Data from the
NATIONAL HEALTH SURVEY

Series 11
Number 104

Height and Weight of Children

United States

Height and weight measurements by age, sex, race, and geographic region of the country for children 6 through 11 years of age in the United States, 1963-65, are presented and discussed.

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Rockville, Maryland

Series 11 reports present findings from the National Health Examination Survey, which obtains data through direct examination, tests, and measurements of samples of the U.S. population. Reports 1 through 38 relate to the adult program, Cycle I of the Health Examination Survey. The present report is one of a number of reports of findings from the children and youth programs, Cycles II and III of the Health Examination Survey. These latter reports from Cycles II and III are being published in Series 11 but are numbered consecutively beginning with 101. It is hoped this will guide users to the data in which they are interested.

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COOPERATION OF THE BUREAU OF THE CENSUS

In accordance with specifications established by the National Center for Health Statistics, the Bureau of the Census, under a contractual agreement, participated in the design and selection of the sample, and carried out the first stage of the field interviewing and certain parts of the statistical processing.

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CONTENTS

THIS REPORT CONTAINS national estimates based on findings from the Health Examination Survey in 1963-65 on height and weight measurements of children 6-11 years of age.

For this part of the survey a nationwide probability sample of 7,417 children was selected to represent the roughly 24 million noninstitutionalized children 6-11 years of age in the United States. Of these, 7,119, or 96 percent, were examined.

Measurements of height and weight on each examinee was part of the standardized examination. Height was obtained in stocking feet with the head in the Frankfort Plane, subject standing erect but not manually elongated, and recorded by means of a polaroid camera mounted on the measuring rod to reduce observer error. Weight was measured in standardized clothing weighing less than 2/3 lb., on a carefully calibrated, self-recording scale, to minimize measurement error.

The present findings are compared with other findings, both in the past and in other countries. There has been a steady and very regular increase in both height and weight of children in the United States over the past 90 years. This increase has been on the order of 10 percent for height and 15-30 percent for weight, although all the causes and meaning of this increased stature and bulk are not readily apparent.

American children, both white and Negro, are amongst the largest in the world. White Americans are in the highest group, both in height and weight, compared to their European counterparts, while Negro Americans are taller than the tallest African sample reported at 8.0 years of age.

American boys at age 6 are slightly taller and heavier than the girls; but, by age 11, the girls are larger. This holds true for both white and Negro children analyzed separately and together.

The boys of the two races are essentially the same height throughout this age range, but white boys are slightly heavier than Negro boys at every age.

Negro girls, on the other hand, are taller than their white age peers throughout this span, and, although they weigh slightly less until age 11, they then become both taller and heavier than the white girls.

This report does not include analysis by socioeconomic or urban-rural classifications.

Height and weight as measures of growth of the developing human and the use of these findings as standards, both clinical and epidemiologic, is discussed.

HEIGHT AND WEIGHT OF CHILDREN

Peter V. V. Hamill, M.D., M.P.H., Francis E. Johnston, Ph.D., and William Grams, M.A.[a]

INTRODUCTION

Cycle I of the Health Examination Survey (HES), conducted from 1959 to 1962, obtained information on the prevalence of certain chronic diseases and on the distribution of a number of anthropometric and sensory characteristics in the civilian, noninstitutionalized population of the continental United States aged 18-79 years. The general plan and operation of the survey and Cycle I are described in two previous reports,[1,2] and most of the results are published in other PHS Publication 1000-Series 11-reports.

This report on the height and weight of U.S. children 6-11 years old is one of a series of reports on the findings from Cycle II which started in July 1963 and was completed in December 1965. The plan, operation, and response results are described in some detail in PHS Publication 1000-Series 1-No. 5.[3]

Cycle II of the Health Examination Survey involved selection and examination of a probability sample of the noninstitutionalized children in the continental United States aged 6-11 years. This program succeeded in examining 96 percent of the 7,417 children selected for the sample. The examination had two focuses: on factors related to healthy growth and development as determined by a physician, a nurse, a dentist, and a psychologist; and on a variety of somatic and physiologic measurements performed by specially trained technicians.

In this report data on height and weight are analyzed and discussed by chronologic age, sex, race, and geographic region (tables 1-12). The techniques of measurement and quality control are discussed. The present findings are compared with other major studies, both longitudinal and cross-sectional, conducted elsewhere. While this report takes cognizance of other major studies on height and weight in children, it does not purport to be a comprehensive review of all the studies which have obtained heights and weights on children. The analyses of height and weight with variables other than age, race, sex, and region will be presented in future reports. Consideration of body composition and configuration, of obesity, and of nutritional status will be the subjects of future separate reports as will the examination of the relationship of height and weight with other variables such as IQ, school achievement, and self-concept. These future reports will also utilize skeletal age determined from an X-ray of the hand and wrist as a measure of biologic age or state of maturation. Thus, in addition to chronologic age, which is used by itself in this report, two other measures of "age" will be considered in the future: biologic (skeletal age) and some index of behavioral, intellectual, emotional, and achievement level.

METHOD

At each of the 40 randomly selected locations throughout the United States, the children were brought to the centrally located trailers for an examination which lasted about 2½ hours. Six

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children were examined in the morning and six in the afternoon. Except during vacations, they were transported from school and back.

When they entered the trailer, the children's oral temperatures were taken and a cursory screening for acute illness was made; if illness was detected, the child was sent home and re-examined at a later date. The examinees next dressed in shorts, cotton sweat socks, and a light sleeveless topper and proceeded to different stages of the examination, each one following a different route. There were six different stations where examinations were conducted simultaneously and the stations were exchanged like musical chairs so that at the end of 2½ hours each child would have had essentially the same examinations by the same examiners but in different sequence. Thus, heights and weights were taken at successive half-hour intervals during the day. The exact time of each examination was recorded so that analysis could be made of any diurnal or sequential effect. Analysis of the data has showed no meaningful difference during the 9:00 a.m. to 4:00 p.m. interval (see tables 27 and 28).

Weight

A Toledo self-balancing weight scale which mechanically printed the weight directly onto the permanent record was used. The direct printing was used to minimize observer and recording error. The scale was calibrated with a set of known weights and any necessary fine adjustments were made at the beginning of each new trailer location, i.e., approximately every month. This recorded weight was later transferred to a punched card to the nearest 0.5 pounds (lb.) The total weights of all clothing worn ranged from 0.24 to 0.66 lb.; this has *not* been deducted from weights presented in this report. (The weights, then, are 0.24 to 0.66 lb. above nude weight recorded to the nearest 0.5 lb.). The examination clothing used throughout the year was the same so there is no seasonal variation in the effect of clothing.

Height

Height was measured in stocking feet, with feet together, back and heels against the upright bar of the height scale, head in the Frankfort plane ("look straight ahead"), and standing erect ("stand up tall" or "stand up real straight" with some assistance and demonstration when necessary). However, there was no upward pressure exerted by the examiner on the subjects' mastoids to purposefully "stretch everyone in a standard manner" as is done by Tanner and some others. It is reported that supine length, that is the recumbent position which relieves gravitational compression of the intervertebral spaces, yields 2 centimeters (cm.) greater length (height) and that height with Tanner's "upward pressure technique" measures 1 centimeter greater than with HES technique.[4]

The equipment consisted of a level platform to which was attached a vertical bar with a steel tape. Attached to the vertical bar perpendicularly was the horizontal bar, which was brought down *snugly* on the examinee's head. Attached to another bar in *the same plane as the horizontal measuring bar* was a polaroid camera which records the subject's identification number next to the pointer on the scale giving a precise reading. The camera, of course, not only gives a permanent record minimizing observer and recording error, but by sliding up and down with the horizontal bar and *always* being in the same plane, it completely eliminated parallax. That is, if the pointer had been in the space in front of the scale, it would have been read too high if the observer had looked up at the scale from below or too low if read down from above. These extra efforts in quality control appear justified when the excellent level of reproducibility is noted (see fuller discussion of replicate studies in the appendix).

RESULTS

Mean Heights by Sex and Age

Between the ages of 6.0 and 12.0 years[b] there is an approximately linear increase in mean height for both boys and girls (fig.1). This

[b] That is, 6.00-11.99 years at time of selection for examination. When a mean value is given in a table or plotted on a graph, the integer age is used, referring to age at last birthday, i.e., "6 year old" means all children 6.00 through 6.99 years with a mean value of approximately 6.5 years. Table 1 gives exact mean ages to nearest hundredth of each yearly interval.

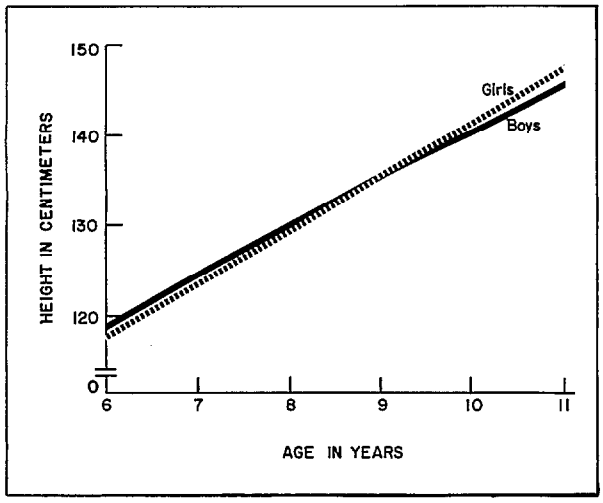

Figure 1. Mean heights for U.S. children, 6-11 years of age, by sex and age.

linear relation results from a very regular increase in the means of the heights each year during the ages of 6-11 for both boys and girls. The girls' average annual increase in mean height is 6.0 cm. (2.36 in.) over the age range 6-11 years, while the boy's average annual increase in mean height is only 5.4 cm. (2.13 in.).[c] The mean heights for boys increase from 118.6 cm. (46.7 in.) at age 6 years to 145.7 cm. (57.3 in.) at age 11 years. For girls the means increase from 117.8 cm. (46.4 in.) at 6 years of age to 147.6 cm. (58.1 in.) at 11 years.

Between ages 6 and 8 years the mean heights for boys average 0.8 cm. (0.3 in.) more than those for girls. At age 9 the mean heights for boys and girls are equal, but at 11 years the mean height for girls is 1.9 cm. (0.75 in.) greater (tables 1 and 2) than that for boys.

From tables 1 and 2 it can be seen that the standard deviations for height increase from ages 6 through 11 years for both boys and girls. This indicates that the distributions are more compact at lower ages for both sexes, and conversely both sexes become more heterogeneous in height and weight as they get older. This increasing heterogeneity also holds true when using the coefficients of variation[d] rather than simply the standard deviations.

Mean Weights by Sex and Age

The yearly increment for mean weight increases for both boys and girls during 6-11 years of age (tables 3 and 4) is not as regular as it is for heights. The increment between ages 6 and 7 for boys is about 2.7 kg. (5.9 lb.). This increment increases to about 4.6 kg. (10.1 lb.) for boys between the ages of 10 and 11. For girls the increment in mean weight increases from 2.6 kg. (5.7 lb.) between ages 6 and 7 to 4.7 kg. (10.3 lb.) between ages 10 and 11.

Increments of mean weight from year to year are unequal, and so the curve of mean weight by sex and age (fig. 2) is not quite linear. There is an unexplained tendency towards flattening of the boy's slope between 9 and 10 years (possibly a result of mere sampling variability, while at no age does the girls' slope diminish.

For boys the mean weights increase from 22.0 kg. (48.4 lb.) at age 6 to 38.4 kg. (84.4 lb.) at age 11. For girls the increase is from a mean weight of 21.6 kg. (47.4 lb.) at age 6 to 40.0 kg. (88.0 lb.) at age 11.

Between ages 6 and 8 years boys are, on the average, about ½ to 1 lb. heavier than girls. At age 9 girls are about ½ lb. heavier than boys, but at the age of 11 years the average weight for girls is 3.6 lb. greater than that of boys.

The same pattern exists for the distributions of weight as for the distributions of height. The distributions for weight are, in fact, even more compact at the lower ages, relative to the distribution of weight for the older ages, than are the distributions of height. Thus children become more heterogeneous in weight than they do in height at ages 6 through 11 years.

[c] For comparative uses and for ease of data handling, the metric system is used throughout this report. Except when unwieldy, inches and pounds are included parenthetically. Equivalents are as follows: 1 inch (in.)=2.54 centimeters (cm.); 1 cm.=0.39 in.; 1 kilogram (kg.)=2.2 pounds (lb.); 1 lb.=0.45 kg.

[d] The coefficient of variation is computed by dividing the standard deviation by the mean. Big boulders would have a greater standard deviation than small pebbles simply because all their dimensions are greater absolute numbers (the mean and the variance) even though, in fact, it is true that they were no more heterogeneous than the pebbles. By use of dimensionless ratios a truer comparison of relative variance or heterogeneity is gotten.

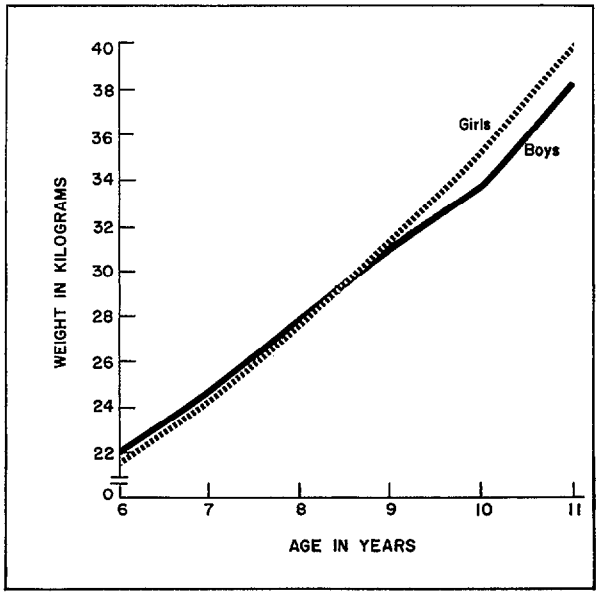

Figure 2. Mean weights for U.S. children, 6-11 years of age, by sex and age.

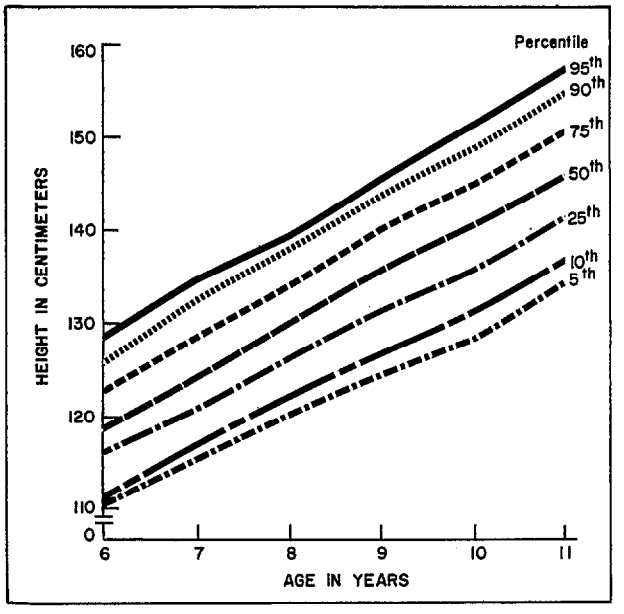

Figure 3. Percentile distributions of boys, 6-11 years of age, by height.

Percentiles for Distribution of Heights and Weights

Percentile distributions for heights and weights are given in tables 1-4. The percentiles are derived from the percentage distributions given in tables 5 and 6.

It was assumed that the measurements—heights and weights—were distributed uniformly across each of the height and weight groups. On the basis of this assumption the linear interpolation method was used to derive both the height and weight percentiles. For both the heights and weights the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles were derived for each sex-age group. Graphs of the percentile distributions are given in figures 3-6.

