GROUP ACCIDENT AND HEALTH HOSPITAL THERAPEUTIC BENEFITS — MEASUREMENT OF LOSS COSTS FOR RATEMAKING PURPOSES

BY

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PART I INTRODUCTION

A. COVERAGE DEFINITION

Hospital therapeutics benefits coverage is often referred to as "hospital extras" or "hospital miscellaneous benefits." As defined in our policy it covers "hospital charges for necessary therapeutic services and supplies (including ambulance service, whether or not charged by the hospital)" but does not include hospital charges for room and board and general nursing service.

The amount of this benefit generally is set forth as a certain maximum amount, with all charges payable in full up to this maximum. Sometimes it includes a coinsurance factor beyond a set limit, or a deductible.

This paper will consider hospital therapeutic benefits as a coverage entirely separate and distinct from hospital room and board.

B. OBJECTIVES

The general objective of the thesis is to determine the extent to which individual company loss experience can be used as a basis for hospital therapeutic benefit rates. Consideration will be given both to the securing of necessary loss experience and to the interpretation of this experience for ratemaking purposes.

Parts of the thesis pertaining to development of a plan for accumulation of statistical data will be equally applicable to other group accident and health coverages. The statistical problems will be viewed through the eyes of a company also writing fire and casualty lines.

Certain statistical data will be used to illustrate techniques and approach. This data is not intended to represent typical industry experience.

No consideration is given to any phase of rate regulation.

C. SIGNIFICANCE OF HOSPITAL THERAPEUTIC BENEFITS IN THE OVERALL GROUP ACCIDENT AND HEALTH PICTURE

Group accident and health coverages may be classified into three major areas for purposes of considering loss experience and the general ratemaking problem.

1. Weekly indemnity or loss of time coverage provides indemnity to the claimant to compensate for loss of earnings. It has no direct bearing on the *cost* of medical care.

2. Maternity and obstetrical coverages provide reimbursement of the costs of medical care for child birth. The loss experience problems and patterns are completely different than for coverages providing reimbursement for accident and sickness hazards.

3. Hospital room and board, hospital therapeutic benefits and surgical coverage all have certain common characteristics. They all cover the hazards of accident and sickness, they all cover the cost of medical care and a large proportion of the claims will involve all three coverages.

The term "extras" or "miscellaneous benefits" for hospital therapeutic services may be misleading because these terms imply "secondary" importance. Of the coverages listed in "3" above, therapeutic benefits can be considered as both the most important and the most interesting from the ratemaking standpoint.

The relative amounts involved for each coverage will vary by company in accordance with the types of business written and maximum benefit levels but the following tabulation illustrates the fact that hospital therapeutic benefits can be considered as a "principal" and not a "secondary" coverage.

Federated Mutual
Incurred Losses, Accident Year 1953

Coverage	*Amount of Loss*
Hospital Therapeutic Benefits	$ 451,715
Hospital Room and Board	343,434
Surgical	301,421
Weekly Indemnity	244,970
Maternity & Obstetrical*	187,430
All Other	48,626
Total	$1,577,596

*–Amount of loss on claims hospitalized in 1953.

D. RATING PROBLEM

The hospital therapeutics rating problem is extremely interesting. On hospital room and board coverage the rating problem is limited to claim frequency and average duration of confinement. On most surgical losses the amount of loss paid is the maximum provided by the policy. On hospital therapeutics the amount paid on each loss is generally far below the maximum provided by the policy. This means that the loss costs are very sensitive to inflationary trends and to changes in hospital pricing principles and treatment techniques.

There is a considerable difference in insurance philosophy among companies concerning maximum hospital therapeutic benefits. Some companies do not believe that high benefits can be written safely. Higher maximum benefit levels can throw off the experience of an

individual policy so companies who view rating and underwriting from a "per policy basis" generally favor keeping down the maximum benefit.

