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LONG-TERM CARE INSURANCE VALUATION METHODS

**SOCIETY OF ACTUARIES LONG-TERM CARE INSURANCE
VALUATION METHODS TASK FORCE¹**

EXECUTIVE SUMMARY

This final report is the culmination of the Society of Actuaries' response to the National Association of Insurance Commissioners (NAIC) 1991 request, and the general need felt, to develop valuation recommendations for long-term care (LTC) insurance. Specifically, the charge given the Task Force reads:

This Task Force will develop recommendations for the valuation of long-term care insurance products, incorporating, as appropriate, an interim method, available data, the valuation actuary concept, and methodologies suitable for the type of product being valued and its underwriting characteristics.

This Executive Summary reviews the recommendations given in the various sections of the report—they are provided here only as an abbreviated snapshot. The spirit of the valuation actuary and this final report, for this sometimes elusive and always complex product, can be served only by carefully considering these recommendations in the context in which they are presented in the various sections.

The valuation recommendations in this final report apply to individual (or quasi-individual) insurance products. They include individual, association group, and group in which the employee pays all or nearly all of the premium.

Two basic sets of tables are provided: one for institutional benefits (nursing home) and one for noninstitutional benefits (home health care). The valuation actuary should use each of these with judgment and should blend/combine them if the insurance policy has both types of benefits. This final report provides guidance to the valuation actuary on how to adjust and use both of the basic tables. The tables and guidance for their usage are presented in this final report as well as on the companion valuation diskette, which is available from the SOA office.

The LTC morbidity tables of Section II, Institutional Tables, and Section III, Noninstitutional Tables, are to be combined for policies with elements of both institutional and noninstitutional LTC insurance.

¹Task Force membership is given in Section XIX.

The valuation diskette provides guidance on the use of those basic tables. Areas in which assumptions are needed to be made are identified, and default assumptions are included to permit the programs to function while the valuation actuary considers the appropriate assumptions to make. This is described in Appendix D, Screens of Valuation Diskette with Users Manual, and Appendix E, Documentation of Valuation Diskette Program. The LTC valuation actuary will find it beneficial to become familiar with that valuation diskette.

Depending on the product being valued, the morbidity tables given in this report might have to be adjusted for such elements as product features, benefit triggers, spousal discount, geographic region, and various risk classes (Section IV, Application of Tables).

An appropriate mortality table is one piece of the overall termination assumption to be used in the valuation of LTC insurance (Section V, Mortality). Consideration was given to constructing a new mortality table by adding conservatism to the unloaded 1980 CSO mortality rates, which would be achieved by lowering them somewhat and extending the table beyond age 100. After making a number of attempts to construct such a modified table, we observed that the 1983 GAM table had characteristics very similar to those of the desired new table. The 1983 GAM table was chosen because it is an existing, recognized, publicly used table that has the appropriate characteristics.

It is appropriate to allow terminations in excess of mortality (Section VI, Voluntary Lapses). The proposed practice allows 80% of the voluntary lapse assumption used when the policy was filed and priced for state approval to market the product, not to exceed 8%. Lapse termination can be used in addition to the mortality decrement without limit on the combination.

Sound underwriting is critical to proper risk management of a block of LTC insurance (Section VII, Selection and Antiselection). At a minimum, reserves should be based on the morbidity tables prescribed without select adjustments. The valuation actuary should consider whether to include select morbidity adjustments used in pricing. However, in all cases selection factors should grade to an ultimate selection factor of at least 1.00 by duration 10.

Voluntary lapses will be more frequent on lower cost (healthier) individuals. As a result, voluntary lapses should be expected to increase claim costs per remaining individual. If lapses are included in the reserve calculation, the valuation actuary should recognize that lapses will have an impact on morbidity. The valuation diskette allows the valuation actuary to quantify the effect of assumed antiselective lapses.

Recognizing the time value of money is an important part of sound actuarial principles and commonly accepted *Actuarial Standards of Practice* (ASOP) (Section VIII, Interest Rate). The maximum allowable interest rate for active life reserves for LTC policies issued in a given year should be equal to the maximum allowable interest rate for calculating reserves for whole life insurance policies (with maturities 20 or more years after issue) issued in the same year. The maximum allowable interest rate for claim reserves incurred in a given year should be equal to the maximum allowable interest rate for calculating reserves for whole life insurance policies issued in the year of the claim.

Asset adequacy testing should be performed if the product is material to the insurer. Tests involving the sensitivity to declining interest rates are more important than disintermediation, unless significant nonforfeiture benefits payable in the form of cash are available.

Whether active life reserves should be calculated on the net level, one-year preliminary term or two-year preliminary term basis is of some considerable interest (Section IX, Method). Each method is used by insurers today, especially the two methods based on preliminary term. The Task Force believes that either the one-year or two-year preliminary term method can be an appropriate statutory reserve method. The method used should be tested by the valuation actuary and fit the circumstances. For pieces of additional coverage purchased periodically at attained age premiums, the reserve for such pieces should be calculated on the net level basis unless expenses for the purchased pieces are higher than normal renewal expenses.

It is important to understand the reserving implications of various nonforfeiture benefit options (Section X, Nonforfeiture Benefits). Actuaries should be very cautious about using intuition in trying to assess how to determine reserves for LTC nonforfeiture benefit options. Because of the variety and great number of possible nonforfeiture benefit forms, their amounts and patterns, and the developing nature and uncertainty of the subject, this final report does not prescribe precise applicability of its recommendations to this subject. Rather, it offers several components of possible reserves to be considered.

Unusual patterns of nonforfeiture benefits may cause reserves to be deficient if actual lapses and mortality do not follow assumptions. Testing for sensitivity to variations in mortality and lapses should be done when there is any doubt about reserve adequacy. The active life reserve should not be less than the net single premium for the nonforfeiture benefits at each policy duration.

Waiver of premium product features vary (Chapter XI, Premium Waiver). Waiver upon institutionalization is a common benefit in LTC insurance. Some policies also waive premiums if the insured is approved for home health care.

The approach used to compute active life reserves generally will determine which of two techniques should be employed to properly value waiver of premium benefits: (1) the active life reserve assumes future premiums are received from all in-force policies regardless of benefit status, or (2) the active life reserve omits premiums to be waived from the present value of future premiums. Note that the valuation diskette accompanying this final report assumes that no premiums are paid once under waiver due to claim status and therefore also does not include waived premiums as a benefit.

For claim reserves and those for reported claims:

- On nursing home (institutional) benefits, this recommendation uses the continuance tables based on utilization data from the 1985 National Nursing Home Survey (NNHS) as interpreted and developed by the Long-Term Care Experience Committee of the SOA (*TSA 1988-89-90 Reports*, 1992, pp. 101–164) (Section XII, Claim Reserves). Any generally accepted actuarial method can be used to calculate the liabilities, as long as the reserve aggregate exceeds the minimum.
- On home health care (noninstitutional) benefits, claims should be defined no more liberally than beginning on the first date of care after the elimination period and ending on the first date on which no covered home health care benefits have been received for the prior 14 days. For all home health care claims for which more than 180 days of service have been received, reserves should be set up on a case-by-case basis, with the reserve being the present value of future expected home health care benefits for each open claim. For open home health care claims for which less than 90 days of service has been received, reserves may be set up using any method in conformity with *ASOP No. 5*, "Incurred Health Claim Liabilities," and *ASOP No. 18*, "Long-Term Care Insurance."

Reserves for claims incurred but unreported can be established using any method in conformity with *ASOP No. 5*, "Incurred Health Claim Liabilities," and *ASOP No. 18*, "Long-Term Care Insurance."

Claim reserves are required to make good and sufficient provision for future expected claim payments on all claims that have been incurred prior to the valuation date. If such provision results in the need for reserves higher than the minimums described above, then such higher reserves should be held.

LTC insurance policies are issued, with very rare exceptions, on a guaranteed renewable basis. This, coupled with the structure of level premium by issue age for a benefit with substantially increasing claim costs by attained age, presents significant implications for LTC valuation requirements (Section XIII, Future Changes in Assumptions and Pricing). For existing business, the valuation actuary should consider whether changes in expected experience may indicate that current statutory reserves are no longer adequate on a gross premium valuation basis.

For GAAP purposes, original assumptions would be chosen by using the most likely realistic best estimates, with a provision for adverse deviation. Original GAAP assumptions would continue to be used unless a premium deficiency is recognized. When assumptions are adjusted corresponding to a change in premium scales, the effect should be prospective with no change in GAAP liability at the premium change date. If any change in reserve assumptions results in a material impact on the company financial statement, further disclosure in the annual report could be required.

For a product with so many varied features, so recently on the market, and evolving rapidly, there is increasing emphasis on upgrades, internal replacements, and other changes to existing business (Section XIV, Upgrades and Conversions). The pace of such changes to in-force business is expected to continue. When determining the proper level of reserves for the new policy resulting from an upgrade or a conversion, the valuation actuary must consider several elements. If the premiums under the new policy are not adequate to cover future claims and expenses, an initial reserve needs to be established, either from the reserves of the old policy or from surplus. Premiums under the old block of policies that do not upgrade or convert may not be adequate if only the best risks participate in the program. In such a case, reserves under the old block would have to be strengthened. In any event, appropriate gross premium valuation tests may be warranted.

There are several ASOPs under the auspices of the Actuarial Standards Board (ASB) that relate to the development and application of these proposals for LTC valuation (Section XV, Actuarial Standards of Practice). They are listed and their relevance to this final report is identified, for example:

- *ASOP No. 5*, "Incurred Health Claim Liabilities." Clearly, the standard applies fully to the valuation of LTC benefits. In fact, such benefits are directly referred to in the text of the standard.
- *ASOP No. 7*, "Performing Cash Flow Testing for Insurers." Cash flow testing would be useful if the assets purchased to back a stand-alone LTC policy do not produce future cash flows that closely match the

liability cash flows. Normally, in today's situation, it would appear that for LTC policies without surrender values, backed by reasonably well-matched assets, with reasonably predictable maturities, more simple sensitivity testing of the insurance risk assumptions would satisfy the standard.

- *ASOP No. 8*, "Regulatory Filings for Rates and Financial Projections for Health Plans." While LTC insurance is not specifically mentioned in the standard, it seems clear that it is directly included in the scope.
- *ASOP No. 10*, "Methods and Assumptions for Use in Stock Life Insurance Companies Financial Statements Prepared in Accordance with GAAP." Most LTC policies would be subject to *FAS 60* methodology, where the GAAP active life and claim reserves have a provision for adverse deviation and assumptions are "locked in" for the life of a policy, unless the loss recognition test is failed.
- *ASOP No. 11*, "The Treatment of Reinsurance Transactions in Life and Health Insurance Company Financial Statements." This standard applies fully to LTC coverage as it does to all health and life coverage.
- *ASOP No. 14*, "When To Do Cash Flow Testing for Life and Health Insurance Companies." Sensitivity and other testing for LTC insurance may be more useful for the C-2 (insurance) risk than cash flow testing for the C-3 (interest) risk.
- *ASOP No. 18*, "Long-Term Care Insurance." The last several pages provide sound basic instructions for valuing health insurance in general and LTC in particular. A revised and updated ASOP will be pursued beginning in late 1995, based in part on the content of this final report.

Currently, the Internal Revenue Code (IRC) has no specific language for LTC insurance (Section XVI, Tax Reserves). The basis is not clear and is fairly complex, as this final report summarizes. The basis for tax reserves may well be one of the areas in which significant change occurs soon.

The NAIC risk-based capital (RBC) formula gives instructions for the handling of LTC insurance related to the insurance risk (C-2) for health insurance but is silent elsewhere regarding LTC (Section XVII, Risk-Based Capital). Instructions for the treatment of LTC in the RBC formula provide little direct guidance. Until more is learned, the best course for developing RBC would be to apply the disability income factors to LTC earned premiums. In addition, the 5% of claim reserves component prescribed for all health insurance should apply to LTC.

With respect to deficiency reserves, the LTC valuation actuary should give appropriate consideration to the nature of the premium guarantees, other

policy provisions constraining premium rate changes, premium rate regulations, the impact of premium rate changes on policy lapsation, and the level of benefit utilization of persisting policies (Section XVIII, Reserve Adequacy). For the valuation actuary to provide a clean opinion, the reserves held should not only satisfy the formulas and assumptions required by law but also, at a high probability level when combined with future expected premiums, be able to provide all benefits and expenses expected to be paid under the policies. The valuation actuary must ensure that reserves are adequate within the provisions of the LTC policies being valued and the environment within which that is done. Deviation from well-established or soundly emerging practices and standards should take place only when that deviation is necessary for the valuation actuary to be responsible in valuing LTC insurance. This means the LTC valuation actuary must become familiar with the current relevant environment, both within and outside of the actuarial profession.

A discussion in Appendix A, Product Features, highlights many of the features that must be considered for valuation, among the many that vary with this insurance product.

Appendix B, Mighty Fine Insurance Company: A Case Study, illustrates the thinking the valuation actuary should pursue in applying the recommendations of this final report and its companion valuation diskette to a specific LTC plan. It also serves to describe the default set of assumptions and resulting output, which are compared with illustrative variants in Appendix C, Input/Output of Some Cases Tested.

Appendix D, Screens of Diskette with Users Manual, and Appendix E, Documentation of Diskette Program, give assistance to the valuation actuary using the valuation diskette as a companion to this final report.

Appendix F, Current NAIC Models, gives the current valuation provisions for LTC insurance adopted by the NAIC.

I. INTRODUCTION

This final report of the Society of Actuaries Long-Term Care Insurance Valuation Methods Task Force presents the valuation recommendations for this product, as defined herein, to members of the actuarial profession, insurance regulators, and other interested parties.

A. The Charge

The NAIC requested the SOA to address the valuation needs for long-term care (LTC) insurance in a December 19, 1990 letter from John Montgomery, then Chair of the NAIC Life and Health Actuarial Task Force. The letter stated, in part, as follows:

The NAIC Life and Health Actuarial Task Force requests that an appropriate committee of the Society of Actuaries undertake the following projects:

1. Develop a morbidity table, suitable for statutory valuation purposes, for long-term [sic] insurance. The valuation table should address the variety of product designs and "gatekeeper" mechanisms that exist in the market today.
2. Develop a mortality table. ...

As a result of that request, this Task Force was formed in the summer of 1991. Its charge reads as follows:

This Task Force will develop recommendations for the valuation of long-term care insurance products, incorporating, as appropriate, an interim method, available data, the valuation actuary concept, and methodologies suitable for the type of product being valued and its underwriting characteristics.

