Chapter Four

Other Measures of Nutritional Status

This chapter focuses on non-dietary measures of nutritional status. Information is provided on mean Body Mass Index (BMI), a measure that is used to assess the prevalence of overweight and obesity, as well as the prevalence of healthy weight and underweight. These discussions are supplemented with information on reported weight gain over time, perceived weight status, desire to lose weight, and weight loss attempts during the past year. Laboratory data are used to assess the prevalence of abnormal nutritional biochemistries, including low serum albumin (a measure of protein status), iron deficiency, iron-deficiency anemia, anemia, elevated lipids (cholesterol and related compounds), low red blood cell folate, and low serum vitamin $B_{12.}$ The final section of the chapter presents data on the prevalence of reduced and severely reduced bone mass. The latter condition is indicative of osteoporosis.

Body Mass Index

The prevalence of overweight and obesity has increased dramatically since the first Health Examination Survey (a precursor to the present NHANES survey) was conducted in 1963-65 (Flegal et al., 1998). Being overweight or obese significantly increases the chances of developing many diseases, including type 2 diabetes, high blood pressure, coronary heart disease, stroke, gallbladder disease, respiratory problems, osteoarthritis, sleep apnea, and some types of cancer (U.S. DHHS, 2000a).

Healthy People 2010 includes goals to increase the proportion of adults who are at a healthy weight and to decrease the proportion who are obese (U.S. DHHS, 2000a). Overweight and obesity are defined on the basis of BMI, a measure of the relationship between height and weight that is the commonly accepted index for classifying adiposity (or fatness) in adults (CDC, 2003).[1] For adults, a healthy weight is defined as a BMI that is at least 18.5 but less than 25. Overweight is defined as a BMI of 25.0 to 29.9, and obesity is defined as a BMI of 30 or more. A BMI below 18.5 indicates underweight.

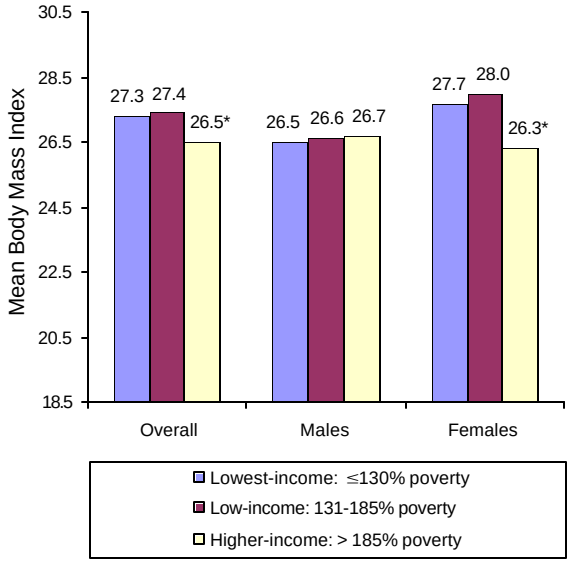
Older adults had a mean BMI of 26.7 (table D-68). This indicates that, on average, older adults were overweight. Mean BMIs were quite similar for males and females (26.6 and 26.8). Moreover, for both males and females, mean BMI tended to decrease with age. Consequently, as age increased, the percentage of individuals with healthy body weights increased and the percentage who were overweight or obese decreased (statistical significance of age-based differences not tested).

Mean BMIs for older adults in the lowest-income and low-income groups were similar, for both males and females (figure 25). However, older adults in the lowest-income group had a significantly greater mean BMI than older adults in the higher-income group (27.3 vs. 26.5). This difference was attributable to a difference among females. Females in the lowest-income group had a mean BMI of 27.7, compared with a mean of 26.3 for females in the higher-income group. The difference was concentrated among females aged 75-79 and 60-64 (table D-68).

There was no statistically significant difference in the distribution of body weights of older adults in the lowest- and low-income groups. This was true for both males and females (figures 26 and 27 and tables D-69 to D-72). However, in keeping with the difference noted in mean

[1] BMI is equal to [weight in kilograms] / [height in meters]^2.

Figure 25—Mean Body Mass Index: Older adults

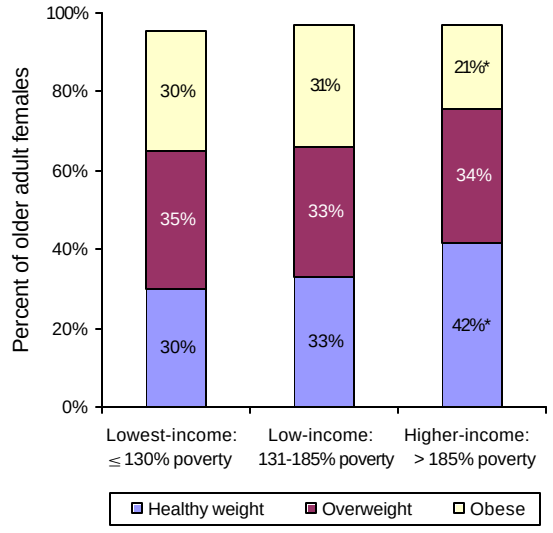


*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

BMIs, older adult females in the lowest-income group were *less* likely than older adult females in the higher-income group to be at a healthy weight and *more* likely to be obese (figure 26 and tables D-69 and D-70). Only 30 percent of females in the lowest-income group were at a healthy weight, compared with 42 percent of females in the higher-income group. Moreover, 30 percent of females in the lowest-income group were obese, compared with 21 percent of females in the higher-income group. Rates of overweight and underweight were comparable for the two groups (tables D-71 and D-72). (Data on the percentage of females who were underweight is not presented in figure 26 because the point estimate for the low-income group is statistically unreliable).