Weight by Height

Figure 7 gives weight by height group. Tables 13-26 give the percentile distributions of weight for each sex-age class and each 5-cm. (approximately 2 in.) height group. The heights are grouped in 5-cm. intervals between 105.0 cm. (41.3 in.) and 165.0 cm. (64.9 in.) along with the two tail groups. The 10th,

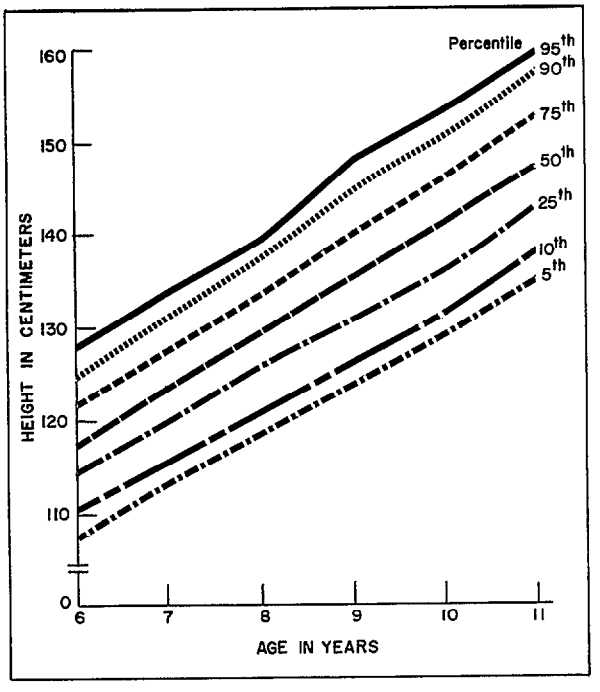

Figure 4. Percentile distributions of girls, 6-11 years of age, by height.

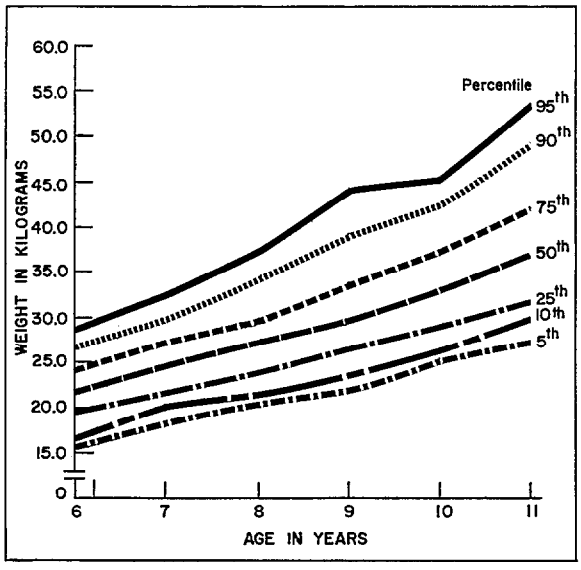

Figure 5. Percentile distributions of boys, 6-11 years of age, by weight.

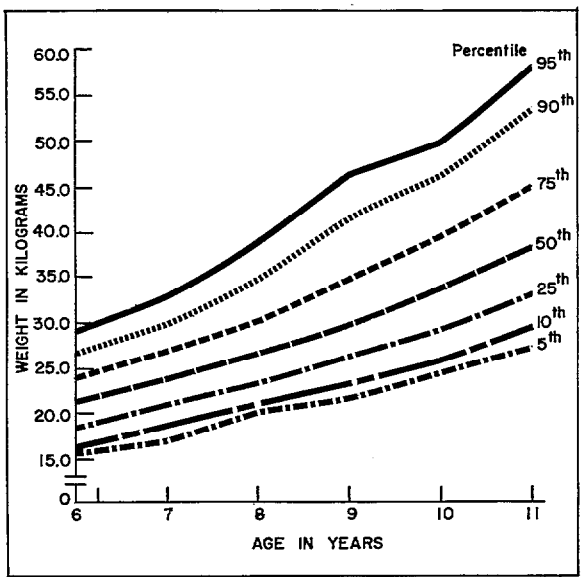

Figure 6. Percentile distributions of girls, 6-11 years of age, by weight.

25th, 50th, 75th, and 90th percentiles are given Although the 5th and 95th percentiles are given when the height and weight percentiles are given separately by sex and age, the further subclassification by height groups in the weight by height distribution makes these percentiles very unstable. This instability for the 5th and 95th percentiles is due to the small sample size resulting from the fine subclassification by sex, age, and height group.

Percentile distributions were derived from sample sizes as small as 15 for the above subclassifications. Whenever less than 15 were available for a sex-age-height group, the percentile is not given since sample sizes this small would make the distribution far less meaningful. This cut-off point of 15 is arbitrary and relative—less value should be attached to the percentiles derived from sample sizes of 15-30 than to those derived from much larger samples.

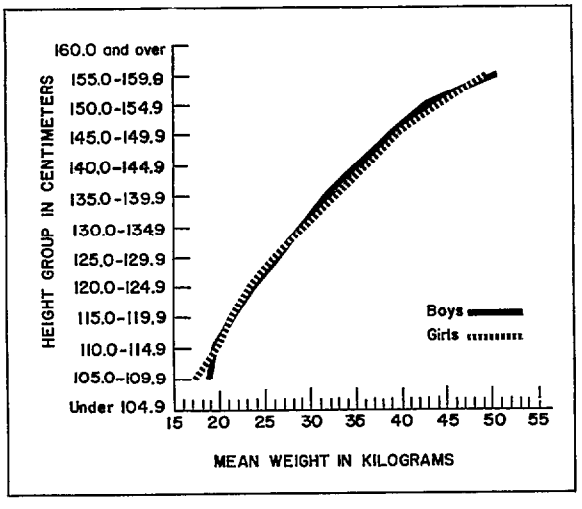

Figure 7. Average weight of U.S. children, 6-11 years of age, by height and sex.

Racial Differences

Height.—Table 10 and figure 8 show that from age 6 through 8 years Negro boys are on the average 0.6 cm. taller than white boys. At ages 9 and 10 white boys are, respectively, 0.5 and 0.7 cm. taller than Negro boys. At age 11 the mean height for both white and Negro boys is the same. At all ages 6 through 11, except age 8, Negro girls are taller on the average than white girls. At age 8 both Negro and white girls have

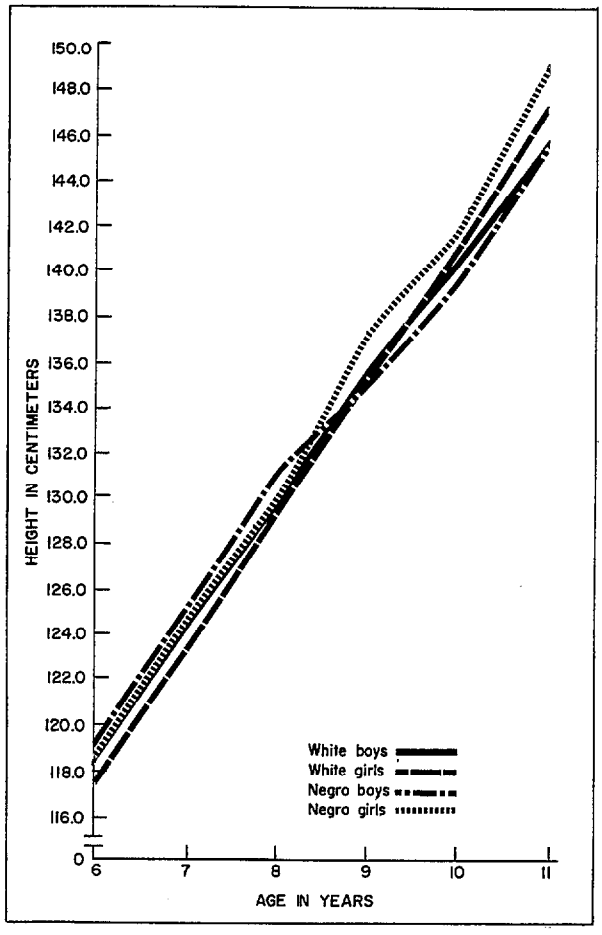

Figure 8. Average height of U.S. children, 6-11 years of age, by race and sex.

the same average height. In fact, Negro girls are also on the average taller than white boys at all ages except age 8. At age 8 the white boys are only 0.4 cm. taller than the Negro girls.

The biggest differences for mean heights occur at age 11. At this age Negro girls are the tallest at 149.2 cm. followed by white girls at 147.2 cm. (this 2-cm. difference is significant $P < .05$). Then come both white boys and Negro boys at identical mean heights of 145.7 cm.

When a two-tailed test of significance was applied at each of the 6 years of age for the difference between Negro and white girls' mean heights, only at ages 9 and 11 was the difference significant at the .05 level with these sample sizes. At none of the 6 years were the white and Negro boys' differences significant at the .05 level with these samples.

At age 11 the amount that the Negro girls are taller than the Negro boys is significantly greater ($P < .05$) than the amount that the white girls are taller than the white boys.

Weight.—Table 11 and figure 9 show that white boys are, on the average, heavier than Negro boys at each age from 6 through 11. These differences range from 0.2 kg. (0.44 lb.) to 2.0 kg. (4.4 lb.) during the ages of 6-11. At ages 7, 9, 10, and 11 years white boys are significantly heavier ($P<.05$) than their Negro counterparts.

At ages 6-9 white girls are on the average 0.5 kg. (1.1 lb.) heavier than Negro girls. At age 10 Negro girls are 0.6 kg. (1.3 lb.) heavier than white girls. By the age of 11 years Negro girls are 1.3 kg. (2.9 lb.) heavier than white girls. Only at age 11 is the difference statistically significant at the 0.5 level.

Not only at age 11 but also at age 10, the amount that the Negro girls are heavier than the Negro boys is significantly greater ($P<.05$) than the amount by which the white girls are heavier

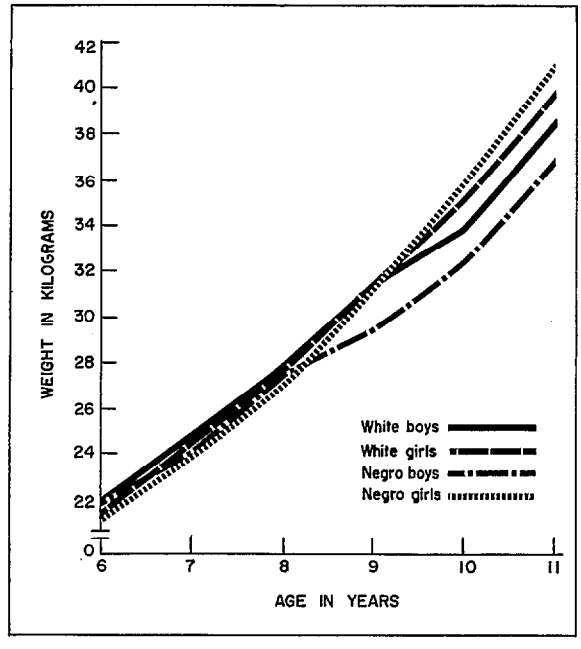

Figure 9. Average weight of U.S. children, 6-11 years of age, by race and sex.

than the white boys. Thus the increasingly greater heterogeneity of weight than height is revealed not only by charting measures of variance but also in this sex-by-race comparison.

There is a definite trend in the racial comparisons of height and weight: in general, Negro children tend to be taller while white children tend to be heavier. At all ages the Negro girls are either equal to (age 8) or taller (ages 6, 7, 9, 10, and 11) than white girls, but at every age white boys (though sometimes a little taller and sometimes a little shorter) are heavier than the Negro boys.

Regional Differences

Data from tables 7 and 8 and figure 10 indicate that at ages 6-11 both boys and girls tend to be taller and heavier in the Midwest and Northeast than in either the South or West.

DISCUSSION

Growth is an essential property of all living things, but it culminates in a vast array of sizes and life spans. In size man is flanked by viruses and bacteria on the one side and by dinosaurs and whales on the other, while in length of life he lies between the few brief hours of the free-flying adult May fly and the 5,000 years of some bristle cone pines. Time is reckoned in two ways for all growing things: the lapse of side-real (calendar) time and the major events of biologic time. The first tells us how long, relative to planetary motion, the organism has lived; the second tells us the stage it has achieved in its own process of cellular and supracellular maturation.

"Age," as such, is purely relative in growth. An hour in the life of a colony of bacteria is

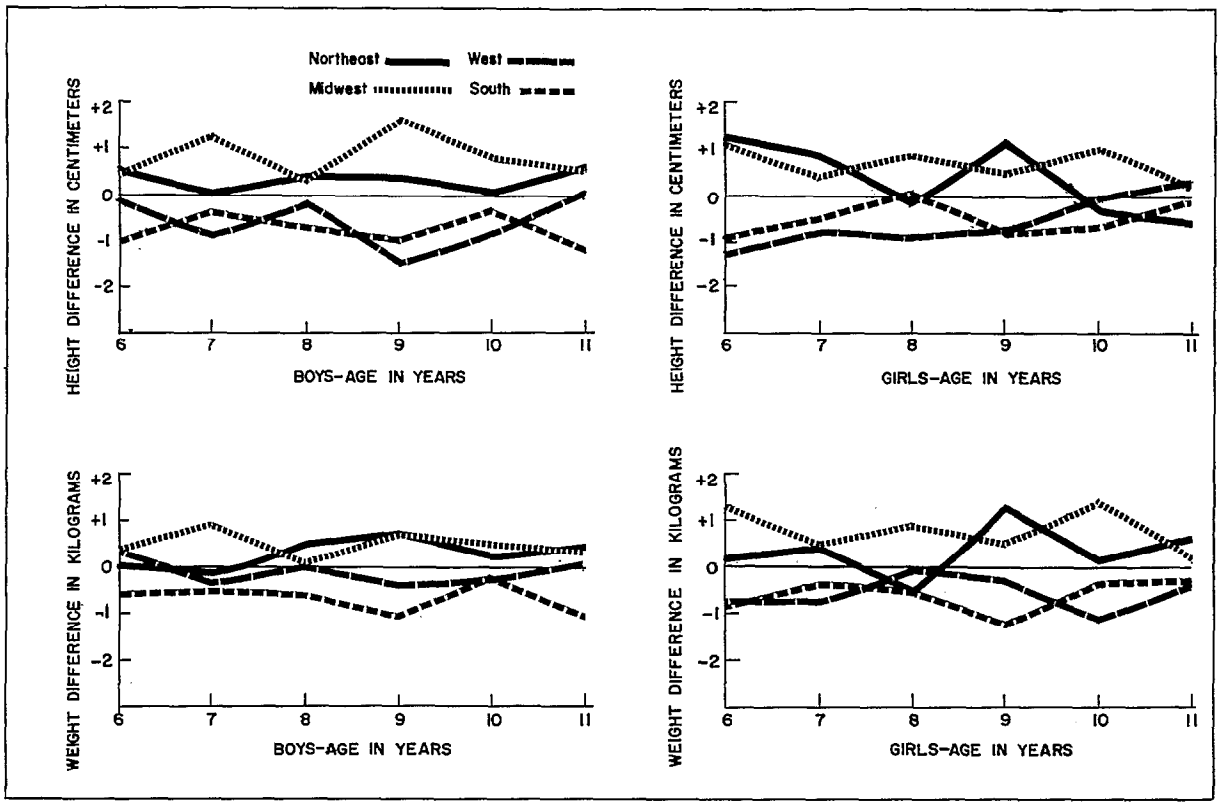

Figure 10. Mean height and weight differences from the national average for U.S. children, 6-11 years of age, by geographic region and sex.

