11 years		12 years		13 years or more	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White females	Serum cholesterol in mg/100 ml							
18-74 years	233.2	49.9	219.5	53.6	209.6	49.5	206.7	48.2
18-24 years	184.7	37.4	182.4	40.1	181.8	41.6	182.0	35.2
25-34 years	197.8	40.7	193.1	37.7	194.4	42.3	191.7	38.9
35-44 years	215.1	42.8	212.5	43.4	204.2	39.5	201.4	39.7
45-54 years	234.3	46.7	231.0	50.6	232.3	53.2	228.8	44.8
55-64 years	244.0	45.7	254.0	49.9	240.6	41.3	246.8	48.6
65-74 years	249.7	49.9	255.0	55.2	246.0	44.1	250.3	50.6
Black females								
18-74 years	231.3	47.4	209.1	46.9	205.1	43.8	202.6	49.6
18-24 years	191.8	42.0	183.6	35.9	187.6	37.9	181.7	33.4
25-34 years	206.8	36.9	197.8	40.6	200.2	40.9	189.1	30.2
35-44 years	212.6	44.2	212.2	37.5	207.6	40.8	186.2	32.8
45-54 years	230.5	39.3	219.6	47.3	242.6	32.4	245.0	56.1
55-64 years	241.4	48.8	259.1	51.5	263.1	35.1	*288.0	*68.8
65-74 years	252.5	45.7	233.1	38.2	223.1	49.2	259.3	45.6

Table 10. Serum cholesterol levels of persons aged 4-74 years, by urbanization status, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Urbanized areas				Nonurbanized areas			
	1 million persons or more		Less than 1 million persons		Urban, not in urbanized area		Rural areas	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
4-17 years	170.1	33.2	166.1	30.1	168.2	32.8	166.7	32.1
18-74 years	214.8	50.2	212.6	50.6	211.6	49.0	212.1	47.2
4-5 years	166.9	31.9	163.2	33.6	165.2	32.2	164.4	30.2
6-11 years	175.7	33.1	170.5	29.1	168.1	25.9	168.1	30.6
12-17 years	165.5	32.7	162.5	29.5	169.1	38.3	166.0	33.7
18-24 years	182.5	34.7	179.5	39.0	176.9	34.0	181.2	39.4
25-34 years	197.3	40.7	198.7	44.2	195.8	36.9	196.8	40.5
35-44 years	214.6	44.6	210.4	44.0	215.8	42.6	213.7	41.6
45-54 years	236.3	51.4	228.0	45.7	228.2	44.6	226.6	44.9
55-64 years	236.8	47.5	246.1	48.5	234.9	50.6	233.4	46.2
65-74 years	242.4	56.0	240.0	51.4	243.1	53.0	235.0	47.7
Males								
4-17 years	168.4	31.5	164.3	29.7	167.6	36.2	164.8	30.7
18-74 years	213.7	48.3	210.2	48.5	211.3	48.1	210.4	46.1
4-5 years	162.7	29.6	164.8	36.4	163.5	34.5	160.8	25.9
6-11 years	174.2	30.0	169.7	29.1	167.1	23.5	166.6	28.7
12-17 years	164.5	32.3	158.7	27.0	169.4	46.5	164.2	33.4
18-24 years	180.3	33.7	174.8	35.5	178.7	33.7	178.1	36.0
25-34 years	200.6	40.5	202.6	45.3	196.3	39.3	201.0	40.9
35-44 years	222.7	44.8	216.8	44.0	224.0	42.3	220.9	43.3
45-54 years	232.9	45.6	226.7	42.5	231.5	46.9	224.3	44.3
55-64 years	230.8	45.0	236.2	50.7	228.6	53.3	224.0	47.9
65-74 years	226.2	64.3	226.0	48.2	229.4	44.4	223.4	44.4
Females								
4-17 years	172.1	34.9	167.7	30.4	168.9	28.6	168.6	33.3
18-74 years	215.9	51.9	214.7	52.2	211.8	49.7	213.6	48.1
4-5 years	171.1	33.5	161.7	30.5	167.3	29.2	168.1	33.6
6-11 years	177.2	36.1	171.3	29.2	169.5	28.6	169.7	32.5
12-17 years	166.9	33.1	165.7	31.0	168.8	28.4	167.9	33.9
18-24 years	184.5	35.5	183.4	41.3	175.2	34.2	184.1	42.2
25-34 years	193.9	40.7	195.1	42.9	195.4	34.7	193.1	39.7
35-44 years	207.3	43.1	203.8	42.9	209.1	41.7	207.1	38.7
45-54 years	239.7	56.4	229.2	48.2	224.9	41.9	228.4	45.2
55-64 years	242.7	49.2	253.5	45.5	241.1	46.9	242.4	42.6
65-74 years	254.7	44.9	250.2	51.2	251.4	55.9	244.8	48.2

Table 11. Serum cholesterol levels of males aged 4-74 years, by urbanization status, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Urbanized area				Nonurbanized area			
	1 million persons or more		Less than 1 million persons		Urban, not in urbanized area		Rural area	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White males	Serum cholesterol in mg/100 ml							
4-17 years	167.6	29.6	164.4	29.8	166.4	37.2	164.1	29.9
18-74 years	214.0	48.7	210.0	47.7	213.1	48.4	210.5	45.7
4-5 years	162.7	28.2	164.1	37.4	158.0	34.1	160.7	26.1
6-11 years	175.3	29.8	169.6	29.9	165.9	23.4	165.1	26.8
12-17 years	162.0	28.2	159.2	26.1	169.3	48.2	164.2	33.4
18-24 years	180.3	34.7	175.1	35.8	181.0	34.1	177.8	36.0
25-34 years	201.2	42.1	200.5	39.9	196.7	40.4	200.9	39.3
35-44 years	223.7	44.1	215.4	43.3	226.7	41.6	221.0	43.1
45-54 years	233.6	46.4	228.3	42.2	231.3	47.3	224.3	44.9
55-64 years	228.7	42.3	237.6	51.7	229.1	53.9	224.1	46.9
65-74 years	227.4	66.1	225.4	48.4	230.1	44.9	223.1	44.4
Black males								
4-17 years	170.1	33.6	163.6	29.2	171.0	28.3	171.6	37.2
18-74 years	211.8	47.2	211.5	57.8	202.5	46.5	207.4	49.8
4-5 years	163.7	35.4	167.5	30.9	177.0	31.5	162.1	23.8
6-11 years	171.8	30.9	169.4	23.9	172.7	21.6	181.7	40.0
12-17 years	169.9	35.4	155.7	32.2	165.1	30.8	163.8	34.6
18-24 years	181.9	27.4	166.3	27.0	167.5	30.1	182.9	35.9
25-34 years	196.1	31.0	228.3	83.3	197.3	26.9	201.8	56.5
35-44 years	213.3	50.4	226.0	47.8	*195.4	*46.1	203.9	43.4
45-54 years	230.6	37.7	199.6	39.4	236.7	43.6	225.3	36.5
55-64 years	252.9	60.4	219.1	36.1	*216.9	*34.6	221.3	59.1
65-74 years	219.1	49.1	235.6	45.5	224.0	40.9	230.1	44.9

Table 12. Serum cholesterol levels of females aged 4-74 years, by urbanization status, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Urbanized area				Nonurbanized area			
	1 million persons or more		Less than 1 million persons		Urban, not in urbanized area		Rural area	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White females	Serum cholesterol in mg/100 ml							
4-17 years	171.0	34.8	166.1	29.7	167.8	28.1	168.1	33.2
18-74 years	216.1	52.4	215.4	52.7	212.0	49.6	213.6	48.2
4-5 years	170.2	34.8	159.7	30.3	166.1	30.1	166.5	32.9
6-11 years	176.4	36.1	170.2	29.0	167.7	27.1	169.6	32.5
12-17 years	165.4	32.3	163.7	29.7	168.3	28.2	167.2	33.8
18-24 years	183.4	35.3	182.9	41.4	175.3	34.5	183.8	42.2
25-34 years	192.5	41.7	195.1	42.5	193.4	32.7	193.6	40.3
35-44 years	207.3	40.9	202.4	42.6	209.1	42.4	207.4	39.1
45-54 years	239.1	58.3	230.1	49.3	225.4	40.8	228.4	45.5
55-64 years	242.9	48.7	253.7	45.4	240.9	45.5	241.1	42.8
65-74 years	255.8	44.8	250.2	51.8	251.1	56.6	244.9	48.3
Black females								
4-17 years	176.2	35.4	175.4	32.2	175.5	30.9	173.7	33.7
18-74 years	215.9	47.5	209.2	47.0	211.0	51.6	215.2	47.7
4-5 years	172.9	29.6	173.5	29.3	172.8	20.0	185.8	35.7
6-11 years	179.3	36.2	177.1	29.5	179.1	34.1	170.8	31.7
12-17 years	173.8	36.2	174.1	35.7	172.5	29.6	173.2	34.1
18-24 years	187.2	33.7	186.7	38.1	172.3	32.5	189.7	43.4
25-34 years	201.1	35.3	194.1	45.5	209.7	43.9	188.3	29.0
35-44 years	208.7	43.8	207.0	40.0	209.5	36.4	202.0	31.7
45-54 years	244.1	45.0	219.6	31.9	220.6	48.9	228.8	41.8
55-64 years	242.1	51.9	250.3	47.2	245.5	63.6	263.5	39.4
65-74 years	248.9	43.8	249.0	44.2	255.0	47.5	243.1	46.9

Table 13. Serum cholesterol levels of adults aged 18-74 years, by geographic region, sex, and age—mean and standard deviation: United States, 1971-74

Sex and age	Geographic region							
	Northeast		Midwest		South		West	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	216.2	50.5	211.7	46.5	212.0	49.3	212.0	50.2
18-24 years	180.0	33.4	179.3	38.1	180.9	39.3	181.4	37.3
25-34 years	200.2	41.1	195.6	37.4	199.2	45.9	195.0	40.5
35-44 years	216.8	46.9	213.4	40.8	209.8	39.9	213.4	44.4
45-54 years	234.8	55.3	231.4	39.6	227.0	46.5	227.3	46.7
55-64 years	238.6	45.5	235.4	49.0	237.8	49.1	239.1	48.4
65-74 years	239.9	49.4	236.0	48.5	236.8	48.3	244.7	59.4
Males								
18-74 years..	215.5	49.0	208.7	44.6	209.5	48.3	212.3	48.6
18-24 years	179.7	34.0	175.8	35.5	177.4	34.4	179.3	35.6
25-34 years	205.4	42.5	196.5	33.7	202.0	49.0	200.3	42.2
35-44 years	228.6	46.8	217.4	39.3	215.1	41.9	221.0	45.6
45-54 years	234.4	52.2	227.0	39.2	226.7	43.3	226.9	44.3
55-64 years	230.9	45.5	228.6	51.1	228.5	52.2	229.6	45.0
65-74 years	220.8	48.9	221.1	47.6	223.0	44.9	236.4	60.2
Females								
18-74 years..	216.9	51.9	214.7	48.1	214.1	50.2	211.8	51.6
18-24 years	180.3	32.9	183.1	40.3	183.9	42.9	183.1	38.6
25-34 years	195.0	39.0	194.8	40.7	196.6	42.8	190.4	38.4
35-44 years	205.6	44.1	209.9	41.8	205.3	37.6	205.8	41.8
45-54 years	235.2	57.8	236.3	39.5	227.2	48.9	227.7	48.9
55-64 years	245.0	44.5	242.5	45.7	246.3	44.5	247.4	49.6
65-74 years	254.8	44.4	246.6	46.2	246.7	48.2	251.3	58.0

Table 14. Serum cholesterol levels of males aged 18-74 years, by geographic region, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Geographic region							
	Northeast		Midwest		South		West	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White males	Serum cholesterol in mg/100 ml							
18-74 years	216.0	49.1	209.4	45.1	208.7	46.6	212.6	48.6
18-24 years	180.0	34.1	175.7	36.4	177.5	35.3	179.9	35.2
25-34 years	205.6	42.6	197.0	34.7	197.7	40.7	201.4	43.3
35-44 years	229.7	47.3	218.9	39.1	214.4	39.5	219.4	44.6
45-54 years	235.1	53.1	226.5	38.9	226.5	44.0	228.2	44.1
55-64 years	231.4	42.9	228.5	51.4	227.4	51.5	229.2	45.1
65-74 years	221.0	48.5	221.1	48.3	222.4	45.4	236.9	60.8
Black males								
18-74 years	208.6	49.4	205.2	38.2	212.9	54.6	205.8	51.6
18-24 years	173.5	28.2	183.6	28.3	177.4	31.5	166.8	34.2
25-34 years	196.3	38.8	192.8	23.4	223.6	74.2	186.1	29.5
35-44 years	211.6	35.3	196.9	36.7	218.0	49.9	233.2	65.0
45-54 years	220.6	27.0	237.2	38.2	227.4	40.4	212.1	46.2
55-64 years	231.9	68.3	234.4	32.7	235.7	55.8	227.0	38.2
65-74 years	218.4	55.1	223.0	38.1	226.5	42.7	237.3	52.1