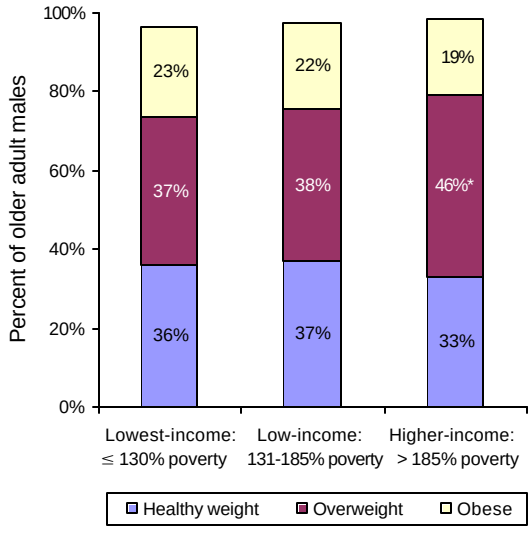
A decidedly different pattern was noted for males. Specifically, older adult males in the lowest-income group were *less* likely than older adult males in the higher-income group to be overweight and *more* likely to be underweight (figure 27 and tables D-71 and D-72). Thirty-seven percent of males in the lowest-income group were overweight, compared with 46 percent of males in the higher-income group. The prevalence of underweight was low; however, males in the lowest-income group were four times as likely as males in the higher-income group to be underweight (4% vs. 1%)

Figure 26—Distribution of bodyweight: Older adult females



*Statistically significant difference from lowest-income group at the .05 level or better.
Note: Percent underweight is not shown because the point estimate for the low-income group is not statistically reliable.
Source: NHANES-III, 1988-94.

Figure 27—Distribution of bodyweight: Older adult males



*Statistically significant difference from lowest-income group at the .05 level or better.
Note: Percent underweight is not shown because the point estimate for the low-income group is not statistically reliable.
Source: NHANES-III, 1988-94.

(table D-72). (This difference is not illustrated in figure 27 because the point estimate for the low-income group is statistically unreliable).

Weight Change in the Past 10 Years and since Age 25

To assess patterns of weight gain during adulthood, NHANES-III respondents were asked to report how much they weighed 10 years ago and how much they weighed at age 25. These responses were compared to reports of current weight to obtain a self-reported history of weight gain/loss for each individual.

Weight Change in the Past 10 Years

Among older adults, average weight gain during the preceding 10 years was minimal to negative (table D-73). Individuals between the ages of 60 and 74 reported gaining weight in the past 10 years but, on average, older individuals reported losing weight. Mean reported weight gain was greatest for 60-64-year-olds (5.8 pounds) and mean reported weight loss was greatest for those 85 and older (-8.9 pounds). For every age group, females reported more weight gain or smaller weight losses than males (statistical significance of age- and gender-based differences not tested).

Overall, there were few significant differences between income groups in reported weight change over the past 10 years. The oldest cohort—those 85 years and older—was a noteworthy exception. In this age group, the lowest-income group *lost* a significantly greater amount of weight over the past 10 years than the higher-income group (10.7 pounds vs. 6.0 pounds). This pattern was observed for both males and females; however, the difference was statistically significant only for males. The reported mean 10-year weight loss of the oldest males in the lowest-income group was twice that of the oldest males in the higher-income group (12.4 pounds vs. 6.2 pounds). Unintentional weight loss among the elderly has been associated with increased mortality (IOM, Committee on Nutrition Services for Medicare Beneficiaries (CNSMB), 2000).[2]

A few other significant differences in mean weight gain/loss were observed between income groups for selected gender-and-age-groups, but there was no consistent pattern.

Weight Change since Age 25

On average, older adults reported weighing 21 pounds more than they did at age 25 (table D-75). Mean reported weight gain was greater for females than males (22.4 pounds vs. 19.1 pounds). In keeping with the trend reported in the preceding section—that, on average, adults 75 and older lost weight over the past 10 years—reported weight gain since age 25 decreased with age (statistical significance of gender- and age-based differences not tested).

There was no significant difference between the lowest-income group and the low-income group in reported mean weight change since age 25 (table D-75). This was true for both males and females. In comparison with the higher-income group, however, older adults in the lowest-income group reported gaining more weight over this period (an average of 22.9 pounds vs. 20.1 pounds). This difference was concentrated among females, where the mean reported weight gain for the lowest-income group was 24.8 pounds, compared with 20.3 pounds for the higher-income group. The difference was particularly noteworthy for 75-79-year-old females (24.3 pounds vs. 12.4 pounds).

