

advancedata

FROM VITAL & HEALTH STATISTICS OF THE NATIONAL CENTER FOR HEALTH STATISTICS

U.S. DEPARTMENT OF HEALTH,
EDUCATION, AND WELFAREPublic Health Service
Office of Health Research, Statistics, and Technology

Number 51 • August 30, 1979

Overweight Adults in the United States

This report presents estimates of the percentages and numbers of overweight adults in the U.S. population developed from height and weight measurements obtained as part of the Health and Nutrition Examination Survey (HANES) conducted by the National Center for Health Statistics. Also presented is a profile of selected body measurements of these overweight persons.

Estimates of the prevalence of overweight in this report are estimates of excess body weight above desirable weight (mean weights for men and women aged 20-29 years) by height.

While weight gained after the twenties is presumed to be due to fat, the gross estimates in this report are not true estimates of excess body fat other than what can be inferred from the deviation of observed weight from the desirable weight. Such estimates will not yield information of how much of the weight difference is accounted for by excess fat. However, findings from HANES in which obesity was defined by criteria ranging from measures that included all body components (e.g., body fat, width of skeletal size, and muscle) to those that included only body fat, will be analyzed and discussed in a future report.¹ Only selected data from that report are presented here (tables 1-6 and figures 1 and 2).

HANES is a program in which measures of nutritional status are collected for a scientifically designed sample representative of the civilian noninstitutionalized population of the

United States over a broad range of ages, 1-74 years.

These HANES findings are based on the examination of the 13,131 persons aged 20-74 years selected from a total sample of 20,749 examined persons aged 1-74 years. A nationwide probability sample of 28,043 persons was selected to be examined from eligible households in the 65 primary sampling units that were visited between April 1971 and June 1974. The HANES nutrition examination included a general medical examination by a physician to identify indicators of nutritional deficiencies, a skin examination by a dermatologist, and a dental examination by a dentist. Body measurements were taken by a trained technician, dietary information was obtained by the 24-hour recall method, and a food frequency questionnaire was administered. Numerous laboratory tests were performed on whole blood, serum, plasma, and urine. A description of the sampling process and the HANES operation has been published.²

The findings in this report are shown as national estimates based on weighted observations, i.e., the data obtained for each examined person were inflated to the level of the total population of which the sample was representative. The appropriate weights were used to account for both sampling fractions and response results.

Method

In this report excess body weight is obtained by comparing the observed height and weight with those shown in the HANES table of desirable weights (table 1). Excess body

¹This report was prepared by Sidney Abraham and Clifford L. Johnson, M.S.P.H., Division of Health Examination Statistics.

Table 1. Desirable weights¹ for men and women aged 20-74 years by height: United States, 1971-74

Height	Weight in pounds	
	Men	Women
57 inches.....	---	113
58 inches.....	---	117
59 inches.....	---	120
60 inches.....	---	123
61 inches.....	---	127
62 inches.....	136	130
63 inches.....	140	134
64 inches.....	145	137
65 inches.....	150	140
66 inches.....	155	144
67 inches.....	159	147
68 inches.....	163	151
69 inches.....	168	154
70 inches.....	173	158
71 inches.....	178	---
72 inches.....	182	---
73 inches.....	187	---
74 inches.....	192	---

¹Based on average weights estimated from regression equation of weight on height for men and women aged 20-29 years.

NOTES: Height measured without shoes. Clothing ranged from 0.20 to 0.62 pounds which was not deducted from weights shown. Derived from data of the Health and Nutrition Examination Survey, 1971-74.

weight status is defined as the deviation of observed weight from desirable weight, times 100.

The desirable weight was developed using a regression equation of weight on height measurement for men and women aged 20-29 years as the standard for desirable weight. This method follows the principle of "desirable weight" that the increase in body weight in adulthood with age is undesirable and is based on the concept that after the twenties an individual should not gain weight, presumably fat, with each year of age. The standard, although not exactly ideal for some persons in the age group 20-29 years, minimizes the observed increase in fat in men and women during maturity. This is in contrast to the standard weight that uses the average weight of men and women of each age group as the standard.