On the other hand there has been a tendency by other companies to raise the maximums or even write the coverage unlimited. These higher benefits do provide insurance protection on serious losses where the claimant is really hurt financially by accident or sickness. The argument for higher benefits is that this is the type of insurance protection needed and that group insurance is not worth while if it does not give the policyholder insurance protection when he needs it.

Increased maximum benefit levels definitely increase the value and importance of loss experience statistics set up on a summary rather than individual policy basis.

PART II BASIC PLAN FOR DEVELOPING RATEMAKING STATISTICS

A. GENERAL APPROACH TO THE RATING & STATISTICAL PROBLEM

The basic question of whether or not individual company loss experience can produce information which will be of value in the establishment of rates must be considered carefully. In a coverage like fire insurance for example a company ordinarily would not even entertain any thoughts about establishing rates on the basis of its own experience.

Hospital therapeutic benefits as well as most other group accident and health coverages represent business on which statistics are unusually effective. There are several reasons for this:

1. Exposure units are easily defined and measured.
2. The number of claims in relation to the number of exposure units is unusually high. Annual hospital therapeutic claim frequency can be considered roughly as 1 claim per 10 male employe lives exposed, and 1 claim per 3-4 dependent units (adult and children) exposed.
3. The average claim costs on a "per coverage basis" are relatively low in relation to the total number of claims incurred.
4. A number of factors that determine loss costs per exposure unit can be isolated and measured. Some of these elements are sex, age and territory.
5. Claims are settled without undue delay so there is no problem of claim valuation such as is present in workmens compensation or automobile liability.

However, many companies writing group accident and health insurance do not keep summary statistics for ratemaking purposes. They base their rates entirely on competitive levels with subsequent adjustments based on the loss experience of individual accounts. This may be modified by the use of industrywide statistics such as those prepared by the Society of Actuaries.

B. PLAN — EXPOSURE AND CLAIMS

The statistical plan should be directed toward a measurement of classified exposure and classified claim data. Premiums can be disregarded completely in the program of ratemaking statistics.

A master card plan under most conditions will be practical in producing classified earned exposure totals. When premiums and exposure statements are received the exposure totals for male employes, female employes and dependents are recorded separately by policy number. There is no breakdown or punching of cards for each coverage included in the policy.

Master cards for each policy contain an indication as to what coverages are involved, maximum benefits and also a classification coding. There is one master card for employes and one for dependents. When the codes are gangpunched from the master cards to the detail cards or summary cards it is possible to determine the number of lives exposed for each coverage according to any classification set up on the master cards. This arrangement is both economical and efficient.

Loss payment cards can be punched from the payment drafts in the same manner as on fire and casualty lines. Case estimates of outstanding losses are not necessary as incurred losses can be determined accurately by a projection of payments.

A major problem involves determining number of claims from the statistical cards. It is highly desirable to have a set of cards completely coded on a one card per claim basis. This permits classification by size of claim as well as making it easy to compile frequency and average claim costs according to any kind of classification.

The one card per claim objective can be accomplished through a summarization of multi payment claims by claim number. This is the most accurate and probably the least expensive approach.

Measurement of loss costs should definitely be made on the basis of amount actually charged by the hospital for each claim rather than on the amount paid to the claimant. These two amounts differ only in those cases where the claimant receives the maximum benefit but where this maximum is less than the amount charged by the hospital.

Average claim costs on a "paid to claimant basis" will vary to an uncertain extent with policy maximum benefit levels. On a paid basis it is necessary to classify all loss experience according to maximum benefit level. This makes the entire set-up unwieldy and actually produces statistics on average claim costs which are nearly worthless. There are other factors of more significance than maximum benefit levels in determining average claim costs.

The proportion of claims for which the amount charged by the hospital exceeds the amount paid to the insured varies in accordance with the maximum benefit levels written. If the business is written at high average benefit levels the number of these claims will be very small. In our own case there were 465 claims that occurred in 1953 for which the amount charged by the hospital exceeded the amount paid to the claimant. This represents about 5% of the total claims.

