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A Projection of the Standing Height of Large American Males for 1985, 1995, and 2005

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16. Abstract

This report presents projections of the standing height of large American males for the years 1985, 1995, and 2005. The background information used in developing these projections includes U. S. population data, estimates of a continuing secular trend toward increased stature, and data describing the decrease in stature as a function of aging.

To develop the projections, models were developed which predict stature as a function of age. The input to the model is stature at 20 years of age. The assumption was made that the secular increase is continuing at approximately 1 centimer per decade. The additional assumption was made that the relatively modest changes in stature as a function of aging proposed by Borkan, et al (1983) are appropriate for the U. S. population in general. These conservative assumptions lead to a model which agrees well with 1960-1962, 1971-1974, and 1976-1980 U. S. population anthropometric survey data for 95th percentile male standing height. This model was then used to project to the years 1985, 1995, and 2005.

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1.0 INTRODUCTION

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To develop the projections, models were developed which predict stature as a function of age. The input to the model is stature at 20 years of age. The assumption was made that the secular increase in stature is continuing at approximately 1 centimeter per decade. The additional assumption was made that the relatively modest changes in stature as a function of aging proposed by Borkan, et al (1983) are appropriate for the U. S. population in general. These conservative assumptions lead to a model which agrees well with 1960-1962, 1971-1974, and 1976-1980 U. S. population anthropometric survey data for 95th percentile male standing height. This model was then used to project to the years 1985, 1995, and 2005.

The background data are discussed in Part 2 of the report. In Part 3, details of development and application of the stature projection models are described. Part 4 contains a brief discussion of sitting height as it relates to stature. Projections for the 20-30, 30-40, and 30-60 year old age groups are presented in Part 5 and a list of references is given in Part 6.

2.0 BACKGROUND

2.1 Standing Height Data for the United States Population.

The primary resource which describes the standing height for the United States population is a series of reports issued by the National Center for Health Statistics (NCHS) of the United States Public Health Service. The survey conducted during the years 1960-1962 (HES, Health Examination Survey) has been reported by Stoudt, et al (1965) while data from 1971-1974 (HANES, Health and Nutrition Examination Survey) were presented by Abraham, et al (1979). More recent data from the 1976-1980 survey have not yet been published but were made available by Rowland (1987).

Summaries of the data included in these reports for 50th and 95th percentile male standing height are included in Tables 1 and 2. Although these data offer the most representative and complete description of United States adult male standing height, some comments are in order with respect to their use in developing projections. All the survey data show a general reduction in standing height as age increases. Also, all data show a general increase in standing height as the date of the survey increases.

Table 1. Summary of NCHS Stature Data, in(cm), for the 95th Percentile Male

Age Group	1960-1962 HES	1971-1974 HANES	1976-1980 HANES
18 - 24	73.1 (186)	74.4 (189)	74.6 (189)
25 - 34	73.8 (187)	74.3 (189)	73.8 (187)
35 - 44	72.5 (184)	73.4 (186)	74.0 (188)
45 - 54	72.7 (185)	73.2 (186)	73.1 (186)
55 - 64	72.2 (183)	72.5 (184)	72.7 (185)
65 - 74	70.9 (180)	71.6 (182)	72.1 (183)

Table 2. Summary of NCHS Stature Data, in(cm), for the 50th Percentile Male

Age Group	1960-1962 HES	1971-1974 HANES	1976-1980 HANES
18 - 24	68.6 (174)	69.7 (177)	69.7 (177)
25 - 34	69.0 (175)	69.5 (177)	69.6 (177)
35 - 44	68.6 (174)	69.2 (176)	69.5 (177)
45 - 54	68.3 (173)	68.8 (175)	69.0 (175)
55 - 64	67.6 (172)	68.2 (173)	68.4 (174)
65 - 74	66.8 (170)	67.3 (171)	67.5 (171)

The changes in standing height can be explained both in terms of a secular trend toward increased standing height and a decrease in height due to aging. An example of the effect of secular trend is demonstrated by following particular age groups through various survey years. A person in the 18-24 age group would presumably be shorter in the 1960-1962 survey than an 18-24 year old measured in the 1971-1974 survey. In addition, this same 18-24 old from the 1960-1962 survey would be in the 25-34 year old group for the 1971-1974 survey. He would be shorter than successive generations of 18-24 year olds as he fits into successively higher age groups. The aging effect is superimposed upon this secular effect to make the reduction in stature with increasing age in a given survey appear even greater.