Table 15. Serum cholesterol levels of females aged 18-74 years, by geographic region, race, and age—mean and standard deviation: United States, 1971-74

Race and age	Geographic region							
	Northeast		Midwest		South		West	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
White females	Serum cholesterol in mg/100 ml							
18-74 years	217.5	52.0	214.1	47.5	215.0	51.3	211.8	51.9
18-24 years	180.7	32.9	182.9	40.4	182.7	43.8	182.0	38.5
25-34 years	194.3	38.9	195.0	41.3	195.0	43.4	190.7	38.4
35-44 years	204.0	41.3	210.4	41.4	206.3	38.0	205.1	42.1
45-54 years	235.8	58.7	234.9	38.8	227.9	50.1	227.1	49.1
55-64 years	245.9	44.1	238.9	43.9	247.2	45.0	247.5	49.5
65-74 years	255.0	44.7	247.3	46.0	247.4	48.7	250.4	58.8
Black females								
18-74 years	211.4	47.2	222.0	53.0	210.5	45.0	214.1	48.9
18-24 years	174.7	30.2	182.9	39.6	188.7	39.4	191.9	31.7
25-34 years	202.6	39.4	193.3	34.3	202.2	40.1	187.9	37.3
35-44 years	214.1	43.6	200.3	39.9	200.8	35.6	216.4	40.8
45-54 years	233.0	42.6	247.2	42.9	223.6	42.3	238.1	47.4
55-64 years	233.9	50.7	271.4	49.0	242.1	42.2	243.6	57.0
65-74 years	252.2	39.6	239.8	47.1	243.1	45.1	264.5	46.1

Table 16. Serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age—mean and standard deviation: United States population

Sex and age	Annual family income							
	Less than $4,000				$4,000-$6,999			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-24 years	176.3	47.6	178.7	34.8	182.1	50.2	183.8	39.0
25-34 years	191.0	52.1	198.5	38.4	199.1	46.3	198.6	38.9
35-44 years	212.3	57.3	208.7	43.8	212.6	52.6	212.9	46.5
45-54 years	223.8	62.5	222.4	50.1	226.9	54.3	227.3	49.0
55-64 years	234.1	63.3	240.3	55.3	236.1	74.7	238.3	50.8
65-74 years	244.1	63.7	239.2	50.4	240.1	83.1	243.2	57.5
Males								
18-24 years	173.2	43.7	178.3	34.0	178.0	43.0	178.7	34.0
25-34 years	193.1	50.8	196.6	40.4	207.1	47.7	202.2	38.2
35-44 years	214.1	61.9	211.4	46.4	220.2	55.0	219.0	52.8
45-54 years	224.0	54.6	226.3	47.8	222.8	56.9	216.7	45.5
55-64 years	218.4	53.7	226.1	61.8	220.6	65.6	223.4	45.8
65-74 years	222.7	51.6	224.8	48.3	242.5	44.0	231.1	61.0
Females								
18-24 years	178.4	50.0	179.1	35.5	185.9	55.7	188.0	42.1
25-34 years	189.1	53.3	199.6	37.1	192.0	43.9	196.1	39.3
35-44 years	210.9	53.7	206.3	41.4	204.7	48.8	208.1	40.3
45-54 years	223.8	66.9	220.2	51.3	231.6	50.7	234.5	49.9
55-64 years	246.4	67.4	247.9	49.9	252.9	80.1	249.9	51.5
65-74 years	261.7	67.3	247.2	49.8	238.2	104.0	253.6	52.1

Table 16. Serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age—mean and standard deviation: United States population—Con.

Sex and age	Annual family income							
	$7,000-$9,999				$10,000 or more			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-24 years	173.5	40.5	181.7	39.3	173.9	50.5	178.9	36.0
25-34 years	202.4	46.9	198.0	42.8	207.8	43.4	196.7	41.2
35-44 years	217.8	50.6	213.7	40.7	220.9	54.2	213.5	43.6
45-54 years	225.7	56.3	230.2	47.7	226.6	59.3	233.4	46.6
55-64 years	242.3	53.2	237.8	47.4	251.6	54.0	235.0	43.8
65-74 years	251.6	44.5	233.4	47.5	246.1	44.8	240.2	49.5
Males								
18-24 years	176.8	37.2	178.0	37.7	173.7	45.8	178.0	34.4
25-34 years	204.6	47.4	202.0	45.2	208.5	43.3	200.7	41.3
35-44 years	227.0	46.9	218.4	37.3	229.3	46.7	222.1	43.9
45-54 years	223.4	50.3	222.2	39.0	225.5	60.0	233.1	44.9
55-64 years	239.8	40.3	228.7	54.1	242.0	58.5	232.1	41.6
65-74 years	225.3	21.2	218.7	45.7	239.5	37.9	226.3	44.8
Females								
18-24 years	170.4	43.3	184.9	40.3	174.1	55.7	179.8	37.7
25-34 years	200.0	46.2	193.8	39.8	207.2	43.5	192.7	40.7
35-44 years	208.3	52.6	209.5	43.0	213.2	59.3	205.1	41.7
45-54 years	228.3	62.6	236.0	52.4	227.9	58.4	233.7	48.5
55-64 years	245.4	65.9	246.0	38.6	265.7	43.0	238.9	46.3
65-74 years	262.5	47.0	248.1	44.5	252.5	49.8	253.6	50.0

Table 17. Serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age—mean and standard deviation: United States population

Sex and age	Educational level							
	All levels				Less than 9 years			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-24 years	177.2	47.8	180.5	37.2	171.7	50.8	182.4	33.8
25-34 years	198.3	47.9	197.4	41.3	195.3	49.6	194.9	37.9
35-44 years	215.4	54.0	213.4	43.4	214.1	52.7	213.7	42.4
45-54 years	226.1	57.5	230.2	47.3	222.8	55.8	227.6	45.5
55-64 years	240.8	64.7	237.9	48.1	236.3	64.0	236.0	52.8
65-74 years	241.9	66.2	239.6	51.7	237.6	70.1	240.1	52.4
Males								
18-24 years	176.3	42.8	178.0	35.0	175.8	33.8	178.2	28.6
25-34 years	202.9	47.8	200.8	41.9	191.7	53.4	190.6	35.0
35-44 years	223.6	52.9	220.9	44.0	223.1	55.0	213.6	41.8
45-54 years	224.3	54.8	228.4	44.5	220.3	54.3	222.7	45.3
55-64 years	228.6	56.6	229.5	48.8	224.5	53.8	229.0	57.6
65-74 years	226.7	51.2	225.9	51.2	224.2	55.2	228.6	53.3
Females								
18-24 years	178.0	51.7	182.7	39.1	167.4	63.4	187.0	38.2
25-34 years	194.2	47.6	194.1	40.3	198.2	46.2	199.2	40.2
35-44 years	207.9	54.0	206.6	41.6	204.9	48.7	213.8	43.1
45-54 years	227.9	59.9	231.8	49.6	225.4	57.1	233.3	45.1
55-64 years	251.9	69.5	245.5	46.1	248.7	71.1	243.4	46.1
65-74 years	254.7	74.3	249.9	49.7	249.9	79.5	250.0	49.4

Table 17. Serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age—mean and standard deviation: United States population—Con.

Sex and age	Educational level							
	9-12 years				13 years or more			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-24 years	179.1	49.5	180.5	38.1	174.3	39.5	180.1	36.2
25-34 years	197.8	47.5	198.3	40.4	201.6	47.5	196.4	43.4
35-44 years	213.3	54.8	213.5	43.3	222.7	52.6	213.0	44.0
45-54 years	227.9	59.2	230.1	49.1	228.2	55.4	232.9	44.1
55-64 years	241.3	65.5	240.4	43.8	252.7	63.7	234.9	48.7
65-74 years	254.1	54.0	238.5	50.7	238.7	65.2	240.4	51.7
Males								
18-24 years	177.7	46.7	178.0	34.1	172.5	34.8	178.0	37.0
25-34 years	204.7	45.1	203.0	38.8	205.3	48.5	200.3	46.6
35-44 years	220.2	53.4	222.7	43.9	231.3	48.6	221.4	45.0
45-54 years	227.5	52.5	227.7	44.9	223.6	62.2	235.3	42.1
55-64 years	229.7	58.3	232.2	40.4	239.0	60.2	224.9	46.1
65-74 years	225.7	34.6	221.8	47.8	241.2	50.5	224.9	49.7
Females								
18-24 years	180.3	51.6	182.5	40.9	176.0	43.3	182.3	35.3
25-34 years	192.6	48.6	194.7	41.2	196.0	45.4	191.5	38.3
35-44 years	208.0	55.3	207.1	41.7	211.7	55.4	200.1	39.2
45-54 years	228.2	64.9	231.8	51.9	232.2	48.5	230.0	46.3
55-64 years	249.8	69.1	246.2	45.2	265.3	64.2	247.6	49.0
65-74 years	272.0	56.3	249.3	49.6	236.1	77.1	250.7	50.5

Table 18. Serum cholesterol levels of white adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age—mean and standard deviation: United States population

Sex and age	Annual family income							
	Less than $4,000				$4,000-$6,999			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	217.9	63.4	217.2	54.1	212.2	59.2	214.4	51.4
18-24 years	177.3	49.1	177.0	34.4	182.8	49.8	185.6	39.4
25-34 years	191.6	51.7	199.1	37.4	199.4	46.7	197.9	38.9
35-44 years	213.5	54.5	212.5	43.0	213.3	53.3	213.8	47.2
45-54 years	226.2	63.2	220.2	54.1	227.1	54.4	222.7	47.8
55-64 years	238.2	61.8	242.4	56.4	238.2	72.3	236.6	48.6
65-74 years	245.8	63.1	239.1	50.8	238.9	84.9	243.7	58.3
Males								
18-74 years	209.0	57.2	207.1	51.7	212.7	56.1	208.9	48.5
18-24 years	173.5	46.1	176.1	33.3	178.6	43.6	182.3	34.6
25-34 years	193.9	55.1	198.1	37.1	208.2	48.6	201.7	38.3
35-44 years	214.3	61.0	219.7	44.1	220.7	56.5	219.6	53.8
45-54 years	224.3	59.3	222.5	52.8	223.2	56.3	214.0	44.9
55-64 years	220.9	53.6	226.4	64.0	217.0	66.6	220.0	37.3
65-74 years	223.3	51.6	224.1	48.3	242.5	44.0	232.0	62.3
Females								
18-74 years	224.3	66.8	223.7	54.6	211.6	62.1	218.6	53.2
18-24 years	179.9	51.0	178.0	35.3	186.7	54.7	188.3	42.8
25-34 years	189.3	48.1	199.9	37.6	191.6	43.5	195.1	39.0
35-44 years	212.9	49.8	206.4	41.1	205.4	48.4	209.1	40.6
45-54 years	227.3	65.2	219.1	54.6	231.5	51.8	228.6	48.9
55-64 years	251.2	64.2	250.8	50.0	259.6	71.6	249.2	52.3
65-74 years	264.3	65.7	247.1	50.3	235.8	108.5	253.7	52.7

Table 18. Serum cholesterol levels of white adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age—mean and standard deviation: United States population—Con.