B. United States Only

It is important to note this final report addresses the valuation actuary's environment only in the U.S.

C. The NAIC

From the very beginning it has been clear that one of the most important stakeholder groups for this venture is LTC insurance regulators. The regulators take somewhat diverse views in their several states on certain features of LTC insurance (for example, benefits to be provided, benefit triggers, and nonforfeiture benefits). However, they can be thought of, for the purpose of this final report, as the NAIC. The extent to which the NAIC may choose to adopt these valuation recommendations, and the timing of doing so, are of course beyond the purview of this Task Force. Even less certain is how these recommendations will play into those actually applied by the various states. The Task Force, or succeeding remnants thereof, stand ready to assist

in those efforts, especially the interpretation and understanding of these recommendations, if requested.

The full relevant quotations from the current existing NAIC models are found in Appendix F.

It is clear that, to date, LTC insurance has been retrofitted for valuation purposes into a model regulation that generally does not apply to level premium (albeit guaranteed renewable) contracts with substantial prefunding and no available insured claim experience. There clearly is a regulatory need that the actuarial profession should address. This final report attempts to meet that need.

D. Products Addressed

The Task Force defined the LTC insurance products that it should address. The resulting definition, determined at the beginning of the Task Force's deliberations, remained through the preparation of this final report. The definition is specifically confined to stand-alone products but still covers the vast majority of LTC insurance products marketed.

1. Stand-Alone Long-Term Care Products

a. Individual (or Quasi-Individual) Products

It is clear that reserve standards for these coverages appropriately would be contained in any health valuation law or regulation. Available insured claim data, such as they are, are almost entirely from these products. Any methodologies developed for individual products may or may not be appropriate for other types of products. The valuation recommendations in this final report apply to these individual (or quasi-individual) insurance products. They include the following.

- ***Individual.*** Though there is substantial variation of product design (see Appendix A), these products all exist to pay benefits for LTC. Some pay benefits only for nursing home (institutional) stays; some pay only for home health care visits or other community services (noninstitutional); and some pay for both. Some pay regardless of whether LTC services are being provided from paid providers; most require paid services. These products are all individually underwritten, though the extent of underwriting varies considerably. Because of the sharply rising claim costs by attained age, any of these products will require policy reserves unless the premium structure is attained age (annual renewable term).

- *Association Group*. These products are very similar to individual LTC products. The association group contract is usually filed in one state, and certificates are issued much like individual contracts, perhaps in multiple states. The insured usually pays for the coverage from personal funds. Employment relationship or organization membership often is not required to be eligible for coverage. Reserve requirements should be the same as those for otherwise similar individual products.
- *Group (Employee Pays All)*. These products are also similar to individual LTC products. They are marketed most commonly to employee groups. Often spouses, parents, and other close relatives of the employee are also eligible for coverage. Premiums are usually level and based on issue age. After issue the coverage usually does not depend on continued employment. The extent of underwriting varies, even within a group, such as between employees and other covered lives; evidence of insurability is almost always required for nonemployees and may also be required for employees, because participation tends to be low. Reserve requirements should be the same as those for otherwise similar individual products.

b. True Group Products (Employer Pays a Substantial Portion of Premium)

This coverage would be true group insurance, in which full or nearly full participation is achieved because the employer pays much, even all, of the cost. There is little or no underwriting. The insured usually needs to stay with the employer to participate. Premiums tend to be based on annual cost of insurance. Pension-type funding and valuation would seem appropriate. This product was a low priority for the Task Force, because these products are not likely to develop very far without at least clarification of their tax status. They are not included in these valuation recommendations, though many elements appropriately could be applied.

2. Long-Term Care Riders on Life Insurance Products

These riders can be attached to life insurance products at issue or extended to in-force contracts. They grant the right to receive an LTC benefit.

- *Riders in Which the LTC Benefit Does Not Reduce the Death Benefit*. These riders provide an LTC benefit that is not integrated with the death benefit, and the premium is also separable. Thus, for reserve purposes these riders are independent of the base policy and are substantially similar to stand-alone products; methodologies developed for stand-alone

LTC products are likely to be transferrable to these products. The valuation recommendations of this final report should apply.

- *Riders in Which the LTC Benefit Reduces the Death Benefit and/or Cash Surrender Value.* These riders essentially begin payment of the death benefit while the insured is still alive. Usually nursing home (institutional) confinement is required for benefit eligibility. Typically the payment is 1%–2% per month of the original death benefit. Commonly, the death benefit is reduced by the LTC benefits received. The cost for the rider can vary from zero (when the LTC benefit is essentially a loan against the life insurance contract) to a significant amount (when there is substantial additional benefit). In some cases the reserve impact is minor, and in others the LTC benefit needs to be an integral part of the total reserve calculations (when the two benefits are significantly integrated). Developing reserve recommendations for these products is important, but it should be done by the actuarial profession after the stand-alone products addressed by this final report have been taken care of.

3. Long-Term Care Options on Annuity Products

These products provide additional annuity income benefits when LTC is received or provide LTC benefits packaged with an annuity. Because LTC benefits combined with annuities are not yet common in the market and because they raise unique complexities, they are not addressed by this final report.

4. Long-Term Care Insurability Guarantees Attached to Other Products

These provisions allow issue of an LTC product in the future without evidence of insurability. The feature may or may not have a separate premium. The reserve would simply be an accumulation for the inherent anti-selection. These provisions were not addressed by the Task Force.

E. General Valuation Approach

The following points summarize the basic characteristics of the valuation approach that is described in this final report.

- The work of the LTC valuation actuary must be consistent with the profession's general valuation actuary concepts. Any tables provided must be used with considerable judgment.
- Because of the many significant variations in products—how they are marketed, underwritten, and upgraded, and their claims adjudicated—it

is not possible to derive an adequate number of tables that can or should be applied simply by selecting from such a catalog.

- The practicing LTC valuation actuary, nonetheless, needs to be practical. True, the variations in certain product features (for example, benefit triggers) or underwriting standards (which are extremely important to LTC insurance) can have a direct and significant impact on LTC insurance risks. However, to some extent, that is also true for risks inherent in other products such as life insurance.
- Two basic sets of tables are provided: one for institutional benefits (nursing home) and one for noninstitutional benefits (home health care). The valuation actuary is to use each of these with judgment and should blend/combine them if the insurance policy has both types of benefits. This final report provides guidance to the valuation actuary on how to adjust and use both of the basic sets of tables.
- The tables and guidance for their usage are found in this final report as well as on the companion valuation diskette, available from the SOA office. This is much like the approach taken for disability income valuation, with the CIDA (Commissioners' Individual Disability Tables A) adopted in 1985 (*TSA*, Vol. XXXVII, pp. 449–601) and CGDT (Commissioners' Group Disability Tables) adopted in 1987 (*TSA*, Vol. XXXIX, pp. 393–458).

F. The Valuation Diskette

The diskette does not contain the actual set of recommendations the valuation actuary should follow (this final report does). Rather, the valuation diskette provides a useful tool for applying the guidance found herein, and it contains the morbidity tables the valuation actuary should employ as the underlying basis.

The use of the valuation diskette is fully described in Appendix D, and its programs are documented in Appendix E.

The valuation diskette contains the following features:

- It provides, as output, net premiums and reserves by issue age and duration for a chosen base policy.
- The valuation diskette permits use of net level, one-year preliminary term (1YPT) and two-year preliminary term (2YPT) valuation methods.
- The valuation diskette uses mortality, lapse, and interest rates, as described in other sections, with the ability for the user to vary those assumptions.

- It allows the user to make assumptions about: selection at issue and antiselection at lapse; inflation protection; daily benefit amounts; non-forfeiture benefits; length of the premium paying period; and mix by sex. These are fully documented in the appendixes of this final report.

The default assumptions are contained in the valuation diskette so that its programs will function as the valuation actuary explores what should be used. The insurer's tools are not intended to be supplanted by this tool. Rather, the valuation actuary may choose to develop tools other than this referenced companion valuation diskette or the insurer's current tools or to modify existing ones; information is provided to assist that process, if desired.

G. The Mighty Fine Insurance Company

This is described in Appendix B. The valuation actuary will find that this is helpful background for understanding the use of the valuation diskette and its default case.

II. INSTITUTIONAL TABLES

A. LTC Morbidity Data

As is generally known, there is very little LTC insured data upon which to base pricing or reserving of this product. Almost all data are from public sources (surveys, Medicare, state programs, etc.)—some from outside the U.S.—but most data that are particularly relevant are from within the U.S.

The SOA has pursued two activities to help address this problem:

- Since 1986 the SOA LTC Experience Task Force (now Committee) has pursued an intercompany study of LTC experience; this study is being made public for the first time in early 1995. Contributions from 10 companies covered exposure years 1984–91. Virtually no data for noninstitutional coverage were contributed. This Committee also has been pursuing other data sources.
- In 1991, in the *1988-89-90 TSA Reports* the SOA published an article on the 1985 National Nursing Home Survey (NNHS) Utilization Data (principal authors: John Wilkin, Gordon Trapnell, and Holen Chang), under the auspices of the SOA LTC Experience Committee. This 1985 NNHS is the principal data source used by actuaries for measuring nursing home (institutional) benefits. It serves as the basis of this final report's recommendations for nursing home claim costs.

In general, the difficulty in gathering and developing useful LTC morbidity data flows from three characteristics of the product:

- Only in recent years has it been marketed in any volume, so relatively little experience exists.
- The product has changed considerably in the last few years, in ways that have significant impact on claims—actual and anticipated.
- Little is known about future results due to antiselection, effects of lapsation, changes in underwriting awareness and claim adjudication, policy definitions (for example, activities of daily living), medical advances (for example, Alzheimer's), and other environmental impacts.

The insured claim data for institutional benefits are quite uncertain. They are even more uncertain for noninstitutional benefits.

B. Overview

The institutional tables are on the valuation diskette, as described in the appendixes of this final report. Examples from the tables are shown in this section. The valuation diskette provides continuance tables, which can be used appropriately by elimination period and maximum benefit period, in either days and years or in dollars.

The institutional tables are based on the 1985 NNHS, as interpreted and developed further in the *1988-89-90 TSA Reports*. The reader is referred to that source if additional details about the data are needed.

C. Standard Table and Adjustments

The reserves for institutional care are based on utilization data from the 1985 NNHS as interpreted and developed by the SOA LTC Experience Committee. In particular, this final report uses the rates from the *Reports* article for insurable stays, using the benefit period concept as explained therein. This concept combines nursing home stays that are interrupted by a hospital stay or transfers between nursing homes. The admission rates are from Tables 1 and 2 in the *Reports* article (for males and females, respectively), while the continuance table is from Table 17 in that report. (While the tables presented in this section correspond to the "insurable stays" basis described in the *Reports* article, both the "insurable stays" and "all stays" tables, both using the benefit period concept, are available for use with the valuation diskette. Case 11 of Appendix C demonstrates the impact of utilizing "all stays.")

As mentioned in that article, the SOA LTC Experience Committee did not develop these utilization rates from the point of view of a valuation actuary

attempting to produce rates directly appropriate for the reserving of LTC insurance products. This Task Force believes, however, that the utilization rates from the 1985 NNHS are not too dissimilar from insured experience, although somewhat conservative. The degree of conservatism depends on many factors, including the strictness of the LTC product's underwriting criteria and benefit triggers. Some conservatism of course is considered appropriate for the purpose of establishing statutory reserves.

In addition, the Task Force has anticipated that the valuation actuary may wish to modify the utilization rates from the NNHS. Therefore, the companion valuation diskette produced by the Task Force contains a factor that multiplies each of the admission rates from the 1985 NNHS. The choice of the factor to be used in valuation is the responsibility of the valuation actuary. Considerations in this choice include the following:

- The 1985 NNHS is based on the general population instead of an insured population, although an attempt was made in the *Reports* to adjust the 1985 NNHS experience to be more applicable to an insured population.
- The environment in 1985 was one of very little insurance, so that nearly all nursing home residents had to pay for their care out-of-pocket or through Medicaid after depletion of nearly all their assets.
- In 1985, many states limited their nursing home bed supply in an effort to hold down Medicaid costs, yet individuals with private insurance might not have been as restricted in their access to nursing homes as the controls on the overall supply would suggest.
- The effects of selection at underwriting and antiselection at lapse (as discussed in Section VII) must be considered. The valuation diskette provides factors for both of these effects.
- The effects of product features (as discussed in Section IV and in Appendix A) must be considered.
- The 1985 NNHS admission rates do not reflect the effect of benefit triggers, such as activities of daily living (ADL), cognitive impairment (CI), or medical necessity.
- The effects of various premium classifications must be considered.

D. Method of Application of Rates

1. Admission Rates

There are two main considerations in applying the nursing home admission rates to calculate reserves: the exposure and the sex mix.

a. Exposure

The admission rates as published in the *Reports* were derived by dividing admissions by the noninstitutionalized population. Therefore, to be consistent, the admission rates to be used by the valuation actuary should be applied to an exposure calculated as the total number of policies in force less the number of policies for those residents in nursing homes. The valuation diskette applies the admission rates derived from Tables 1 and 2 in the *Reports* article to an estimate of this exposure, in order to calculate admissions in each policy year. That estimated exposure relies on the number of nursing home residents at the beginning of each policy year being estimated from the number of prior admissions and the probability of those admissions being still resident. Those probabilities of still being resident were obtained from continuance Table 11 in the *Reports* article.

Note that the continuance table used for estimating the number of nursing home residents is the "proportion of admissions still resident" table (which can be thought of as a "person" table, because it shows the distribution of persons by length of stay) as opposed to the "proportion of days after" table (which can be thought of as a "days" table, because it shows the distribution of days by length of stay). The estimate of the number of nursing home residents affects only the exposure and has a relatively minor effect on the reserve calculation.