The survey data given in Tables 1 and 2 are plotted in Figure 1. Analysis of the tables and this figure reveals inconsistencies which were observed by Schneider, et al (1983), in an analysis involving only the 1960-1962 and 1971-1974 survey data for mean standing height. Note that the 1971-1974 data have been taken a little more than one decade later on the average than the 1960-1962 data. As a result the 18-24 year old group from 1960-1962 should approximate the 25-34 year old group for 1971-1974. Likewise, the 25-34 year old group from 1960-1962 should approximate the 35-44 year old group in 1971-1974, etc.

The inconsistencies can be noted by the following observations:

1. There is an increase in standing height of 1.2 in (3 cm) when the 18-24 year old age group (95th percentile stature) in the 1960-1962 survey is compared with the 25-34 year old age group in the 1971-1974 survey.

2. There is a similar increase in standing height from the 35-44 year old group (95th percentile stature) in 1960-1962 to the 45-54 year old age group in 1971-1974.

3. For 50th percentile standing height, the same observations can be made for the 18-24, 25-34, and 35-44 year old age groups when they are projected to the 25-34, 35-44, and 45-54 year old age groups for 1971-1974. The three cases show height increases as age increases of 0.9 in (3 cm), 0.2 in (1 cm), and 0.2 in (1 cm).

4. When 1971-1974 survey data are compared with the 1976-1980 data, there is no evidence of an increase in height when the height of age groups in the earlier survey are projected toward the results predicted for the later.

It has been conjectured that these inconsistencies with known aging factors may be due to statistical sampling problems or to the use of different data analysis computer programs for the processing of information gathered during the surveys (personal communications with L. W. Schneider of UMTRI, H. W. Stoudt of Michigan State University who was a participant in the original 1960-1962 survey, and M. Rowland of the National Center for Health Statistics). As a conclusion, these survey data, which are the primary source of U.S. population data on standing height, must be used with caution and in

