COMMUTATION FUNCTIONS FOR INDIVIDUAL POLICIES PROVIDING FOR HOSPITAL, SURGICAL AND MEDICAL CARE BENEFITS AFTER RETIREMENT

BY

HENRY W. STEINHAUS

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Normally, actuarial tables for the purpose of calculating reserves and costs are the results of the joint work of special committees, groups of insurance companies, organizations such as rating bureaus and similar associations. It is unusual nowadays to have a table prepared by an individual actuary and presented for public use without all of the preliminary steps of appointing committees, issuing a call for data and then proceeding with the work, which is generally considered a major undertaking.

When the work is undertaken by a group of men, the judgment elements used are frequently arrived at on the basis of compromises. In this case Dr. Steinhaus has assumed full responsibility.

We have in this instance a set of tables, reasonably comprehensive in scope, prepared by an individual, suitable for use directly by the industry. Since the tables have not been prepared under the sponsorship of a major organization or committee of actuaries it becomes important to review them rather carefully, keeping the following main elements in mind:

(1) The adequacy of the basic data
(2) The actuarial procedures used in the construction of the tables
(3) The limitations that have to be placed on the uses of these tables.

(1) *The Adequacy of the Basic Data.*

The basic data used is a combination derived in part from the experience of other countries and in part from data compiled in this country. Some specific figures are shown to indicate the total exposure and number of cases considered. We have to assume that as regards actual volume of data the experience used is adequate. Furthermore since the basic data is not shown separately by year we have no means of judging as to whether or not there are any significant trends, or whether there occur any major variations from one year to another. Perhaps these are not too important, but they might have been illuminating.

A brief comment as to the use of the experience of foreign countries for tables to use in this country may be appropriate. Currently we have become accustomed to reliance on tables based entirely on United States experience. It was not always so. We have used the Northampton tables, the Combined Experience Table, the tables prepared by the Friendly Societies, and in determining widows' pen-

sions under workmen's compensation laws we still use the Dutch and Danish Tables. One of the earliest tables in the casualty field was the table prepared by our first president, Dr. I. M. Rubinow, called the Standard Accident Table, which utilized foreign experience.

It is also important to bear in mind that much of the basic data used is American experience, adjusted by European experience where the American experience was missing.

We should therefore not dismiss as inapplicable data derived from foreign sources. Medical and hospital needs are probably similar both in England and Germany to those in this country. The major differences will result from availability of services, utilization, and cost elements, and not from any fundamental differences in either people or their medical requirements.

Appropriate references are included to show the basic sources of the data used whether in foreign publications or in local publications.

(2) *The Actuarial Procedure Used in the Construction of the Tables.*

Actually, standard actuarial procedures have been used in the construction of the table. Unfortunately a separate section usually devoted to a series of definitions and the exposition and development of the formulas, step by step, has not been included. Such a section would have been extremely useful for students and for company actuaries who might wish to substitute some modification of their own. The saving feature in the presentation results from the fact that the net annual claim cost Sx is shown on each of the tables prior to the calculation of Hx & Kx values so that it becomes a simple matter to derive new values by simply substituting alternative sets of annual claim cost figures Sx in order to derive commutation values reflecting changed net annual claim cost figures. I would have preferred to have all of the intermediate calculations and factors shown, including lx figures. I know that this would have increased the printing costs but with the new increased dues, the Society, I am sure, could afford the cost.

There can be very little criticism made of the actuarial techniques involved since they are basically simple and follow standard procedures.

(3) *The Limitations That Have to be Placed on the Tables.*

Since we have no uniform set of charges for medical services, nor for stays in hospitals, the tables can be used only if we remember that costs vary from region to region, that costs and services in rural areas are different from those in city areas, that the actual amount of insurance an individual has often unduly influences the utilization he may make, or the services that may be suggested for him by the physician. Thus I would feel that a $20 per diem for room and board in a hospital would not cost exactly twice what a $10 per diem would

cost. The extra $10 will have an influence on both the utilization and length of stay.

It is my belief that the variations from area to area in this country will prove as great if not greater than the possible difference between the use of European experience and the use of American experience in the construction of the tables.

The second important consideration has to do with trend. Even if the Steinhaus' Tables were exactly comparable to current American experience, will they be valid for use five years or ten years from now? For that matter, will any table constructed on the basis of current experience stay valid for a very long period of time? Not unless there is some form of stabilization reached on hospital charges and surgeons' and physicians' fees. Thus, any actuary using these tables must know what he is doing and must be able to make such adjustments, either in the tables or by overall factors in order to be reasonably sure that the experience of his own company is reflected properly. This in no way detracts from the value or usefulness of the tables. Any basic table will require some adjustment for underwriting procedures and actual company experience.

In view of the recent public discussion of the various alternative proposals for insuring the cost of medical and hospital care for those over 65, Dr. Steinhaus' summary of the probable costs on a net annual basis are of great interest. They are worth repeating at this time.

	Male	Female
For $10 Hospital R & B up to 31 days	$ 26.370	$ 27.670
For Hospital Incidentals up to $150	24.165	25.101
For Surgical Benefits up to $325	12.790	9.910
For Physicians Services, $5 average charge	37.785	43.200
For In-Hospital visits at $3, one a day	3.164	3.320
	$104.274	$109,201

Unless one has a better basis, the above figures represent an informed estimate of the minimum cost of a reasonably adequate program of care for the elderly.