The valuation diskette that is a companion to this final report uses a continuance function as an approximation to the actual person continuance Table 11 from the *Reports* article. The functional form is based on that presented in the 1959 *Transactions* article "Continuance Functions" by E. Paul Barnhart (Vol. XI, p. 649). The Barnhart function uses duration of stay as the only parameter; this was modified slightly in order to take into account that lengths of stay generally become shorter with higher admission ages. Table 1 compares the actual continuance table from the *Reports* article with the approximations derived by the continuance function approach, for admission ages 75–84 as an example. The table approach would more accurately model the effect of the elimination period and the maximum benefit amount, but results shown in Table 1 demonstrate the reasonableness of using the function approach.

b. Sex Mix

Even though LTC policies usually are priced on a unisex basis, nursing home admission rates vary significantly by sex. Therefore, the Task Force

TABLE I
 COMPARISON OF PROPORTION OF ADMISSIONS STILL RESIDENT
 AT THE END OF THE PERIOD SHOWN
 ADMISSION AGES 75-84; INSURABLE STAYS; BENEFIT PERIOD CONCEPT;
 ADJUSTED TO MATCH THE 1985 NNHS RESIDENTS

Days from Admission (t)	Table 11 from 1988-89-90 Reports	Function = Formula Estimation	Function Less Table
0	1.0000	1.0000	0.0000
10	0.9212	0.9243	0.0031
20	0.8441	0.8485	0.0044
30	0.7728	0.7728	0.0000
60	0.6633	0.7102	0.0469
90	0.5858	0.6553	0.0695
121	0.5298	0.6052	0.0754
182	0.4570	0.5227	0.0657
365	0.3581	0.3581	0.0000
730	0.2497	0.2009	-0.0488
1095	0.1710	0.1292	-0.0418
1460	0.1185	0.0900	-0.0285
1825	0.0791	0.0661	-0.0130
2190	0.0504	0.0504	0.0000
2555	0.0306	0.0395	0.0089
2920	0.0179	0.0316	0.0137
3285	0.0103	0.0256	0.0153
3650	0.0059	0.0211	0.0152

thought it appropriate that the valuation actuary use sex-distinct tables to calculate reserves. However, unisex tables may be determined based on the sex mix at issue for each of the policies to be valued. If the sex mix is not known, the Task Force suggests that the mix be assumed to be 60% female and 40% male.

See test Cases 1 and 2 in Appendix C for the impact of differing assumptions about sex.

For unisex tables, the valuation diskette allows the valuation actuary to enter the proportion of policies sold that are female. From this proportion, a unique unisex table is created for each issue age. (The valuation actuary may choose to make sex-distinct tables by using factors of 0%/100% for female/male, or vice versa.) The valuation diskette first calculates a unisex mortality table by calculating the " l_x " for each age from issue until the end of life, separately for males and females. The radix for females is equal to 100,000 times the proportion female, while the radix for males is 100,000 less the female radix. The unisex " l_x " is calculated at each age as the sum

of the sex-distinct l_x 's, and then unisex mortality rates are calculated based on the ratio of succeeding unisex l_x 's. Finally, unisex admission rates are calculated by weighing the sex-specific admission rates at each age by the l_x 's. This results in a gradually increasing percentage female.

The admission rates and average lengths of stay used by the Task Force are shown in Table 2.

TABLE 2
ADMISSION RATE AND AVERAGE LENGTH OF STAY (ALOS)

Age	Males		Females	
	Admission Rate (%)	ALOS (Days)	Admission Rate (%)	ALOS (Days)
30	0.01	830	0.01	1,098
31	0.01	828	0.01	1,101
32	0.01	825	0.01	1,105
33	0.01	822	0.01	1,109
34	0.01	818	0.01	1,114
35	0.01	813	0.01	1,120
36	0.01	807	0.01	1,125
37	0.01	800	0.01	1,132
38	0.02	793	0.02	1,138
39	0.02	785	0.02	1,144
40	0.03	776	0.02	1,150
41	0.05	767	0.02	1,156
42	0.06	757	0.03	1,162
43	0.08	748	0.03	1,166
44	0.10	738	0.03	1,170
45	0.12	729	0.03	1,172
46	0.14	720	0.04	1,172
47	0.14	712	0.04	1,171
48	0.14	705	0.04	1,167
49	0.13	699	0.05	1,162
50	0.13	693	0.05	1,153
51	0.12	689	0.06	1,143
52	0.12	685	0.07	1,129
53	0.13	681	0.07	1,113
54	0.14	678	0.08	1,094
55	0.16	674	0.09	1,073
56	0.18	670	0.10	1,049
57	0.20	666	0.11	1,024
58	0.22	660	0.13	996
59	0.23	653	0.15	966
60	0.24	644	0.18	936
61	0.26	634	0.22	904
62	0.27	622	0.27	872
63	0.28	608	0.34	839
64	0.30	593	0.42	808

TABLE 2—Continued

Age	Males		Females	
	Admission Rate (%)	ALOS (Days)	Admission Rate (%)	ALOS (Days)
65	0.32	577	0.51	778
66	0.36	561	0.61	750
67	0.43	543	0.72	725
68	0.52	525	0.83	703
69	0.65	507	0.95	684
70	0.82	489	1.07	669
71	1.03	471	1.21	656
72	1.28	453	1.36	646
73	1.57	436	1.56	639
74	1.89	419	1.81	633
75	2.24	404	2.13	628
76	2.60	390	2.53	624
77	2.99	378	3.02	621
78	3.39	369	3.59	618
79	3.82	361	4.24	615
80	4.29	356	4.97	612
81	4.80	353	5.78	609
82	5.36	352	6.65	604
83	6.00	352	7.58	599
84	6.73	353	8.56	594
85	7.57	355	9.58	588
86	8.52	356	10.63	583
87	9.60	358	11.70	577
88	10.81	358	12.76	571
89	12.16	357	13.80	566
90	13.67	355	14.82	561
91	15.33	352	15.80	556
92	17.17	346	16.73	550
93	19.19	339	17.62	544
94	21.39	331	18.46	538
95	23.80	321	19.26	532
96	26.41	309	20.03	525
97	29.23	296	20.78	518
98	32.27	281	21.51	510
99	35.52	265	22.24	503
100	38.99	249	22.97	496
101	42.67	230	23.73	488
102	46.57	211	24.52	481
103	50.69	191	25.34	473
104	55.02	169	26.20	466
105	59.57	150	27.10	458
106	64.34	150	28.05	450
107	69.32	150	20.04	443
108	74.52	150	30.07	435
109	79.93	150	31.15	427
110	84.95	150	32.37	419

The Task Force notes that the admission rate for males crosses from below the female rate for ages 91 and younger to above the female rate for ages 92 and older. In addition, the male rates attain a rather high level after age 100. The Task Force tested the sensitivity of using unisex admission rates after age 91. The resulting reserves, assuming 60% female sales, were greater than those under the published admission rates, but by only a fraction of 1% for reserves at attained ages less than 95. Therefore, it was decided to use the published admission rates as the recommendation.

2. Continuance Table

The average length of stay (ALOS) is equal to the average number of days in a total stay, per admission. However, not all those days would generate a benefit payment because of the elimination period and maximum benefit period. In theory, using the "days" continuance table in order to estimate the proportion of a total stay that will fall within the benefit period (that is, after the elimination period and before the lifetime maximum) is relatively straightforward. There are a few decisions, however, that must be made in the detailed use of the table. These include the methods of interpolation between the discrete points in the table and the sex mix. The continuance table contains a set of probabilities for each sex separately for specific thresholds by age group. The valuation diskette does a two-way linear interpolation between age groups and thresholds. It is assumed that the continuance table for each age group represents the mid-age of the group. After the proportion of days within the maximum benefit period have been determined, these proportions are applied to the average length of stay in order to determine the average number of days per admission for which benefits are paid.

In order to handle the sex mix, a unisex continuance table is calculated from the sex-distinct tables in a manner similar to that used for calculating the unisex mortality table. The distributions of days for a cohort of male admissions and a cohort of female admissions are calculated separately and then combined in proportion to the sex distribution of the admissions, to create a unisex distribution. The continuance tables recommended by the Task Force are shown in Table 3, for males, and in Table 4, for females.

TABLE 3

PROPORTION OF DAYS AFTER THE PERIOD SHOWN; FOR MALES; INSURABLE STAYS;
BENEFIT PERIOD CONCEPT; ADJUSTED TO MATCH THE 1985 NNHS RESIDENTS

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	0.9878	0.9844	0.9839	0.9786	0.9707	0.9711	0.9590
20	0.9773	0.9713	0.9705	0.9607	0.9470	0.9480	0.9243
30	0.9672	0.9589	0.9580	0.9442	0.9253	0.9270	0.8926
60	0.9396	0.9245	0.9243	0.9003	0.8689	0.8703	0.8092
90	0.9156	0.8949	0.8949	0.8626	0.8210	0.8208	0.7433
121	0.8937	0.8675	0.8678	0.8283	0.7776	0.7753	0.6878
151	0.8746	0.8432	0.8438	0.7985	0.7400	0.7357	0.6429
182	0.8565	0.8195	0.8208	0.7701	0.7044	0.6983	0.6033
212	0.8401	0.7976	0.7999	0.7444	0.6724	0.6648	0.5698
243	0.8242	0.7757	0.7795	0.7192	0.6413	0.6326	0.5391
273	0.8095	0.7551	0.7607	0.6959	0.6128	0.6032	0.5124
304	0.7949	0.7343	0.7420	0.6727	0.5848	0.5745	0.4872
334	0.7813	0.7147	0.7248	0.6509	0.5589	0.5480	0.4647
365	0.7678	0.6949	0.7077	0.6291	0.5333	0.5218	0.4430
547	0.6971	0.5925	0.6210	0.5134	0.4039	0.3856	0.3345
730	0.6395	0.5166	0.5530	0.4189	0.3044	0.2741	0.2393
912	0.5897	0.4583	0.4935	0.3408	0.2314	0.1906	0.1591
1095	0.5420	0.4063	0.4359	0.2721	0.1793	0.1328	0.1098
1277	0.4951	0.3609	0.3839	0.2148	0.1415	0.0931	0.0838
1460	0.4480	0.3209	0.3406	0.1683	0.1117	0.0640	0.0652
1642	0.4012	0.2829	0.3025	0.1290	0.0885	0.0427	0.0481
1825	0.3544	0.2490	0.2653	0.0941	0.0704	0.0269	0.0314
2190	0.2710	0.1988	0.2000	0.0474	0.0432	0.0069	0.0124
2555	0.2056	0.1561	0.1498	0.0245	0.0256	0.0006	0.0076
2920	0.1543	0.1204	0.1107	0.0131	0.0148	0.0000	0.0054
3285	0.1143	0.0914	0.0803	0.0073	0.0084	0.0000	0.0040
3650	0.0834	0.0682	0.0569	0.0042	0.0048	0.0000	0.0031
4015	0.0598	0.0502	0.0391	0.0026	0.0027	0.0000	0.0023
4380	0.0421	0.0364	0.0259	0.0016	0.0016	0.0000	0.0017
4745	0.0292	0.0261	0.0166	0.0011	0.0009	0.0000	0.0012
5110	0.0199	0.0185	0.0102	0.0007	0.0006	0.0000	0.0007
5475	0.0134	0.0131	0.0062	0.0005	0.0004	0.0000	0.0003
5840	0.0091	0.0092	0.0037	0.0003	0.0002	0.0000	0.0000
6205	0.0061	0.0064	0.0022	0.0002	0.0001	0.0000	0.0000
6570	0.0040	0.0045	0.0013	0.0001	0.0001	0.0000	0.0000
6935	0.0027	0.0030	0.0008	0.0001	0.0000	0.0000	0.0000
7300	0.0017	0.0020	0.0005	0.0001	0.0000	0.0000	0.0000
7665	0.0011	0.0013	0.0003	0.0000	0.0000	0.0000	0.0000
8030	0.0006	0.0008	0.0001	0.0000	0.0000	0.0000	0.0000
8395	0.0003	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000
8760	0.0001	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
9125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALOS	820	667	669	488	355	361	258

TABLE 4

PROPORTION OF DAYS AFTER THE PERIOD SHOWN; FOR FEMALES; INSURABLE STAYS;
BENEFIT PERIOD CONCEPT; ADJUSTED TO MATCH THE 1985 NNHS RESIDENTS

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	0.9905	0.9908	0.9889	0.9840	0.9826	0.9813	0.9789
20	0.9829	0.9828	0.9797	0.9706	0.9680	0.9657	0.9610
30	0.9758	0.9754	0.9711	0.9584	0.9546	0.9511	0.9441
60	0.9554	0.9556	0.9474	0.9257	0.9184	0.9115	0.8968
90	0.9356	0.9390	0.9268	0.8974	0.8865	0.8768	0.8538
121	0.9156	0.9238	0.9078	0.8714	0.8568	0.8445	0.8131
151	0.8968	0.9105	0.8908	0.8483	0.8303	0.8158	0.7770
182	0.8778	0.8974	0.8742	0.8259	0.8048	0.7879	0.7428
212	0.8598	0.8854	0.8589	0.8054	0.7814	0.7622	0.7121
243	0.8417	0.8733	0.8436	0.7849	0.7583	0.7368	0.6827
273	0.8245	0.8619	0.8292	0.7656	0.7369	0.7130	0.6561
304	0.8072	0.8504	0.8145	0.7462	0.7154	0.6892	0.6304
334	0.7908	0.8393	0.8006	0.7278	0.6953	0.6667	0.6069
365	0.7743	0.8281	0.7865	0.7091	0.6751	0.6441	0.5840
547	0.6841	0.7667	0.7098	0.6070	0.5665	0.5231	0.4710
730	0.5988	0.7166	0.6436	0.5199	0.4722	0.4210	0.3826
912	0.5206	0.6739	0.5862	0.4494	0.3908	0.3364	0.3119
1095	0.4580	0.6330	0.5358	0.3901	0.3200	0.2644	0.2540
1277	0.4068	0.5934	0.4906	0.3389	0.2601	0.2041	0.2068
1460	0.3587	0.5570	0.4470	0.2934	0.2091	0.1553	0.1676
1642	0.3164	0.5234	0.4047	0.2531	0.1665	0.1179	0.1335
1825	0.2833	0.4903	0.3627	0.2160	0.1313	0.0877	0.1032
2190	0.2290	0.4281	0.2906	0.1550	0.0795	0.0428	0.0554
2555	0.1813	0.3738	0.2380	0.1121	0.0474	0.0176	0.0217
2920	0.1400	0.3276	0.1986	0.0821	0.0283	0.0062	0.0049
3285	0.1050	0.2889	0.1684	0.0612	0.0172	0.0019	0.0004
3650	0.0759	0.2565	0.1446	0.0464	0.0109	0.0006	0.0000
4015	0.0527	0.2290	0.1254	0.0359	0.0072	0.0002	0.0000
4380	0.0350	0.2051	0.1095	0.0282	0.0050	0.0001	0.0000
4745	0.0221	0.1836	0.0958	0.0224	0.0036	0.0001	0.0000
5110	0.0134	0.1637	0.0838	0.0180	0.0026	0.0000	0.0000
5475	0.0079	0.1449	0.0728	0.0144	0.0019	0.0000	0.0000
5840	0.0047	0.1270	0.0626	0.0114	0.0014	0.0000	0.0000
6205	0.0027	0.1099	0.0533	0.0090	0.0011	0.0000	0.0000
6570	0.0016	0.0937	0.0446	0.0070	0.0008	0.0000	0.0000
6935	0.0009	0.0783	0.0366	0.0053	0.0005	0.0000	0.0000
7300	0.0005	0.0636	0.0293	0.0039	0.0004	0.0000	0.0000
7665	0.0003	0.0496	0.0225	0.0028	0.0003	0.0000	0.0000
8030	0.0002	0.0363	0.0162	0.0019	0.0002	0.0000	0.0000
8395	0.0001	0.0236	0.0103	0.0011	0.0001	0.0000	0.0000
8760	0.0000	0.0115	0.0050	0.0005	0.0000	0.0000	0.0000
9125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ALOS	1107	1186	959	664	614	565	497

III. NONINSTITUTIONAL TABLE²

The limitations on LTC data in general and institutional data in particular, as expressed in Section II, apply even more strongly to noninstitutional data. Because of the absence of any publicly available noninstitutional data useful for valuation, this Task Force has undertaken a study of the 1982–84 National Long-Term Care Surveys (NLTCs). The results are prescribed here for valuation.