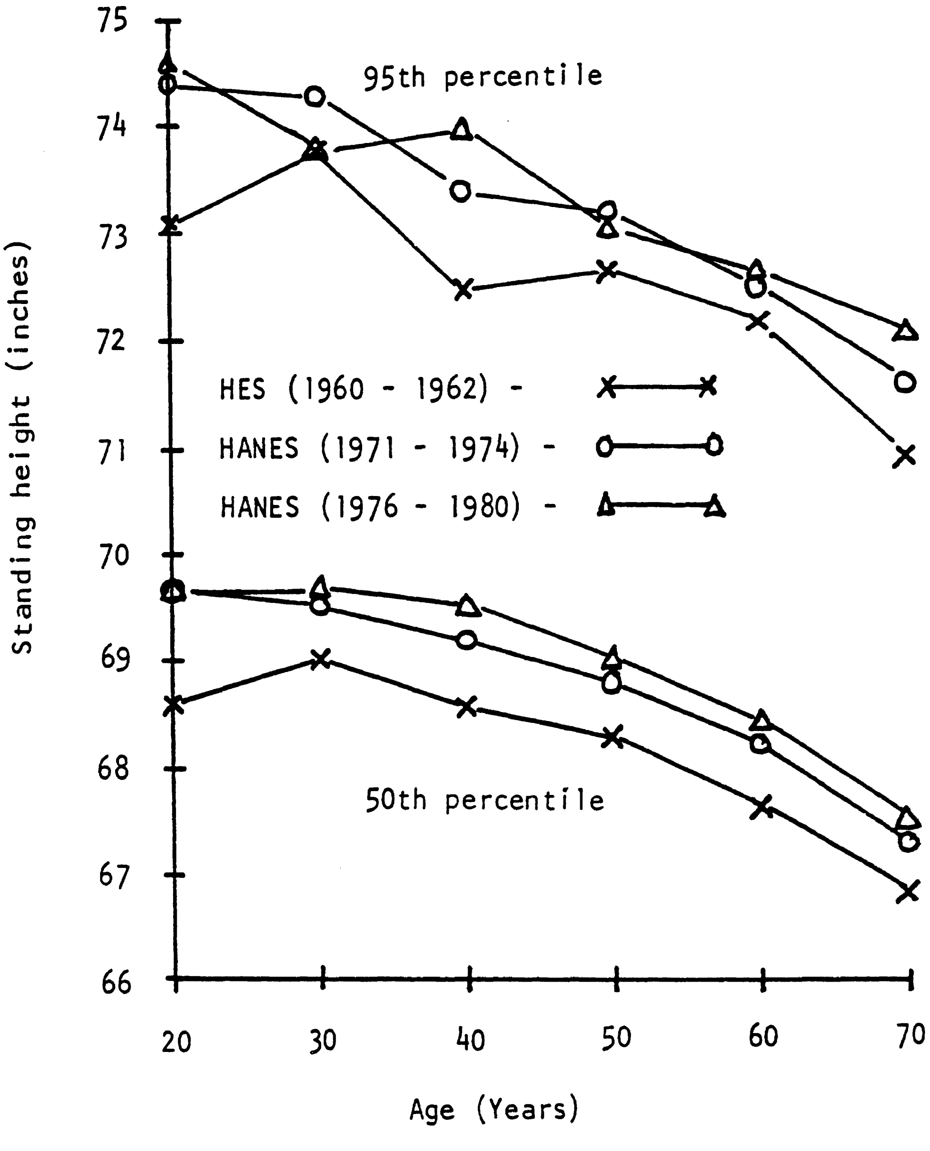

Figure 1. Standing Height as a Function of Age.

a conservative manner in any process of developing projections. No other data resource is available for the complete U.S. population.

2.2 Secular Trends

The secular trend in standing height for the U. S. population continues to be an unsettled issue. There is evidence, on one hand, that the secular trend in standing height is continuing at a rate of approximately 1 centimeter per decade based on studies of military populations through the years as reviewed by Schneider, et al (1983). On the other hand, Schneider et al (1983) report personal communications with S. Abraham (National Center for Health Statistics and S. Garn (Center for Human Growth and Development at The University of Michigan) which theorize that the end of a secular increase in standing height is in sight or, at least, taking place at a decreasing rate in societies where health and nutrition problems are minimized.

In a more recent paper Garn (1987) adopts a practical point of view in stating "Some growth standards have already been declared obsolete because of the secular changes, others are now at or beyond their useful life, and we are at the point where new and updated standards are needed for the year 1990 and beyond." He also suggests that "Taller people with longer limbs require larger living places ..." and "Automobiles and trains and airplanes must be built to accommodate their larger dimensions." In discussing the magnitude of the secular trend he suggests a useful approximation of 1 centimeter per decade "when considering anthropometric standards and when considering how soon such standards may become obsolete and in need of replacing."

For the development of projections, the 1 centimeter per decade secular trend in standing height has been adopted for use in the present project. This is to assure that standing height projected to 2005 will be sufficiently great in magnitude for use in the design of vehicles to be produced in the early twenty-first century.

2.3 The Effect of Aging on Standing Height

Various studies have shown that older people are shorter and lighter than their younger counterparts. Most of these studies are limited to population samples with little relation to the U. S. population and have not been analyzed to separate out secular changes which may bias the results. An exception is the paper by Borkan, et al (1983), which reports on the role of longitudinal change and secular trend in age differences in male body dimensions. His sample included 1212 participants in the Normative Aging Study of the Veterans Administration Outpatient Clinic in Boston, Massachusetts. The participants were predominantly white, middle-income, and disease-free. The measured effect of aging on standing height for this sample is summarized in Table 3. These relatively modest changes in stature have been used in developing the projection equations presented in Part 3.

