TRANSACTIONS OF SOCIETY OF ACTUARIES
1968 VOL. 20 PT. 1 NO. 58

BOOK REVIEWS AND NOTICES*

* Society of Actuaries' Textbook, *Health Insurance Provided through Individual Policies*, Edwin L. Bartleson, Principal Contributor, pp. x, 240, Society of Actuaries, Chicago, Ill., 1968.

The contributing authors are to be congratulated on their success in enveloping the kaleidoscopic changes in the individual health insurance business that took place in the five years subsequent to the previous revision of this textbook.[1] A careful examination of this almost-new book reveals no instance of intentional or accidental omission of any of the items to which attention was drawn by the two previous reviewers. Indeed, additional material has been included in sufficient detail to warrant a statement in the Preface that, in addition to its purpose of serving the needs of students, "It is also intended to serve as a reference for practicing actuaries." This it does very excellently, but perhaps to the point of overburdening the student.

The authors have shown commendable restraint in not devoting excessive space to recent developments that have not demonstrated evidence of sales appeal and to basic values that will stand the test of time. Some coverages that are no longer a factor in the individual health insurance business have been given very scant or no mention in this new textbook. The need for some was short-lived, as, for example, polio coverages; others served as a nucleus around which broader coverage was developed, as in the case of a blanket accident medical expense reimbursement.

The business has thrived because of the steady development of new products, and, although the description of the tremendous expansion of the past twenty-five years is compressed into the first five pages, it is certain to engage and stimulate the interest of every Fellowship student. It is unfortunate that space was not available for a chapter that would provide a discussion of the broad issues that face the actuary today and bear importantly on his role in the long-range management problems of this business. Such a chapter would enable the text to focus the attention of the student on the interrelationship of social insurance, Blue Cross, and group insurance with individual health insurance coverage. The health actuary can neither design his contracts nor measure their markets without such orientation.

The serious student will not fail, however, to get the message that is spelled out, chapter by chapter, that this is a dynamic and extremely fluid line of insurance that will test both the managerial and technical skills of the actuary. Mr. Bartleson has woven this theme into the structure of his book, turning it into a truly cohesive exposition rather than what might have been a series of

* Books and other publications noted with an asterisk (*) may be borrowed from the library of the Society of Actuaries under the rules stated in the *Year Book*.

[1] Reviewed in *TSA*, XV, 600.

disjointed chapters. This was not an easy task, although it must be conceded that health insurance is fine material and his contributing authors were thoroughly competent. It is to be regretted that more attention could not have been given to current sociological mores which have substituted status for stigma for some physical and mental ills. The consequent inflation of cost and rise in demand for medical care more importantly affects actuarial calculations than the notation of the commutation symbols.

Some of the detailed data on past developments—such as coverage adjustments required as a result of Medicare enactment; the status of Uniform Law amendments in Wyoming and South Dakota, on pages 68–70; and the special state requirements of pages 72–76—could have been relegated to the Appendix. On the other hand, more substantial attention should have been given to the effect of increased social security disability coverage in reducing the market and in increasing the overinsurance underwriting problems for disability insurance.

Chapter iv on "Underwriting," is well written except for the introductory paragraph, retained from the previous edition. It is suggested that the chief objective of underwriting "is the determination of a premium. . . ." It would be desirable to restore the more understandable definition that appeared in the first edition of this book even though it is not quite as lucid as that contained in McGill's text on *Life Insurance*. It is not made clear that the basic principle of health underwriting is to avoid antiselection as to (*a*) frequency of claim, (*b*) severity, and (*c*) termination of benefits.

Too much attention is given to the interesting underwriting problems of long-term disability insurance and too little to the dull underwriting of medical care coverage of dependent females, included in most of the applications currently written. Moreover, it is not stated definitely that most of the current premium volume (as well as excessive claim cost) arises from medical care insurance for females. It would have been desirable to call attention to the repeated increases in medical care premium rates in recent years required as a result of unsatisfactory financial experience; for the contrastingly good experience on noncancellable disability coverage, the student could be referred to the tabulation and summaries of the Argus Chart.

