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PREMIUM CALCULATION FOR
SERVICEMEN'S GROUP LIFE INSURANCE

by

Frank Tolbert Proctor, Jr.

March 1979

Thesis Advisor: D.R. Whipple

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Premium Calculation for Servicemen's Group Life Insurance

by

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Major , United States Army
B.S., The Ohio State University, 1973

Submitted in partial requirements for the requirements for the degree of

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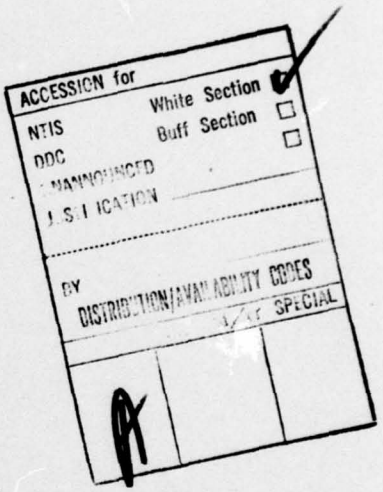

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ABSTRACT

This thesis presents an examination of premium calculations for group life insurance policies and how they relate to premiums charged participants of Servicemen's Group Life Insurance. The focus is on those factors used in premium calculations and how they relate to Servicemen's Group Life Insurance. An alternative method of premium calculation and experience rating is presented.

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I. INTRODUCTION AND BACKGROUND

Since the beginning of recorded history human life has been recognized as having great value with many dimensions. The economic value of human life is especially important if other members of society are directly dependent upon the earnings of an individual, since loss of life means loss of the associated earnings. One protection against the loss of earnings is life insurance which is the focus of this thesis.

A. LIFE INSURANCE AND ITS GROWTH

Insurance is an economic activity of one portion of the "service industry" in existence today in the United States. A price is paid for a service received. The price paid for life insurance is called the premium and the service received is the economic protection received when one dies as well as the lessened feelings of risk to the insured. Life insurance provides for payment of a stipulated sum of money to a designated beneficiary upon death of the insured, and has been a growing economic activity since its introduction in the United States in 1759. By 1975 there were 1,790 companies with total life insurance in force of $2,130.6 billion. This equaled 99% of the national income of $236.2 billion by 1950, and 176% of national income of $1,207.6 billion in 1975. Disposable personal income per family in 1950 was $4,100 with life insurance in force per family equal to

$4,600. In 1975 disposable personal income per family had increased to $14,100 (an increase of 344%) while life insurance in force per family increased to $28,100 (an increase of 611%). The number of policies grew from 9 million policies in 1895 to 380 million in 1975 [Ref. 1 and 2].

B. POLICY TYPES AND PROTECTION

Life insurance is comprised of two major types of contracts, term and ordinary life which accomplishes one or both of the following objectives:

1. Protection

To guarantee the existence of an estate out of which one's dependents may meet debts and receive income if the person they are dependent upon dies.

2. Savings

To save money as a part of one's own living estate, which is created for future needs of income.

Life insurance can also be considered permanent or temporary. Permanent insurance will mean, for the purpose of this thesis, an enduring form of insurance issued for no specified time period while temporary insurance will mean a form of insurance covering a specified time period of short duration.

Term insurance is a form of temporary insurance. The time period is usually one year, but may be as long as five or ten years. The premium is for protection only.

Since only protection is provided, term insurance is the cheapest form of life insurance. When the specified time period has elapsed, the policy is no longer in effect and if the persons wish to continue to have their life insurance, they must purchase another policy. At the time the person wishes to purchase another policy one might not be available or the person may have become uninsurable because of age, disability, detection of some disease, or other circumstance or occurance which has increased the probability of their death to a point that no insurance company will "cover" them. To preclude this occurance, renewable term life insurance is available.

Renewable term life insurance is modified term life insurance with a provision that the insured may purchase another term life insurance policy when the one in force expires. This provision does increase the premium of the policy because there is a cost associated with the probability of becoming uninsurable. The new policy or renewed policy is purchased at a higher premium than the preceding policy. This increase in price is due to the fact that as age increases, the probability of death increases.[1] To prevent the increase in premiums as the term policy is renewed, a level premium policy was introduced in which the

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[1]The probability of death increases after age 10. From ages 0 to 10 the probability of death actually decreases. See Ref. 2.

premium remains the same each time the policy is renewed. This is accomplished by the insured paying more for the policy during its early years, more in relation to the probability of dying, and less for the policy, in relation to the probability of dying, in the policy's latter years. This, in effect, averages the cost of the policy over the periods that it will be renewed, allowing the insured to pay the same premium over those renewed policies. The policy can be renewed as many times as the insured wishes or as many times as the insurance company will allow.

Term Life Insurance can then be straight term or renewable term either of which offers the maximum protection for the price.

Ordinary life insurance is a permanent form of life insurance. It provides insurance coverage for the life of the insured, up to age 100. Premiums are paid to the insurance company as long as the person lives. Ordinary life offers protection, but also includes some of the savings aspect of life insurance. The savings portion of ordinary life is accomplished through a "cash value" concept. This insurance is sold with the risk being that a person will attain a certain age before his death. The insurance company then sets a price that will allow them to receive the same amount of money that they will pay out when the person dies. This is accomplished by considering all the persons who purchase ordinary life insurance. Some will die before the insurance company receives all their premiums while

others will live longer than expected, thus paying more than expected. Also a charge is added to this price that covers the possibility of the insured dying before the expected age. This added charge is where the cash value comes from. The insured has paid a charge for the possibility that he might die before expected, such as during the 1st, 2nd or 10th year of the policy. As the policy continues in effect and the insured has not died, that charge paid for early death has not been used so it is deposited in a cash value account. The insured may cancel his policy or borrow that money from the insurance company. This in effect is a savings account, and thus, the savings aspect of ordinary life insurance.

Ordinary life insurance may take the form of 20 or 30 payment life, in which the insured pays a premium for 20 or 30 years and is insured for life. This form of ordinary life, referred to as limited payment life insurance, requires a higher premium than ordinary life insurance because the total premium must be paid in less time.

Ordinary life insurance can be purchased in many forms which increase the savings portion of the premium. The more money paid for the savings portion, the more available is the cash value.

An endowment policy is different from an ordinary life policy in that it is issued for a specific period of time, 20 or 30 years, at which time the policy is no longer

in effect. Thus, endowment insurance is a temporary form of life insurance and is basically a savings account, offering little protection. The policy is issued in a form that, simply stated, establishes a savings account. If the insured dies before the savings account is completed, the insurance company completes the savings account for the insured. This type of insurance allows the person to save for the future, such as retirement. If he dies before completion of the savings, his beneficiary receives the total savings planned.

C. GROUP LIFE INSURANCE

As this country became more industrialized, the economic security needs of the wage earner grew. This indirectly led to a special type of life insurance known as group life insurance. From the first group policy, written as such in 1911, group life insurance has grown until it comprised more than 40% of the total life insurance in force in the United States by 1975. In 1912 the total value of group life insurance in force in the United States was $13 million. This value had grown to $904.7 billion by 1975 [Ref. 1 and 2]. Group life insurance can be viewed many ways, but for this thesis will be considered as a single insurance policy issued by a single insurance company to cover a group of people. The group normally consists of persons with some common characteristic such as employer, union, profession, or similar relationship. Law prohibits formation of a group

strictly for insurance purposes, therefore this relationship must exist before group insurance is obtained. The size of the group may vary from 2 or 3 to several million members.