We considered the deviation of 10 and 20 percent above desirable weight, more so the latter, as arbitrary estimates that represent a presumption of obesity. There is no universal agreement on this definition. Ten percent above the desirable weight falls in the upper

20 percent of the distribution of relative desirable weight of men and women aged 20-29 years. The corresponding percentage of 20 percent above the desirable weight is 8 percent for men and 11 percent for women. There is little or no question that the markedly overweight individual is obese.

A profile of selected body measurements of overweight persons was made of those persons with observed weight deviation 10 and 20 percent or more above desirable weights. In addition to height and weight data from HANES, skinfold thickness (triceps plus subscapular) and height-weight indices, a power function of height in relation to weight, were used in the profile.

While direct anatomical and chemical methods for the estimation of body fat are not suitable for large-scale epidemiological surveys, an indirect method such as the measurement of skinfold thickness meets the need for a simple test of relative fatness for the estimation of prevalence of obesity. If skinfold measurements are not available, there is general agreement that the most satisfactory measure is the body mass index.^{3,4}

During the HANES, two measurements were made of skinfolds plus subcutaneous tissue: One was made over the triceps midway between the elbow and the shoulder, and the other was made over the tip of the scapular. These measurements were recommended by the Committee on Nutritional Anthropometry (Food and Nutrition Board) for the general population.⁵ The two measurements were added into a single measure of leanness-fatness. This method obtained normative values based on the distribution of added measurements.

The power function of height in relation to weight avoided the use of population reference standards by calculating a power function of height in a height-weight index, W/H^p (in kg/meter^p). Using the formula of Benn, we computed the optimal power value from the HANES data and obtained a value of $p=2$ for men and $p=1.5$ for women.⁶

Findings

Table 2 presents body weight measurements for each examined person whose weight was 10 or 20 percent or more above the desir-

Table 2. Mean of selected body measurements for men and women aged 20-74 years with relative desirable weight measurements 10 and 20 percent or more above desirable weight¹, by age: United States, 1971-74

Sex and age	Weight in pounds		Height in inches		Body mass index ²		Skinfold thickness in millimeters ³	
	10 percent or more	20 percent or more	10 percent or more	20 percent or more	10 percent or more	20 percent or more	10 percent or more	20 percent or more
Men								
20-74 years.....	202	219	69	69	29.97	32.52	39	45
20-24 years.....	210	225	70	70	29.73	32.52	42	52
25-34 years.....	212	231	70	69	30.67	33.75	41	49
35-44 years.....	203	219	69	69	29.78	32.04	37	41
45-54 years.....	202	217	69	69	30.05	32.52	39	45
55-64 years.....	198	215	68	68	30.02	32.57	37	42
65-74 years.....	190	204	67	67	29.54	31.74	37	42
Women								
20-74 years.....	176	188	64	63	38.91	41.84	58	64
20-24 years.....	174	195	64	64	37.95	42.57	58	67
25-34 years.....	183	194	64	64	39.76	42.55	61	67
35-44 years.....	182	195	64	64	39.76	42.69	60	65
45-54 years.....	176	187	64	63	38.90	41.55	60	65
55-64 years.....	172	182	63	63	38.93	41.18	58	62
65-74 years.....	167	177	62	62	38.15	40.52	53	56

¹Based on average weights estimated from regression equations of weight on height for men and women aged 20-29 years.

²(W/H^p) in $kg/meter^p$, where $p=2$ for men and $p=1.5$ for women.

³Skinfold thickness = triceps plus subscapular.

able weight for each measurement. The mean values shown in this table are graphically shown in figures 1 and 2.

The mean height for men 10 percent or more above the desirable weight was about 69 inches, and their mean weight ranged from 190 pounds at ages 65-74 to 212 pounds at ages 25-34 years. The mean weight for the age range 20-74 years was about 202 pounds. Comparable data for men 20 percent or more above the desirable weight showed the mean height to be 69 inches and mean weight to range from 204 pounds at ages 65-74 to 231 pounds at ages 25-34 years. The mean weight for ages 20-74 was about 219 pounds. The National Center for Health Statistics has previously reported that the mean weight and height of men in the United States aged 20-74 years was 172 pounds and 69 inches. For men 10 percent or more above desirable weight, the mean observed weight was 30 pounds above that of the general male population. Corresponding data for men 20 percent or more above the desirable weight showed the mean observed weight to be 47 pounds above the mean weight of the general male population.⁵

Table 2 also shows that in terms of the body mass index, W/H^2 , the mean height-weight index for all age groups was about $30 kg/(m^p)$ for men 10 percent or more above desirable weight and $33 kg/(m^p)$ for those 20 percent or more above desirable weight.