Continuation of the present policy of increasing maximum benefits will reduce this percentage in 1954.

Checking each claim in the branch offices as to whether the payment was at the maximum will add another procedure complexity. Therefore, we follow the plan of sorting out all cards where the loss payment is equal to *any* maximum benefit level written by the company. These cards are then checked against the files to determine amount charged.

(In contrast to the policy of using amount charged on therapeutic benefits there appears to be no need for recording this information on hospital room and board. On room and board computations the claim frequency multiplied by average number of days confinement per claim will produce a "per dollar a day" pure premium.)

Another basic element in the statistical plan is the classification of protected persons and claimants. For employes it is highly desirable to classify exposure and losses as to male and female. This permits computation of a separate pure premium for male and female employes. The necessary female loading can then be determined by a comparison of male and female pure premiums.

Separate classification of adult dependent and childrens claims is advisable because of the difference in the loss experience pattern from both a frequency and severity standpoint. Analysis of dependent claim experience would be limited without this breakdown. For example, a decrease in claim costs might be the result of an unusually high proportion of children's claims.

If a master card for each policy is set up, a great deal of classification information as to type of group, industry, or location can be made available at very little cost. These master cards can also carry adequate coding as to policy provisions pertinent to the development of ratemaking statistics.

C. EXPERIENCE PERIOD

Separate calculation of claim frequency and average claim costs makes it possible to use different periods in measuring these two component parts of the pure premium. This flexibility has advantages, but there is also an advantage in being able to relate pure premium directly to a period of time so that 1953 can be compared with 1952, and so forth. Also, frequency must be related to a definite period of time to be compared with exposure totals. Further, there is always the problem of the possible interplay between frequency and average claim costs; the question of whether or not frequency in itself is a factor that influences average claim costs must be kept in mind in analyzing loss experience.

The policy year concept is unnecessary because there is no problem of waiting for final audits to determine correct exposures. Also, the exposure totals recorded on the books are earned so there is no problem of computing earned from written.

The calendar year basis for losses has the disadvantages of having to contend with errors in loss reserves at both the beginning and the end of the period. Also, it does not produce frequency figures comparable with earned exposure totals.

Earned-accident-year is the most practical experience period to work with. The major problem is the development of incurred frequency and amounts from payments made during the accident year in question and during a loss develoment period in the following year.

The most accurate figures of course are obtained by waiting for a loss development of several months. However, 1953 experience may be needed badly for policy decisions or revised rates in March or April. Waiting for perfection of the figures is expensive.

The incurred loss experience figures used in this study are for accident year 1953 developed through February 28, 1954. The estimate of 1953 claims outstanding February 28, 1954 was computed according to a simple projection formula.

An important problem to consider in estimating unpaid losses is the fact that the proportion of long duration cases may be higher than average even after a two months' development. For example, a confinement of sixty days beginning in December would just barely be completed by the end of February. These long duration cases can be expected to develop higher than average costs per claim.

Therefore, it is well to make a separate projection of claims of different confinement durations. The classification basis for claims in this study is:

1. 0- 7 Days
2. 8-14 Days
3. 15-21 Days
4. 22 Days and Over

Separate average claim costs for each of the above classifications were used in projecting incurred losses by size of claim.

The projection method used considered the following factors:

A. First 6 months 1953 accidents (each duration classification separately)
   1. Claims paid through August 1953
   2. Claims paid September 1953 through February 1954
   3. Outstanding February 28, 1954 (Estimate derived from Company loss reserve projection. Amounts and numbers involved very small).

B. Second 6 months 1953 accidents paid through February 1954

$$\text{Factor } F = \frac{A_1 + A_2 + A_3}{A_1}$$

Losses Outstanding on 1953 claims $= (A_3) + (BF - B)$

It is possible to calculate reasonably accurate frequency and claim cost figures on hospital therapeutics after a two months' development. In analyses which compare one segment or classification against another (as in Part III) the losses outstanding are disregarded. However in computing the pure premiums that go into the final rate computations it is very essential that outstanding losses are included.