For adults 85 and older, the trend was reversed. In this age cohort, the mean reported weight gain since age 25 was *lower* for the lowest-income

[2]Studies that have looked at the relationship between unintentional weight loss and mortality have generally looked at weight loss over shorter periods of time (6 months, 1 year, 4-5 years) or between specific age ranges—for example, between 50 and 70 (IOM, CNSMB, 2000).

group than for the higher-income group. This pattern was noted for both males and females; however, the difference was statistically significant only for males (most of the point estimates for these comparisons are statistically unreliable).

Additional information on patterns of reported weight change in older adults is provided in tables D-74 and D-76, which show full distributions of reported weight change over the past 10 years and since age 25, respectively. In addition, tables D-77 and D-78 show means and distributions for differences between current weight and lifetime maximum weight.

Accuracy of Perceptions about Body Weight

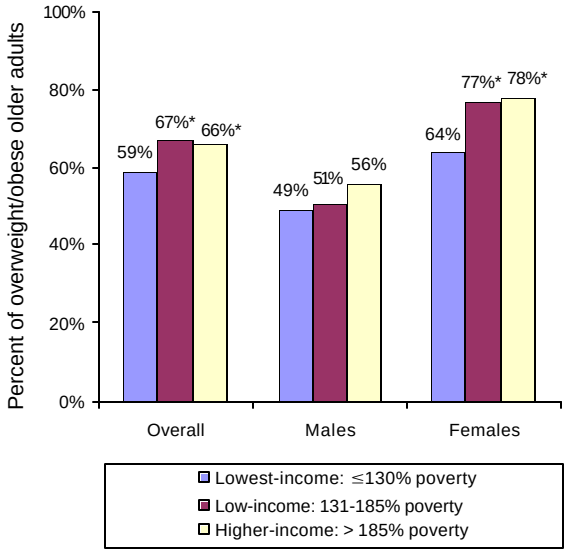
NHANES-III included a question that asked adults about their current body weight: "Do you consider yourself now to be overweight, underweight, or about the right weight?" These data were analyzed for all older adults as well as separately for older adults who were at a healthy weight and older adults who were overweight or obese based on actual BMIs.

The data reveal that about two out of three (65%) older adults who were overweight or obese had an accurate perception of their body weight—that, is, they considered themselves to be overweight (table D-79). The percentage of overweight/obese persons with an accurate perception of their body weight was greater for females than for males (73% vs. 53%) (tables D-80 and D-81). Moreover, the percentage of overweight/obese older adults with an accurate perception of their body weight decreased with age. Overall, 77 percent of overweight/obese adults between 60 and 64 perceived themselves to be overweight, compared with 40 percent of overweight/obese adults 85 years and older (table D-79). This pattern was observed for both males and females (tables D-80 and D-81) (statistical significance of gender- and age-based differences not tested).

Overweight/obese older adults in the lowest-income group were less likely than their counterparts in either of the other income groups to have an accurate perception of their body weight (figure 28). Fifty-nine percent of overweight/obese older adults in the lowest-income group perceived themselves to be overweight, compared with 66-67 percent of overweight/obese older adults in the other two income groups. This trend was noted for both males and females; however, the between-group differences were statistically significant only for females (figure 28 and tables D-80 and D-81). Among overweight/obese females, 64 percent of those in the lowest-income group perceived themselves to be overweight, compared with 77-78 percent of those in the other two income groups.

Overall, 18 percent of older adults who were at a healthy weight perceived themselves to be overweight (table D-79). The percentage of

Figure 28—Percent of overweight and obese older adults who perceived themselves to be overweight

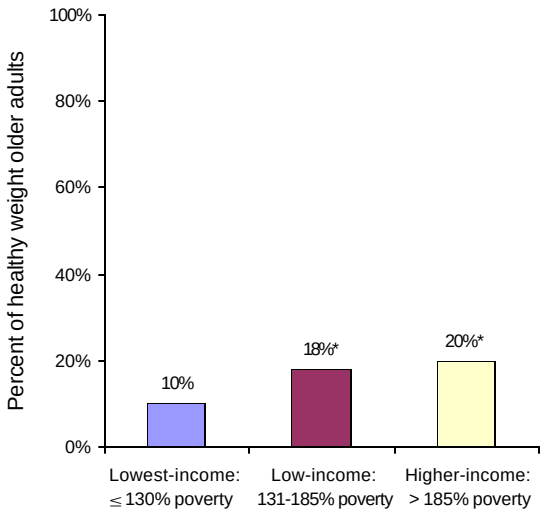


*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

healthy weight males with this perception was markedly lower than the percentage of healthy weight females (9% vs. 24%) (tables D-80 and D-81). For both genders, the tendency of healthy weight individuals to perceive themselves as being overweight decreased with age (statistical significance of gender- and age-based differences not tested).

