PATTERNS OF SERIOUS ILLNESS INSURANCE

BY

MARK KORMES

1. *Introduction*

Several years ago I presented to the Society a paper describing the coverage and the methods of rate calculation for Prolonged Illness Insurance[1] developed by the Massachusetts Hospital Service, Inc. and the Massachusetts Medical Service.

About two years later there was introduced by these organizations a plan of coverage designated as Master Medical coverage. This plan in its current form is a single contract issued by both organizations which provides an unlimited period of hospital coverage with a specified room and board allowance and the entire amount of the hospital's maximum charges for included services in other than private accommodations in a licensed general, maternity or acute contagious disease hospital, and sixty days in a licensed mental hospital. Services of a private duty nurse are covered when ordered by attending physicians at 80% of customary charges with a limit of $1,000 for conditions other than serious illnesses. Following discharge from the hospital, benefits for specific prolonged illness conditions are covered in full except for transportation, services of a registered nurse and purchase of appliances where 80% of the charges is paid. For other than prolonged illness, benefits are provided on an out-patient basis except that for certain services there is a $25 deductible in each calendar quarter. Coverage for room and board in a licensed nursing home is limited to $8 per diem. Regular obstetrical delivery is limited to $100 for hospital benefits. Caesarian section or serious complications of delivery are treated as any other illness. Medical services are covered in accordance with Schedule B of fees ($500) and no further liability for service accrues to individual members with an annual income of $5,000 or less, two persons with income up to $6,000 and three or more persons with an income of $7,500 during the twelve months preceding the services rendered. For those members whose annual income exceeds the above limits, either the Fee Schedule, or 80% of charges customarily made by physicians and dentists in the community to patients of similar income status, whichever is greater, is allowed. Oral surgical benefits are provided for the excision of impacted teeth or extraction of seven or more teeth. Diagnostic X-Rays in a physician's office are covered to the extent of 50% (minimum member's responsibility is $15) either of the Fee Schedule or, for over-limit income members, of customary charges in the community. The rates for Master Medical coverage were set approximately 50% higher than those for Prolonged Illness insurance.

It may be readily seen from the above description that the Master Medical coverage is similar to many Major Medical plans written by insurance companies.

The purpose of this paper is to present the experience over a period of years under these coverages and several analyses of the cost elements which would be of general interest to the profession.

---

[1] CAS XLI, p. 102.

In the Transactions of the Society of Actuaries there appeared a paper by Charles A. Siegfried[2] which presents various analyses of claim distributions for a major medical plan with the first $25 deductible, the next $225 in full and 85% of excess. A comparison of the results will show that there are substantial differences which arise from the fact that the subject matter of this paper relates to the "excess" coverages.

I wish to express my sincere appreciation to the management of the Massachusetts Hospital Service, Inc. and the Massachusetts Medical Service for their kind permission to use the information and to the staff of both organizations for the preparation of the many tabulations of data which were required for this paper.

2. *Over-All Experience*

In Table I there is shown the total experience for each of the coverages since inception up to and including policy year 1960.

It may be seen from Table I that the experience under the Prolonged Illness coverage is very favorable. This is due in part to the change in the basic coverage where the extension of days of coverage from 60 full and 60 partial in-hospital days to 120 full days was made effective July 1, 1957. The complete review of the experience was made for the first time in 1960 and as a result the rates have been reduced by 15% and a slightly restricted coverage was offered to direct (non-group) subscribers on a health statement (warranty) basis.

Because of the upward trend in the Master Medical experience a revision of rates did not appear warranted at that time.

The well-known fact that a considerable period of time is required for the development of losses to their ultimate cost may be seen from the fact that even the earliest years still have loss reserves. The development of losses paid shown in Table II further illustrate this fact:

TABLE II

PAID LOSSES AS PERCENTAGE OF THE ULTIMATE ESTIMATED INCURRED COST

Cal. Year	*Paid at 3/31*	*Prolonged Illness*	*Master Medical*
1956	1957	38.5%	—
	1958	70.2	—
	1959	80.6	—
	1960	85.1	—
	1961	89.3	—
1957	1958	43.4	33.2%
	1959	65.2	68.6
	1960	75.6	82.1
	1961	83.1	92.3
1958	1959	47.0%	39.4%
	1960	69.8	67.7
	1961	79.7	84.3
1959	1960	39.8	42.0
	1961	61.5	66.7
1960	1961	28.3	34.9

[2] Some Considerations Involved in the Analysis of Major Medical Insurance Experience", Transactions, Vol. X, 1958, p. 505.