Proper valuation of noninstitutional benefits relies heavily upon the principles of the valuation actuary concept. Use of the tables presented in this chapter requires that valuation actuaries make explicit their aggregate assessment of the impact of such items as benefit triggers, underwriting standards, and claim administration practices. The section begins with a brief description of the data source and the methodology used to construct the tables. Next, the table values are presented and discussed. Finally, consideration is given to proper use of the tables.

A. Data Source: The National LTC Survey (NLTCs)

The NLTCs is a longitudinal survey of a random sample of Medicare enrollees exhibiting chronic ADL or instrumental activity of daily living (IADL) impairment. Screening interviews of 36,000 randomly selected Medicare enrollees in 1982 identified 6,393 community residents and 1,992 institutional residents with such impairments. Detailed interviews were obtained from 6,088 disabled community residents, while institutional residents were not questioned further. Follow-up surveys in 1984 and 1989 rescreened the surviving 1982 population, screened additional new Medicare enrollees, and conducted detailed interviews with both disabled community and institutional residents. The 1984 follow-up survey produced 5,934 community and 1,728 institutional questionnaires. The 1989 follow-up survey produced 4,463 community and 1,354 institutional questionnaires. Public use files containing the NLTCs screening and detailed interview results were used in the construction of the noninstitutional LTC tables of this section.

Unfortunately, the initial release of the 1989 NLTCs data was unusable, because there was no distinction between individuals screened out by reason of death and individuals screened out due to lack of chronic ADL/IADL impairment. A recent re-release of the 1989 survey results may provide this

²Much of the material of this section is based upon research conducted by Jim Robinson and funded, in part, by an award from the National Science Foundation (No. 9110891).

information. Rather than incorporate the revised information and further delay this final report, the Task Force constructed the noninstitutional table from the 1982 and 1984 survey responses alone.

The SOA LTC Experience Committee is currently analyzing insured data and the NLTCs data, including the revised 1989 survey results. Again, rather than wait for the Experience Committee's report, the Task Force decided to present its work without further delay.

Careful consideration should be given to whether the tables of this final report should be updated, whenever credible LTC experience becomes available, from whatever source.

B. Methodology

LTC claim incidence rates and claim costs are a function of the policyholder's health status (ADL and CI) and subsequent use of available services (institutional, noninstitutional, and informal). Health status, for whatever challenges it presents, is more easily studied and more reliably projected than service utilization. Health status is more likely to be out of the individual's control than is service use. Service utilization depends upon the individual's perceived service options, available financing, and disposition toward using LTC services, all subject to change over time. Consequently, the noninstitutional tables have been constructed to provide projections of future health status, but require that the valuation actuary determine the appropriate service utilization and frequency rates for each such health status.

The 1982 and 1984 NLTCs include questions on the ADL and CI statuses of those questioned at both points in time. This information was analyzed in the following steps.

1. To simplify the analysis, ADL status alone was considered initially. Later, CI was conditionally examined based upon the individual's ADL status development.

The 1982 and 1984 interviews were summarized by ADL status. Unless deceased, those screened out were assumed to be zero ADL-impaired. Detailed interviews were classified as 0, 1, 2, or 3+ ADL-impaired, requiring active human assistance, as opposed to supervision only. The six ADLs considered were eating, bathing, dressing, toileting, transference, and mobility. IADLs were not considered.

The resulting 1982 and 1984 ADL status pairs were summarized by sex and 1982 age group to form six observed transition matrices, three each

for males and females, for 1982 ages of below age 65, 65–74, and 75 and over for each sex. These matrices are shown in Table 5. As an example, the first section of the table shows the observed transition matrix for males age 65–74 in 1982. The table indicates, for example, that of 8,108 unimpaired individuals in 1982, 749 died by 1984, 7,165 remained unimpaired, and the remaining 194 became ADL-impaired and were still alive and impaired as shown in 1984. Despite the sparsity of data in some cells, the observed transition matrices provide some information about movement from one ADL status to another over the two years from 1982 to 1984.

2. Maximum likelihood estimation was used to fit a constant force of transition (CFT) model to the six observed sex/age group transition matrices. The CFT model assumes that the forces of transition from one ADL status to another are constant over time, at least over a two-year period. The constant transition forces may vary by sex, age group, starting ADL status, and destination ADL status (including death). The CFT model is similar to the constant force of mortality assumption frequently used within a year of age in mortality table analyses. In the CFT case, however, there are several statuses other than living or dead. Note that many other model forms might also be fit to the observed transition matrices. Such alternative models might allow transition rates to vary through time or by duration in current status, both reasonable structures. However, because of the form of the data, the sparsity of the data, and a desire for model simplicity, the more restrictive CFT model was adopted for this analysis.

Table 6 displays, as an example, the estimated annual forces of transition for a 70-year-old male and a 70-year-old female. For example, the annual force of transition from 2 ADLs to 3 or more ADLs impaired is 11.79% for a male. The annual force of mortality for an individual with 3 or more ADLs impaired is 14.08% for a female. Notice that there is no force of remaining in the current status, just as there is no force of survival in the constant force of mortality counterpart to the CFT model.

TABLE 5
OBSERVED TRANSITION MATRIX FOR MALES AND FEMALES
AGED 65-74, 75-84 AND 85+ IN 1982

1982 Status	1984 Status					
	0 ADLs	1 ADL	2 ADLs	3+ ADLs	Dead	Total
Males, Age 65-74						
0 ADLs	7,165	73	43	78	740	8,108
1 ADL	44	24	13	9	35	125
2 ADLs	10	10	7	6	18	51
3+ ADLs	8	2	6	22	29	67
Total	7,227	109	69	115	831	8,351
Males, Age 75-84						
0 ADLs	2,834	87	34	66	566	3,587
1 ADL	29	12	13	14	64	132
2 ADLs	6	4	7	10	24	51
3+ ADLs	4	2	4	21	32	63
Total	2,873	105	58	111	686	3,833
Males, 85 and Up						
0 ADLs	386	28	18	22	161	615
1 ADL	9	12	3	13	26	63
2 ADLs	0	3	2	5	14	24
3+ ADLs	1	0	5	3	10	19
Total	396	43	28	43	211	721
Females, Age 65-74						
0 ADLs	9,854	141	41	64	468	10,568
1 ADL	61	41	15	15	28	160
2 ADLs	14	11	9	17	13	64
3+ ADLs	7	5	6	31	29	78
Total	9,936	198	71	127	538	10,870
Females, Age 75-84						
0 ADLs	4,881	265	77	109	653	5,985
1 ADL	69	51	13	34	46	213
2 ADLs	13	8	13	18	23	75
3+ ADLs	9	5	11	39	30	94
Total	4,972	329	114	200	752	6,367
Females, 85 and Up						
0 ADLs	955	145	48	72	299	1,519
1 ADL	30	37	10	22	44	143
2 ADLs	6	8	9	11	26	60
3+ ADLs	7	5	5	25	43	85
Total	998	195	72	130	412	1,807

TABLE 6
ANNUAL FORCES OF TRANSITION FOR MALE AND FEMALE AGE 70

Current Status	Destination Status				
	0 ADLs	1 ADL	2 ADLs	3+ ADLs	Dead
Male					
0 ADLs	—	0.0134	0.0030	0.0045	0.0453
1 ADL	0.3703	—	0.0557	0.0431	0.1721
2 ADLs	0.0832	0.3752	—	0.1179	0.1691
3+ ADLs	0.0552	0.0465	0.1723	—	0.2453
Female					
0 ADLs	—	0.0140	0.0032	0.0047	0.0260
1 ADL	0.4004	—	0.0580	0.0449	0.0988
2 ADLs	0.0899	0.4058	—	0.1227	0.0971
3+ ADLs	0.0596	0.0503	0.1863	—	0.1408

Transition forces for other ages are obtained from the forces at age 70 using the following adjustments. Forces of mortality, the right-most column, are multiplied (divided) by 1.0537 for each year of age beyond (before) age 70. Forces of impairment, the region above the diagonal, are multiplied (divided) by 1.0980 for each year of age beyond (before) age 70. Forces of recovery, the region below the diagonal, are multiplied (divided) by 0.9818 for each year of age beyond (before) age 70. For example, the annual force of transition from 1 ADL impaired to 3 or more ADLs impaired for a 90-year-old female is $0.0449 \times (1.0980)^{90-70} = 0.2913$.

Since the data provided no observations below age 65, transition forces for younger ages were further adjusted. Because of the lack of impairment data at younger ages, forces of impairment, including mortality, were related to the pattern of nursing home admission rates in the institutional tables from Section II. Forces of recovery were extended using the age adjustment from the previous paragraph.

- Under the CFT model, the ADL transition process is completely specified. Forces of transition from the model were used to compute monthly probabilities of transition from one ADL status to another. In other words, the CFT model was used to extract expected monthly movement among the ADL statuses from the observed biannual movement. Table 7 illustrates the resulting monthly probabilities of transition among the various ADL statuses, for males and females and for ages 70, 80 and 90. Note that the rows sum to one and there is a high probability of remaining in the same status.

TABLE 7

MONTHLY PROBABILITIES OF TRANSITION FOR MALES AND FEMALES AGE 70, 80, AND 90

Current Status	Destination Status				
	0 ADLs	1 ADL	2 ADLs	3+ ADLs	Dead
Males, Age 70					
0 ADLs	99.45%	0.11	0.03	0.04	0.38
1 ADL	3.00	94.81	0.44	0.35	1.41
2 ADLs	0.72	2.95	93.99	0.94	1.40
3+ ADLs	0.46	0.39	1.36	95.77	2.01
Males, Age 80					
0 ADLs	98.93%	0.27	0.06	0.10	0.64
1 ADL	2.47	93.18	1.10	0.88	2.37
2 ADLs	0.59	2.42	92.29	2.35	2.36
3+ ADLs	0.38	0.32	1.12	94.81	3.38
Males, Age 90					
0 ADLs	97.82%	0.68	0.16	0.25	1.09
1 ADL	2.01	89.12	2.67	2.21	3.99
2 ADLs	0.48	1.92	87.84	5.78	3.89
3+ ADLs	0.31	0.25	0.90	92.90	5.64
Females, Age 70					
0 ADLs	99.60%	0.11	0.03	0.04	0.22
1 ADL	3.25	95.12	0.46	0.36	0.81
2 ADLs	0.78	3.20	94.23	0.98	0.81
3+ ADLs	0.50	0.43	1.48	96.43	1.16
Females, Age 80					
0 ADLs	99.18%	0.29	0.07	0.10	0.37
1 ADL	2.69	93.87	1.15	0.92	1.37
2 ADLs	0.64	2.63	92.89	2.47	1.36
3+ ADLs	0.41	0.35	1.22	96.06	1.95
Females, Age 90					
0 ADLs	98.23%	0.71	0.17	0.26	0.63
1 ADL	2.19	90.34	2.82	2.35	2.31
2 ADLs	0.52	2.11	88.94	6.12	2.31
3+ ADLs	0.34	0.28	0.99	95.11	3.27

4. The monthly probabilities of transition were used to simulate 40,000 male and 40,000 female ADL status histories. Each simulated individual started at age 35, without ADL impairment, and progressed month by month according to the CFT monthly probabilities, until death. These simulation cohorts provide a convenient basis for determining ADL impairment incidence and continuation rates under various benefit trigger definitions.
5. CI statuses for the simulation cohorts were generated by a second-stage simulation based upon the known ADL status development of each individual. CI was defined as being unable to correctly answer five or

more of ten questions from the Short Portable Mental Status Questionnaire (SPMSQ), included in the NLTCs questionnaires. The NLTCs CI statuses were summarized by starting and ending ADL status and by age group. The observed conditional rates of CI and recovery were adjusted to a monthly basis and used to simulate the monthly CI status of the individuals in the simulation cohorts.

Table 8 shows summary characteristics of the two simulation cohorts. The second column shows the number of survivors to each quinquennial attained age. The third column is the annual mortality rate for the next five years of age. The remaining columns show the percentage allocation of the survivors among the various ADL/CI statuses. (Due to rounding, these values may not sum exactly to one across the last eight columns of each row.)

6. The simulated ADL/CI experience months were grouped into disability episodes, defined as a continuous sequence of months for which the individual was impaired cognitively or failed in at least one ADL. Episodes separated by no more than six unimpaired months were combined and treated as a single disability episode.

Disability episodes were then classified by sex and quinquennial age at onset. The number of incurral and the number of disability months were summarized for each such age group. Within each age of incurral, total disability months were summarized by ADL/CI status and duration from incurral.

7. Using the 1984 NLTCs, institutional prevalence rates were computed by sex, age, and ADL/CI status. A simple regression model was fit to smooth the results. These rates were applied to the disability episodes of the previous step to identify the remaining portion of disability months during which noninstitutional benefits might be generated.
8. The incidence rates, average number of noninstitutional days per episode, and ADL/CI-specific continuance tables were smoothed using a variety of graduation techniques. During this process, male and female incidence rates were set equal, and lengths of stay were graded together after age 93.

