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# DISCUSSION OF PAPERS PRESENTED AT THE SPRING MEETINGS

## GROSS PREMIUMS FOR INDIVIDUAL AND FAMILY MAJOR MEDICAL EXPENSE INSURANCE

MORTON D. MILLER

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CHARLES N. WALKER:

It is difficult to imagine an area of less actuarial precision than costs and premiums for individual and family major medical expense insurance. My primary purpose in presenting these remarks is to set forth similar cost figures, as used by my own company, the Lincoln National Life. I think Mr. Miller will be the first to admit that the costs presented in the paper cannot be considered more than estimates. Since, unlike the Equitable, we did not have the benefit of any previous experience whatsoever, our own cost figures must also be considered to be estimates—probably to a greater degree. I think they may be of interest, however, since costs are shown for several different plans.

While our policy form is, in many respects, the same as that of the Equitable, several differences occur which will probably have a significant effect on claim costs. The most important of these are:

1. The benefit period in the Lincoln policy is three years beginning with the date the first expense is incurred. This will usually be longer than the benefit period of the Equitable policy.
2. The Lincoln policy does not use any "inside qualifications" for satisfaction of the deductible requirement, such as a 60 day period or a hospital confinement requirement.
3. The Lincoln policy contains an "inside limit" on the amount of daily hospital room and board which will be covered. The amount is either $15 or $25 as applied for by the policyholder. Separate cost figures are shown below for each limit.
4. Under the Lincoln policy, the date on which expenses in excess of the deductible amount are first incurred for a particular accident or sickness is defined as the "Eligible Date." If expenses in excess of $100 are incurred within 12 months after the Eligible Date for a different injury or sickness, the deductible amount applicable to each such different injury or sickness is reduced to $100.

Other features of the two policies are substantially the same. Both cover about the same types of expenses and contain substantially the same exclusions. Both reimburse 75% of excess expenses. Both policies are renewable at the option of the Company to age 65 for adults and to age 18 for children, although the Lincoln policy does not provide that it will not be nonrenewed solely for change of health. Premiums for the Lincoln policy are grouped for ages under 30 and for 5 year age groups thereafter.

In obtaining the cost of insurance for this policy, a different approach was necessarily used. Basically, the method was to obtain the portion of the total claim cost resulting from hospital room and board expenses and

TABLE 1

DIVISION OF MAJOR MEDICAL EXPENSE INSURANCE
CLAIM COSTS BY TYPE OF EXPENSE

| SEX AND PLAN | HOSPITAL EXPENSES | | OTHER EXPENSES (BALANCE) |
|---|---|---|---|
| | Room and Board | Other | |
| Men, $250 Deductible | 18% | 26% | 56% |
| Women, $250 Deductible | 14% | 22% | 64% |
| Men, $500 and $750 Deductible | 20% | 30% | 50% |
| Women, $500 and $750 Deductible | 16% | 24% | 60% |

from other hospital expenses and then to estimate the remaining claim cost as a multiple of this hospital cost.

The primary source of information for hospital costs was the intercompany investigation of group hospital expense insurance presented by Stanley W. Gingery in *TSA* IV, 44. By a process which was largely empirical, complete functions for the costs of hospitalization by age, sex and amount of maximum benefit were produced for hospital room and board and, separately, for other hospital expenses. The portion of the total major medical expense claim costs which should be allocated to these two items was determined from Alan Thaler's paper *TSA* III, 429, from the Second Progress Report of the Research Council for Economic Security, and from studies of our own group insurance experience. The allocations used are shown in Table 1. An examination of the actual figures will show that hospital expenses are probably more nearly equally divided between room and board and other expenses than Table 1 would indicate. However, the divisions were found to be somewhat conservative.

In order to compute costs for the hospital room and board portion of

the total cost, the amount of dollar benefits allocated by Table 1 were first translated into equivalent benefits in terms of time—the deductible being expressed as a waiting period and the maximum benefit as a maximum length of hospital stay.