PART III LOSS EXPERIENCE CHARACTERISTICS

The remaining subject matter will consider the analysis, interpretation and use of loss experience statistics for ratemaking purposes.

A statistical description of hospital therapeutic losses is helpful as a starting point. The data on male employe claims with hospitalization and with surgery illustrates claim characteristics of this coverage. The *average* claim costs constantly used are not *typical* claim costs. The dispersion is high even when the sample is limited to one type of claim. The frequency distribution is heavily skewed positively.

Male Employes, Claims with Hospitalization, with Surgery

Number of Claims in Sample:		832
Average Cost per Claim:	Mean	$109.44
	Median	68.00
	Mode	45.00
Standard Deviation		136.38

The main emphasis in working with individual company statistics is to develop homogeneity in classification. Industry tabulations are representative of *overall* conditions but they can easily cover up pertinent factors that cause differences in loss costs for companies writing a specialized type of business or in a limited territory.

Tabulation A presents a rough perspective as to the extent that different types of business can cause different loss patterns.

Federated Mutual — Tabulation A

1953 Claims Paid Through February 28, 1954

Hospital Therapeutic Benefits

	Type of Claimant	a Amount of Loss Paid Claimant	b Amount of Loss Chgd. by Hospital	c Number Losses	d Number Days Hosp.	a÷b	b÷c	b÷d	d÷c
Segment A	Male Employe	$92,378	$110,998	1,427	11,154	83.2	77.78	9.95	7.82
	Dep.-Adult Female	98,424	108,210	1,509	9,765	91.0	71.71	11.08	6.47
	Dep.-Children	62,325	64,420	1,873	5,888	96.7	34.39	10.94	3.14
Segment B	Male Employe	15,819	18,441	291	1,846	85.8	63.37	9.99	6.34
	Dep.-Adult Female	14,644	15,487	223	1,391	94.6	69.45	11.13	6.24
	Dep.-Children	9,639	9,703	310	836	99.3	31.30	11.61	2.70
Segment C	Male Employe	12,658	13,051	129	965	97.0	101.17	13.52	7.48
	Dep.-Adult Female	12,686	12,855	144	1,139	98.7	89.27	11.29	7.91
	Dep.-Children	6,602	6,603	161	514	100.0	41.01	12.85	3.19
Segment D	Male Employe	21,298	26,727	296	2,418	79.7	90.29	11.05	8.17
	Dep.-Adult Female	10,014	10,716	122	902	93.4	87.84	11.88	7.39
	Dep.-Children	4,153	4,243	111	424	97.9	38.23	10.01	3.82
Segment E (Canada)	Male Employe	7,530	8,270	186	1,448	91.1	44.46	5.71	7.78
	Dep.-Adult Female	6,119	6,599	158	1,239	92.7	41.77	5.33	7.84
	Dep.-Children	5,471	5,494	258	1,112	99.6	21.29	4.94	4.31

Tabulation A summarizes in a general way the differences in maximum benefit levels, loss severity, and hospital charges of segments of a book of business. A year to year comparison of this type, particularly when related to claim frequency, is useful in getting a general perspective of variations in loss experience by type. There is always a question of business being good or bad and also of whether a single set of rates can be used for all segments of the business.

The facts suggest that there are causative factors that bring about different loss experience for different types of business. The discussion following will consider a few of these causative factors.

Tabulation B represents a type of loss classification which is useful in the analysis of loss experience. It groups claims according to whether or not the claim involved surgery and also whether or not the employe was confined to the hospital for one or more days.

