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## YOU SHOULD LIVE SO LONG!

by Arthur Pedoe

It is stated that more than one thousand teams in the U. S. alone are doing research work concerning the span of human life and human vigour at the higher ages. It is a problem for actuaries to keep advised of the results of this work.

The *Gerontologist* is one learned periodical covering this field and recently three articles have appeared covering research by the Center for the Study of Aging and Human Development at Duke University, N. C., under Erdman B. Palmore, Ph.D., Associate Professor of Medical Sociology. (Vol. 8, No. 4; Vol. 9, Nos. 2 and 4). The initial article deals with the effects of aging on activities (physical and mental) and attitudes (satisfactions). Some striking conclusions are drawn from these three investigations, all of which will interest actuaries and some of which, in particular, actuaries will dispute.

Dr. Palmore suggests that life insurance companies could substantially improve the accuracy of their estimates of longevity of their applicants by using tests of "intelligence" and "work satisfaction" or a similar rating of social adjustment, which his researches indicate are important factors in predicting longevity. Of the 35 references given in his three papers not one refers to an actuarial investigation; yet actuaries and their medical associates have done considerable work over the last 70 years in evaluating the factors which appear to determine mortality. Of course, Dr. Palmore is mainly concerned with older lives, from ages 60 to 90, whereas actuarial investigations are mainly concerned with younger ages.

The Duke University researches indicate that there is no overall reduction in activities as people get older. Disability

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## COMMITTEES

As the members of the Society know, the Committee on Professional Development under the Chairmanship of Paul A. Campbell submitted a comprehensive and detailed report to the Board of Governors. One of the recommendations was that the Society "inform all members of committee functions and opportunities and actively solicit participation."

The Board concurred in this recommendation and a series of articles on the operations of various committees will appear in *The Actuary*. The first of these is on the Committee on Investments. This has been prepared by Robert H. Hoskins who as Treasurer during 1968-71 was also *ex officio* chairman of that Committee.

The successful operation and growth of the Society depends to a large extent on the Committee structure. This series gives the members a chance to learn more about how the work of the Society is handled. Any member who believes that he can contribute to the work of any Committee is invited to communicate with the Chairman.

Robert J. Myers  
President

## Committee on Investments

by Robert H. Hoskins

As stated in the *Year Book*, "This Committee evaluates the investment policy of the Society and recommends changes to the Board of Governors. It also interprets investment policy and advises the Treasurer in the management of the Society's investments."

## Investment Policy

When the Society of Actuaries was formed to succeed the Actuarial Society of America and the American Institute

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## PROSPECTIVE MEDICINE

Lewis C. Robbins, M.D., M.P.H. and Jack H. Hall, A.B., M.D., *How To Practice Prospective Medicine*, Methodist Hospital of Indiana, Indianapolis 1970, \$7.50.

by Paul S. Entmacher, M.D.\*

Drs. Robbins and Hall have taken an interesting approach to the appraisal of health and those factors that have an adverse effect on an individual's long-term prognosis.

There are many similarities between life insurance underwriting and health hazard appraisal and this point is made repeatedly by the authors. Life insurance statistics have been used whenever possible. The overall objective of health hazard appraisal is different, however, since it is an attempt to demonstrate to an individual in a numerical fashion his state of health and how it may be adversely affected by certain risk factors. It also tries to show how his state of health and presumably his life expectancy can be improved if those risk factors are modified or removed.

Briefly, the authors have presented tables that show the probability of dying from specific causes within a ten-year period. The data, based on the 1960 U.S. mortality experience and the population as defined in the 1960 census, are presented in five-year age groups by sex and race. Only the 10 to 15 leading causes of death are considered and there is a large "other causes" category. Thus the number of deaths per 100,000 population by cause for each age is tabulated, and these are then collated into tables that project for a ten-year period the chances of dying from a specific cause of death.

For example, a white male in the age

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ty or sickness will force changes, but the aged as a group tend to maintain their standard of activities. They may change from physical to other activities such as contacts with family and friends or reading; it is the total rating which counts. Changes in total activities appear to be directly correlated with changes in total satisfactions. Over a span of ten years the men investigated showed almost no overall reduction in activities or satisfactions; the women had significant but quite small reductions over the same period.

