

stage of development of this potentially important branch of medical genetics to say that after having read the book the reader will find himself with many more questions than answers.

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BUILD AND BLOOD PRESSURE¹

NEW evidence that large variations in mortality are associated with body weight and with blood pressure is provided by the findings published by the Society of Actuaries in Volume One of BUILD AND BLOOD PRESSURE, 1959. The unfavorable effect of excess weight and of elevated blood pressure on health has been widely recognized for a number of years, very largely as a result of earlier studies by the Society of Actuaries. Insurance companies have a unique opportunity to study mortality over a period of years among large populations of policy holders for whom various individual characteristics are available, such as weight and medical impairments. This latest statistical analysis of mortality from 1935 to 1954 not only provides data on recent mortality experience for several million persons but also furnishes up to date measures of height, weight, and blood pressure. The findings no doubt will be carefully studied by professional personnel in the health field for significant implications to programs for promoting better health.

The study is based on the mortality experience of persons aged 15 to 69 years to whom Ordinary standard policies were issued in the years 1935 to 1953, except that in the build study policies substandard only because of weight are included and in the blood pressure study, those substandard only because of blood pressure are included. Data for persons with selected minor impairments who were eligible for standard insurance are included. The analysis is done separately for this group and the relation of specific impairments to variations in mortality according to build is shown. The population for whom

¹ BUILD AND BLOOD PRESSURE STUDY 1959. Vol. 1. Society of Actuaries.

records were assembled, the data on build and blood pressure and that on minor impairments are described in detail in the report. It is the opinion of the authors that this insured population includes a sizable proportion of wage earners and a representative portion of the later immigrant stocks, whereas in earlier studies, the bulk of the population was in the middle and upper economic groups.

Mortality experience is expressed throughout the report as a ratio of the reported deaths among any group of policy holders to the expected number of deaths estimated from a Basic Table of Mortality Rates for 1935–1954 according to “Age at Issue” and “Policy Years.” This Basic Table was developed from insurance mortality experience for men and women combined and is used for estimating expected deaths for each sex. It is so predominately weighted by mortality of men that the mortality ratio for the male population in the study on build is 99. For the total female population, however, the ratio is 60, and decreases from 74 at ages 20 to 29 to 51 and 53 at ages 50 to 59 and 60 to 69. Consequently, the mortality ratios compared for subgroups of men classified by build or other characteristic have a relative variation centering around approximately 100. But for women, the relative variation must be judged with reference to a base ratio as low as 50 for older women. This can be misleading unless careful attention is given to the percentage variation of the mortality ratio for a specific subgroup from the ratio for the compared subgroups. For example, for men aged 40 to 69 in the most overweight group (V) with 1 to 19 policy years, the mortality ratio is 137 compared with 94 for men in the normal weight group (II) (page 79). For women in these subgroups, the mortality ratios are 72 and 49 (page 82). This represents a 46 percentage excess in mortality for the overweight men, and a 47 percentage excess for overweight women, although the differences in percentage points are 43 and 23 for men and women, respectively. The authors of the report were fully cognizant of this problem, of course, and it is mentioned here only because of its importance to any comparisons of effects of weight or blood pressure on mortality among men and women, and to comparisons of variations in mortality for younger and older women.

The scope of this mortality investigation may be indicated by listing the major characteristics of the population for which variations in mortality are examined. Mortality ratios in the build study are given for: (1) specific weight-height classifications by sex and age at issue, and five "build" classifications by sex and age at issue and by sex and policy year durations since issue for (a) persons without known minor impairments, (b) persons with minor impairments and (c) total with and without minor impairments, including persons whose status was not determined; (2) cause of death for broad weight-height groups; (3) obese persons, weight exceeding 254 pounds; (4) groups with specific minor impairments classified by build and age, and by build and "policy years"; (5) specific weight-height classifications for persons issued substandard policies because of overweight who subsequently had standard insurance because of weight reduction. In the blood pressure study, mortality ratios are given for: (1) specific systolic-diastolic blood pressures classified by sex and age for persons with and for persons without known minor impairments, and for the total including those for whom minor impairment status was unknown; (2) specific causes of death among men and among women classified by age and by broad systolic-diastolic blood pressure groups; (3) groups with specific minor impairments classified by systolic blood pressure and by diastolic blood pressure and by age at issue and policy years since issue. A separate analysis of the mortality experience of men and women classified as substandard risks because of excess weight is made according to age at issue of policy and blood pressure at that time.

The major variations in mortality associated with height, weight, build (weight for height), blood pressure levels and minor impairments and the interaction of these factors by sex and age are summarized in the report. Obviously, it is not possible to review them, but a careful reading of this well-prepared text is both necessary and interesting to anyone desirous of understanding the findings from this investigation. In the discussion of comparisons of the current study with the two earlier intercompany investigations of build and mortality (experience on issues of 1885 to 1908 and on issues of 1885 to

1927), the authors summarize major findings concerning build and mortality as follows: (page 95)

The major changes in mortality among men according to build are the relative improvement for tall men at most ages and the relative worsening for short men at most ages. . . . Comparisons . . . for specific weight ranges according to height show a somewhat mixed picture. The most consistent change is the decline in the mortality ratios for tall underweights, especially at ages under 40, and the increase in the mortality of short overweights at most ages. . . . All three studies bring out the clear-cut disadvantage of overweight—mortality ratios rising in every instance with increase in degree of overweight.

With such a large experience for mortality in relation to height and weight and to blood pressure, up to date tables for desirable weight and the most favorable blood pressure can be prepared. This has been done for weight by the Metropolitan Life Insurance² which has published "New Weight Standards for Men and Women" to replace the former tables of "Ideal Weights for Women" and "Ideal Weights for Men" which have been very widely used. Data from the BUILD AND BLOOD PRESSURE STUDY show that mortality was most favorable for persons who were below average weight for height and age and also that average weights for women are now less than those obtained from earlier studies but for men tend to be somewhat higher. In the new standards of weight, the upper limits of weight for men have been changed very little but the range has been widened. For women, the upper limit of desirable weight has been reduced 5 or 6 pounds for the medium frame category and the range also widened. The consistency of the evidence that even a moderate degree of overweight is unfavorable makes it clear that weight control is an important health problem even for those who are free of impairments. It is encouraging to find that the mortality of overweights who reduced was in general comparable with that of standard risks.

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² *Statistical Bulletin*, Metropolitan Life Insurance, November-December, 1959.