Healthy weight older adults in the lowest-income group were more likely than healthy weight older adults in either of the other income groups to have an accurate perception of their body weight. That is, healthy weight older adults in the lowest income group were *less* likely than healthy weight older adults in the other two income groups to perceive themselves as being overweight (figure 29 and table D-79). Ten percent of healthy weight older adults in the lowest-income group perceived themselves to be overweight, compared with 18 percent of healthy weight older adults in the low-income group and 20 percent in the higher-income group. These between-group differences were noted for both males and females (tables D-80 and D-81). However, among females, only the difference between the lowest- and higher-income groups was statistically significant. Between-group differences were most pronounced for 60-64-year-old males. (Data are not presented by gender in figure 29 because the point estimate for the lowest-income males is statistically unreliable).

Figure 29—Percent of healthy weight older adults who perceived themselves to be overweight



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

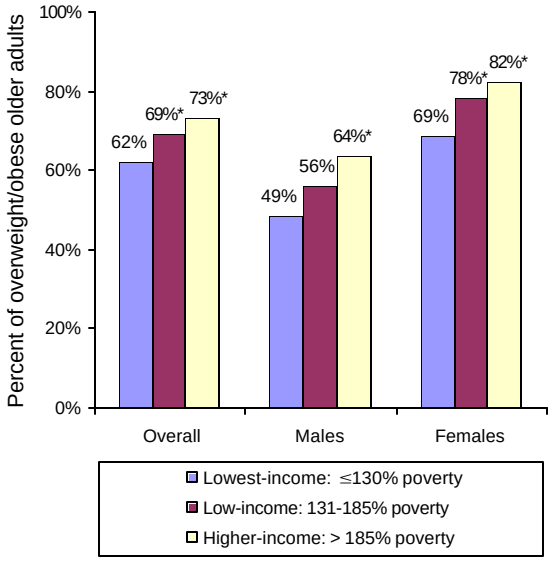
Desire to Lose Weight

Questions about a stated desire to lose weight were also analyzed by actual weight status. In response to the question "Would you like to weigh more, less, or stay about the same?" 7 out of 10 older adults who were overweight or obese indicated that they would like to lose weight (table D-82). In keeping with patterns observed in preceding weight-related analyses, overweight/obese males were less likely than overweight/obese females to want to lose weight (60% vs. 77%) (tables D-83 and D-84). Moreover, for both males and females, the desire to lose weight decreased with age (statistical significance of gender- and age-based differences not tested).

Overweight/obese older adults in the lowest-income group were less likely than similar older adults in either of the other income groups to want to lose weight (62% vs. 69% and 73%) (figure 30 and table D-82). This pattern was observed for both males and females (figure 30 and tables D-83 and D-84). However, among males, the difference between the lowest-income group and the low-income group was not statistically significant.

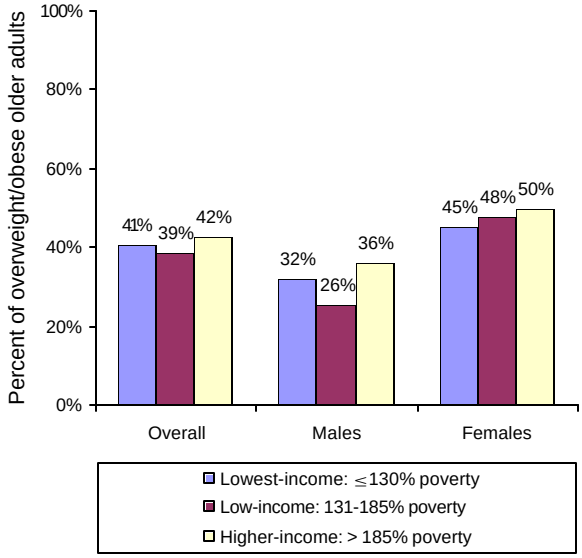
Similar patterns were observed across income groups in the percentage of healthy weight older adults who expressed a desire to lose weight. Healthy weight older adults in the lowest-income group were less likely than their counterparts in the other two income groups to want to lose weight (12% vs. 23% and 25%) (table D-82). This pattern was noted for both males and females (table D-83 and D-84), but between-group differences were not always statistically

Figure 30—Percent of overweight and obese older adults who expressed a desire to lose weight



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

Figure 31—Percent of overweight and obese older adults who tried to lose weight in the past 12 months



No statistically significant differences between income groups.
Source: NHANES-III, 1988-94.

significant. For older adult males, between-group differences were significant for both comparisons. For older adult females, only the difference between the lowest-income group and the higher-income group was statistically significant.

Attempts to Lose Weight During the Past 12 Months

All adult NHANES-III respondents were asked whether they made any attempt to lose weight during the preceding 12 months. Overall, 32 percent of all older adults reported that they had tried to lose weight (table D-85). Both healthy weight and overweight/obese older adults attempted to lose weight, although the proportion of overweight and obese individuals who made such attempts was substantially greater (42%t vs. 16%) (statistical significance of weight-based difference not tested).