Federated Mutual — Tabulation B

1953 Claims Paid Through February 28, 1954

United States Only — Hospital Therapeutic Benefits

	a # *Claims*	*b* # *Days*	*c* *Amt. Chgd. by Hospital*	*c÷a*	*c÷b*	*b÷a*
			Male Employes			
Outpatient-no surgery	204	—	$ 4,053	19.87	—	—
Hosp. confinement-with surgery	832	8,064	90,529	108.81	11.23	9.69
Hosp. confinement-no surgery	990	8,299	72,550	73.28	8.74	8.38
Outpatient-with surgery	116	—	2,086	17.98	—	—
	2,142	16,363	169,218	79.00	—	—
			Dependents-Adult Female			
Outpatient-no surgery	131	—	3,191	24.36	—	—
Hosp. confinement-with surgery	1,116	8,353	102,035	91.43	12.22	7.48
Hosp. confinement-no surgery	686	4,834	40,676	59.29	8.41	7.05
Outpatient-with surgery	64	—	1,366	21.34	—	—
	1,997	13,187	147,268	73.74	—	—
			Female Employes			
Outpatient-no surgery	59	—	981	16.63	—	—
Hosp. confinement-with surgery	323	2,376	29,193	90.38	12.29	7.36
Hosp. confinement-no surgery	228	1,794	13,792	60.49	7.69	7.87
Outpatient-with surgery	17	—	514	30.24	—	—
	627	4,170	44,480	70.94	—	—
			Dependents-Children			
Outpatient-no surgery	186	—	2,322	12.48	—	—
Hosp. confinement-with surgery	1,263	3,681	53,204	42.13	14.45	2.91
Hosp. confinement-no surgery	776	3,980	26,197	33.76	6.58	5.13
Outpatient-with surgery	230	—	3,247	14.12	—	—
	2,455	7,661	84,970	34.61	—	—

This type of classification is valuable in analyzing loss costs by individual policy or for various segments of business. Further, it indicates certain loss experience characteristics quite definitely:

1. Outpatient claims represent about 3.5% of the *total* amount for adults and 6.5% for children. Possibly these claims could be best excluded in analyzing frequency and claim costs. Variation in numbers of these small claims can distort the averages. The cost of these claims could be figured on an overhead basis.

2. Average cost on claims involving surgery and hospitalization run about 50% higher for all adult claimant classifications than for claims without surgery.

3. The average higher duration on male claims and the high proportion of surgical claims for females becomes significant in the analysis of experience by age.

A comparison of 1954 claims set up on the same basis as the above tabulation will provide a much more accurate measurement of trends in claim costs than would a comparison of overall averages. In the writing of new groups also, the proportion of surgical claims could be expected to run higher than in older groups. Therefore, as these new groups mature the average claim cost could decrease because of a decrease in the proportion of surgical claims and this may tend to offset an increase in average cost caused by other factors.

It is generally believed that average claim costs are lower in the Southeastern states than in the balance of the United States. Industry figures comparing average costs by geographical region were published in an article by Stanley W. Gingery in the Society of Actuaries Transactions Volume 3 published in 1952. A comparison of these costs is shown on pages 109-110. It shows the average amount charged on male claims in the Southeast to be $54.18 as compared with $67.88 in the Midwest. The fact that average claim costs are lower in the Southeastern Region brings up the question as to whether or not this difference in average claim costs should be reflected in rate level. The lower average claim cost could possibly be offset by higher frequency as it is possible that increased use of the hospitals for minor illness could bring about shorter hospital stays with small average claim costs but with resulting higher frequency.

Tabulation C examines this problem from an individual company experience standpoint in greater detail. The sample of business selected is homogeneous from a type of business standpoint and it is expected that the comparison between these two sections of country should be reasonably fair.