Somewhere in the underwriting discussion of the "Significance of Medical History and Physical Impairments" there should be a fairly complete exposition of the approaches of medical care underwriters toward solving their most important problem—the elimination of coverage for pre-existing conditions through impairment riders and contract language that make it possible to decline the claims that were in gestation before the policy was born. The additional text could be offset by condensing the five pages on "The Underwriting of Substandard Risks," for which figures on premium volume would enable the student to evaluate the importance of the extra premiums that actually result from this complex but experimental type of underwriting.

In chapter vii it is unfortunate that the paragraph on page 91 of the previous

edition, deploring the scarcity of statistical data, was copied verbatim into the new book. The detailed compilations prepared by the Society's Morbidity Committee during the past five years and published in the *Transactions' Reports*, listed as references, certainly call for a change in that paragraph (now on p. 123). Also, the reference on page 135 to Mr. Bassford's paper prepared for the 1940 International Congress of Actuaries might have been deleted and replaced with a reference to the two up-to-date papers[2] at the 1968 International Congress; they were available before this book went to press.

Taken as a whole, the book poses the question, "What is 'adequate' medical expense coverage today?" The authors have provided an answer, perhaps cryptically, through their comments on pages 117, 121, and 197–202. The discerning student who gets the message of these very pertinent comments will conclude that "it is essential to offer only adequate coverage and strive for persistency." This conclusion is inescapable also for practicing actuaries, not as a result of altruistic objectives but because of its actuarial postulation. If the effective commission rates described are provided, with other expenses in line with those of page 200 and persistency as poor as that indicated on page 197, in states that have a measure of "reasonable" benefits, the problem of the actuary emerges as that of solving for the size of benefit that will produce a satisfactory gross premium.

Currently it will be found that close to $25 of daily room and board benefit in a basic type of policy is the minimum needed to satisfy the stated requirements on a sound actuarial basis. Generally this will require an annual premium of over $100 per male life. The text has made it quite clear that a smaller benefit is inadequate for both the present-day medical care costs of the policyholder and the insurer's successful financial operation.

I trust that the Examination Committee will forgive me for providing a solution to a question that would have tested the student's over-all assimilation of the practicalities so well delineated in this text.

EDUARD H. MINOR

* J. E. Greider and W. T. Beadles, *Law and the Life Insurance Contract*, Rev. ed., pp. xiv, 556, Richard D. Irwin, Inc., Homewood, Ill., 1968.

It was my privilege to prepare a review of the first edition of *Law and the Life Insurance Contract* in 1963.[3] After reading the Preface of the revised edition, as well as the complete text, it became apparent to me that my comments prepared in 1963 are applicable to this new edition. The following additions, however, seem pertinent as a supplement to this previous review.

[2] C. M. Sternhell, "Calculation of Gross Annual Premiums for Participating Noncancellable Monthly Income Disability Policies;" E. H. Minor, "Comments on U.S. Sickness Insurance and Bases of Premiums Therefor."

[3] Reviewed in *TSA*, XV, 603.

The revised edition of this book follows the format used in the first edition published in 1963. The authors have again presented the material in a sequence which covers the formation, operation, and termination of life insurance contracts. Court decisions and other illustrations have been revised and up-dated to reflect current legal thinking. Repetition of concepts is deliberately used as a means of communicating ideas and of achieving a better understanding on the part of the reader.

In my judgment the changes incorporated in this revised edition have been effective in maintaining this book as a valuable and informative one to those interested in the legal aspects of the life insurance contract.

I would like to point out an error in certain figures on page 3 of the book. In the second paragraph there is a figure shown for life insurance in force in the United States at the end of 1965. This figure as printed is $900,500 billion; it should be $900.5 billion, which checks with figures quoted in the *Institute of Life Insurance Fact Book*. Likewise, the figure shown for premiums paid in 1965 appears as $16,083 billion; the correct figure is $16.1 billion, which also is verified by the *Institute of Life Insurance Fact Book*.