Sex and age	Annual family income							
	$7,000-$9,999				$10,000 or more			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	215.5	54.1	211.2	48.5	221.6	57.0	212.3	47.5
18-24 years	175.1	38.6	181.9	39.9	173.3	51.8	178.1	36.0
25-34 years	202.6	47.6	198.2	42.9	205.9	42.2	196.1	39.9
35-44 years	218.4	51.5	213.2	40.0	220.9	54.3	213.1	43.1
45-54 years	225.7	57.1	230.3	48.5	226.0	59.6	234.1	46.8
55-64 years	242.5	53.7	237.1	47.2	251.6	54.0	234.8	43.9
65-74 years	251.6	44.5	233.7	47.3	246.1	44.8	240.1	49.6
Males								
18-74 yeasr	217.1	49.3	208.1	46.8	222.1	55.0	214.7	46.1
18-24 years	177.4	37.7	178.6	38.5	173.5	46.8	178.0	34.9
25-34 years	204.5	48.0	202.9	45.2	205.4	42.5	199.5	38.9
35-44 years	228.3	47.0	216.2	35.0	229.3	46.9	221.9	44.0
45-54 years	224.1	51.0	221.5	39.7	224.4	60.6	233.8	44.9
55-64 years	239.8	40.3	229.2	55.1	242.0	58.5	231.7	41.4
65-74 years	225.3	21.2	218.9	45.9	239.5	37.9	226.4	44.9
Females								
18-74 years	213.7	58.7	214.0	49.8	221.0	59.0	209.7	48.8
18-24 years	172.9	39.4	184.6	40.8	173.0	57.7	178.3	37.0
25-34 years	200.5	47.0	193.4	39.9	206.3	41.9	192.7	40.7
35-44 years	208.1	53.9	210.6	43.8	213.2	59.3	204.5	40.3
45-54 years	227.6	63.4	236.3	52.8	227.9	58.4	234.5	49.0
55-64 years	246.1	67.2	244.3	37.3	265.7	43.0	238.8	46.6
65-74 years	262.5	47.0	248.5	43.9	252.5	49.8	253.3	50.2

Table 19. Serum cholesterol levels of white adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age—mean and standard deviation: United States population

Sex and age	Educational level							
	All levels				Less than 9 years			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	215.9	59.5	213.2	49.2	224.7	61.4	226.5	51.2
18-24 years	178.4	48.2	180.3	37.4	178.7	47.0	181.7	34.2
25-34 years	199.0	47.6	197.0	40.7	197.7	51.3	194.4	38.7
35-44 years	216.2	53.8	213.6	42.9	215.6	50.0	216.4	41.8
45-54 years	227.1	57.8	230.4	47.8	225.8	54.9	227.3	46.8
55-64 years	243.1	63.8	237.6	47.6	239.2	63.1	235.9	52.3
65-74 years	242.9	65.4	239.8	52.1	238.4	69.4	240.1	53.0
Males								
18-74 years	214.7	54.5	211.7	47.4	219.4	54.0	219.9	51.5
18-24 years	177.2	43.8	178.3	35.4	177.2	35.8	179.0	30.7
25-34 years	203.5	48.8	200.4	40.6	195.6	57.5	190.9	36.2
35-44 years	224.7	52.3	221.3	43.6	225.4	49.8	217.7	40.6
45-54 years	225.4	55.8	228.9	44.9	223.7	54.5	221.6	46.2
55-64 years	229.0	56.9	229.2	48.1	224.7	53.2	228.4	56.8
65-74 years	228.2	48.5	226.0	51.7	225.6	52.1	228.9	54.3
Females								
18-74 years	216.9	63.7	214.5	50.8	229.8	67.5	233.2	49.9
18-24 years	179.4	51.7	182.1	39.2	180.4	56.2	184.7	37.4
25-34 years	194.8	46.0	193.7	40.6	199.4	45.8	197.8	40.7
35-44 years	208.4	53.9	206.4	40.9	205.6	48.2	215.1	42.8
45-54 years	228.8	59.7	231.7	50.2	228.1	55.2	234.3	46.7
55-64 years	255.8	67.0	245.2	45.8	254.2	68.7	244.0	45.7
65-74 years	255.3	74.5	250.0	50.0	250.4	80.5	249.7	49.9

Table 19. Serum cholesterol levels of white adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age—mean and standard deviation: United States population—Con.

Sex and age	Educational level							
	9-12 years				13 years or more			
	HES, 1960-62		HANES, 1971-74		HES, 1960-62		HANES, 1971-74	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Both sexes	Serum cholesterol in mg/100 ml							
18-74 years	211.6	58.6	211.8	48.5	215.0	58.1	207.4	48.0
18-24 years	179.8	50.9	180.4	38.3	174.0	39.5	179.8	36.3
25-34 years	198.4	46.5	197.9	40.0	200.9	47.7	196.0	42.2
35-44 years	213.8	54.9	213.2	42.4	223.2	53.4	213.2	44.3
45-54 years	227.6	60.1	230.4	49.7	228.2	56.3	232.6	43.5
55-64 years	242.6	64.0	240.0	43.6	253.6	64.4	234.1	48.7
65-74 years	254.3	54.0	239.1	51.1	239.6	64.8	240.4	51.7
Males								
18-74 years..	211.7	54.1	211.0	45.1	215.2	55.4	208.0	47.8
18-24 years	179.1	47.8	178.6	34.3	172.4	34.9	177.8	37.2
25-34 years	204.5	45.8	202.7	37.8	205.0	49.2	199.5	44.3
35-44 years	221.0	54.6	222.5	42.9	231.4	48.8	220.8	45.4
45-54 years	227.3	53.9	228.3	45.2	223.4	63.3	235.5	42.3
55-64 years	229.3	59.1	232.7	40.4	239.5	60.6	223.6	46.3
65-74 years	226.3	34.2	221.8	48.1	243.0	49.1	225.6	49.7
Females								
18-74 years..	211.6	61.8	212.4	50.8	214.7	61.1	206.7	48.2
18-24 years	180.5	53.3	182.0	41.2	175.7	43.6	182.0	35.2
25-34 years	193.6	46.5	194.1	41.3	194.8	44.6	191.7	38.9
35-44 years	208.3	54.5	206.5	40.7	212.0	57.1	201.4	39.7
45-54 years	227.9	65.1	231.9	52.5	232.4	49.2	228.8	44.8
55-64 years	252.5	65.6	245.4	45.0	266.8	65.0	246.8	48.6
65-74 years	272.0	56.7	250.3	49.9	236.1	77.1	250.3	50.6

APPENDIXES

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STATISTICAL NOTES

Survey Design

The sampling plan of the Health and Nutrition Examination Survey (HANES) followed a highly stratified multistage probability design in which a sample of the civilian noninstitutionalized population of the conterminous United States, aged 1-74 years was selected. Excluded from the selection process were those persons confined to institutions or residing on any of the reservation lands set aside for the American Indians. Successive elements that are dealt with in the process of sampling are the primary sampling unit (PSU), census enumeration district (ED), segment (a cluster of households), household, eligible person, and finally, sample person.

The starting points in the first stage of this design were the 1960 decennial census lists of addresses and the nearly 1,900 PSU's into which the conterminous United States was divided. Each PSU is either a standard metropolitan statistical area, a single county, or two or three contiguous counties. The PSU's were grouped into 357 strata for the Health Interview Survey and subsequently collapsed into 40 superstrata for the Health and Nutrition Examination Survey.

Of the 40 superstrata, 15 contained a single large metropolitan area with more than two million persons. These 15 large metropolitan areas were chosen for the sample with certainty. The remaining 25 superstrata were formed by classifying the noncertainty strata into 4 population density groups within each of the 4 geographic regions. Then using a modified Goodman-Kish controlled-selection technique to assure proportionate representation of specified State groups and rate-of-population-change classes, 2 PSU's were chosen from each of the 25 noncertainty

superstrata with the probability of selection of a PSU proportionate to its 1960 population. In this manner, a total first-stage sample of 65 PSU's or "stands" included the areas within which a sample of persons would be selected for examination. The PSU's were scheduled to be sampled over a 3-year period with 300-600 persons to be examined per stand.

Although the 1970 census data were used as the frame for selecting the sample within the PSU when available, the calendar of operations required that the 1960 census data be used for the first 44 locations in the HANES sample. The 1970 census data were used for the last 21 stands of the sample.

Beginning with the 1970 census data, the segment size was changed from an expected 6 households that were selected from compact clusters of 18 households to an expected compact cluster of 8 households. This change was made for operational advantages, and research by the U.S. Bureau of the Census indicated that precision of estimates would not be appreciably affected by the change from noncompact clusters to compact clusters.

For ED's not having usable addresses (generally located in rural areas), area sampling was employed and consequently some variation in the segment size occurred. To make the sample representative of the current population of the United States, the address or ED segments were supplemented by a sample of housing units that had been constructed since the 1960 and 1970 Decennial Censuses.

Within each PSU, a systematic sample of segments was selected. The enumeration districts that fell into the sample were coded into one of two economic classes. The first class, identified as the "poverty stratum," was composed of

"current Poverty Areas" that had been identified by the Census Bureau in 1970 (pre-1970 census), plus other ED's in the PSU with a mean family income of less than $3,000 in 1959 (based on the 1960 census). The second economic class, the "nonpoverty stratum," included all ED's not designated as belonging to the poverty stratum.

All sample segments classified as "poverty stratum" were retained in the sample. For the first 42 stands, sample segments in nonpoverty stratum ED's were divided into 8 random subgroups and one of the subgroups was chosen to remain in the HANES sample. Research indicated that efficiency of estimates could be increased by changing the ratio of poverty to nonpoverty segments from 8:1 to 2:1. Therefore in the later stands, the selected segments in the nonpoverty-stratum ED's were divided into two random subgroups and one of the subgroups was chosen to remain in the HANES sample. The differential sampling permits a separate analysis with adequate reliability of those classified as "below the poverty level" and those classified as "above the poverty level."

After identification of the sample segments, a list of all current addresses within the segment boundaries was made and household members were interviewed to determine the age and sex of each person as well as demographic and socioeconomic information required for the survey. If no one was at home after repeated calls or if the household members refused to be interviewed, the interviewer tried to determine the household composition from neighbors.

To select the persons in sample segments to be examined in HANES and at the same time to oversample certain groups at high risk of malnutrition, all household members aged 1-74 in each segment were first listed on a sample selection worksheet with each household in the segment listed serially. The number of household members in each of the six age-sex groups shown in table I were then listed on the worksheet under the appropriate age-sex group column. The sample selection worksheets were then put in segment-number order and a systematic random sample of persons in each age-sex group was selected to be examined using the sampling rates shown in table I.

Table I. Sampling rates by age-sex groups

Age and sex	Rate
1-5 years (boys and girls)	1/2
6-19 years (boys and girls)	1/4
20-44 years (males)	1/4
20-44 years (females)	1/2
45-64 years (males and females)	1/4
65-74 years (males and females)	1

The persons selected in the 65-stand sample of HANES made up a representative sample of the target population and included 28,043 sample persons aged 1-74 years of whom 20,749 or 74 percent were examined. When adjustments were made for different sampling for high-risk groups, the response rate became 75 percent.

All data presented in this report are based on "weighted" observations. That is, data recorded for each person are inflated to characterize the subuniverse from which that sample person was drawn. The weight for each examined person is the product of the reciprocal of the probability of selecting the person, an adjustment for nonresponse cases (i.e., persons not examined), and a poststratified ratio adjustment that increases precision by closer alignment of survey results with known U.S. population figures for 20 age, race, and sex groups from November 1, 1972— the approximate midpoint of HANES.

A more detailed description of the survey design and selection technique can be found in "Plan and Operation of the Health and Nutrition Examination Survey, United States, 1971-1973," *Vital and Health Statistics*, Series 1-Number 10a.[4]

Nonresponse

In any health examination survey, after the sample is identified and the sample persons are requested to participate in the examination, the survey meets one of its more severe problems, namely that of nonresponse. Usually a sizable number of sample persons will not participate in the examination. A further potential for bias results if the sample persons who do not participate differ from the sample persons examined

NOTE: A list of references follows the text.

concerning the characteristics under examination. Intensive efforts were made in HANES to develop and implement procedures and inducements that would reduce the number of nonrespondents and thereby reduce the potential of bias due to nonresponse. These procedures and inducements are discussed in "Plan and Operation of the Health and Nutrition Examination Survey, United States, 1971-1973," Series 1-Number 10a.[4]

Despite these intensive efforts, 25 percent of the sample persons from 65 stands were not examined as compared with previous surveys having response rates of more than 86 percent. Consequently, the potential for a sizable bias does exist in the 1971-74 estimates in the publication. Because more than 95 percent of the sample persons responded to a medical questionnaire in 1971-74, the characteristics of the nonrespondents and the nature of nonresponse were examined. This examination indicated that the likelihood of sizable bias is small. For instance, no greater proportion of persons with characteristics related to serum cholesterol were observed in those who were examined as compared with those who were not.

