

HEALTH INSURANCE CLAIM RESERVES
AND LIABILITIES

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AT THE end of 1963 health insurance claim reserves and liabilities held by companies on this continent totaled well over one billion dollars. This paper seeks to study the problems involved in calculating these reserves and liabilities and to describe the methods in use. It takes account of methods used by thirty-one companies. Together, these companies hold about 58 per cent of the industry-wide total of health insurance claim reserves and liabilities. There is great variety in the methods used. This results from the profusion of coverages in force, differences in availability of statistical information to home offices, and differences of opinion as to proper procedures.

We are concerned with the following statement items, appearing in the Life and Accident and Health blank:

- Reserve for Amounts Not Yet Due;
- Reserve for Deferred Maternity and Similar Benefits;
- Liability for Due and Unpaid Claims;
- Liability for Claims in Course of Settlement; and
- Liability for Incurred but Unreported Claims.

The problems encompass both group and individual lines and a multiplicity of coverages, including loss-of-time, hospital, surgical, major medical, and accidental death insurance.

We will first seek to establish the theoretical bases of the various reserve and liability items. We will then consider the applicable laws and regulations and proceed to discuss the detailed methods in use.

The subject will be studied under the following headings:

- I. Definitions and Bases
- II. The Problems of Incurral Date and Period of Disability
- III. Laws and Regulations
- IV. General Comments about Methods
- V. The Seriatim Method
- VI. The Grouping Method
- VII. The Development Method
- VIII. The Tabular Method
- IX. Confidence Levels
- X. Study of Bases and Methods by Line of Coverage
- XI. Conclusion

I. DEFINITIONS AND BASES

Reserve for Amounts Not Yet Due

This reserve consists of two parts. The first part deals with reported claims. This reserve is for future "unaccrued" payments only; such payments can be identified as those which the insurance company would not be required to pay if the claimant were to recover from disability at the close of December 31. Future payments of this sort are not certain, and the statement item is therefore properly considered a "reserve" rather than a "liability." The reserve is intended to be sufficient, with interest at an assumed rate, to pay such unaccrued future amounts which become payable prior to the death or recovery of the insured and prior to the exhaustion of the maximum benefits provided.

The second part of this reserve is exactly the same as the first part, except that it refers to unreported claims. Again this refers only to the unaccrued future payments on such claims, identified as those which would not be paid if the claimant were to recover on December 31.

Reserve for Deferred Maternity and Similar Benefits

This item is a reserve and not a liability, because it refers to future payments which are not certain. This, like all other reserves, is subject to actuarial estimation or calculation.

The best example is given by a policy with deferred maternity benefits provided during a period (usually nine months) following termination of insurance. Deferred maternity benefits of this nature are usually provided in the case of group insurance and sometimes even in the case of individual insurance. A ruling of the New York Insurance Department, for example, requires an extension of maternity benefits wherever a cancelable individual contract is terminated by the insurance company. In situations not involving maternity benefits, examples of this reserve are quite rare. They can be identified with reference to benefits which still exist after the theoretical termination of coverage. One example would be the extended benefits provided under group contracts after termination of insurance.

There are two viewpoints on the question of claim reserves for maternity benefits. The first viewpoint holds that a maternity claim is incurred on the date of termination of pregnancy, in much the same fashion as any other claim. Under this viewpoint future maternity claims are always a charge against future premiums.

Under this first viewpoint a reserve for deferred maternity benefits is needed only where there is a maternity extension and thus a possibility that there would be no premiums collectible at the time of termination of

pregnancy. Under the most restricted interpretation, such a reserve is needed only in the case of business which has actually terminated and is still in the extended period. However, the reserve can also be set up on the assumption that all the business in force is to terminate December 31 in such fashion as to bring the extended maternity benefit into existence. Companies holding this first viewpoint would set up no deferred maternity reserves on guaranteed renewable business or other business having no maternity extension. However, they might possibly set up additional "unearned premium" reserves of roughly equivalent size; otherwise, the first-year experience will appear unduly favorable.

The second viewpoint is that a maternity claim is incurred on the date of conception. Under this viewpoint the object is to hold a deferred maternity reserve suitable to pay benefits for all pregnant policyholders, if such benefits will ultimately become payable, either as a result of continued premium payment or the existence of a maternity extension. This viewpoint is based on a belief that a maternity claim can very seldom be avoided once pregnancy occurs.

Practices concerning maternity reserves for group health insurance are discussed at greater length in Section X(4) of this paper.

Liability for Due and Unpaid Claims

This represents benefits which are fully accrued and on which all proofs have been completed and approved but which have not as yet been paid. Owing to prompt claim payment, when proofs are complete, many companies show little or nothing on this line for any type of business.

To determine whether an item appears on this line, due regard should be had for the policy provision relating to "time of payment of claims." This provision usually provides for periodic payment, not less frequent than monthly, in the case of loss-of-time claims, and payment immediately "upon receipt of due written proof of such loss" for other claims. Needless to say, no item will appear on this line if its payment has not yet been called for by the policy provision.

Liability for Claims in Course of Settlement

This item refers to claims which have been reported but on which benefits have not yet become payable because of incomplete proofs, etc. Items appearing here refer only to accrued benefits and can be identified as amounts which would be payable if all such claimants recovered from disability at the end of December 31.

This item can include "open claims" on which some payments have already been made but which have further payments pending.

A special category contained in this line is "resisted claims"—or at least the accrued portion of such claims. Any unaccrued portion would be included in "Reserve for Amounts Not Yet Due on Claims." Resisted claims are included according to the best estimate of the amount likely to be paid.

Liability for Claims Incurred But Unreported

This is exactly the same as the "Liability for Claims in Course of Settlement," except that it refers to "unreported" items instead of "reported" items. It has reference to "accrued" items only, which can be identified as payments which would be made if all claimants recovered at the end of December 31.

It will be noted that this liability is reported net of reinsurance ceded, unlike the other reserve and liability items.

Special Note Regarding the Fire and Casualty Blank

The Fire and Casualty blank requires the following three items in Part 3A of the Underwriting and Investment Exhibit:

- a) Claims Adjusted or in Process of Adjustment;
- b) Claims Incurred but Unreported; and
- c) Unpaid Loss Adjustment Expense.

Item (a) includes the reported portion of "Reserve for Amounts Not Yet Due" plus all the "Liability for Due and Unpaid Claims" and the "Liability for Claims in Course of Settlement." Item (b) includes the unreported portion of "Reserve for Amounts Not Yet Due" plus all the "Reserve for Deferred Maternity and Similar Benefits" and the "Liability for Claims Incurred but Unreported."

No basic separation is required between reserves and liabilities, although a footnote to Exhibit 3A requires the "Present Value of Life Indemnity Claims" and the "Reserve for Deferred Maternity and Other Similar Benefits." The item "Unpaid Loss Adjustment Expense" is peculiar to the Fire and Casualty blank.

The methods discussed in this paper are applicable to casualty as well as life companies, but it is clear that the statement arrangement of items is somewhat different.

II. THE PROBLEMS OF INCURRAL DATE AND PERIOD OF DISABILITY

To identify health insurance claim reserves and liabilities, it is necessary to have rules determining (1) the incurral date of any claim and (2) the claim payments attributed to such claim. It is clear that an incurral date is essential, since claims which have been incurred prior to the year end are those which lead to reserves and liabilities. Furthermore,

incurral date is needed to determine the claim duration and thus the size of the reserve for future payments.

The question of which claim payments are to be attributed to a particular claim is also important, because, in setting up a reserve for such a claim, the object is to hold a sufficient amount to cover the future claim payments attributed to the claim in question.

Discussing incurral date first, we find that the following problems occur:

- a) On loss-of-time claims with an elimination period, we must determine whether the claim is incurred at the beginning or end of the elimination period. This obviously is an important question, because, if the claim is incurred at the beginning of the elimination period, reserves can be generated during the elimination period, especially for unreported claims. On April 24, 1941, a report of the NAIC Special Committee on Reserves for Noncancelable Accident and Health Insurance recommended that the duration of disability should be considered as dating from the time that benefits would have begun to accrue had there been no elimination period. The applicable portion of this report is shown on pages 196 and 197 of the Society of Actuaries textbook, *Health Insurance Provided through Individual Policies*.
- b) Basic hospital, surgical, and similar policies generally present no problem. The claim is simply regarded as having been incurred on the first date of entry into hospital, or the date of surgery, whichever applies.
- c) Major medical policies on a per cause of disability basis present little difficulty except that it is necessary to determine whether the claim is incurred when the first dollar of deductible expense is spent or when the deductible has been fully satisfied. This problem is similar to that in (a) above.
- d) Major medical policies using a calendar year or similar deductible present more trouble. These policies are nearly always on a group basis. Practices are discussed in Section X(4) of this paper.
- e) Differences of opinion with regard to incurral date for maternity benefits have been discussed above.

Most companies record incurral date in some fashion on all claim payments. This may take the limited form of "calendar year of incurral." The information is necessary for completion of Schedule O. This presents another reason for clear-cut rules defining incurral dates.