KENNETH D. MITCHEM

SELECT CURRENT BIBLIOGRAPHY

In compiling this list, the Committee on Review has digested only those papers which appear to be of direct interest to members of the Society of Actuaries; in doing so, the Committee offers no opinion on the views which the various articles express. The digested articles will be listed under the following subject-matter classifications: 1—"Actuarial and Other Mathematics, Statistics, Graduation"; 2—"Life Insurance and Annuities"; 3—"Health Insurance"; 4—"Social Security"; 5—"Other Topics."

The review section of the *Journal of the Institute of Actuaries* contains digests in English of articles appearing in foreign actuarial journals.

ACTUARIAL AND OTHER MATHEMATICS, STATISTICS, GRADUATION

G. A. Barnard, "The Bayesian Controversy in Statistical Inference," *Journal of the Institute of Actuaries*, XCIII (1967), 229–50.

In this invited paper Professor Barnard provides an excellent summary of the history of the development of the principal schools of thought in statistics. He makes the point that the likelihood function, the density of the observed values viewed as a function of the distribution parameters, plays an important role in each of the principal theories of statistical inference. Within the modern Bayesian school the likelihood function is weighted by a prior distribution for the parameters to form a posterior distribution which is the basis for all inferences. Barnard believes that the power-function concept is the most important contribution of the Neyman-Pearson method of testing statistical hypotheses, and he points out the relationship between the likelihood and power functions. He views the likelihood principle, that an inference should be based on the likelihood function, as the intellectual intersection of the various schools of statistical thought. Besides putting the current controversy in its proper historical perspective, the paper will help an actuary to extend his understanding of several important statistical ideas, such as sufficiency and likelihood.

K. H. Borch, *The Economics of Uncertainty*, pp. vii, 227, Princeton University Press, Princeton, N.J., 1968.

This little book, written by a prominent Norwegian actuary-economist, covers a remarkably wide range of topics. Many of the principal results from utility theory, subjective probability, statistical decision theory, and game theory are stated and illustrated with business examples. No new results are presented in the book, and actuaries will recognize several examples which Borch has used in earlier actuarial papers. The book requires the reader to have mastered no mathematics other than that required by the preliminary actuarial examinations. A diligent reader will be rewarded with an introduction to many of the most important ideas in modern management science.

Howard Raiffa, *Decision Analysis: Introductory Lectures on Choices under Uncertainty*, pp. xxiii, 309, Addison Wesley, Reading, Mass., 1968.

The past decade has witnessed a veritable flood of books on statistical decision theory. These books have ranged in level from those written for use as texts in graduate courses in the mathematical sciences to popular expositions designed to persuade, not to teach. Howard Raiffa has been a major contributor to statistical decision theory as it is applied to business problems. The book he coauthored with Schlaifer, *Applied Statistical Decision Theory*, has undoubtedly had a profound impact on the development of the subject.

In the paperback volume being reviewed, Raiffa has summarized the salient points in statistical decision theory, using arithmetic and tight logical reasoning as a substitute for abstract mathematics. The book is not easy to read. This is, however, to be expected, for the ideas it develops are difficult. An actuary armed with pencil and paper, for use in confirming some of the demonstrations, and a willingness to follow tightly reasoned arguments will be amply rewarded in reading this book with significant insights into what the fuss is all about in decision theory.

Experts will be interested in Raiffa's development of subjective probability and utility. His overview of statistics, operations research, and allied disciplines in chapter x is delightful.

Health Insurance

U.S. National Center for Health Statistics, *Current Estimates from the Health Interview Survey, United States—July, 1965–June, 1966*, pp. 47, Public Health Service Publication No. 1,000, Series 10, No. 37, Washington, May, 1967.

"From July 1965 through June 1966, an estimated 404.4 million acute illnesses and injuries required restriction of usual activity or medical attention among the civilian, noninstitutional population." This represented 212.0 acute conditions per 100 persons per year. There were noted increases in the number of respiratory conditions, primarily influenza, and continuing decreases in the incidence of the infective and parasitic diseases.

Chronic conditions were reported by 49.1 per cent of the population with the percentage reaching a high in the 65-years-and-older age group (85.2 per cent). The report also presents statistics on the numbers of persons injured and associated disability days, the number of hospital discharges, the number of disability days associated with illness, and the number of persons with corrective lenses.