The tremendous growth of group term life insurance is undoubtedly due to its ability to provide low cost economic protection in the event of death. Group term life insurance also provides such services as: extension of death benefits; continuation of insurance; conversion privilege; and, disability benefits. These additional benefits will be discussed in the following paragraphs.

The primary purpose of group term life insurance is to provide the "cheapest" death protection available. The reasons group term insurance can provide this lower rate is discussed in a subsequent section. Death protection is the payment of the stipulated sum to the beneficiary upon the death of the insured. This is payable even when death is caused by an occupational accident or sickness, while most other group benefits are not.

The death provision is extended to include a period of 1 year after an employee is terminated from employment. This termination may be for many reasons such as retirement, movement to another employer, or being fired. This extension of death benefits allows the person to remain insured for 1 year which gives him time to purchase other life insurance before his group policy expires. This permits the maintenance of continuous life insurance even when the

individual changes employers or retires. Without this provision there would exist a period of noncoverage between jobs, even when both had group life plans.

The continuance of insurance provision refers to the fact that the group term insurance coverage remains in effect during temporary interruptions in employment. These temporary interruptions are caused by leaves of absence or the employee being laid off, for example.

The conversion privilege gives an insured employee the right to convert his group term life insurance to an individual policy. This conversion provision may be exercised if the employee terminates his employment or if the insurance contract is terminated with the employer.

The disability benefits provisions contain three major subdivisions; maturity value benefit, extended death benefit and waiver of premium benefit. Maturity value benefit indicates that the face value of the policy will be paid to the insured should they become totally or permanently disabled prior to age 60. Extended death benefit ensures that the life insurance policy remains in effect for one year if the person becomes totally and permanently disabled. The insured must have been continuously and totally disabled from the date of termination of employment and death must occur before some stipulated age, usually 65. The waiver of premium disability benefit continues the death coverage in effect regardless of the amount of times since employment termination, provided the employee was totally disabled

at the time of termination, and remains disabled from termination date to death. This coverage is continued to age 60 or 65.

Group term life insurance is normally offered as a yearly renewable term plan. The insurance contract is offered for a one year term and is then renewed on a yearly basis. This renewal process is continued for as long as the employer and the insurance company desires.

Group term life insurance offers many advantages over other types of insurance to the employee. Some of these advantages are:

1. Conversion Privilege

The employee can convert his group policy to an individual policy without having to pass a medical examination.

2. Insurability

All employees are eligible for coverage under the policy simply because they are employed. This allows some people to purchase life insurance who would otherwise be unable to do so because of their health.

3. Lower Costs

Maximum coverage for the least amount of money. Mortality costs are lower because persons who work are generally healthier than nonworking persons. A healthier population results in a lower expected death rate, which reduces the cost associated with the risk of dying. Other savings are caused by the reduction or elimination of such costs as:

a. Medical Examination

Usually no medical examination is required to establish insurability. Normally, the cost of medical exams is either directly borne by the insured, or if paid by the insurance company, is passed back to the insured by the insurance company in the form of administrative costs.

b. Commissions

Commissions to insurance salesmen are reduced since only one policy is sold to cover many people, the sales commission "paid" by each individual insured is much less.

c. Expenses

The administrative expense is reduced because only one policy is issued. Policies are not issued to each member of the group only to the group as a whole, thereby reducing the cost of issuance and materials.

d. Employer Contributions

Some employers further reduce the cost of group term life insurance to their employees by paying a portion or all of the premium. This is usually part of the total compensation package.

D. RATES

The price charged for a service represents an amount equal to the cost of materials used in the service, expenses (both short and long term), and a profit to the firm.

Conceptually life insurance is priced in much the same manner as any other service. However, because of the nature of insurance (risk and uncertainty), there is considerable difficulty involved in the actual pricing of insurance.

The price is a function of the expected amount of claims plus expenses which include administrative expenses, taxes, licenses and commissions paid to salesmen minus any interest earned on invested premiums plus some profit. Expressed as a formula this would be:

$$\text{Price} = \text{Claims} + \text{Expenses} - \text{Interest} + \text{Profit}.$$

The premium is the price paid for insurance. Since premiums may be of different types with different meanings, a review of those premiums relevant to this thesis is useful. Gross premiums are the total price charged for an insurance contract. Gross premiums are composed of the net premium, which is cost of the benefits provided in the policy, plus expenses and profit. Often a net cost is used in insurance which is the gross premium minus any dividends paid to the insured. Dividends are premium refunds in mutual insurance companies and retroactive rate credit for stock companies.

> "Much life insurance, including almost all group life insurance, is sold on a mutual or participating basis, and this is an aspect of insurance pricing not found in commerce and industry. Additional margins are included in the gross premium under a participating contract with the expectation that premium refunds will be made to the policy holder annually during the life of the contract if experience

shows the added margins are not needed by the company for its operations." [Ref. 3]

Dividends are computed for group policies based on the experience of the group using claims, expenses and the investment history of a class of similar policies.

> "Where a group contract insures a large enough number of persons so that its claims experience over a period of time takes on sufficient reliability from a statistical point of view, the policy may be looked upon as being in a class by itself for purposes of dividend participation. This is the practice of experience or merit rating, through which a dividend or retroactive rate credit for the policy may be based upon its own claims experience in whole or in part depending upon its size. The larger the group, the more weight may be attached to the group's experience in this determination." [Ref. 3]

These gross premiums are reviewed at the end of each policy year to allow the insurance company to adjust the premium to reflect the experience during the last policy year. If the gross premium was too high or too low, the new premium is adjusted to compensate for this difference.

Of particular relevance to this thesis are the specific procedures used in the calculation of the gross premium. This procedure is known as mutual rate making, and involves the classification of risk, estimated cost of the benefits of the policy, the interest earned on monies received as premiums, and the "loading" for expenses and contingencies.

Until 1957 the mortality rates used to determine the expected number of deaths in the coming period for group term life policies were derived from tables reflecting the

mortality rates of the U.S. population as a whole. Specifically, the American Experience Table, followed by the American Men Ultimate, and then the Commissioners 1941 Standard Ordinary Mortality Tables, were used [Ref. 3]. However it was recognized in 1957 that these tables did not accurately reflect the mortality rate of the working population covered by group life policies and that a mortality table was needed to more accurately reflect this portion of the population. Thus the Commissioners 1960 Standard Group Mortality Table was developed and adopted by the National Association of Insurance Commissioners in November 1960 [Ref. 3]. Since its adoption this table has been used to determine the net premium to charge for group term policies. This universal use, within the United States, of the Commissioners 1960 Standard group mortality table to determine gross premiums for group policies assumes that all groups are very similar in composition, especially in their mortality experience and thereby expected death rates. One such group term life policy now in effect whose rates are determined using standard procedures is Servicemen's Group Life Insurance.

E. SERVICEMEN'S GROUP LIFE INSURANCE

Servicemen's Group Life Insurance is a group term life insurance policy negotiated for the Federal government by the Veteran's Administration. The Veteran's Administration negotiates and administers this policy in the manner

specified by Title 38, Subchapter III, United States Code. Those active military members employed by the Department of Defense, commissioned officers of the Environmental Science Services Administration and the Public Health Service on active duty, Reservists, Army National Guard, Air National Guard and members of the Reserve Officers Training Corps are eligible for protection under this policy. The primary insurer for Servicemen's Group Life Insurance is the Prudential Insurance Company of America which reinsures with 560 companies [Ref. 4]. The premiums charged for Servicemen's Group Life Insurance are determined using the "lowest schedule of basic premium rates generally charged for new group life insurance policies issued to large employers" [Ref. 5].