The question of determining the claim payments attributable to a particular claim will now be discussed. This usually depends on the "period of disability" rules laid down in the policy. A period of disability can often consist of two or more actual periods of sickness, hospitalization, etc. The policy generally spells out the circumstances under which such successive sicknesses belong to one period of disability. The maximum benefits under the policy are usually provided on a period of dis-

ability basis, and, if so, the policy must have clear-cut rules defining "period of disability."

Some typical rules for determining whether a successive illness, due to the same cause, is part of an old period of disability are as follows:

- a) *Individual loss-of-time policies.* If regular occupation has not been resumed for a continuous period of six months.
- b) *Individual hospital and surgical policies.* If full normal activities have not been resumed for a continuous period of twelve months.
- c) *Group hospital insurance for employees.* If active employment has not been resumed for a continuous period of two weeks.
- d) *Group hospital insurance for dependents.* If stays in hospital have not been separated by three months.

The object of a claim reserve calculation is to hold an amount sufficient to cover future claim payments during the period of disability in existence, using the period of disability rules laid down in the policy. The period of disability concept does not apply in the case of some major medical policies in which the benefit maximum is stated on a lifetime basis rather than a per disability basis. This is particularly true of group policies, which are discussed in Section X(4) of this paper.

III. LAWS AND REGULATIONS

Although specifying nothing of a definite nature, some insurance codes contain a statement along the following lines: "If the loss experience shows that an insurer's loss reserves, however estimated, are inadequate, the Commissioner shall require the insurer to maintain loss reserves at such increased amounts as are needed to make them adequate." States with this type of provision are Arizona, Georgia, Illinois, Kentucky, South Carolina, Washington, and West Virginia.

Illinois, Louisiana, Nevada, South Carolina, and Virginia have general provisions requiring adequate reserves on reported and unreported claims. "Complete and itemized records" of reported claims are required by Illinois, Louisiana, Nevada, Utah, and Washington. The South Carolina and Virginia statutes also require reserves "in an amount estimated to provide for the expenses of adjustment or settlement of claims."

Section 219 of the New York Insurance Law provides the following with respect to health insurance claim reserves on disability income policies: "The reserve for losses under non-cancellable disability policies shall be based on Class III disability experience with conference modifications except that for claims of less than twenty-seven months' duration the reserve may be taken as equivalent to the prospective claim payment for three and one-half times the elapsed period of disability, provided

that, in no case, shall the reserve be less than the equivalent of seven weeks' claim payments." The superintendent has power to modify these requirements in certain instances. A maximum interest assumption of $3\frac{1}{2}$ per cent is mentioned.

The statutes of Arizona, Kentucky, Louisiana, Utah, and Washington also specify the basis quoted above for noncancelable disability policies.

In 1941 the Accident and Health Committee of the National Association of Insurance Commissioners made certain recommendations dealing with disabled life reserves for noncancelable loss-of-time policies. Included is a recommendation that the duration of disability should be considered as dating from the beginning of the elimination period. The NAIC recommendations are shown on pages 196 and 197 of the Society of Actuaries textbook, *Health Insurance Provided through Individual Policies*, and are somewhat different from the current requirements of New York Law.

IV. GENERAL COMMENTS ABOUT METHODS

The methods available for determining health insurance claim reserves and liabilities are difficult to classify. Methods other than those described certainly exist. However, the four methods described herein seem to be sufficiently distinct to call for separate description. The selection of method varies greatly, depending on size of company, type of coverage, information available, and reserve or liability item under consideration.

The first three methods (seriatim, grouping, and development) are working methods of an empirical nature. The tabular method bases results on theoretical considerations rather than on a direct study of actual recent claims. It is quite possible to use several of these four methods, in combination, to arrive at final results.

V. THE SERIATIM METHOD

Under the seriatim method (sometimes called the "case method") a specific reserve or liability is determined for each claim. The method can therefore be used only for reported claims. It is very frequently used with respect to the following:

Reserve for Amounts Not Yet Due on Reported Claims;
Liability for Claims Due and Unpaid; and
Liability for Claims in Course of Settlement (both Resisted and Unresisted).

There are three approaches in use, as follows:

- a) *The individual judgment approach.* Using individual examination, accrued liabilities are easily determined. Unaccrued reserves are judged on the bases of severity of disability, remaining benefits, etc. An intelligent estimate is made of the reserve required.

- b) *The table factor approach.* Reserve factors derived from an established table are applied. The most common example is the use of the Conference Modification of the Class III Disability Tables for evaluation of loss-of-time claims. Page 118 of the textbook *Health Insurance Provided through Individual Policies* gives the method for calculating such reserve factors.
- c) *The average claim factor approach.* Under this approach, factors derived from past experience are applied to open claims for the purpose of arriving at the reserve or liability item in question. Page 119 of the textbook *Health Insurance* comments further on methods for calculating such factors.

VI. THE GROUPING METHOD

The grouping method is similar to the seriatim method except that open claims are examined in appropriate groups rather than individually. This means that the individual judgment approach described under the seriatim method is not available. However, the table factor approach and the average claim factor approach are available. The grouping of reported claims must, of course, be such that the factors are appropriate.

Where the factors are applied to known groups of reported claims, the method is appropriate for the following two items:

- Reserve for Amounts Not Yet Due on Reported Claims; and
- Liability for Claims in Course of Settlement (Unresisted portion only).

Sometimes the method is applied to estimated groups of claims. Where this is done, the method can be applied to unreported as well as reported claims. If factors are applied to estimated groups of claims, the method can be used for all statement items.

Page 120 of the textbook *Health Insurance* refers to the possibility of determining average claim factors which are to be applied to the number of reported claims as a base but which include provision for the reserve on unreported claims also. Table 5 on page 121 illustrates the calculation of an average claim factor of this sort.

VII. THE DEVELOPMENT METHOD

The development method is very widely used. It consists essentially of determining claim reserves and liabilities which were actually required at a previous year end and then of establishing this year's results by a proportioning method.

It is necessary to record the calendar year of incurral for every claim payment. When claim payments are recorded in this fashion, it is eventually possible to determine the sum total of claim reserves and liabilities that were required at the end of any particular calendar year in the past. A complete claims "run-off" can take several years, and a company gen-

erally wishes to base the development method primarily on the last year's results. Consequently, a method such as that described below is used.

To arrive at claim reserves and liabilities at the end of calendar year (Y), for example, the steps involved are as follows:

1. Obtain the estimated claim "run-off" after the end of year ($Y - 1$). This would be obtained by determining:
 - a) Payments during (Y) on claims incurred in ($Y - 1$), plus estimates of payments still to be made in ($Y + 1$), ($Y + 2$), etc., on these claims.
 - b) Payments during (Y) on claims incurred in ($Y - 2$), plus estimates of payments still to be made in ($Y + 1$), ($Y + 2$), etc., on these claims.
 - c) Payments during (Y) on claims incurred in ($Y - 3$), plus estimates of payments still to be made in ($Y + 1$), ($Y + 2$), etc., on these claims.
 - d) As many similar items as are desired.

The payments in year (Y) referred to above are accurately available. The estimates of payments in ($Y + 1$), ($Y + 2$), etc., are obtained by studying payments during (Y) on claims incurred in ($Y - 2$) and prior years, appropriately adjusted to reflect change in volume of business. Such adjustment can be made by the methods described in (3) below. Items (*b*), (*c*), and (*d*) are normally very small compared to item (*a*) and are of decreasing size. This is especially true where the maximum benefit periods are of short duration. Many companies appear to ignore the "estimates" mentioned above and do not carry claim records in sufficient detail to obtain these items accurately.

2. Appropriate discount factors may be applied, although the effect is small. A rough method would use three months' discount for payments in the year after incurral, one and a half years' discount in the next year, etc. A more refined method would involve a month-by-month breakdown of claims and would apply appropriate monthly interest factors. The sum of the discounted results will give a rather accurate estimate of the total claim reserves and liabilities actually required at the end of year ($Y - 1$).
3. It then is necessary to update this reserve to the end of year (Y) by use of a "stabilizing factor." Such a factor is the ratio of some stable element in operations of year (Y) to a corresponding stable element in operations of ($Y - 1$). Some stabilizing factors in actual use are based on:
 - a) Premium income received in the calendar year;
 - b) Total claim payments in the calendar year;
 - c) Total claim payments in a short period such as the last three months of the calendar year; and
 - d) Annual premium in force at the end of the calendar year.
4. A margin for conservatism may now be added, such as 10 per cent. This gives the total of claim reserves and liabilities at the end of year (Y).
5. It then is necessary to split the result into the various statement items. Three ways of doing this are as follows:

- a) A split may be based on studies of past claim results, which will have yielded factors for making the appropriate division. Such studies might normally be made less frequently than once a year.
- b) Some statement items, such as "Reserve for Amounts Not Yet Due on Reported Claims," "Liability for Claims Due and Unpaid," and "Liability for Claims in Course of Settlement," may be already available through seriatim or grouping methods. If this is so, the results may be deducted from the total. This will simply leave the "Liability for Claims Incurred but Unreported" and the "Reserve for Amounts Not Yet Due on Unreported Claims." The split is made by experience factors, as in (a) above.
- c) Factors obtained by the tabular method (described in Sec. VIII) may be used.