The mean value of skinfold thickness measurement was 39 mm for men 10 percent or more above the desirable weight and 45 mm for those 20 percent or more above the desirable weight in ages 20-74 years.

The mean value of the body mass index (W/H^2) of $33 kg/(m^p)$ for men of all ages who were 20 percent or more above the desirable weight was about equal to the mean plus 2 times the standard deviation of the distribution of the height-weight indices for men of the same ages in the general population: $25.5 + 2(4.2) = 34$.

The mean value of skinfold thickness of 45 mm for men of all ages who were 20 percent or more above the desirable weight was more than the mean plus 1 times the standard deviation of the distribution of the tricep plus subscapular of men of the same ages in the general population: $tri + sub = 28.2 + 1(12.5) = 41$.

Figure 1. MEAN OF SELECTED BODY MEASUREMENTS OF MEN AND WOMEN AGED 20-74 YEARS WHO ARE 10 PERCENT OR MORE ABOVE DESIRABLE WEIGHT, BY SEX AND AGE: UNITED STATES, 1971-74

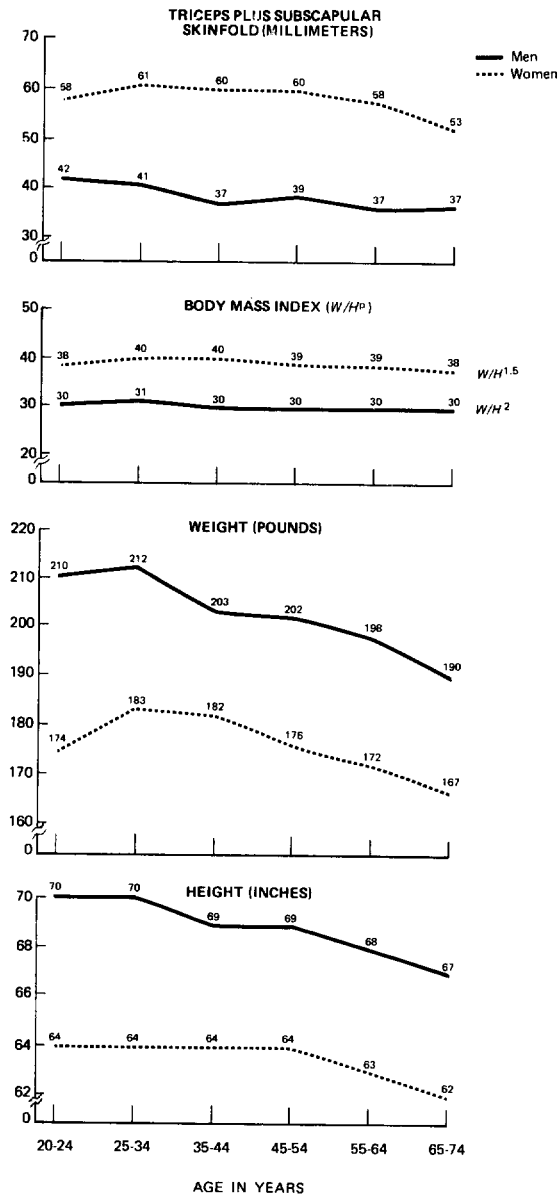
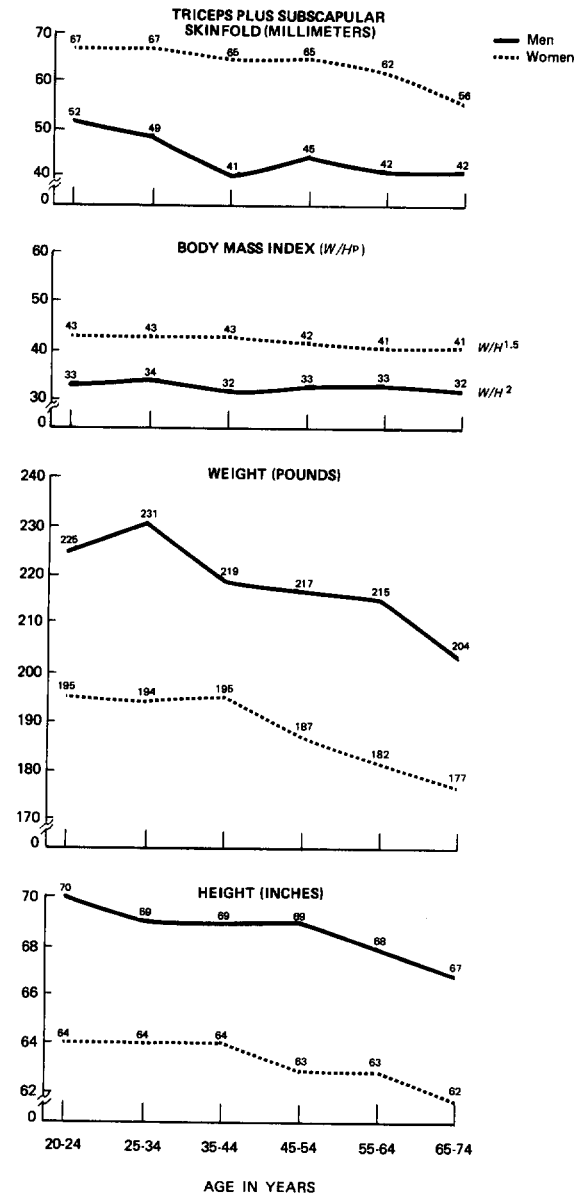