A potential problem arises when the characteristics of the general population differ sifnificantly from the population covered by Servicemen's Group Life Insurance (SGLI). If these differences do exist then the insurance companies could be "overcharging" (undercharging) for the service they are providing. In fact, we posit that there are sufficient differences (which are presented in Chapter IV of this thesis) between the SGLI population and the general population to warrant an investigation of the impact of these differences on the correct premium. Chapter II contains a detailed presentation of Servicemen's Group Life Insurance. Chapter III presents a detailed analysis of the development of the Commissioners 1960 Standard Group Mortality Table, those factors used in its construction, and other

pertinent data to the calculation of gross premiums. Chapter IV presents the comparison of Servicemen's Group Life Insurance and the factors used in the Standard Group Mortality Table mentioned above. Chapter V uses those factors that are common to both Servicemen's Group Life Insurance and the Commissioners 1960 Standard Group Mortality Table to construct a "Servicemen's Group Mortality Table" (ser GMT). This mortality table is used to recalculate the SGLI premium which will be compared to its present premium history. Chapter VI then presents alternative solutions to the problem and the conclusions of this thesis.

II. SERVICEMEN'S GROUP LIFE INSURANCE

Servicemen's Group Life Insurance is a group term life insurance program offered on a yearly renewable basis to certain employees of the United States Government. SGLI is administered by the Office of Servicemen's Group Life Insurance and supervised by the Veterans Administration.

A. ELIGIBLE PARTICIPANTS AND INSURANCE AMOUNTS

SGLI is offered to members of the "Uniformed Services"[2] of the United States on full-time duty, or full-time duty as a cadet or midshipmen at the United States Military Academy, United States Naval Academy, United States Air Force Academy, or the United States Coast Guard Academy. A member of the Ready Reserve of a uniformed service who is assigned to a unit or position in which he may be required to perform active duty, or active duty for training, and each year will be scheduled to perform at least twelve periods of inactive duty training that is creditable for retirement purposes under chapter 67 of Title 10 United States Code is also eligible for participation. Members, cadets or midshipment of the Reserve Officers Training Corps while attending field training or practice cruises may also

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[2]Uniformed services means the Army, Navy, Air Force, Marine Corps, Coast Guard, the commissioned corps of the Public Health Service, and the commissioned corps of the National Oceanic and Atmospheric Administration.

participate in SGLI. Each eligible person is automatically insured for $20,000, unless he requests, in writing, coverage in a lesser amount. Available coverages are $20,000, $15,000, $10,000, $5000 and $0. On 30 June 1977 about 3,239,000 members were covered under SGLI for $64.3 billion of insurance [Ref. 6].

B. BENEFITS

SGLI offers the following benefits:

1. Death Benefit

Payment of the insured amount if the insured dies during a period of coverage.

2. Extended Death Benefit

The extended death benefit period is for 120 days from the date of separation from active duty, except for those members who are totally disabled at the time of separation. For such members the extended death benefit remains in effect for one year or 120 days after the date the member is declared not totally disabled, whichever is the earlier date. Totally disabled members are required to separate from the service. This benefit requires no payment from the member during the period covered.

3. Conversion

SGLI is automatically converted to Veterans' Group Life Insurance (VGLI) effective the day after the date SGLI eligibility ends. VGLI is another group policy which is discussed later in this chapter. The member may convert

from VGLI to an individual policy of life insurance without medical examination.

C. PREMIUM PAYMENTS

The premiums are deducted from the insured's pay on a monthly basis. The amount of this payment is determined by the rate making procedures established by Title 38 U.S. Code and discussed below. These monthly premiums are deposited in a revolving fund established in the Treasury of the United States. Also credited to the revolving fund are any dividends paid by the insurance companies and the "extra hazard" duty premiums paid by the appropriate services. (The "extra hazard" duty premiums will be discussed in the rate making section of this chapter.) From the revolving fund all payments are made to the insurance company or companies. Any funds remaining in the revolving fund not used for the payment of premiums, SGLI administrative expenses experienced by the Veterans Administration, or expenses payable to the insurance companies may be invested. The Secretary of the Treasury is authorized to sell and retire, special interest-bearing obligations of the United States for the account of the revolving fund.

D. ELIGIBLE INSURANCE COMPANIES

All U.S. insurance companies who are

> "lincensed to issue life insurance in each of the fifty states of the United States and in the District of Columbia, and, as of the most recent December 31 for which information is available to the Administration, have in

> effect at least 1 per centum of the total amount of group life insurance which all life insurance companies have in effect in the United States" [Ref. 5]

are eligible to participate as insurers in SGLI. The Administrator is also authorized to arrange with the life insurance company or companies issuing a policy or policies to SGLI to reinsure portions of the total amount of insurance with other life insurance companies as may elect to participate in such reinsurance. At the time of this writing the Prudential Insurance Company of America is the primary insurer with over 560 reinsurers [Ref. 7].

E. CERTIFICATES OF INSURANCE

The issuance of certificates is the responsibility of the Administrator. Certificates are issued by the Administrator in lieu of the certificates otherwise issued by the insurance company or companies. The certificate sets forth the benefits to which the member is entitled, to whom the benefit is payable, to whom claims should be submitted and a summary of the provisions of the policy.

F. VETERANS GROUP LIFE INSURANCE

Veterans Group Life Insurance (VGLI) is a non-renewable five-year term policy that is offered in amounts of $5,000, $10,000, $15,000 or $20,000. VGLI insures 334,000 members for approximately $6.4 billion of insurance [Ref. 6]. No person may be insured by SGLI and VGLI for a total amount greater than $20,000. At the end of the five-year period

the insured must either convert to an individual policy or lose coverage under this policy.

G. RATES/PREMIUMS

Policies purchased for SGLI:

> "shall include for the first policy year a schedule of basic premium rates by age which the Administrator shall have determined on a basis consistent with the lowest schedule of basic premium rates generally charged for new group life insurance policies issued to large employers, this schedule of basic premium rates by age to be applied, except as otherwise provided in this section, to the distribution by age of the amount of group life insurance under the policy at its date of issue to determine an average basic premium per $1,000 of insurance. Each policy so purchased shall also include provisions whereby the basic rates of premium determined for the first policy year shall be continued for subsequent policy years, except that they may be readjusted for any subsequent year, based on the experience under the policy, such readjustments to be made by the insurance company or companies issuing the policy on a basis determined by the Administrator in advance of such year to be consistent with the general practice of life insurance companies under policies of group life insurance issued to large employers" [Ref. 5].

> "In the event the Administrator determines that ascertaining the actual age distribution of the amounts of group life insurance in force at the date of issue of the policy or at the end of the first or any subsequent year of insurance thereunder would not be possible except at a disproportionately high expense, the Administrator may approve the determination of a tentative average group life premium, ..., in lieu of using the actual age distribution" [Ref. 5].

The total premium for SGLI is that gross premium determined in accordance with the above paragraphs plus the estimated cost traceable to the extra hazard of active

duty in the uniformed services. The extra hazard premium is that premium required by the excess mortality incurred by members and former members of the uniformed services above the mortality experienced under peacetime conditons. The extra hazard premium is "contributed from the appropriation made for active duty pay of the uniformed service concerned" [Ref. 5]. This amount is determined by the Administrator and certified to the Secretary concerned.