Federated Mutual — Tabulation C

Hospital Therapeutic Benefits — Outpatient Claims Excluded
Male and Female Employe and Adult Female Dependent Claims
1953 Claims Paid Through February, 1954

	(a) Number of Claims	(b) Amount Charged by Hospital	(c) Number of Days Hosp.	b÷a	b÷c	Frequency*
		1 Day Claims — No Surgery				
Southeast	30	$ 627.	30	20.90	20.90	.27
Middle West	109	2,685.	109	24.63	24.63	.34
		2-7 Day Claims — No Surgery				
Southeast	279	$ 11,735.	1,117	42.06	10.51	2.50
Middle West	650	26,913.	2,228	41.40	12.08	2.02
		Over 7 Day Claims — No Surgery				
Southeast	110	$ 12,673.	1,763	115.21	7.19	.98
Middle West	319	38,611.	5,598	121.04	6.90	.99
		1 Day Claims — With Surgery				
Southeast	41	$ 1,066.	41	26.00	26.00	.37
Middle West	147	4,112.	147	27.97	27.97	.46
		2-7 Day Claims — With Surgery				
Southeast	206	$ 12,080.	850	58.64	14.21	1.84
Middle West	555	36,040.	2,414	64.94	14.93	1.71
		Over 7 Day Claims — With Surgery				
Southeast	188	$ 27,811.	2,904	147.93	9.58	1.68
Middle West	520	82,596.	7,642	158.84	10.81	1.61
		Grand Total				
Southeast	854	$ 65,992.	6,705	77.27	9.84	7.64
Middle West	2,300	190,957.	18,138	83.02	10.53	7.13

*–Number of claims per month per 1,000 weighted exposure units.
Exposures weighted as follows:

1 Male employe month	1.00
1 Female employe month	1.35
1 Dependent unit month	1.46

Weights based on 1953 experience.

The loss experience pattern for these two regions runs extremely close. The best measure of comparative cost levels is column (b) ÷ (c) representing the claim cost related to number of days hospitalized. The evidence that lower claim costs per unit of exposure can be expected in the Southeast is not convincing. Although the Southeastern average claim cost in total is lower — this is offset by a higher frequency. The Southeastern pure premium excluding outpatient claims adds up to $.590 while the corresponding Midwestern pure premium adds up to $.592. Southeastern frequency ran higher in the non surgical claims which produced lower average claim costs.

It is possible that varying proportions of rural and large city business can influence regional cost variations. Canadian costs, however, definitely are different.

One of the most interesting and important factors in the determination of loss costs is the age distribution of protected persons.

Tabulation D indicates the importance of age in determining both frequency and claim costs. The sample involved is small (we are just now working on this project) but nevertheless the message conveyed is definite and certain.

Federated Mutual — Tabulation D

Male Employes — Hospital Therapeutic Benefits

Selected Sample — Midwestern U. S.

1953 Claims Paid Through February, 1954

Age	(a) No. of life months exposed	(b) No. of Claims	(c) No. of Days Hosp.	(d) Amt. Chgd. by Hosp.	Freq. 1000 X b÷a	Severity d÷b	Severity c÷b	Severity d÷c
<20	1,427	6	20	$ 191.	4.20	31.83	3.33	9.55
20—29	22,269	114	682	7,386.	5.12	64.79	5.98	10.83
30—39	37,070	205	1,082	11,519.	5.53	56.19	5.28	10.65
40—49	32,169	208	1,588	15,533.	6.47	74.68	7.63	9.78
50—59	22,044	164	1,535	14,124.	7.44	86.12	9.36	9.20
60—69	10,279	110	1,247	13,049.	10.70	118.63	11.34	10.46
70 and Over	3,085	56	707	6,448	18.15	115.14	12.63	9.12
	128,343	863	6,861	68,250	6.72	79.08	7.95	9.95

There are a number of "traps" to be considered in working on the problem of age distribution as a factor in the rating plan. The group life insurance carrier will likely have available a distribution of *total* employes (male and female combined) by age because this is the basis of life insurance rates. This distribution is of no use in accident and health insurance because here it definitely is necessary to have male and female employes separate. The age distribution for female employes is entirely different than for males.

The loss costs on wives does not increase with age to the same extent as on male employes. This is illustrated in Tabulation E.