Table 3. Longitudinal Change in Standing Height over a Ten Year Period

Beginning Age	Ending Age	Change in Height cm (in)
25	35	- 0.00 (- 0.00)
35	45	- 0.22 (- 0.09)
45	55	- 0.52 (- 0.20)
55	65	- 0.84 (- 0.33)
65	75	- 1.25 (- 0.49)

3.0 STANDING HEIGHT PROJECTION MODELS

3.1 Development of Projection Models

The first step in the development of the projection models involves the selection of five quantities:

- a value of standing height for a large U. S. male
- the age of the male at the time
- the year in which the standing height is obtained
- an estimate of secular trend in standing height
- an estimate of the effect of aging on standing height

Standing height and age can be used to place a point on a plot such as Figure 1. The year in which the standing height is obtained identifies whether the point should fit on, or near, one of the curves shown in Figure 1 corresponding to one of the three surveys.

A year in the past or future can also be represented. The estimates of aging effects allow projection of the point to earlier years when the male was taller and to later years when he would be shorter. A plot of standing height versus the year of its prediction for the particular male can thus be generated. The estimate of secular trend can be used to project what the standing height of this hypothetical male would be, as a function of his age, if he were born in an earlier or later year. In the case of an earlier year of birth, he would have been shorter throughout his life (assuming a positive secular trend), and, the opposite for a later birth year.

Perhaps the most critical, and difficult, selections are those of the first three quantities - standing height, year, and age of the male at the time. Because the objective is projection of large male standing height forward to the year 2005, it seems most logical to start with a standing height estimate for a hypothetical young, large, U. S. male. A review of the HANES data from 1971-1974 and 1976-1980 shows fairly good consistency between the two sets of points on Figure 1 which are listed in Tables 1 and 2. On the basis of these two surveys, a target year of 1975 has been selected (mid way between the two surveys). The standing height is assumed to be 74.5 in (189 cm) which is the average of the values (74.4 in and 74.6 in) given for 95th percentile standing height for the 18-24 year old age group in the two surveys.

The effect of secular trend on standing height has been discussed in Section 2.2. The assumption of a continuing trend of 0.4 in (1 cm) per decade has been made to assure that standing height projected to the year 2005 will be sufficiently great for use in the design of vehicles to be produced in the early twenty-first century. This trend implies that a large 95th percentile male who is 20 years of age in 1985 is predicted to be 74.9 in (190 cm) tall, etc. Conversely, a large male who is 20 years of age in 1965 would be 74.1 in (188 cm) tall.

There are two aging effects which will be considered in this study. The first effect is the age at which maximum standing height is reached. The second is the decrease in height associated with aging. The 1976-1980 HANES survey results for standing height give a breakdown by age groups including 18-24, 18-19, and 20-24 years old. For the 95th percentiles the values given are 74.6, 74.4, and 74.7 inches. The traditional age grouping of 18-24 year olds is shorter by 0.1 inch than the 20-24 year olds indicating continuing growth up to, and perhaps beyond, the age of 20. As a result, projection formulae for height will be assumed to yield an increase of 0.1 inch in the 25-34 year old age group over the height of the 18-24 year olds. This will represent the assumed full growth potential of large males segmented into groupings in the manner of the HES and HANES surveys.

The second effect of aging on standing height which will be assumed for the study has been presented in Table 2. It should be noted that the center age points for the subject groups used in the HES and HANES studies are 20, 30, 40, 50, and 60 years of age. These also represent the target end points for the age groupings which are the subject of this study. The end points in Table 2 are 25, 35, 45, 55, etc. years of age. A simple linear interpolation of the values given in Table 2 can be carried out to yield results which are compatible to the HES/HANES groupings. As an example, consider the age groups from 30-40 years. The value given by Borkan, et al (1983) for the 25-35 year old age group is 0.00 inches reduction in standing height while the value for 35-45 year olds is -0.09 inches. Using half the value for 25-35 year olds and half the value for the 35-45 year olds yields an estimated value of -0.045 inches for a hypothetical 30-40 year old age group.

The data from both aging effects are combined in Table 4. This table includes the 0.1 inch increase of standing height in the 25-34 year old age survey group reflecting the probable low estimate of adult stature for the 18-24 year olds. It also includes the aging effects for all older groups. The purpose of developing this table is to establish a basis for aging models which can be used to study and model the information included in the HES and HANES surveys and then used in projection models for the years 1985, 1995, and 2005.