The determination of rates using this "lowest schedule of basic rates generally charged for new group life insurance policies issued to large employers" [Ref. 5] assumes that the mortality rate and thus the expected claims rate of the SGLI population is the same, or nearly the same, as the general working population. The average death rate of the population used to develop the 1960 Commissioners Standard Group Mortality Table was 6.47 deaths per 1000. The highest yearly death rate experienced by SGLI members to date is 1.80 deaths per 1000. This difference clearly shows a need for an analysis of rate making procedures and a comparison of those procedures relevant to SGLI. The focus of this thesis is an investigation of rate making procedures, how they are used to determine SGLI rates and how SGLI rate making might be improved.

III. PREMIUM CALCULATION METHODOLOGY

The determination of the premium, the price, is the most difficult aspect of any insurance contract. This is especially difficult because a price must be determined that is a price for an unknown service. The service is unknown in that the total number of claims, both in number of claims or total dollar amounts of those claims, is not known and can only be predicted. This prediction is best done using historical data, if one assumes that the future will continue to reflect the past. This is in fact the basis upon which insurance premiums are calculated. The price that is to be charged must be based on a predicted number or amount of claims that is expected in the future period. The premium is then the expected claims plus expenses and profit minus interest.

A. COMMISSIONERS 1960 STANDARD GROUP MORTALITY TABLE

To determine the price, a prediction of the events that cause claims to be paid must be made. Until the development of the Commissioners 1960 Standard Group Mortalty Table, the expected death rate of the U.S. population was used to predict the expected death rate of group insurance policies. In 1957 the National Association of Insurance Commissioners recognized that the Commissioner Standard Ordinary Mortality Table was not a good predictor of group mortality, but would be used by default if nothing was done. As a result of this

perception, they appointed a committee to produce a group mortality table. In November 1960 the Commissioners 1960 Standard Group Mortality Table (1960 CSG Table) was adopted by the National Association of Insurance Commissioners to calculate the expected claims rate (death rate) for group insurance.

The first step in the development of the 1960 CSG Table was the accumulation of data relative to the benefits offered by group term life insurance policies. These benefits were discussed in chapter I.C. The data collected was only from employer-employee type groups with twenty-five members or more. These groups were chosen as the source of the data because they are the more widespread type of group insurance policy written and would represent the expected claims of groups accurately. The data was collected for the period 1950 through 1958.

In determining the expected claims for the future period it was noted that all claims did not result as a direct consequence of the death of a premium paying member. Certain claims also arose from the other benefits offered under group life insurance policies. These benefits were the extended death benefit clause, the waiver of premium clause and the total and permanent disability clause. Investigation of these benefits also indicated that the request for payment of these benefits did not always result in a 100% payment. An example is the waiver of premium clause,

> "an approved disability claim may not actually be paid as a death claim for many years or indeed may not be paid at all if the claimant should recover from his disability." [Ref. 3]

The results of the investigation indicated that the mortality rates derived from the benefits should be counted as 100% for the extended death benefit clause and 75% for the waiver of premium clause.

> "The total and permanent clause is the most valuable of the three disability clauses. In accordance with its provisions, the disability installments which reduce the face amount of insurance commence immediately upon satisfactory proof of disability. The payout of the face amount in this way before death occurs represents a substantial additional policy benefit, for which an extra premium is charged. More or less on the basis of judgment, it was decided to consider that the extra premium defrayed the cost of one half of the disability claims and that the remaining half should be combined with the death claims." [Ref. 3]

The mortality rates derived from the three clauses above were combined with the actual death claims to determine the composite mortality rates without margins that constituted the underlying experience level for the 1960 CSG Table [Ref. 3].

Margins were added to this mortality rate. The margins were necessary to cushion the fluctuations in claims from period to period, to permit the companies to write group life policies for all groups except the few highly hazardous industries with a standard premium, to account for the extreme element of possible loss caused by accidental death (especially at the younger ages), and to allow for the

conversions to individual policies after termination of the group coverage. Over the range of quinquennial ages eighteen to ninety-nine the mortality rates of the 1960 SGM Table was 110% of the corresponding 1958 CSO Table, on the average [Ref. 3]. From the quinquennial rates individual age rates were developed. The rates were then smoothed, so the rates would progress smoothly from age to age.[3]

B. NET PREMIUM

With the 1960 CSG Table the development of net premiums was the next step. Net premiums are the premiums before loading for expenses. The assumption was made that the premium would be paid at the beginning of the period and therefore was available for investment. That interest received on the premium should be deducted from the total premium paid to the insurance company. An interest rate of 3 percent is assumed and a present value method is applied to the premium to deduct the interest received by the insurance company. The investment is assumed to be available for investment of one-half the period because a uniform death rate is assumed. A uniform death rate means the claims will be paid in the middle of the period on the average, therefore the money is available for one-half the period. An interest rate of 3% for one-half period yields a present value factor of .985329.

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[3]For further discussion of the development of the 1960 SGM Table see Ref. 3.

With the death rates established in the 1960 CSG Table it became a simple task to compute the net premium. This is done for each age and a premium per $1,000 of insurance is derived. An illustrative calculation is made to show the process.

For age 23 the Deaths per 1000 from the 1960 CSG Table are 2.21. If it is assumed that a population of 100,000 persons are insured for $1,000 each and with the expected death rate of 2.21 per 1000, 221 claims are expected and $221,000 in benefits will be paid. Discounting this amount by the present value of 3% for one-half period yields $221,000 X .985329 = $217,757.71 net premium. To get the cost per person divide $217,757.71 by 100,000 which yields $2.18 annual net premium per person (per $1,000). After determining this premium for each age the net premiums are loaded for expenses and other contingencies.

The net premium is then the expected claims minus interest. The addition of expenses leads to the gross premium.

C. GROSS PREMIUM

The final step in the calculation of the premium to charge the insured is the determination of the gross premium. The gross premium is the net premium plus any loading necessary for expenses and contingencies.

Because of the desire to have a single formula that would make reasonable provision for expenses encountered by

all group sizes a loading formula was devised. A three part loading formula was decided on. First a basic loading percentage was applied to all ages. This was a 33.3 percent addition to the net premium. For the example used in chapter III.B the tabular gross premium (as it is called) for age 23 becomes $2.18 x 1.333 which equals $2.90 annual tabular premium.

Second was a policy constant to take care of the extra expense needs of "baby groups".

> "This constant per $1,000 of insurance applied only to the first $40,000 coverage in the group. The amount of the addition was $2.40 per thousand on an annual premium basis, $1.20 semi-annually, $.60 quarterly and $.20 monthly. For a group with more than $40,000 of life insurance volume, the policy constant would thus be $96 per year, $48 semiannually, $24 per quarter or $8 per month." [Ref. 3]

The third part of the formula is a size discount. Like many other products a price discount on life insurance is given for a large volume. The amount of discount varies with the size of the group and the amount of insurance in force and ranges from 0 to 35 percent [Ref. 4].

The gross premium is then calculated by determining the number of people in each age and the amount of insurance they will carry. Then for each age the following is computed. The tabular gross premium is multiplied by the amount of total insurance (in thousands) for that age. This is done for all ages and added. As described previously, the policy constant is added to this total. The discount factor is

then subtracted from the previous total. The result is the total gross premium for policy. This amount is divided by the total value of the life insurance to obtain the gross premium per $1000 insurance.

D. EXPERIENCE RATING

Experience rating is the process whereby the manual premium charged during the first policy year is adjusted upward or downward for subsequent policy years based on actual claim experience by the group.