Among overweight/obese older adults, there were no statistically significant differences between income groups in the percentage of individuals who attempted weight loss during the preceding 12 months (figure 31 and tables D-86 and D-87). This was true for both males and females. Among healthy weight older adults, however, those in the lowest-income group were less likely than those in the higher-income group to have attempted weight loss (10% vs. 17%) (table D-85). This difference was concentrated among males (table D-86).

Nutritional Biochemistries

Serum Albumin

A low level of serum albumin in older adults is suggestive of sustained undernutrition. Levels of serum albumin below 3.5 g/dL have been associated with increased morbidity and mortality in both institutionalized and noninstitutionalized elderly (Corti et al., 1994). However, the MacArthur Studies of Successful Aging, which included older adults with little or no functional impairment (at the beginning of the study), found that serum albumin levels of 3.8 g/dL or less were associated with greater 3-year mortality risk (IOM, CNSMB, 2000).

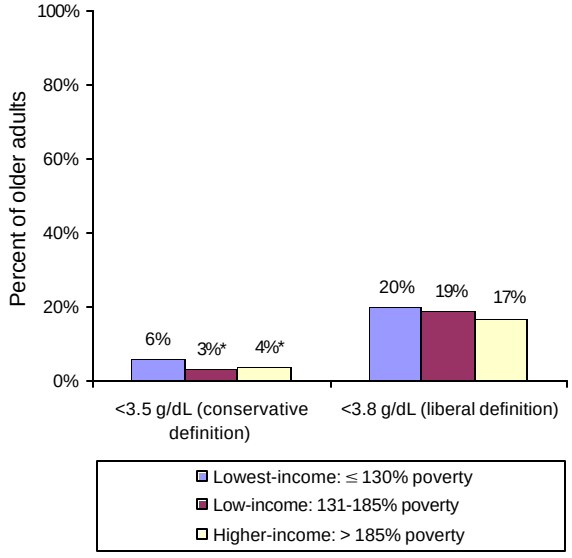
This analysis examined the prevalence of low serum albumin using both a conservative cutoff (< 3.5 g/dL) and a more liberal cutoff (< 3.8 g/

dL). In reviewing the results, it is important to bear in mind that serum albumin levels can be affected by factors other than nutrition, including inflammation, cirrhosis, and kidney disease (IOM, CNSMB, 2000).

Using the conservative measure (< 3.5 g/dL), 5 percent of all older adults had low levels of albumin (table D-88). The prevalence of low serum albumin was somewhat greater for females than males (5% vs. 3%), and generally increased with age (statistical significance of gender- and age-based differences not tested). The latter trend is expected because serum albumin is known to decline with age, largely as a result of the increased burden of chronic disease and probably also because of a slight physiological decrease in albumin levels with age (IOM, CNSMB, 2000).

Older adults in the lowest-income group were more likely than those in either of the other income groups to have serum albumin levels below 3.5 g/dL (6% vs. 3% and 4%) (figure 32). Both of these significant between-group differences were observed for males, but not for females (table D-88).

Figure 32—Percent of older adults with low levels of serum albumin



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

When the more liberal definition of a low serum albumin (< 3.8 g/dL) was used, prevalence increased dramatically, to 18 percent overall (table D-89). Again, prevalence was greater for females than for males and increased markedly with age (statistical significance of gender- and age-based differences not tested).

Using the cutoff of < 3.8 g/dL, there were no statistically significant differences between income groups in the prevalence of low serum albumin (figure 32). Overall, 20 percent of older adults in the lowest-income group had serum albumin levels below 3.8 g/dL. The same was true for 19 percent of the low-income group and 17 percent of the higher-income group.

Iron Deficiency, Iron-Deficiency Anemia, and Anemia

Iron deficiency is the most common known form of nutritional deficiency (CDC, 1998). Iron deficiency can lead to decreases in verbal learning and memory and can affect immune function, energy metabolism, and work performance (U.S. DHHS, 2000a, CDC, 1998 and Looker et al., 1997).

The terms anemia, iron deficiency, and iron-deficiency anemia are often used interchangeably, however, they are not equivalent (U.S. DHHS, 2000a). Although iron deficiency can contribute to anemia, anemia can also be caused by other factors, including other nutrient deficiencies, infection, inflammation, and hereditary anemias. When the prevalence of iron deficiency is high, anemia is a good predictor of iron deficiency. However, when the prevalence of iron deficiency is low, the majority of anemia is due to other causes (U.S. DHHS, 2000a).

This analysis assessed the prevalence of iron deficiency using the criterion defined in *Healthy People 2010* (U.S. DHHS, 2000a). This

criterion defines iron deficiency as abnormal results on two or more of the following measures of iron status: serum transferrin saturation, erythrocyte protoporphorin, and serum ferritin. Iron-deficiency anemia was defined as documented iron deficiency (as defined above) plus an abnormally low hemoglobin (Looker et al., 1997). Cutoff values used in the analysis are shown in appendix B. The analysis sample was limited to sample members with data for all relevant variables.