Figure 2. MEAN OF SELECTED BODY MEASUREMENTS OF MEN AND WOMEN AGED 20-74 YEARS WHO ARE 20 PERCENT OR MORE ABOVE DESIRABLE WEIGHT, BY SEX AND AGE: UNITED STATES, 1971-74



A similar profile was made for women of comparable ages. Table 2 shows that the average height of women 10 percent or more above the desirable weight was 64 inches, which was about equal to the average height of women in the general population.⁷ Women 10 percent or more above the desirable weight had an average weight of 176 pounds, which was on the average 33 pounds above the

reported average weight of 143 pounds for all women aged 20-74 years.⁷ For women 20 percent or more above the desirable weight, the average height was about equal to the average reported for women in the general population.⁷ Their average weight was 188 pounds, which was on the average 45 pounds above the average weight previously reported for women in the general population.⁷

The mean value of the body mass index ($W/H^{1.5}$) was 39 kg/(m^P) and 42 kg/(m^P), respectively, for women 10 percent or more and 20 percent or more above desirable weights in all age groups. The corresponding skinfold thickness measurements were 58 mm and 64 mm for the two selected criteria of overweight in all age groups.

For the body mass index of women who were 20 percent or more above desirable weight, the mean value (42 kg/(m^P)) was more than the mean plus 1 times the standard deviation of the distribution of height-weight index ($W/H^{1.5}$) of women aged 20-74 years in the general population: $W/H^{1.5} = 31.8 + 1(6.9) = 39$. For the skinfold measurement, the mean value (64 mm) exceeded the mean plus 1 times the distribution of triceps plus subscapular of women aged 20-74 years in the general population: $tri + sub = 42.3 + 1(17.4) = 60$.

The body mass indices for men and women 10 percent or more above the desirable weight were in the upper 12 and 14 percent, respectively, of the distribution of this index for the general population aged 20-74 years. For men and women 20 percent or more above the

desirable weight, the indices were in the upper 4 and 8 percent, respectively, of the distribution. Corresponding percentages for men who were 10 percent or more and 20 percent or more above the desirable weight were in the upper 16 and 10 percent, respectively, of the distribution of skinfold thickness measurements. For women the percentages were in the upper 19 percent for those 10 percent or more above the desirable weight and in the upper 12 percent for those 20 percent or more above the desirable weight.

Table 3 shows that about a third of the men aged 20-74 years in the United States or an estimated 18.4 million were 10 percent or more above the desirable weight. The corresponding value for men 20 percent or more above the desirable weight was 14 percent, or 8.0 million men. Among women of comparable ages, the proportions were higher for each of the selected percents above the desirable weight—36.4 percent, or 23.4 million, for those 10 percent or more above the desirable weight and 23.8, or 15.3 million, for those 20 percent or more above the desirable weight.