Species	Length of pregnancy	Status at birth	Period of dependency on mother	Learns to walk	Suckled for:	Capable of social independence	Sexual maturity	Social organization	Longevity*
Lemur	111, 145 days (two species): multiple births: other primates usually single	Relatively very large, mature, with senses functional	A few hours or days	Within first week, usually	Several days or a few weeks	Within a few weeks	Within a year	*Tarsius* in pairs; but some lemurs are gregarious	25 years
Monkey	Marmoset 150 days; macaque, 163 days; rhesus, 166 days	Relatively large, mature, with senses well developed	A few days or weeks	Within first month, usually	Several weeks	Within 2-4 months	Within 2 or 3 years	Mostly gregarious; harem-forming in some baboons	15-45 years, depending on species
Ape	Gibbon, 200 days; chimpanzee, 235 days	Relatively very small and helpless, with senses partly functional	3-6 months	Within 6 months, ordinarily	Several months	Within 12-18 months	Within 8-12 years	Gibbon: family bands; orang: ?sexes apart except at mating; chimp: bands of 4-14 (av. 8.5); gorilla: groups of 2-4 nests; maximum known 16	25-45 years, depending on species
Man	266 days	Relatively small and helpless, with senses partly functional	At least a year	Within 18 months, usually	1-2 years	Within 6-8 years	Within 10-14 years	Exogamous family groups within larger societies	Depends upon time** and country; in U.S. a male born now may expect to live 67 years; a female, 72 years
Trend from lemur to man	Lengthening of the period of gestation	Smaller, more helpless and immature	Dependency increases	Longer time needed to learn to walk	Length of suckling extended	More time needed to achieve social independence	Puberty progressively delayed	Tendency for family to emerge in higher primates	With human culture, longevity distinctly increases over infra-humans

*Figures based on known *maxima* of life in individual animals in captivity; since the *average* span of life in wild animals is less, and only the average (not the maxima) for humans has been given, the contrast in longevity between man and the infra-human primates is probably much greater than the table indicates.

**See figures for Neanderthals, later Stone Age men, men in primitive societies, eleventh-century Englishmen, and modern Europeans and Americans. The average length of life steadily increases; there is probably no prolongation of the potential duration of life in *Homo sapiens*, which is possibly stationary through the ages. The differences are probably due to decreased life-hazards, i.e., are cultural and not biological.

Figure 11. Comparison of individual development in primates.[6]

vastly different from an hour to a daisy, a crocodile, a robin, a man, or to the giant redwood tree or to the ageless anthrax spore.

The important thing for humans is that while man shares the process of growth and decay with all other plants and animals, he is set distinctly apart by the protracted period of his infancy and childhood. It is as though nature, cognizant of man's unique cerebral evolution, cooperates by providing a longer training period. This is illustrated in the following chart of comparative development and the chart in figure 11.

Ratio of ~~length of "childhood" to life~~-span for man and other mammals[7]

Animal	I Length of "childhood"	II Usual life-span	Ratio of I to II
Man--------	14 years	70 years	1:5
Dog--------	9 months	16 years	1:21
Sheep, goat-----	5 months	12 years	1:29
Cow--------	6 months	16 years	1:30
Horse------	9 months	27 years	1:36
Pig--------	4 months	12 years	1:36

Herein lies one source of man's boasted supremacy over all other beasts—he is essentially a learning animal. He unfolds biologically so slowly that his mental processes are enabled to absorb the cumulative experience of the species. Each successive generation does not have to invent the wheel all over again. The measurement of a host of somatic, physiologic, and behavioral variables within a context of healthy growth and development during this uniquely human protracted childhood and adolescence is the object of Cycles II and III of the Health Examination Survey.

The two most universally accepted measures of human physical growth are height (increase in linear size) and weight (increase in bulk).[5] These are the two measures reported here in this first of a series of reports of the detailed growth findings of Cycle II of the Health Examination Survey. The time framework for this report is the chronologic time elapsed from the moment of birth to the moment of measurement, i.e., sidereal, calendar, or planetary time; the "other time," biologic time, will also be included in future reports.

When discussing growth in humans, the differences between data derived from cross-sectional studies and those derived from longitudinal studies cannot be overemphasized. Both modes have their strong points and their limitations, and it is only by combining the two perspectives that a full description of the growth process can be obtained. While longitudinal studies provide the most information, the cross-sectional studies are logistically more efficient, more easily made representative of the total population, and equally appropriate for many purposes.

Longitudinal studies follow a group of people through time making serial observations at specified intervals over a period of months or years.[e] The intervals should not be so short that the measurement error overwhelms the real increment nor so long that the critical points on the growth curve are missed. After the rapid changes in the first months of life necessitating very frequent observations, it is customary to set the intervals so that most of the physical and physiologic observations occur once or twice a year (preferably at the birthday, both for ease of remembering the examination date and for increased efficiency of analysis) but, then, to increase again the frequency of observations during the circumpuberal growth spurt and afterward to taper off to much longer intervals. For a fuller discussion of optimal frequency of observation see Krogman's discussion of work done by Meredith and Marshall.[5]

Growth being a sequence of highly interdependent events extended through sidereal time which are unified by being the attributes of one person can really be understood only when related to an individual (real or a construct) followed through time. In fact, one of the earliest systematic studies of growth—and certainly the alltime champion for its contribution of new information—was extremely simple and straightforward in design: Philibert Gueneau de Montbeillard from 1759 to 1777 made serial height measurements every 6 months on his first-born son.[7] If all humans grew identically, except for a few refinements in de Montbeillard's measuring technique, there would have been no necessity for increasing the sample of heights on humans from this one.

But variations in attained height and weight at a given age (distance curves) and variations in patterns of attainment or rates of growth (incremental or velocity curves) pervade the entire process of measurement of growth and so there are introduced immense problems of sampling variation and sample size.

Longitudinally is the "natural" way to study growth. And this is the only mode which can describe variations from person to person in rates of growth and which can produce individual incremental curves. It is also the most efficient (Tanner estimates 20 to 1)[8] mode for group incremental curves. But the longitudinal approach has great logistic limitations which usually restrict the sample size to several hundred or less.

The study of the variation of heights and weights in a given population by accurate demographic variables at a point in time is the chief strength of the cross-sectional mode. With its many logistical advantages it allows a large and

[e]The Child Research Council in Denver has been following some of their subjects regularly for 42 years now (and into the second generation).

representative sample, so an overview of great accuracy in ranges and estimates of variations can be made.

The cross-sectional is topographic. As a map doesn't tell much about a city (and nothing of its history) although it locates the city very accurately in time and space, so the cross-sectional data can allow the accurate placement of an individual—*at a point in time relative to the rest of the group*—for the particular variable under study.

Cross-sectional data of attributes of growth and development obtained on different age cohorts and then grouped by ascending order of chronologic age, as these data have been, can be very deceiving. It is very tempting to follow the mean value from one age grouping to the next and to presume that this is a description of the growth pattern of the average typical American child. That would not be entirely correct. It is true that the mean value of height is the best estimate of height for the group of children of each of the successive age cohorts measured at that point in time. However, because of sampling differences from age group to age group (children of age 8 *are* a different sample from those of age 9 or of age 10 in this study) but mostly because real children reach their adolescent growth spurt at different times, these successive group averages do not describe the actual growth to adulthood of the average, or typical, child.

In one of the most carefully done longitudinal studies, it has been demonstrated that growth of the long bones of the extremities[9–11] (which determine most of the height) during infancy (up to about 4 years) is quite erratic within both the individual's own incremental curve over time and the individual compared with the rest of the group. The curve described by the successive averages for this age period is *falsely smooth* relative to a real individual. However, during midchildhood (from about 4 years to about 9 to 10 years in most girls and 11 or 12 years in most boys), when somatic growth and physiologic processes, like behavior, are quite stable, the smooth linear curve of the group averages probably best describes the growth curve of the flesh-and-blood child, except for the small annual fluctuations frequently reputed to be due to seasonal variation in rates of growth. Since de Montbeillard's study of his son, there has been a growing literature on seasonal variation in rate of growth of children.[12–15] The fact that the extremely meticulous Denver study has failed to demonstrate this seasonal variation may mean that in some environments or with some sociogenetic groups of people this seasonal variation does not operate with sufficient force to be detected. On the other hand, the possibility that this seasonal variation is merely a statistical fiction deriving from measurement error overwhelming the real change does not appear too likely because it reappears rather consistently in diverse times and places and the season of this reputed greatest growth in height and weight is rather constantly spring or summer. But for the circumpuberal period, the curve of the group means can be the most misleading.

As vividly and forcefully described by Tanner,[16] when the age cohorts move through adolescence and the growth spurt occurs amongst the individuals at very different times, the average of the group, by averaging out or blunting the peaks of the differently phased individuals' crests, is *falsely low*. The rate of movement of the *average* is much less than that of the typical real person—in fact, any individual whose growth curve during adolescence was best described by the composite curve constructed from the group average of each consecutive age would definitely be atypical, or abnormal. The typical, or average, growth curve of the individuals would be much steeper than the curve typical of the group, i.e., the mathematical average.

The critical reader with a good memory (who had had a typical child) who looked at the curve described by the successive averages (or group averages) and said, "When my boy really grew fast, he grew much faster than the *average*," might be confused, but he would be absolutely correct in his observation.

In short, to use these cross-sectional data properly, the inherent limitations must be borne in mind.

Sex Differences

The differences between the means of males and females at corresponding ages are numerically quite small. Maximum differences are but

2 cm. (less than 1 in.) in height and 1.7 kg. (about 3½ lb.) in weight. The age period immediately prior to the adolescent growth spurt[f] has been shown to be the time when children grow the most slowly and when size differences between the sexes are but very slight.[5,8] Data from the HES are in accord with these findings for this age range.

Despite the lack of any great differences between the means of any particular age, different patterns can be observed in males and females between the curves of growth indicated by the lines connecting the cross-sectional means. The increase is, for either sex, essentially linear over this 6-11 age range, but the slope of the line is greater for girls than for boys. For the former the regression of height on age is 5.92 cm. per year (2.3 in. per year) and for the latter, 5.37 cm. per year (2.1 in. per year). The slopes for weight are 3.69 kg. per year (8.1 lb. per year) and 3.21 kg. per year (7.1 lb. per year) respectively. These findings indicate that the rates of increase in both height and weight are greater for females than for males 6-11 years of age.

This difference may also be seen if the female means are plotted on the percentile distributions for males as given in figure 3. At age 6 the female height mean is at the 42d percentile for males. This means that at this age 58 of every 100 boys are *taller* than an average girl. The female mean moves with increasing age steadily upward through the percentiles for the males until at age 11 it is at the 58th percentile. Thus at this age 58 of every 100 boys are *shorter* than a girl of average height.

The same pattern exists for the means for weight in females relative to the male percentile distribution. They move from the 43d to the 56th percentile.

All of the cross-sectional data, therefore, indicate that from 6-11 years of age girls are growing at a more rapid rate than are boys, though the attained-size curves of both sexes show the increase to be almost linear. In the early part of the range the boys are a little larger, but by the end they are a little smaller. It is difficult to explain this obvious difference in rate of growth. Many of the girls of the HES sample have already entered their adolescent spurt of growth near the end of the period, thereby accounting for their greater size at 10½ years and especially at 11½ years.[g] On the other hand, these differences at 10½ and 11½ are but part of a trend observable at 6, 7, 8, and 9 years. Even though the earlier maturity of the girls explains part of the differences, it certainly cannot explain most of it from 6 to 12 years. The HES data on heights (fig. 1) suggests a slight upward inflection of the girls' curve in the vicinity of 10½ years. However, with the different individual girls entering the growth spurt over a 5-year range, a sharp point of inflection would become badly obscured.

The variability within each age and sex group increases with age as indicated by the standard deviations. Though the differences are not statistically significant, girls display greater variation around their mean at every age than do boys. (Note that since weight has a skewed distribution with a long tail to the right, its standard deviation is not necessarily an accurate indicator of the actual variability in either this particular sample or the general population). The coefficients of variation are larger among females than males at every age, indicating that this increased variability of females is not just a function of greater means.

Race Differences

Differences between the age-specific means of Negro children and white children of the Health Examination Survey are small. At 6, 7, and 8 years of age Negro boys are, on the aver-

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[f] As will be pointed out later, the girls as a group have already entered the circumpuberal growth period.

[g] Analysis of the individual growth curves on 80 girls from the Denver Child Research Council[17] gives a mean onset of the adolescent growth spurt at 9.57 years with a first inflection at 10.96 years and maximum increment of growth at 11.84 years with a range of 6 years. Therefore most girls are well into the adolescent spurt by 11.99 years, but very few boys have even entered it.

None of the population data yields any good clues as to the reason for the faster growth rate in girls from 6-10 years, however.

age, one-half to three-quarters of an inch taller than their white age peers; at 9 and 10 they are about a quarter of an inch shorter, and at 11 they are essentially the same height. Small differences such as these could easily arise through sampling error, and there seems to be no justification for saying that there is any difference in stature between Negro and white boys 6 through 11 years of age in the United States.

Negro girls are, however, taller than their white age peers except for the 8-year group, where the mean heights are the same. This difference ranges from 0.8 cm. (0.3 in.) to 2.4 cm. (0.9 in.) and is statistically significant ($P < .05$) at 9 and 11 years.

The data from this national survey of Negro and white children parallel the findings of others; for example, in Philadelphia Malina[18] also found no difference in height between males but greater means for stature among Negro females aged 6-11 years. The data of the HES survey as well as that of Malina indicate that this difference increases with advancing age from 6 through 11. The underlying reasons for this difference are not clear but may represent a more rapid rate of maturation among Negro females than among their white peers; thus, for example, a 9-year-old Negro girl is taller than a white girl of the same age because the former is biologically more precocious. Evidence for this comes from the assessment of skeletal maturity scores by Malina: he found little difference between the males but an advanced bone maturity score between females of the two racial groups.[18] In addition as early as 1931, Todd[19] noted greater skeletal age discordance between Negro and white females than Negro and white males but did not draw any definite conclusions. Future reports of the Health Examination Survey will consider the question of rates of maturation and will shed further light on this difference.

Although the differences in stature between Negro and white girls are statistically very real, they are nonetheless quite small and of very little consequence from a comparative or evaluative standpoint. Thus we may assess the stature of an individual Negro female, or of a white female as well, using the combined percentiles from the entire study without fear of making any major error in our assessment.

Our data indicate that Negro boys weigh less than their white peers at every age from 6 through 11 years, the differences being considerably greater at 9, 10, and 11 years; for these three ages, the means differed from 1.5 to 2.0 kg. (3.3 to 4.4 lb.). Thus, though the same in height, Negro boys weigh significantly less than their white counterparts. Despite their greater heights, Negro girls weigh slightly less as a rule than white girls of the same age until age 11, when they weigh slightly more. These differences are not nearly so great as those between the boys of the two groups.

Thus there is greater weight for height among white children of either sex when compared with Negro children of the same age. Negro boys are as tall as white boys but weigh less; Negro girls are taller but weigh the same as white girls. HES skinfold values, when considered along with other measurements dealing with the components of body mass, will help clarify these patterns.

Geographical Differences

As with race, small though consistent differences among the means of height and weight may be observed when the children are grouped by four geographical regions—Northeast, Midwest, South, and West. The greatest differences between extreme values occurred for height among 9-year-old boys: 3.2 cm. (1.3 in.). For weight, a difference of 2.6 kg. (5.7 lb.) among 9-year-old girls was the greatest.

Although for either height or weight the ranking of the four regions varies, some patterns appear. Males and females of the Northeast and Midwest are almost always the largest; children of the South and West are the smallest of the sample.

The HES data are unable to explain these regional differences from among the many genetic, cultural, economic, educational, and environmental possibilities.