The overall prevalence of iron deficiency among older adults was 6 percent (table D-90).[3] The problem was more prevalent among females than males and generally increased with age (statistical significance of gender- and age-based differences not tested). There was a sharp increase in the prevalence of iron deficiency at 75-79 years of age. In the overall sample, the prevalence of iron deficiency doubled between 70-74 years and 75-79 years (4% vs. 8%). This pattern was observed for both males and females. There were no statistically significant differences between income groups in the prevalence of iron deficiency.

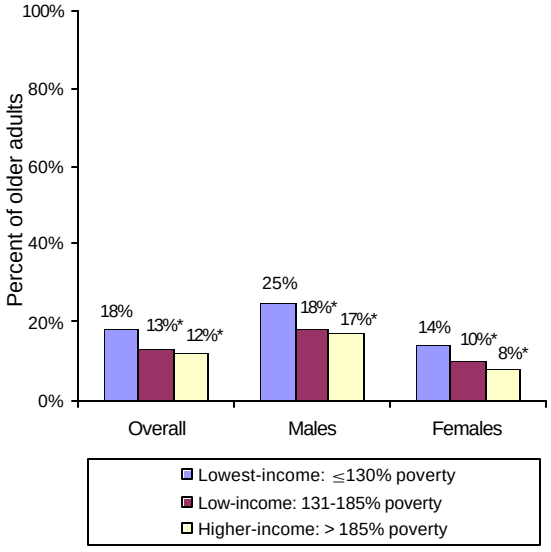
Iron-deficiency anemia was observed in 3 percent of all older adults (table D-94). There were a few scattered significant differences between income groups (all between the lowest-income group and the low-income group), but no consistent pattern.

The prevalence of anemia, defined on the basis of low hemoglobin or hematocrit, was substantially greater than the prevalence of iron-deficiency or iron-deficiency anemia, as assessed in this analysis (tables D-95 and D-96). Overall, 14 percent of older adults had a low hemoglobin level (table D-95). This problem was more common among males than females (19% vs. 10%). Prevalence generally increased with age, with a sharp incline at 75-79 years among males and at 80-84 years among females (statistical significance of gender- and age-based differences not tested).

The prevalence of anemia, defined on the basis of low hemoglobin levels, was greater in the lowest-income group than in either of the other income groups. Eighteen percent of the lowest-income older adults were anemic, compared with 12-13 percent of older adults in the low-income and higher-income groups (figure 33 and table D-95). This pattern was observed for both males and females.

The primary causes of anemia in older adults are iron deficiency, chronic disease, deficiencies of folate and/or vitamin B_{12}, gastrointestinal bleeding, and cancer (Smith, 2000). As noted in the introduction to this section, anemia is a good predictor of iron deficiency when the prevalence of iron deficiency is high. However, when the prevalence of iron deficiency is low, the majority of anemia is due to other causes (U.S. DHHS,

Figure 33—Percent of older adults with anemia/low hemoglobin



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

[3]Results for each of the three measures of iron status considered in defining iron deficiency (serum ferritin, free erythrocyte protoporphorin, and transferrin saturation) are presented in tables D-91 to D-93.

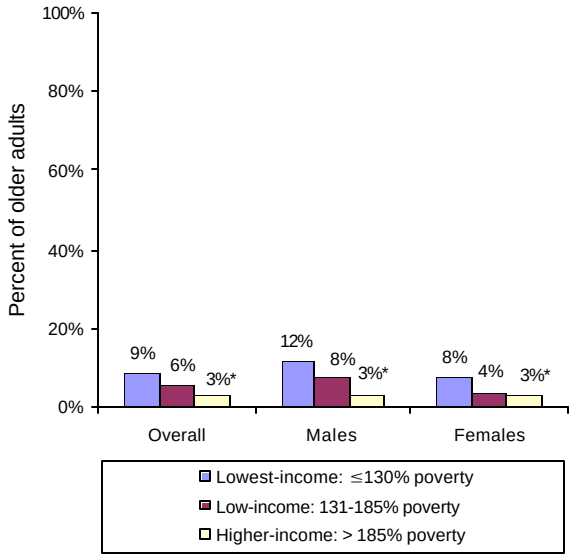
2000a). The relatively low prevalence of iron deficiency (6%) and iron-deficiency anemia (3%) observed in this population suggests that much of the anemia observed in older adults is due to causes other than iron deficiency.

Red Blood Cell (RBC) Folate

Overall, 5 percent of older adults had low red blood cell (RBC) folate, an indicator of long-term folate status (Wright et al., 1998) (table D-97). As noted in the preceding section, folate deficiency may play a role in the development of anemia in older adults. The prevalence of low RBC folate was comparable for males and females and, overall, there was no consistent pattern in the prevalence of this problem by age.

Low levels of RBC folate were significantly more common in the lowest-income group than the higher-income group (9% vs. 3%) (figure 34). This was true for both males and females. Only two isolated differences were observed for the comparison between the lowest-income and low-income groups (table D-97).