U.S. National Center for Health Statistics, *Prescribed and Nonprescribed Medicines, Type and Use of Medicines, United States—July, 1964–June, 1965*, pp. 41, Public Health Service Publication No. 1,000, Series 10, No. 39, Washington, October, 1967.

"Prescribed medicines are classified according to the condition for which prescribed, and annual costs are shown per person and per acquisition. The largest proportion of prescribed medicines, about 25%, were for illnesses with respiratory manifestations. Approximately 9% of all prescriptions were provided free, 81% were purchased with the cost known, and the remainder purchased with the cost unknown. The average cost per purchased acquisition ranged from $2.70 for the treatment of thyroid conditions to $4.70 for high blood pressure." The accompanying tabulation shows the per cent

PER CENT DISTRIBUTIONS BY COST OF PRESCRIBED MEDICINES ACCORDING TO CONDITION FOR WHICH PRESCRIBED

Condition for which Prescribed	Cost				
	Under $2.00	$2.00–$2.99	$3.00–$4.99	$5.00–$6.99	$7.00 and Over
Diabetes	25.1	20.9	16.3	22.2	15.5
Heart conditions (with or without high blood pressure)	25.2	17.8	29.4	15.2	12.4
High blood pressure	14.1	16.1	32.7	19.0	18.2
Peptic ulcers	40.8	19.5	20.7	10.6	8.3
Other digestive system conditions	34.4	22.1	26.8	11.0	5.6
Colds, coughs, throat conditions, and influenza	38.6	22.4	25.1	9.4	4.4
Other respiratory conditions	23.4	19.5	32.6	13.9	10.7
Kidney conditions	13.8	19.6	34.8	15.4	16.4
Other genitourinary conditions	9.9	21.6	34.6	18.7	15.3
Mental illness and epilepsy	21.4	21.3	31.0	15.3	11.1

distribution by cost of prescribed medicines according to the condition for which prescribed.

"Nonprescribed medicines are classified by type of medicine, and average costs per person and the distribution of costs by place of purchase are presented. Annual per person expenditures were found to be greatest, $1.40, for aspirin and aspirin compounds and for vitamins; several types of medicines fell into the lowest cost category tabulated, $.10."

U.S. National Center for Health Statistics, *Characteristics of Persons with Diabetes, United States, July, 1964–June, 1965*, pp. 44, Public Health Service Publication No. 1,000, Series 10, No. 40, Washington, October, 1967.

This report provides tables "on the number and per cent distribution of diabetics by age, sex, color, marital status, family income, and education." Included also are data in terms of number of chronic conditions, disability days, and limitations of activity.

"The reported prevalence of diabetes was higher among females than among males, and in both sexes increased with age, reaching a peak in the 65–74-year age group. . . . The median age of diabetics was more than twice that of the total population. While the rates of disability for diabetics were roughly three times those for the total population, much of the disability was attributed to conditions other than diabetes: the majority of diabetics (80.1%) had at least one chronic condition in addition to diabetes."

U.S. National Center for Health Statistics, *Hearing Levels of Adults by Race, Region, and Area of Residence, United States, 1960–1962*, pp. 33, Public Health Service Publication No. 1,000, Series 11, No. 26, Washington, September, 1967.

"Hearing tended to be somewhat less acute among white than Negro adults. By region, the rates for persons with better than 'normal' hearing were slightly greater in the South than elsewhere. Rural residents were found to be somewhat more likely than their urban counterparts to have better than 'normal' hearing below 4,000 cycles per second."

U.S. National Center for Health Statistics, *Total Loss of Teeth in Adults, United States, 1960–1962*, pp. 23, Public Health Service Publication No. 1,000, Series 11, No. 27, Washington, October, 1967.

"An estimated 20.1 million men and women, or 18 out of every 100, had lost all of their permanent teeth. The proportion of edentulous persons increased rapidly as age increased, rising from about 1 in 100 among the youngest men and women to as many as 1 in 2 among those 65 years of age and older. Within any given age group, relatively more women than men were edentulous and relatively more white than Negro adults. As levels of education and income increased, the prevalence of men and women without teeth decreased."