Making sharp regional comparisons is not one of the strengths of the Health Examination Survey design for two reasons: (1) The four sampling quadrants of the country are listed in the appendix. These divisions were not prima-

rily based on biologic environmental rationale; they represented slight modifications of the existing Bureau of the Census divisions which were necessary for our multiple stage sampling. These divisions were used by HES more for their sampling conveniences than for their epidemiologic convenience. (2) The second reason is logistic. As depicted on a map by McDowell[3] HES went south in the winter and north in the summer (not simply for the delectation of the staff, but because one good winter snowstorm would have played havoc with the very elaborate advance scheduling). With the possibility of a real seasonal variation in rate of growth[12–15] (see p. 10) which would be reflected in the heights and weights, the regional comparisons cannot be considered quite unbiased. To have standardized for season would have been extremely costly in time and money.

More detailed analyses are in progress which will examine the differences in the sample between the urban and rural children and among the children of various socioeconomic classes.

Comparisons With Other Studies

The Health Examination Survey of children 6 through 11 years old was a national survey carried out on a statistically representative sample. Although there are numerous other studies in the literature, no others are truly national in scope,[h] and all these others represent samples limited geographically, socioeconomically, and ethnically.[i] Despite this, it is useful to select from among the many good reports on the heights and weights of American children some of the better known to compare with these United States estimates from the Health Examination Survey.

With respect to data reported by Stoudt, Damon, and McFarland,[20] Reed and Stuart,[21] Stuart and Meredith,[22] Boyd,[23] and Simmons,[24] it can be seen that with but one exception the averages of children from the HES are greatest. Where the occasional mean of another study is greater than the comparable HES group, it will not be more than half of a centimeter or half of a kilogram greater.

On the other hand, HES means are often markedly greater than those of any other single study. For example, the mean weights for girls from the HES are from 2½ to 5½ pounds greater than those reported by Stoudt,[20] who selected data from published studies on some 6,000 children which were supposedly representative of the United States. Average weights of boys from the HES are up to 2 lb. greater than those of Stoudt's survey. This is noteworthy since the heights of the HES children are almost identical to those of Stoudt's report.

The only exception to the greater value for HES children is to be found in the data from the Brush Foundation Study.[24] The means of these Cleveland children, though representing children born some 30 years earlier, are almost the same as the means of the HES. The Brush sample was drawn from an upper middle to upper socioeconomic level where the parents were professional people and the children were cared for by a pediatrician, quite unusual in the 1930's. In addition error may be introduced by comparing a national sample to a more localized one. Therefore if we compare the Brush Foundation means to those of HES children only from the Midwest, we find that, indeed, the HES children are larger and weigh more. These differences are not very great numerically, but they are consistent. Such a comparison seems to go a long way toward explaining this apparent paradox with respect to the Cleveland children of the 1930's.

Secular Changes

Secular change, i.e., the increase in body size of a particular population through time, has been demonstrated for a number of groups throughout the world and has been well documented by Tanner[8] and further discussed by Bakwin[26] and Tanner.[27] Utilizing this HES data as the most current, by comparing them to averages of children measured during the past 90 years, some insight may be gained into the amount and rate of secular change among American children. Meredith[25] has summarized body size

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[h] Except for McDowell and others, Height and Weight of Children in the United States, India, and the United Arab Republic. To be published in PHS Pub. No. 1000, Series 3.

[i] Most of the better known studies of the past were restricted to white children of middle and upper middle class (frequently professional groups) of North European ancestry.

increase in boys from the latter quarter of the 19th century through 1960; this data from the Health Examination Survey may be added to that of Meredith. When this is done, it is found that for 10-year old boys, the regression of stature on year of measurement is 0.13 cm. per year, with a straight line fitting the data quite well. This indicates that between 1875 and 1965, 10-year-old boys were about ½ in. taller per decade.

The data for 6-year-olds are not as clear, since they cannot be adequately represented by a straight line without a transformation involving the logarithm of stature. However, the increase in stature from the earliest data cited by Meredith to those of the HES is about 10 cm., very close to the 11 cm. recorded for 10-year-old boys. Thus a marked secular trend in the stature of children of all these ages can be seen for the United States. However, Tanner[26] has cautioned the overly hasty interpretation of such results without considering the equivalent maturation rate. Wherever studied, secular change has involved not only increased height but also increased rate of maturation and, hence, a shorter growth period. Thus a boy who was 10 years old in 1875 might have been only about 50 percent of the way through his growth period, while a 10-year-old boy of the mid-1960's might be 60 to 65 percent mature. Comparisons among children based strictly on chronological age will be confounded by the fact that chronological age equivalence will not mean equivalent growth stages. [Of course, the older studies had no accurate index of maturational age such as skeletal age, so comparisons with them cannot be properly standardized for maturation. However, by looking at an extrapolated eventual outcome (i.e., adult trends using other cohorts)[28] the adults are also increasingly larger, so an earlier rate of maturation could not account for all of this obvious increase.]

Regardless of the biological meaning of comparisons of children born in different years when they are at the same chronological age, such comparisons reveal the marked body size increase which has occurred. For the age range 6-11, this increase has been on the order of 10 percent in height and 15 to 30 percent in weight over the past 90 years.

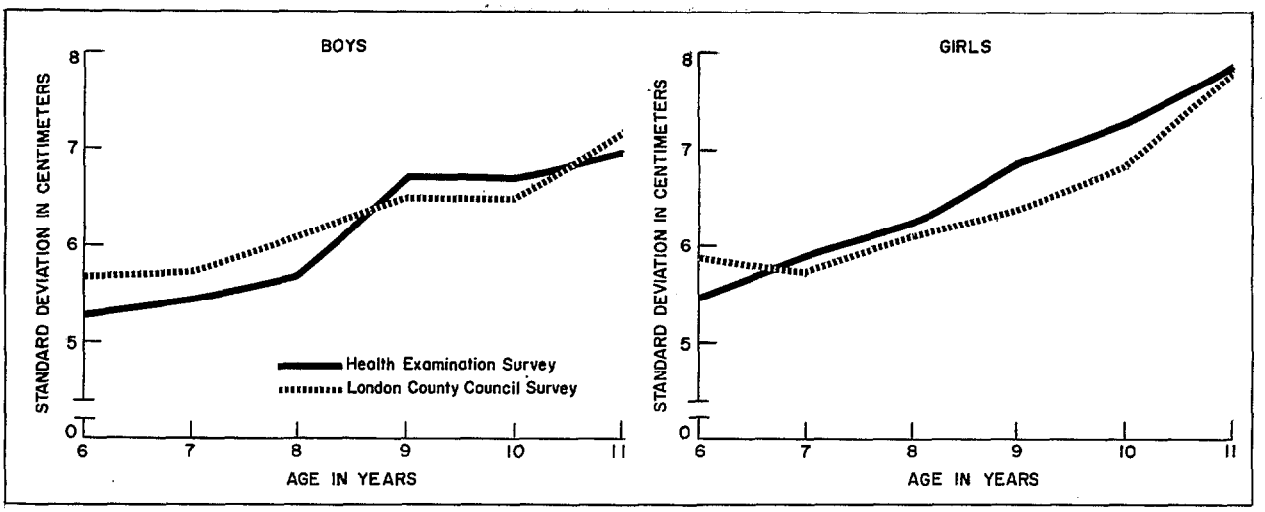

Figure 12. Standard deviations for height of children, 6-11 years of age, for the Health Examination Survey and the London County Council Survey.

Comparison With Children From Other Countries

Attempts to compare the data from the HES with those from studies on children of other countries are subject to even greater problems of control, but some information may be gained by comparing HES results with those of the 1959 survey by the London County Council (LCC) of schoolchildren from that city (Scott).[29] This sample of British children consisted of 25,568 children between 5 and 16 years of age. A comparison of the LCC means to those for the HES reveals slightly greater values for children from the United States. The differences range from about 1 to 2 cm. (½ to 1 in.) in height and up to 2 kg. (4 lb.) in weight. The children in the American sample are slightly larger at all ages than their British age peers.

The standard deviations for height of these two studies as seen in figure 12 showed little difference if any and certainly no consistent pattern. The deviations in height at the same percentiles between the two samples were about the same as those for differences in the means. The lowest calculated percentile common to the two studies was the 10th. The height of 10th percentile British children was about 1 centimeter less than of the 10th percentile American children from the HES except in the case of 11 year-old girls. For this age group the difference between the 10th percentile values was 2.5 cm. (1 in.), which may be due to increased growth in the HES girls but may also reflect the onset of their adolescent spurt as well.

If we examine the 10th percentile values for weight, as seen in figure 13, we note that among boys they follow each other quite well. The lower limit for weight seems about the same in British and American boys. For girls the 10th percentile values for the LCC children are also nearly identical with those of the HES sample.

The upper limits of weight, however, do not correspond in the two samples of children for either sex. The 90th percentile values for boys or girls in the HES are increasingly greater from 6 through 11 years than for those children from the LCC survey. By age 11 this difference is almost 3 kg. (about 6½ lb.) in boys and some 3½ kg. (over 7½ lb.) in girls. Thus while the measures of central tendency coincide quite well, the upper limits of body weight are not the same, greater values occurring in the U.S. sample.

However, the high degree of overall correspondence of the data from Scott[29] and the HES

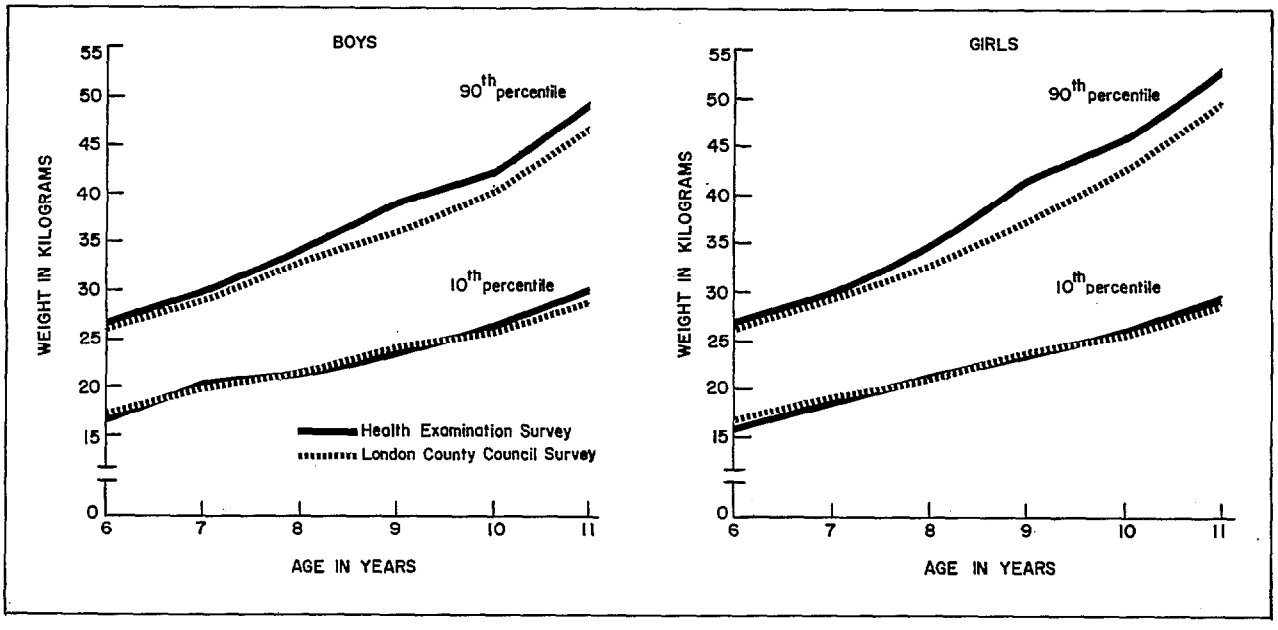

Figure 13. Percentiles for weight of children, 6-11 years of age, for the Health Examination Survey and the London County Council Survey.

is quite remarkabe. Since presumably the children of London ought to be more homogeneous than those of the United States, greater variation was expected in the HES sample. However, since the LCC sample was measured by a greater number of individuals without as careful quality control, an inflated variance may be seen in these data due to measuring error. It may also be that London children are just not as homogeneous as presumed.

In a recent summary of world's literature on height and weight of children, Meredith[30] has brought together available data on the body size of 8-year-old children from all over the world measured in the 1950's. His report summarizes over 300 samples. The data are quite heterogeneous with respect to measurement technique, genetic background, and environmental quality, but they are homogeneous with respect to the ages at which the measurements were made. Meredith has interpolated all reported means to 8.0 years. Since the HES means are centered on the half-year (i.e., 8.5 years), we have likewise interpolated to 8.0 to permit comparisons to be made.

The 8-year-olds of the Health Examination Survey are at the upper extreme of the range of mean heights and weights compiled by Meredith. He found a range among North American children of 118.8 to 128.7 cm. for height, males and females grouped together. The interpolated male female height for HES children is 126.9 cm.

The same is true for weight. Meredith found a range of 17.3 to 27.7 kg., while the HES interpolated value is 26.04 kg.

This is even more outstanding when we consider that the HES data are national averages, representing the whole range of socioeconomic classes. The samples considered by Meredith are far more restricted in scope and are almost universally drawn from a much more limited stratum. Such samples might very well be expected to yield means of a greater value than found among the HES because of their generally more restricted and favorable socioenvironmental surroundings.

The Negro component of the HES has an interpolated mean of 127.7 cm. for height and 25.5 kg. for weight. These national values are again at the upper range of all the means summarized by Meredith.

Thus at 8 years of age U.S. children of either Negro or white racial backgrounds are, when viewed comprehensively, taller than any other children in the world. Where the HES means are less, the samples with which they are being compared are more restricted in nature.

These differences are in part due to the genetic potential of the two racial groups. Children of both European and African ancestry are among the tallest in the world at 8.0 years whereas Asian and American Indian children and Pacific Islanders are the smallest. Environmental differences must also play a considerable role. American Negroes, as indicated by data from the HES, are taller than the tallest African sample reported by Meredith. Likewise American white children are at the very top of the range of the European white means.

Caution should be used in that this comparison, while valid from an arithmetic point of view, may reflect differences in maturation levels of the groups being sampled. Thus U.S. children may be taller at 8.0 years because they are more mature than their African or European chronological age peers. Only more detailed studies encompassing greater age ranges can provide the answers to this problem. The existing HES data will yield additional information on further analysis, but it cannot supply all of the definitive answers.

When applying these data to the individual child, one must use skill and additional specific knowledge about the child and his total setting. The size of parents and grandparents,[5,8,31] region of country, socioeconomic strata, ethnic and racial differences (including the difficult assessment[32,33] of food intake patterns from birth onwards, which will vary by cultural habits and tastes, knowledge of nutrition, economics and availability of various foods), genetic differences, amount and type of exercise, disease, and environmental influences must all be used to make the proper adjustments.

It has been pointed out in the discussion that the regional and racial differences are very real, though the causes are not immediately evident, but that the magnitude of these differences is so small as not to warrant separate gross standards. However, these differences can still give good clues for the necessary interpretive adjustments for clinical use for the individual. They also serve

as a reference point and yardstick, both for direction and probably for a sense of magnitude when these HES data are used as a benchmark for making international comparisons (this sense of magnitude of variation will be gone into in much more detail in future reports containing finer analyses of urban-rural and socioeconomic differences). When the confounding of these variables (socioeconomic, urban-rural, possibly genetic, or racial) has been further clarified, both by our own more detailed analyses and other additional studies, it will most likely be the understanding of these confounding variables which will have the greatest utility for international comparisons and not the use of the absolute numbers from the HES data as some kind of international standard of excellence by which the children of all other countries presumptively should be compared.