> "Viewed prospectively, it should operate so as to increase or decrease the premium for the insurance on a particular group to a level that will exactly support the probable future experience of that particular group. Viewed retrospectively, after the group insurance plan has been in existence for a number of years, the experience rating process should operate so as to produce a total net cost (premium charges less experience refunds) which approaches, even more closely, the actual past experience of the group." [Ref. 3]

The factors used in experience rating are expenses and claims cost. The claims cost is a reflection of the mortality rate experienced by the group. The exact experience rating formulas used by the different insurance companies differ widely however to some extent they may be divided into the following types.

Type 1 is the risk-averaging formula. This type experience rating formula calculates the claims as a weighted average of (1) actual claims on the policy and (2) average claims on the class of policies. As the size of the group

increases the portion of the formula represented by actual claims increase. An illustrative credibility factor for Group Insurance Dividends is presented [Ref. 4].

TABLE I

CREDIBILITY FACTORS FOR GROUP INSURANCE DIVIDENDS

Size of Group (Lives)	Credibility Factor
100	0.0
300	0.3
1000	1.0

Then if the group size is 300, 0.3 or 30% of the claims portion of the dividend is accounted for by the group's actual claims experience. The same method is used in determining renewal rates except the period of time is longer than one year. An illustrative credibility factors for group insurance renewal is presented [Ref. 4].

TABLE II

CREDIBILITY FACTORS FOR GROUP INSURANCE RENEWAL

Size of Group Lives	One Year	Five Years
100	0.00	0.25
500	0.25	0.60

The second type formula is the risk-charge formula. This type is used only in dividend or retrospective rate credits determination. This type experience rating utilizes an additional risk charge which depends upon the type of coverage and, as a percent of premium, varies inversely with the size of the group [Ref. 4].

The actual formulas used are [Ref. 4]

Type 1

$$K = yC + (1-y)KP$$

Type 2

$$K = C + R$$

where

- K = Claims charge
- C = Actual incurred claims
- P = Annual Premium earned
- K = Average ratio of claims to premiums on class of coverage
- y = Credibility factor varying by coverage and dependent on volume of exposure, as measured by number of lives or amount of premium
- R = Additional risk charge

The use by SGLI of "the lowest schedule of basic premium rates generally charged for new group life insurance policies issued to large employers" [Ref. 5] assumes that this rate will represent the expected claims and expenses of SGLI. If this rate does not reflect the experience of SGLI the rates should be changed through experience rating. This must be accomplished using the Type 1 experience rating formula because Title 38 U.S. Code prohibits any member of SGLI from receiving dividends from SGLI. Data would seem to indicate that the experience rating used has not done an adequate job of reflecting the actual experience of SGLI. Chapter IV will investigate the differences between SGLI and the general population and how these relate to the factors used in rate making in general.

IV. COMPARISON OF SERVICEMEN'S GROUP LIFE INSURANCE WITH OTHER GROUP POLICIES

An investigation of the 12th Annual Report of Servicemen's and Veterans Group Life Insurance programs, for the year ending June 30, 1977 shows a cumulative difference between premiums received and claims paid of $183,483,714. This amount is the difference between premiums (both personal and extra hazard) and claims for the period September 29, 1965 (the beginning date of SGLI) and June 30, 1977. This amount is for premiums only and does not include $40,889,811 interest earned on premiums during the same period. After cumulative expenses and taxes of $38,572,044 during the same period are deducted, $144,911,670 plus interest remains as what may be considered an overcharge for protection provided to SGLI members. As discussed in chapter III, the purpose of experience rating, is to cause the actual premium charged to closely reflect actual claims experience. To understand why this does not seem to have been done with SGLI, further investigation seems appropriate.

A. POPULATION DIFFERENCES

Differences between the average working population and the population covered by SGLI could account for some of the discrepancy discussed above.

A comparison of the deaths per thousand from the Commissioner's 1958 Standard Ordinary Mortality Table or

the Commissioner's 1960 Standard Group Mortality Table with the deaths per thousand of the uniformed services as reported in the 1977 annual report of the Servicemen's and Veterans' Group Life Insurance programs reveal a difference between these death rates. This difference is especially pronounced for those ages over 25. The death rate per thousand of the uniformed services is lower in all age brackets. The difference increases as age increases. (See Table III.) [Ref. 6 and 7]

TABLE III

COMPARISON OF DEATHS PER 1000

AGE	1958 SOM TABLE	1960 SGM TABLE	SGLI 1966-68	SGLI 1974-76
17-19	1.68	1.97	1.04	1.44
20-24	1.86	2.17	1.47	1.31
25-29	2.00	2.31	1.47	1.00
30-34	2.26	2.53	1.37	.92
35-39	2.84	3.25	1.86	1.20
40-44	4.20	4.78	2.55	1.73
45-49	6.41	7.36	3.49	2.32
50-54	16.30	18.18	7.30	3.10

These differences in death rates, especially between SGLI and the 1960 CSG Table might be explained by certain characteristics of SGLI. While in general Group Life

Insurance does not require a physical examination to establish insurability, the military service does require a physical examination for employment or membership. Not only is a physical examination required for entrance, but one is required every 1 or 3 years depending on the status of the service member. These periodic physical examinations identify and cause treatment of diseases and illness. It seems reasonable to assume that this results in a healthier population with longer life expectancy leading to a lower mortality rate.

Proper physical conditioning has been generally accepted to extend life and the military services require physical conditioning. Those members unable to meet those physical standards are removed from the military service, and therefore, the group life insurance program. In addition to physical fitness standards, weight standards are also enforced for the active military service. Maintaining proper weight standards also leads to a healthier population with a lower mortality rate than the general population. The military services have weight standards programs requiring their members to maintain proper weight standards.

The most important difference between the military population and the general population relating to mortality rate is the age distributions of the populations. From 1954 to 1976 the median age of male Military Personnel ranged from 22.7 years to 24.5 years, with the median of the

median ages being 23.9 years. This compares to a median age of 29.5 [Ref. 9] for the population of the United States in 1979.

B. RATE MAKING DIFFERENCES

Some factors used in rate making for general group policies and some factors used in the development of the 1960 CSG Table do not apply to, or differ to some extent from, the coverage and characteristics of SGLI.

The treatment of disability claims used to develop the 1960 SGM Table, as discussed in chapter III.C, do not reflect the coverage provided by SGLI. The extended benefit clause used to develop the 1960 CSG Table was for a period of 1 year, the period length for SGLI is only 120 days. This difference in period length should result in SGLI insurers experiencing fewer deaths per thousand under the extended benefit coverage than group insurers in general. This lesser death rate would be overstated using the 1960 CSG Table. The waiver of premium clause and the total or permanent disability clause were also included in the disability calculations for the 1960 CSG Table. Neither of these are contained in SGLI coverage. The inclusion of these clauses again causes the 1960 CSG Table to overestimate the expected mortality rate of SGLI participants because deaths are counted for coverage not provided.

The mortality margins added in the development of the 1960 SGM Table were discussed in chapter III. Some of the

reasons used to support the need for mortality margins are not appropriate for SGLI coverage. SGLI is certainly not a "baby group" (a baby group contains less than 25 members), the industry shouldn't be considered a high hazard industry (because the hazard portion of the insurance policy is paid by the U.S. Government), and SGLI does not allow for conversion to an individual policy but to another group policy. If a conversion charge is necessary it should be charged to VGLI, which would let the person receiving the service pay for it. The inclusion of these margins tend to further overestimate the expected death rate and claims under SGLI.