Table 4. Hypothesized Changes in Standing Height with Increased Age

Beginning Age	Ending Age	Change in Height, in(cm)
25	34	0.100 (0.25)
35	44	- 0.045 (- 0.11)
45	54	- 0.145 (- 0.37)
55	64	- 0.265 (- 0.67)

The very simple models in equations 1 use standing height at 20 years of age as input and predict height in inches as age increases by 10 year intervals.

$$
\begin{aligned}
H30 &= H20 + 0.1 \\
H40 &= H30 - 0.045 \\
H50 &= H40 - 0.145 \\
H60 &= H50 - 0.265
\end{aligned}
\qquad (1)
$$

The quantities H20,..., H60 are standing height at the ages of 20,..., 60. These equations are implemented in a computer program which also includes the year of birth. This computer program can thus be used to predict the height of an adult male born in any year for a period up to 60 years into the future. In other words it can predict the standing height for any group in the HES or HANES surveys for which the assumptions may be valid. It can also be used to simulate future standing heights to develop information useful in automobile design.

3.2 Application of the Projection Models

The projection models were run with the objective of simulating HES and HANES survey data structures for years starting with 1955 and increasing in 10 year intervals to the year 2005. To accomplish this it was necessary to choose birth dates from 1895 to 1985 and standing heights at 20 years of age from 72.1 in (183 cm) to 75.7 in (192 cm). The birth dates were selected to predict extremes of 60 years of age for simulated 1955 survey results and 20 years of age for simulated 2005 survey results. The standing heights were adjusted upward or downward from 74.5 in (189 cm), the assumed baseline 95th percentile standing height for a 20 year old in the year 1975, based on the secular trend increasing at 1 centimeter per decade throughout the period. In order to make a comparison of prediction results for the 95th percentile with those of other percentiles, a parallel set of runs was made for 50th percentile standing height data. The baseline standing height selected was 69.7 in (177 cm). The same value for this quantity was reported in both the 1971-1974 and 1976-1980 HANES surveys.

Figure 2 is a plot showing the projection curves generated, points obtained from the HES and HANES survey, and a point representing the projected 95th percentile stature of 35 year old USAF flying personnel in 1985 developed by McConville, et al (1978). p The data points used in constructing these curves are presented in Table 5. Several observations can be made about these curves:

1. The projected curve for 95th percentile stature in 1975 shows an excellent match with the HANES survey results of the 1971-1974 and 1976-1980. Its values are generally between the points representing the two survey curves.

2. The projected curves for 1955 and 1965 would be expected to bracket the points representing the 1960-1962 HES survey. Considering the scatter of the survey results, the average of the two projections appears to be fairly representative of the survey results.

3. The projections for 50th percentile standing height do not show as good a match with survey results as do 95th percentile projections. Two possible reasons for this are based on assumptions used in developing the projections for 95th percentile standing height. The first reason is that the assumption of a continuing secular trend of 0.4 in (1 cm) per decade may be too large for the 50th percentile. A change in assumption would contradict the conservative assumption made in Section 2.2. The second reason is that the assumed value for standing height at age 20 may be too small for the 50th percentile male. This value was selected in the same manner as the value for 95th percentile standing height at age 20. In other words, the procedures and assumption used in developing the 95th percentile standing height projections do not apply as well to the 50th percentile. This tends to illustrate the problems that occur in understanding and using the existing population data base.

4. The fact that projection of one point to 1985 based on USAF data yields a result which agrees well with the projection curve to 1985 developed in the present study provides some degree of confidence that the proposed modeling procedure yields useful results for the population groupings which are being studied.

On the basis of the generally positive observations of the projected U. S. male survey results for 95th percentile standing height,they have been used to develop projections to 1985, 1995, and 2005 for the 20-30, 30-40, and 30-60 year old age groups which are given in Part 5 of the report. The reasons for the relatively poor performance of the projections of 50th percentile standing height are unclear. It is recommended that this issue be addressed in future investigations.