Figure 34—Percent of older adults with low levels of RBC folate



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

Serum Vitamin B_{12}

Vitamin B_{12} deficiency is observed more often in older adults than in other population groups because aging causes gastrointestinal changes, including decreased levels of hydrochloric acid, that impede absorption of the vitamin (IOM, FNB, 2000a). As noted previously, vitamin B_{12} is one of several leading causes of anemia in older adults.

Five percent of all older adults had low serum vitamin B_{12} (table D-98). Prevalence of this condition was comparable for males and females. Prevalence generally increased with age, but the pattern was not consistent.

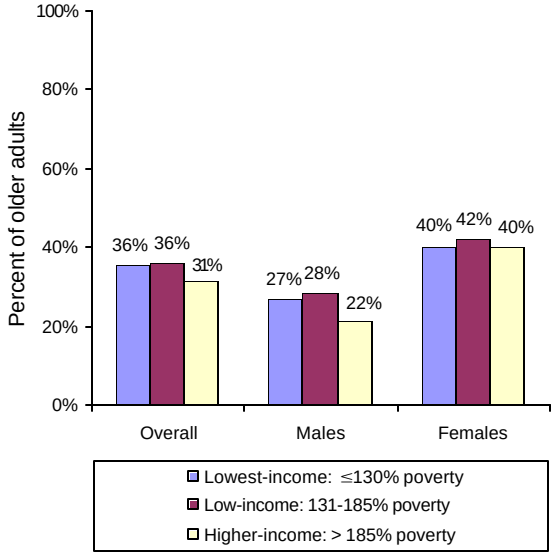
Overall, there were no significant differences between income groups in the prevalence of low serum vitamin B_{12}. However, among the two oldest cohorts (80-84-year-olds and 85 years and above), the problem of low serum vitamin B_{12} was less common in the lowest-income group than in the higher-income group. These differences were concentrated among females.

Serum Cholesterol and Related Measures

The National Cholesterol Education Campaign (NCEP) considers a serum cholesterol level of 240 mg/dL or more to be high (National Institutes of Health (NIH), 2001). Cholesterol levels of 200-239 mg/dL are considered borderline high.

The data indicate that one in three older adults had a high cholesterol level (table D-99). The problem was markedly more common among women than men (41% vs. 23%) (statistical significance of gender-based difference not tested). There were no significant differences between income groups in the prevalence of high serum cholesterol, overall or by gender (figure 35). A significant difference was detected, however, among 65-69-year-old males. In this cohort, the prevalence of high serum cholesterol in the lowest-income group was

Figure 35—Percent of older adults with high levels of total cholesterol



No statistically significant differences between income groups.
Source: NHANES-III, 1988-94.

double that of the higher-income group (41% vs. 20%) (table D-99). A comparable pattern was observed among 70-74-year-old males. However, in this case, the significant difference was between the low-income group and the lowest-income group.

Thirty-six percent of all older adults had borderline-high serum cholesterol levels (tables D-100). Prevalence was comparable for males and females, and there were no statistically significant differences in prevalence between income groups, overall.

Among older adult males, however, the prevalence of borderline-high serum cholesterol was significantly greater in the lowest-income group, relative to the higher-income group (31% vs. 38%). This difference was concentrated among 65-69-year-olds, and follows from the previously reported difference between these two groups in the prevalence of high serum cholesterol. In this cohort of males, the lowest-income group was *more* likely than the higher-income group to have a high serum cholesterol (as reported above), and were *less* likely have borderline-high serum cholesterol (23% vs. 45%) (table D-100). These lowest-income males were also less likely than their low-income counterparts to have borderline-high serum cholesterol levels (23% vs. 41%).

The prevalence of high and borderline-high levels of LDL ("bad") cholesterol and low levels of HDL ("good") cholesterol was also examined. Older adults in the lowest-income group were significantly more likely than those in the higher-income group to have high levels of LDL cholesterol (34% vs. 26%) (table D-101).[4] This difference was concentrated among females between 75 and 84 years of age.

The opposite effect was observed for the prevalence of borderline-high LDL cholesterol levels.[5] Overall, older adults in the lowest-income group were *less* likely than their counterparts in the higher-income group to have borderline-high levels of LDL cholesterol (27% vs. 36%) (table D-102). This pattern was observed for females, but not for males. Among females, the prevalence of borderline-high levels of LDL cholesterol was significantly lower in the lowest-income group than in either of the other income groups (25% vs. 38% for each of the other groups). The difference between the lowest- and higher-income groups was concentrated among females 60-64 and 80-84 years of age.

A notably different pattern was observed for 75-79-year-old males. In this cohort, the lowest-income group was significantly *more* likely than either the low-income group or the higher-income group to have borderline-high levels of LDL cholesterol.

[4]The cutoff used to define high LDL cholesterol levels (≥ 160 mg/dL) includes both high and very high levels as defined by the NCEP (NIH, 2001).

[5]LDL cholesterol levels of 130-159 mg/dL were considered borderline-high (NIH, 2001).