In conclusion, these data on heights and weights of children obtained in Cycle II of the Health Examination Survey from 1962-65 are submitted as the best existing data for use as standards for children in the United States from age 6.0 through 11.99 years in the 1960's for attained heights and weights at a specified age. In addition, as long as the user remains aware of the cautions discussed, because of the great sampling strengths and the careful measuring techniques on such a large sample, these heights and weights can also serve as incremental estimates for this relatively orderly and biologically stable age group.

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DETAILED TABLES

DETAILED TABLES—Con.

Table 1. Distribution of height by group and percentiles, mean age, standard deviation, and standard error of mean of children, 6-11 years of age, by sex and age: United States, 1963-65

Selected variables	Boys						Girls					
	6 years	7 years	8 years	9 years	10 years	11 years	6 years	7 years	8 years	9 years	10 years	11 years
Height group	Estimated number of children in population in thousands											
All groups	2,082	2,074	2,026	2,012	1,963	1,924	2,016	2,010	1,960	1,945	1,904	1,868
Under 105.0 cm	-	-	-	7	-	-	14	-	10	4	-	3
105.0-109.9 cm	87	3	4	-	3	4	161	17	-	-	5	3
110.0-114.9 cm	417	74	14	2	5	-	389	127	12	3	5	3
115.0-119.9 cm	749	326	76	8	-	2	775	379	106	25	3	-
120.0-124.9 cm	586	715	230	92	14	-	475	688	292	81	13	4
125.0-129.9 cm	200	605	684	267	108	18	173	546	602	297	85	14
130.0-134.9 cm	40	265	645	529	289	81	25	199	591	508	267	57
135.0-139.9 cm	4	76	306	586	483	257	4	38	273	534	464	164
140.0-144.9 cm	-	8	58	409	600	486	-	12	63	303	515	416
145.0-149.9 cm	-	-	6	82	333	560	-	5	12	143	347	555
150.0-154.9 cm	-	-	3	21	103	357	-	-	-	47	148	324
155.0-159.9 cm	-	-	-	10	25	139	-	-	-	-	44	240
160.0-164.9 cm	-	-	-	-	-	16	-	-	-	-	8	63
165.0 cm and over	-	-	-	-	-	5	-	-	-	-	-	20
Percentile	Height in centimeters											
5th	110.2	115.4	120.2	124.5	128.5	134.5	107.7	113.3	118.6	124.0	129.1	135.3
10th	111.4	117.0	122.4	126.7	131.2	136.7	110.4	115.7	121.2	126.4	131.5	138.1
25th	116.2	120.9	126.3	131.2	135.7	141.2	114.2	119.7	125.6	130.8	136.1	142.6
50th	118.6	124.4	130.0	135.9	140.7	146.0	117.9	123.5	129.7	135.5	141.1	147.4
75th	122.6	128.6	134.0	140.2	144.8	150.5	121.8	127.7	133.8	140.1	146.0	152.8
90th	125.9	132.7	137.8	143.9	149.0	154.6	125.1	131.3	137.8	144.9	150.4	157.9
95th	128.5	134.7	139.4	145.8	151.5	157.3	128.0	133.9	139.6	148.3	153.6	159.8
Mean age at time of examination (in years)	6.50	7.50	8.51	9.50	10.49	11.52	6.53	7.50	8.49	9.48	10.48	11.54
Mean height in cm	118.6	124.5	130.0	135.5	140.2	145.7	117.8	123.5	129.4	135.5	140.9	147.6
Standard deviation in cm	5.27	5.42	5.67	6.71	6.79	6.98	5.47	5.91	6.22	6.89	7.27	7.83
Standard error of mean	0.24	0.36	0.26	0.44	0.37	0.27	0.27	0.18	0.33	0.31	0.31	0.24

Table 2. Mean heights, standard deviations for mean heights, selected percentiles, and coefficient of variation for height of children, 6-11 years of age, by sex and age: United States, 1963-65

Sex and age	Mean height in inches	Standard deviation in inches	Percentiles							Coefficient of variation
			5th	10th	25th	50th	75th	90th	95th	
			Height in inches							
Boys										
6 years	46.7	2.07	43.4	43.9	45.7	46.7	48.3	49.6	50.6	.0444
7 years	49.0	2.13	45.4	46.1	47.6	49.0	50.6	52.2	53.0	.0435
8 years	51.2	2.23	47.3	48.2	49.7	51.2	52.8	54.3	54.9	.0436
9 years	53.3	2.64	49.0	49.9	51.7	53.5	55.2	56.7	57.4	.0495
10 years	55.2	2.67	50.6	51.7	53.4	55.4	57.0	58.7	59.6	.0484
11 years	57.4	2.75	53.0	53.8	55.6	57.5	59.3	60.9	61.9	.0479
Girls										
6 years	46.4	2.15	42.4	43.5	45.0	46.4	48.0	49.3	50.4	.0464
7 years	48.6	2.33	44.6	45.6	47.1	48.6	50.3	51.7	52.7	.0478
8 years	50.9	2.45	46.7	47.7	49.4	51.1	52.7	54.3	55.0	.0481
9 years	53.3	2.71	48.8	49.8	51.5	53.3	55.2	57.0	58.4	.0508
10 years	55.5	2.86	50.8	51.8	53.6	55.6	57.5	59.2	60.5	.0516
11 years	58.1	3.08	53.3	54.4	56.1	58.0	60.2	62.2	69.2	.0530

Table 3. Distribution of weight by group and percentiles, mean age, standard deviation, and standard error of mean of children, 6-11 years of age, by sex and age: United States, 1963-65

Selected variables	Boys						Girls					
	6 years	7 years	8 years	9 years	10 years	11 years	6 years	7 years	8 years	9 years	10 years	11 years
Weight group	Estimated number of children in population in thousands											
All groups	2,082	2,074	2,026	2,012	1,963	1,924	2,016	2,010	1,960	1,945	1,904	1,868
Under 15.0 kg	-	-	-	-	-	-	16	-	-	-	-	-
15.0-19.9 kg	563	159	44	8	-	-	722	275	70	16	3	-
20.0-24.9 kg	1,220	1,080	578	251	65	14	1,014	1,026	627	264	101	18
25.0-29.9 kg	258	662	928	797	518	175	194	528	773	717	459	180
30.0-34.9 kg	29	136	336	569	688	555	52	136	313	503	444	442
35.0-39.9 kg	6	23	91	220	422	585	18	33	104	213	427	457
40.0-44.9 kg	3	2	24	80	170	246	-	9	55	109	214	306
45.0-49.9 kg	3	12	18	43	43	185	-	3	15	102	113	202
50.0-54.9 kg	-	-	8	7	27	98	-	-	2	14	59	123
55.0-59.9 kg	-	-	-	21	15	29	-	-	-	3	13	73
60.0-64.9 kg	-	-	-	9	7	15	-	-	-	3	9	41
65.0-69.9 kg	-	-	-	6	3	14	-	-	-	-	-	16
70.0 kg. and over	-	-	-	-	3	8	-	-	-	-	12	9
Percentile	Weight in kilograms											
5th	15.9	18.3	20.5	21.8	25.3	27.4	15.6	16.8	20.2	21.5	24.6	27.1
10th	16.8	20.2	21.4	23.8	26.3	30.0	16.3	18.7	21.0	23.4	25.9	29.7
25th	19.6	21.7	24.0	26.5	29.1	32.6	18.4	21.1	23.3	26.4	29.1	33.0
50th	22.0	24.7	27.1	29.7	32.9	36.9	21.3	23.6	26.8	29.8	33.9	38.2
75th	24.1	27.4	29.8	34.0	37.4	42.3	23.8	27.0	30.0	34.6	39.3	45.0
90th	26.8	29.7	34.1	39.2	42.1	49.3	26.6	29.8	34.7	41.7	45.7	53.1
95th	28.8	32.6	37.1	44.2	45.1	53.5	29.2	33.0	38.8	46.3	49.9	58.2
Mean age at time of examination (in years)	6.50	7.50	8.51	9.50	10.49	11.52	6.53	7.50	8.49	9.48	10.48	11.54
Mean weight in kg	22.0	24.7	27.8	31.2	33.7	38.4	21.6	24.2	27.6	31.4	35.2	40.0
Standard deviation in kg	3.48	4.06	4.85	6.82	6.63	8.42	3.73	4.21	5.48	6.84	8.15	9.28
Standard error of mean	0.15	0.18	0.22	0.43	0.30	0.36	0.23	0.21	0.23	0.37	0.41	0.40

Table 4. Mean weights, standard deviations for mean weights, selected percentiles, and coefficient of variation for weight of children, 6-11 years of age, by sex and age: United States, 1963-65

Sex and age	Mean weight in pounds	Standard deviation in pounds	Percentiles							Coefficient of variation
			5th	10th	25th	50th	75th	90th	95th	
			Weight in pounds							
Boys										
6 years	48.4	7.65	35.0	37.0	43.1	48.4	53.0	59.0	63.4	.158
7 years	54.3	8.94	40.3	44.4	47.7	53.0	60.3	65.3	71.7	.165
8 years	61.1	10.68	45.1	47.1	52.8	59.6	65.6	75.0	81.6	.175
9 years	68.6	15.00	48.0	52.4	58.3	65.3	74.8	86.2	97.2	.219
10 years	74.2	14.58	55.7	57.9	64.0	72.4	82.3	92.6	99.2	.196
11 years	84.4	18.51	60.3	66.0	71.7	81.2	93.1	108.5	117.7	.219
Girls										
6 years	47.4	8.20	34.3	35.9	40.5	46.9	52.4	58.5	64.2	.173
7 years	53.2	9.26	37.0	41.1	46.4	51.9	59.4	65.6	72.6	.174
8 years	60.6	12.06	44.4	46.2	51.3	59.0	66.0	76.3	85.4	.199
9 years	69.1	15.04	47.3	51.5	58.1	65.6	76.1	91.7	101.9	.218
10 years	77.4	17.93	54.1	57.0	64.0	74.6	86.5	100.5	109.8	.232
11 years	88.0	20.42	59.6	65.3	72.6	84.0	99.0	116.8	128.0	.232

Table 5. Percent distributions of children, 6-11 years of age, by height groups, according to sex and age: United States, 1963-65

Height group	Boys						Girls					
	6 years	7 years	8 years	9 years	10 years	11 years	6 years	7 years	8 years	9 years	10 years	11 years
	Percent distribution											
All groups----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 105.0 cm----	-	-	-	0.4	-	-	0.7	-	0.5	0.2	-	0.2
105.0-109.9 cm----	4.2	0.2	0.2	-	0.2	0.2	8.0	0.9	-	-	0.2	0.2
110.0-114.9 cm----	20.0	3.6	0.7	0.1	0.2	-	19.3	6.3	0.6	0.1	0.2	0.2
115.0-119.9 cm----	36.0	15.7	3.7	0.4	-	0.1	38.4	18.8	5.4	1.3	0.2	-
120.0-124.9 cm----	28.2	34.5	11.4	4.6	0.7	-	23.6	34.2	14.9	4.2	0.7	0.2
125.0-129.9 cm----	9.6	29.2	33.8	13.2	5.5	0.9	8.6	27.2	30.7	15.2	4.5	0.8
130.0-134.9 cm----	1.9	12.8	31.8	26.3	14.7	4.2	1.3	9.9	30.1	26.1	14.0	3.1
135.0-139.9 cm----	0.2	3.7	15.1	29.1	24.6	13.4	0.2	1.9	13.9	27.5	24.4	8.8
140.0-144.9 cm----	-	0.4	2.9	20.3	30.6	25.2	-	0.6	3.2	15.6	27.0	22.3
145.0-149.9 cm----	-	-	0.3	4.1	17.0	29.1	-	0.2	0.6	7.4	18.2	29.7
150.0-154.9 cm----	-	-	0.1	1.0	5.2	18.5	-	-	-	2.4	7.8	17.4
155.0-159.9 cm----	-	-	-	0.5	1.3	7.2	-	-	-	-	2.3	12.9
160.0-164.9 cm----	-	-	-	-	-	0.8	-	-	-	-	0.4	3.4
165.0 cm. and over	-	-	-	-	-	0.3	-	-	-	-	-	1.0

Table 6. Percent distributions of children, 6-11 years of age, by weight groups, according to sex and age: United States, 1963-65

Weight group	Boys						Girls					
	6 years	7 years	8 years	9 years	10 years	11 years	6 years	7 years	8 years	9 years	10 years	11 years
	Percent distribution											
All groups----	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 15.0 kg-----	-	-	-	-	-	-	0.8	-	-	-	-	-
15.0-19.9 kg------	27.0	7.7	2.2	0.4	-	-	35.8	13.6	3.6	0.8	0.2	-
20.0-24.9 kg------	58.6	52.0	28.5	12.5	3.3	0.7	50.3	51.0	32.0	13.6	5.3	0.9
25.0-29.9 kg------	12.4	31.9	45.8	39.6	26.4	9.1	9.6	26.3	39.4	36.9	24.1	9.6
30.0-34.9 kg------	1.4	6.5	16.6	28.3	35.1	28.8	2.6	6.8	16.0	25.9	25.9	23.7
35.0-39.9 kg------	0.3	1.1	4.5	10.9	21.5	30.4	0.9	1.6	5.3	10.9	22.4	24.5
40.0-44.9 kg------	0.1	0.1	1.2	4.0	8.7	12.8	-	0.4	2.8	5.6	11.2	16.4
45.0-49.9 kg------	0.2	0.6	0.9	2.2	2.2	9.6	-	0.1	0.8	5.2	5.9	10.8
50.0-54.9 kg------	-	-	0.4	0.4	1.4	5.1	-	-	0.1	0.7	3.1	6.6
55.0-59.9 kg------	-	-	-	1.0	0.8	1.5	-	-	-	0.2	0.7	3.9
60.0-64.9 kg------	-	-	-	0.4	0.4	0.8	-	-	-	0.2	0.5	2.2
65.0-69.9 kg------	-	-	-	0.3	0.2	0.7	-	-	-	-	-	0.8
70.0 kg. and over-	-	-	-	-	0.1	0.4	-	-	-	-	0.6	0.5

Table 7. Mean heights and standard errors for mean heights of children, 6-11 years of age, by geographic region, sex, and age: United States, 1963-65

Sex and age	Geographic region														
	Total	Northeast	Midwest	South	West	Total	Northeast	Midwest	South	West	Total	Northeast	Midwest	South	West
	Mean height in centimeters					Mean height in inches					Standard error in centimeters				
Boys															
6 years	118.6	119.2	119.1	117.8	118.5	46.7	46.9	46.9	46.4	46.7	0.24	0.39	0.32	0.30	0.85
7 years	124.5	124.5	125.8	124.2	123.6	49.0	49.0	49.5	48.9	48.7	0.36	0.47	0.58	0.52	1.02
8 years	130.0	130.5	130.3	129.3	129.9	51.2	51.4	51.3	50.9	51.1	0.26	0.25	0.65	0.49	0.60
9 years	135.5	135.9	137.2	134.5	134.0	53.3	53.5	54.0	53.0	52.8	0.44	0.63	0.69	0.39	1.78
10 years	140.2	140.2	141.0	139.9	139.4	55.2	55.2	55.5	55.1	54.9	0.37	0.51	0.38	0.84	1.00
11 years	145.7	146.3	146.2	144.5	145.8	57.4	57.6	57.2	56.9	57.4	0.27	0.62	0.46	0.24	1.01
Girls															
6 years	117.8	119.0	118.9	116.9	116.6	46.4	46.9	46.8	46.0	45.9	0.27	0.35	0.51	0.34	0.56
7 years	123.5	124.4	123.9	123.0	122.7	48.6	49.0	48.8	48.4	48.3	0.18	0.27	0.16	0.45	0.70
8 years	129.4	129.2	130.3	129.5	128.5	50.9	50.9	51.3	51.0	50.6	0.33	0.41	0.40	0.58	1.11
9 years	135.5	136.7	135.9	134.6	134.7	53.3	53.8	53.5	53.0	53.0	0.31	0.69	0.65	0.74	0.90
10 years	140.9	140.6	141.9	140.2	140.9	55.5	55.4	55.9	55.2	55.5	0.31	0.77	0.61	0.64	0.85
11 years	147.6	147.0	147.8	147.5	147.9	58.1	57.9	58.2	58.1	58.2	0.24	0.54	0.46	0.63	0.61