As previously mentioned, the data in this report were based on weighted observations, and one of the components of the weight assigned to an examined person was an adjustment for nonresponse. A procedure was adopted that multiplies the reciprocal of the probability of selection of sample persons who were examined by a factor that raises estimates to a level that would have been achieved if all sample persons had been examined. The nonresponse-adjustment factor was calculated by dividing the sum of the reciprocals of the probability of selection for all selected sample persons in each of five income groups within each stand by the sum of the reciprocals of the probability of selection for examined sample persons in the same stand and income group. The five income groups were: under $3,000; $3,000-$6,999; $7,000-$9,999; $10,000-$14,999; and $15,000 and over. For sample weighting purposes, income group was imputed for 5.6 percent of the sample persons

using the educational level of head of household. To the extent that the income-within-stand classes were homogeneous regarding the health characteristics under study, the adjustment procedure was effective in reducing the potential of bias due to nonresponse. The percent distribution of the nonresponse adjustment factors computed for the 65-stand sample of HANES is shown in table II.

Data Limitation and Reliability

When the mean serum cholesterol level was examined according to age, sex, race, and socioeconomic status, the sample sizes were usually too small to produce reliable estimates for black persons; therefore, certain groups were rearranged (e.g., income levels of $10,000-$14,999 and $15,000 or more were combined and replaced by the category $10,000 or more per year). Even then, the sample sizes for some age categories remained too small to present reliable estimates. Nevertheless, all means and variances appearing in this report met defined standards before they were considered acceptably precise and reliable.

The rule for reporting means consisted of the following two basic consecutive criteria: (1) that a sample size be at least five persons and (2) that the estimated coefficient of variation (i.e., the standard error of the mean divided by the mean $(s_{\bar{x}}/\bar{X})$ be less than 25 percent). Thus if the sample size was too small, or if adequate

Table II. Percent distribution of nonresponse adjustment factors, stands 1-65, Health and Nutrition Examination Survey (HANES): United States, 1974

Size of factor	Percent distribution
Total	100.0
1.00-1.24	32.6
1.25-1.49	38.5
1.50-1.74	18.2
1.75-1.99	7.4
2.00-2.49	2.8
2.50-2.99	0.3
3.00[1]	0.3

[1]A size of 3.00 was assigned for all factors greater than 3.00. The final poststratified ratio adjustment corrects for this truncation.

NOTE: A list of references follows the text.

and the variation regarding the mean was too large, then the estimate was neither precise nor reliable enough to meet the standards established for publication.

Missing Data

Examination surveys are subject to loss of information not only as a result of failure to examine all sample persons but also as a result of the failure to complete fully the examination items for the respondents. The distribution of the number of children selected for examination, percent examined, percent with cholesterol measurement, and the distribution of the number of examined persons aged 18-74 years with missing serum cholesterol measurements have been published.[2]

Persons with missing socioeconomic and/or serum cholesterol values are excluded from the estimates presented in this report.

Standard Error

The probability design of the survey determines the estimation of standard errors that correspond to the weighted estimates. The standard error is primarily a measure of sampling variability, that is, the variations that might occur by chance because only a sample of the population is surveyed. As calculated for this report, the standard error also reflects part of the variation that arises in the measurement process. Estimates of any biases that might lie in the data are not included. The chances are about 68 out of 100 that an estimate from the sample would differ from a complete census by less than the standard error. The chances are about 95 out of 100 that the difference would be less than twice the standard error and about 99 out of 100 that it would be less than 2 1/2 times as large.

Estimates of standard errors are obtained from the sample data and are subject to sampling error when the number of cases in a cell is small or even, occasionally, when the number of cases is substantial.

Estimates of the standard errors for selected statistics used in this report are presented in

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NOTE: A list of references follows the text.

tables III-XVI. These estimates have been prepared by a replication technique that yields overall variability through observation of variability among random subsamples of the total sample. These estimated standard errors do not reflect any residual bias that might still be present after the attempted correction for nonresponse.

Tests of Significance

The procedure used in this report for testing the significance of the difference between two means is the Z-statistic.

If more than one test was implied (such as, regional differences—six implied tests), then the Bonferroni test[16] was used to test for significance. In the Bonferroni test the Z-statistic is computed as described in the following section; however, the critical value for Z is 2.64 for six comparisons and 2.81 when 10 comparisons are implied.

Comparison between HES and HANES.— Statistical comparisons of the mean serum cholesterol levels between HES, 1960-62, and HANES, 1971-74, were performed by using the Z-test (which is the inability to obtain variance-covariance matrix for HES data). The following technique was used:

Z-test—If one independent sample is drawn from each of two univariate normal distributions with means μ_1 and μ_2, a method is sought to test the hypothesis that the means are equal, that is, $\mu_1 = \mu_2$. The null hypothesis is $H_0 : \mu_1 = \mu_2$ with the alternative $H_A : \mu_1 \neq \mu_2$.

Ordinarily, to test a hypothesis concerning means from two independent samples a t-test is performed, which makes the assumption that $\sigma_1^2 = \sigma_2^2$. In both the HES and the HANES data, the numbers (sample sizes) are generally large; hence it was assumed that $S_1^2 = \sigma_1^2$, and $S_2^2 = \sigma_2^2$ (where S^2 is the variance computed from a sample and σ^2 is the true variance in the population) and that each can be treated as constants. In this sense, df = ∞ and $t = z$.

The standard normal test can then determine whether to reject or accept the null hypothesis. Because a difference between two means is being examined, the standard error of the difference must be computed. By using the balanced half-

Table III. Standard errors of the mean serum cholesterol levels of persons aged 4-74 years, by annual family income, sex, and age: United States, 1971-74

Sex and age	Annual family income				
	Less than $4,000	$4,000-$6,999	$7,000-$9,999	$10,000-$14,999	$15,000 or more
Both sexes	Standard error in mg/100 ml				
4-17 years	1.75	1.74	1.10	1.26	1.38
18-74 years	1.63	1.67	1.48	1.41	1.29
4-5 years	3.29	3.75	2.21	1.92	2.74
6-11 years	3.13	3.07	1.79	2.17	2.08
12-17 years	2.58	2.83	1.84	1.66	2.12
18-24 years	1.93	2.68	2.05	2.89	3.24
25-34 years	2.81	2.91	2.34	1.99	2.37
35-44 years	5.34	4.54	2.07	2.40	2.46
45-54 years	4.32	5.21	3.05	2.77	2.62
55-64 years	3.37	4.83	4.31	4.74	4.62
65-74 years	1.97	3.52	2.35	4.61	3.62
Males					
4-17 years	2.16	2.04	1.30	1.61	1.73
18-74 years	2.84	2.05	1.82	1.88	1.85
4-5 years	4.43	5.52	2.65	3.15	2.63
6-11 years	3.54	2.85	2.15	2.51	2.96
12-17 years	3.50	3.71	2.46	3.09	3.02
18-24 years	2.93	4.21	3.15	3.65	3.15
25-34 years	5.44	5.57	3.70	2.57	4.46
35-44 years	10.64	8.50	3.36	4.22	3.84
45-54 years	6.98	7.70	4.04	3.74	4.09
55-64 years	7.11	6.47	6.85	4.80	5.78
65-74 years	2.78	4.68	3.13	3.64	4.01
Females					
4-17 years	2.48	2.14	1.44	1.69	1.81
18-74 years	1.92	1.83	1.60	1.93	1.93
4-5 years	4.98	5.00	4.28	3.15	4.76
6-11 years	4.17	4.90	2.56	3.00	2.62
12-17 years	2.87	3.86	2.62	2.43	2.51
18-24 years	2.60	3.82	2.67	3.25	4.87
25-34 years	2.91	2.98	2.16	2.75	2.32
35-44 years	5.09	3.52	2.43	2.29	2.37
45-54 years	7.12	6.18	4.35	5.65	3.42
55-64 years	3.74	5.86	4.05	7.51	6.44
65-74 years	3.09	3.85	3.50	7.28	4.33

sample replication technique, $\sqrt{V(\overline{X}_1)}$ is obtained for HES and $\sqrt{V(\overline{X}_2)}$ is obtained for HANES. Because HES and HANES are assumed to be independent samples, the covariance between $\overline{X}_1$ and $\overline{X}_2$ is zero and $V(\overline{X}_1 - \overline{X}_2) = V(\overline{X}_1) + V(\overline{X}_2)$. Thus the statistic used to test $\mu_1 = \mu_2$ is

$$Z = (\overline{X}_1 - \overline{X}_2)/\sqrt{V(\overline{X}_1) + V(\overline{X}_2)}.$$

If one is willing to accept the above assumptions as well as the one of normally distributed estimators, the Z-statistic can then be used to test the difference between two means. All tests were done at $\alpha = 0.05$.

Table IV. Standard errors of the mean serum cholesterol levels of children aged 4-11 years, by education of head of household, sex, and age: United States, 1971-74

Sex and age	Education of head of household			
	Less than 9 years	9-11 years	12 years	13 years or more
Both sexes	Standard error in mg/100 ml			
4-5 years	2.88	3.15	2.33	2.35
6-11 years	2.18	1.18	2.03	1.70
4 years	3.35	4.51	2.42	2.99
5 years	4.60	3.61	3.44	3.38
6 years	4.93	3.27	3.95	5.45
7 years	5.08	6.96	2.54	5.67
8 years	4.76	4.83	3.35	3.72
9 years	3.48	3.37	5.05	5.23
10 years	3.78	3.44	4.64	3.13
11 years	6.20	5.44	4.65	4.43
Boys				
4-5 years	4.81	3.74	2.84	2.96
6-11 years	3.38	2.11	2.53	2.17
4 years	5.07	3.74	3.18	3.55
5 years	7.92	5.79	4.92	4.43
6 years	6.42	4.23	3.59	5.10
7 years	6.48	9.86	2.80	7.51
8 years	5.65	6.61	4.79	3.84
9 years	4.47	6.41	7.33	7.16
10 years	7.78	4.24	4.04	3.61
11 years	8.31	6.66	4.86	5.66
Girls				
4-5 years	4.16	4.95	3.85	3.52
6-11 years	2.37	2.16	2.75	2.78
4 years	5.77	9.04	3.70	4.20
5 years	5.65	3.82	5.53	5.14
6 years	6.67	4.63	5.90	9.57
7 years	7.57	8.38	4.24	5.96
8 years	6.22	6.53	5.18	5.77
9 years	5.25	4.83	5.76	6.57
10 years	4.02	5.76	9.87	6.59
11 years	7.04	7.14	6.47	5.60

Table V. Standard errors of the mean serum cholesterol levels of youths aged 12-17 years, by education of head of household, sex, and age: United States, 1971-74

Sex and age	Education of head of household			
	Less than 9 years	9-11 years	12 years	13 years or more
Both sexes	Standard error in mg/100 ml			
12-17 years	1.58	2.01	2.07	2.29
12 years	4.26	4.44	3.02	7.14
13 years	4.74	3.18	5.12	5.33
14 years	4.18	5.53	3.91	4.03
15 years	4.62	7.86	4.50	4.43
16 years	4.86	3.88	4.17	6.88
17 years	4.02	4.26	3.76	5.40
Boys				
12-17 years	2.72	3.48	2.57	3.56
12 years	3.58	7.32	3.98	15.03
13 years	7.60	5.80	9.51	6.00
14 years	6.69	11.72	5.40	5.57
15 years	7.01	13.20	3.91	5.54
16 years	8.18	5.56	3.75	8.99
17 years	4.30	4.94	4.67	5.92
Girls				
12-17 years	1.96	2.26	2.65	2.48
12 years	10.25	5.72	4.39	4.76
13 years	5.19	2.73	3.97	8.11
14 years	6.40	4.70	5.05	8.55
15 years	5.90	9.90	8.62	7.86
16 years	6.33	6.75	6.67	8.45
17 years	5.71	6.50	5.31	9.65

Table VI. Standard errors of the mean serum cholesterol levels of adults aged 18-74 years, by educational level, sex, and age: United States, 1971-74

Sex and age	Educational level			
	Less than 9 years	9-11 years	12 years	13 years or more
Both sexes	Standard error in mg/100 ml			
18-74 years	1.55	1.38	1.03	1.60
18-24 years	3.72	2.19	1.78	1.96
25-34 years	3.63	2.27	1.90	2.35
35-44 years	2.88	3.01	2.17	2.48
45-54 years	3.32	3.40	2.48	3.23
55-64 years	2.96	4.29	2.86	4.64
65-74 years	1.84	3.22	2.86	2.92
Males				
18-74 years	2.40	1.99	1.39	2.18
18-24 years	7.09	2.25	2.47	2.94
25-34 years	6.08	5.38	2.68	4.07
35-44 years	4.61	5.88	3.94	3.90
45-54 years	3.99	3.89	3.81	3.50
55-64 years	4.81	4.28	4.70	6.14
65-74 years	3.25	4.84	3.91	5.07
Females				
18-74 years	1.60	2.15	1.44	1.86
18-24 years	5.16	4.43	2.69	2.14
25-34 years	4.37	2.56	2.24	2.16
35-44 years	3.85	2.45	1.74	2.54
45-54 years	5.60	5.42	3.69	5.49
55-64 years	3.94	5.90	3.49	6.96
65-74 years	2.47	3.61	2.77	5.26