Only isolated between-income-group differences were observed for the prevalence of low levels of HDL cholesterol and high levels of triglycerides (tables D-103 and D-104).[6] The only difference that was significant for more than a single age or gender-and-age subgroup was a difference between females in the lowest-income group and females in the higher-income group in the prevalence of low HDL cholesterol (16% vs. 12%) (table D-103).

Bone Density

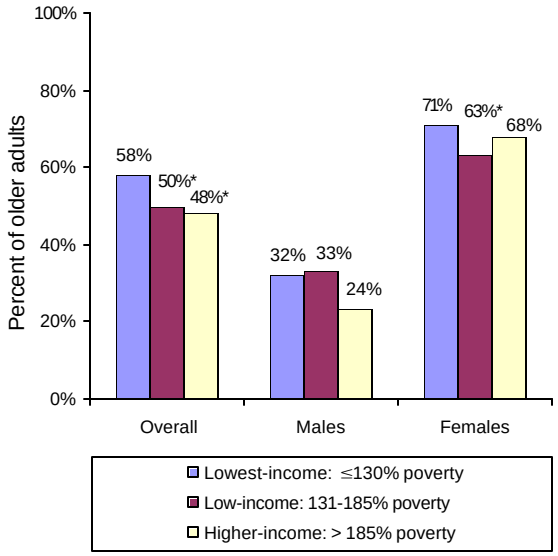
A reduction in bone mass or bone density can lead to deteriorated or fragile bones (U.S. DHHS, 2000a). Reduced bone density, or osteopenia, has been defined as bone density 1 to 2.5 standard deviations below the mean for non-Hispanic white women between the ages of 20 and 29, as measured in NHANES-III (NCHS, 1999). Severely reduced bone mass, or osteoporosis, is defined as a bone density more than 2.5 standard deviations below this norm (NCHS, 1999). The *Healthy People 2010* objectives include a goal to reduce the prevalence of osteoporosis among adults (U.S. DHHS, 2000a).

Overall, 50 percent of adults 60 years of age and older had reduced or severely reduced bone density (table D-105). The prevalence of these conditions was markedly greater among females than males (68% vs. 26%) (tables D-107 and D-109). Moreover, prevalence increased dramatically with age. Overall, slightly more than one in three adults between 60 and 64 (35%) had reduced or severely reduced bone mass (table D-105). In contrast, close to 8 out of 10 of those 85 and older (78%) suffered from these conditions. This pattern was noted for both males and females (tables D-107 and D-109) (statistical significance of gender- and age-based differences not tested).

Older adults in the lowest-income group were more likely than those in either of the other income groups to have reduced or severely reduced bone density (figure 36). Fifty-eight percent of the lowest-income older adults had compromised bone density, compared with 50 percent of older adults in the low-income group and 48 percent in the higher-income group. When data were examined by gender, neither of the between-group differences was statistically significant for males and only the difference between the lowest-income and low-income groups was significant for females (71% vs. 63%).

When the analysis was limited to those with severely reduced bone density (osteoporosis), the significant between-group differences noted above persisted for the older adult population as a whole (figure 37 and table D-106). Twenty-one percent of older adults in the lowest-income group had osteoporosis, compared with 14

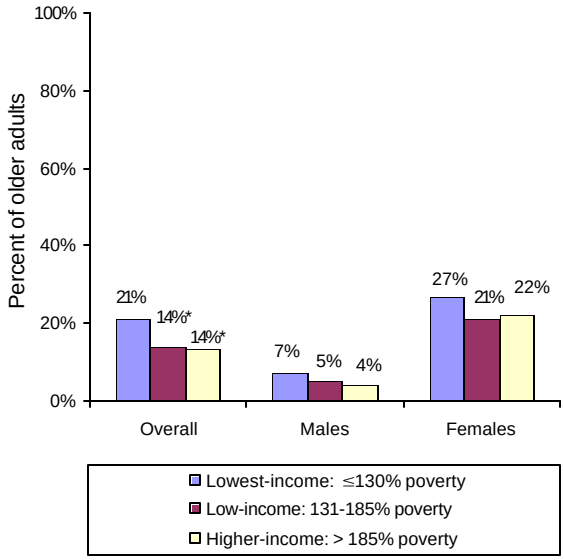
Figure 36—Percent of older adults with reduced or severely reduced bone density



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

[6]HDL cholesterol levels of < 40 mg/dL were considered low (NIH, 2001). The cutoff used to define high triglycerides (≥ 200 mg/dL) includes both high and very high triglycerides as defined by the NCEP (NIH, 2001).

Figure 37—Percent of older adults with severely reduced bone density (osteoporosis)



*Statistically significant difference from lowest-income group at the .05 level or better.
Source: NHANES-III, 1988-94.

percent of older adults in each of the other groups.

Between-group differences in the prevalence of osteoporosis were not significant when the data were examined separately by gender (figure 37 and tables D-107 to D-110). However, for the two oldest cohorts (80-84-year-olds and 85 and older), older adults in the lowest-income group were significantly more likely than those in one or both of the other income groups to have osteoporosis (table D-106) (the point estimate for the 85 and older age category in the low-income group is statistically unreliable).