The next subsection displays the resulting incidence rates, average number of noninstitutional disability days per episode, and a breakdown of such days by ADL/CI status and duration since incurral.

TABLE 8
SUMMARY CHARACTERISTICS OF SIMULATION COHORTS

Attained Age	Survivors	Annual Mortality per 1,000	ADL/CI Status of Survivors (%)							
			No CI and No. of ADLs Failed				CI and No. of ADLs Failed			
			0	1	2	3+	0	1	2	3+
Male										
35	40,000	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	39,850	3	99.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0
45	39,332	5	99.7	0.2	0.0	0.1	0.1	0.0	0.0	0.0
50	38,357	5	99.4	0.3	0.1	0.1	0.1	0.0	0.0	0.0
55	37,327	10	99.2	0.4	0.1	0.1	0.2	0.0	0.0	0.0
60	35,584	16	98.7	0.5	0.2	0.2	0.3	0.0	0.0	0.0
65	32,832	37	97.7	1.1	0.3	0.4	0.5	0.1	0.0	0.1
70	27,247	57	95.3	1.9	0.6	0.7	1.0	0.2	0.1	0.2
75	20,303	81	91.5	2.9	0.9	1.3	2.0	0.5	0.3	0.5
80	13,291	114	86.0	3.9	1.5	2.4	3.9	0.7	0.6	0.9
85	7,245	162	79.5	4.3	1.9	3.4	7.0	1.1	0.9	1.9
90	2,977	235	69.0	5.2	2.0	5.4	10.5	1.8	1.4	4.7
95	785	338	58.2	6.1	3.4	5.7	13.4	2.2	1.4	9.6
100	100	430	48.0	6.0	3.0	8.0	18.0	1.0	4.0	12.0
Female										
35	40,000	0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40	39,917	2	99.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45	39,613	3	99.6	0.2	0.0	0.1	0.1	0.0	0.0	0.0
50	39,037	3	99.3	0.4	0.1	0.1	0.2	0.0	0.0	0.0
55	38,452	5	99.2	0.4	0.1	0.1	0.2	0.0	0.0	0.0
60	37,511	10	98.6	0.6	0.2	0.2	0.3	0.0	0.0	0.0
65	35,713	21	97.4	1.2	0.3	0.4	0.6	0.0	0.0	0.1
70	32,139	33	94.9	2.1	0.6	0.8	1.1	0.2	0.1	0.2
75	27,150	49	90.3	3.3	1.1	1.6	2.3	0.5	0.3	0.6
80	21,108	72	84.1	4.3	1.6	3.0	4.1	0.9	0.6	1.3
85	14,518	106	75.5	5.3	2.2	4.4	6.8	1.5	1.1	3.2
90	8,271	166	63.1	5.4	2.6	7.0	10.4	2.2	1.7	7.5
95	3,336	252	51.4	5.0	2.4	10.0	13.3	2.0	2.6	13.3
100	781	369	36.0	4.7	2.4	15.7	14.5	1.5	2.6	22.5

C. Noninstitutional Tables

Table 9 shows the incidence rate of disability episodes and the average number of noninstitutional days associated with each episode. The values are graduated.

TABLE 9
INCIDENCE RATES AND AVERAGE NUMBER OF NONINSTITUTIONAL IMPAIRMENT DAYS

Age	Male and Female Incidence per 1000 Survivors	Male Noninstitutional Days	Female Noninstitutional Days
37	0.47	1,652	2,111
42	0.88	1,339	1,624
47	1.63	1,133	1,337
52	2.96	1,001	1,178
57	5.26	923	1,111
62	9.18	882	1,110
67	15.35	824	1,065
72	24.45	742	961
77	37.15	644	813
82	53.80	538	646
87	74.28	434	483
92	97.77	337	338
97	122.68	237	237
102	146.76	160	160
107	167.38	103	103

Note that the incidence rates are per 1,000 survivors, not nondisabled survivors. Therefore, from a population of 1,000 72-year-old females of average disability, we expect to observe about 24 new disability episodes per year, each averaging 961 noninstitutional disability days.

Tables 10–25 allocate the noninstitutional disability days by ADL/CI status and duration from incurral. Again, the values are graduated.

As an example, a disability episode of a 72-year-old female is expected to average 961 noninstitutional days. According to the tables, 11.75% of these days, about 113 days, will arise after 3 months of disability and will be associated with 3 or more ADLs and no CI. We expect that 35.84% of the days, or 344 days, will correspond to CI without ADL impairment. About 59% of all noninstitutional days for such individuals will arise after 2 years of disability.

TABLE 10

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ALL ADL/CI STATUSES; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurreal Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1	98.55	98.16	97.92	97.72	97.55	97.40	97.25	97.07	96.73	96.11	94.99	93.44	92.12	90.18
2	97.14	96.38	95.91	95.51	95.18	94.90	94.61	94.25	93.61	92.42	90.33	87.46	85.05	81.59
3	95.78	94.66	93.96	93.38	92.90	92.49	92.06	91.55	90.62	88.93	85.98	82.01	78.70	74.06
4	94.46	92.99	92.07	91.31	90.69	90.16	89.61	88.95	87.77	85.61	81.92	77.03	72.97	67.44
5	93.18	91.37	90.24	89.31	88.55	87.91	87.25	86.46	85.04	82.46	78.13	72.47	67.80	61.59
6	91.93	89.81	88.47	87.37	86.49	85.74	84.98	84.07	82.43	79.47	74.58	68.28	63.11	56.41
7	90.73	88.29	86.75	85.50	84.50	83.65	82.79	81.77	79.93	76.63	71.26	64.44	58.86	51.82
8	89.56	86.81	85.09	83.68	82.57	81.63	80.68	79.55	77.54	73.93	68.15	60.90	55.00	47.72
9	88.42	85.39	83.48	81.92	80.71	79.69	78.65	77.43	75.25	71.36	65.23	57.64	51.48	44.05
10	87.32	84.00	81.92	80.22	78.91	77.81	76.69	75.39	73.05	68.91	62.50	54.63	48.26	40.76
11	86.25	82.66	80.41	78.56	77.17	75.99	74.81	73.42	70.95	66.59	59.93	51.84	45.31	37.79
12	85.22	81.36	78.95	76.97	75.49	74.24	72.99	71.53	68.94	64.37	57.51	49.26	42.60	35.12
15	81.93	77.24	74.32	71.94	70.19	68.72	67.25	65.53	62.67	57.56	50.30	41.94	34.49	26.78
18	78.95	73.53	70.16	67.42	65.47	63.81	62.16	60.24	57.21	51.72	44.32	36.08	28.17	20.64
21	76.26	70.18	66.43	63.37	61.25	59.44	57.65	55.57	52.42	46.69	39.31	31.32	23.18	16.06
24	73.81	67.16	63.06	59.72	57.47	55.54	53.64	51.44	48.22	42.33	35.08	27.41	19.20	12.58
27	71.59	64.42	60.03	56.43	54.08	52.06	50.06	47.76	44.52	38.53	31.49	24.14	15.99	9.92
30	69.57	61.95	57.29	53.47	51.04	48.94	46.87	44.49	41.24	35.21	28.40	21.39	13.37	7.87
33	67.72	59.70	54.81	50.79	48.31	46.14	44.01	41.56	38.33	32.29	25.73	19.05	11.23	6.27
36	66.04	57.66	52.57	48.37	45.85	43.63	41.44	38.94	35.73	29.71	23.41	17.05	9.46	5.01
48	59.96	50.43	44.74	39.78	37.16	34.40	32.13	29.35	26.15	20.31	15.22	10.66	4.36	1.91
60	55.61	45.45	39.47	33.98	31.39	28.22	25.90	22.94	19.82	14.35	10.25	6.96	2.07	0.76
72	52.33	41.84	35.76	29.89	27.37	23.85	21.49	18.40	15.41	10.37	7.07	4.67	0.99	0.30
84	49.70	39.07	33.00	26.85	24.41	20.60	18.21	15.05	12.19	7.61	4.94	3.18	0.48	0.12
96	47.49	36.82	30.83	24.47	22.11	18.06	15.65	12.47	9.76	5.65	3.49	2.19	0.24	0.05
108	45.55	34.92	29.04	22.52	20.23	16.00	13.58	10.43	7.88	4.22	2.48	1.51	0.12	0.02
120	43.79	33.24	27.50	20.86	18.63	14.26	11.87	8.77	6.40	3.17	1.77	1.05	0.06	0.01

TABLE 11

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: 0; CI: YES; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	59.34	48.23	40.45	35.43	32.63	31.49	31.49	32.05	32.64	32.71	31.71	29.10	24.31	16.81
1	59.20	48.10	40.32	35.29	32.50	31.36	31.32	31.83	32.35	32.29	31.20	28.42	23.51	16.13
2	59.06	47.97	40.20	35.14	32.38	31.22	31.15	31.62	32.05	31.87	30.70	27.75	22.74	15.48
3	58.92	47.83	40.08	35.00	32.26	31.08	30.98	31.40	31.76	31.46	30.20	27.10	21.99	14.85
4	58.78	47.70	39.96	34.86	32.14	30.95	30.81	31.19	31.47	31.05	29.71	26.47	21.27	14.25
5	58.65	47.57	39.83	34.72	32.02	30.81	30.65	30.98	31.19	30.65	29.23	25.85	20.57	13.67
6	58.51	47.43	39.71	34.58	31.89	30.67	30.48	30.77	30.91	30.26	28.76	25.24	19.90	13.12
7	58.37	47.30	39.59	34.44	31.77	30.54	30.32	30.56	30.63	29.87	28.29	24.65	19.24	12.59
8	58.24	47.17	39.47	34.31	31.65	30.40	30.16	30.35	30.35	29.48	27.84	24.08	18.61	12.08
9	58.10	47.04	39.35	34.17	31.54	30.27	29.99	30.15	30.07	29.10	27.39	23.51	18.00	11.59
10	57.97	46.91	39.23	34.03	31.42	30.14	29.83	29.94	29.80	28.72	26.94	22.96	17.41	11.12
11	57.83	46.78	39.11	33.90	31.30	30.01	29.67	29.74	29.53	28.35	26.51	22.43	16.83	10.67
12	57.70	46.65	38.99	33.76	31.18	29.87	29.51	29.54	29.26	27.98	26.08	21.90	16.28	10.23
15	57.26	46.22	38.61	33.35	30.79	29.41	28.92	28.76	28.32	26.70	24.60	20.30	14.06	7.95
18	56.84	45.80	38.24	32.95	30.41	28.95	28.34	28.00	27.41	25.47	23.20	18.81	12.15	6.17
21	56.41	45.39	37.87	32.55	30.03	28.50	27.77	27.26	26.52	24.31	21.88	17.43	10.49	4.80
24	55.99	44.97	37.50	32.16	29.66	28.06	27.21	26.54	25.67	23.19	20.64	16.16	9.06	3.73
27	55.57	44.56	37.14	31.77	29.29	27.62	26.66	25.84	24.84	22.13	19.47	14.97	7.83	2.89
30	55.15	44.16	36.78	31.39	28.92	27.19	26.12	25.16	24.04	21.11	18.36	13.88	6.76	2.25
33	54.74	43.76	36.42	31.01	28.56	26.77	25.60	24.49	23.27	20.14	17.32	12.86	5.84	1.75
36	54.33	43.36	36.07	30.63	28.21	26.35	25.08	23.85	22.52	19.22	16.33	11.92	5.05	1.36
48	52.48	41.56	34.45	28.75	26.37	23.89	22.31	20.45	18.63	14.70	11.82	8.38	2.52	0.49
60	50.70	39.82	32.91	26.98	24.65	21.67	19.85	17.53	15.41	11.25	8.55	5.89	1.26	0.18
72	48.97	38.17	31.43	25.32	23.05	19.65	17.65	15.04	12.74	8.60	6.19	4.15	0.63	0.07
84	47.30	36.58	30.02	23.76	21.54	17.82	15.70	12.89	10.54	6.58	4.48	2.92	0.32	0.02
96	45.70	35.05	28.68	22.30	20.14	16.16	13.97	11.06	8.72	5.04	3.24	2.05	0.16	0.01
108	44.14	33.59	27.39	20.92	18.83	14.65	12.42	9.48	7.21	3.85	2.35	1.44	0.08	0.00
120	42.64	32.19	26.16	19.64	17.60	13.28	11.05	8.13	5.96	2.95	1.70	1.01	0.04	0.00