Table VII. Standard errors of the mean serum cholesterol levels of males aged 4-74 years, by annual family income, educational level, race, and age: United States, 1971-74

Race and age	Annual family income				Educational level			
	Less than $4,000	$4,000-$6,999	$7,000-$9,999	$10,000 or more	Less than 9 years	9-11 years	12 years	13 years or more
White males	Standard error in mg/100 ml							
4-17 years....................................	2.98	2.31	1.56	1.08	2.28	1.55	1.53	1.46
18-74 years..................................	2.72	1.79	1.95	1.28	2.72	2.29	1.42	2.11
4-5 years.......................................	7.61	4.96	2.93	2.22	5.94	3.11	2.72	2.96
6-11 years.....................................	5.17	3.29	2.60	1.78	4.08	2.48	2.84	2.06
12-17 years...................................	3.58	4.25	2.85	2.16	3.31	2.89	2.81	3.57
18-24 years...................................	3.91	4.91	3.64	2.68	10.62	2.77	2.66	3.12
25-34 years...................................	5.75	5.72	4.30	2.22	6.82	7.18	2.86	3.67
35-44 years...................................	11.11	10.06	3.53	2.82	4.97	5.91	4.05	3.84
45-54 years...................................	9.92	8.05	4.69	2.83	4.53	4.32	3.83	3.56
55-64 years...................................	7.51	5.22	7.29	4.28	4.83	4.34	4.93	6.98
65-74 years...................................	3.44	5.19	3.21	2.79	3.84	5.09	3.97	5.22
Black males								
4-17 years....................................	2.55	3.79	3.76	5.04	2.91	3.56	3.10	6.74
18-74 years..................................	5.69	9.50	5.88	7.42	4.90	6.28	5.67	11.79
4-5 years.......................................	5.75	10.57	11.88	12.76	6.35	8.23	8.81	39.17
6-11 years.....................................	3.32	6.39	4.98	10.00	4.73	4.48	4.03	9.25
12-17 years...................................	4.77	5.69	5.43	6.77	3.82	7.56	5.02	15.41
18-24 years...................................	6.27	6.40	9.14	5.21	4.87	7.36	8.39	7.86
25-34 years...................................	15.53	12.38	6.98	22.42	13.08	11.14	7.34	27.13
35-44 years...................................	14.21	15.88	14.43	16.18	11.22	24.06	14.15	21.95
45-54 years...................................	8.05	18.41	6.10	15.05	6.93	8.17	17.15	21.04
55-64 years...................................	14.19	33.42	19.01	28.68	15.49	14.36	20.21	*82.81
65-74 years...................................	3.82	10.70	8.95	15.84	3.41	16.69	20.77	18.92

Table VIII. Standard errors of the mean serum cholesterol levels of females aged 4-74 years, by annual family income, educational level, race, and age: United States, 1971-74

Race and age	Annual family income				Educational level			
	Less than $4,000	$4,000-$6,999	$7,000-$9,999	$10,000 or more	Less than 9 years	9-11 years	12 years	13 years or more
White females	Standard error in mg/100 ml							
4-17 years...	2.61	2.63	1.30	1.20	1.74	1.62	1.83	1.56
18-74 years...	2.09	2.02	1.76	1.65	1.87	2.41	1.48	1.98
4-5 years...	6.34	6.67	4.45	3.40	4.50	5.91	4.35	3.95
6-11 years...	6.09	6.17	2.16	2.15	2.82	2.51	2.75	2.90
12-17 years...	3.07	4.04	2.53	1.65	2.45	2.09	2.71	2.57
18-24 years...	2.96	5.01	3.01	3.15	6.09	5.05	2.84	2.25
25-34 years...	4.49	2.88	2.46	1.85	5.08	2.96	2.33	2.27
35-44 years...	6.53	3.76	2.51	1.98	4.46	2.96	1.71	2.73
45-54 years...	9.00	7.13	4.68	3.66	7.15	5.24	3.75	5.41
55-64 years...	4.09	6.62	4.30	5.09	4.48	6.74	3.42	6.93
65-74 years...	3.28	4.16	3.67	5.30	2.62	3.78	2.82	5.46
Black females								
4-17 years...	4.07	2.73	4.61	6.07	4.20	3.91	5.56	7.79
18-74 years...	2.83	5.50	4.17	3.23	2.82	4.80	3.17	6.83
4-5 years...	6.87	6.00	10.01	7.99	6.96	6.50	6.81	7.46
6-11 years...	5.79	3.81	9.82	9.59	5.79	3.55	9.08	6.94
12-17 years...	3.85	5.91	6.84	8.41	3.91	7.77	6.44	15.77
18-24 years...	4.76	4.94	6.31	10.66	11.67	5.62	5.22	6.69
25-34 years...	4.05	8.66	5.60	7.16	5.88	5.39	4.44	7.32
35-44 years...	5.50	7.79	8.18	5.61	8.02	5.03	5.38	7.95
45-54 years...	7.34	12.54	11.89	13.25	8.26	14.39	15.38	23.93
55-64 years...	8.26	12.71	16.50	60.45	8.82	18.13	22.43	*78.65
65-74 years...	5.15	8.56	15.12	43.76	3.68	6.10	14.54	17.62

Table IX. Standard errors of the mean serum cholesterol levels of persons aged 4-74 years, by urbanization status, sex, and age: United States, 1971-74

Sex and age	Urbanized area		Nonurbanized area	
	1 million persons or more	Less than 1 million persons	Urban, not in urbanized area	Rural area
Both sexes	Standard error in mg/100 ml			
4-17 years	0.85	1.77	2.20	1.36
18-74 years	1.10	2.23	1.63	1.44
4-5 years	1.80	1.98	4.00	2.74
6-11 years	1.52	2.10	2.45	1.93
12-17 years	1.09	2.36	4.49	1.64
18-24 years	2.13	3.00	4.18	2.28
25-34 years	1.77	3.44	3.26	2.21
35-44 years	1.98	3.75	3.34	1.98
45-54 years	2.66	4.36	3.16	2.35
55-64 years	3.93	4.78	4.48	3.97
65-74 years	3.47	3.30	3.92	1.97
Males				
4-17 years...	1.11	2.14	2.95	1.51
18-74 years...	1.01	2.19	3.24	1.78
4-5 years	2.00	3.57	5.40	2.44
6-11 years	2.57	3.21	2.68	2.17
12-17 years	1.76	2.31	8.07	1.97
18-24 years	2.25	3.99	6.32	3.44
25-34 years	3.26	4.68	5.76	3.21
35-44 years	2.93	7.14	7.90	3.58
45-54 years	3.46	4.50	6.16	4.26
55-64 years	4.79	7.44	5.96	4.67
65-74 years	6.26	3.68	2.93	2.06
Females				
4-17 years...	1.53	1.91	2.12	1.67
18-74 years...	1.75	3.00	2.06	1.66
4-5 years	3.39	4.07	5.19	4.00
6-11 years	2.33	2.19	3.68	2.78
12-17 years	2.04	3.21	2.44	2.64
18-24 years	2.70	3.37	2.90	3.93
25-34 years	2.58	3.05	2.32	2.20
35-44 years	2.05	3.66	2.52	2.29
45-54 years	4.94	5.51	6.52	3.35
55-64 years	5.36	4.18	5.45	4.58
65-74 years	2.90	4.27	4.96	3.19

Table X. Standard errors of the mean serum cholesterol levels of persons aged 4-74 years, by sex, urbanization status, race, and age: United States, 1971-74

Race and age	Males				Females			
	Urbanized area		Nonurbanized area		Urbanized area		Nonurbanized area	
	1 million persons or more	Less than 1 million persons	Urban, not in urbanized area	Rural area	1 million persons or more	Less than 1 million persons	Urban, not in urbanized area	Rural area
White	Standard error in mg/100 ml							
4-17 years	1.42	2.42	3.33	1.55	1.80	2.02	1.94	1.53
18-74 years	1.29	2.19	3.11	1.82	2.07	3.15	2.14	1.70
4-5 years	2.05	3.30	5.67	2.52	4.52	5.42	5.95	4.27
6-11 years	2.97	4.04	2.90	2.19	2.86	2.33	3.63	2.92
12-17 years	1.59	2.70	8.63	2.18	2.31	3.31	2.77	2.48
18-24 years	2.45	4.28	5.96	3.81	3.29	3.69	3.54	4.28
25-34 years	3.79	3.85	6.28	3.65	3.16	2.71	2.36	2.32
35-44 years	3.57	6.69	8.32	3.66	2.73	3.75	2.87	2.46
45-54 years	3.70	4.35	7.39	4.50	5.25	6.32	7.11	3.24
55-64 years	5.40	8.02	6.44	4.39	6.03	4.67	5.46	4.66
65-74 years	6.95	4.10	3.42	2.49	3.46	4.37	5.17	3.38
Black								
4-17 years	2.72	3.56	3.48	5.04	3.20	4.02	8.65	6.40
18-74 years	4.28	8.67	9.21	7.71	3.02	4.07	7.78	4.61
4-5 years	8.58	14.25	9.81	5.60	5.19	7.69	8.67	8.61
6-11 years	4.09	3.90	7.47	9.62	4.81	5.08	10.75	3.19
12-17 years	3.85	5.75	13.28	·3.47	4.98	7.15	12.46	9.60
18-24 years	3.83	13.43	15.12	7.81	4.77	7.71	7.53	6.06
25-34 years	4.27	37.60	8.49	13.69	3.38	9.16	8.98	5.59
35-44 years	11.29	19.19	*72.22	18.86	4.31	5.69	10.33	8.70
45-54 years	8.56	11.85	12.31	9.05	11.45	6.41	13.47	13.14
55-64 years	18.11	14.95	*78.35	25.64	11.27	13.85	44.69	5.41
65-74 years	5.82	7.71	10.88	5.57	5.82	7.71	10.88	5.57

Table XI. Standard errors of the mean serum cholesterol levels of adults aged 18-74 years, by geographic region, sex, and age: United States, 1971-74

Sex and age	Geographic region			
	Northeast	Midwest	South	West
Both sexes	Standard error in mg/100 ml			
18-74 years	1.31	1.14	1.89	1.99
18-24 years	1.85	2.80	3.27	2.89
25-34 years	2.49	1.57	4.06	2.80
35-44 years	2.28	1.78	3.50	3.33
45-54 years	3.76	1.66	3.07	2.33
55-64 years	3.96	5.67	5.41	4.73
65-74 years	3.03	2.41	1.49	3.57
Males				
18-74 years	1.69	1.68	2.30	1.90
18-24 years	2.53	3.70	4.67	3.33
25-34 years	4.10	1.43	6.81	4.41
35-44 years	4.02	2.76	7.66	4.44
45-54 years	6.96	3.03	5.59	3.03
55-64 years	5.93	7.00	6.16	6.91
65-74 years	4.55	1.93	2.36	5.22
Females				
18-74 years	1.86	1.72	2.21	2.66
18-24 years	3.07	3.71	3.82	4.18
25-34 years	2.40	2.55	2.58	3.01
35-44 years	1.68	2.57	2.10	3.58
45-54 years	4.91	3.37	5.22	4.58
55-64 years	4.67	5.93	6.03	4.82
65-74 years	3.46	2.84	3.17	5.15

Table XII. Standard errors of the mean serum cholesterol levels of adults aged 18-74 years, by sex, geographic region, race, and age: United States, 1971-74

Race and age	Males				Females			
	Northeast	Midwest	South	West	Northeast	Midwest	South	West
White	Standard error in mg/100 ml							
18-74 years..	1.81	1.65	2.21	1.92	2.03	1.83	2.45	2.59
18-24 years..	2.78	3.98	5.59	3.82	3.62	4.17	3.99	4.54
25-34 years..	4.21	1.63	6.47	4.84	2.72	2.85	2.62	3.11
35-44 years..	4.44	2.95	6.42	4.26	1.80	2.44	2.15	4.40
45-54 years..	7.15	2.87	5.72	3.19	5.33	2.57	5.92	4.90
55-64 years..	5.88	7.22	7.27	7.48	4.66	6.11	6.89	5.16
65-74 years..	4.80	2.45	3.83	5.88	3.80	2.88	3.67	5.07
Black								
18-74 years..	5.25	5.65	4.92	8.65	3.42	5.64	3.22	6.66
18-24 years..	5.91	6.23	4.86	22.27	5.42	8.46	5.68	4.91
25-34 years..	9.43	5.75	24.71	4.05	4.83	5.44	5.30	11.27
35-44 years..	10.94	5.13	15.67	25.47	5.96	5.57	4.93	7.02
45-54 years..	11.23	10.60	7.41	14.98	13.12	22.08	5.50	12.12
55-64 years..	27.71	20.28	18.33	15.57	13.99	9.42	7.43	24.24
65-74 years..	9.08	5.66	5.43	4.77	8.09	8.22	3.32	12.75