Table 8. Mean weights and standard errors for mean weights of children, 6-11 years of age, by geographic region, sex, and age: United States, 1963-65

Sex and age	Geographic region														
	Total	Northeast	Midwest	South	West	Total	Northeast	Midwest	South	West	Total	Northeast	Midwest	South	West
	Mean weight in kilograms					Mean weight in pounds					Standard error in kilograms				
Boys															
6 years	22.0	22.0	22.4	21.4	22.3	48.4	48.4	44.3	47.1	49.1	0.15	0.33	0.15	0.23	0.49
7 years	24.7	24.5	25.6	24.2	24.3	54.3	53.9	56.3	53.2	53.5	0.18	0.23	0.48	0.24	0.50
8 years	27.8	28.3	27.8	27.2	27.8	61.1	62.3	61.2	59.8	61.2	0.22	0.43	0.43	0.25	0.41
9 years	31.2	31.9	31.9	30.1	30.8	68.6	70.2	70.2	66.2	67.8	0.43	0.64	0.63	0.59	0.39
10 years	33.7	33.9	34.1	33.5	33.4	74.2	74.6	75.0	73.7	73.5	0.30	0.28	0.37	0.55	0.40
11 years	38.3	38.8	38.7	37.3	38.5	84.4	85.4	85.1	82.1	84.7	0.36	0.21	0.55	0.39	0.69
Girls															
6 years	21.5	21.8	22.8	20.7	20.8	47.4	48.0	50.2	45.5	45.8	0.23	0.30	0.31	0.30	0.51
7 years	24.2	24.6	24.6	23.8	23.4	53.2	54.1	54.1	52.4	51.5	0.21	0.40	0.24	0.63	0.28
8 years	27.5	27.0	28.5	27.0	27.5	60.6	59.4	62.7	59.4	60.5	0.23	0.33	0.44	0.53	0.54
9 years	31.4	32.7	31.8	30.1	31.1	69.1	71.9	70.0	66.2	68.4	0.37	0.47	0.59	0.45	0.09
10 years	35.2	35.3	36.6	34.8	34.0	77.4	77.7	80.5	76.6	74.8	0.41	0.32	0.10	0.19	0.54
11 years	40.0	40.6	40.1	39.7	39.6	88.0	89.3	88.2	87.3	87.1	0.40	0.29	0.50	0.37	0.25

Table 9. Number of children, 6-11 years of age, in sample from the Health Examination Survey, by geographic region, sex, and age: United States, 1963-65

Sex and age	Total	North-east	Mid-west	South	West
	Number of children				
Boys					
All ages, 6-11 years	3,632	893	961	850	928
6 years	575	148	138	144	145
7 years	632	154	163	147	168
8 years	618	148	164	145	161
9 years	603	154	157	146	146
10 years	576	139	174	121	142
11 years	628	150	165	147	166
Girls					
All ages, 6-11 years	3,487	1,782	1,896	1,707	1,734
6 years	536	142	134	123	137
7 years	609	160	179	144	121
8 years	613	178	151	136	148
9 years	581	146	158	146	131
10 years	584	127	163	148	146
11 years	564	136	150	155	123

Table 10. Mean heights and standard errors for mean heights of children, 6-11 years of age, by race, sex, and age: United States, 1963-65

Sex and age	Total	White	Negro	Total	White	Negro	Total	White	Negro
	Mean height in centimeters			Mean height in inches			Standard error in centimeters		
Boys									
6 years	118.6	118.5	119.1	46.7	46.7	46.9	0.24	0.30	0.72
7 years	124.5	124.5	125.2	49.0	49.0	49.3	0.36	0.38	0.59
8 years	130.0	129.8	131.3	51.2	51.1	51.7	0.26	0.29	0.57
9 years	135.5	135.5	135.0	53.3	53.3	53.1	0.44	0.50	0.67
10 years	140.2	140.3	139.6	55.2	55.2	55.0	0.37	0.37	0.97
11 years	145.7	145.7	145.7	57.4	57.4	57.4	0.27	0.30	0.50
Girls									
6 years	117.8	117.7	118.5	46.4	46.3	46.7	0.27	0.32	0.87
7 years	123.5	123.4	124.6	48.6	48.6	49.1	0.18	0.17	0.59
8 years	129.4	129.4	129.4	50.9	50.9	50.9	0.33	0.39	0.52
9 years	135.5	135.1	137.5	53.3	53.2	54.1	0.31	0.36	0.90
10 years	140.0	140.8	141.8	55.5	55.4	55.8	0.31	0.34	0.65
11 years	147.6	147.3	149.2	58.1	58.0	58.7	0.24	0.27	0.69

Table 11. Mean weights and standard errors for mean weights of children, 6-11 years of age, by race, sex, and age: United States, 1963-65

Sex and age	Total	White	Negro	Total	White	Negro	Total	White	Negro
	Mean weight in kilograms			Mean weight in pounds			Standard error in kilograms		
Boys									
6 years	22.0	22.0	21.8	48.4	48.4	48.0	0.15	0.17	0.37
7 years	24.7	24.8	24.0	54.3	54.6	52.8	0.18	0.21	0.32
8 years	27.8	27.8	27.5	61.1	61.2	60.5	0.22	0.25	0.42
9 years	31.2	31.4	29.4	68.6	69.1	64.7	0.43	0.47	0.29
10 years	33.7	33.9	32.4	74.2	74.6	71.3	0.30	0.30	0.10
11 years	38.3	38.6	36.8	84.4	84.9	81.0	0.36	0.40	0.50
Girls									
6 years	21.5	21.6	21.1	47.4	47.5	46.4	0.23	0.25	0.36
7 years	24.2	24.3	23.7	53.2	53.5	52.1	0.21	0.20	0.47
8 years	27.5	27.6	27.0	60.6	60.7	59.4	0.23	0.26	0.37
9 years	31.4	31.4	31.2	69.1	69.1	68.6	0.37	0.43	0.62
10 years	35.2	35.1	35.7	77.4	77.2	78.5	0.41	0.44	0.54
11 years	40.0	39.8	41.1	88.0	87.6	90.4	0.40	0.36	0.33

Table 12. Number of children,6-11 years of age, in sample from the Health Examination Survey, by race, sex, and age: United States, 1963-65

Sex and age	Total	White	Negro	Other races
	Number of children			
Boys				
All ages, 6-11 years	3,632	3,153	464	15
6 years	575	489	84	2
7 years	632	551	79	2
8 years	618	537	79	2
9 years	603	525	74	4
10 years	576	509	65	2
11 years	628	542	83	3
Girls				
All ages, 6-11 years	3,487	2,947	523	17
6 years	536	461	72	3
7 years	609	512	93	4
8 years	613	498	113	2
9 years	581	494	84	3
10 years	584	505	77	2
11 years	564	477	84	3

Table 13. Population, number of children in sample, mean weight, and percentiles by weight for boys, 6-11 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	7	2	---	---	---	---	---	---
105.0-109.9 centimeters	100	28	19.0	15.9	16.9	17.9	19.0	19.8
110.0-114.9 centimeters	512	145	19.5	17.1	18.1	19.3	20.6	21.6
115.0-119.9 centimeters	1,161	323	21.3	18.9	20.0	21.1	22.5	23.6
120.0-124.9 centimeters	1,638	488	23.5	20.7	21.9	23.2	24.7	26.4
125.0-129.9 centimeters	1,881	569	26.1	23.1	24.2	25.6	27.5	29.6
130.0-134.9 centimeters	1,848	555	28.8	25.0	26.4	28.2	30.0	33.0
135.0-139.9 centimeters	1,711	520	31.8	27.6	29.0	31.0	33.8	36.5
140.0-144.9 centimeters	1,561	473	35.2	30.3	31.9	34.0	37.1	41.8
145.0-149.9 centimeters	980	300	39.0	32.8	34.8	37.6	41.8	47.6
150.0-154.9 centimeters	482	163	42.6	36.0	37.7	41.0	45.9	51.4
155.0-159.9 centimeters	174	58	50.7	40.1	43.3	48.3	56.7	65.0
160.0 centimeters and over	20	8	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	7	2	---	---	---	---	---	---
41.3-43.3 inches	100	28	41.8	35.0	37.3	39.4	41.9	43.7
43.3-45.2 inches	512	145	42.8	37.6	39.9	42.4	45.3	47.6
45.3-47.2 inches	1,161	323	46.8	41.5	44.0	46.5	49.5	51.9
47.2-49.2 inches	1,638	488	51.7	45.5	48.3	51.1	54.3	58.0
49.2-51.1 inches	1,881	569	[redacted]5	50.8	53.2	56.4	60.6	65.2
51.2-53.1 inches	1,848	555	[redacted]3	55.0	58.2	62.1	66.0	72.6
53.2-55.1 inches	1,711	520	[redacted]9	60.7	63.8	68.2	74.3	80.4
55.1-57.1 inches	1,561	423	[redacted]5	66.7	70.3	74.8	81.6	92.0
57.1-59.0 inches	980	300	[redacted]9	72.1	76.5	82.3	91.9	104.5
59.1-61.0 inches	482	163	[redacted]7	79.1	82.9	90.2	100.9	113.0
61.0-63.0 inches	174	58	[redacted]6	88.2	95.2	106.3	124.8	142.9
63.0 inches and over	20	8	[redacted]--	---	---	---	---	---

Table 14. Population, number of children in sample, mean weight, and percentiles by weight for girls, 6-11 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	30	7	---	---	---	---	---	---
105.0-109.9 centimeters	185	49	17.4	15.3	15.9	16.8	18.0	19.5
110.0-114.9 centimeters	539	153	19.6	17.1	18.4	19.3	20.4	22.1
115.0-119.9 centimeters	1,288	359	21.1	18.7	19.6	20.8	22.4	24.1
120.0-124.9 centimeters	1,552	452	23.5	20.3	21.7	23.0	24.8	27.4
125.0-129.9 centimeters	1,717	518	26.1	22.2	23.8	25.6	28.1	30.8
130.0-134.9 centimeters	1,647	512	28.7	24.6	26.0	27.9	30.2	33.8
135.0-139.9 centimeters	1,477	450	32.3	27.3	28.9	31.3	35.0	39.4
140.0-144.9 centimeters	1,309	400	36.1	30.1	32.1	34.7	38.8	44.7
145.0-149.9 centimeters	1,062	314	39.5	32.0	34.9	38.5	43.1	48.3
150.0-154.9 centimeters	519	161	43.8	35.1	37.8	42.6	47.1	53.9
155.0-159.9 centimeters	284	83	49.4	40.2	43.4	49.3	54.9	60.0
160.0 centimeters and over	90	29	53.8	43.8	46.7	50.9	61.7	67.0
			Weight in pounds					
Under 41.3 inches	30	7	---	---	---	---	---	---
41.3-43.3 inches	185	49	38.3	33.8	34.9	36.9	39.7	42.9
43.3-45.2 inches	539	153	43.1	37.7	40.5	42.4	44.9	48.6
45.3-47.2 inches	1,288	359	46.4	41.1	43.0	45.9	49.4	53.1
47.2-49.2 inches	1,552	452	51.7	44.7	47.7	50.6	54.5	60.3
49.2-51.1 inches	1,717	518	57.3	48.9	52.3	56.2	61.9	67.7
51.2-53.1 inches	1,647	512	63.2	54.2	57.2	61.4	66.5	74.3
53.2-55.1 inches	1,477	450	71.1	60.0	63.6	68.8	77.0	86.6
55.1-57.1 inches	1,309	400	79.5	66.3	70.6	76.4	85.5	98.4
57.1-59.0 inches	1,062	314	86.9	70.4	76.9	84.8	94.9	106.2
59.1-61.0 inches	519	161	96.3	77.3	83.1	93.7	103.7	118.6
61.0-63.0 inches	284	83	108.6	88.6	95.4	108.5	120.7	131.9
63.0 inches and over	90	29	118.4	96.5	102.7	111.9	135.7	147.4

Table 15. Population, number of children in sample, mean weight, and percentiles by weight for boys, 6 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	86	24	17.6	15.8	16.8	17.7	18.7	19.5
110.0-114.9 centimeters	416	117	19.4	17.1	18.1	19.2	20.5	21.6
115.0-119.9 centimeters	748	198	21.2	18.9	20.0	21.2	22.5	23.6
120.0-124.9 centimeters	586	163	23.7	20.6	21.7	23.1	24.8	26.6
125.0-129.9 centimeters	199	60	25.8	22.9	24.0	25.4	27.1	29.5
130.0-134.9 centimeters	39	12	---	---	---	---	---	---
135.0-139.9 centimeters	3	1	---	---	---	---	---	---
140.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	86	24	38.7	34.7	37.0	38.9	41.2	42.9
43.3-45.2 inches	416	117	42.6	37.6	39.8	42.4	45.1	47.4
45.3-47.2 inches	748	198	46.8	41.5	44.1	46.6	49.5	51.9
47.2-49.2 inches	586	163	52.1	45.3	47.7	50.8	54.6	58.6
49.2-51.1 inches	199	60	56.7	50.4	52.8	55.8	59.6	65.0
51.2-53.1 inches	39	12	---	---	---	---	---	---
53.2-55.1 inches	3	1	---	---	---	---	---	---
55.1 inches and over	---	0	---	---	---	---	---	---

Table 16. Population, number of children in sample, mean weight, and percentiles by weight for boys, 7 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	3	1	---	---	---	---	---	---
110.0-114.9 centimeters	74	22	19.6	17.3	18.6	19.5	20.9	22.1
115.0-119.9 centimeters	326	100	21.3	18.9	20.0	21.1	22.5	23.8
120.0-124.9 centimeters	715	224	23.4	20.8	22.0	23.2	24.7	26.2
125.0-129.9 centimeters	605	186	26.1	22.9	24.2	25.7	27.5	29.6
130.0-134.9 centimeters	264	75	28.8	23.9	25.8	27.6	29.9	31.8
135.0-139.9 centimeters	76	22	30.2	26.5	28.5	29.9	32.3	33.1
140.0-144.9 centimeters	8	2	---	---	---	---	---	---
145.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	3	1	---	---	---	---	---	---
43.3-45.2 inches	74	22	43.1	38.0	40.8	42.9	45.8	48.6
45.3-47.2 inches	326	100	46.9	41.6	44.0	46.4	49.5	52.3
47.2-49.2 inches	715	224	51.4	45.7	48.5	51.2	54.3	57.6
49.2-51.1 inches	605	186	57.5	50.1	53.1	56.6	60.5	65.1
51.2-53.1 inches	264	75	63.4	52.6	56.7	60.8	65.9	70.0
53.2-55.1 inches	76	22	66.4	58.3	62.6	65.8	71.1	72.8
55.1-57.1 inches	8	2	---	---	---	---	---	---
57.2 inches and over	---	0	---	---	---	---	---	---

