DISCUSSION BY ELDON J. KLAASSEN

Mr. Bevan has presented a paper on a subject where it is unlikely that we will ever be surfeited with data. Every study of comprehensive medical insurance reveals some new fact, sometimes difficult to reconcile with previous experience. The ratemaking problem is thus a matter of grappling with these disparities using as many sources of information as are available to the actuary. Mr. Bevan's contribution is a significant addition to our sources.

The approach taken by Mr. Bevan is constructive, giving us a model statistical plan to follow in generating internal data. Bearing in mind the ever-present difficulty of obtaining accurate exposure data for group health insurance contracts and the extent to which contracts are tailor-made to each insured's demands, we are forced to the approach of analyzing a single case at a time. Only certain segments of the experience of several cases can subsequently be combined in a meaningful manner.

The loss card outlined is very suitable for the collection of loss information. In order to accommodate the tailoring of individual contracts in the ratemaking process, some improvement could be made in items 85 and 86. This would involve segregating "Doctors' charges — Other than Surgery" into two classes, in hospital and out of hospital, and indicating for each the number of calls as well as the charges. Similarly, Nurse charges could be segregated as to hospital or non-hospital and the number of days of care for each. It would then be possible to establish relativities for various inside limits or exclusions of coverage.

The author has indicated that, for severity indications, claims incurred during the last twelve months of the experience period were omitted because a substantial number of claims were still open. An alternative means of getting severity data would have been to obtain all the claims closed during the experience period (whether incurred during this period or not). Provided the case had been in force for two or three years prior to the experience period and the exposure had been fairly stable, this type of loss information would have been relatively unbiased and the amount of data would have been increased by two-thirds.

The discussion of area and income differentials indicates these differentials as independent variables. This is, of course, the industry practice and further refinement may be unwarranted at present. The income and area variables are, however, probably correlated to some extent. For example, one of the principal costs of a hospital is labor cost; therefore, in an area where income levels are relatively high, hospital charges will be high. An improvement might be made in these relativities by relating the average area cost relativity to the average income for that area. This would give rise to a two way table of relativities for the income and area variables somewhat as follows:

Area	Average Income			
	$4000	$4000-5999	$6000-7999	$8000 or more
1	.80	.90	1.00	1.10
2	.85	.95	1.05	1.15
3	.90	1.00	1.10	1.20
4	.95	1.05	1.15	1.25
5	1.00	1.10	1.20	1.30

This table was not constructed from any specific data but merely indicates the form that such a table might take. The use of average income as an index of income level instead of brackets of income ties in with the National Council on Compensation Insurance construction of its Standard Wage Scale. There it was found that the ratio of a given salary to the average for the group was reasonably consistent from group to group.

The study of charges by size of loss is always a fascinating one. Curve fitting techniques often provide more frustration than results when applied to comprehensive medical data. In my company, however, Tom Friedberg, a student of our society, produced a reasonable fit to the data presented by Gingery and Mellman (*TSA* XIII). The equation in its final form was as follows:

$$R = 10^{(.00168\ x^{1.42335} + 2.45455) - y(.01006\ x^{-.40293} - .00067)} + 10^{(.04459\ x - .30819)} + 40.56$$

where x = age in years
y = deductible in dollars

R is a relativity function using age 29, $500 deductible, $5,000 maximum benefit as a base equal to 100. Age 29 is assumed equivalent to a group population under age 40. An abbreviated table of these relativities follows:

Deductible	Age				
	25	35	45	55	65
25	416	533	716	1023	1590
100	304	410	573	850	1372
300	146	217	332	542	971
500	85	130	212	376	741

It is quite possible that a suitable modification of the parameters in this equation would suffice to fit the Liberty Mutual data.

The author has expressed some concern for the lack of spouse exposure data by age. It would seem that this is irrelevant. It is quite likely that we will continue rating group business on the basis of employee age data alone for some time. Spouse loss experience should, therefore, be related to "em-

ployee with spouse" exposure data to obtain the most reasonable ratemaking data. This could be accomplished merely by indicating employee's age in the loss card instead of claimant's age.

The apparent discrepancy in frequency data, where the frequency for ages over 60 is less than for the group aged 50-59, was passed by Mr. Bevan as a statistical fluke caused by lack of data. It may, however, be an inherent characteristic of this particular group. If a company has unusually liberal early retirement benefits, for example, it is entirely possible that the employees over age 60 and still working are healthier than the employees aged 50-59 and have lower claim frequencies. We would not, however, expect this result in the majority of cases. For purposes of making manual rates, it would, therefore, be necessary to use the experience of a more typical group to establish age relativities for the higher ages.

In his conclusion, Mr. Bevan has chosen to emphasize that companies must develop their own record-keeping techniques for comprehensive medical insurance. This allows for a maximum of flexibility as the ratemaking techniques become more sophisticated.

DISCUSSION BY ALLEN D. PINNEY

One of the most difficult tasks facing the Group Actuary today is the development of proper rates for Comprehensive Medical Insurance. The newness of the coverage, the variety of benefit provisions offered, and the many variables which affect the cost of this product have combined to raise numerous questions as to what statistical data should be assembled and how it should be analyzed for the purposes of ratemaking. The fact that Mr. Bevan had to approach this problem by making a detailed analysis of one large case rather than a study of several cases serves to illustrate the difficulties that most of us face in this area. Nevertheless, he was able to enlighten us on many aspects of this subject, and his paper is a most welcome and needed addition to our *Proceedings*. Mr. Bevan shows how important it is to have detailed statistical information of the claim charges. His method of using these charges to determine rates for various types and sizes of deductibles is sound. The only weakness in the approach used is that it does not measure the effect that differing deductibles may have on the actual utilization of the coverage. This, however, could only be measured if sufficient data were available to study the experience of many similar type plans separately by deductible.

The data obtained from any one risk will, of course, reflect any abnormality inherent in that particular risk, but it is interesting to compare the results so obtained with one's own findings. One noticeable difference appears in the distribution of charges for male employees shown in Table III where the percentage of hospital charges to total charges is significantly lower than the percentage developed from our studies.

In using the data collected from this risk to produce rates for males segre-