In this initial research 127 volunteers (51 men and 76 women) were examined and interviewed, for the first time during 1955-59 and thereafter at approximately three-year intervals. When interviewed for the fourth time (1966-64) they ranged in age from 70 to 93 with a mean age of 78. All were ambulatory, non-institutionalized residents of central North Carolina. Their distribution by sex, race, and occupation approximated that of the area. However, there is a qualification mentioned later regarding this. The summary of this part of the research is: "The American formula for happiness in old age is to keep active"—find substitutes for activities which must be given up—substitutes for work when forced to retire and substitutes for friends and loved ones when lost by death. The idea that the aged become increasingly rigid and set in their ways does not find support.

### Work Satisfaction and Longevity

The importance of the conclusions of the initial paper is that, in the next two investigations, *work satisfaction* is shown to be the best overall predictor of longevity, particularly among the men aged 60 to 69. This means a person's "reaction to his general usefulness and ability to perform a meaningful social role."

The second most important predictor is the *overall happiness* rating given by the interviewer, reflecting a person's general satisfaction with his or her situation. Note that the first two most important factors are social-psychological rather than based on some measure of health or mental abilities.

The third most important longevity predictor is the *physical functioning rating* as given by the examining physi-

cian. The examination is unusually extensive, including physical and neurological examination, audiogram, encephalogram, besides medical history, chest X-ray, electrocardiogram, and laboratory studies of the blood and urine. It is stated that a history of cardiovascular disease has a strong negative correlation with longevity which accords with medico-actuarial studies. For the older men (over 70) this physical functioning rating is the most important predictor.

One result hard to accept is that "obesity or emaciation" has little effect on longevity. Obesity is considered a definite negative factor in the U.S.A. Recently observing a group photograph of 12 of the most senior officers of a life insurance company with four million policyholders and founded some 50 years ago I noted that 6 were substantially overweight, 4 were very well nourished and only 2 were of normal build, of which one appeared to be the youngest of the group. What has happened to Uncle Sam? In life insurance ratings, overweight is considered an important factor.

### Tobacco as a Factor

Tobacco use contributed a significant negative factor to longevity prediction. It was particularly noticeable among the men in the age 60-69 group and among black men, probably reflecting their greater use of tobacco.

The above predictions of longevity were based on 268 volunteers from the central region of North Carolina as in the initial study. From among the hundreds of measures taken during the two-day examinations, 38 items were selected to test for correlation with longevity. Only the few mentioned as well as those based on Intelligence Tests indicated any significant relation with longevity. Actuaries should note the two-day examination. The 268 volunteers were aged 60 to 94 at the initial examination some 15 years ago and the records of death were noted in this period. For those living at the end of the period (about half the panel) the total years recorded would be the expectation of life at the end of the period plus the period since the initial testing. The expectation of life was that for North Carolina (State Life Tables, Public Health Service, 1959-61).

Dr. Palmore acknowledges that certain of his findings are not in accordance with usual acceptance. Thus the measures of socio-economic status—education and occupation—do not appear to have any relevance to longevity. Actuaries consider them of major importance. In *The Actuary*, February 1969, there is an article on the subject by the writer, quoting figures from *TSA XII* and *XV* and referring to a paper by Quint and Cody of the Metropolitan Life which has the opening sentence: "It has been recognized since the early 1800's that there were wide differences in mortality by social class."

The group of people studied in North Carolina approximated a cross section of those of the area in which they lived. It is stated: "Nevertheless, analysis of selection and attrition factors indicates that the panelists were a social, psychological and physical elite among the aged and became more so through time . . . This would tend to reduce the variance attributable to socio-economic status."

### Family History

Another criticism is that there is no correlation shown between longevity and the father's and mother's age at death. It is stated that in a large scale survey in the USSR a similar lack of inherited longevity was found. Family history is a recognized factor in life insurance evaluation of an applicant's future mortality. A radical change in standards of living and social organization might offset to some extent a poor family history, but this would not be expected in the U.S.A. Dr. Palmore warns us that generalizations based on a sample of volunteers from the central region of North Carolina should be made with extreme caution and that correlation does not prove causality.

The importance of *work satisfaction* in predicting longevity as shown in these researches is well worth further study. Lack of satisfaction may be a major factor in such middle-age illnesses as the cardio-vascular group. Actuaries would fully endorse Dr. Palmore's summary that in general the most important ways to increase longevity are (1) maintain useful and satisfying role in society, (2) maintain a positive view of life, (3) maintain good physical functioning, and (4) avoid smoking. □