It should be made clear that the development method is not applied in the case of long-term loss-of-time claims and similar items which are being valued according to a seriatim or grouping method. Such items are excluded entirely from the calculations being described here under "Development Method." However, the development method is widely used for loss-of-time claims which are of short duration.

It should also be pointed out that the development method is usually applied separately to broad classes of business, such as hospital and surgical business, loss-of-time business, major medical business, etc. The method is sometimes modified so that claims are tabulated by month incurred and month paid instead of by year incurred and year paid. A description of this procedure is given on page 120 of the textbook *Health Insurance* under the heading "Claim Runoff Factors."

VIII. THE TABULAR METHOD

The tabular method is presented as an analytical approach, representing a theoretical approximation to actual conditions. Its use is not essential to the determination of claim reserves and liabilities, since all items can be obtained by the working methods already described. However, the tabular method may provide a useful insight into the nature of the reserve and liability items under discussion.

Although all items can be obtained by the method, its use may be of particular interest for "unknown" items such as the unreported portion of "Reserves for Amounts Not Yet Due" and the "Liability for Unreported Claims." It is also of interest for very new blocks of business, or where pending claim records are difficult to obtain, such as might be the case if claims are settled by many distant field offices or by group policyholders. It may also be of value in determining factors for breaking down an over-

all total determined by some other method such as the development method.

The end product of the method is the "Claim Reserve and Liability Table," some examples of which are given in Appendix A of this paper. Reserve and liability items are obtained by application of the factors in such a table to the total claims which are assumed to have been incurred in the past.

Three versions are discussed, suitable for different classes of business.

VERSION I

This version appears suitable for loss-of-time coverages. It may also be suitable for certain other coverages. The following assumptions are made:

1. Claims are incurred either according to a recognized standard (such as the Conference Modification of the Class III Disability Table) or to some other easily defined assumption.
2. Claims incurred on a given day are accrued over a period of time according to an established accrual lag table.
3. Claims incurred on a given day are reported according to an established reporting lag table, which measures the probability of reporting according to days elapsed since the incurral date.
4. Once reported, all benefits accrued on a given claim prior to the reporting date then become subject to payment according to an established payment lag table, which measures the probability of payment according to days elapsed since such reporting date. Furthermore, subsequent benefits becoming accrued on the same reported claim become subject to payment, as they accrue, according to an established payment lag table. This second payment lag table differs from the first.

With the necessary tables, it is possible to determine the entire accrual, reporting, and payment pattern for an assumed block of incurred claims and to determine the reserves and liabilities that are necessary at any time. In practical application, the combined effect of the lag tables is determined for a given benefit, resulting in a claim reserve and liability table which determines the required statement items for claims incurred in any given past period.

Many lengthy loss-of-time claims involve disabilities which are known to be of a continuing nature. Benefits accruing after the original report are paid automatically, or at least with less detailed proof. It is due to these considerations that Version I is considered appropriate for loss-of-time benefits. It may also be considered appropriate for other benefits.

Claim reserve and liability table for Version I.—For a given benefit, the effect of the lag tables is combined, and the resulting claim reserve and

liability table gives the required statement results by easy application to incurred claim figures.

If CI = claims incurred on a given date;

A_i = proportion of incurred claims accrued on the i th day, measured from the date of incurral (this comes from the accrual lag table);

R_j = the probability that a claim will be reported on the j th day, measured from the date of incurral (this comes from the reporting lag table).

Claims becoming eligible for payment on the r th day, measured from the date of incurral, consist of two parts: (1) all benefits accrued up to but not including day r on claims being reported on day r and (2) all benefits accruing on day r for claims that have been reported on or prior to day r . Then, if part (1) is CE_r^1 and part (2) is CE_r^2 ,

$$CE_r^1 = CI \sum_{i=1}^{r-1} A_i \cdot R_r, \quad (1)$$

$$CE_r^2 = CI \cdot A_r \sum_{j=1}^r R_j. \quad (2)$$

It is assumed that these two quantities are intrinsically subject to different payment rates, as follows:

P_k^1 = probability that an amount represented in CE_r^1 will be paid on the k th day, measured from day r .

P_k^2 = probability that an amount represented in CE_r^2 will be paid on the k th day, measured from day r .

Then claims paid on day s , where s is measured from the incurral date, are

$$CP_s = \sum_{r=1}^s CE_r^1 (P_{s-r+1}^1) + \sum_{r=1}^s CE_r^2 (P_{s-r+1}^2). \quad (3)$$

Claims unaccrued as of day t , measured from date of incurral, are

$$CU_t = CI \left(1 - \sum_{i=1}^t A_i \right). \quad (4)$$

Formula (4) is the basis of the item "Present Value of Amounts Not Yet Due" for claims incurred t days prior to the year end. The result may be discounted at interest for statement purposes for the remaining accrual period.

It will be noted immediately that claims accrued after December 31 on a given block of claims incurred before that date are determined solely by the accrual lag table. Reporting and payment patterns do not enter the picture. Therefore, the reporting and payment lag tables do not affect the reserve item "Reserve for Amounts Not Yet Due," which is based solely on claims not yet accrued after the year end.

Claims eligible for payment but not paid as of day t are

$$CENP_t = \sum_{r=1}^t CE_r^1 + \sum_{r=1}^t CE_r^2 - \sum_{s=1}^t CP_s. \quad (5)$$

Formula (5) is the basis of the item "Claims in Course of Settlement" for claims incurred t days prior to the year end. Claims accrued but not reported as of day t are

$$CANR_t = CI \sum_{i=1}^t A_i - \sum_{r=1}^t CE_r^1 - \sum_{r=1}^t CE_r^2. \quad (6)$$

Formula (6) is the basis of the statement item "Claims Incurred but Unreported" for claims incurred t days prior to the year end. Total claims paid up to and including day t are

$$TCP_t = \sum_{s=1}^t CP_s. \quad (7)$$

This item does not enter into claim reserves and liabilities, of course. Expressions (4), (5), (6), and (7) add up to CI , claims incurred on the given date.

It may be desirable to separate item (4), claims unaccrued as of day t , into two portions, representing claims that have never been reported ($NRCU_t$) and claims that have been reported (RCU_t) on or prior to day t . This separation is not essential to the tabular method but is convenient to companies using the tabular method only for the unreported portion of "Reserve for Amounts Not Yet Due on Claims" and some other method for the reported portion.

This division is made on the basis of the probability, derived from the reporting lag table, that the claim has been reported by day t .

$$NRCU_t = \left(1 - \sum_{j=1}^t R_j\right) CU_t, \quad (8)$$

$$RCU_t = \left(\sum_{j=1}^t R_j\right) CU_t. \quad (9)$$

The most practical method for evaluating these expressions is by electronic data-processing equipment. However, the calculations can be simplified somewhat (permitting manual calculation) by using lag tables on a weekly rather than a daily basis. Simplifications also occur if results are desired only for certain items, such as expression (8).

Basically, the method has taken a block of claims incurred on a given day and traced its development, determining the appropriate reserves and liabilities at every point (t) in the future. It is now necessary to transform our thinking so that the point (t) is always December 31. We therefore know the situation with regard to claims which were incurred (t) days before such date, with the date of incurral, of course, becoming the variable.

The end point of calculations is the claim reserve and liability table, an example of which is shown in Appendix A (Table 1). It is logical to express results so that the first items in the table refer to claims incurred just prior to December 31 and to work backward from that point. Results are shown on an average weekly basis for recently incurred claims but less frequently for more distant claims. This is done because the factors vary widely from week to week only in the case of recent claims. It is not necessary to show final results on a daily basis. However, it does appear necessary to show results on a weekly or quarterly basis in order that due weight can be given where the level of incurred claims has changed during the year owing to growth in business in force or any other reason.

VERSION II

This version appears suitable for hospital, surgical, major medical, and similar health care coverages. It may also be suitable for certain loss-of-time coverages. The following assumptions are made:

1. Claims are incurred either according to a recognized standard (such as the 1956 Intercompany Hospital and Surgical Tables), or according to some other easily defined assumption.
2. Claims incurred on a given day are accrued over a period of time according to an established accrual lag table.
3. Claims accrued on a given day are reported according to an established reporting lag table which measures the probability of reporting according to days elapsed since the accrual date.
4. Claims reported on a given day are paid according to an established payment lag table which measures the probability of payment according to days elapsed since the reporting date.