An interest rate of 3% is assumed in determining net premiums. This estimate seems low. A review of net interest earned on assets by life insurance companies in general is in excess of 4.5% [Ref. 1]. A comparison of the interest earned by SGLI with the service premiums indicates a rate of return of 3.7% during the life of the policy. This underestimation of interest results is an overestimation of net premiums.

The loading of the net premiums for expenses and contingencies to determine the gross premium also includes charges for some elements not appropriate for SGLI operations. The certificates provided to SGLI participants are provided by the Administrator, not by the insurance companies. Expenses for the administration of SGLI by the Veteran's

Administration have been approximately 0.3% of service personnel premiums during the life of policy [Ref. 6]. Also SGLI is not a "baby company", thus the addition of charges to cover the extra expense of insuring "baby companies", seems inappropriate.

These differences between SGLI and the general population and standard rate making procedures support the premise that the wrong factors were used to determine the premiums for SGLI. Experience rating should have accounted for the differences but has not as indicated by the 1977 policy year when $122,223,944 was received in premiums and $90,008,279 was paid in claims. The $90,008,279 includes an estimate of unreported claims plus actual claims. Assuming that all those insured who died had maximum coverage, the 3012 actual deaths in 1976 indicate $60,240,000 in actual death claims. This leaves $29,768,279 as an estimate of unreported claims.

Dividends can not be returned to the participants of SGLI to remedy the overcharge since Title 38 U.S. Code prohibits the payment of dividends to SGLI participants. Therefore a more representative estimate of expected claims must be used in experience rating.

A portion of insurance pricing that has not been discussed thus far is reserves. Reserves are required to cover liabilities of premiums, claims, dividends and contingencies. Premium reserves are required for coverage not yet extended.

An example is premiums received on 1 January for the period 1 to 30 January. On 15 January only half of the paid-for coverage has been provided, thus requiring half the premium to be held as a reserve [Ref. 4].

Claim reserves are required to cover approved but unpaid claims, unsettled claims, unreported claims, extended claim liabilities, amounts not due on open claims and approved disability claims [Ref. 4]. These are accounted for in SGLI by an estimate of unreported claims in addition to death claims. A typical claims reserve as a percentage of annual premiums for group life insurance is 12% [Ref. 4]. Using the 1976 premium of SGLI this reserve should be $14.7 million. As previously indicated, the difference between actual death claims and death claims estimated in the 12th annual report is $29.7 million. This "reserve" is over 24% of annual premiums as compared to 12%.

Dividend reserves are required for dividiends earned but not paid. SGLI participants are not allowed to receive dividends therefore this does not apply to SGLI.

Contingency reserves are accumulated to protect against insufficiency of funds resulting from unusual losses caused by catastrophic accidents or epidemics [Ref. 4]. As of 30 June 1977, SGLI had a contingency reserve of $84.1 million dolars [Ref. 6]. No conclusions are available as to the appropriate size reserve insurance companies should maintain for these contingencies. The possiblity of excess reserves also lend credibility to the premise that SGLI participants have been overcharged for the service they received.

V. SGLI PREMIUM CALCULATION

The mortality and claims experience of SGLI is reported annually in the Servicemen's Group Life Insurance Program numbered Annual Report published by the Department of Veterans Benefits, Veterans Administration (hereafter referred to as "Annual Report"). Due to the manner in which death rates are presented it is difficult, if not impossible, to replicate an in depth analysis of the data as was done in the development of the 1960 Commissioners Standard Group Mortality Table. For this reason a "Servicemen's Group Mortality Table" will be developed using those factors used in establishing the 1960 Commissioners Standard Group Mortality Table substituting actual experienced deaths rates of SGLI participants.

Deaths per thousand by age were first presented in the Fourth Annual Report, age groups 17-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, and 50 and over. These age groups will be used in presenting the "Servicemen's Group Mortality Table." (Ser GMT) Since June 30, 1969 the death rate has been presented as a three year total. This practice will be followed to develop the Ser GMT. A five year total would be preferred [Ref. 4] but this data is not retrievable from available sources. Table IV presents the available data.

Over the quinquennial ages eighteen to ninety eight, the 1960 CSG Table death rate was 110% of the corresponding

1958 CSO Table death rate. A factor of 110% is applied to Table IV to yield the Ser GMT. (See Table V) [Ref. 3]

The Ser GMT may be used to calculate the net premiums as follows, using age 20-24 for 1966-68 as an example. Assume a population of 100,000. This yields 162 claims (100 x 1.62). Each claim is assumed to be $1,000 yielding $162,000 in claims paid per year. Since the premiums are paid monthly each premium can be invested for 1/24 year (1/2 month) at an assumed interest rate of 3% which equals a present value factor of .998769 [Ref. 3]. Thus $162,000 multiplied by .998769 equals $161,800.58 total net premiums. Dividing by 100,000 persons yields $1.62 annual net premium per year (per $1,000). The net annual premiums are presented in Table VI.

The tabular gross premium rates are determined by loading the net premium rates by 33.3% [Ref. 3]. Loading the Net Servicemen's premiums yields Table VIII, the Tabular Gross Premium. (Net Annual Premium multiplied by 1.333 divided by 12 equals the Tabular Gross Premium per month.)

To determine the gross premium to charge, the number of persons in each quinquennial age group must be known. This data is not available but will be estimted using the total number of lives insured for the year multiplied by the percentage composing that quinquennial of the male population of the Department of Defense, for the year [Ref. 8]. An example is age 17-19 for 1976, 2,139,956 lives were insured and the age group comprised 16.8% of

the DOD male population. 2,139,956 multiplied by 16.8% equals 359,513 members in the age group 17-19 for 1976. The tabular gross premium calculated in Table VIII will be used to calculate the gross premium for the following year. For example the tabular gross premium calcualted for 1966-68 will be used to calculate the gross premium for 1969. These calculations are shown in Tables IX through XIV. For ease of calculation, the amount of insurance per participant is assumed to be $1,000. The actual amount of insurance is needed to calculate the size discount and the maximum discount is achieved with $80,000 total premium per month. With over 2 million participants the maximum discount is achieved with $1,000 coverage per insured person.

The rate determined using existing insurance procedures above underestimates the actual claims experienced by SGLI. However the Ser GMT does provide a conservative estimate of the expected total deaths per 1000 for SGLI. An examination of the predicted and actual death rates shows that in seven of the eight years for which predictions could be made, the predicted rate is higher than the actual rate. Standard statistical techniques can be used to yield a 95% confidence interval for the probability of being conservative. That interval is (.517, .997) [Ref. 10]. Thus we may infer that the probability of Ser GMT overestimating the actual death rate is at least .5, with high confidence. The actual performance of providing a conservative estimate is 85% of the time provides even more "cushion" for the insurers.

Since the predicted death rate usually overestimates actual experience, but underestimates the actual claims experience, it appears the 35% discount on the premium is too big. A discount of 15% is assumed to be a better and more conservative approximation of the actual claims experienced for SGLI. Using a discount rate of 15% the monthly rates per $1,000 insurance are presented in Table XVI and compared to the actual premiums charged for SGLI derived using the 1960 CSG Table. The procedure and calculations presented in this chapter are posited to be more representative predictors of future claims for SGLI than those used to the past.