Final cost figures are shown in Tables 2 and 3. Table 2 shows the major medical expense insurance cost when hospital room and board expenses are limited to $15 per day. Table 3 shows similar costs for the $25 daily limit.

In comparing these costs with those given by Mr. Miller, it can be seen that for the $500 deductible, $7,500 maximum benefit plan, with $25 daily limit for hospital room and board (most comparable to the Equitable plan) the Lincoln figures for males are generally lower for ages 43 and under, but rise more rapidly with age so that at the higher ages they are substantially above the Equitable figures. For females the Lincoln figures are uniformly higher. This is not intended as a criticism of either set of figures. The Lincoln policy will probably produce somewhat higher costs because of benefit differences. In addition, I do not believe there is yet sufficient information available to tell which will be closer to actual experience.

A comparison of the costs for the two different room and board limits shows a very substantial cost increase when the limit is increased from $15 to $25. It was for this reason that we introduced the limit in the policy, feeling, first, that the absence of any limit would be a source of possible antiselection by tending to encourage the use of unnecessarily expensive hospital facilities, and, second, that making it possible for the agent to sell a plan in keeping with the level of local hospital costs was an easy and convenient method to account, at least in part, for the variation in medical costs with geographic area.

Gross premiums in our own case were calculated by a method different from the Equitable's but equally straightforward. "Unloaded" gross premiums were calculated by a Cammack method, providing for overhead expenses and commissions of 55% in the first year, 25% in the second year, 20% in the third and fourth years and 2½% plus 10% service fees thereafter. Asset shares were computed for quinquennial ages to adjust the "unloaded" premiums to provide the desired level of contingency margins and profits. Calculations were made separately for adult males, adult females, and children. When both the husband and wife are insured under a single policy, a premium reduction is allowed which is approximately equal to the amount of per policy expenses. Separate premiums for each child provide for commission and percentage expenses, but not for "per policy" expenses.

TABLE 2

INDIVIDUAL AND FAMILY GROUP MAJOR MEDICAL EXPENSE INSURANCE
75% BENEFIT IN EXCESS OF DEDUCTIBLE AMOUNT
ANNUAL CLAIM COST, $S_x$, IN YEAR OF AGE $x$ TO $x + 1$
$15 LIMIT ON HOSPITAL ROOM AND BOARD EXPENSE