Federated Mutual — Tabulation E
Adult Female Dependents — Hospital Therapeutic Benefits
Selected Sample — Midwestern U. S. (Same as above)
1953 Claims Paid Through February, 1954

Age	*(a) No. of Claims*	*(b) No. of Days Hosp.*	*(c) Amt. Chgd. by Hospital*	*c÷a*	*b÷a*	*c÷b*
<20	17	94	$ 1,484.	87.29	5.53	15.78
20—29	179	997	11,531.	64.42	5.57	11.57
30—39	299	1,838	20,508.	68.59	6.15	11.16
40—49	228	1,648	18,720.	82.11	7.23	11.36
50—59	150	1,276	12,432.	82.88	8.51	9.74
60—69	55	396	3,923.	71.33	7.20	9.91
70 and Over	17	171	1,364.	80.24	10.06	7.98
	945	6,420	69,962.	74.03	6.79	10.90

In analyzing Tabulation E it is helpful to refer back to Tabulation B to compare the surgical claims of adult females as compared to male employes.

The measurement of childrens' claims in relation to the age of the father or mother becomes a further problem. As the age of the parents increases beyond the fifty year mark it is reasonable to expect the number of protected children to decrease. On the above sample there were 883 claims for children under ten years of age and only 355 claims on children ten years of age and over.

The effect of age on other coverages must be considered carefully. A high average age distribution for male employes should mean a low loss cost on dependent maternity and obstetrical coverages.

The illustrated statistical data indicates that average age distribution will have its most pronounced effect upon male employe loss costs. The problem of working out a factor in the employe rates does not appear difficult for groups made up mostly of male employes. However, the female loading calculations would be distorted.

The problem of working out the age factor for dependent rates with the problem of offsets in both maternity and children claims would become more challenging. Also, the solution would depend upon whether dependents rate were figured on a composite or split basis.

The approach followed in considering problems in age distribution and geographic location can be followed in a study of other pertinent factors. One of these other factors which is considered important is "newness" of the policy. How much "extra" loss costs are involved in first year policy experience?

PART IV — TRANSLATION OF LOSS EXPERIENCE INTO PURE PREMIUMS

The first and most important step in gathering together the loss experience for ratemaking or rate review purposes is to decide what constitutes homogeneous classifications.

After deciding this, tabulations are run by size of claim separately for each of the following types of claimants:

1. Male Employes
2. Female Employes
3. Adult Dependents
4. Children

A worksheet can then be set up showing the average claim costs according to maximum benefit levels. An abbreviated example of an actual case follows.

Tabulation F

Average Claim Costs by Maximum Benefit Level
1953 Incurred Claims (Selected Sample)

Male Employes

Maximum Benefit	*Paymts. Under Max.*		*Paymts. at Max.*		*Total Cost*	*Av. Cost Per Claim*
	No.	*Amount*	*No.*	*Amount*		
20	182	$ 1,932	817	$16,340	$18,272	$18.29
50	471	11,546	528	26,400	37,946	37.98
100	775	32,857	224	22,400	55,257	55.31
200	926	53,642	73	14,600	68,242	68.31
500	992	73,887	7	3,500	77,387	77.46
Unlimited	999	78,893	—	—	78,893	78.97

On the basis of the above tabulation the rate differentials according to maximum benefit level can be determined. For example, the loss costs at a $500 maximum are 40% higher than at a $100 maximum.

In establishing pure premium for policies with no female loading we have considered the sex distribution to be:

94% Male
6% Female

Assuming a monthly frequency of 8.00 claims per 1,000 lives on male employes and 11 claims per 1,000 lives on female employes the frequency factor would be:

$$.94 \times .008 = .0075$$
$$.06 \times .011 = .0007$$
$$.0082$$

The employe pure premium for a $500 maximum benefit would then be:

$$.0082 \times 77.46 = \$.635$$

On dependent rate computations the pure premimus for adult dependents and children are computed separately. The resulting pure premiums are combined in order to produce a composite pure premium rate. On policies where the dependent rate is on a "split" basis, the adult and children losses must be kept separate and related back to classified exposure data.

Deductible Provisions

Information in Tabulation F can provide the basis for determining the effect that a deductible will have upon pure premiums.