Table 17. Population, number of children in sample, mean weight, and percentiles by weight for boys, 8 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	3	1	---	---	---	---	---	---
110.0-114.9 centimeters	14	4	---	---	---	---	---	---
115.0-119.9 centimeters	75	22	21.0	18.8	19.6	20.8	22.2	23.0
120.0-124.9 centimeters	230	71	23.7	21.0	22.1	23.3	24.6	26.8
125.0-129.9 centimeters	684	209	26.0	23.4	24.2	25.6	27.5	29.4
130.0-134.9 centimeters	645	196	29.0	15.2	26.8	28.4	30.3	33.8
135.0-139.9 centimeters	305	94	32.6	27.9	29.1	31.8	34.3	37.4
140.0-144.9 centimeters	58	18	34.9	30.6	31.6	33.3	34.9	39.0
145.0-149.9 centimeters	5	2	---	---	---	---	---	---
150.0-154.9 centimeters	2	1	---	---	---	---	---	---
155.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	3	1	---	---	---	---	---	---
43.3-45.2 inches	14	4	---	---	---	---	---	---
45.3-47.2 inches	75	22	46.4	41.5	43.1	45.9	48.8	50.7
47.2-49.2 inches	230	71	52.1	46.2	48.6	51.2	53.9	58.9
49.2-51.1 inches	684	209	57.2	51.5	53.2	56.2	60.5	64.8
51.2-53.1 inches	645	196	63.9	55.4	59.0	62.4	66.6	74.5
53.2-55.1 inches	305	94	71.9	61.3	64.1	69.9	75.5	82.3
55.1-57.1 inches	58	18	76.8	67.4	69.4	73.2	76.7	85.7
57.1-59.0 inches	5	2	---	---	---	---	---	---
59.1-61.0 inches	2	1	---	---	---	---	---	---
61.0 inches and over	---	0	---	---	---	---	---	---

Table 18. Population, number of children in sample, mean weight, and percentiles by weight for boys, 9 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	7	2	---	---	---	---	---	---
105.0-109.9 centimeters	---	0	---	---	---	---	---	---
110.0-114.9 centimeters	2	1	---	---	---	---	---	---
115.0-119.9 centimeters	7	2	---	---	---	---	---	---
120.0-124.9 centimeters	91	26	23.2	20.6	22.1	23.4	24.7	25.9
125.0-129.9 centimeters	266	78	26.1	22.7	23.9	25.5	27.7	30.0
130.0-134.9 centimeters	529	163	28.4	25.0	26.3	28.0	29.7	32.3
135.0-139.9 centimeters	585	177	31.7	27.2	28.8	30.9	33.8	37.7
140.0-144.9 centimeters	408	121	36.3	30.0	31.9	34.4	37.7	43.3
145.0-149.9 centimeters	81	23	39.3	30.6	32.4	36.4	46.8	49.4
150.0-154.9 centimeters	20	7	48.3	---	---	---	---	---
155.0-159.9 centimeters	10	3	53.7	---	---	---	---	---
160.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	7	2	---	---	---	---	---	---
41.3-43.3 inches	---	0	---	---	---	---	---	---
43.3-45.2 inches	2	1	---	---	---	---	---	---
45.3-47.2 inches	7	2	---	---	---	---	---	---
47.2-49.2 inches	91	26	51.0	45.3	48.7	51.6	54.3	57.0
49.2-51.1 inches	266	78	57.5	49.9	52.7	56.2	60.9	66.0
51.2-53.1 inches	529	163	62.5	55.0	57.9	61.5	65.3	71.0
53.2-55.1 inches	585	177	69.7	59.9	63.4	67.9	74.4	82.9
55.1-57.1 inches	408	121	79.8	66.1	70.2	75.7	83.0	95.3
57.1-59.0 inches	81	23	86.5	67.3	71.2	80.0	103.0	108.8
59.1-61.0 inches	20	7	---	---	---	---	---	---
61.0-63.0 inches	10	3	---	---	---	---	---	---
63.0 inches and over	---	0	---	---	---	---	---	---

Table 19. Population, number of children in sample, mean weight, and percentiles by weight for boys, 10 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	3	1	---	---	---	---	---	---
110.0-114.9 centimeters	4	1	---	---	---	---	---	---
115.0-119.9 centimeters	---	0	---	---	---	---	---	---
120.0-124.9 centimeters	14	4	---	---	---	---	---	---
125.0-129.9 centimeters	107	30	26.7	23.7	25.1	26.1	27.7	30.7
130.0-134.9 centimeters	289	82	28.4	24.0	26.2	28.4	30.0	32.4
135.0-139.9 centimeters	482	143	31.4	27.7	29.0	30.8	33.5	35.7
140.0-144.9 centimeters	600	178	34.6	30.3	31.8	33.5	36.5	40.9
145.0-149.9 centimeters	332	96	38.8	32.5	35.1	38.0	41.8	45.6
150.0-154.9 centimeters	102	33	42.0	35.7	36.9	39.9	43.1	50.9
155.0-159.9 centimeters	24	8	---	---	---	---	---	---
160.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	3	1	---	---	---	---	---	---
43.3-45.2 inches	4	1	---	---	---	---	---	---
45.3-47.2 inches	---	0	---	---	---	---	---	---
47.2-49.2 inches	14	4	---	---	---	---	---	---
49.2-51.1 inches	107	30	58.8	---	---	---	---	---
51.2-53.1 inches	289	82	62.5	52.2	55.3	57.3	60.9	67.5
53.2-55.1 inches	482	143	69.1	55.1	57.5	62.5	65.9	71.4
55.1-57.1 inches	600	178	76.1	60.9	63.8	67.8	73.6	78.7
57.1-59.0 inches	332	96	85.5	66.6	69.9	73.6	80.2	90.1
59.1-61.0 inches	102	33	92.5	71.5	77.3	83.7	92.1	100.5
61.0-63.0 inches	24	8	---	78.4	81.1	87.7	94.8	112.0
63.0 inches and over	---	0	---	---	---	---	---	---

Table 20. Population, number of children in sample, mean weight, and percentiles by weight for boys, 11 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	3	1	---	---	---	---	---	---
110.0-114.9 centimeters	---	0	---	---	---	---	---	---
115.0-119.9 centimeters	2	1	---	---	---	---	---	---
120.0-124.9 centimeters	---	0	---	---	---	---	---	---
125.0-129.9 centimeters	17	6	---	---	---	---	---	---
130.0-134.9 centimeters	80	27	29.8	26.0	27.9	29.6	32.1	33.6
135.0-139.9 centimeters	257	83	32.0	28.4	29.3	31.3	34.3	36.3
140.0-144.9 centimeters	485	154	35.2	30.5	32.2	34.2	37.3	41.1
145.0-149.9 centimeters	560	179	39.1	33.4	34.9	37.6	41.2	47.8
150.0-154.9 centimeters	356	122	42.4	36.2	37.9	41.2	45.8	50.8
155.0-159.9 centimeters	138	47	49.9	39.7	42.8	47.8	54.5	65.1
160.0 centimeters and over	20	8	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	3	1	---	---	---	---	---	---
43.3-45.2 inches	---	0	---	---	---	---	---	---
45.3-47.2 inches	2	1	---	---	---	---	---	---
47.2-49.2 inches	---	0	---	---	---	---	---	---
49.2-51.1 inches	17	6	---	---	---	---	---	---
51.2-53.1 inches	80	27	65.6	57.3	61.4	65.0	70.6	74.0
53.2-55.1 inches	257	83	70.4	62.5	64.6	68.8	75.4	79.9
55.1-57.1 inches	485	154	77.6	67.1	70.8	75.3	82.0	90.3
57.1-59.0 inches	560	179	86.2	73.6	76.7	82.7	90.7	105.1
59.1-61.0 inches	356	122	93.3	79.7	83.4	90.6	100.7	111.7
61.0-63.0 inches	138	47	109.8	87.3	94.3	105.2	120.0	143.1
63.0 inches and over	20	8	---	---	---	---	---	---

Table 21. Population, number of children in sample, mean weight, and percentiles by weight for girls, 6 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	13	3	---	---	---	---	---	---
105.0-109.9 centimeters	160	41	16.8	15.3	15.8	16.6	17.8	18.7
110.0-114.9 centimeters	388	107	19.4	17.0	18.4	19.2	20.3	21.9
115.0-119.9 centimeters	774	204	21.1	18.6	19.5	20.8	22.4	24.2
120.0-124.9 centimeters	474	128	23.5	20.5	21.8	23.1	24.7	27.0
125.0-129.9 centimeters	173	46	26.5	22.5	23.8	25.6	28.1	31.7
130.0-134.9 centimeters	25	6	---	---	---	---	---	---
135.0-139.9 centimeters	4	1	---	---	---	---	---	---
140.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	13	3	---	33.7	34.8	36.5	39.1	41.2
41.3-43.3 inches	160	41	37.0	37.5	40.4	42.3	44.6	48.1
43.3-45.2 inches	388	107	42.6	41.0	42.9	45.8	49.3	53.2
45.3-47.2 inches	774	204	46.4	45.1	48.1	50.8	54.4	59.4
47.2-49.2 inches	474	128	51.8	49.5	52.4	56.4	61.7	69.7
49.2-51.1 inches	173	46	58.2	---	---	---	---	---
51.2-53.1 inches	25	6	---	---	---	---	---	---
53.2-55.1 inches	4	1	---	---	---	---	---	---
55.1 inches and over	---	0	---	---	---	---	---	---

Table 22. Population, number of children in sample, mean weight, and percentiles by weight for girls, 7 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	17	6	---	---	---	---	---	---
110.0-114.9 centimeters	127	39	19.2	17.3	18.4	19.2	20.0	21.5
115.0-119.9 centimeters	378	114	21.1	18.7	19.6	20.9	22.3	23.5
120.0-124.9 centimeters	688	204	23.6	20.4	21.7	23.1	24.8	27.7
125.0-129.9 centimeters	545	166	26.3	22.0	23.8	25.8	28.6	31.3
130.0-134.9 centimeters	198	63	28.0	24.2	25.4	26.7	29.7	33.4
135.0-139.9 centimeters	37	12	---	---	---	---	---	---
140.0-144.9 centimeters	11	4	---	---	---	---	---	---
145.0-149.9 centimeters	4	1	---	---	---	---	---	---
150.0-154.9 centimeters	---	0	---	---	---	---	---	---
155.0 centimeters and over	---	---	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	17	6	---	---	---	---	---	---
43.3-45.2 inches	127	39	42.3	38.0	40.5	42.2	44.0	47.3
45.3-47.2 inches	378	114	46.4	41.2	43.2	45.9	49.0	51.7
47.2-49.2 inches	688	204	51.8	44.8	47.8	50.7	54.6	60.9
49.2-51.1 inches	545	166	57.9	48.4	52.3	56.7	62.9	68.8
51.2-53.1 inches	198	63	61.6	53.2	55.8	58.8	65.3	73.5
53.2-55.1 inches	37	12	71.6	---	---	---	---	---
55.1-57.1 inches	11	4	---	---	---	---	---	---
57.1-59.0 inches	4	1	---	---	---	---	---	---
59.1-61.0 inches	---	0	---	---	---	---	---	---
61.0 incnes and over	---	---	---	---	---	---	---	---

Table 23. Population, number of children in sample, mean weight, and percentiles by weight for girls, 8 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	9	2	---	---	---	---	---	---
105.0-109.9 centimeters	---	0	---	---	---	---	---	---
110.0-114.9 centimeters	12	4	---	---	---	---	---	---
115.0-119.9 centimeters	100	33	21.7	18.8	19.6	21.2	23.7	25.0
120.0-124.9 centimeters	291	92	23.0	20.0	21.0	22.5	24.4	26.8
125.0-129.9 centimeters	601	186	25.7	22.2	23.6	25.4	28.1	30.5
130.0-134.9 centimeters	590	188	29.0	24.7	26.2	28.3	30.6	34.4
135.0-139.9 centimeters	272	82	32.5	27.8	29.2	31.8	35.1	39.4
140.0-144.9 centimeters	63	21	38.7	31.8	34.0	38.3	42.2	46.7
145.0-149.9 centimeters	11	5	---	---	---	---	---	---
150.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	9	2	---	---	---	---	---	---
41.3-43.3 inches	---	0	---	---	---	---	---	---
43.3-45.2 inches	12	4	---	---	---	---	---	---
45.3-47.2 inches	106	33	47.7	41.3	43.2	46.7	52.1	55.0
47.2-49.2 inches	291	92	50.7	44.0	46.3	49.5	53.7	58.9
49.2-51.1 inches	601	186	56.7	48.7	52.0	55.8	61.7	67.0
51.2-53.1 inches	590	188	63.9	54.3	57.8	62.2	67.3	75.6
53.2-55.1 inches	272	82	71.7	61.2	64.3	69.9	77.1	86.7
55.1-57.1 inches	63	21	85.1	70.1	74.8	84.2	92.8	102.8
57.1-59.0 inches	11	5	---	---	---	---	---	---
59.1 inches and over	---	0	---	---	---	---	---	---

Table 24. Population, number of children in sample, mean weight, and percentiles by weight for girls, 9 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	3	1	---	---	---	---	---	---
105.0-109.9 centimeters	---	0	---	---	---	---	---	---
110.0-114.9 centimeters	2	1	---	---	---	---	---	---
115.0-119.9 centimeters	25	7	---	---	---	---	---	---
120.0-124.9 centimeters	81	23	23.7	20.7	22.2	23.2	25.3	27.0
125.0-129.9 centimeters	296	90	26.1	22.8	24.1	25.7	28.0	29.8
130.0-134.9 centimeters	507	152	28.4	24.6	26.0	27.6	30.2	33.2
135.0-139.9 centimeters	534	165	32 4	27.8	29.2	31.1	35.0	38.5
140.0-144.9 centimeters	302	91	37.1	30.5	32.3	34.7	40.3	45.0
145.0-149.9 centimeters	143	38	39.8	29.9	33.3	40.0	46.5	49.9
150.0-154.9 centimeters	46	13	---	---	---	---	---	---
155.0 centimeters and over	---	0	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	3	1	---	---	---	---	---	---
41.3-43.3 inches	---	0	---	---	---	---	---	---
43.3-45.2 inches	2	1	---	---	---	---	---	---
45.3-47.2 inches	25	7	---	---	---	---	---	---
47.2-49.2 inches	81	23	52.1	45.5	48.8	51.1	55.6	59.5
49.2-51.1 inches	296	90	57.3	50.1	52.9	56.6	61.6	65.5
51.2-53.1 inches	507	152	62.5	54.1	57.2	61.3	66.3	73.0
53.2-55.1 inches	534	165	71.4	61.2	64.1	68.5	77.1	84.7
55.1-57.1 inches	302	91	81.7	67.1	71.0	76.3	88.6	99.0
57.1-59.0 inches	143	38	87.5	65.8	73.3	87.9	102.4	109.8
59.1-61.0 inches	46	13	---	---	---	---	---	---
61.0 inches and over	---	0	---	---	---	---	---	---

Table 25. Population, number of children in sample, mean weight, and percentiles by weight for girls, 10 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	---	0	---	---	---	---	---	---
105.0-109.9 centimeters	4	1	---	---	---	---	---	---
110.0-114.9 centimeters	4	1	---	---	---	---	---	---
115.0-119.9 centimeters	3	1	---	---	---	---	---	---
120.0-124.9 centimeters	13	4	---	---	---	---	---	---
125.0-129.9 centimeters	85	26	25.5	21.4	23.5	24.6	26.5	30.1
130.0-134.9 centimeters	266	85	28.6	24.6	25.8	27.4	29.8	32.8
135.0-139.9 centimeters	463	139	31.9	26.7	28.2	31.0	34.8	40.0
140.0-144.9 centimeters	515	161	36.3	30.3	32.2	34.7	37.0	45.4
145.0-149.9 centimeters	347	106	40.0	32.4	35.7	38.7	42.6	48.7
150.0-154.9 centimeters	148	45	43.4	35.7	37.4	41.8	45.0	51.4
155.0-159.9 centimeters	44	12	---	---	---	---	---	---
160.0 centimeters and over	7	3	---	---	---	---	---	---
			Weight in pounds					
Under 41.3 inches	---	0	---	---	---	---	---	---
41.3-43.3 inches	4	1	---	---	---	---	---	---
43.3-45.2 inches	4	1	---	---	---	---	---	---
45.3-47.2 inches	3	1	---	---	---	---	---	---
47.2-49.2 inches	13	4	---	---	---	---	---	---
49.2-51.1 inches	85	26	56.2	47.1	51.8	54.1	58.2	66.2
51.2-53.1 inches	266	85	62.9	54.1	56.8	60.4	65.1	72.3
53.2-55.1 inches	463	139	70.3	58.8	62.0	68.3	76.6	88.0
55.1-57.1 inches	515	161	79.9	66.7	71.0	76.4	81.4	99.9
57.1-59.0 inches	347	106	88.1	71.4	78.5	85.5	93.7	107.1
59.1-61.0 inches	148	45	95.5	78.5	82.3	91.2	99.0	113.1
61.0-63.0 inches	44	12	---	---	---	---	---	---
63.0 inches and over	7	3	---	---	---	---	---	---