| AGE | $250 DEDUCTIBLE $5,000 MAXIMUM BENEFIT | | $500 DEDUCTIBLE $7,500 MAXIMUM BENEFIT | | $750 DEDUCTIBLE $10,000 MAXIMUM BENEFIT | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 25 | $ 9.77 | $19.68 | $ 5.77 | $11.28 | $ 5.11 | $ 8.52 |
| 26 | 9.95 | 20.29 | 5.89 | 11.74 | 5.22 | 8.87 |
| 27 | 10.16 | 20.89 | 5.99 | 12.18 | 5.29 | 9.26 |
| 28 | 10.34 | 21.48 | 6.12 | 12.62 | 5.38 | 9.58 |
| 29 | 10.52 | 22.08 | 6.26 | 13.06 | 5.47 | 9.95 |
| 30 | 10.73 | 22.69 | 6.38 | 13.53 | 5.56 | 10.31 |
| 31 | 10.93 | 23.31 | 6.50 | 13.99 | 5.67 | 10.66 |
| 32 | 11.16 | 23.88 | 6.66 | 14.45 | 5.78 | 11.04 |
| 33 | 11.39 | 24.51 | 6.80 | 14.91 | 5.89 | 11.42 |
| 34 | 11.64 | 25.14 | 6.94 | 15.36 | 5.99 | 11.78 |
| 35 | 11.84 | 25.74 | 7.11 | 15.82 | 6.10 | 12.17 |
| 36 | 12.11 | 26.34 | 7.28 | 16.28 | 6.26 | 12.55 |
| 37 | 12.48 | 26.97 | 7.50 | 16.76 | 6.43 | 12.94 |
| 38 | 12.84 | 27.57 | 7.78 | 17.22 | 6.65 | 13.33 |
| 39 | 13.32 | 28.25 | 8.09 | 17.73 | 6.92 | 13.74 |
| 40 | 13.84 | 28.87 | 8.45 | 18.21 | 7.24 | 14.18 |
| 41 | 14.41 | 29.50 | 8.87 | 18.71 | 7.58 | 14.61 |
| 42 | 15.05 | 30.15 | 9.31 | 19.23 | 7.99 | 15.03 |
| 43 | 15.77 | 30.78 | 9.81 | 19.72 | 8.44 | 15.46 |
| 44 | 16.55 | 31.42 | 10.36 | 20.24 | 8.92 | 15.93 |
| 45 | 17.36 | 32.07 | 10.95 | 20.76 | 9.46 | 16.37 |
| 46 | 18.23 | 32.73 | 11.58 | 21.31 | 10.02 | 16.86 |
| 47 | 19.11 | 33.44 | 12.23 | 21.86 | 10.61 | 17.36 |
| 48 | 20.07 | 34.15 | 12.88 | 22.46 | 11.18 | 17.89 |
| 49 | 20.98 | 34.89 | 13.59 | 23.11 | 11.78 | 18.46 |
| 50 | 21.95 | 35.64 | 14.27 | 23.78 | 12.39 | 19.04 |
| 51 | 22.95 | 36.46 | 14.99 | 24.46 | 13.02 | 19.69 |
| 52 | 23.95 | 37.29 | 15.72 | 25.21 | 13.66 | 20.37 |
| 53 | 25.00 | 38.14 | 16.48 | 25.94 | 14.31 | 21.07 |
| 54 | 26.07 | 38.99 | 17.26 | 26.74 | 14.99 | 21.77 |
| 55 | 27.16 | 39.90 | 18.03 | 27.57 | 15.66 | 22.55 |
| 56 | 28.43 | 41.01 | 18.94 | 28.56 | 16.45 | 23.45 |
| 57 | 29.93 | 42.47 | 20.08 | 29.82 | 17.46 | 24.61 |
| 58 | 31.80 | 44.30 | 21.46 | 31.37 | 18.65 | 26.02 |
| 59 | 33.89 | 46.50 | 23.03 | 33.24 | 20.01 | 27.72 |
| 60 | 36.32 | 49.07 | 24.85 | 35.36 | 21.68 | 29.65 |
| 61 | 39.02 | 52.00 | 26.90 | 37.79 | 23.51 | 31.83 |
| 62 | 42.00 | 55.27 | 29.16 | 40.50 | 25.53 | 34.29 |
| 63 | 45.32 | 58.91 | 31.66 | 43.52 | 27.77 | 37.01 |
| 64 | 48.89 | 62.96 | 34.37 | 46.81 | 30.23 | 39.95 |

## TABLE 3

### INDIVIDUAL AND FAMILY GROUP MAJOR MEDICAL EXPENSE INSURANCE
### 75% BENEFIT IN EXCESS OF DEDUCTIBLE AMOUNT
### ANNUAL CLAIM COST, $S_x$, IN YEAR OF AGE $x$ TO $x + 1$
### $25 LIMIT ON HOSPITAL ROOM AND BOARD EXPENSE