TABLE 12

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: I; CI: NO; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	22.75	32.02	37.93	41.01	41.82	40.88	38.74	35.96	33.06	30.59	29.10	29.13	31.21	35.90
1	21.97	30.93	36.64	39.58	40.26	39.22	37.03	34.19	31.18	28.49	26.43	25.59	26.87	30.01
2	21.22	29.88	35.39	38.20	38.76	37.64	35.40	32.52	29.42	26.53	24.01	22.48	23.13	25.09
3	20.50	28.86	34.18	36.87	37.31	36.11	33.83	30.92	27.75	24.71	21.81	19.75	19.91	20.97
4	19.80	27.88	33.02	35.58	35.92	34.65	32.34	29.41	26.18	23.01	19.81	17.35	17.14	17.53
5	19.13	26.93	31.89	34.34	34.59	33.25	30.91	27.97	24.70	21.43	18.00	15.25	14.75	14.65
6	18.47	26.01	30.81	33.14	33.30	31.90	29.54	26.60	23.30	19.96	16.35	13.39	12.70	12.25
7	17.85	25.12	29.76	31.98	32.06	30.61	28.24	25.29	21.98	18.59	14.85	11.77	10.93	10.24
8	17.24	24.27	28.74	30.86	30.86	29.37	26.99	24.05	20.73	17.31	13.49	10.34	9.41	8.56
9	16.65	23.44	27.76	29.78	29.71	28.19	25.80	22.87	19.56	16.12	12.25	9.08	8.10	7.15
10	16.08	22.64	26.82	28.74	28.61	27.04	24.66	21.75	18.45	15.01	11.13	7.98	6.97	5.98
11	15.53	21.87	25.90	27.74	27.54	25.95	23.57	20.69	17.40	13.98	10.11	7.01	6.00	5.00
12	15.01	21.12	25.02	26.77	26.51	24.90	22.52	19.67	16.42	13.02	9.18	6.16	5.17	4.18
15	13.34	18.77	22.24	23.73	23.32	21.67	19.36	16.64	13.55	10.34	6.77	4.13	3.26	2.40
18	11.85	16.69	19.76	21.03	20.52	18.86	16.65	14.07	11.18	8.21	5.00	2.77	2.05	1.38
21	10.53	14.83	17.57	18.64	18.05	16.41	14.31	11.90	9.22	6.51	3.69	1.86	1.29	0.79
24	9.36	13.18	15.61	16.52	15.88	14.28	12.30	10.07	7.61	5.17	2.72	1.25	0.81	0.46
27	8.32	11.71	13.88	14.64	13.97	12.43	10.58	8.51	6.28	4.10	2.01	0.84	0.51	0.26
30	7.40	10.41	12.33	12.97	12.29	10.82	9.09	7.20	5.18	3.26	1.48	0.56	0.32	0.15
33	6.57	9.25	10.96	11.50	10.81	9.42	7.82	6.09	4.27	2.59	1.09	0.38	0.20	0.09
36	5.84	8.22	9.74	10.19	9.51	8.19	6.72	5.15	3.53	2.05	0.81	0.25	0.13	0.05
48	3.45	4.86	5.75	5.96	5.37	4.42	3.45	2.47	1.53	0.76	0.22	0.05	0.02	0.01
60	2.04	2.87	3.40	3.48	3.04	2.38	1.77	1.19	0.66	0.28	0.06	0.01	0.00	0.00
72	1.20	1.69	2.01	2.04	1.72	1.29	0.91	0.57	0.29	0.10	0.02	0.00	0.00	0.00
84	0.71	1.00	1.19	1.19	0.97	0.69	0.47	0.27	0.12	0.04	0.00	0.00	0.00	0.00
96	0.42	0.59	0.70	0.70	0.55	0.37	0.24	0.13	0.05	0.01	0.00	0.00	0.00	0.00
108	0.25	0.35	0.41	0.41	0.31	0.20	0.12	0.06	0.02	0.01	0.00	0.00	0.00	0.00
120	0.15	0.21	0.24	0.24	0.18	0.11	0.06	0.03	0.01	0.00	0.00	0.00	0.00	0.00

TABLE 13

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: I; CI: YES; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	0.15	0.38	0.75	1.22	1.76	2.34	2.92	3.45	3.91	4.26	4.46	4.48	4.29	3.83
1	0.15	0.37	0.74	1.21	1.75	2.31	2.87	3.37	3.80	4.10	4.24	4.14	3.90	3.42
2	0.15	0.37	0.74	1.20	1.73	2.28	2.82	3.30	3.69	3.94	4.03	3.81	3.55	3.04
3	0.14	0.37	0.74	1.19	1.71	2.25	2.77	3.23	3.58	3.79	3.83	3.52	3.23	2.71
4	0.14	0.37	0.73	1.18	1.69	2.21	2.72	3.16	3.48	3.65	3.63	3.24	2.94	2.42
5	0.14	0.37	0.73	1.17	1.67	2.18	2.67	3.09	3.38	3.51	3.45	2.99	2.68	2.16
6	0.14	0.37	0.73	1.16	1.66	2.15	2.62	3.02	3.28	3.38	3.28	2.76	2.44	1.92
7	0.14	0.36	0.72	1.16	1.64	2.12	2.58	2.95	3.19	3.25	3.11	2.55	2.22	1.71
8	0.14	0.36	0.72	1.15	1.62	2.09	2.53	2.89	3.10	3.13	2.96	2.35	2.02	1.53
9	0.14	0.36	0.72	1.14	1.61	2.06	2.49	2.82	3.01	3.01	2.81	2.16	1.84	1.36
10	0.14	0.36	0.71	1.13	1.59	2.04	2.45	2.76	2.92	2.89	2.67	2.00	1.68	1.21
11	0.14	0.36	0.71	1.12	1.57	2.01	2.40	2.70	2.84	2.78	2.53	1.84	1.53	1.08
12	0.14	0.36	0.71	1.11	1.56	1.98	2.36	2.64	2.75	2.68	2.41	1.70	1.39	0.96
15	0.14	0.35	0.70	1.09	1.51	1.89	2.23	2.44	2.50	2.35	2.04	1.32	1.04	0.68
18	0.14	0.35	0.70	1.06	1.46	1.81	2.10	2.26	2.26	2.06	1.73	1.03	0.78	0.48
21	0.14	0.35	0.69	1.04	1.42	1.73	1.98	2.10	2.05	1.81	1.47	0.80	0.59	0.34
24	0.14	0.35	0.69	1.01	1.37	1.65	1.86	1.94	1.86	1.59	1.25	0.63	0.44	0.24
27	0.13	0.34	0.68	0.99	1.33	1.58	1.76	1.80	1.69	1.39	1.06	0.49	0.33	0.17
30	0.13	0.34	0.68	0.97	1.29	1.51	1.65	1.66	1.53	1.22	0.90	0.38	0.25	0.12
33	0.13	0.34	0.67	0.94	1.25	1.45	1.56	1.54	1.38	1.07	0.76	0.30	0.19	0.08
36	0.13	0.34	0.67	0.92	1.21	1.38	1.47	1.43	1.25	0.94	0.64	0.23	0.14	0.06
48	0.13	0.33	0.65	0.85	1.05	1.13	1.14	1.02	0.81	0.54	0.32	0.08	0.04	0.01
60	0.12	0.32	0.63	0.79	0.91	0.93	0.88	0.73	0.52	0.31	0.16	0.03	0.01	0.00
72	0.12	0.31	0.62	0.73	0.79	0.76	0.68	0.52	0.34	0.18	0.08	0.01	0.00	0.00
84	0.12	0.30	0.60	0.68	0.69	0.62	0.53	0.37	0.22	0.10	0.04	0.00	0.00	0.00
96	0.12	0.29	0.58	0.63	0.60	0.51	0.41	0.26	0.14	0.06	0.02	0.00	0.00	0.00
108	0.11	0.29	0.57	0.58	0.52	0.42	0.31	0.19	0.09	0.03	0.01	0.00	0.00	0.00
120	0.11	0.28	0.55	0.54	0.45	0.34	0.24	0.13	0.06	0.02	0.00	0.00	0.00	0.00

TABLE 14

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 2; CI: NO; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	7.03	8.64	9.73	10.38	10.72	10.85	10.87	10.88	11.00	11.33	11.97	13.03	14.62	16.84
1	6.83	8.39	9.44	10.08	10.39	10.51	10.51	10.50	10.58	10.81	11.27	12.16	13.55	15.47
2	6.63	8.15	9.17	9.78	10.07	10.18	10.16	10.13	10.18	10.32	10.61	11.34	12.55	14.21
3	6.44	7.91	8.90	9.50	9.77	9.86	9.82	9.78	9.79	9.85	9.99	10.58	11.63	13.05
4	6.25	7.68	8.64	9.22	9.47	9.55	9.50	9.44	9.42	9.40	9.41	9.87	10.77	11.98
5	6.07	7.46	8.39	8.95	9.18	9.25	9.18	9.11	9.06	8.97	8.86	9.20	9.98	11.00
6	5.89	7.24	8.15	8.68	8.89	8.96	8.88	8.79	8.72	8.57	8.34	8.59	9.25	10.11
7	5.72	7.03	7.91	8.43	8.62	8.68	8.58	8.49	8.39	8.18	7.85	8.01	8.57	9.28
8	5.55	6.83	7.68	8.18	8.36	8.40	8.30	8.19	8.07	7.80	7.39	7.47	7.94	8.52
9	5.39	6.63	7.46	7.94	8.10	8.14	8.02	7.90	7.76	7.45	6.96	6.97	7.36	7.83
10	5.24	6.44	7.24	7.71	7.85	7.89	7.76	7.63	7.47	7.11	6.56	6.50	6.81	7.19
11	5.08	6.25	7.03	7.48	7.61	7.64	7.50	7.36	7.18	6.79	6.17	6.06	6.31	6.60
12	4.94	6.07	6.83	7.26	7.38	7.40	7.25	7.11	6.91	6.48	5.81	5.66	5.85	6.06
15	4.45	5.47	6.16	6.54	6.61	6.61	6.45	6.28	6.04	5.52	4.73	4.41	4.44	4.44
18	4.02	4.94	5.56	5.90	5.93	5.91	5.73	5.55	5.28	4.70	3.85	3.44	3.37	3.26
21	3.62	4.46	5.01	5.31	5.31	5.29	5.09	4.91	4.62	4.01	3.13	2.68	2.56	2.39
24	3.27	4.02	4.52	4.79	4.76	4.73	4.53	4.34	4.03	3.42	2.55	2.09	1.94	1.75
27	2.95	3.63	4.08	4.31	4.26	4.23	4.02	3.84	3.53	2.91	2.07	1.63	1.48	1.28
30	2.66	3.27	3.68	3.89	3.82	3.78	3.58	3.40	3.08	2.48	1.69	1.27	1.12	0.94
33	2.40	2.95	3.32	3.50	3.42	3.38	3.18	3.00	2.69	2.11	1.37	0.99	0.85	0.69
36	2.17	2.66	3.00	3.16	3.07	3.02	2.83	2.65	2.36	1.80	1.12	0.77	0.65	0.50
48	1.35	1.66	1.87	1.96	1.86	1.81	1.66	1.53	1.29	0.89	0.45	0.25	0.18	0.12
60	0.85	1.04	1.17	1.22	1.13	1.09	0.97	0.88	0.71	0.44	0.18	0.08	0.05	0.03
72	0.53	0.65	0.73	0.76	0.68	0.65	0.57	0.51	0.39	0.21	0.07	0.03	0.01	0.01
84	0.33	0.41	0.46	0.47	0.42	0.39	0.33	0.29	0.21	0.11	0.03	0.01	0.00	0.00
96	0.21	0.25	0.29	0.29	0.25	0.24	0.20	0.17	0.12	0.05	0.01	0.00	0.00	0.00
108	0.13	0.16	0.18	0.18	0.15	0.14	0.12	0.10	0.06	0.03	0.00	0.00	0.00	0.00
120	0.08	0.10	0.11	0.11	0.09	0.08	0.07	0.06	0.03	0.01	0.00	0.00	0.00	0.00

TABLE 15

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 2; CI: YES; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	0.37	0.32	0.41	0.63	0.93	1.28	1.66	2.04	2.37	2.64	2.81	2.86	2.74	2.44
1	0.36	0.32	0.41	0.62	0.92	1.27	1.64	2.00	2.32	2.57	2.70	2.67	2.53	2.20
2	0.36	0.31	0.41	0.62	0.90	1.25	1.61	1.97	2.27	2.50	2.59	2.50	2.34	1.99
3	0.36	0.31	0.41	0.61	0.89	1.23	1.59	1.93	2.22	2.43	2.49	2.33	2.16	1.80
4	0.36	0.31	0.41	0.61	0.88	1.21	1.56	1.90	2.17	2.36	2.39	2.18	1.99	1.62
5	0.36	0.31	0.41	0.60	0.87	1.20	1.54	1.86	2.13	2.30	2.29	2.04	1.84	1.47
6	0.36	0.31	0.41	0.60	0.86	1.18	1.51	1.83	2.08	2.23	2.20	1.91	1.70	1.32
7	0.36	0.31	0.40	0.59	0.84	1.16	1.49	1.80	2.04	2.17	2.11	1.78	1.56	1.20
8	0.36	0.31	0.40	0.59	0.83	1.15	1.47	1.77	1.99	2.11	2.03	1.66	1.44	1.08
9	0.35	0.31	0.40	0.58	0.82	1.13	1.45	1.74	1.95	2.05	1.95	1.56	1.33	0.98
10	0.35	0.31	0.40	0.58	0.81	1.11	1.42	1.71	1.91	2.00	1.87	1.45	1.23	0.88
11	0.35	0.30	0.40	0.57	0.80	1.10	1.40	1.68	1.87	1.94	1.79	1.36	1.14	0.80
12	0.35	0.30	0.40	0.57	0.79	1.08	1.38	1.65	1.83	1.89	1.72	1.27	1.05	0.72
15	0.35	0.30	0.39	0.55	0.76	1.04	1.31	1.56	1.71	1.72	1.51	1.03	0.81	0.52
18	0.34	0.30	0.39	0.53	0.73	0.99	1.25	1.47	1.60	1.57	1.32	0.83	0.63	0.37
21	0.34	0.29	0.38	0.51	0.70	0.95	1.19	1.39	1.49	1.44	1.16	0.67	0.49	0.27
24	0.33	0.29	0.38	0.49	0.67	0.91	1.13	1.31	1.40	1.31	1.01	0.55	0.38	0.20
27	0.33	0.29	0.38	0.47	0.64	0.87	1.07	1.24	1.31	1.20	0.89	0.44	0.30	0.14
30	0.33	0.28	0.37	0.46	0.62	0.84	1.02	1.17	1.22	1.09	0.78	0.36	0.23	0.10
33	0.32	0.28	0.37	0.44	0.59	0.80	0.97	1.11	1.14	1.00	0.68	0.29	0.18	0.07
36	0.32	0.28	0.36	0.42	0.57	0.77	0.92	1.05	1.07	0.91	0.59	0.23	0.14	0.05
48	0.31	0.27	0.35	0.37	0.47	0.62	0.71	0.78	0.75	0.58	0.32	0.09	0.05	0.01
60	0.29	0.25	0.33	0.32	0.39	0.51	0.55	0.58	0.53	0.37	0.17	0.04	0.02	0.00
72	0.28	0.24	0.32	0.27	0.32	0.41	0.43	0.43	0.37	0.24	0.09	0.01	0.01	0.00
84	0.27	0.23	0.31	0.24	0.26	0.33	0.33	0.32	0.26	0.15	0.05	0.01	0.00	0.00
96	0.26	0.22	0.29	0.20	0.22	0.27	0.26	0.24	0.18	0.10	0.03	0.00	0.00	0.00
108	0.25	0.21	0.28	0.18	0.18	0.22	0.20	0.18	0.13	0.06	0.01	0.00	0.00	0.00
120	0.24	0.20	0.27	0.15	0.15	0.18	0.15	0.13	0.09	0.04	0.01	0.00	0.00	0.00