The proportions of men above the desir-

Table 3. Number of examined persons and estimated population aged 20-74 years and number and percent of persons 10 and 20 percent or more above desirable weight¹, by sex and age: United States, 1971-74

Sex and age	Number examined	Estimated population in thousands	Percent deviation from desirable weight			
			10 percent or more		20 percent or more	
			Number	Percent	Number	Percent
Men						
20-74 years.....	5,001	57,431	18,434	32.1	8,041	14.0
20-24 years.....	513	8,217	1,522	18.5	612	7.4
25-34 years.....	804	12,766	3,866	30.3	1,742	13.6
35-44 years.....	665	10,804	4,222	39.1	1,839	17.0
45-54 years.....	765	11,260	4,023	35.7	1,778	15.8
55-64 years.....	597	8,888	3,022	34.0	1,339	15.1
65-74 years.....	1,657	5,496	1,784	32.5	737	13.4
Women						
20-74 years.....	8,130	64,181	23,394	36.4	15,268	23.8
20-24 years.....	1,243	8,919	1,729	19.4	859	9.6
25-34 years.....	1,895	13,996	3,526	25.2	2,390	17.1
35-44 years.....	1,663	11,772	4,305	36.6	2,864	24.3
45-54 years.....	836	12,264	5,266	42.9	3,411	27.8
55-64 years.....	670	9,953	5,001	50.2	3,449	34.7
65-74 years.....	1,822	7,277	3,565	49.0	2,291	31.5

¹Based on average weights estimated from regression equations of weight on height for men and women aged 20-29 years.

able weight increased with advancing age and peaked at ages 35-44 years, where about 40 percent were 10 percent above the desirable weight and 17 percent were 20 percent above that weight. For women, the proportions also increased with advancing age and peaked at older ages (55-64 years), than men and then declined.

Women in the youngest age group and at ages 45 years or over showed a larger percent of deviation from desirable weight in the 10 percent or more category than men did. This direction was not evident for ages 25-44 years, where the differences were much smaller between men and women than they were in the older age groups.

Comparison of the relative frequency of men and women above desirable weight from HANES was made with that from the Health Examination Survey (HES), 1960-62. However, since the average weights were higher in HANES than in the HES⁷, the desirable weights estimated from regression equations of weight on height for men and women aged 20-29 years obtained from HANES were used as the base for the findings in HES.

Overweight as defined by the percent of persons deviating from desirable weight was as prevalent among U.S. adults aged 20-74 years in 1971-74 (HANES) as it was in 1960-62 (HES) (table 4). The prevalence rate for men 10 percent or more above desirable weight from the two surveys was identical. The prevalence rates for those 20 percent or more above the desirable weight differed no more than expected from sampling variability. A similar pattern in prevalence rates was also evident for women of comparable age range. At these ages the observed differences in proportions were 1.7 percent at 10 percent or more above desirable weight and 1.3 percent at 20 percent or more above desirable weight.

Table 4 also shows that the prevalence rates for men 10 and 20 percent or more above desirable weight in the HES sample were higher than the prevalence rates for men in the HANES sample in the youngest age group and age 45 years and over. The actual differences in prevalence rates are numerically small. At these ages for those 10 percent or more above desirable weight, the HES data range was from 1.0 percent to 3.7 percent

Table 4. Comparison of the percent of men and women aged 20-74 years in HES (1960-62) and HANES (1971-74) 10 and 20 percent or more above desirable weight¹, by sex and age: United States