Table XIII. Standard errors of the mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population

Sex and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74
Both sexes	Standard error in mg/100 ml							
18-24 years	3.57	1.93	2.47	2.68	3.48	2.05	6.36	2.42
25-34 years	2.78	2.81	1.81	2.91	2.47	2.34	4.44	1.58
35-44 years	3.25	5.34	2.13	4.54	3.62	2.07	3.83	1.83
45-54 years	3.37	4.32	2.91	5.21	2.60	3.05	4.32	1.96
55-64 years	2.79	3.37	3.78	4.83	4.08	4.31	4.43	3.48
65-74 years	4.19	1.97	5.63	3.52	9.24	2.35	9.36	3.16
Males								
18-24 years	3.91	2.93	4.73	4.21	5.42	3.15	9.17	2.63
25-34 years	4.31	5.44	3.61	5.57	3.45	3.70	5.20	2.64
35-44 years	6.24	10.64	3.48	8.50	4.83	3.36	5.70	2.88
45-54 years	5.43	6.98	3.66	7.70	3.50	4.04	6.65	2.84
55-64 years	4.41	7.11	4.74	6.47	5.65	6.85	7.22	3.96
65-74 years	5.12	2.78	8.27	4.68	8.17	3.13	8.94	2.67
Females								
18-24 years	4.10	2.60	2.96	3.82	3.85	2.67	5.09	3.14
25-34 years	3.45	2.91	2.72	2.98	3.03	2.16	7.27	1.77
35-44 years	4.21	5.09	2.62	3.52	4.57	2.43	3.25	1.81
45-54 years	3.62	7.12	3.62	6.18	5.95	4.35	4.98	3.57
55-64 years	2.90	3.74	5.29	5.86	9.37	4.05	8.00	5.02
65-74 years	5.74	3.09	8.04	3.85	8.34	3.50	12.72	5.03

Table XIV. Standard errors of the mean serum cholesterol levels of adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population

Sex and age	Educational level							
	All levels		Less than 9 years		9-12 years		13 years or more	
	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74
Both sexes	Standard error in mg/100 ml							
18-24 years	2.04	1.35	3.42	3.72	2.23	1.67	3.48	1.96
25-34 years	1.85	1.38	3.20	3.63	2.60	1.47	3.40	2.35
35-44 years	1.75	1.49	2.61	2.88	1.82	1.71	4.50	2.48
45-54 years	1.88	1.40	2.31	3.32	2.08	1.82	3.04	3.23
55-64 years	2.13	2.35	4.06	2.96	2.95	2.48	5.38	4.64
65-74 years	3.23	1.28	4.37	1.84	4.78	2.19	5.16	2.92
Males								
18-24 years	2.54	1.73	4.42	7.09	3.49	1.76	3.75	2.94
25-34 years	2.91	2.20	4.28	6.08	4.27	2.46	3.80	4.07
35-44 years	2.56	2.56	4.05	4.61	2.33	3.35	5.67	3.90
45-54 years	2.41	2.34	3.68	3.99	2.87	3.05	5.21	3.50
55-64 years	3.13	3.08	4.59	4.81	4.50	3.75	2.79	6.14
65-74 years	3.66	1.95	4.87	3.25	4.93	2.94	8.27	5.07
Females								
18-24 years	2.17	1.89	5.35	5.16	1.88	2.45	5.55	2.14
25-34 years	1.41	1.32	3.71	4.37	1.92	1.79	3.99	2.16
35-44 years	1.95	1.29	4.19	3.85	2.07	1.36	4.26	2.54
45-54 years	2.02	2.27	2.46	5.60	2.96	2.96	3.17	5.49
55-64 years	2.45	2.67	4.32	3.94	3.93	3.26	9.28	6.96
65-74 years	3.94	1.86	5.49	2.47	6.31	2.36	9.26	5.26

Table XV. Standard errors of the mean serum cholesterol levels of white adults 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by annual family income, sex, and age: United States population

Sex and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74
Both sexes	Standard error in mg/100 ml							
18-24 years	3.96	2.41	2.69	2.92	3.57	2.32	6.85	2.39
25-34 years	3.30	3.24	1.94	2.79	2.54	2.70	4.69	1.51
35-44 years	3.06	5.81	2.21	5.25	3.61	2.27	3.87	1.87
45-54 years	3.18	6.36	3.12	5.41	2.72	3.29	4.16	1.93
55-64 years	2.91	3.79	3.86	4.97	4.14	4.70	4.43	3.61
65-74 years	4.62	2.08	5.89	3.86	9.24	2.51	9.36	3.25
Males								
18-24 years	4.39	3.91	5.03	4.91	5.58	3.64	9.58	2.68
25-34 years	4.22	5.75	3.74	5.72	3.53	4.30	5.27	2.22
35-44 years	4.96	11.11	3.95	10.06	4.89	3.53	5.76	2.82
45-54 years	5.73	9.92	3.85	8.05	3.64	4.69	6.24	2.83
55-64 years	5.10	7.51	4.84	5.22	5.65	7.29	7.22	4.28
65-74 years	5.51	3.44	8.27	5.19	8.17	3.21	8.94	2.79
Females								
18-24 years	4.62	2.96	3.09	5.01	3.91	3.01	5.61	3.15
25-34 years	4.31	4.49	2.87	2.88	3.04	2.46	7.28	1.85
35-44 years	3.90	6.53	2.54	3.76	4.94	2.51	3.25	1.98
45-54 years	3.74	9.00	4.05	7.13	5.95	4.68	4.98	3.66
55-64 years	3.06	4.09	5.40	6.62	9.80	4.30	8.00	5.09
65-74 years	5.91	3.28	8.44	4.16	8.34	3.67	12.72	5.30

Table XVI. Standard errors of the mean serum cholesterol levels of white adults aged 18-74 years for Health Examination Survey (HES) 1960-62 and Health and Nutrition Examination Survey (HANES) 1971-74, by educational level, sex, and age: United States population

Sex and age	Educational level							
	All levels		Less than 9 years		9-12 years		13 years or more	
	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74	HES, 1960-62	HANES, 1971-74
Both sexes	Standard error in mg/100 ml							
18-24 years	1.94	1.38	4.33	5.20	2.28	1.72	3.67	2.00
25-34 years	1.78	1.41	3.18	4.15	2.54	1.60	2.94	2.26
35-44 years	1.69	1.51	2.42	3.17	1.60	1.81	4.58	2.54
45-54 years	1.75	1.50	1.94	4.01	2.20	1.90	3.05	3.12
55-64 years	2.06	2.49	3.79	3.24	3.05	2.57	5.44	5.15
65-74 years	3.35	1.40	4.82	2.05	5.03	2.27	4.85	3.08
Males								
18-24 years	2.43	1.90	6.48	10.62	3.36	1.91	3.82	3.12
25-34 years	2.68	2.29	5.00	6.82	3.96	2.73	3.66	3.67
35-44 years	2.59	2.40	4.24	4.97	2.26	3.29	5.72	3.84
45-54 years	2.30	2.42	3.09	4.53	2.93	3.27	5.37	3.56
55-64 years	3.49	3.27	4.98	4.83	4.66	3.87	2.97	6.98
65-74 years	3.99	2.28	5.34	3.84	4.97	3.09	8.41	5.22
Females								
18-24 years	2.36	2.06	5.73	6.09	2.25	2.67	6.06	2.25
25-34 years	1.49	1.41	4.23	5.08	2.10	1.85	3.02	2.27
35-44 years	1.93	1.45	3.98	4.46	1.97	1.54	4.38	2.73
45-54 years	2.10	2.38	2.86	7.15	3.07	2.97	3.02	5.41
55-64 years	2.58	2.81	4.50	4.48	4.11	3.49	9.14	6.93
65-74 years	3.82	1.94	5.61	2.62	6.38	2.37	9.26	5.46

APPENDIX II

DEMOGRAPHIC AND SOCIOECONOMIC TERMS

Age.—The age recorded for each examinee was the age prior to the examination date. The age criterion used in this survey was defined as the examinee's age at time of the census interview. Twenty persons who were 74 years old at the time of the interview became 75 years old at the time of the examination. In the adjustment and weighting procedures used to produce national estimates, these persons were included in the 74-year-old group.

Race.—For each individual, race was recorded as "white," "black," or "other races." The last category included American Indians, Chinese, Japanese, and all races other than white or black. Mexican persons were included with white unless definitely known to be American Indian or of another race other than white. Black persons and persons of mixed black and other parentage were recorded as "black."

Geographic region.—The 48 contiguous States and the District of Columbia (excluding Alaska and Hawaii) were stratified into four broad geographic regions, each of about the same population size. With a few exceptions the compositions were as follows:

Region	States included
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania
Midwest	Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri
South	Delaware, Maryland, Virginia, West Virginia, Kentucky, Arkansas, Tennessee, North Carolina,

South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, District of Columbia

West	Washington, Oregon, Idaho, Montana, Wyoming, Colorado, Utah, Nevada, California, Arizona, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota

In a few instances the actual boundaries of the regions did not follow State lines. Some strata in the Midwest and South include primary sampling units (PSU's) located in the West. Similarly, some strata in the West contain PSU's located in the Midwest and South.

Family income.—The income recorded was the total income received during the 12 months prior to the interview by the head of the household and all other related household members. This income was considered the gross cash family income (excluding pay in kind) except for those families owning farms or businesses. Then, the net income was recorded. Furthermore, the income of a member of the Armed Forces living at home with his family (even though he was not considered a household member) was included. If he was not living at home, allotments or other money received by the family from him were included in the family income figure.

Education.—The only grades counted were those attended in a regular graded public or private school where persons were given formal education, during the day or at night, either on a full-time or part-time attendance basis. A "regular" school advances a person toward an elementary or high school diploma, or a college, university, or professional school degree. Education received in vocational, trade, or business

schools outside the regular school system was not counted in determining the highest grade completed. If a person attended school in a foreign country, at an ungraded school, under a tutor, or under other special circumstances, the nearest equivalent of his highest grade attended was given.

Urbanization status.—The classification of urban-rural areas was defined in the 1960 census. According to that definition, the urban areas are (1) places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns (except towns in New England, New York, and Wisconsin); (2) the densely settled urban fringe, whether incorporated or unincorporated, of urbanized areas; (3) towns in New England and townships in New Jersey and Pennsylvania that have no incorporated municipalities as subdivisions and either have 2,500 inhabitants or more, or a population of 2,500 to 25,000 with a density of 1,500 persons per square mile; (4) counties in States except the New England States, New Jersey, and Pennsylvania that have no incorporated municipalities within their boundaries and have a density of 1,500 persons or more per square mile; and (5) unincorporated places of 2,500 inhabitants or more that are not included in any urban fringe. The remaining population is classified as rural.

The categories of urbanization status (according to population density) are as follows: (1) urbanized area, 3,000,000 persons or more; (2) urbanized area, 1,000,000-2,000,000 persons; (3) urbanized area, 250,000-999,999 persons; (4) urbanized area, under 250,000 persons; (5) urban, not in an urbanized area, 25,000 persons or more; (6) urban, not in an urbanized area, 10,000-24,999 persons; (7) urban, not in an urbanized area, 2,500-9,999 persons; and (8) rural.