TABLE 16

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: 3+; CI: NO; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	9.10	9.93	10.50	10.90	11.21	11.50	11.85	12.35	13.05	14.06	15.43	17.25	19.61	22.56
1	8.78	9.57	10.12	10.52	10.81	11.11	11.46	11.95	12.62	13.55	14.78	16.46	18.66	21.41
2	8.46	9.23	9.76	10.15	10.43	10.74	11.09	11.56	12.20	13.06	14.15	15.70	17.76	20.31
3	8.16	8.90	9.41	9.80	10.06	10.37	10.72	11.18	11.79	12.59	13.55	14.98	16.90	19.27
4	7.87	8.58	9.08	9.46	9.71	10.02	10.37	10.82	11.40	12.14	12.98	14.29	16.09	18.29
5	7.59	8.27	8.75	9.12	9.37	9.68	10.03	10.47	11.02	11.70	12.43	13.63	15.31	17.35
6	7.31	7.98	8.44	8.81	9.03	9.36	9.70	10.13	10.65	11.28	11.90	13.00	14.57	16.47
7	7.05	7.69	8.14	8.50	8.72	9.04	9.38	9.80	10.29	10.88	11.40	12.40	13.87	15.62
8	6.80	7.42	7.84	8.20	8.41	8.74	9.07	9.48	9.95	10.49	10.92	11.83	13.20	14.82
9	6.56	7.15	7.56	7.91	8.11	8.44	8.77	9.18	9.62	10.11	10.46	11.29	12.56	14.07
10	6.32	6.89	7.29	7.64	7.82	8.15	8.48	8.88	9.30	9.75	10.01	10.77	11.96	13.35
11	6.10	6.65	7.03	7.37	7.55	7.88	8.21	8.59	8.99	9.40	9.59	10.27	11.38	12.66
12	5.88	6.41	6.78	7.11	7.28	7.61	7.94	8.31	8.69	9.06	9.18	9.80	10.83	12.02
15	5.20	5.67	6.00	6.31	6.45	6.78	7.08	7.41	7.71	7.95	7.85	8.29	9.09	9.98
18	4.60	5.01	5.30	5.60	5.72	6.03	6.31	6.61	6.84	6.98	6.71	7.01	7.63	8.29
21	4.07	4.43	4.69	4.97	5.07	5.37	5.63	5.90	6.07	6.13	5.74	5.93	6.40	6.89
24	3.60	3.92	4.15	4.41	4.50	4.78	5.02	5.26	5.39	5.38	4.91	5.02	5.37	5.72
27	3.18	3.47	3.67	3.92	3.98	4.26	4.47	4.69	4.78	4.72	4.20	4.24	4.51	4.75
30	2.81	3.07	3.24	3.48	3.53	3.79	3.99	4.18	4.25	4.15	3.59	3.59	3.78	3.95
33	2.49	2.71	2.87	3.09	3.13	3.37	3.56	3.73	3.77	3.64	3.07	3.04	3.18	3.28
36	2.20	2.40	2.54	2.74	2.78	3.00	3.17	3.32	3.35	3.20	2.62	2.57	2.67	2.72
48	1.29	1.40	1.48	1.63	1.62	1.79	1.90	1.99	1.94	1.76	1.28	1.18	1.17	1.14
60	0.75	0.82	0.87	0.96	0.95	1.07	1.13	1.19	1.13	0.97	0.63	0.54	0.52	0.48
72	0.44	0.48	0.51	0.57	0.56	0.63	0.68	0.71	0.66	0.54	0.31	0.25	0.23	0.20
84	0.26	0.28	0.30	0.34	0.32	0.38	0.40	0.42	0.38	0.30	0.15	0.11	0.10	0.08
96	0.15	0.16	0.17	0.20	0.19	0.22	0.24	0.25	0.22	0.16	0.07	0.05	0.04	0.03
108	0.09	0.10	0.10	0.12	0.11	0.13	0.14	0.15	0.13	0.09	0.04	0.02	0.02	0.01
120	0.05	0.06	0.06	0.07	0.06	0.08	0.09	0.09	0.07	0.05	0.02	0.01	0.01	0.01

TABLE 17

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 3+; CI: YES; SEX: MALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	1.27	0.48	0.24	0.42	0.93	1.65	2.47	3.28	3.96	4.41	4.51	4.15	3.22	1.61
1	1.27	0.48	0.23	0.42	0.92	1.63	2.43	3.22	3.88	4.30	4.37	4.01	3.10	1.54
2	1.26	0.48	0.23	0.42	0.91	1.61	2.39	3.16	3.80	4.19	4.24	3.88	2.98	1.47
3	1.26	0.47	0.23	0.41	0.89	1.58	2.35	3.10	3.72	4.09	4.11	3.75	2.87	1.41
4	1.25	0.47	0.23	0.41	0.88	1.56	2.31	3.04	3.64	3.99	3.99	3.63	2.76	1.34
5	1.25	0.47	0.23	0.41	0.87	1.54	2.28	2.98	3.57	3.89	3.87	3.51	2.66	1.29
6	1.24	0.47	0.23	0.40	0.86	1.52	2.24	2.93	3.49	3.79	3.75	3.39	2.56	1.23
7	1.24	0.47	0.23	0.40	0.85	1.50	2.20	2.87	3.42	3.70	3.64	3.28	2.46	1.18
8	1.23	0.47	0.23	0.40	0.83	1.48	2.16	2.82	3.35	3.61	3.53	3.17	2.37	1.12
9	1.23	0.46	0.23	0.39	0.82	1.45	2.13	2.77	3.28	3.52	3.42	3.07	2.28	1.08
10	1.22	0.46	0.23	0.39	0.81	1.43	2.09	2.71	3.21	3.43	3.32	2.97	2.20	1.03
11	1.22	0.46	0.22	0.39	0.80	1.41	2.06	2.66	3.14	3.34	3.22	2.87	2.12	0.98
12	1.21	0.46	0.22	0.38	0.79	1.39	2.03	2.61	3.08	3.26	3.12	2.77	2.04	0.94
15	1.19	0.45	0.22	0.37	0.75	1.32	1.91	2.44	2.85	2.98	2.79	2.46	1.78	0.80
18	1.17	0.44	0.22	0.36	0.71	1.25	1.80	2.27	2.64	2.72	2.50	2.18	1.55	0.69
21	1.15	0.43	0.21	0.35	0.67	1.19	1.69	2.12	2.44	2.49	2.24	1.94	1.36	0.58
24	1.13	0.43	0.21	0.34	0.64	1.13	1.59	1.98	2.26	2.27	2.01	1.72	1.19	0.50
27	1.11	0.42	0.20	0.33	0.61	1.07	1.50	1.84	2.09	2.08	1.80	1.53	1.04	0.43
30	1.09	0.41	0.20	0.32	0.57	1.02	1.41	1.72	1.94	1.90	1.61	1.35	0.91	0.36
33	1.07	0.40	0.20	0.31	0.54	0.96	1.33	1.60	1.79	1.73	1.44	1.20	0.79	0.31
36	1.05	0.40	0.19	0.30	0.52	0.91	1.25	1.49	1.66	1.58	1.29	1.07	0.69	0.26
48	0.95	0.36	0.18	0.26	0.41	0.73	0.97	1.12	1.20	1.07	0.80	0.63	0.38	0.13
60	0.86	0.33	0.16	0.22	0.32	0.58	0.75	0.84	0.87	0.73	0.49	0.37	0.21	0.06
72	0.78	0.30	0.14	0.19	0.26	0.46	0.58	0.63	0.63	0.49	0.30	0.22	0.11	0.03
84	0.71	0.27	0.13	0.17	0.20	0.37	0.45	0.47	0.46	0.33	0.19	0.13	0.06	0.02
96	0.64	0.24	0.12	0.14	0.16	0.29	0.35	0.36	0.33	0.22	0.12	0.08	0.03	0.01
108	0.58	0.22	0.11	0.12	0.13	0.23	0.27	0.27	0.24	0.15	0.07	0.05	0.02	0.00
120	0.53	0.20	0.10	0.11	0.10	0.19	0.21	0.20	0.17	0.10	0.04	0.03	0.01	0.00

TABLE 18

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ALL ADL/CI STATUSES; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurreal Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1	98.88	98.41	98.10	97.95	97.86	97.82	97.78	97.67	97.42	96.94	96.14	94.98	93.06	91.36
2	97.79	96.87	96.26	95.97	95.80	95.72	95.64	95.41	94.94	94.02	92.50	90.32	86.82	83.73
3	96.73	95.39	94.48	94.05	93.80	93.68	93.57	93.24	92.55	91.23	89.05	85.99	81.18	76.99
4	95.71	93.95	92.76	92.20	91.87	91.71	91.56	91.13	90.25	88.56	85.79	81.95	76.09	71.01
5	94.72	92.56	91.11	90.41	90.00	89.80	89.62	89.10	88.04	86.00	82.71	78.19	71.47	65.69
6	93.76	91.22	89.50	88.67	88.19	87.95	87.74	87.14	85.91	83.56	79.79	74.69	67.28	60.95
7	92.82	89.92	87.96	87.00	86.44	86.17	85.92	85.24	83.85	81.22	77.03	71.41	63.46	56.71
8	91.92	88.66	86.46	85.38	84.75	84.44	84.16	83.41	81.87	78.98	74.40	68.35	59.98	52.91
9	91.04	87.44	85.02	83.81	83.11	82.76	82.46	81.63	79.96	76.83	71.92	65.48	56.79	49.49
10	90.19	86.27	83.62	82.29	81.52	81.14	80.81	79.92	78.12	74.77	69.55	62.79	53.87	46.40
11	89.36	85.13	82.28	80.83	79.99	79.57	79.21	78.26	76.34	72.80	67.30	60.27	51.19	43.61
12	88.55	84.02	80.97	79.41	78.50	78.05	77.66	76.66	74.63	70.91	65.17	57.90	48.72	41.07
15	85.99	80.54	76.88	74.93	73.80	73.23	72.73	71.54	69.18	64.97	58.64	50.88	41.73	34.07
18	83.66	77.42	73.22	70.92	69.58	68.90	68.30	66.96	64.33	59.75	53.04	45.03	36.15	28.66
21	81.53	74.61	69.94	67.32	65.79	64.99	64.31	62.83	59.99	55.15	48.19	40.11	31.61	24.41
24	79.58	72.07	67.00	64.08	62.38	61.48	60.70	59.12	56.10	51.08	43.98	35.93	27.87	20.99
27	77.80	69.78	64.37	61.17	59.30	58.30	57.45	55.77	52.60	47.45	40.29	32.35	24.73	18.20
30	76.16	67.71	62.00	58.54	56.52	55.43	54.49	52.73	49.44	44.20	37.04	29.25	22.07	15.88
33	74.64	65.82	59.86	56.17	54.01	52.82	51.81	49.98	46.57	41.29	34.16	26.55	19.80	13.94
36	73.24	64.10	57.93	54.02	51.73	50.45	49.37	47.47	43.97	38.66	31.59	24.18	17.83	12.29
48	67.95	57.97	51.20	46.52	43.72	41.99	40.55	38.41	34.61	29.30	22.71	16.32	11.44	7.15
60	63.87	53.61	46.64	41.42	38.26	36.16	34.40	32.04	28.04	22.87	16.85	11.42	7.65	4.36
72	60.52	50.31	43.35	37.77	34.35	31.94	29.89	27.33	23.20	18.21	12.77	8.18	5.26	2.76
84	57.64	47.63	40.80	34.99	31.38	28.72	26.43	23.71	19.48	14.71	9.82	5.96	3.68	1.79
96	55.06	45.35	38.70	32.76	29.02	26.16	23.66	20.80	16.54	12.00	7.63	4.39	2.61	1.19
108	52.69	43.32	36.89	30.87	27.04	24.03	21.36	18.40	14.16	9.86	5.97	3.26	1.88	0.80
120	50.49	41.47	35.27	29.21	25.32	22.20	19.41	16.37	12.19	8.15	4.70	2.44	1.35	0.54

TABLE 19

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 0; CI: YES; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	70.94	58.74	49.85	43.70	39.77	37.51	36.38	35.84	35.36	34.39	32.39	28.83	23.16	12.86
1	70.76	58.60	49.72	43.57	39.64	37.36	36.21	35.63	35.09	34.04	31.95	28.32	22.71	12.57
2	70.58	58.45	49.59	43.45	39.51	37.21	36.04	35.43	34.82	33.69	31.51	27.82	22.26	12.28
3	70.40	58.30	49.47	43.32	39.38	37.07	35.87	35.22	34.55	33.35	31.08	27.32	21.82	12.00
4	70.22	58.15	49.34	43.20	39.25	36.92	35.70	35.02	34.28	33.01	30.65	26.84	21.39	11.73
5	70.04	58.00	49.22	43.07	39.12	36.78	35.54	34.81	34.02	32.68	30.23	26.36	20.97	11.47
6	69.86	57.86	49.09	42.95	38.99	36.64	35.37	34.61	33.76	32.35	29.81	25.90	20.56	11.21
7	69.69	57.71	48.97	42.82	38.86	36.49	35.21	34.41	33.50	32.02	29.40	25.44	20.16	10.95
8	69.51	57.57	48.85	42.70	38.73	36.35	35.04	34.21	33.24	31.69	29.00	24.99	19.76	10.71
9	69.33	57.42	48.72	42.57	38.61	36.21	34.88	34.01	32.99	31.37	28.60	24.54	19.37	10.46
10	69.16	57.27	48.60	42.45	38.48	36.07	34.72	33.81	32.73	31.05	28.20	24.11	18.99	10.23
11	68.98	57.13	48.48	42.33	38.35	35.93	34.55	33.62	32.48	30.74	27.82	23.68	18.62	10.00
12	68.81	56.98	48.35	42.20	38.23	35.79	34.39	33.42	32.23	30.42	27.43	23.26	18.25	9.77
15	68.21	56.49	47.93	41.77	37.79	35.31	33.84	32.75	31.36	29.33	26.13	21.86	17.04	9.04
18	67.61	55.99	47.51	41.35	37.35	34.84	33.31	32.10	30.51	28.28	24.88	20.54	15.91	8.36
21	67.02	55.50	47.09	40.92	36.91	34.38	32.77	31.46	29.68	27.27	23.70	19.30	14.85	7.74
24	66.43	55.02	46.68	40.50	36.49	33.92	32.25	30.83	28.88	26.29	22.57	18.14	13.86	7.16
27	65.85	54.53	46.27	40.09	36.06	33.47	31.74	30.21	28.10	25.35	21.50	17.05	12.94	6.62
30	65.28	54.06	45.87	39.68	35.65	33.03	31.23	29.60	27.34	24.44	20.47	16.02	12.08	6.13
33	64.70	53.58	45.47	39.27	35.23	32.59	30.74	29.01	26.60	23.56	19.50	15.05	11.28	5.67
36	64.14	53.12	45.07	38.87	34.83	32.15	30.25	28.43	25.88	22.71	18.57	14.15	10.53	5.25
48	61.63	51.04	43.31	37.10	33.00	30.18	27.99	25.82	22.76	19.15	14.82	10.66	7.70	3.68
60	59.22	49.04	41.61	35.41	31.27	28.32	25.90	23.45	20.02	16.15	11.83	8.04	5.63	2.59
72	56.90	47.12	39.98	33.80	29.63	26.58	23.97	21.30	17.60	13.62	9.44	6.06	4.11	1.82
84	54.68	45.28	38.42	32.26	28.08	24.95	22.18	19.35	15.48	11.48	7.54	4.56	3.01	1.28
96	52.54	43.51	36.92	30.80	26.60	23.41	20.53	17.57	13.61	9.68	6.02	3.44	2.20	0.90
108	50.48	41.81	35.47	29.39	25.21	21.97	19.00	15.96	11.97	8.16	4.80	2.59	1.61	0.63
120	48.51	40.17	34.09	28.06	23.89	20.62	17.58	14.50	10.53	6.88	3.83	1.95	1.17	0.44