Table II indicates that the paid losses develop in a more or less similar pattern. The low percentages for the year 1960 are the result of a rather conservative method of setting up of reserves at the early stages of the experience. The pattern of loss development was utilized in the determination of the incurred and unreported liabilities.

The data in Table I indicate that the losses paid constitute the following percentages of the estimated ultimate incurred cost:

Year	*Prolonged Illness*	*Master Medical*
1955	91.0%	—
1956	89.2	100.0%
1957	83.1	92.3
1958	79.7	84.3
1959	61.5	66.7
1960	28.3	34.9

The higher ratio of paid claims to ultimate cost for Master Medical can be explained by the larger percentage of small claims (where payments occur at early stages of the illness) which do not arise under Prolonged Illness coverage.

In some of the following sections the analyses presented are based on the paid experience for the years 1956 to 1960 for Prolonged Illness and 1957 to 1960 for Master Medical. The inclusion of policy year 1960 was made solely for comparative purposes of certain elements where the trend is of significance.

Because of the fact that some confusion existed in the count of claims, the analyses presented are based on the distribution of paid cost rather than the number of claims. Since many elements of cost reflect a rising trend of charges for services the pure trend of incidence is obscured, but from the distribution it is still possible to discern just what elements are on the rise in relative importance.

3. *Cost of Medical Services*

The ratio of the cost of services of physicians and surgeons to the total cost is of interest. In Table III there is shown the proportion of the cost of medical services to the total cost based on paid claims plus reserves for known outstanding claims.

TABLE III

RATIO OF MEDICAL COST TO TOTAL COST

	Prolonged Illness			*Master Medical*		
Cal. Year	*Individual Contracts*	*Family Contracts*	*All Contracts*	*Individual Contracts*	*Family Contracts*	*All Contracts*
1956	.277	.352	.332	*	*	*
1957	.264	.310	.299	.333	.248	.256
1958	.242	.285	.275	.331	.291	.297
1959	.248	.284	.277	.257	.289	.285
1960	.281	.301	.296	.264	.272	.271

* Volume insignificant.

The rate structure is based on an assumption that the medical cost is approximately 26% of the total cost and this assumption is well borne out by the above experience indications.

4. *Analysis by Location of Service*

Table IV gives the distribution of losses paid by the location where the service is rendered. The distributions for Prolonged Illness and Master Medical differ as would be expected. Prolonged Illness is superimposed on contracts with various allowances for room and board and additional benefits accrue only for specific illnesses in the hospital, doctor's office and at home. It is for these reasons that relatively larger percentages are shown for these elements under Master Medical coverage. It should be borne in mind in this connection that the payments for costs incurred at doctor's office or patient's home are made towards the end of the disease and that, therefore, in the ultimate cost distribution the percentages for these elements will be relatively higher for the years 1958, 1959 and 1960.

Both distributions show a substantial upward trend in costs incurred in Mental Hospitals. This is due in part to the limitation of 30 days in the basic contract, in part to the successful application of electric or insulin shock treatments to cases which would otherwise be confined to an institution, and possibly to a rise in actual incidence as a result of increasing tensions stemming from the pressures and tempo of modern life.

5. *Analysis by Type of Service*

The difference between the Prolonged Illness and Master Medical coverages is also very marked when we analyze them by Type of Service as shown in Table V. Because of a rather large number of detail codes only two years have been summarized. Since the results are very similar for each kind of coverage by itself, the comparison as between coverages is sufficiently indicative.

It is seen from Table V that between 64.7% and 75.0% of the total cost of Master Medical is due to charges for surgeons, nurses and drugs or medicines, while for Prolonged Illness these services account for only 31.7% to 44.4% of the total cost.

6. *Analysis by Diagnosis*

This analysis is predicated on known incurred cost as of March 31, 1961 and is shown for the years 1958 and 1959 in Table VI.

Here again we see that the so-called dread diseases account for only between 53.6% and 61.5% of total Master Medical cost, the balance representing additional benefits for ordinary illnesses.

7. *Distribution by Size of Claim*

In order to arrive at a satisfactory size of loss distribution the following procedure was adopted: All paid and known outstanding claim punched cards were sorted by claim number and summary punched cards showing

total cost were obtained. These summary punched cards were then sorted on the "amount of loss" field to obtain the various loss sizes. This was done for the experience of 1958 and 1959 incurred as of March 31, 1960. The results are shown in Table VII in intervals of $25 up to $100, $50 up to $300, $100 up to $600 etc.