| AGE | $250 DEDUCTIBLE $5,000 MAXIMUM BENEFIT | | $500 DEDUCTIBLE $7,500 MAXIMUM BENEFIT | | $750 DEDUCTIBLE $10,000 MAXIMUM BENEFIT | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| 25 | $11.99 | $23.56 | $ 7.71 | $14.55 | $ 6.58 | $11.09 |
| 26 | 12.23 | 24.30 | 7.90 | 15.14 | 6.76 | 11.58 |
| 27 | 12.49 | 25.03 | 8.07 | 15.72 | 6.90 | 12.10 |
| 28 | 12.73 | 25.74 | 8.27 | 16.29 | 7.05 | 12.56 |
| 29 | 12.97 | 26.46 | 8.47 | 16.86 | 7.21 | 13.06 |
| 30 | 13.23 | 27.20 | 8.67 | 17.46 | 7.37 | 13.56 |
| 31 | 13.50 | 27.94 | 8.85 | 18.06 | 7.55 | 14.05 |
| 32 | 13.79 | 28.64 | 9.08 | 18.65 | 7.73 | 14.56 |
| 33 | 14.08 | 29.39 | 9.30 | 19.24 | 7.91 | 15.07 |
| 34 | 14.40 | 30.14 | 9.51 | 19.83 | 8.08 | 15.57 |
| 35 | 14.66 | 30.86 | 9.75 | 20.42 | 8.26 | 16.09 |
| 36 | 15.00 | 31.57 | 10.00 | 21.02 | 8.50 | 16.61 |
| 37 | 15.47 | 32.33 | 10.32 | 21.62 | 8.79 | 17.13 |
| 38 | 15.93 | 33.05 | 10.71 | 22.22 | 9.12 | 17.65 |
| 39 | 16.54 | 33.84 | 11.16 | 22.86 | 9.48 | 18.20 |
| 40 | 17.20 | 34.57 | 11.66 | 23.47 | 9.94 | 18.77 |
| 41 | 17.92 | 35.31 | 12.25 | 24.10 | 10.44 | 19.33 |
| 42 | 18.73 | 36.08 | 12.88 | 24.75 | 11.02 | 19.88 |
| 43 | 19.64 | 36.81 | 13.58 | 25.36 | 11.66 | 20.44 |
| 44 | 20.63 | 37.57 | 14.35 | 26.01 | 12.35 | 21.04 |
| 45 | 21.66 | 38.33 | 15.18 | 26.65 | 13.11 | 21.61 |
| 46 | 22.76 | 39.09 | 16.05 | 27.35 | 13.91 | 22.24 |
| 47 | 23.88 | 39.92 | 16.96 | 28.01 | 14.73 | 22.88 |
| 48 | 25.07 | 40.74 | 17.86 | 28.76 | 15.55 | 23.56 |
| 49 | 26.23 | 41.60 | 18.83 | 29.55 | 16.40 | 24.29 |
| 50 | 27.45 | 42.48 | 19.78 | 30.37 | 17.27 | 25.04 |
| 51 | 28.70 | 43.42 | 20.76 | 31.21 | 18.16 | 25.86 |
| 52 | 29.95 | 44.38 | 21.76 | 32.12 | 19.07 | 26.73 |
| 53 | 31.26 | 45.37 | 22.79 | 33.01 | 19.99 | 27.63 |
| 54 | 32.59 | 46.35 | 23.84 | 33.98 | 20.95 | 28.53 |
| 55 | 33.95 | 47.41 | 24.90 | 35.00 | 21.90 | 29.52 |
| 56 | 35.52 | 48.69 | 26.13 | 36.20 | 23.01 | 30.66 |
| 57 | 37.40 | 50.38 | 27.67 | 37.74 | 24.43 | 32.14 |
| 58 | 39.72 | 52.50 | 29.52 | 39.64 | 26.10 | 33.94 |
| 59 | 42.32 | 55.04 | 31.65 | 41.92 | 28.02 | 36.08 |
| 60 | 45.35 | 58.02 | 34.10 | 44.53 | 30.34 | 38.54 |
| 61 | 48.71 | 61.41 | 36.86 | 47.50 | 32.92 | 41.30 |
| 62 | 52.42 | 65.20 | 39.91 | 50.83 | 35.70 | 44.41 |
| 63 | 56.55 | 69.43 | 43.29 | 54.53 | 38.82 | 47.85 |
| 64 | 61.00 | 74.12 | 46.94 | 58.56 | 42.24 | 51.58 |

FRANCIS S. PERRYMAN:

It is a pleasure to make a few remarks upon my friend Morton's paper which, as usual, is a model of lucidity and compactness. With regard to his actuarial approach to his problem I have very little to say. He has dealt with it in an adequate way—adequate in view of all the uncertainties which underlie this form of insurance. I have, however, a few remarks which may be of interest regarding the way in which our experience has turned out.