We may summarize the paper presented by Dr. Steinhaus in a few simple words. We now have a set of tables actuarially useful for computing costs and reserves for medical care for those over 65 where none was previously available. We have some basic experience presented supplementing our own meagre data. We have an informed estimate of the net annual cost for those over age 65, extremely useful at this particular time.

It is a most timely and appropriate paper.

DISCUSSION BY M. KORMES

Mr. Steinhaus' paper is a very timely one. The much discussed Forand bill and its Republican counter-measure the Javits bill threaten to

become a serious election issue. The rising cost of hospital care and the limited financial resources of the vast majority of the aged create a serious challenge to the insurance industry and unless it can come up very shortly with a satisfactory solution, government intervention will become inevitable and we are all well aware of the concomitant danger of socialized medicine.

There is no doubt that a level premium is very desirable from the public's point of view but as respects hospitalization coverage which provides a fixed amount of benefits a plan bought at age 65 may become wholly inadequate at age 75 or even age 70, thus necessitating the purchase of additional protection at a higher age at higher rates. Only a few years ago—in 1955—the Prudential Life Insurance Company offered a "Senior Hospital Expense Policy" providing for Room and Board indemnity of $8.00 per day up to 31 days and up to $64.00 indemnity for other hospital charges with an aggregate limit of $2,400. The surgical benefits provided a $200 schedule. The annual level rates which were payable up to age 80 or up to the time when the aggregate limit of $2,400 was reached ranged from $64.08 at age 60 to $84.50 at age 70 (no policies would be issued after that age) for males and from $70.42 at age 60 to $84.50 at age 70 for females. (The higher rates for females most probably due to lower mortality rates.) In the light of present hospital charges this coverage would pay less than 50% of the hospital bill and would be, therefore, totally unsatisfactory.

This leads to another very unsound situation of overinsurance whereby those who can afford it buy policies from several companies and in many cases have also Blue Cross coverage, so that a hospitalization very often results in a financial gain to the insured and having no gainful employment the tendency to extend the hospital stay is very substantial. This fact has been amply demonstrated by a recent study of hospital stays of older persons made by a large Blue Cross organization.

The basic data in Mr. Steinhaus' paper are from European sources and since the ages under 65 show similar claim frequencies to those of the "1957" study, Mr. Steinhaus feels justified to conclude that the extrapolation of the American data should produce satisfactory results. In general, this may be a satisfactory method but the use of claim frequencies will, in my opinion, lead to inadequate net costs.

Several years ago I served on a committee which made quite an extensive study of the cost of hospitalization for persons over 65 based on the experience of fourteen Blue Cross plans comprising a total of 3,411,975 contracts and 3,899,565 days of hospitalization. Each segment of the country was represented (there were three states each in the East and South, and four states each in the Central and Western regions). The data were weighted by the U. S. census distribution for the given state or area of plan operation and the excess of days per 1,000 contracts was calculated for those over 65 as compared with those under 65. In order to determine whether the variations from state to state were merely a matter of chance we applied the statistical methods of analysis of variance. A group of four states, one from each region was considered as a sample and three samples were taken at a time. The within sample and between samples variation was computed and the Snedecor F test applied. No matter what combination of plans were used

the test indicated that the variations were not significant, that is, that the mean of the samples is very close to the mean of the parent population. The results indicated that measured in days of hospitalization per 1,000 contracts, the cost for those 65 and over is from three to four times that for those under 65 (excluding minor dependents).

If we assume that the average age for those over 65 is 75, the net annual cost index S_x of 3.03 shown in Tables 2 and 3 appears on the low side. It is of interest to note that Mr. Steinhaus uses the same cost index S_x for males and for females although the tables in the body of his paper indicate lower cost for aged females. This fact is also borne out by the above mentioned study of Blue Cross plans which indicates an index of 3.79 for males and only 2.17 for females.

I find it somewhat difficult to understand the S_x in Tables 4 and 5 for special services which is rising from 18.6 at age 65 to 45.9 at age 85 remaining constant thereafter. As is indicated in the body of the paper the annual rate of surgery decreases, especially for females, and the cost of other services is lower in medical cases than in surgical cases, so that the values of S_x should be more or less constant unless these values represent an adjustment for the longer duration not expressed in Tables 1 and 2.

The data on the cost of surgical and medical care for the aged available from some Blue Shield plans were not sufficient to form a basis for any definite conclusions. On the whole, they indicated a cost somewhat higher after age 65 but not to any material extent. For this reason I withhold any comments on Tables 6, 7, 8 and 9.

Since the level method of premium requires the setting up of reserves, the problem of rising hospital costs and the resulting inadequacy of coverage could be met by either of the following means:

(a) By using the principle of variable annuities. This method may in specific instances cause hardship but in general should work out fairly well.

(b) By using the principle of increasing insurances whereby the benefits would rise automatically either each year or preferably every five years. This would require the replacement of the K_x column by column $S_x = \sum_{x}^{99} fK_x$ where f would be a factor to adjust for periodic increases in benefits.

In conclusion, I would like to say that the members of the Society should be grateful to Mr. Steinhaus for the presentation of this paper which required not only a great deal of calculation but also research and study of data from this and other countries. I know of no other problem whose timely solution will have a more important impact on the future of a large segment of the insurance industry as well as on the economic welfare of the senior citizen.