From Table VII it is quite apparent that the size distributions do not follow any regular pattern and that there are significant bunchings of claims in size groups $250.01 to $300.00 and $800.01 to $1,500.00, both for Prolonged Illness and Master Medical coverages. This is most probably due to certain types of more frequent serious illnesses for which the costs fall into the above ranges.

The total incurred costs as of March 31, 1960 are somewhat higher than those as of March 31, 1961 which is due to a conservative method of setting up reserves.

It should be noted that the Prolonged Illness coverage has a maximum limit of $5,000 (with the exception of one risk). While the Master Medical coverage has a limit of $15,000, there were no claims in excess of $10,000. Whether this is significant only time and more years of experience will give a satisfactory answer.

The data in Table VII permit the calculation of savings for certain deductible provisions or corridors. It may be found readily that a 15% reduction of cost may be realized on Master Medical with a $75 deductible but for Prolonged Illness $100 deductible is required for a similar saving. This is in line with the higher average claim cost for Prolonged Illness coverage.

8. *Claim Incidence*

As stated before, the analysis of the experience as respects the number of claims was not possible in most instances. The only reliable claim count was established in the course of preparation of the data for Table VII. These claims permit the calculation of the claim incidence for the years 1958 and 1959 for each of the coverages which give the following results:

Claim Incidence Per 1000 Contract Months

Policy Year	*Prolonged Illness*		*Master Medical*	
	Individual	*Family*	*Individual*	*Family*
1958	.695	1.443	3.665	10.649
1959	.669	1.482	3.494	8.695

Since the data are as of March 31, 1960, the number of incurred but unreported claims for the year 1959 is greater than that for the year 1958 so that the ultimate incidence for 1959 will be most probably equal or even higher than that for 1958.

The much higher incidence on Master Medical is primarily due to small claims. We find from Table VII that claims under $100.01 account for

43.4% to 64.8% of all claims for Master Medical while for Prolonged Illness they account for only 20.2% to 38.1% of total claims.

9. *Concluding Remarks*

The material presented in this paper not only brings out the difference between two types of excess plans but also as between individual and family contracts. The author hopes that further results will be presented in the future based on fully developed experience and several additional years to permit of a better evaluation of the cost of these coverages.

In general, the results of this paper appear to justify the social value of the Prolonged Illness coverage designed to mitigate the impact of serious and costly diseases. The Master Medical coverage introduced more or less for competitive reasons appears to add benefits primarily for services of physicians and nurses, and for drugs or medicines. Further study should be made whether these additional services are of sufficient impact on the budget of the average purchaser of this coverage or whether they benefit only a small segment of the insured population.

The claim incidence and the average cost indications for individual and family contracts produce pure premiums which are in line with the rate relativity for these classes of contracts.

TABLE I

EXPERIENCE FOR POLICY YEARS 1954—1960

As of March 31, 1961

Policy Year	*Earned Premiums*	*Losses Paid*	*Losses Outstanding*	*Losses Incurred But Unreported*	*Total Losses Incurred*	*Loss Ratio*
			Prolonged Illness			
1955*	$ 927,219	$ 163,412	$ 16,140	$ —	$ 179,552	19.4%
1956	2,230,425	391,593	47,275	—	438,868	19.7
1957	3,067,953	682,347	139,235	—	821,582	26.8
1958	3,708,339	994,568	253,099	—	1,247,667	33.6
1959	4,323,834	1,174,183	702,030	33,459	1,909,675	44.2
1960	4,816,329	1,021,054	2,109,337	474,295	3,604,686	74.2
			Master Medical			
1956	$ 732	$ 1,063	$ —	$ —	$ 1,063	145.2%
1957	71,630	38,509	3,223	—	41,732	58.3
1958	309,848	206,919	38,629	—	245,548	79.2
1959	927,633	525,713	184,533	78,243	788,489	85.0
1960	1,559,415	484,359	769,190	133,205	1,386,754	88.9

* Includes October to December of 1954.