A lengthy health care claim often consists of a series of hospital stays and medical care episodes which cannot be accurately foreseen when the

first "report" is received. Furthermore, payments subsequent to the first are not made until a subsequent portion of the accruing claim is again "reported" in the same manner and with as much detail as the first portion. To represent approximately these actual conditions, the method requires that benefits accruing on each day be separately reported. It also treats all benefits which have not been reported in this manner as "unreported." Although this may at first seem an unusual approach, it accords with the practical facts for many health care coverages; for such coverages, further benefits likely to accrue after the first report are truly unknown and can be considered "unreported."

Claim reserve and liability table for Version II.—For a given benefit the effect of the three lag tables is combined, and the resulting table gives the required statement results by easy application to incurred claim figures.

If CI = claims incurred on a given date;

A_i = proportion of incurred claims accrued on the i th day, measured from the date of incurral (this comes from the accrual lag table);

R_j = proportion of accrued claims reported on the j th day, measured from the date of accrual (this comes from the reporting lag table);

P_k = proportion of reported claims paid on the k th day, measured from the date of reporting (this comes from the payment lag table).

Then for day r , where r is measured from date of incurral, claims becoming eligible for payment on day r are

$$CE_r = CI \sum_{i=1}^r A_i (R_{r-i+1}). \quad (10)$$

Claims paid on day s , where s is measured from date of incurral, are

$$CP_s = \sum_{r=1}^s CE_r (P_{s-r+1}). \quad (11)$$

Claims unaccrued as of day t , measured from the date of incurral, are

$$CU_t = CI \left(1 - \sum_{i=1}^t A_i \right). \quad (12)$$

Formula (3) is the basis of the item "Present Value of Amounts Not Yet Due" for claims incurred t days prior to the year end. The result may be discounted at interest for statement purposes for the estimated remaining accrual period.

It will again be noted that claims accrued after December 31 on a given block of claims incurred before that date are determined solely by the accrual lag table. Reporting and payment patterns do not enter the pic-

ture. Therefore, the reporting and payment lag tables do not affect the reserve item "Reserve for Amounts Not Yet Due," which is based solely on claims not yet accrued after the year end.

Claims eligible for payment but not paid as of day t are

$$CENP_t = \sum_{r=1}^t CE_r - \sum_{s=1}^t CP_s. \quad (13)$$

Formula (13) is the basis of the item "Claims in Course of Settlement," for claims incurred t days prior to the year end.

Claims accrued but not reported as of day t are

$$CANR_t = CI \sum_{i=1}^t A_i - \sum_{r=1}^t CE_r. \quad (14)$$

Formula (14) is the basis of the statement item "Claims Incurred but Unreported" for claims incurred t days prior to the year end.

Total claims paid up to and including day t are

$$TCP_t = \sum_{s=1}^t CP_s. \quad (15)$$

This item does not enter into claim reserves and liabilities, of course. Expressions (12), (13), (14), and (15) add up to CI , claims incurred on the given date.

It may be desirable to separate item (12), claims unaccrued as of day (t), into two portions, representing claims on which no benefit has ever been reported ($NRCU_t$) and claims on which benefits have been reported (RCU_t) on or prior to day (t). This separation is not essential to the tabular method but is convenient to companies using the tabular method only for the unreported portion of "The Reserve for Amounts Not Yet Due on Claims" and some other method for the reported portion.

This division is made on the basis of the probability, derived from the reporting lag table, that the first day's accrued claims have not been reported by day (t).

$$NRCU_t = \left(1 - \sum_{j=1}^t R_j\right) CU_t. \quad (16)$$

$$RCU_t = \left(\sum_{j=1}^t R_j\right) CU_t. \quad (17)$$

Comments in the last three paragraphs under Version I are also applicable at this point. Examples of claim reserve and liability tables determined by Version II are shown in Tables 2-10 of Appendix A.

VERSION III

This version is much simpler in form and applies only to the "Reserve for Future Contingent Benefits" for maternity benefits. It consists of applying nine-twelfths of the maternity claim costs in a table such as the 1956 Intercompany Hospital Table to a year-end tabulation of maternity benefits in force. A multiple of this table may be used if actual experience seems to require it. A suitable interest adjustment for four and one-half months may be made. Liability items for "Claims in Course of Settlement" and "Unreported Claims" are necessary, in addition, and may be obtained by the tabular or any other method.

Incurred Claim Assumption

Claim reserves and liabilities calculated by the tabular method depend, first of all, on the claims assumed to have been incurred prior to the year end. One method is to base incurred claims on a recognized standard such as the 1956 Intercompany Hospital and Surgical Tables, or the Conference Table, or a recognized company table. This would be done by applying net claim costs from such tables to valuation records of business in force at various times. For example, claims incurred in a given calendar year might be based on the mean of business in force at the beginning and end of such year. If this is done, the resulting claim reserves and liabilities can be considered as based upon such recognized standards. It might normally be expected that the resulting reserves and liabilities will be conservative. (If not, multiples of such standard tables may be used.)

The incurred claim assumption can be determined by other methods. One such method would be to apply a conservative assumed loss ratio to earned premium income for the period. If desired, the incurred claim assumption can be established on a calendar quarter basis or even a weekly or some other basis which would permit giving effect to seasonal trends in claim levels or growth in business.

Accrual Lag Tables

Loss-of-time, hospital, and major medical claims are obviously accrued over a lengthy period of time following the incurral date. Surgical claims and accidental death and dismemberment claims are generally not subject to an accrual lag.

Accrual lag tables should theoretically reflect the fact that claims can "stop" and "start." For example, a hospital claim can consist of several hospital stays separated by periods of time when no benefits are being accrued. Furthermore, for loss-of-time policies with a waiting period, an accrual lag table would commence with a period of time (equal to the waiting period), when no claims are being accrued. In practice, it may be

quite satisfactory to consider that the claim continuance tables given in the Conference Tables are suitable as a basis for "accrual lag tables" if the necessary waiting periods are allowed for.

In the case of hospital and surgical claims the Intercompany Tables do not provide continuance patterns. Accrual lag tables have been determined for certain benefits and are shown in Appendix B (Tables 11-15). These tables are based on a normal distribution of business by sex and age.

Reporting Lag Tables

Reporting lag tables for certain benefits are shown in Appendix B, Tables 11-15. In the case of Version I, the lag is measured between the incurral date and the date of reporting. The claim is considered to be reported only once.

In the case of Version II, the lag is measured between date of accrual and date of reporting. It is probably independent of the particular plan of benefit involved (e.g., these tables can be used just as well for a 31-day hospital plan as for a 90-day plan). It will be seen that the method calls for each accrued block of claims to be reported separately; consequently, the portion of a claim accruing later will emerge as "unreported" even though the earlier portion is "reported." This is of convenience to companies using the tabular method for "Unreported Claims" but not for "Claims in Course of Settlement," since they may use only the reported accrued benefits for the latter item and need not concern themselves with estimating the remaining accrued benefits to year end on such claims.

Payment Lag Tables

Payment lag tables for certain benefits are shown in Appendix B, Tables 11-15. In the case of Version I, two payment lag tables are required—one, P_k^1 , being applicable to accrued benefits becoming eligible for payment at the time of reporting, and the other, P_k^2 , being applicable to further benefits as they accrue. In the case of Version II, only one payment lag table, P_k , is needed, since each item of accrued benefit is required to be reported separately. Upon reporting, each such item becomes eligible for payment, and only one payment lag table is required.

General Comments about the Tabular Method

If the required claim reserve and liability tables are available, direct results may easily be obtained by application to assumed incurred claim figures. Once such tables are available, they may presumably be used for several years without change. If incurred claims are obtained only for the calendar year, such claims may easily be prorated using some suitable

measure to reflect growth in business. In this manner the claim reserve and liability tables may be applied on a weekly or quarterly basis. The effect of growth rate is pointed up by the tabular method. The portion of a year's incurred claims which is not paid by year end is obviously greater if business is growing.

In the case of individual hospital business, it seems desirable to derive separate tables for room and board, miscellaneous services, and maternity benefits, so that appropriate combined tables may be constructed depending on the plans in force. Alternatively, incurred claim figures may be obtained for each of these elements, and the tables applied separately.

The method may be used in combination with other methods. For example, it may be used only for "unknown" items, such as the unreported portion of "Reserve for Amounts Not Yet Due on Claims," with other methods being used to obtain "known items," such as "Claims in Course of Settlement."

The accrual, reporting, and payment lag tables for hospital and surgical business (see Appendix B) were obtained from a study of claims paid in the author's company in January, 1962, and January, 1963, for a normal distribution of business by sex and age. Claims are paid from the home office. To establish a firm basis, "Reported Date" was defined as the date of receipt of the hospital insurance form or, for surgical claims, the attending physician's statement. It is of interest to note that the median length of time required for reporting a nonmaternity hospital claim was 37 days for individual business and 29 days for group business. In the case of surgical claims the median required time was 49 days for individual business and 33 days for group business.

The accrual lag table for loss-of-time coverage was obtained from the Conference Table, and the corresponding reporting and payment lag tables are of an illustrative nature. The loss-of-time benefit illustrated provides accident and sickness benefits for two years with a one-week elimination period.