U.S. National Center for Health Statistics, *History and Examination Findings Related to Visual Acuity among Adults, United States, 1960–1962*, pp. 31, Public Health Service Publication No. 1,000, Series 11, No. 28, Washington, March, 1968.

"An estimated 60 percent of adults reported they wore glasses, and 32 percent said they wore them all the time. Women were more likely to wear them than men, but for both sexes the rate increased with advancing age. . . . History reports show that 7 percent (a rate which increases with age) have serious trouble seeing even with their glasses."

U.S. National Center for Health Statistics, *Osteoarthritis and Body Measurements*, pp. 37, Public Health Service Publication No. 1,000, Series 11, No. 29, Washington, April, 1968.

"Data are presented on the relation of osteoarthritis to body measurements. A strong positive relationship was found in both sexes between both osteoarthritis of the hands and osteoarthritis of the feet for those body measurements that denote body and limb girths and breadths. The age group 45–54 appeared to show the strongest association between body measurements and osteoarthritis."

U.S. National Center for Health Statistics, *Prevalence of Chronic Conditions and Impairments among Residents of Nursing and Personal Care Homes, United States, May–June, 1964*, pp. 36, Public Health Service Publication No. 1,000, Series 12, No. 8, Washington, July, 1967.

Residents of these homes are described in terms of their chronic conditions and impairments, mobility status, and length of stay in the homes, as well as by the services provided in the homes. On the average there were 3.1 conditions per resident, and only 4 per cent had no chronic conditions or impairments; 15 per cent of the residents were eighty-five years of age and over.

U.S. National Center for Health Statistics, *Charges for Care in Institutions for the Aged and Chronically Ill, United States, May–June, 1964*, pp. 51, Public Health Service Publication No. 1,000, Series 12, No. 9, Washington, August, 1967.

"Excluding approximately 3 percent of the residents who had made initial payment for lifetime care, the average monthly charge was $186. In general, charges increased with age and with the amount of care provided the individual patient. Charges were higher for females in all age groups. Regionally, average monthly charges ranged from a high of $213 in the Northeast to a low of $161 in the South. Residents with private sources of income paid an average monthly charge of $202, compared with $179 by those on public assistance."

Social Security

United States Congress, *First Annual Report on Medicare*, House Document No. 331, 90th Congress, pp. 101, U.S. Government Printing Office, Washington, June, 1968.

This report, prepared by the Department of Health, Education, and Welfare, presents an extensive analysis of the operations of the Medicare program during the period up to June 30, 1967. The report concentrates on the administrative and organizational experience, although certain information is given about the statistics of the experience.

F. Bayo, *Retirement Experience of Old-Age Beneficiaries, 1958–67*, Actuarial Note No. 43, pp. 3, Social Security Administration, Washington, June, 1968.

This note briefly analyzes the retirement experience of workers under the social security system for the years 1958–67. The "prevalence of retirement" among eligible workers has been relatively stable for females in the last eight years. For males the rates increased up to 1964 but have leveled off since then. Data are presented by sex and single years of age. A short discussion is included on the proportions of workers who have been electing to retire before age 65 with actuarially reduced benefits. It is concluded that 60 per cent of the female workers and 44 per cent of the male workers are retiring before age 65.

R. J. Myers, *Comparison of Actual Experience under Medicare with Original Estimates, 1966–67*, Actuarial Note No, 44, pp. 3, Social Security Administration, Washington, July, 1968.

This note compares actual experience under the Medicare program for calendar years 1966 and 1967 with the cost estimates which were made when the program was enacted in 1965. One difficulty in the comparison is the extent of administrative lag present; the HI cost estimate was made on the basis that no such lag would be present but that the experience would be on an accrual basis, whereas the SMI cost estimate attempted to recognize the lag that undoubtedly would occur. Still another problem was the timing of the government contributions (for both HI and SMI), which were assumed to be made on a current basis, although the actual experience did not develop in this manner.

Both the HI and SMI experiences as to benefit outgo were initially considerably lower than the estimates because of greater lag being present than had been anticipated, but on an accrual basis the reverse was the case. The contribution income for HI was somewhat larger than estimated, increases in taxable earnings being larger than had been assumed.