TABLE IV
DISTRIBUTION OF PAID AMOUNTS BY LOCATION

Location of Service	*Individual Contracts*					*Family Contracts*				
	1956	*1957*	*1958*	*1959*	*1960*	*1956*	*1957*	*1958*	*1959*	*1960*
					Prolonged Illness					
General Hospital										
In-Patient	36.8%	34.0%	25.9%	31.4%	26.0%	41.0%	37.2%	29.6%	27.5%	34.4%
Out-Patient	1.4	1.8	1.2	1.2	1.6	3.4	2.4	2.8	2.1	2.0
Mental Hospital										
In-Patient	13.3	18.1	28.5	32.4	40.7	11.7	14.5	23.7	25.9	28.0
Out-Patient	2.1	1.7	3.5	3.8	5.7	2.5	3.2	4.3	6.7	5.1
Nursing Home	22.9	11.6	16.0	13.2	8.5	5.1	3.8	2.5	6.0	3.3
Chronic Disease Hospital	.7	10.3	4.7	3.6	3.5	2.8	4.7	6.0	7.4	5.8
Doctor's Office	8.5	6.7	8.5	6.4	6.4	10.6	12.5	11.3	10.4	9.9
Patient's Home	14.3	15.8	11.7	8.0	7.6	22.9	21.7	19.8	14.0	11.5
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
					Master Medical					
General Hospital										
In-Patient		14.0%	34.4%	45.7%	43.2%		41.9%	44.3%	48.9%	51.0%
Out-Patient		—	1.3	1.3	.9		1.6	2.2	1.7	1.8
Mental Hospital										
In-Patient		1.5	6.8	13.7	17.4		5.4	12.1	11.8	14.1
Out-Patient		—	.1	.9	2.3		.3	2.6	1.7	1.9
Nursing Home		1.4	9.7	.6	7.7		—	.2	2.0	.8
Chronic Disease Hospital		—	2.9	3.7	4.0		.2	.1	3.0	1.4
Doctor's Office		36.1	13.0	15.3	14.0		15.4	15.6	14.1	14.3
Patient's Home		47.0	31.8	18.8	10.5		35.2	22.9	16.8	14.7
		100.0%	100.0%	100.0%	100.0%		100.0%	100.0%	100.0%	100.0%

TABLE V
ANALYSIS OF PAID CLAIMS BY TYPE OF SERVICE

	Prolonged Illness				*Master Medical*			
	1958		*1959*		*1958*		*1959*	
Type of Service	*Individual*	*Family*	*Individual*	*Family*	*Individual*	*Family*	*Individual*	*Family*
Physician—								
Medical	5.8%	3.0%	3.7%	2.6%	2.5%	2.0%	2.1%	1.5%
Surgical	8.1	11.6	6.9	8.7	26.3	20.9	19.5	22.4
Shock Treatment	8.8	9.1	11.0	12.0	1.8	4.1	1.9	2.7
Miscellaneous	.7	2.0	.7	1.1	1.7	1.5	.9	1.4
Room and Board	34.0	22.3	33.5	27.3	12.1	12.6	21.3	11.5
Reg. or Vis. Nurse	18.4	23.6	23.8	24.0	29.3	32.6	37.5	42.3
Physiotherapy	2.8	3.1	2.5	2.2	2.7	1.1	.9	1.0
X-Rays	.5	.8	.6	.7	1.2	.9	.7	.5
Drugs	5.2	9.2	4.2	7.7	17.1	17.2	7.7	10.3
Ancillaries	14.2	12.9	11.4	11.4	4.1	5.6	5.4	4.9
Prosthetics & Appliances	1.3	1.9	.7	1.5	.3	.3	.3	.5
Other	.2	.5	1.0	.8	.9	1.2	1.8	1.0
Totals	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE VI
ANALYSIS BY DIAGNOSIS OF DISEASE
(Paid Claims Plus Reserves For Known Outstanding)

	Prolonged Illness				*Master Medical*			
	1958		*1959*		*1958*		*1959*	
	Individual	*Family*	*Individual*	*Family*	*Individual*	*Family*	*Individual*	*Family*
Polio	—%	.5%	.7%	1.7%	—%	.1%	—%	—%
Cancer	18.8	14.4	16.8	11.8	31.1	13.0	7.6	10.3
Cerebral Hemorrhage, Embolism or Thrombosis	8.8	8.9	12.8	7.7	1.6	5.7	7.9	4.7
Coronary Emb. or Throm.	8.0	18.0	10.6	17.4	9.2	8.1	9.7	9.1
Rheumatic Fever or Chorea	1.4	3.8	—	7.8	—	—	—	4.9
Congestive Heart Failure	4.3	3.6	3.7	1.6	3.0	1.0	2.4	4.6
Active Pulmonary TB	2.2	2.8	1.5	2.6	1.0	—	.1	.7
Ulcerative Colitis & Regional Enteritis	.4	.9	—	.8	—	4.6	—	.7
Cirrhosis of Liver & Chronic Nephritis	1.8	1.9	.1	3.3	—	.3	4.0	.1
Fractures	7.0	5.9	6.7	4.5	10.2	4.6	11.8	5.7
Amputations	6.6	.5	.2	1.2	—	1.0	—	.7
Mental & Nervous	30.9	23.8	31.7	23.9	5.4	15.2	12.1	12.9
All Other	9.8	15.0	15.2	15.7	38.5	46.4	44.4	45.6
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

TABLE VII

Part 1.