TABLE IV

SGLI DEATH RATES PER 1000

(Excluding Post Separation and Vietnam Experience)

ages	66-68	67-69	68-70	69-71	70-72	71-73	72-74	73-75	74-76
17-19	1.04	1.30	1.57	1.60	*	*	1.67	1.56	1.44
20-24	1.47	1.49	1.51	1.49	*	*	1.36	1.36	1.31
25-29	1.47	1.52	1.48	1.38	*	*	1.18	1.09	1.00
30-34	1.37	1.45	1.40	1.43	*	*	1.07	1.02	.92
35-39	1.86	1.87	1.79	1.72	*	*	1.40	1.34	1.20
40-44	2.55	2.68	2.53	2.28	*	*	1.84	1.78	1.73
45-49	3.49	3.53	3.36	3.11	*	*	2.97	2.47	2.32
50 and over	7.30	5.58	5.12	4.50	*	*	4.02	3.23	3.10
Total	1.56	1.61	1.63	1.59	1.55	1.50	1.42	1.36	1.27

* Data Not Available

Extrapolated data from references 6 and 7.

TABLE V

Servicemen's Group Mortality Table [Ser GMT]

ages	66-68	67-69	68-70	69-71	70-72	71-73	72-74	73-75	74-76
17-19	1.14	1.43	1.73	1.76	*	*	1.82	1.72	1.58
20-24	1.62	1.64	1.66	1.64	*	*	1.50	1.50	1.44
25-29	1.62	1.67	1.63	1.52	*	*	1.30	1.20	1.10
30-34	1.51	1.60	1.54	1.57	*	*	1.18	1.12	1.01
35-39	2.05	2.06	1.97	1.89	*	*	1.54	1.47	1.32
40-44	2.81	2.95	2.79	2.51	*	*	2.02	1.96	1.90
45-49	3.84	3.88	3.70	3.42	*	*	3.27	2.72	2.55
50 and over	8.03	6.14	5.63	4.95	*	*	4.42	3.55	3.41
Total	1.72	1.77	1.79	1.75	1.71	1.65	1.56	1.50	1.40

* Data not available

TABLE VI

PROPOSED NET ANNUAL PREMIUM PER PERSON

ages	66-68	67-69	68-70	69-71	70-72	71-73	72-74	73-75	74-76
17-19	$1.14	$1.43	$1.73	$1.76	*	*	$1.82	$1.72	$1.58
20-24	$1.62	$1.64	$1.66	$1.64	*	*	$1.50	$1.50	$1.44
25-29	$1.62	$1.67	$1.63	$1.52	*	*	$1.30	$1.20	$1.10
30-34	$1.51	$1.60	$1.54	$1.51	*	*	$1.18	$1.12	$1.01
35-39	$2.05	$2.06	$1.97	$1.89	*	*	$1.54	$1.47	$1.32
40-44	$2.81	$2.95	$2.79	$2.51	*	*	$2.02	$1.96	$1.90
45-49	$3.84	$3.88	$3.70	$3.42	*	*	$3.27	$2.72	$2.55
50 and over	$8.02	$6.13	$5.62	$4.94	*	*	$4.41	$3.55	$3.41
Total	$1.72	$1.77	$1.79	$1.75	$1.71	$1.65	$1.56	$1.50	$1.40

TABLE VII

ANNUAL TABULAR GROSS PREMIUM RATES PER $1000 OF SGLI

ages	66-68	67-69	68-70	69-71	70-72	71-73	72-74	73-75	74-76
17-19	$1.52	$1.91	$2.31	$2.35	*	*	$2.43	$2.29	$2.11
20-24	$2.16	$2.19	$2.21	$2.19	*	*	$2.00	$2.00	$1.92
25-29	$2.16	$2.23	$2.17	$2.03	*	*	$1.73	$1.60	$1.47
30-34	$2.01	$2.13	$2.05	$2.01	*	*	$1.57	$1.49	$1.35
35-39	$2.73	$2.75	$2.63	$2.52	*	*	$2.05	$1.96	$1.76
40-44	$3.75	$3.93	$3.72	$3.35	*	*	$2.69	$2.61	$2.53
45-49	$5.12	$5.17	$4.93	$4.56	*	*	$4.36	$3.63	$3.40
50 and over	$10.69	$8.17	$7.49	$5.99	*	*	$5.88	$4.73	$4.55
Total	$2.29	$2.36	$2.39	$2.33	$2.28	$2.20	$2.08	$2.00	$1.87

TABLE VIII

MONTHLY TABULAR GROSS PREMIUM RATES PER $1000 OF SGLI

ages	66-68	67-69	68-70	69-71	70-72	71-73	72-74	73-75	74-76
17-19	$0.13	$0.16	$0.19	$0.20	*	*	$0.20	$0.19	$0.18
20-24	$0.18	$0.18	$0.18	$0.18	*	*	$0.17	$0.17	$0.16
25-29	$0.18	$0.19	$0.18	$0.17	*	*	$0.14	$0.13	$0.12
30-34	$0.17	$0.18	$0.17	$0.17	*	*	$0.13	$0.12	$0.11
35-39	$0.23	$0.23	$0.22	$0.21	*	*	$0.17	$0.16	$0.15
40-44	$0.31	$0.33	$0.31	$0.28	*	*	$0.22	$0.22	$0.21
45-49	$0.43	$0.43	$0.41	$0.38	*	*	$0.36	$0.30	$0.28
50 and over	$0.89	$0.68	$0.62	$0.55	*	*	$0.49	$0.39	$0.38
Total	$0.19	$0.20	$0.20	$0.19	$0.19	$0.18	$0.17	$0.17	$0.16

TABLE IX

PREMIUM CALCULATION FOR 1969

age	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	395,221	X	1	X	$.13	=	$ 51,378.73
20-24	1,539,591	X	1	X	$.18	=	$277,126.38
25-29	383,423	X	1	X	$.18	=	$ 69,016.14
30-34	238,902	X	1	X	$.17	=	$ 40,613.34
35-39	221,206	X	1	X	$.23	=	$ 50,877.38
40-44	97,330	X	1	X	$.31	=	$ 30,172.30
45-49	47,191	X	1	X	$.43	=	$ 20,292.13
50 and over	26,544	X	1	X	$.89	=	$ 23,624.16
	2,949,408						$563,100.56
					Loading		+ 8.00
							$563,108.56

Discount: 35% (1-.35 = .65)

Adjusted Premium = 563,108.56 X .65 = $366,020.53

$\frac{\$366,020.53}{2,949,408}$ = .124 = $.13 = monthly rate per $1,000 insurance

TABLE X

PREMIUM CALCULATION FOR 1970

ages	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	370,324	X	1	X	$.16	=	$ 59,251.84
20-24	1,353,316	X	1	X	$.18	=	$243,596.88
25-29	351,263	X	1	X	$.19	=	$ 66,739.97
30-34	228,729	X	1	X	$.18	=	$ 41,171.22
35-39	220,561	X	1	X	$.23	=	$ 50,729.03
40-44	114,365	X	1	X	$.33	=	$ 37,740.45
45-49	54,459	X	1	X	$.43	=	$ 23,417.37
50 and over	29,953	X	1	X	$.68	=	$ 20,368.04
	2,722,970						$543,014.80
					Loading		+ 8.00
							$543,022.80

Discount: 35% (1-.35 = .65)

Adjusted Premium = 543,022.80 X .65 = $352,964.82

$$\frac{\$352,964.82}{2,722,970} = .129 = \$.13 = \text{monthly rate per \$1000 insurance}$$