As a result of various counterbalancing factors, the balance in the HI Trust Fund on June 30, 1967, was only 4 per cent lower than had been estimated in 1965, being at a level of $1.1 billion. The balance in the SMI Trust Fund on that date was $412 million; this was close to 40 per cent more than had been estimated, which was due almost entirely to the much greater lag in benefit payments than had been assumed.

R. J. Myers and F. Bayo, *Disability Incidence Rates under OASDI System for Disability Onsets Occurring in 1956–63,* Actuarial Note No. 45, pp. 7, Social Security Administration, Washington, August, 1968.

This note briefly analyzes the incidence experience for disabilities with onset in the period 1956–63. The data are based on actual awards made before 1966 and on projections of awards after 1965. Values of the number of disability awards and of the incidence rates are presented by sex and by five-year age groups for each calendar year in the period. According to the analysis, the incidence rates increased until 1961 but remained relatively level thereafter through 1963. Preliminary data for 1966 and 1967 seem to indicate that, when disregarding the effect of the 1965 Amendments, the incidence rates have increased lately.

F. Bayo, *Termination Experience of Disabled-Child Benefits under OASDI*, Actuarial Note No. 46, pp. 6, Social Security Administration, Washington, September, 1968.

This note analyzes the benefit termination experience for disabled-child beneficiaries under the OASDI system. Data for the period 1958–66 are analyzed in a broad form, while the 1962–65 experience is analyzed in detail. Mortality data are analyzed separately, and a comparison with general population experience is presented. Annuity values based on the 1962–65 termination experience and on an extension of that experience at the older ages are given for different interest rates.

OTHER TOPICS

U.S. National Center for Health Statistics, *Suicide in the United States, 1950–1964*, pp. 34, Public Health Service Publication No. 1,000, Series 20, No. 5, Washington, August, 1967.

"During the 15-year period studied, suicide rates increased with age at least until the 65–74-year age group. Males committed suicide much more frequently than females and white persons more frequently than nonwhites." Suicide by firearms and explosives ranked far above all others. Hanging and strangulation were second, with poisonings the third most frequent means of committing suicide. The relationship of marital status to suicide, as well as variations in suicide rates by color, sex, and age, are discussed.

U.S. National Center for Health Statistics, *Homicide in the United States, 1950–1964*, pp. 33, Public Health Service Publication No. 1,000, Series 20, No. 6, Washington, October, 1967.

"Homicide occurred most frequently among adults aged 25–44. While homicide differed by both color and sex, the color differential was greater. The nonwhite population, which comprises 11 percent of the total population, accounts for about the same percentage of deaths from all causes, but for over 50 percent of all homicides for the years studied. The rate for males was more than three times that for females at ages

15–64. Data for 1959–61 indicate that the highest rates of homicide were in the South; and, by marital status, the age-adjusted homicide rate was highest for divorced and lowest for married persons. Differences by nativity of the white population were minor."

U.S. National Center for Health Statistics, *Methodology of the National, Regional, and State Life Tables for the United States: 1959–61*, pp. 24, Public Health Service Publication No. 1,252, Vol. 1, No. 4, Washington, October, 1967.

"This report describes the methodology employed in the preparation of the decennial life tables 1959–61 for the United States, individual States, the nine geographic divisions established by the Bureau of Census, and metropolitan and nonmetropolitan areas."

U.S. National Center for Health Statistics, *United States Life Tables by Causes of Death: 1959–61*, pp. 63, Public Health Service Publication No. 1,252, Vol. 1, No. 6, Washington, May, 1968.

"The life tables in this report are based on the 1960 census of population and the deaths of the 3-year period 1959–61. Separate life tables are presented for the total population and for each of the four color-sex combinations: white male, white female, nonwhite male, and nonwhite female." Each of the tables is based on data from the fifty states and the District of Columbia. The causes of death are combined into groups and subgroups according to the *Seventh Revision of the International List of Diseases and Causes of Death, 1955.*

Abridged life tables with specified causes of death eliminated provide information on the gain in life expectation that could be expected if the specified cause were completely eliminated "while the force of mortality at each age from other causes was that deduced from the mortality experience of 1959–61." From other tables one can find the probability of eventually dying from a specified cause of death.