DISTRIBUTION BY SIZE OF CLAIM
(Incurred as of March 31, 1960)

Prolonged Illness

Size of Claim	1958				1959			
	Individual		*Family*		*Individual*		*Family*	
	No.	*Amount*	*No.*	*Amount*	*No.*	*Amount*	*No.*	*Amount*
Up to - $ 25.00	72	$ 964	345	$ 4,642	44	$ 589	214	$ 2,960
$ 25.01- 50.00	48	1,905	200	7,723	33	1,276	159	5,994
50.01- 75.00	52	3,401	163	10,347	27	1,797	104	6,767
75.01- 100.00	46	4,173	119	10,508	28	2,462	95	8,340
100.01- 150.00	43	5,278	199	24,843	39	5,020	174	21,944
150.01- 200.00	47	8,063	109	18,789	23	4,031	93	16,061
200.01- 250.00	32	7,245	107	23,955	28	6,419	91	20,154
250.01- 300.00	53	15,358	199	57,887	103	30,146	336	98,526
300.01- 400.00	19	6,784	94	33,141	10	3,341	43	14,831
400.01- 500.00	26	11,677	67	30,371	37	18,344	141	69,622
500.01- 600.00	11	6,082	39	21,677	9	5,227	28	15,374
600.01- 800.00	20	14,074	68	48,291	10	7,081	42	29,915
800.01- 1,000.00	41	38,876	116	111,206	156	154,892	529	525,375
1,000.01- 1,500.00	41	52,769	221	282,834	78	100,638	378	486,857
1,500.01- 2,000.00	10	17,280	35	63,307	9	15,527	41	70,256
2,000.01- 3,000.00	11	26,679	39	97,681	15	35,920	77	193,879
3,000.01- 5,000.00	12	50,887	39	158,700	5	18,250	66	273,450
5,000.01- 7,500.00	1	7,050	7	41,800	—	—	—	—
7,500.01- 10,000.00	1	7,800	2	16,047	—	—	—	—
Totals	586	$286,345	2,168	$1,063,749	654	$410,960	2,611	$1,860,305

TABLE VII

Part 2.

DISTRIBUTION BY SIZE OF CLAIM
(Incurred as of March 31, 1960)

Master Medical

	1958				*1959*			
	Individual		*Family*		*Individual*		*Family*	
Size of Claim	*No.*	*Amount*	*No.*	*Amount*	*No.*	*Amount*	*No.*	*Amount*
Up to - $ 25.00	27	$ 385	230	$ 3,189	74	$ 943	428	$ 5,503
$ 25.01- 50.00	27	1,007	157	5,956	44	1,533	217	7,834
50.01- 75.00	8	473	78	4,811	13	785	101	6,167
75.01- 100.00	8	703	31	2,723	12	1,016	79	6,883
100.01- 150.00	12	1,412	54	6,361	12	1,457	87	10,560
150.01- 200.00	3	489	24	4,100	2	352	45	7,813
200.01- 250.00	3	665	19	4,207	6	1,279	28	6,289
250.01- 300.00	13	3,790	56	16,222	86	25,790	536	159,226
300.01- 400.00	1	384	17	5,942	7	2,315	29	10,131
400.01- 500.00	1	444	14	6,560	9	4,428	52	24,843
500.01- 600.00	—	—	7	3,907	3	1,617	15	8,222
600.01- 800.00	3	2,119	15	10,869	2	1,500	18	13,057
800.01- 1,000.00	7	6,701	20	18,640	14	13,447	121	118,849
1,000.01- 1,500.00	6	7,243	26	33,820	17	20,859	83	106,475
1,500.01- 2,000.00	1	1,745	5	9,150	2	3,700	29	51,261
2,000.01- 3,000.00	1	2,500	7	17,125	3	7,350	14	34,535
3,000.01- 5,000.00	1	3,900	4	16,322	2	6,750	16	63,800
5,000.01- 7,500.00	2	14,850	1	5,078	1	5,842	4	23,500
7,500.01- 10,000.00	—	—	1	9,900	—	—	1	8,500
Totals	124	$48,810	766	$184,882	309	$100,963	1,903	$675,448