Sex and age	Percent deviating from desirable weight					
	10 percent or more			20 percent or more		
	HES	HANES	Excess ²	HES	HANES	Excess ²
<u>Men</u>						
20-74 years.....	32.1	32.1		14.5	14.0	-0.5
20-24 years.....	22.2	18.5	-3.7	9.6	7.4	-2.2
25-34 years.....	28.7	30.3	+1.6	13.3	13.6	+0.3
35-44 years.....	31.8	39.1	+7.3	14.9	17.0	+2.1
45-54 years.....	36.9	35.7	-1.2	16.7	15.8	-0.9
55-64 years.....	36.4	34.0	-2.4	15.8	15.1	-0.7
65-74 years.....	33.5	32.5	-1.0	14.6	13.4	-1.2
<u>Women</u>						
20-74 years.....	38.1	36.4	-1.7	25.1	23.8	-1.3
20-24 years.....	18.8	19.4	+0.6	9.1	9.6	+0.5
25-34 years.....	24.3	25.2	+0.9	14.8	17.1	+2.3
35-44 years.....	34.6	36.6	+2.0	23.2	24.3	+1.1
45-54 years.....	43.4	42.9	-0.5	28.9	27.8	-1.1
55-64 years.....	56.2	50.2	-6.0	38.6	34.7	-3.9
65-74 years.....	56.2	49.0	-7.2	38.8	31.5	-7.3

¹Desirable weight estimated from regression equations of weight on height for men and women aged 20-29 years, obtained from Health and Nutrition Examination Survey (HANES) and used as the base for the findings in Health Examination Survey (HES).

²Excess of HANES over HES.

greater than the HANES data. The corresponding differences for those 20 percent or more above desirable weight range from 0.7 percent to 2.2 percent. In contrast, HANES prevalence rates were higher than HES prevalence rates at ages 25-44 years for both criteria of overweight. The maximum difference is 7.3 percent at ages 35-44 years with the differences ranging from 0.3 percent to 2.1 percent for both criteria of overweight.

A similar pattern was observed for women in each age group with the exception of the youngest age group, where the HANES prevalence rate was higher than that for HES. The maximum differences were 7.2 percent and 7.3 percent, respectively, at the oldest age group for both criteria of overweight.

In HES, the proportion of women 10 percent or more above the desirable weight was less than that for men under 35 years of age and greater than that for men 35 years and over. The corresponding proportion for women in comparison with men in HANES was more for women at the youngest age group 20-24 years, less than that for men at ages 25-44 years, and greater than that for men in the older age groups. The proportion of women 20 percent above the desirable

weight in HES was about the same as that for men in ages 20-24 years, and in HES and HANES exceeds that for men beyond this age group.

Table 4 shows that the overweight prevalence rate for both criteria from HES and HANES sets of data increase with advancing years. For men, HES data reach a maximum at ages 45-54 years where 37 percent of the men were 10 percent or more above desirable weight and 17 percent were 20 percent or more above desirable weight. For HANES, the prevalence rates peaked a decade earlier at about the same proportions for 10 and 20 percent or more above desirable weight. For HES and HANES the greatest increase in proportions occurs from the twenties to thirties.

For women, the prevalence rates continued to rise with age and peaked at ages 55-64 years, where more than 50 percent of the women from HES and HANES were 10 percent or more above desirable weight and more than 1 out of every 3 were 20 percent or more above desirable weight.

The proportion of men and women whose relative weight exceed any other specified criteria may be found in tables 5 and 6.

Table 5. Cumulative percent distribution of relative weight (observed weight/desirable weight for height x 100) for men aged 20-74 years in HES (1960-62) and HANES (1971-74), by age: United States