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Appendix III

SAMPLE SIZE AND ESTIMATED POPULATION TABLES

Table XVII. Sample size and estimated population in thousands for persons aged 4-74 years, by annual family income, sex, and age: United States, 1971-74

Sex and age	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000-$14,999		$15,000 or more	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
Both sexes										
4-17 years.........	938	6,176	874	7,359	1,267	13,041	1,196	14,112	920	12,082
18-74 years........	3,268	19,882	2,256	17,883	2,962	29,170	2,587	29,824	2,072	27,111
4-5 years............................	231	939	211	1,048	296	1,791	249	1,635	159	1,119
6-11 years..........................	353	2,792	351	3,294	482	5,692	486	6,392	336	4,598
12-17 years........................	354	2,445	312	3,017	489	5,558	461	6,085	425	6,365
18-24 years........................	549	4,756	412	4,293	563	6,107	423	4,960	270	3,741
25-34 years........................	317	2,146	427	3,338	685	7,055	702	7,814	494	5,794
35-44 years........................	291	1,870	283	2,043	519	4,697	592	6,345	558	6,505
45-54 years........................	231	2,299	209	2,514	346	4,706	401	6,335	353	6,447
55-64 years........................	322	3,836	215	2,943	268	4,256	202	3,213	194	3,725
65-74 years........................	1,558	4,975	710	2,752	581	2,349	267	1,156	203	899
Males										
4-17 years..............	478	3,259	413	3,667	635	6,412	584	7,057	473	6,380
18-74 years.............	1,196	7,917	851	7,758	1,131	13,741	1,012	15,027	857	14,386
4-5 years............................	121	518	102	506	148	935	118	789	77	563
6-11 years..........................	186	1,522	163	1,714	246	2,842	243	3,275	165	2,243
12-17 years........................	171	1,219	148	1,447	241	2,635	223	2,994	231	3,574
18-24 years........................	197	2,289	126	1,928	170	2,810	150	2,416	106	1,972
25-34 years........................	75	814	104	1,358	219	3,563	231	3,939	151	2,909
35-44 years........................	63	860	73	891	149	2,178	180	3,076	173	3,272
45-54 years........................	99	852	86	1,021	152	1,994	213	3,454	186	3,422
55-64 years........................	118	1,334	97	1,288	130	2,018	106	1,664	116	2,283
65-74 years........................	644	1,768	365	1,273	311	1,177	132	479	125	528
Females										
4-17 years..............	460	2,917	461	3,692	632	6,629	612	7,055	447	5,702
18-74 years.............	2,072	11,965	1,405	10,125	1,831	15,429	1,575	14,797	1,215	12,725
4-5 years............................	110	421	109	542	148	855	131	846	82	556
6-11 years..........................	167	1,270	188	1,579	236	2,850	243	3,117	171	2,355
12-17 years........................	183	1,226	164	1,570	248	2,923	238	3,092	194	2,791
18-24 years........................	352	2,466	286	2,365	393	3,297	273	2,545	164	1,769
25-34 years........................	242	1,333	323	1,981	466	3,491	471	3,876	343	2,885
35-44 years........................	228	1,010	210	1,152	370	2,519	412	3,268	385	3,232
45-54 years........................	132	1,447	123	1,493	194	2,712	188	2,882	167	3,025
55-64 years........................	204	2,502	119	1,655	138	2,238	96	1,548	78	1,442
65-74 years........................	914	3,207	345	1,479	270	1,172	135	678	78	371

Table XVIII. Sample size and estimated population in thousands for males aged 4-74 years, by annual family income, race, and age: United States, 1971-74

Race and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
White males								
4-17 years	199	1,764	266	2,877	510	5,506	970	12,674
18-74 years	824	5,920	685	6,659	957	12,160	1,713	27,895
4-5 years	52	284	64	386	128	840	183	1,292
6-11 years	78	872	107	1,299	191	2,438	373	5,234
12-17 years	69	608	95	1,193	191	2,227	414	6,149
18-24 years	141	1,781	97	1,606	140	2,454	227	4,112
25-34 years	53	550	80	1,203	180	3,171	340	6,274
35-44 years	40	548	55	745	123	1,846	334	6,052
45-54 years	55	495	65	834	119	1,704	365	6,644
55-64 years	81	1,069	80	1,111	114	1,875	209	3,839
65-74 years	454	1,477	308	1,160	281	1,111	238	976
Black males								
4-17 years	274	1,445	146	785	122	863	75	611
18-74 years	357	1,824	155	1,055	157	1,403	133	1,206
4-5 years	68	225	38	121	19	87	11	50
6-11 years	106	627	55	410	54	383	29	229
12-17 years	100	592	53	254	49	393	35	332
18-24 years	50	386	28	308	27	328	24	228
25-34 years	21	232	21	140	37	368	36	471
35-44 years	22	308	18	146	25	306	14	176
45-54 years	44	357	21	186	31	276	30	206
55-64 years	36	259	16	174	13	76	11	93
65-74 years	184	281	51	100	24	51	18	31

Table XIX. Sample size and estimated population in thousands for females aged 4-74 years, by annual family income, race, and age: United States, 1971-74

Race and age	Annual family income							
	Less than $4,000		$4,000-$6,999		$7,000-$9,999		$10,000 or more	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
White females								
4-17 years	183	1,638	293	2,793	490	5,544	972	12,049
18-74 years	1,355	9,177	1,077	8,482	1,527	13,763	2,561	26,050
4-5 years	46	262	72	400	114	741	190	1,307
6-11 years	61	656	117	1,211	186	2,431	385	5,157
12-17 years	76	719	104	1,182	190	2,372	397	5,584
18-24 years	210	1,851	205	1,909	331	2,973	382	4,025
25-34 years	123	780	239	1,612	381	3,058	756	6,377
35-44 years	106	653	140	918	285	2,048	727	6,141
45-54 years	84	1,089	97	1,219	171	2,511	327	5,547
55-64 years	141	2,017	94	1,456	119	2,061	168	2,943
65-74 years	691	2,788	302	1,367	240	1,113	201	1,017
Black females								
4-17 years	274	1,250	167	881	137	1,030	78	640
18-74 years	701	2,699	310	1,521	282	1,555	194	1,220
4-5 years	63	158	37	142	32	99	20	83
6-11 years	106	614	70	350	49	409	25	269
12-17 years	105	479	60	388	56	521	33	288
18-24 years	135	572	75	415	54	281	47	238
25-34 years	117	545	79	345	81	416	48	308
35-44 years	119	329	68	226	78	441	56	282
45-54 years	47	355	25	265	23	201	26	336
55-64 years	63	485	23	174	18	158	5	24
65-74 years	220	414	40	96	28	57	12	31

Table XX. Sample size and estimated population in thousands for children and youths aged 4-17 years, by education of head of household, sex, race, and age: United States, 1971-74

Race and age	Less than 9 years Both sexes Sample size	Estimated population in thousands	Boys Sample size	Estimated population in thousands	Girls Sample size	Estimated population in thousands	9-11 years Both sexes Sample size	Estimated population in thousands	Boys Sample size	Estimated population in thousands	Girls Sample size	Estimated population in thousands
All races[1]												
4-17 years	1,240	10,421	615	5,147	625	5,274	1,118	10,199	545	5,124	573	5,075
4-5 years	211	·946	104	448	107	499	257	1,173	123	562	134	611
6-11 years	455	4,129	221	2,100	234	2,029	435	4,498	208	2,240	227	2,258
12-17 years	574	5,346	290	2,599	284	2,747	426	4,527	214	2,321	212	2,206
White												
4-17 years	779	7,867	381	3,848	398	4,020	704	7,964	349	3,986	355	3,978
4-5 years	128	723	60	326	68	397	153	863	71	379	82	484
6-11 years	286	3,008	138	1,489	148	1,519	269	3,495	133	1,755	136	1,740
12-17 years	365	4,137	183	2,033	182	2,104	282	3,606	145	1,852	137	1,753
Black												
4-17 years	454	2,471	229	1,243	225	1,228	410	2,195	193	1,101	217	1,093
4-5 years	82	223	44	122	38	100	102	297	51	174	51	123
6-11 years	165	1,067	79	557	86	510	165	998	74	481	91	518
12-17 years	207	1,181	106	564	101	617	143	899	68	446	75	453

[1]Includes races other than white and black.

Table XX. Sample size and estimated population in thousands for children and youths aged 4-17 years, by education of head of household, sex, race, and age: United States, 1971-74—Con.

Race and age	12 years Both sexes Sample size	Estimated population in thousands	Boys Sample size	Estimated population in thousands	Girls Sample size	Estimated population in thousands	13 years or more Both sexes Sample size	Estimated population in thousands	Boys Sample size	Estimated population in thousands	Girls Sample size	Estimated population in thousands
All races[1]												
4-17 years	1,820	19,877	905	10,070	915	9,806	1,061	14,168	546	6,902	515	6,205
4-5 years	428	2,596	213	1,362	215	1,233	254	1,840	127	962	127	878
6-11 years	708	8,575	359	4,363	349	4,212	405	5,604	214	2,923	191	2,681
12-17 years	684	8,706	333	4,345	351	4,361	402	5,663	205	3,017	197	2,646
White												
4-17 years	1,485	17,647	741	8,936	744	8,711	952	12,197	498	6,469	454	5,728
4-5 years	347	2,316	178	1,211	169	1,105	224	1,673	122	932	102	740
6-11 years	574	7,642	288	3,900	286	3,742	361	5,169	189	2,712	172	2,457
12-17 years	564	7,689	275	3,825	289	3,864	367	5,356	187	2,825	180	2,531
Black												
4-17 years	328	2,142	161	1,094	167	1,048	95	767	42	362	53	405
4-5 years	81	280	35	152	46	128	27	153·	5	30	22	123
6-11 years	133	923	70	453	63	471	37	356	21	174	16	182
12-17 years	114	939	56	490	58	449	31	257	16	158	15	99

[1]Includes races other than white and black.

Table XXI. Sample size and estimated population in thousands for adults aged 18-74 years, by educational level, sex, race, and age: United States, 1971-74

Race and age	Educational level											
	Less than 9 years						9-11 years					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
18-74 years	3,740	24,655	1,750	12,446	1,990	12,209	2,416	21,500	816	9,499	1,600	12,000
18-24 years	144	1,299	51	679	93	621	456	4,459	162	2,257	294	2,202
25-34 years	264	2,325	76	1,155	188	1,170	476	3,633	110	1,381	366	2,252
35-44 years	404	3,013	119	1,540	285	1,473	471	3,896	114	1,643	357	2,253
45-54 years	458	5,207	248	2,839	210	2,368	300	4,182	142	2,114	158	2,069
55-64 years	527	6,674	263	3,404	264	3,270	222	3,333	94	1,377	128	1,956
65-74 years	1,943	6,136	993	2,829	950	3,307	491	1,997	194	728	297	1,269
White												
18-74 years............	2,742	20,114	1,301	10,151	1,441	9,963	1,804	18,252	648	8,203	1,156	10,048
18-24 years	88	916	28	479	58	437	308	3,643	121	1,893	187	1,749
25-34 years	206	1,949	62	961	144	988	321	2,774	73	1,040	248	1,734
35-44 years	272	2,319	85	1,148	187	1,171	332	3,201	90	1,374	242	1,828
45-54 years	330	4,042	178	2,210	152	1,832	239	3,717	114	1,905	125	1,813
55-64 years	389	5,616	200	2,921	189	2,694	184	3,064	82	1,315	102	1,750
65-74 years	1,459	5,272	748	2,431	711	2,841	420	1,853	168	678	252	1,175
Black												
18-74 years............	957	4,335	432	2,219	525	2,116	595	3,144	160	1,269	435	1,876
18-24 years	50	322	21	178	29	144	142	773	40	361	102	411
25-34 years	56	370	14	195	42	175	152	846	35	331	117	515
35-44 years	124	650	34	392	90	258	136	666	23	266	113	401
45-54 years	125	1,135	68	602	57	533	61	465	28	209	33	256
55-64 years	134	1,023	60	472	74	551	37	266	11	60	26	206
65-74 years	468	836	235	380	233	455	67	128	23	42	44	86

[1]Includes races other than white and black.

Table XXI. Sample size and estimated population in thousands for adults aged 18-74 years, by educational level, sex, race, and age: United States, 1971-74—Con.