All resulting claim reserve and liability tables should be considered illustrative. Companies using the method may wish to determine lag tables suitable to their own conditions.

A claim reserve and liability table contains "paid" claim figures. Consequently, if paid claims are tabulated by incurred date, it is possible to determine all the corresponding reserve and liability items, because the ratio of each reserve and liability item to the paid item is available from the table. This procedure may be somewhat open to question where paid claims are subject to wide random fluctuation.

It is interesting to note that claim reserve and liability tables give re-

maining reserve and liability figures for claims incurred in years *prior to* the statement year. Such figures may be of interest in the completion of Schedule O of the annual statement.

IX. CONFIDENCE LEVELS

Health insurance claim reserves and liabilities should be set at a level creating at least a three-to-one likelihood of sufficiency. Confidence levels are widely recognized in other statement areas. Life insurance reserves, for example, are based on recognized mortality standards which contain adequate margins; no pretense is made that actual mortality follows such standards. Indeed, health insurance claim reserves can often be based on similar recognized standards—either company standards or published standards.

The total of health insurance claim reserves and liabilities can be considered as the product of two independent variables: (1) the number of persons represented in such total and (2) the average amount per person. Both of these items, and particularly the latter, are subject to considerable standard deviation; the standard deviation of the average amount per person, which has a strong effect on that of the product, is independent of the size of the health insurance operation involved. It appears that even large companies can expect sizable variance. Some of the largest companies maintain a 10 per cent margin over the level considered to be most likely. The required margin should be larger in smaller operations.

X. STUDY OF BASES AND METHODS BY LINE OF COVERAGE

The outline below will pinpoint specific problems arising with certain lines of coverage.

1. *Individual loss-of-time policies.*—New York Law provides that “Reserves for Amounts Not Yet Due” should be based on the Conference Modification of the Class III disability experience. However, for claims of less than 27 months’ duration, the basis may be replaced by the “ $3\frac{1}{2}$ times elapsed disability—7-week minimum” rule. In actual practice most companies use tabular reserve factors for claims of 12 months’ duration or longer; for shorter durations the $3\frac{1}{2}$ times rule is used, or some other method such as the development method.

At the time of writing, a new table is being developed under NAIC auspices to replace the Conference Table.

2. *Individual hospital, surgical, and major medical coverages.*—The seriatim, grouping, development, and tabular methods are all in use. Major medical policies are generally handled in the same manner as hospital and surgical policies, but the seriatim and judgment methods are

probably in greater use. One company is known to assume that the future liability is equal to $3\frac{1}{2}$ times the amount paid to date (subject to the maximum provided by the policy). This is an interesting parallel with the $3\frac{1}{2}$ times rule used with loss-of-time policies.

Major medical policies with a large deductible present an incurral date problem. If the claim is regarded as incurred when the first deductible dollar is spent, such a claim can generate a "Reserve for Amounts Not Yet Due" during the deductible accumulation period.

A procedure which appears to be practical for reported hospital and surgical claims is to base calculations on the 1956 Intercompany Hospital and Surgical Table or suitable modifications thereof. These tables contain "average claim" factors for each attained age and sex and for a variety of benefits, including room-and-board benefits, miscellaneous hospital expense benefits, and surgical benefits. This procedure is somewhat similar to valuing "disabled life" annuities with the Conference Modification of the Class III Disability Tables.

It is possible to use the "average claim" figures in the Intercompany Tables to arrive at the total expected claims from a given block of reported claims, such as all the claims reported in the statement year. From the answer would be deducted that portion known to be "in course of settlement" or already paid, leaving the "Reserve for Amounts Not Yet Due on Reported Claims." It may then be considered desirable to apply an approximate interest adjustment.

Caution should be exercised where tabular "average claim" factors are applied to actual year-end pending claims. At any moment of time the pending claim inventory may contain a higher than average proportion of more severe claims, and it may be necessary to apply a loading factor such as 25 per cent.

3. *Accidental death, dismemberment, and similar benefits.*—These benefits are fully accrued at the date of death or dismemberment. However, claim reserves can exist between the date of accident and the date of death or dismemberment. Liability items for unpaid claims and those in course of settlement are easily obtained by seriatim means. A common method for unreported claims is judgment, strongly assisted by a retrospective look at claims reported between December 31 and the date of statement preparation.

4. *Group health insurance.*—This paper deals only with annual statement items. Claim reserves for experience rating purposes are contained in an entirely different Pandora's box. In recent years, group health insurance plans have been developed on which the insurance company carries only an excess risk. However, it services all the claims and maintains full

claim reserves and liabilities, although technically having only a small premium income. We therefore see the phenomenon of large claim reserves and liabilities standing opposite small premiums.

One special problem regarding group health insurance concerns maternity reserves. There are three situations:

- a) *Where a maternity extension is provided both on termination of employment and on termination of contract.* In this case all companies appear to hold a reserve adequate to provide payment for maternity claims for all existing pregnancies of persons presently insured or in the maternity extended period.
- b) *Where a maternity extension is provided on termination of employment but not on termination of contract.* Out of twelve companies studied, eight felt that a full reserve should be held, just as in (a) above. One company used a development method which reflects the effect of contract termination. One company held a reserve equal to 10 per cent of that which would be appropriate for (a) above. Two companies felt that no reserve was necessary.
- c) *Where the contract provides for no maternity extension.* Two companies felt that a full reserve should be held, just as in (a) above. The other companies felt that no reserve should be held. Group insurance contracts of this type appear to be rare.

The extended benefit provision under basic and major medical plans represents an area in which a "Reserve for Future Contingent Benefits" is being held by some companies. Presumably, the reserve is held with regard to persons (unknown in the main) whose group coverage has terminated but who have been continuously disabled since termination and are still within the extended benefit period.

Another group problem concerns the assignment of incurral date in the case of major medical plans with a calendar year or similar deductible and the assignment of the payments attributable to a particular claim. Out of the companies studied, five assigned incurral date on the basis of the calendar year in which the particular claim payment is actually accrued. These companies would automatically have a "new" claim every year.

Three used the date of accrual of the first expense that is applied toward the deductible. One company used the date of accrual of the first expense that is reimbursable. These companies would recognize a "new claim" when a deductible is reimposed; this might normally be every year but could be less frequent when a carry-over deductible is involved.

Three companies made a judgment as to the beginning of the disability causing the claim and would retain the same incurral date, even through several years, as long as the same disability was deemed to exist. Thus a "new" claim would be recognized only if a new cause of disability was deemed to come into being.

XI. CONCLUSION

Thanks are due to members of the Actuarial and Statistical Committee of the Health Insurance Association of America and its Subcommittee on Valuation and Reserves, without whose aid this paper would not have been possible.

This paper has attempted to outline the theoretical considerations underlying health insurance claim reserves and liabilities and to indicate the practical methods that can be used to arrive at these statement items. Calculation of these items is often an art rather than a science. Many methods are hidden within the internal workings of companies. Light has not been thrown on all this mystery. It is hoped, however, that this paper will be of some aid in the determination of health insurance claim reserves and liabilities.

APPENDIX A

TABLE 1

CLAIM RESERVE AND LIABILITY TABLE FOR INDIVIDUAL POLICY LOSS-OF-TIME COVERAGE PROVIDING MONTHLY SICKNESS AND ACCIDENT BENEFITS FOR A MAXIMUM PERIOD OF TWO YEARS WITH A ONE-WEEK ELIMINATION PERIOD

(Nonmaternity Coverage Only)

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLEMENT (%)	INCURRED BUT UNREPORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unreported Claims (%)	Total (%)			
Year of Statement	Quarter Week						
4th	13	0.00	100.00	100.00	0.00	0.00	0.00
	12	2.82	74.08	76.90	0.81	22.25	0.04
	11	22.79	39.46	62.25	6.79	23.93	7.03
	10	34.65	18.03	52.68	12.66	16.20	18.46
	9	36.67	9.56	46.23	14.63	11.12	28.02
	8	36.15	5.43	41.58	14.19	7.63	36.60
	7	35.04	2.99	38.03	12.83	4.87	44.27
	6	33.73	1.51	35.24	11.21	2.78	50.77
	5	31.74	1.15	32.89	9.52	2.35	55.24
	4	29.97	0.97	30.94	8.01	2.18	58.87
	3	28.47	0.82	29.29	6.76	2.00	61.95
	2	27.15	0.70	27.85	5.78	1.82	64.55
	1	25.98	0.59	26.57	5.02	1.64	66.77
4th quarter (average)		26.55	19.64	46.19	8.32	7.60	37.89
3d quarter		20.62	0.18	20.80	2.61	0.62	75.97
2d quarter		14.52	0.00	14.52	1.08	0.01	84.39
1st quarter		10.74	0.00	10.74	0.69	0.01	88.56
Average for year		18.11	4.95	23.06	3.18	2.06	71.70
1st preceding year		4.46	0.00	4.46	0.48	0.01	95.05
2d preceding year		0.00	0.00	0.00	0.03	0.00	99.97