Relative desirable weight in pounds	20-74 years		20-24 years		25-34 years		35-44 years		45-54 years		55-64 years		65-74 years	
	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74
	Cumulative percent distribution													
Under 85.....	10.5	10.5	18.1	20.2	13.3	9.8	6.7	6.4	6.7	8.6	10.3	9.8	14.1	11.2
Under 90.....	19.7	18.5	30.6	32.0	23.7	19.0	13.8	12.6	14.5	14.6	19.1	17.4	25.0	18.5
Under 95.....	31.3	29.9	48.2	48.1	34.4	32.9	24.1	22.9	27.0	23.2	29.7	27.2	34.8	27.9
Under 100.....	43.9	41.6	60.2	60.4	46.9	46.7	38.5	32.1	39.0	33.9	41.1	38.3	47.2	40.9
Under 105.....	56.0	54.1	70.9	71.8	58.1	58.5	53.8	45.0	51.2	48.2	53.1	50.1	55.8	53.7
Under 110.....	67.9	67.9	77.8	81.5	71.3	69.7	68.2	60.9	63.1	64.3	63.6	66.0	66.5	67.5
Under 115.....	77.6	78.1	86.4	89.0	78.9	78.6	77.9	73.2	72.9	74.4	74.7	77.3	79.4	79.3
Under 120.....	85.5	86.0	90.4	92.6	86.7	86.4	85.1	83.0	83.3	84.2	84.2	85.0	85.4	86.6
Under 125.....	91.5	90.8	93.1	94.7	92.3	90.2	90.9	89.8	90.0	89.5	92.9	90.3	90.3	91.9
Under 130.....	94.7	94.2	95.0	96.6	95.5	93.1	94.8	95.0	93.7	92.9	95.6	93.2	93.7	95.4
Under 135.....	96.8	96.0	96.3	98.0	96.9	94.9	96.9	96.5	96.5	95.2	97.5	95.3	96.8	97.3
Under 140.....	98.2	97.4	97.4	98.6	98.2	96.3	98.0	97.7	98.6	97.3	98.4	96.9	98.5	98.4
Under 145.....	98.7	97.9	97.4	98.6	98.4	97.1	98.8	98.1	99.1	97.9	98.6	97.6	99.1	98.8
Under 150.....	99.5	98.7	100.0	99.2	99.6	98.2	99.0	99.0	99.6	98.1	99.0	99.0	100.0	99.4
Under 155.....	99.6	99.1	100.0	99.8	99.7	98.5	99.3	99.0	99.9	98.8	99.0	99.3	100.0	99.7
Under 160.....	99.7	99.3	100.0	100.0	99.7	98.7	99.5	99.2	99.9	99.0	99.3	99.4	100.0	99.8

Table 6. Cumulative percent distribution of relative weight (observed/desirable weight x 100) for women aged 20-74 years in HES (1960-62) and HANES (1971-74), by age: United States

Relative desirable weight in pounds	20-74 years		20-24 years		25-34 years		35-44 years		45-54 years		55-64 years		65-74 years	
	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74	1960-62	1971-74
	Cumulative percent distribution													
Under 85.....	10.2	12.7	23.1	23.5	16.2	18.0	8.8	10.1	6.4	7.6	3.8	9.1	4.5	6.4
Under 90.....	19.7	22.1	38.2	36.8	30.1	31.5	19.0	19.3	13.2	15.0	8.9	14.3	9.2	13.0
Under 95.....	31.9	34.0	55.8	53.7	47.1	44.3	34.0	31.7	21.5	27.0	14.5	23.2	16.7	20.3
Under 100.....	42.9	45.2	66.6	65.6	59.6	57.6	46.9	45.1	32.9	36.6	23.4	31.0	23.8	30.3
Under 105.....	52.8	55.1	75.9	75.3	70.4	66.2	55.3	55.6	42.7	46.5	34.1	40.9	34.8	42.2
Under 110.....	61.9	63.6	81.2	80.6	75.7	74.8	65.4	63.4	56.6	57.1	43.8	49.8	43.8	51.0
Under 115.....	69.2	70.3	87.2	87.3	81.1	79.6	72.2	69.8	64.6	64.2	53.1	58.1	52.5	59.7
Under 120.....	74.9	76.2	90.9	90.4	85.2	82.9	76.8	75.7	71.1	72.2	61.4	65.3	61.2	68.5
Under 125.....	80.3	80.9	93.1	92.6	88.2	85.8	81.9	80.2	76.5	77.7	68.8	72.4	72.2	75.6
Under 130.....	84.6	84.6	94.7	93.7	91.4	88.1	85.8	82.8	80.2	83.2	76.3	77.3	78.2	81.5
Under 135.....	88.1	88.0	96.0	95.1	93.1	90.9	88.6	86.1	85.3	86.6	81.1	83.2	84.4	85.8
Under 140.....	90.9	90.7	96.2	95.8	94.9	92.5	91.3	88.7	89.3	89.8	85.6	87.4	87.1	89.9
Under 145.....	93.3	92.8	96.8	96.9	96.0	93.8	93.3	91.1	92.7	92.1	89.1	90.7	91.8	92.4
Under 150.....	95.0	94.4	97.3	97.2	97.5	95.3	94.3	93.1	94.1	93.4	91.9	93.2	94.6	94.5
Under 160.....	97.1	96.6	98.5	98.3	98.5	97.0	96.1	95.8	96.7	95.6	95.6	96.5	97.8	97.2
Under 170.....	98.4	98.0	99.0	99.1	99.0	98.2	98.2	97.5	97.9	97.0	96.8	97.9	99.7	98.5
Under 180.....	99.2	98.8	99.9	99.3	99.5	98.8	99.2	98.0	98.6	98.8	98.4	98.6	100.0	99.3
Under 190.....	99.6	99.2	100.0	99.6	99.8	99.4	99.6	98.8	99.1	99.4	99.0	98.8	100.0	99.5