Male Employes

Maximum Benefits	*Claim Costs No Deductible*	*% Reduction in Claim Costs from $20 Deductible*
$100	$55,257	33.1%
200	68,242	26.8
500	77,387	23.6

A comparable study on 1952 claim experience resulted in a reduction factor for a $20 deductible at the $500 maximum benefit level of 25.2% for male employes and 28.7% for dependents.

The entire concept of a deductible is extremely interesting and this may be the factor that will permit hospital therapeutics to be written for benefit levels that provide real protection and at the same time at a cost that is reasonable.

The loss cost for a $20 deductible, $500 maximum is nearly the same as for a $100 maximum without the deductible.

The adding of a deductible in itself may affect claim costs through affecting either or both frequency and amount charged. (In this respect the limited experience we have had has been favorable.)

It is important that claims incurred under policies with a deductible

provision be kept *entirely separate* from claims incurred under policies without a deductible. Otherwise both the frequency and the average claim costs will be upset.

Coinsurance

A tabulation classifying claims according to size will contain the basic information necessary in the determination of changes in loss costs resulting from coinsurance provisions.

Number of Days

Some thought has been given to setting maximum benefits at a specified number of dollars per day. There are policies written on this basis.

Although number of days serves a useful purpose as a rough measurement of severity, Tabulation G indicates that this could become a "trap" when used as a rating factor.

Federated Mutual — Hospital Therapeutic Benefits
1953 Claims Paid Through February 1954
Average Amount Charged Per Day Hospitalized

Duration of Confinement (Days)	*Number of Claims*	*Average Amount Charged* — *Mean*	*Median*	*Standard Deviation*
	Adult Claimants — With Surgery			
1	262	$29.80	$26.12	$15.78
2—7	1,048	16.53	14.40	8.43
8—14	638	12.05	10.25	6.48
15 +	314	10.73	9.07	7.28
	Adult Claimants — No Surgery			
1	180	24.97	20.77	17.80
2—7	1,111	12.39	9.92	7.75
8—14	348	8.48	8.79	5.83
15 +	259	7.60	5.34	8.06
	Children — With Surgery			
1	741	26.82	25.70	10.34
2—7	427	15.97	14.32	7.81
8—14	61	9.93	7.58	5.48
15 +	31	8.15	7.00	4.80
	Children — No Surgery			
1	163	18.57	15.00	13.78
2—7	463	8.48	6.83	6.16
8—14	104	6.14	4.90	4.58
15 +	43	5.17	4.43	3.74

Tabulation G indicates definitely that the average charge for extras per day decreases as the duration of confinement increases. This factor could have a tendency to increase durations in cases where the average *daily* benefit was high.

Reduction of amounts charged to a per day basis does reduce both the elements of skewness and dispersion. The relative amount of deviation from mean costs, however, is still surprisingly large on a "charged per day" basis. Factors other than number of days definitely affect claim costs. Many of these must still be considered as unknown.

Tabulation H further illustrates how the "per day" maximum benefit level basis would affect different types of claims. A per day maximum benefit would fall far short on certain types of claims particularly those involving surgery.

% of claims that would be 100% covered at indicated "per day" maximum benefit levels

Duration of Confinement (Days)	*Maximum benefit per day*		
	$10	*$15*	*$20*
	Adult Claims — No Surgery		
1—7	47.8%	68.4%	81.3%
8 and over	81.3	93.1	97.1
	Adult Claims — With Surgery		
1—7	19.4	47.7	70.1
8 and over	58.9	83.3	93.8
	Childrens Claims — No Surgery		
1—7	64.7	80.4	89.5
8 and over	92.7	97.2	99.4
	Children Claims — With Surgery		
1—7	11.9	30.2	47.4
8 and over	73.6	90.1	96.7

The entire question of loss costs by maximum benefit levels is becoming more interesting and more important as more business is written at higher levels. Many interesting research studies can be made to fill in the gaps left in this general review of the overall rating and statistical problem.