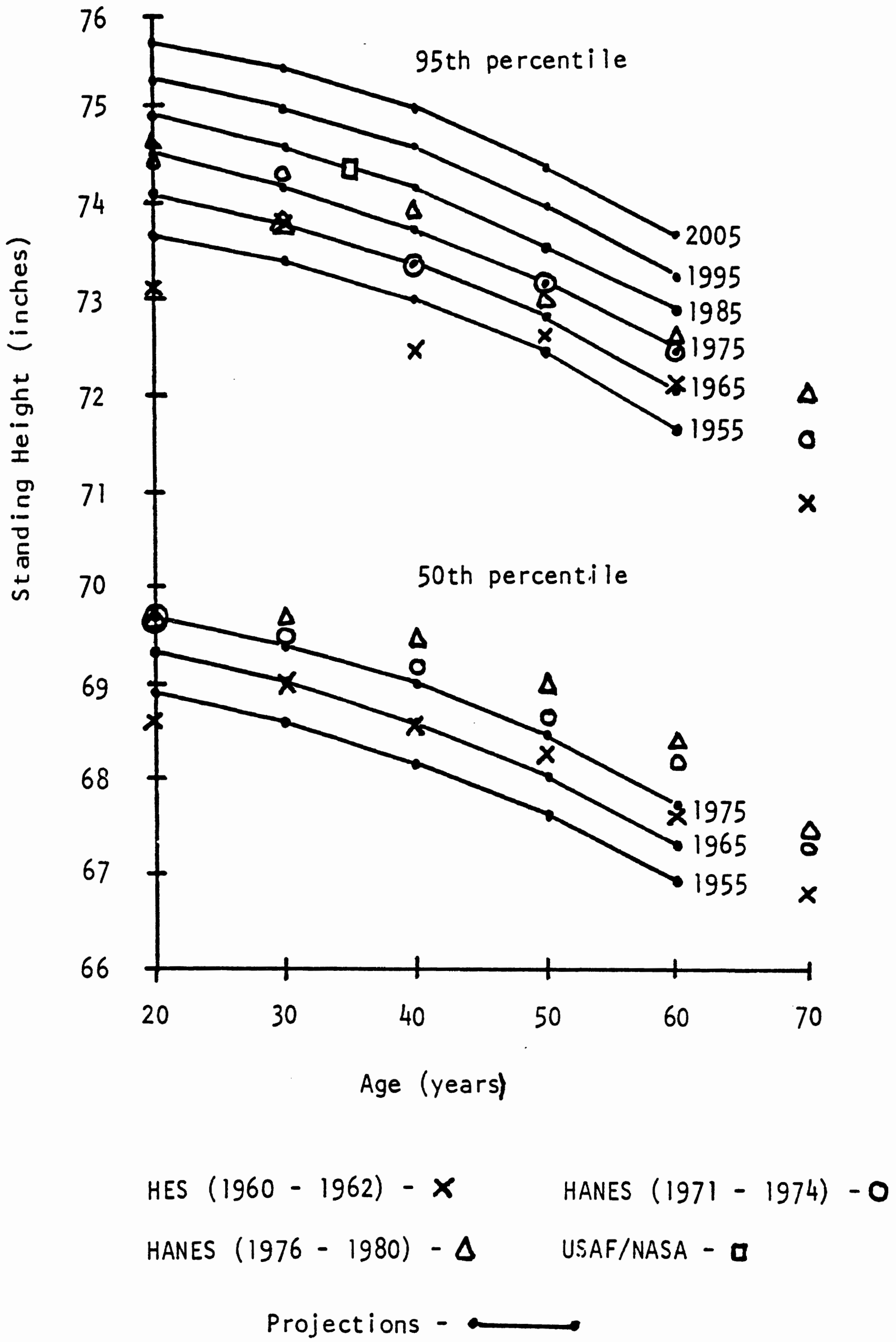

Figure 2. Projected Standing Height

Table 5. Projected Standing Height Results, in(cm)

Age Group	Mid Point Age	Projection Date of Survey and Subject Percentile								
		1955 95M	1965 95M	1975 95M	1985 95M	1995 95M	2005 95M	1955 50M	1965 50M	1975 50M
18-24	20	73.7 (187)	74.1 (188)	74.5 (189)	74.9 (190)	75.3 (191)	75.7 (192)	68.9 (175)	69.3 (176)	69.7 (177)
25-34	30	73.4 (186)	73.8 (187)	74.2 (188)	74.6 (189)	75.0 (190)	75.4 (192)	68.6 (174)	69.0 (175)	69.4 (176)
35-44	40	73.0 (185)	73.4 (186)	73.8 (187)	74.2 (188)	74.6 (189)	75.0 (191)	68.2 (173)	68.6 (174)	69.0 (175)
45-54	50	72.4 (184)	72.8 (185)	73.2 (186)	73.6 (187)	74.0 (188)	74.4 (189)	67.6 (172)	68.0 (173)	68.4 (174)
55-64	60	71.7 (182)	72.1 (183)	72.5 (184)	72.9 (185)	73.3 (186)	73.7 (187)	66.9 (170)	67.3 (171)	67.7 (172)

