

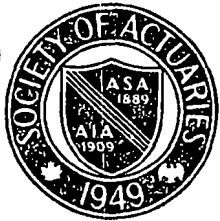


SOCIETY OF ACTUARIES

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# The Actuary

The Newsletter of the Society of Actuaries

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## PATTERNS OF MORTALITY

Editors: Richard B. Singer, M.D. and Louis Levinson, F.S.A., *Medical Risks: Patterns of Mortality and Survival*, Lexington Books, D.C. Heath and Company, Lexington, Mass., 1976, \$25.00.

by Frank E. Rooke

"Monumental" is an adjective one hears in reference to this book and it certainly seems apt both in regard to the tremendous amount of work in its preparation and, more importantly, its value to those to whom it is directed. The book contains a mine of information in the form of mortality indices relating to a large number of "risk factors", mainly specific diseases, abnormal physical findings, or abnormal findings on medical tests.

The book is described as a reference volume sponsored by the Association of Life Insurance Medical Directors of America and the Society of Actuaries. For the history of the evolution of the book the reader is referred to the Preface. There is a long list of contributors — 22 in all — whose assistance is gratefully acknowledged by the Mortality Monograph Committee who were responsible for the total production of the volume. A special word of appreciation is due the Editors, Richard B. Singer, M.D. and Louis Levinson.

This volume breaks new ground in that for the first time the bulk of the data presented is drawn from sources outside insured populations, thus covering many patient groups and conditions not likely to be found among persons who have been issued life insurance.

To a considerable extent, therefore, this book is based on reports of follow-up studies reported in medical literature. Over 2,000 articles were evaluated in the search to find those with data in a form suitable for producing the mortality indices desired. Results from these

(Continued on page 3)

To All Our Readers,  
A Happy New Year!  
The Editors

The Society of Actuaries and the American Academy of Actuaries have submitted a joint brief *amici curiae* in the case of the *City of Los Angeles et al. versus Marie Manhart et al.* scheduled for the October term of the Supreme Court of the United States. The pension plan of the City of Los Angeles, Department of Water and Power, requires larger contributions from female employees than from their male counterparts. The 9th U.S. Circuit Court of Appeals held that this violated Title VII of the 1964 Federal Civil Rights Act as amended by the Equal Employment Opportunity Act of 1972. This title prohibits discrimination by sex in employment, including compensation. The decision has been appealed to the Supreme Court.

## MINORITY SCHOLARSHIP PROGRAM

by Eugene M. Woodard

In the June, 1977 issue of *The Actuary*, I reported on a change in direction of the Society's Minority Recruiting Program. Basically, the article discussed the discontinuance of the Lincoln University Summer Institute and the formation of a new expanded actuarial scholarship program. This is a report on the scholarship awards granted for the school year beginning in the Fall of 1977.

Scholarship material was distributed earlier this year to a number of colleges and universities throughout the U.S. As a result, the Society received 36 appli-

(Continued on page 2)

## REORGANIZATION OF THE ACTUARIAL PROFESSION

by Anna M. Rappaport

There are many problems facing the actuarial profession in the mid and late 1970's. The profession is small, but it is also divided. There are several actuarial organizations in North America, and as a result different groups are addressing limited energy to the same problems. It seems clear that it makes little sense to have 6-8 organizations representing the needs of under 10,000 people.

The Board of Governors of the Society of Actuaries has recognized that the profession would be stronger if unified, and in October 1976 it unanimously endorsed a proposal for reorganization of the actuarial profession. The full report of the ARC Committee together with the motion adopted by the Board was mailed to the membership late in 1976.

The Board authorized the appointment of a Committee to proceed with the reorganization. The Committee has been set up with Julius Vogel as Chairman, and Barbara Lautzenheiser as Vice Chairman. The Committee members are Paul Barnhart, David Carpenter, Richard Daskais, Robin Leckie, Jim MacGinnitie, Anna Rappaport and Gathings Stewart.

The Committee has met twice. Its mission is to serve as a negotiating body for the Society of Actuaries, so that a proposal could be developed in enough detail to be brought to the boards and members of all the actuarial bodies for them to vote on. The ARC proposal was deliberately left vague so it could be a starting point for negotiations.

At present, the Society of Actuaries is the only body which has endorsed the principles of the ARC proposal. The

(Continued on page 8)

## Patterns of Mortality

(Continued from page 1)

studies appeared in a wide variety of forms with virtually none containing the specific age and year-by-year data available in life insurance investigations. As a consequence, the writers had to develop, frequently by trial and error, techniques to approximate the set of indices they set out to illustrate. These indices include annual and cumulative rates of mortality and survival, excess death rates (EDR) per 1,000 per year, mortality ratios and survival indices.