TABLE 2
CLAIM RESERVE AND LIABILITY TABLE FOR INDIVIDUAL POLICY PROVIDING
ROOM-AND-BOARD BENEFIT—70-DAY MAXIMUM
(Does Not Include Maternity Coverage or Miscellaneous Services)
Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement	Quarter Week						
4th	13.....	0.17	58.82	58.99	0.02	40.92	0.07
	12.....	1.57	25.86	27.43	0.40	70.32	1.85
	11.....	3.43	15.18	18.61	1.42	72.07	7.90
	10.....	4.86	10.25	15.11	2.64	65.10	17.15
	9.....	5.54	7.32	12.86	3.54	57.25	26.35
	8.....	5.88	5.33	11.21	4.11	49.90	34.78
	7.....	6.17	4.02	10.19	4.45	42.87	42.49
	6.....	6.49	3.09	9.58	4.60	36.21	49.61
	5.....	6.65	2.42	9.07	4.55	30.44	55.94
	4.....	6.71	1.93	8.64	4.31	25.81	61.24
	3.....	6.72	1.55	8.27	4.00	21.97	65.76
	2.....	6.69	1.26	7.95	3.65	18.83	69.57
	1.....	6.63	1.04	7.67	3.30	16.24	72.79
4th quarter (average).....		5.19	10.62	15.81	3.16	42.15	38.88
3d quarter.....		5.37	0.58	5.95	1.50	10.82	81.73
2d quarter.....		3.05	0.14	3.19	0.51	5.65	90.65
1st quarter.....		0.91	0.01	0.92	0.29	2.38	96.41
Average for year.....		3.63	2.84	6.47	1.36	15.25	76.92
Preceding year.....		0.00	0.00	0.00	0.02	0.12	99.86

TABLE 3

CLAIM RESERVE AND LIABILITY TABLE FOR \$25 MISCELLANEOUS
EXPENSE BENEFIT UNDER INDIVIDUAL POLICY
(Nonmaternity Coverage Only)

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement Quarter	Week						
4th	13.....	0.00	0.00	0.00	0.08	99.60	0.32
	12.....	.00	.00	.00	1.03	93.88	5.09
	11.....	.00	.00	.00	2.73	81.22	16.05
	10.....	.00	.00	.00	4.04	67.70	28.26
	9.....	.00	.00	.00	4.78	56.75	38.47
	8.....	.00	.00	.00	5.15	47.52	47.33
	7.....	.00	.00	.00	5.29	39.42	55.29
	6.....	.00	.00	.00	5.24	32.25	62.51
	5.....	.00	.00	.00	4.93	26.63	68.44
	4.....	.00	.00	.00	4.50	22.29	73.21
	3.....	.00	.00	.00	4.06	18.70	77.24
	2.....	.00	.00	.00	3.61	15.86	80.53
	1.....	.00	.00	.00	3.18	13.57	83.25
4th quarter (average).....		.00	.00	.00	3.74	47.34	48.92
3d quarter.....		.00	.00	.00	1.30	9.54	89.16
2d quarter.....		.00	.00	.00	0.37	4.09	95.54
1st quarter.....		0.00	0.00	0.00	0.16	0.92	98.92
Average for year.....		0.00	0.00	0.00	1.39	15.47	83.14

TABLE 4

**CLAIM RESERVE AND LIABILITY TABLE FOR \$100 MISCELLANEOUS
EXPENSE BENEFIT UNDER INDIVIDUAL POLICY
(Nonmaternity Coverage Only)**

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement Quarter	Week						
4th	13.....	0.10	33.49	33.59	0.05	66.18	0.18
	12.....	0.80	13.47	14.27	0.67	81.82	3.24
	11.....	1.36	6.16	7.52	1.99	79.02	11.47
	10.....	1.34	2.89	4.23	3.30	70.24	22.23
	9.....	0.95	1.28	2.23	4.19	61.29	32.29
	8.....	0.43	0.41	0.84	4.74	52.98	41.44
	7.....	0.02	0.02	0.04	5.04	45.10	49.82
	6.....	0.00	0.00	0.00	5.14	37.33	57.53
	5.....	0.00	0.00	0.00	4.99	30.84	64.17
	4.....	0.00	0.00	0.00	4.67	25.69	69.64
	3.....	0.00	0.00	0.00	4.28	21.47	74.25
	2.....	0.00	0.00	0.00	3.86	18.09	78.05
	1.....	0.00	0.00	0.00	3.44	15.36	81.20
4th quarter (average).....		0.38	4.44	4.82	3.57	46.57	45.04
3d quarter.....		0.00	0.00	0.00	1.43	9.97	88.60
2d quarter.....		0.00	0.00	0.00	0.38	4.32	95.30
1st quarter.....		0.00	0.00	0.00	0.16	1.02	98.82
Average for year.....		0.09	1.11	1.20	1.39	15.47	81.94

TABLE 5

**CLAIM RESERVE AND LIABILITY TABLE FOR \$250 MISCELLANEOUS
EXPENSE BENEFIT UNDER INDIVIDUAL POLICY
(Nonmaternity Coverage Only)**

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement	Quarter Week						
4th	13.....	0.14	43.92	44.06	0.04	55.76	0.14
	12.....	1.46	23.61	25.07	0.57	71.65	2.71
	11.....	3.33	14.70	18.03	1.70	70.49	9.78
	10.....	4.57	9.67	14.24	2.87	63.66	19.23
	9.....	5.04	6.65	11.69	3.68	56.39	28.24
	8.....	5.10	4.64	9.74	4.21	49.51	36.54
	7.....	4.95	3.24	8.19	4.52	43.05	44.24
	6.....	4.64	2.22	6.86	4.66	37.07	51.41
	5.....	4.15	1.51	5.66	4.58	32.02	57.74
	4.....	3.56	1.02	4.58	4.36	27.90	63.16
	3.....	2.96	0.68	3.64	4.08	24.39	67.89
	2.....	2.37	0.45	2.82	3.76	21.44	71.98
	1.....	1.82	0.29	2.11	3.43	18.94	75.52
4th quarter (average).....		3.39	8.66	12.05	3.27	44.02	40.66
3d quarter.....		0.20	0.03	0.23	1.65	11.85	86.27
2d quarter.....		0.00	0.00	0.00	0.44	4.71	94.85
1st quarter.....		0.00	0.00	0.00	0.17	1.23	98.60
Average for year.....		0.90	2.17	3.07	1.38	15.45	80.10

TABLE 6
CLAIM RESERVE AND LIABILITY TABLE FOR INDIVIDUAL
POLICY \$100 MATERNITY BENEFIT
 Showing reserves, liabilities, and claims paid as percentage of incurred claims*

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement	Quarter Week						
4th	13	0.04	32.26	32.30	0.04	67.53	0.13
	12	.23	2.82	3.05	0.85	92.12	3.98
	11	.32	1.04	1.36	2.85	79.60	16.19
	10	.11	0.15	0.26	5.15	61.03	33.56
	9	.00	0.00	0.00	7.01	40.82	52.17
	8	.00	0.00	0.00	7.89	24.27	67.84
	7	.00	0.00	0.00	7.73	14.09	78.18
	6	.00	0.00	0.00	6.98	8.20	84.82
	5	.00	0.00	0.00	5.81	6.16	88.03
	4	.00	0.00	0.00	4.72	5.16	90.12
	3	.00	0.00	0.00	3.76	4.62	91.62
	2	.00	0.00	0.00	2.97	4.25	92.78
	1	.00	0.00	0.00	2.39	3.89	93.72
4th quarter (average)		.05	2.79	2.84	4.48	31.67	61.01
3d quarter		.00	0.00	0.00	1.01	1.90	97.09
2d quarter		.00	0.00	0.00	0.13	0.00	99.87
1st quarter		0.00	0.00	0.00	0.02	0.00	99.98
Average for year		0.01	0.70	0.71	1.41	8.39	89.49
Preceding year		0.00	0.00	0.00	0.01	0.00	99.99

* For purposes of applying this table, maternity claims should be considered incurred on the date of termination of pregnancy rather than date of conception. Reserve for "Deferred Maternity Benefits," if held, would be in addition.