Table 26. Population, number of children in sample, mean weight, and percentiles by weight for girls, 11 years of age, by height group: United States, 1963-65

Height groups	Population in thousands	Number in sample	Mean weight	Percentile				
				10th	25th	50th	75th	90th
			Weight in kilograms					
Under 105.0 centimeters	3	1	---	---	---	---	---	---
105.0-109.9 centimeters	3	1	---	---	---	---	---	---
110.0-114.9 centimeters	3	1	---	---	---	---	---	---
115.0-119.9 centimeters	---	0	---	---	---	---	---	---
120.0-124.9 centimeters	3	1	---	---	---	---	---	---
125.0-129.9 centimeters	14	4	---	---	---	---	---	---
130.0-134.9 centimeters	57	18	29.7	26.6	27.3	28.5	31.5	33.3
135.0-139.9 centimeters	164	51	32.4	27.4	29.2	32.3	35.2	39.6
140.0-144.9 centimeters	416	123	34.9	29.4	31.4	34.4	37.5	40.0
145.0-149.9 centimeters	555	164	39.2	32.3	34.5	38.2	42.9	47.9
150.0-154.9 centimeters	324	103	44.0	34.8	38.0	42.8	48.2	54.6
155.0-159.9 centimeters	240	71	49.4	40.3	42.9	49.3	55.3	61.8
160.0 centimeters and over	82	26	53.7	43.7	46.2	50.8	61.2	67.4
			Weight in pounds					
Under 41.3 inches	3	1	---	---	---	---	---	---
41.3-43.3 inches	3	1	---	---	---	---	---	---
43.3-45.2 inches	3	1	---	---	---	---	---	---
45.3-47.2 inches	---	0	---	---	---	---	---	---
47.2-49.2 inches	3	1	---	---	---	---	---	---
49.2-51.1 inches	14	4	---	---	---	---	---	---
51.2-53.1 inches	57	18	65.4	58.6	60.1	62.6	69.3	73.3
53.2-55.1 inches	164	51	71.3	60.2	64.3	71.0	77.5	82.2
55.1-57.1 inches	416	123	76.7	64.6	69.0	75.6	82.4	88.0
57.1-59.0 inches	555	164	86.4	70.9	75.9	83.9	94.4	105.4
59.1-61.0 inches	324	103	96.9	76.7	83.6	94.2	106.1	120.1
61.0-63.0 inches	240	71	108.6	88.7	94.4	108.4	121.7	135.9
63.0 inches and over	82	26	118.2	96.1	101.8	111.7	134.5	148.3

Table 27. Mean heights and standard errors for mean heights of children, 6-11 years of age, by time of examination, sex, and age: United States, 1963-65

Sex and age	Time of examination				
	9:00 a.m.	10:00 a.m.	11:00 a.m.	2:00 p.m.	3:00 p.m.
	Mean height in centimeters				
Boys					
6 years	118.9	118.5	119.1	117.7	118.3
7 years	124.8	124.3	124.9	123.9	124.8
8 years	130.4	129.8	130.9	129.8	130.2
9 years	136.2	135.8	135.1	135.2	134.6
10 years	140.8	140.3	138.8	139.7	139.7
11 years	146.0	145.4	146.7	146.0	144.6
Girls					
6 years	119.7	117.2	117.7	118.2	118.0
7 years	125.0	124.0	123.0	122.9	123.3
8 years	129.7	129.2	129.7	128.9	129.5
9 years	135.6	136.8	133.7	135.9	135.1
10 years	141.0	142.0	139.7	140.8	139.3
11 years	147.9	148.0	145.5	147.0	149.4
	Standard error in centimeters				
Boys					
6 years	1.06	0.46	0.32	1.26	0.39
7 years	0.49	0.70	0.51	0.69	0.40
8 years	0.90	0.56	0.53	0.66	0.33
9 years	0.44	0.70	1.53	0.38	1.21
10 years	0.59	0.53	2.08	0.63	0.71
11 years	0.55	0.69	1.64	0.46	1.36
Girls					
6 years	0.91	0.57	0.44	1.38	0.44
7 years	1.02	0.29	0.61	0.57	0.41
8 years	0.54	0.72	0.71	0.56	1.17
9 years	0.87	0.82	0.95	0.55	0.67
10 years	0.64	0.55	1.74	0.73	1.61
11 years	0.61	0.90	2.68	0.41	1.51

Table 28. Mean weights and standard errors for mean weights of children, 6-11 years of age, by time of examination, sex, and age: United States, 1963-65

Sex and age	Time of examination				
	9:00 a.m.	10:00 a.m.	11:00 a.m.	2:00 p.m.	3:00 p.m.
Boys	Mean weight in kilograms				
6 years	21.2	21.7	22.2	21.9	22.0
7 years	24.4	24.7	24.2	24.7	24.9
8 years	28.5	27.3	27.8	28.1	27.7
9 years	31.1	30.8	31.9	31.3	30.7
10 years	34.0	33.4	34.4	33.7	32.8
11 years	38.5	37.6	38.3	38.6	39.5
Girls					
6 years	22.0	21.0	21.6	22.5	21.6
7 years	24.6	24.3	24.0	23.8	24.2
8 years	27.6	27.7	26.9	27.6	27.9
9 years	31.5	31.7	29.3	32.1	31.7
10 years	34.2	35.8	35.9	35.0	34.1
11 years	40.4	40.1	37.2	39.4	41.8
Boys	Standard error in kilograms				
6 years	0.33	0.29	0.22	0.08	0.24
7 years	0.37	0.39	0.22	0.64	0.30
8 years	0.55	0.36	0.60	0.64	0.22
9 years	0.48	0.59	0.13	0.59	0.41
10 years	0.13	0.49	0.28	0.52	0.68
11 years	0.14	0.33	0.69	0.49	0.64
Girls					
6 years	0.32	0.40	0.39	0.33	0.31
7 years	0.47	0.30	0.34	0.31	0.59
8 years	0.35	0.44	0.58	0.58	0.68
9 years	0.35	0.62	0.24	0.66	0.36
10 years	0.63	0.65	0.57	0.08	0.40
11 years	0.55	0.52	0.67	0.56	0.26

APPENDIX

STATISTICAL NOTES

Survey Design

The sample design of the second cycle of the Health Examination Survey is quite similar to that of the first cycle—a multistage stratified probability sample of loose clusters of persons in land-based segments. The successive elements dealt with in the process of sampling were primary sampling unit (PSU), census enumeration district, segment (a cluster of households), household, eligible child, and sample child.

The total number of children in the United States (including Alaska and Hawaii) who met the general criteria for inclusion in the universe sampled was about 24,000,000. This was the estimated U.S. population aged 6 through 11 years as of mid-1964 excluding small numbers who were residing in institutions or residing outside the United States.

The sample actually selected consisted of 7,417 children. The proportion of this sample that was finally examined was 96 percent (7,119 sample children examined). This means that the nonresponse rate was held down to 4 percent of the sample selected.

Considerable effort was made to determine whether the class of nonrespondents was different than the respondents with respect to the data collected. No final answer to this question was obtained, but this search along with the fact that the nonresponse rate was only 4 percent, indicated that the possibility of results being biased by the nonrespondents was very small.

Sampling and Measurement Error

In the present report, reference has been made to efforts to minimize bias and variability of measurement techniques. This effort has come mainly through automatic recording of the heights and weights and through regular recalibration of the equipment and intensive training and retraining of the technicians. This topic will be extensively discussed in "Quality Control in a National Health Examination Survey" by Wesley Schaible (in preparation).

The sample design along with the replication method[1] makes it possible to calculate sampling errors.

The estimation of sampling errors for a survey of the type of the Health Examination Survey is difficult for at least three reasons: (1) measurement error and "pure" sampling error are confounded in the data, (2) the survey design and estimation procedure are complex and require computationally involved techniques for the calculation of variances, and (3) there are thousands of statistics being produced from the survey, many coming from small numbers of samples cases. Since the estimates of sampling error are based on sample data, they too are subject to sampling error and may be large when the number of sample cases in a cell is small.

Replication and Training for the Measurement Process

The only good replication data available for the standing height measurement from Cycle II comes from the Chicago stand. In this particular replication study 100 of the original 283 children examined were brought back for reexamination. Fifty of these children were originally examined by Caravan I and were reexamined by Caravan II;[j] the other 50 were originally examined by Caravan II and reexamined by Caravan I. As a result of this planning, all replicature comparisons are interobserver comparisons.

The replicate sample was chosen in terms of convenience of transportation to and from the examination center rather than in a strictly random manner. The technicians were specially instructed to use the same procedures as they did in the original examinations.

All body measurements (see form in figure I) were replicated except for weight. Weight was not replicated because of the 2-week interval between the dates of the original examination and the replicate examination and because of high day-to-day variability of weight.

These data suggest that after accounting for growth there is not more than a 3-centimeter average interobserver difference for the standing height measurement.

This result is consistent with results of another Health Examination Survey that used similar procedures. The data in this other survey (the present Cycle III) suggest that the inter- and intra-examiner differences found on replication of height measurements of

[j] See reference 3 for greater detail.

HEALTH EXAMINATION SURVEY—II

BODY MEASUREMENTS

☆ GPO: 1964—741079

OBSERVER (6-7) | RECORDER

CARD 06 COL. NO.	SITTING *
8-10	FOOT LENGTH
11-13	FOOT BREADTH
14-17	KNEE HEIGHT
18-21	POPLITEAL HEIGHT
22-25	THIGH CLEARANCE
26-28	SEAT BREADTH
29-31	ELBOW—ELBOW BREADTH
32-35	SITTING HEIGHT—ERECT
36-38	BUTTOCK-POPLIT LENGTH
39-41	BUTTOCK-KNEE LENGTH
42-44	ELBOW-WRIST LENGTH
45-47	HAND LENGTH
48-50	HAND BREADTH
	STANDING (ON STEP) *
51-53	R. BICONDYLAR DIAM.
54-56	R. CALF GIRTH
57-60	STANDING HEIGHT
	ANTHRO. NO.
61-62	COLS. 14-25
63-64	COLS. 32-35
79-80	END CARD 06

CARD 07 COL. NO.	STANDING (FLOOR) *
8-10	BIACROMIAL DIAM.
11-13	ACROMION TO OLECRANON
14-16	CHEST BREADTH 4TH ICS
17-19	CHEST DEPTH 4TH ICS
20-22	BICRISTAL DIAM.
23-25	CHEST GIRTH
26-28	WAIST GIRTH
29-31	HIP GIRTH
32-34	R. UPPER ARM GIRTH
35-37	R. LOWER ARM GIRTH
	SKIN FOLDS
38-40	R. UPPER ARM (MM)
41-43	R. INFRASCAPULAR (MM)
44-46	R. LAT. CHEST WALL (MM)
47-50	WEIGHT (LBS)
79-80	END CARD 07

BODY MEAS.

* In cm

MEASUREMENTS NOT DONE OR SIDE VARIED—specify which and give reason .....

.....

Figure I. Body measurement form.

the same subjects had median absolute differences of only 3 or 4 millimeters.

In the analysis of the height data, the heights have generally been considered in 5-centimeter groups. Since the variability in the measurements due to examiner error seems equally likely to be in either direction, and since its magnitude is small relative to the measurement itself and to the range included in the grouped frequencies, it is believed that the effect on the resultant means, percentiles, and the like can be disregarded.

Training and retraining in body measurement techniques was accomplished in several ways. The initial training was given by Dr. Francis E. Johnston in the pretests conducted in Washington, D.C., and Wilmington, Delaware, prior to the beginning of Cycle II. Two formal retraining sessions were held with Dr. Johnston at Philadelphia in November 1963 and at Washington in January 1964. Besides these sessions with Dr. Johnston, there were practice sessions once a month among the technicians supervised by the supervisory staff physician during the dry runs conducted the day before each stand.

Further reduction of interobserver variability was achieved by using the small number of observers who could be well trained. The same four technicians were used throughout the entire survey of 2½ years and 7,119 sample children.

DEMOGRAPHIC VARIABLES

Regional and demographic characteristics by which the population has been classified for this report are defined as follows.

Age and Sex

Population was classified into 12 age-sex groups—the six ages 6 through 11 years by sex. For 95 percent of the children the given age was verified by birth certificates. Age stated by the parents was accepted as the true age for the other 5 percent.

Race

Heights and weights were reported by race for white and Negro children. Children of other races were not sampled sufficently for comparison purposes; these children represented only 0.45 percent of the sample (see table 16).

Region

Regional data are presented for four regions of the continental United States.

Region	*States Included*
Northeast	Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey
Midwest	Minnesota, Wisconsin, Michigan, Iowa, Missouri, Illinois, Ohio
South	Delaware, Maryland, Virginia, District of Columbia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana
West	Washington, Oregon, Idaho, Montana, North Dakota, South Dakota, Wyoming, Nebraska, Kansas, Colorado, Utah, Nevada, California, Arizona, New Mexico, Texas, Oklahoma

ESTIMATION PROCEDURE

An examination finding for a sample child is included in tabulations as a weighted frequency, the weight being a product of the reciprocal of the probability of selecting the child, an adjustment for nonresponse cases, and a poststratified ratio adjustment which increases precision by bringing survey results into closer alignment with known U.S. population figures by color and sex within single years of age 6 through 11.

In the second cycle of the Health Examination Survey the sample of slightly more than 7,400 children was the result of three stages of selection, the probability of selecting an individual sample boy or girl being the product of the probabilities of selection at each stage. Briefly the three stages of probability selection are of:

1. A single PSU from each stratum of PSU's.
2. Twenty segments from each sample PSU.
3. Sample children from among eligible children found in the segments.

Since the strata are roughly equal in population size and a nearly equal number of sample children were

examined in each of the sample PSU's, the sample design is essentially self-weighting with respect to the target population, that is, each child 6 through 11 years old has about the same probability of being drawn into the sample.

The adjustment for nonresponse is intended to minimize the impact of nonresponse on final estimates by imputing to nonrespondents the characteristics of "similar" respondents, relating nonrespondents to respondents by ancillary data known for both. In the second cycle the usual household nonresponse due to refusals to be interviewed and "not at homes" was virtually zero, so the only nonresponse category requiring some adjustment was the "failure to be examined" nonresponses, which amounted to 4.0 percent of the 7,417 sample children. "Similar" respondents were judged to be children in a sample PSU having the same age (in years) and sex as the children not examined in the sample PSU. The weights of all respondents in a PSU having the same age and sex were adjusted upward to give representation to the nonrespondents in the PSU having that age and sex.

The poststratified ratio adjustment used in the second cycle achieved most of the gains in precision which would have been attained if the sample had been drawn from a population stratified by age, color, and sex and makes the final sample estimates of population agree exactly with independent controls prepared by the U.S. Bureau of the Census for the noninstitutional population as of August 1, 1964 (approximate mid-survey point), by color and sex for each single year of age 6 through 11. The weights of every responding sample child in each of the 24 age, color, and sex classes is adjusted upwards or downwards so that the weighted total within the class equals the independent population control.

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