Race and age	Educational level											
	12 years						13 years or more					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
18-74 years	4,469	47,606	1,416	19,876	3,053	27,730	2,938	34,364	1,224	18,800	1,714	15,564
18-24 years	941	10,403	284	4,417	657	5,986	750	8,493	274	4,416	476	4,077
25-34 years	1,173	11,632	325	5,239	848	6,392	772	9,229	289	5,159	483	4,070
35-44 years	942	9,190	223	3,741	719	5,449	485	5,897	196	3,564	289	2,334
45-54 years	545	8,529	209	3,188	336	5,341	287	5,230	159	2,926	128	2,304
55-64 years	328	5,561	137	2,329	191	3,232	178	3,334	97	1,865	81	1,468
65-74 years	540	2,291	238	962	302	1,330	466	2,181	209	871	257	1,311
White												
18-74 years............	3,859	43,823	1,245	18,439	2,614	25,385	2,627	31,775	1,113	17,497	1,514	14,277
18-24 years	741	9,129	228	3,861	513	5,268	652	7,734	248	4,064	404	3,670
25-34 years	989	10,547	279	4,853	710	5,693	685	8,381	255	4,675	430	3,706
35-44 years	817	8,420	203	3,509	614	4,911	434	5,496	183	3,360	251	2,136
45-54 years	502	8,127	185	3,028	317	5,099	255	4,905	146	2,820	109	2,085
55-64 years	310	5,388	130	2,266	180	3,122	167	3,162	91	1,737	76	1,425
65-74 years	500	2,212	220	921	280	1,291	434	2,096	190	841	244	1,255
Black												
18-74 years............	567	3,480	158	1,345	409	2,135	248	1,870	79	765	169	1,105
18-24 years	191	1,213	53	530	138	683	76	527	17	189	59	338
25-34 years	173	1,021	45	383	128	638	68	628	24	319	44	309
35-44 years	112	675	18	201	94	473	40	254	8	83	32	170
45-54 years	40	365	22	144	18	221	27	302	10	94	17	208
55-64 years	15	138	5	53	10	86	8	82	4	57	4	25
65-74 years	36	68	15	33	21	35	29	77	16	22	13	55

[1]Includes races other than white and balck.

Table XXII. Sample size and estimated population in thousands for persons aged 4-74 years, by urbanization status, sex, race, and age: United States, 1971-74

Race and age	Urbanized area											
	1 million persons or more						Less than 1 million persons					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
4-17 years	1,536	16,568	778	8,939	758	7,629	1,258	12,912	594	6,124	664	6,788
18-74 years	3,756	38,920	1,437	18,878	2,319	20,042	3,354	31,624	1,246	14,668	2,108	16,956
4-5 years	338	1,865	158	935	180	930	273	1,567	139	778	134	790
6-11 years	601	7,247	306	3,748	295	3,498	506	5,657	241	2,721	265	2,935
12-17 years	597	7,457	314	4,256	283	3,201	479	5,688	214	2,624	265	3,063
18-24 years	641	7,191	211	3,474	430	3,717	618	6,470	190	2,939	428	3,532
25-34 years	803	8,127	238	4,053	565	4,075	698	7,039	211	3,415	487	3,624
35-44 years	702	7,134	202	3,346	500	3,789	522	5,063	150	2,596	372	2,467
45-54 years	467	7,507	238	3,767	229	3,741	359	5,313	163	2,440	196	2,873
55-64 years	345	5,582	167	2,778	178	2,804	309	4,658	135	1,973	174	2,684
65-74 years	798	3,379	381	1,461	417	1,917	848	3,082	397	1,305	451	1,776
White												
4-17 years............	954	13,076	504	7,157	450	5,918	933	10,828	443	5,140	490	5,688
18-74 years............	2,607	32,775	1,035	16,215	1,572	16,560	2,755	28,381	1,052	13,338	1,703	15,043
4-5 years	204	1,445	108	767	96	679	201	1,309	101	654	100	655
6-11 years	373	5,670	190	2,959	183	2,712	380	4,706	183	2,263	197	2,444
12-17 years	377	5,960	206	3,432	171	2,528	352	4,812	159	2,223	193	2,589
18-24 years	418	5,936	150	2,979	268	2,957	496	5,743	158	2,659	338	3,084
25-34 years	556	6,691	169	3,393	387	3,298	583	6,287	184	3,127	399	3,160
35-44 years	485	5,949	151	2,846	334	3,103	405	4,308	129	2,273	276	2,035
45-54 years	329	6,390	169	3,276	160	3,113	313	4,942	143	2,292	170	2,650
55-64 years	247	4,838	125	2,431	122	2,407	260	4,288	114	1,797	146	2,491
65-74 years	572	2,972	271	1,290	301	1,682	698	2,814	324	1,190	374	1,624
Black												
4-17 years............	560	3,261	265	1,666	295	1,595	317	1,981	148	952	169	1,029
18-74 years............	1,063	5,564	366	2,322	697	3,243	557	2,984	117	1,225	380	1,759
4-5 years	129	394	49	159	80	235	70	241	37	115	33	126
6-11 years	218	1,454	111	726	107	728	124	929	57	452	67	477
12-17 years	213	1,413	105	781	108	632	123	811	54	385	69	426
18-24 years	207	1,148	56	448	151	700	106	624	28	243	78	381
25-34 years	227	1,275	60	547	167	728	108	690	25	262	83	427
35-44 years	193	1,013	46	429	147	584	112	724	21	323	91	401
45-54 years	131	1,075	65	463	66	612	44	352	19	140	25	212
55-64 years	94	673	38	275	56	397	46	351	18	158	28	193
65-74 years	211	380	101	159	110	221	141	242	66	98	75	144

[1]Includes races other than white and black.

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Table XXII. Sample size and estimated population in thousands for persons aged 4-74 years, by urbanization status, sex, race, and age: United States, 1971-74—Con.

Race and age	Nonurbanized area											
	Urban, not in urbanized area						Rural area					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
4-17 years	599	6,252	309	3,254	290	2,998	1,962	18,950	986	9,496	976	9,454
18-74 years	1,749	16,962	660	7,945	1,089	9,017	4,812	41,512	1,918	19,689	2,894	21,822
4-5 years	142	820	73	442	69	378	419	2,420	207	1,224	212	1,196
6-11 years	224	2,634	120	1,461	104	1,173	726	7,819	359	3,984	367	3,835
12-17 years	233	2,798	116	1,351	117	1,447	817	8,711	420	4,288	397	4,423
18-24 years	342	3,808	119	1,830	223	1,978	695	7,208	253	3,540	442	3,667
25-34 years	302	3,011	90	1,400	212	1,611	897	8,759	265	4,135	632	4,624
35-44 years	280	2,801	73	1,259	207	1,542	824	7,270	239	3,475	585	3,795
45-54 years	181	2,890	85	1,465	96	1,424	594	7,604	279	3,479	315	4,125
55-64 years	163	2,537	80	1,269	83	1,268	450	6,273	216	3,052	234	3,220
65-74 years	481	1,915	213	721	268	1,193	1,352	4,398	666	2,008	686	2,390
White												
4-17 years	471	5,383	238	2,785	233	2,598	1,635	17,106	821	8,565	814	8,540
18-74 years	1,505	15,129	569	7,017	936	8,112	4,234	38,331	1,688	18,123	2,546	20,208
4-5 years	107	652	50	326	57	326	352	2,215	177	1,120	175	1,095
6-11 years	175	2,277	93	1,282	82	995	599	7,054	298	3,570	301	3,484
12-17 years	189	2,455	95	1,178	94	1,277	684	7,837	346	3,876	338	3,961
18-24 years	288	3,236	100	1,493	188	1,742	588	6,517	218	3,169	370	3,348
25-34 years	266	2,694	81	1,276	185	1,418	806	8,083	238	3,798	568	4,285
35-44 years	243	2,541	68	1,137	175	1,404	738	6,829	221	3,260	517	3,570
45-54 years	154	2,508	70	1,254	84	1,254	537	7,079	246	3,217	291	3,862
55-64 years	147	2,408	74	1,219	73	1,189	402	5,778	192	2,828	210	2,951
65-74 years	407	1,742	176	638	231	1,104	1,163	4,045	573	1,852	590	2,193
Black												
4-17 years	123	819	67	422	56	397	321	1,776	159	862	162	914
18-74 years	227	1,576	82	734	145	842	557	2,931	222	1,472	335	1,459
4-5 years	33	157	22	108	11	49	67	205	30	104	37	101
6-11 years	47	337	25	159	22	178	124	739	58	387	66	352
12-17 years	43	325	20	155	23	170	130	832	71	370	59	461
18-24 years	46	429	15	226	31	203	102	647	33	353	69	293
25-34 years	35	285	8	92	27	193	84	628	26	330	58	299
35-44 years	32	200	4	92	28	107	64	386	16	160	68	225
45-54 years	25	362	13	192	12	170	56	504	33	262	23	242
55-64 years	16	129	6	50	10	79	44	421	23	219	21	202
65-74 years	73	170	36	81	37	89	187	345	91	148	96	197

[1]Includes races other than white and black.

Table XXIII. Sample size and estimated population in thousands for adults aged 18-74 years, by geographic region, sex, race, and age: United States, 1971-74

Race and age	Geographic region											
	Northeast						Midwest					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
18-74 years	2,926	31,459	1,123	14,936	1,803	16,523	3,251	33,370	1,258	16,542	1,993	16,828
18-24 years	457	5,506	159	2,723	298	2,783	541	5,983	193	3,093	348	2,890
25-34 years	613	6,231	186	3,130	427	3,101	709	7,565	215	3,734	494	3,831
35-44 years	522	5,695	156	2,784	366	2,911	579	5,900	166	2,785	413	3,115
45-54 years	361	5,903	163	2,684	198	3,218	402	6,240	201	3,272	201	2,968
55-64 years	279	4,958	124	2,226	155	2,732	283	4,744	135	2,433	148	2,311
65-74 years	694	3,167	335	1,390	359	1,778	737	2,937	348	1,224	389	1,714
White												
18-74 years	2,483	28,776	978	13,833	1,505	14,943	2,732	30,345	1,075	15,121	1,657	15,224
18-24 years	378	4,977	139	2,525	239	2,452	437	5,386	159	2,752	278	2,634
25-34 years	508	5,672	156	2,886	352	2,786	600	6,824	185	3,343	415	3,481
35-44 years	432	5,150	141	2,617	291	2,533	480	5,332	142	2,517	338	2,815
45-54 years	317	5,526	142	2,543	175	2,983	333	5,621	167	2,990	166	2,631
55-64 years	234	4,474	104	1,950	130	2,525	247	4,437	126	2,383	121	2,053
65-74 years	614	2,977	296	1,314	318	1,664	635	2,745	296	1,135	339	1,610
Black												
18-74 years	422	2,438	137	955	285	1,483	489	2,706	172	1,228	317	1,478
18-24 years	75	468	18	149	57	318	93	456	29	244	64	212
25-34 years	98	518	27	214	71	304	102	671	28	347	74	325
35-44 years	85	511	14	163	71	348	91	485	23	236	68	249
45-54 years	42	357	21	141	21	216	68	604	33	268	35	337
55-64 years	43	396	19	213	24	183	36	307	9	50	27	257
65-74 years	79	188	38	74	41	114	99	182	50	83	49	99

[1]Includes races other than white and black.

Race and age	Geographic region											
	South						West					
	Both sexes		Males		Females		Both sexes		Males		Females	
	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands	Sample size	Estimated population in thousands
All races[1]												
18-74 years	3,778	30,905	1,427	14,127	2,351	16,778	3,716	33,284	1,453	15,576	2,263	17,708
18-24 years	663	6,374	217	2,943	446	3,431	635	6,815	204	3,024	431	3,791
25-34 years	657	6,183	197	2,899	460	3,285	721	6,956	206	3,240	515	3,717
35-44 years	577	4,821	147	2,203	430	2,617	650	5,853	195	2,904	455	2,949
45-54 years	410	5,362	189	2,374	221	2,988	428	5,808	212	2,820	216	2,989
55-64 years	351	4,757	163	2,281	188	2,476	354	4,590	176	2,133	178	2,457
65-74 years	1,120	3,407	514	1,427	606	1,981	928	3,262	460	1,456	468	1,805
White												
18-74 years...........	2,710	25,029	1,042	11,445	1,668	13,583	3,176	30,467	1,249	14,294	1,927	16,173
18-24 years	449	4,868	155	2,239	294	2,629	526	6,200	173	2,784	353	3,416
25-34 years	480	4,960	150	2,406	330	2,554	623	6,299	181	2,959	442	3,340
35-44 years	407	3,888	113	1,747	294	2,141	552	5,257	173	2,634	379	2,623
45-54 years	311	4,388	136	1,909	175	2,479	372	5,383	183	2,598	189	2,786
55-64 years	269	4,089	127	1,967	142	2,122	306	4,313	148	1,975	158	2,337
65-74 years	794	2,835	361	1,177	433	1,658	797	3,015	391	1,344	406	1,671
Black												
18-74 years...........	1,056	5,805	380	2,663	676	3,142	437	2,106	158	907	279	1,199
18-24 years	208	1,475	61	696	147	779	85	449	24	180	61	269
25-34 years	175	1,214	46	488	129	726	79	475	18	183	61	292
35-44 years	170	932	34	456	136	476	75	395	16	150	59	245
45-54 years	99	974	53	465	46	509	47	359	23	183	24	176
55-64 years	81	643	36	314	45	329	40	227	21	125	19	101
65-74 years	323	565	150	243	173	322	111	202	56	86	55	116

[1]Includes races other than white and black.

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