4.0 SITTING HEIGHT

Sitting height data are available for the HES and HANES studies as well as from the studies of aging by Borkan, et al (1983). The data from the 1971-1974 HANES survey are reported by Johnson, et al (1981). Table 6 presents erect sitting height data for various percentiles and age groups in the HES and HANES studies. The number given first in the table is the number obtained from the reference. The ratio of sitting height to standing height for various percentiles and age groups has been derived from Tables 1, 2, and 6. These data are given in Table 7 along with results computed from the population means. The similar data developed by Borkan (1983) are presented in Table 8.

Three observations can be made based on the results presented in Table 7 and 8. The first is that the ratio of sitting height to standing height is nearly the same for 95th percentile values of these quantities as it is for 50th percentile and mean values presented in Table 7. This does not address the much more complex issue of the probability of the simultaneous occurrence of 95th percentile sitting height and stature in the same person. However, it does indicate that overall decreases in standing height are accompanied by overall decreases in sitting height.

The second observation based on Table 7 is that only a small decrease in the ratio of sitting height to standing height occurs as age increases. For example, the average ratio of all numbers for the 25-44 year old age group is 0.5245 while the average value for the 55-64 year old age group is 0.5231. One can conjecture that this change amounts to about a 0.1 in (3mm) loss in sitting height for a 73 in (185 cm) male who is 60 years old in comparison to when his standing height is at the maximum. In other words, it can be concluded from the HES and HANES data that the ratio of upper body length to total standing height remains nearly constant with only a small effect due to differential shortening of the spinal column with age.

The third observation is based on the study by Borkan, et al (1983). The data presented in Table 8 are very similar to those developed for Table 7. The ratio of sitting height to standing height is nearly the same for the 60-69 decade as for the earlier years. It drops considerably for subjects over 70 years of age. Borkan has also conducted longitudinal studies of the ratio of sitting height to standing height for the individual participants in the study. In these comparisons, the same measurements were taken on the same subject at two different times, ten years apart. The conclusion was that "the ratio of sitting height to total height had no age related differences." It was based on both longitudinal and secular considerations.

The conclusion is that sitting height remains a nearly fixed percentage of standing height for all age and standing height groups. It appears quite safe to make this assumption for the projections as well.

Table 6. Sitting Heights for the HES and HANES Surveys

Age	60-62 50% in (cm)	60-62 95% in (cm)	60-62 Mean in (cm)	71-74 50% in (cm)	71-74 95% in (cm)	71-74 Mean in (cm)	76-80 50% in (cm)	76-80 95% in (cm)	76-80 Mean in(cm)
18-24	35.9 (91.2)	38.3 (97.3)	35.8 (90.9)	92.5 (36.4)	99.0 (39.0)	92.6 (36.5)	92.7 (36.5)	98.9 (38.9)	92.8 (36.5)
25-34	36.1 (91.7)	38.4 (97.5)	36.0 (91.4)	92.8 (36.5)	98.8 (38.9)	92.7 (36.5)	93.1 (36.7)	99.0 (39.0)	93.1 (36.7)
35-44	36.0 (91.4)	38.0 (96.5)	35.9 (91.2)	92.1 (36.3)	97.6 (38.4)	92.0 (36.2)	92.9 (36.6)	98.6 (38.8)	92.8 (36.5)
45-54	35.7 (90.7)	38.0 (96.5)	35.7 (90.7)	91.7 (36.1)	97.5 (38.4)	91.6 (36.1)	92.2 (36.3)	97.5 (38.4)	92.0 (36.2)
55-64	35.3 (90.0)	37.7 (95.8)	35.2 (89.4)	90.8 (35.7)	96.4 (38.0)	90.6 (35.7)	91.1 (35.9)	96.7 (38.1)	91.0 (35.8)
65-74	34.8 (88.4)	36.9 (93.7)	34.7 (88.1)	89.2 (35.1)	95.0 (37.4)	89.1 (35.1)	89.6 (35.3)	95.5 (37.6)	89.4 (35.2)