REFERENCES

¹National Center for Health Statistics: Obesity of adults, 20-74 years of age, United States, 1971-74, by S. Abraham. *Vital and Health Statistics*. Series 11. Public Health Service, DHEW, Hyattsville, Md. To be published.

²National Center for Health Statistics: Plan and operation of the Health and Nutrition Examination Survey, United States, 1971-73, by H. W. Miller. *Vital and Health Statistics*. Series 1-Nos. 10a and 10b. DHEW Pub. No. (PHS) 79-1310. Public Health Service. Washington. U.S. Government Printing Office, June 1979.

³Keys, A., et al: Indices of relative weight and obesity. *J. Chron. Dis.*, 25:329-343, 1972.

⁴Womersley, J., and Durnin, J. V. G. A.: A Comparison of the skinfold method with extent of overweight and various weight-height relationships in the assessment of obesity. *Br. J. Nutr.* 38: 271-284, 1977.

⁵Committee on Nutritional Anthropometry, Food and Nutrition Board. National Research Council: Recommendations concerning body measurements for the characterizations of nutritional status, in J. Brozek, ed., *Body Measurements and Human Nutrition*. Detroit. Wayne University Press, 1956.

⁶Benn, R. J.: Some mathematical properties of weight for height indices as measures of adiposity. *Br. J. Prev. Soc. Med.* 25:42-50, 1971.

⁷National Center for Health Statistics: Weight and height of adults, 18-74 years of age, United States, 1971-74, by S. Abraham, C. L. Johnson, and M. F. Najjar. *Vital and Health Statistics*. Series 11-No. 211. DHEW Pub. No. (PHS) 79-1659. Public Health Service. Washington. U.S. Government Printing Office, May 1979.

TECHNICAL NOTES

The sampling plan for the 65 examination locations in 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. Successive elements dealt with in the process of sampling were the primary sampling unit, census enumeration district, segment (a cluster of households), household, eligible person, and sample person. The sampling design provided for oversampling among persons living in poverty areas, preschool children, women of child-bearing age, and the elderly.

The excess weight determinations are shown as population estimates, that is, the findings for each individual have been "weighted" by the reciprocal of the probability of selecting the person. An adjustment for persons in the sample who were not examined and poststratified ratio adjustments were also made so that the final sampling estimates of the population size were brought into closer alignment with the independent U.S. Bureau of the Census estimates for the civilian noninstitutionalized population of the United States as of November 1, 1972, by race, sex, and age.

SYMBOLS

Data not available-----	---
Category not applicable-----	...
Quantity zero-----	-
Quantity more than 0 but less than 0.05-----	0.0
Figure does not meet standards of reliability or precision-----	*

Recent Issues of *Advance Data From Vital and Health Statistics*

No. 50. Office Visits by Black Patients, National Ambulatory Medical Care Survey: United States, 1975-76 (Issued: July 23, 1979)

No. 49. Office Visits for Family Planning, National Ambulatory Medical Care Survey: United States, 1977 (Issued: April 16, 1979)

No. 48. 1977 Summary: National Ambulatory Medical Care Survey (Issued: April 13, 1979)

No. 47. Prevalence, Disability, and Health Care for Psoriasis Among Persons 1-74 Years: United States (Issued: April 3, 1979)

No. 46. Hemoglobin and Selected Iron-Related Findings of Persons 1-74 Years of Age: United States, 1971-74 (Issued: January 26, 1979)

A complete list of *Advance Data From Vital and Health Statistics* is available from the Scientific and Technical Information Branch.