TABLE XI

PREMIUM CALCULATION FOR 1971

ages	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	369,284	X	1	X	$.19	=	$ 70,163.96
20-24	1,206,496	X	1	X	$.18	=	$217,169.28
25-29	336,402	X	1	X	$.18	=	$ 60,552.36
30-34	240,287	X	1	X	$.17	=	$ 40,848.79
35-39	220,053	X	1	X	$.22	=	$ 48,411.66
40-44	98,644	X	1	X	$.31	=	$ 30,579.64
45-49	37,940	X	1	X	$.41	=	$ 15,555.40
50 and over	20,235	X	1	X	$.62	=	$ 12,545.70
	2,529,341						$495,826.79
					Loading		+ 8.00
							$495,834.79

Discount: 35% (1 - .35 = .65)

Adjusted Premium = 495,834.79 X .65 = $322,292.61

$\frac{\$322,292.61}{2,529,341}$ = .127 = $.13 = montly rate per $1000 insurance

TABLE XII

PREMIUM CALCULATION FOR 1972

ages	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	351,035	X	1	X	$.20	=	$ 70,207.00
20-24	986,693	X	1	X	$.18	=	$117,604.74
25-29	365,266	X	1	X	$.17	=	$ 62,095.22
30-34	256,161	X	1	X	$.17	=	$ 43,547.37
35-39	244,302	X	1	X	$.21	=	$ 51,303.42
40-44	113,849	X	1	X	$.28	=	$ 31,877.72
45-49	35,578	X	1	X	$.38	=	$ 13,519.64
50 and over	18,975	X	1	X	$.55	=	$ 10,436.25
	2,371,859						$400,591.36
					Loading		+ 8.00
							$400,599.36

Discount: 35% (1 - .35 = .65)

Adjusted Premium = $400,599.36 X .65 = $260,389.58

$\frac{\$260,389.58}{2,371,859}$ = .109 = $.11 = montly rate per $1000 insurance

TABLE XIII

PREMIUM CALCULATION FOR 1975

ages	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	367,807	X	1	X	$.20	=	$ 73,561.40
20-24	811,339	X	1	X	$.17	=	$137,927.63
25-29	382,952	X	1	X	$.14	=	$ 53,613.28
30-34	244,483	X	1	X	$.13	=	$ 31,782.79
35-39	216,357	X	1	X	$.17	=	$ 36,780.69
40-44	97,361	X	1	X	$.22	=	$ 21,419.42
45-49	32,454	X	1	X	$.36	=	$ 11,683.44
50 and over	10,818	X	1	X	$.49	=	$ 5,300.82
	2,163,571						$372,069.47
					Loading		+ 8.00
							$372,077.47

Discount: 35% (1 - .35 = .65)

Adjusted Premium = $372,077.47 X .65 = $241,850.36

$$\frac{\$241,850.36}{2,163,571} = .112 = \$.12 = \text{montly rate per \$1000 insurance}$$

TABLE XIV

PREMIUM CALCULATION FOR 1976

ages	Participants		Insurance Amount (000)		Tabular Gross Premium		Total Cost
17-19	359,513	X	1	X	$.19	=	$ 68,307.47
20-24	791,784	X	1	X	$.17	=	$134,603.28
25-29	402,312	X	1	X	$.13	=	$ 52,300.56
30-34	241,815	X	1	X	$.12	=	$ 29,017.80
35-39	207,575	X	1	X	$.16	=	$ 33,212.00
40-44	96,298	X	1	X	$.22	=	$ 21,185.56
45-49	32,099	X	1	X	$.30	=	$ 9,629.70
50 and over	8,560	X	1	X	$.39	=	$ 3,338.40
	2,139,956						$351,594.77
						Loading	+ 8.00
							$351,602.77

Discount: 35% (1 - .35 = .65)

Adjusted Premium = 351,602.77 X .65 = $228,541.80

$\frac{\$228,541.80}{2,139,956}$ = $.106 = $.11 = monthly rate per $1000 insurance

TABLE XV

PREDICTED DEATH RATE VS ACTUAL DEATH RATE OF SGLI USING SER GMT

Year	Predicted	Actual
69	1.72	1.76
70	1.77	1.72
71	1.79	1.69
72	1.75	1.69
73	1.71	1.59
74	1.65	1.43
75	1.56	1.49
76	1.50	1.30
77	1.40	*

* data not available

TABLE XVI

MONTHLY PREMIUMS COMPARISONS

Year	15% Discount	Actual
1969	$.17	$.20
1970	$.17	$.20
1971	$.17	$.20
1972	$.15	$.20
1975	$.15	$.17
1976	$.14	$.17

VI. CONCLUSIONS AND RECOMMENDATIONS

The data presented in chapters IV and V of this thesis clearly suggest that the participants of SGLI have been overcharged for the service of group life insurance. An alternative mortality table was presented that could be used in the experience rating of SGLI. This mortality table seems to more accurately represent the expected claims of SGLI. However under present law new policies purchased by the Administrator of SGLI must be purchased using premium rates that do not reflect the expected claims of SGLI. Additionally some state laws and regulations, especially New York State, set lower limits on rates which may be charged for new group insurance policies. Any company licensed in states that have lower limits laws must comply with the laws nation-wide, and since insurance companies must be licensed in all 50 states, to be eligible to participate in SGLI, the laws and regulations apply to SGLI.

Three basic alternatives exist. First, change the laws to allow a proper rate to be charged SGLI when new policies are purchased. Second, self-insure. (In fact self-insurance would require a change of law.) Third, require the insurance companies (when renewing policies) to utilize an experience rating method that more accurately reflects the expected claims of SGLI.

The third alternative would appear to be the best because it allows the participants of SGLI to receive the insurance service at a "fair" price. However if the insurance companies are not willing to use a more representative experience rating method then alternative 1 seems preferable.

Alternative 1 would require much effort, the changing of laws (both state and federal) is a long and laborious task. But allowing insurance companies to set an initial rate that accurately reflects SGLI experience, would allow them to compete for the SGLI policy. The company or companies offering the service at the lowest price would receive the SGLI business.

Alternative 2 would require a change to Title 38 U.S. Code, allowing the Veterans Administration to self-insure, but if neither alternative three nor one is acceptable such a change is necessary.

Self-insurance can be viewed in many ways but for the purpose of this thesis it is the employer acting as an insurance company, receiving premiums from the employees and providing the insurance service. The primary reason for self-insurance is to reduce cost, which is usually accomplished by the reduction of expenses of the policy. The expenses of SGLI are extremely low (averaging about 3% of premiums) while the mortality cost are excessive. Self-insurance would allow the mortality charge to be representative of the cost.

The government, through the Veterans' Administration, could act as an insurance company. They could receive from the service members a premium, which would be deposited in the revolving fund, and pay the beneficiaries, from the revolving fund, the amount of insurance purchased. Any monies not used for administrative and risk cost could be invested to further reduce the cost of the premium.

Servicemen's Group Life Insurance has been in existence since 1965. These 13 years of existence have given the Veterans' Administration vast experience in the administration of the insurance program. At present, certificates of insurance are provided by the services and premiums are collected by the services. The payment of the insurance premiums are prescribed by law and have been functioning well for 13 years. These factors tend to support self-insurance for Servicemen's Group Life Insurance. However, since the insurance is provided to a segment of the federal government, which is supported by the civilian portion of the population, every effort should be expended to allow the insurance companies to provide the service, and thus, the profit from this service. This profit should not be excessive, however.

It is recommended that the Administrator use the generic method of experience rating presented in this thesis to accurately price SGLI.

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