One example of the type of approximation used is the case where source data is a set of cumulative survival rates at intervals longer than one year. Here the assumption was made that the annual rate of survival, intermediate between the reported rates, was constant. For an  $n$  year interval, the  $n^{\text{th}}$  root was extracted to produce a geometric mean annual rate of survival from which intervening functions were derived. Similarly where the source material is in the form of aggregate deaths and exposures over several years, the aggregate mean  $q$  was taken as the average rate over the constituent years. When such methods have been used, appropriately defined symbols are employed in the table headings. According to the circumstances the authors have used, for the cumulative mortality ratio, either the cohort method with the formula  $Q/Q'$  or the annual exposure method using  $\Sigma d/\Sigma d'$  (with the prime identifying "expected"). In the latter case, the expected deaths are based on the observed year-to-year exposures, whereas the former ratio uses the complement of the product of survival rates. In effect the expected deaths in the cohort method are larger if, as is usually the case, the decremental rate in the exposures is larger than in the standard table. The result is larger ratios by the annual exposure method by amounts that can be rather substantial. However, it is not thought that this or the various approximations resorted to by necessity because of the nature of the original data invalidate the general results obtained. In general the risk factors reported on in other than the life insurance experiences are associated with high mortality ratios and fine distinctions are relatively unimportant. Other examples of the ingenuity of the Committee in solving problems are to be

## Deaths

Jesse D. Brown  
Charles C. Dubuar  
Gilbert A. Heun  
Aubrey L. Joyce  
Gladstone Marshall  
William J. November  
Frederick P. Perkins  
James H. Van Dyke

found in Chapters 1, 2 and 3 covering, respectively, Plan and Scope of the Study, Methodology, and Interpretation of Comparative Mortality and Survival Data.

The book consists of two major divisions, Part I of 172 pages being the Text and Part II of 520 pages being the Tabular Extracts. The latter include with each set of tables a note containing References, Subjects Studied, Follow-up and Results. Some may think the tables to be unduly elaborate but the intended readership includes people accustomed to using different indices. Life insurance underwriters, for example, probably have little interest in survival rates and ratios, but many involved in medical research use them. In addition to mortality ratios, those involved in life insurance selection are likely to find the Excess Death Rate helpful. A diminishing mortality ratio by age tends to give the superficial impression of diminishing importance. But the EDR may be remaining level or even increasing and thus its display helps keep the picture in focus. Also, very high ratios, such as, to quote an example, 34,000%, are a little difficult for some of us to grasp. The EDR in such cases is more meaningful. The studies included in the Tabular Extracts come from a wide variety of sources, with various medical journals being the commonest source. Studies by the End Results Section of the National Cancer Institute are the source for the very extensive tables relating to that disease. The Framingham Study provided material for a number of tables on cardiovascular disease. The Mayo, Cleveland, Joslin, and other clinics are prominently represented. While the bulk of the material is United States data, several other countries are represented including Canada, Great Britain, Denmark, France, and Israel. There are also many tables based on the data of individual

life insurance companies including the Prudential Assurance Company of London, England, the Sverige Reinsurance Company, Sweden and a number of United States companies, most prominently the New York Life whose previously unpublished Single Impairment Studies form the basis of numerous tables.

The first part of the book, following the three introductory chapters on Plan and Scope of the Study, Methodology, and Interpretation of Comparative Mortality and Survival Data, has thirteen chapters in which the various risk factors are discussed. These briefly describe current thinking on the nature of the disease process, illustrate the incidence of the disease (most commonly by tables of the number of deaths in the United States in 1970) and discuss the follow-up results reported in Part II. Here is a sampling of topic titles: "Prognostic Significance of Coronary Arteriography"; "Post Exercise ECG (Master's Test)"; "Impact of Coronary Artery Bypass on Prognosis"; "Prognosis in Hypertension Since 1955" (i.e. since the advent of widespread use of anti-hypertensive medication); and even "Cardiac Transplant." One of the more surprising results is the high level of residual excess mortality after ten years following diagnosis of cancer in many sites.

From Dr. Singer's *Preface*:

"There is a long tradition of cooperation between the two sponsoring organizations both dependent in their professional activities on the availability of suitable mortality data in the preparation and production of mortality studies. Extensive studies based on life insurance experience were jointly undertaken and published between 1914 and 1960. The present volume continues this tradition of making contributions to scientific knowledge of mortality in relation to body build, blood pressure, and other medical characteristics."

Those of us who are involved in life insurance risk selection, and I have no doubt this is shared by the others for whom this reference volume is intended, owe a debt of gratitude to the authors and their colleagues for the tremendous amount of time and effort which they have devoted to this task and for the truly excellent book which has resulted. □