We have been issuing a major medical policy in individual and family form for several years, and have some experience on that. Of course, that has to be taken in the light of the way in which we do business and the kind of people with whom we do business, which is a very important point in work in this field.

Our policy is the usual form of commercial accident-health policy, not on a level premium basis, but with premium varying by age groups, and in general the coverage is not too different from what other companies in the English field issue.

We issue policies on various plans with various total amounts of insurance and coverage, and varying deductibles, which we try to apply according to the different income ranges of our clients.

Our policy differs from those which most of the industry are issuing in that we have no coinsurance provision in our policy at all. Our experience has not been too satisfactory under this form, but a very careful examination of it does not reveal that it is the lack of coinsurance feature which is responsible for the unsatisfactory nature, in some respects, of our experience.

As a matter of fact, when other and more mild forms of policies started to be issued some years ago covering reimbursement for medical-surgical costs—the medical reimbursement policies in the commercial accident and health field—the same fear was felt that unless they had protection by way of coinsurance the companies would experience a very unsatisfactory selection against them; and that, as we all know, has not turned out, in those kinds of policies, to be as bad as people had thought it would be.

While we have no coinsurance, most of the industry is on a 25 percent coinsurance basis. When we look at the function which these policies should fulfill, it seems to me that in one way we could say that those companies which issue policies with a 25 percent coinsurance feature are perhaps not providing as much coverage as is needed to take care of the needs of the people. A 25 percent coinsurance on a catastrophe medical policy seems to be a pretty steep amount for the insured to pay.

On the other hand, at the other extreme, where there is no coinsurance

at all, it does seem that a case can be made out for some protection for the company, and my own personal opinion is that it is quite reasonable to guess that perhaps in the long run the business may settle down to a milder coinsurance provision—say, something in the neighborhood of 10 percent.

Our experience was not too satisfactory for the first year or two that we issued these policies. However, that was due to the fact that success in this field—success in the way of issuing policies which pay for themselves—is not a matter of pure actuarial technique. It involves, more than many forms of insurance, a very careful application of the principles that you set out to adopt, and the principles of underwriting and collection. Our business, frankly, was unsatisfactory in the large metropolitan areas where we allowed ourselves to be overloaded with people with large incomes and people whose experience was obviously not going to be as satisfactory as if we had a bigger spread of business over the rank and file of the people in this country.

We have increased our rates recently and we have made a few changes in the coverage, and we now believe that our experience is on a satisfactory basis provided, of course, that we don't get further sizable increases in medical and surgical costs, which, if we do get them, may force all of us to increase our rates accordingly.

I have made some comparisons of the Equitable rates with our own. By and large, taking into account the differences in coverage, the differences in the way the policies are put together, and the differences in loadings, the rates are not too far away from ours—or ours are not too far away from theirs, whichever way you like to put it.

I want to emphasize again that in this field of insurance, particularly in the embryonic state in which it now is, it is not purely a question of an actuarial calculation—and I think Morton Miller would be the first to agree with that—but it is a question of how you apply your rates, how you sell them, how you select your business; and you must make sure that you get a proper spread in the business and don't get yourself overloaded against the interest of the company.

PAUL THOMSON:

We are again indebted to Morton Miller for an interesting and informative discourse on accident and sickness insurance. Those of us who work on A & S have much reason already to be grateful for his previous papers on group A & S subjects.