TABLE 7
CLAIM RESERVE AND LIABILITY TABLE FOR INDIVIDUAL POLICY SURGICAL BENEFIT
(Nonmaternity Coverage Only)
Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLEMENT (%)	INCURRED BUT UNREPORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unreported Claims (%)	Total (%)			
Year of Statement	Quarter Week						
4th	13.....	0.00	0.00	0.00	0.01	99.97	0.02
	12.....	.00	.00	.00	0.38	97.93	1.69
	11.....	.00	.00	.00	1.51	90.14	8.35
	10.....	.00	.00	.00	2.82	78.99	18.19
	9.....	.00	.00	.00	3.68	68.74	27.58
	8.....	.00	.00	.00	4.17	60.10	35.73
	7.....	.00	.00	.00	4.36	52.92	42.72
	6.....	.00	.00	.00	4.38	46.69	48.93
	5.....	.00	.00	.00	4.35	40.72	54.93
	4.....	.00	.00	.00	4.25	35.02	60.73
	3.....	.00	.00	.00	4.12	29.65	66.23
	2.....	.00	.00	.00	3.98	24.58	71.44
	1.....	.00	.00	.00	3.83	19.83	76.34
4th quarter (average).....		.00	.00	.00	3.22	57.33	39.45
3d quarter.....		.00	.00	.00	1.94	6.89	91.17
2d quarter.....		.00	.00	.00	0.33	1.90	97.77
1st quarter.....		0.00	0.00	0.00	0.08	0.43	99.49
Average for year.....		0.00	0.00	0.00	1.39	16.64	81.97

TABLE 8

CLAIM RESERVE AND LIABILITY TABLE FOR GROUP COVERAGE PROVIDING \$10
 BENEFIT—31-DAY MAXIMUM WITH \$100 MISCELLANEOUS EXPENSE
 BENEFIT AND \$100 OUTPATIENT BENEFIT
 (Nonmaternity Coverage Only)

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement Quarter	Week						
4th	13.	0.23	41.58	41.81	0.06	57.86	0.27
	12.	1.42	15.94	17.36	0.67	77.81	4.16
	11.	2.76	8.30	11.06	1.77	72.17	15.00
	10.	3.46	4.88	8.34	2.62	60.52	28.52
	9.	3.79	2.96	6.75	3.20	48.28	41.77
	8.	3.83	1.87	5.70	3.43	37.68	53.19
	7.	3.78	1.28	5.06	3.38	29.67	61.89
	6.	3.59	0.93	4.52	3.16	24.18	68.14
	5.	3.41	0.68	4.09	2.96	19.78	73.17
	4.	3.24	0.49	3.73	2.73	16.16	77.38
	3.	3.03	0.36	3.39	2.49	13.38	80.74
	2.	2.83	0.27	3.10	2.28	11.02	83.60
	1.	2.64	0.19	2.83	2.10	8.95	86.12
4th quarter (average).....		2.93	6.13	9.06	2.37	36.73	51.84
3d quarter.....		1.30	0.05	1.35	1.10	4.29	93.26
2d quarter.....		0.00	0.00	0.00	0.22	1.74	98.04
1st quarter.....		0.00	0.00	0.00	0.07	0.56	99.37
Average for year.....		1.06	1.54	2.60	0.94	10.83	85.63
Preceding year.....		0.00	0.00	0.00	0.02	0.00	99.98

TABLE 9
CLAIM RESERVE AND LIABILITY TABLE FOR GROUP
\$100 MATERNITY HOSPITAL BENEFIT
 Showing reserves, liabilities, and claims paid as percentage of incurred claims*

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement Quarter	Week						
4th	13.....	0.10	32.20	32.30	0.09	67.26	0.35
	12.....	.37	2.68	3.05	1.15	88.60	7.20
	11.....	.42	0.94	1.36	2.64	72.76	23.24
	10.....	.13	0.13	0.26	3.90	52.92	42.92
	9.....	.00	0.00	0.00	4.53	34.35	61.12
	8.....	.00	0.00	0.00	4.46	21.21	74.33
	7.....	.00	0.00	0.00	3.98	14.61	81.41
	6.....	.00	0.00	0.00	3.54	10.41	86.05
	5.....	.00	0.00	0.00	3.13	7.33	89.54
	4.....	.00	0.00	0.00	2.77	4.91	92.32
	3.....	.00	0.00	0.00	2.44	3.11	94.45
	2.....	.00	0.00	0.00	2.14	1.87	95.99
	1.....	.00	0.00	0.00	1.87	1.12	97.01
	4th quarter (average).....	.08	2.76	2.84	2.82	29.27	65.07
	3d quarter.....	.00	0.00	0.00	0.86	0.39	98.75
	2d quarter.....	.00	0.00	0.00	0.09	0.00	99.91
	1st quarter.....	0.00	0.00	0.00	0.02	0.00	99.98
	Average for year.....	0.02	0.69	0.71	0.95	7.41	90.93
	Preceding year.....	0.00	0.00	0.00	0.02	0.00	99.98

* For purposes of applying this table, maternity claims should be considered incurred on the date of termination of pregnancy, rather than date of conception. Reserve for "Deferred Maternity Benefits," if held, would be in addition.

TABLE 10

CLAIM RESERVE AND LIABILITY TABLE FOR GROUP SURGICAL BENEFIT
(Nonmaternity Coverage Only)

Showing reserves, liabilities, and claims paid as percentage of incurred claims

FOR CLAIMS THAT WERE INCURRED IN:		AMOUNTS NOT YET DUE ON			IN COURSE OF SETTLE- MENT (%)	INCURRED BUT UNRE- PORTED (%)	CLAIMS PAID (%)
		Reported Claims (%)	Unre- ported Claims (%)	Total (%)			
Year of Statement Quarter	Week						
4th	13	0.00	0.00	0.00	0.26	98.45	1.29
	12	.00	.00	.00	1.23	89.93	8.84
	11	.00	.00	.00	2.35	75.16	22.49
	10	.00	.00	.00	2.81	62.06	35.13
	9	.00	.00	.00	3.08	51.46	45.46
	8	.00	.00	.00	3.19	42.22	54.59
	7	.00	.00	.00	3.14	34.86	62.00
	6	.00	.00	.00	3.04	28.56	68.40
	5	.00	.00	.00	2.89	23.31	73.80
	4	.00	.00	.00	2.68	19.09	78.23
	3	.00	.00	.00	2.40	16.34	81.26
	2	.00	.00	.00	2.10	14.71	83.19
	1	.00	.00	.00	1.82	13.86	84.32
4th quarter (average)		.00	.00	.00	2.38	43.85	53.77
3d quarter		.00	.00	.00	0.98	9.54	89.48
2d quarter		.00	.00	.00	0.30	3.09	96.61
1st quarter		0.00	0.00	0.00	0.11	0.47	99.42
Average for year		0.00	0.00	0.00	0.94	14.24	84.82
Preceding year		0.00	0.00	0.00	0.02	0.00	99.98

APPENDIX B

TABLE 11

ACCUAL, REPORTING, AND PAYMENT LAG TABLES FOR INDIVIDUAL POLICY LOSS-OF-TIME COVERAGE PROVIDING MONTHLY SICKNESS AND ACCIDENT BENEFITS FOR A MAXIMUM PERIOD OF TWO YEARS WITH A ONE-WEEK ELIMINATION PERIOD

WEEK (<i>i, j, or k</i>)	ACCUAL LAG (100 A_i)	REPORTING LAG (100 R_j)	PAYMENT LAG	
			100 P_k^1	100 P_k^2
1.....	0.00	0.00	86.16	4.89
2.....	23.10	3.67	3.81	19.56
3.....	14.65	32.94	1.84	34.22
4.....	9.57	29.16	1.52	19.56
5.....	6.45	13.55	1.37	9.78
6.....	4.65	7.62	1.26	4.89
7.....	3.55	5.21	1.05	2.93
8.....	2.79	3.57	0.77	1.46
9.....	2.35	0.79	0.37	0.87
10.....	1.95	0.35	0.32	0.32
11.....	1.65	0.33	0.29	0.29
12.....	1.44	0.31	0.23	0.23
13.....	1.28	0.29	0.13	0.13
14-26.....	9.31	2.21	0.88	0.87
27-39.....	4.73	0.00	0.00	0.00
40-52.....	3.18	0.00	0.00	0.00
53-105.....	9.35	0.00	0.00	0.00
Total.....	100.00	100.00	100.00	100.00

TABLE 12

ACCUAL, REPORTING, AND PAYMENT LAG TABLES FOR INDIVIDUAL POLICY BENEFITS PROVIDING (a) ROOM AND BOARD WITH 70-DAY MAXIMUM, (b) \$25 MISCELLANEOUS SERVICES, (c) \$100 MISCELLANEOUS SERVICES, AND (d) \$250 MISCELLANEOUS SERVICES

(Nonmaternity Coverage Only)