Table 7. Ratio of Erect Sitting Height to Standing Height for HES and HANES Surveys

Age	60-62 50%	60-62 95%	60-62 Mean	71-74 50%	71-74 95%	71-74 Mean	76-80 50%	76-80 95%	76-80 Mean
18-24	.523	.524	.521	.522	.522	.524	.524	.521	.524
25-34	.523	.520	.521	.525	.524	.524	.527	.528	.527
35-44	.525	.524	.524	.525	.523	.524	.527	.524	.526
45-54	.523	.523	.523	.525	.525	.524	.526	.525	.525
55-64	.522	.522	.522	.523	.524	.523	.525	.524	.523
65-74	.521	.520	.519	.522	.522	.522	.523	.521	.522

Table 8. Ratio of Erect Sitting Height to Standing Height Taken Ten Years Apart on the Same Population by Borkan, et al (1983)

Age	Time 1	Time 2
20-29	.526	.525
30-39	.527	.528
40-49	.527	.527
50-59	.527	.527
60-69	.526	.526
70+	.522	.520

5.0 PROJECTIONS FOR THE 20-30, 30-40 AND 30-60 YEAR OLD AGE GROUPS

In order to develop projections of large male of standing height, it is necessary first to obtain estimates of the percentage of the U. S. population in the various age groups that are being considered. Given this information, projection formulae can be developed with the necessary weighting factors to account for differences in the size of each group.

The population distribution used for the 1976-1980 HANES survey will be used as a model. Table 9 lists the estimated population in each of the age groupings used in the

Table 9. U. S. Adult Male Population by Age Group

Age Group	Estimated Population in Thousands
18-24	13,275
25-34	15,895
35-44	11,367
45-54	11,114
55-64	9,607

survey. It should be noted that the 18-24 year old group covers a seven year span while the remainder of the groups cover ten year spans. This leaves out 15 to 17 year olds who are smaller in standing height and not considered to be representative of the 20-30 year old age group.

The formulae shown as Equations 2 include weighting factors derived from the numbers in Table 9. The quantities H20, H30, H40, H50, and H60 are input quantities to

$$
\begin{aligned}
H2030 &= ((H20 * 133) + (H30 * 159))/(133 + 159) \\
&= 0.46 * H20 + 0.54 * H30 \\
H3040 &= ((H30 * 159) + (H40 * 114))/(159 + 114) \\
&= 0.58 * H30 + 0.42 * H40 \\
H3060 &= ((H30 * 159) + (H40 * 114) + (H50 * 111) + (H60 * 96)) \\
&\quad / (159 + 114 + 111 + 96) \\
&= 0.33 * H30 + 0.24 * H40 + 0.23 * H50 + 0.20 * H60
\end{aligned}
\qquad (2)
$$

the projection equations. They represent standing heights at 20,...,60 years of age. The terms H2030, H3040, and H3060 are the estimated standing heights for the 20-30, 30-40, and 30-60 year old age groups.

These formulae were evaluated using standing heights projected for the years 1985, 1995, and 2005 which are included in Table 5. The final results are in Table 10.

Table 10.
Large Male Standing Height Projections for the Years, 1985, 1995, 2005

Year	Age Group	Standing Height, cm (in)
1985	20-30	189.7 (74.7)
	30-40	189.1 (74.4)
	30-60	187.8 (73.9)
1995	20-30	190.8 (75.1)
	30-40	190.1 (74.8)
	30-60	188.8 (74.3)
2005	20-30	191.8 (75.5)
	30-40	191.1 (75.2)
	30-60	189.8 (74.7)

These results are considered to be conservative based on the assumptions that have been made. The major assumption is that the secular trend toward greater standing height is continuing at least through birth dates of 1985. This assures that 95th percentile standing height should be no more than those values given in the table. At the same time, evidence has been presented that it also may very well not be less.

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