As is pointed out in the paper, the cost of major medical insurance is uncertain, one reason being a lack of statistics. This is quite likely to be a

permanent characteristic of this form of benefit so far as homogeneous statistics on an intercompany basis are concerned. As of today, I believe there are no two companies writing policies whose benefits are enough alike to be combined for experience data. Just to give a brief run-down of some of the important points of dissimilarity, there are these:

1. Coinsurance may be a flat 25%, 20%, or 0%; also it may be applied only to certain types of expense.
2. The deductible may be a flat amount, or it may vary by salary with or without a corresponding change in premium; it may be applied once per illness or in successive benefit years; it may reduce for different illnesses in the same benefit year.
3. The company's right to refuse renewal may be unlimited, or limited to reasons other than change in the insured's health; or a policy may be guaranteed renewable but subject to change in premium rates.
4. To qualify for benefits a policy may require that the insured be confined in a hospital, or at the other extreme it may require nothing more than the fact of having incurred medical expenses.
5. Exclusions may or may not list
   *a*) pre-existing conditions,
   *b*) occupational injuries,
   *c*) expenses paid by Workmen's Compensation.

Aside from varied benefit patterns there are also the effects each company has on its experience through the character of its market, its field forces, and its underwriting and claim administration.

All this testifies to the fact that each company is its own best source of statistics. The Mutual Life has not yet entered the individual major medical field, and it is therefore very helpful to us to have as a guide Mr. Miller's table of claim costs that are expected for the particular pattern of benefits in Equitable's policy.

OSWALD JACOBY:

There is one very important omission in Mr. Miller's fine paper. He has failed to include the claim experience for the next 15 years!

I have had no experience with this type of policy as yet, but I know that I shall have experience with it because other companies will imitate it and some company that I am a consultant for will ask me to produce such a policy. Caution is indicated and I shall be cautious, but it is difficult to refuse to write a policy that some competitor is offering. The mere fact that he will lose money, and that we will lose money if we follow, is a valid actuarial argument but never seems to appeal to the agency establishment.

This policy has one great disadvantage. The very existence of the policy tends to increase the claim cost in two ways. In the first place, the insured is likely to incur extra hospital and medical expense when someone else is paying for it, whereas he has to get out of the hospital and stop bothering his doctor when he runs out of money. Maybe 25 percent coinsurance will help this. I rather doubt it, but at least I feel that such coinsurance is absolutely necessary.

Secondly, every hospital I know of asks prospective patients about what medical, hospital insurance they carry. Doctors do the same and the fact that a patient is insured is likely to affect their charges.

The Equitable policy starts after the patient has incurred five hundred dollars of expense in a sixty day period. I rather fear that somebody is going to come up with a policy like this but starting with one hundred dollars or fifty dollars or maybe nothing at all. Such a policy should be easy to sell but I doubt if anyone will ever be able to produce a rate that is sufficient to pay the claims.

In conclusion I wish to repeat that I feel that anyone who follows this policy should proceed very carefully and should use every one of the safety factors that has been embodied in the Equitable's pathfinding policy.

(AUTHOR'S REVIEW OF DISCUSSION)

MORTON D. MILLER:

I want first to record my thanks to those who have discussed this paper and by their efforts added so much to its value.

In particular, Mr. Walker's discussion is interesting, not only because it details another approach to the development and calculation of premiums for an individual and family major medical expense policy, but also because of the ingenuity exemplified in the application of actuarial technique and judgment to very slim data. Mr. Thomson's discussion is an excellent capsule summary of the diversity of approaches taken by the companies.

The caution expressed by Mr. Jacoby is well taken. We watch our experience carefully, and I am glad to say that we are gratified so far at the small degree to which abuses or unnecessary utilization has developed. It will be a long time, however, before experience adequate in volume and maturity becomes available to justify a reduction in the coinsurance element from the 25% we feel is necessary to the 10% suggested by Mr. Perryman as the level which may ultimately evolve.