WEEK	DAY (i, j, or k)	ACCUAL LAG (100 A _i)				REPORTING LAG (100 R _j)	PAYMENT LAG (100 P _k)
		R & B	\$25 Misc.	\$100 Misc.	\$250 Misc.		
1.....	1	13.01	100.00	49.69	39.73	0.00	74.62
	2	12.13	.....	7.25	7.05	0.02	8.56
	3	10.32	.....	6.06	5.85	0.03	1.30
	4	8.54	.....	5.19	5.02	0.09	1.11
	5	7.05	.....	4.25	4.11	0.22	0.89
	6	5.79	.....	3.51	3.42	0.43	0.71
	7	4.75	.....	2.74	2.70	0.68	0.59
2.....	8	3.87	.....	2.31	2.28	0.87	0.50
	9	3.09	.....	1.96	1.95	1.02	0.34
	10	2.57	.....	1.68	1.69	1.18	0.27
	11	2.15	.....	1.44	1.46	1.30	0.27
	12	1.81	.....	1.30	1.33	1.45	0.27
	13	1.52	.....	1.14	1.17	1.60	0.27
	14	1.28	.....	1.02	1.06	1.73	0.27
3.....	15	1.09	.....	0.90	0.94	1.83	0.26
	16	0.96	.....	0.80	0.85	1.92	0.26
	17	0.86	.....	0.72	0.77	2.09	0.26
	18	0.76	.....	0.65	0.71	2.23	0.26
	19	0.70	.....	0.59	0.65	2.28	0.26
	20	0.60	.....	0.52	0.59	2.24	0.25
	21	0.51	.....	0.49	0.58	2.10	0.25
4.....	22	0.44	.....	0.44	0.51	1.89	0.23
	23	0.38	.....	0.42	0.49	1.78	0.22
	24	0.37	.....	0.39	0.46	1.70	0.21
	25	0.36	.....	0.37	0.44	1.67	0.21
	26	0.35	.....	0.34	0.41	1.65	0.21
	27	0.34	.....	0.30	0.38	1.63	0.20
	28	0.34	.....	0.28	0.38	1.61	0.20
	5.....	2.00	1.69	2.25	10.15	1.38
6.....	.....	1.39	.....	1.19	1.75	8.77	1.29
7.....	.....	0.77	.....	0.37	1.42	7.65	1.04
8.....	.....	0.55	.....	0.00	1.27	6.64	0.73
9.....	.....	0.47	.....	0.00	1.16	4.91	0.43
10.....	.....	0.41	.....	0.00	1.01	4.04	0.35
11.....	.....	0.35	.....	0.00	0.89	3.22	0.27
12.....	.....	0.29	.....	0.00	0.77	2.59	0.21
13.....	.....	0.28	.....	0.00	0.67	2.03	0.14
14-26.....	.....	2.98	.....	.....	1.83	6.37	0.91
27-39.....	.....	2.73	.....	.....	0.00	4.55	0.00
40-52.....	.....	1.84	.....	.....	0.00	1.84	0.00
Total.....	.....	100.00	100.00	100.00	100.00	100.00	100.00

TABLE 13
 ACCRUAL, REPORTING, AND PAYMENT LAG TABLES FOR INDIVIDUAL
 POLICY SURGICAL BENEFIT AND \$100 MATERNITY BENEFIT

WEEK	DAY (i, j, or k)	ACCRUAL LAG (100 A _i)		REPORTING LAG (100 R _j)		PAYMENT LAG (100 P _k)
		Surgical	\$100 Maternity	Surgical	\$100 Maternity	
1.....	1	100.00	20.90	0.00	0.00	74.62
	2		20.55	0.00	0.00	8.56
	3		19.69	0.00	0.00	1.30
	4		15.37	0.01	0.13	1.11
	5		10.71	0.01	0.31	0.89
	6		5.01	0.03	0.54	0.71
	7		2.25	0.07	0.80	0.59
2.....	8		1.38	0.15	1.07	0.50
	9		0.52	0.29	1.34	0.34
	10		0.35	0.48	1.63	0.27
	11		0.29	0.68	1.91	0.27
	12		0.27	0.87	2.17	0.27
	13		0.26	1.02	2.37	0.27
	14		0.25	1.11	2.47	0.27
3.....	15		0.23	1.17	2.50	0.26
	16		0.22	1.22	2.51	0.26
	17		0.21	1.26	2.53	0.26
	18		0.20	1.32	2.58	0.26
	19		0.19	1.41	2.72	0.26
	20		0.18	1.52	2.91	0.25
	21		0.17	1.63	3.09	0.25
4.....	22		0.16	1.71	3.25	0.23
	23		0.15	1.76	3.33	0.22
	24		0.14	1.74	3.29	0.21
	25		0.13	1.69	3.19	0.21
	26		0.12	1.61	3.05	0.21
	27		0.10	1.53	2.91	0.20
	28		0.00	1.47	2.80	0.20
5.....			0.00	9.42	18.59	1.38
6.....				8.05	10.90	1.29
7.....				6.59	6.90	1.04
8.....				6.09	2.06	0.73
9.....				5.86	0.97	0.43
10.....				5.56	0.51	0.35
11.....				5.24	0.36	0.27
12.....				4.95	0.35	0.21
13.....				4.55	0.32	0.14
14-26.....				15.00	3.64	0.91
27-39.....				1.89	0.00	0.00
40-52.....				1.04	0.00	0.00
Total.....		100.00	100.00	100.00	100.00	100.00

TABLE 14
 ACCRUAL, REPORTING, AND PAYMENT LAG TABLES FOR
 GROUP COVERAGE PROVIDING \$10 BENEFIT—31-DAY MAX-
 IMUM WITH \$100 MISCELLANEOUS EXPENSE BENEFIT AND
 \$100 OUTPATIENT BENEFIT
 (Nonmaternity Coverage Only)

Week	Day (i, j, or k)	Accrual Lag (100 A _i)	Reporting Lag (100 R _j)	Payment Lag (100 P _k)
1.....	1	34.21	0.00	74.39
	2	10.26	0.04	10.75
	3	9.31	0.16	3.87
	4	7.41	0.25	1.58
	5	5.83	0.40	1.29
	6	4.55	0.60	1.09
	7	3.55	0.84	0.50
2.....	8	2.74	1.10	0.24
	9	2.09	1.36	0.20
	10	1.68	1.64	0.19
	11	1.42	1.92	0.16
	12	1.25	2.18	0.15
	13	1.09	2.37	0.15
	14	0.92	2.48	0.15
3.....	15	0.80	2.53	0.14
	16	0.72	2.55	0.14
	17	0.65	2.54	0.14
	18	0.59	2.53	0.13
	19	0.52	2.50	0.13
	20	0.46	2.44	0.13
	21	0.40	2.38	0.12
4.....	22	0.36	2.31	0.12
	23	0.32	2.26	0.12
	24	0.29	2.24	0.11
	25	0.27	2.23	0.11
	26	0.26	2.22	0.11
	27	0.25	2.21	0.10
	28	0.24	2.18	0.10
5.....		1.34	13.31	0.62
6.....		0.84	9.28	0.50
7.....		0.56	5.82	0.38
8.....		0.50	4.36	0.30
9.....		0.39	3.86	0.23
10.....		0.35	2.81	0.21
11.....		0.32	2.34	0.16
12.....		0.28	2.09	0.14
13.....		0.25	1.83	0.14
14-26.....		2.73	4.01	0.91
27-39.....		0.00	0.91	0.00
40-52.....		0.00	0.92	0.00
Total.....		100.00	100.00	100.00

TABLE 15
 ACCRUAL, REPORTING, AND PAYMENT LAG TABLES FOR GROUP SURGICAL
 BENEFIT AND GROUP \$100 MATERNITY HOSPITAL BENEFIT

WEEK	DAY (i, j, or k)	ACCRUAL LAG (100 A _i)		REPORTING LAG (R _j)		PAYMENT LAG (100 P _k)
		Surgical	\$100 Maternity	Surgical	\$100 Maternity	
1.....	1	100.00	20.90	0.11	0.00	74.39
	2		20.55	0.22	0.00	10.75
	3		19.69	0.38	0.09	3.87
	4		15.37	0.52	0.38	1.58
	5		10.71	0.67	0.76	1.29
	6		5.01	0.85	1.19	1.09
	7		2.25	1.03	1.60	0.50
2.....	8		1.38	1.22	1.94	0.24
	9		0.52	1.40	2.16	0.20
	10		0.35	1.59	2.34	0.19
	11		0.29	1.77	2.47	0.16
	12		0.27	1.93	2.59	0.15
	13		0.26	2.06	2.69	0.15
	14		0.25	2.16	2.79	0.15
3.....	15		0.23	2.23	2.87	0.14
	16		0.22	2.27	2.93	0.14
	17		0.21	2.29	2.99	0.14
	18		0.20	2.27	3.04	0.13
	19		0.19	2.20	3.10	0.13
	20		0.18	2.09	3.15	0.13
	21		0.17	1.95	3.19	0.12
4.....	22		0.16	1.82	3.20	0.12
	23		0.15	1.73	3.18	0.12
	24		0.14	1.65	3.12	0.11
	25		0.13	1.61	2.95	0.11
	26		0.12	1.57	2.79	0.11
	27		0.10	1.54	2.64	0.10
	28		0.00	1.51	2.51	0.10
5.....				10.19	15.44	0.62
6.....				8.33	6.78	0.50
7.....				6.89	4.27	0.38
8.....				5.74	3.08	0.30
9.....				4.95	2.52	0.23
10.....				3.55	1.92	0.21
11.....				2.25	1.33	0.16
12.....				1.19	0.84	0.14
13.....				0.69	0.35	0.14
14-26.....				7.76	0.81	0.91
27-39.....				4.73	0.00	0.00
40-52.....				1.09	0.00	0.00
Total.....		100.00	100.00	100.00	100.00	100.00