TABLE 20

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: I; CI: NO; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	17.77	26.79	32.63	35.81	36.85	36.27	34.60	32.36	30.08	28.27	27.46	28.18	30.95	36.29
1	17.11	25.80	31.42	34.50	35.50	34.90	33.24	30.96	28.58	26.55	25.37	25.44	26.88	30.85
2	16.47	24.84	30.25	33.24	34.20	33.59	31.94	29.62	27.15	24.94	23.43	22.96	23.34	26.23
3	15.86	23.92	29.13	32.02	32.95	32.33	30.69	28.34	25.80	23.42	21.64	20.72	20.27	22.30
4	15.27	23.03	28.05	30.85	31.75	31.11	29.48	27.12	24.52	22.00	19.98	18.70	17.60	18.96
5	14.70	22.17	27.00	29.72	30.58	29.94	28.33	25.94	23.30	20.66	18.46	16.88	15.29	16.12
6	14.16	21.35	26.00	28.63	29.47	28.81	27.21	24.82	22.14	19.40	17.05	15.23	13.27	13.71
7	13.63	20.55	25.03	27.58	28.39	27.73	26.15	23.75	21.03	18.22	15.75	13.75	11.53	11.66
8	13.12	19.79	24.10	26.57	27.35	26.69	25.12	22.72	19.99	17.12	14.54	12.41	10.01	9.91
9	12.64	19.06	23.21	25.60	26.35	25.68	24.14	21.74	18.99	16.08	13.43	11.20	8.69	8.43
10	12.17	18.35	22.35	24.66	25.39	24.72	23.19	20.80	18.05	15.10	12.41	10.11	7.55	7.16
11	11.71	17.67	21.52	23.76	24.46	23.79	22.28	19.90	17.15	14.18	11.46	9.12	6.56	6.09
12	11.28	17.01	20.72	22.89	23.56	22.89	21.41	19.04	16.29	13.32	10.58	8.23	5.69	5.18
15	9.92	14.97	18.23	20.18	20.78	20.11	18.70	16.40	13.75	10.85	8.22	5.99	3.72	3.18
18	8.73	13.17	16.04	17.79	18.32	17.66	16.33	14.13	11.61	8.83	6.38	4.36	2.43	1.95
21	7.68	11.58	14.11	15.69	16.16	15.51	14.26	12.18	9.79	7.19	4.95	3.17	1.59	1.20
24	6.76	10.19	12.41	13.83	14.25	13.63	12.46	10.49	8.27	5.86	3.84	2.31	1.04	0.73
27	5.95	8.97	10.92	12.19	12.56	11.97	10.88	9.04	6.98	4.77	2.98	1.68	0.68	0.45
30	5.23	7.89	9.61	10.75	11.08	10.51	9.50	7.79	5.89	3.88	2.32	1.22	0.44	0.28
33	4.60	6.94	8.46	9.48	9.77	9.23	8.30	6.71	4.97	3.16	1.80	0.89	0.29	0.17
36	4.05	6.11	7.44	8.35	8.61	8.11	7.25	5.78	4.19	2.58	1.40	0.65	0.19	0.10
48	2.29	3.45	4.20	4.77	4.92	4.56	3.99	3.01	2.00	1.06	0.48	0.17	0.03	0.01
60	1.29	1.95	2.37	2.72	2.81	2.56	2.19	1.56	0.96	0.44	0.16	0.05	0.01	0.00
72	0.73	1.10	1.34	1.55	1.61	1.44	1.21	0.81	0.46	0.18	0.06	0.01	0.00	0.00
84	0.41	0.62	0.76	0.89	0.92	0.81	0.66	0.42	0.22	0.07	0.02	0.00	0.00	0.00
96	0.23	0.35	0.43	0.51	0.52	0.46	0.37	0.22	0.10	0.03	0.01	0.00	0.00	0.00
108	0.13	0.20	0.24	0.29	0.30	0.26	0.20	0.11	0.05	0.01	0.00	0.00	0.00	0.00
120	0.07	0.11	0.14	0.17	0.17	0.14	0.11	0.06	0.02	0.01	0.00	0.00	0.00	0.00

TABLE 21

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 1; CI: YES; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	1.54	1.07	1.00	1.24	1.72	2.33	2.99	3.61	4.12	4.40	4.39	3.99	3.12	1.68
1	1.54	1.07	1.00	1.24	1.70	2.30	2.95	3.56	4.03	4.28	4.23	3.80	2.88	1.53
2	1.53	1.06	0.99	1.23	1.69	2.28	2.92	3.51	3.95	4.16	4.08	3.62	2.66	1.39
3	1.53	1.06	0.99	1.22	1.68	2.26	2.88	3.46	3.88	4.05	3.93	3.45	2.46	1.26
4	1.52	1.06	0.99	1.22	1.67	2.24	2.85	3.41	3.80	3.93	3.79	3.29	2.28	1.15
5	1.52	1.05	0.98	1.21	1.66	2.22	2.82	3.36	3.73	3.82	3.65	3.13	2.10	1.04
6	1.51	1.05	0.98	1.20	1.65	2.20	2.78	3.31	3.65	3.72	3.52	2.98	1.94	0.95
7	1.51	1.05	0.98	1.20	1.64	2.18	2.75	3.27	3.58	3.61	3.39	2.84	1.80	0.86
8	1.51	1.04	0.98	1.19	1.63	2.16	2.72	3.22	3.51	3.51	3.26	2.71	1.66	0.78
9	1.50	1.04	0.97	1.19	1.62	2.13	2.69	3.17	3.44	3.41	3.15	2.58	1.53	0.71
10	1.50	1.04	0.97	1.18	1.61	2.11	2.66	3.13	3.37	3.32	3.03	2.46	1.42	0.64
11	1.49	1.04	0.97	1.17	1.60	2.09	2.62	3.08	3.31	3.23	2.92	2.34	1.31	0.59
12	1.49	1.03	0.96	1.17	1.59	2.07	2.59	3.04	3.24	3.13	2.81	2.23	1.21	0.53
15	1.48	1.02	0.96	1.15	1.56	2.01	2.48	2.88	3.02	2.85	2.50	1.92	0.96	0.40
18	1.46	1.01	0.95	1.13	1.53	1.94	2.38	2.73	2.82	2.59	2.22	1.65	0.77	0.31
21	1.45	1.01	0.94	1.11	1.49	1.88	2.28	2.59	2.63	2.36	1.97	1.43	0.61	0.23
24	1.44	1.00	0.93	1.10	1.46	1.82	2.18	2.45	2.45	2.14	1.75	1.23	0.48	0.18
27	1.43	0.99	0.92	1.08	1.43	1.76	2.09	2.33	2.29	1.95	1.55	1.06	0.39	0.13
30	1.41	0.98	0.92	1.06	1.40	1.70	2.00	2.21	2.13	1.77	1.38	0.91	0.31	0.10
33	1.40	0.97	0.91	1.05	1.37	1.64	1.92	2.09	1.99	1.61	1.22	0.79	0.24	0.08
36	1.39	0.96	0.90	1.03	1.34	1.59	1.84	1.98	1.86	1.46	1.09	0.68	0.19	0.06
48	1.32	0.91	0.85	0.93	1.20	1.35	1.51	1.57	1.37	0.96	0.64	0.35	0.07	0.02
60	1.25	0.87	0.81	0.85	1.08	1.15	1.24	1.24	1.01	0.63	0.38	0.18	0.03	0.01
72	1.19	0.82	0.77	0.77	0.97	0.98	1.02	0.98	0.75	0.42	0.23	0.09	0.01	0.00
84	1.13	0.78	0.73	0.70	0.87	0.83	0.84	0.77	0.55	0.27	0.13	0.05	0.00	0.00
96	1.07	0.74	0.69	0.64	0.78	0.71	0.69	0.61	0.41	0.18	0.08	0.02	0.00	0.00
108	1.01	0.70	0.66	0.58	0.70	0.60	0.56	0.48	0.30	0.12	0.05	0.01	0.00	0.00
120	0.96	0.67	0.62	0.53	0.63	0.51	0.46	0.38	0.22	0.08	0.03	0.01	0.00	0.00

TABLE 22

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: 2; CI: NO; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	3.57	5.96	7.64	8.75	9.42	9.79	10.00	10.18	10.47	11.00	11.91	13.34	15.42	18.28
1	3.44	5.75	7.37	8.45	9.11	9.48	9.70	9.87	10.14	10.59	11.34	12.54	14.22	16.69
2	3.32	5.55	7.12	8.17	8.81	9.19	9.40	9.58	9.82	10.20	10.81	11.79	13.12	15.24
3	3.21	5.36	6.87	7.90	8.52	8.90	9.12	9.29	9.51	9.83	10.29	11.09	12.10	13.91
4	3.10	5.17	6.64	7.63	8.24	8.62	8.84	9.01	9.21	9.46	9.80	10.43	11.16	12.70
5	2.99	5.00	6.41	7.38	7.96	8.35	8.57	8.74	8.92	9.11	9.34	9.80	10.30	11.59
6	2.89	4.82	6.19	7.13	7.70	8.09	8.31	8.47	8.64	8.78	8.90	9.22	9.50	10.58
7	2.79	4.66	5.97	6.89	7.45	7.83	8.06	8.22	8.37	8.45	8.47	8.67	8.76	9.66
8	2.69	4.50	5.77	6.66	7.20	7.59	7.82	7.97	8.11	8.14	8.07	8.15	8.08	8.82
9	2.60	4.34	5.57	6.44	6.97	7.35	7.58	7.73	7.86	7.84	7.69	7.67	7.46	8.05
10	2.51	4.19	5.37	6.22	6.74	7.12	7.35	7.50	7.61	7.55	7.33	7.21	6.88	7.35
11	2.42	4.05	5.19	6.01	6.51	6.90	7.13	7.28	7.37	7.28	6.98	6.78	6.34	6.71
12	2.34	3.91	5.01	5.81	6.30	6.68	6.91	7.06	7.14	7.01	6.65	6.37	5.85	6.13
15	2.08	3.47	4.45	5.19	5.63	5.99	6.22	6.35	6.39	6.15	5.62	5.17	4.50	4.57
18	1.85	3.09	3.96	4.63	5.03	5.38	5.60	5.72	5.71	5.40	4.76	4.20	3.46	3.41
21	1.64	2.75	3.52	4.13	4.49	4.83	5.04	5.15	5.11	4.74	4.03	3.41	2.67	2.54
24	1.46	2.44	3.13	3.69	4.01	4.34	4.53	4.63	4.57	4.16	3.41	2.76	2.05	1.89
27	1.30	2.17	2.78	3.29	3.59	3.89	4.08	4.17	4.09	3.65	2.88	2.24	1.58	1.41
30	1.15	1.93	2.47	2.94	3.20	3.49	3.67	3.75	3.66	3.21	2.44	1.82	1.21	1.05
33	1.03	1.72	2.20	2.62	2.86	3.14	3.30	3.38	3.27	2.81	2.07	1.48	0.93	0.79
36	0.91	1.52	1.96	2.34	2.56	2.81	2.97	3.04	2.93	2.47	1.75	1.20	0.72	0.59
48	0.54	0.90	1.15	1.40	1.55	1.73	1.85	1.89	1.77	1.37	0.83	0.47	0.23	0.16
60	0.32	0.53	0.67	0.84	0.93	1.06	1.16	1.17	1.07	0.76	0.39	0.19	0.07	0.04
72	0.19	0.31	0.40	0.50	0.56	0.65	0.72	0.73	0.65	0.42	0.19	0.07	0.02	0.01
84	0.11	0.18	0.23	0.30	0.34	0.40	0.45	0.45	0.39	0.23	0.09	0.03	0.01	0.00
96	0.06	0.11	0.14	0.18	0.21	0.25	0.28	0.28	0.24	0.13	0.04	0.01	0.00	0.00
108	0.04	0.06	0.08	0.11	0.12	0.15	0.18	0.17	0.14	0.07	0.02	0.00	0.00	0.00
120	0.02	0.04	0.05	0.06	0.08	0.09	0.11	0.11	0.09	0.04	0.01	0.00	0.00	0.00

TABLE 23

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 2; CI: YES; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	0.88	0.38	0.21	0.32	0.62	1.06	1.57	2.06	2.49	2.77	2.84	2.63	2.07	1.10
1	0.88	0.38	0.21	0.31	0.62	1.05	1.55	2.04	2.45	2.72	2.77	2.54	1.98	1.04
2	0.87	0.37	0.21	0.31	0.61	1.05	1.54	2.02	2.42	2.67	2.70	2.46	1.90	0.98
3	0.87	0.37	0.21	0.31	0.61	1.04	1.52	2.00	2.39	2.63	2.63	2.38	1.82	0.93
4	0.87	0.37	0.21	0.31	0.61	1.03	1.51	1.98	2.36	2.58	2.56	2.30	1.74	0.88
5	0.86	0.37	0.21	0.31	0.60	1.02	1.50	1.96	2.32	2.53	2.50	2.22	1.67	0.83
6	0.86	0.37	0.21	0.31	0.60	1.02	1.48	1.94	2.29	2.49	2.43	2.15	1.60	0.79
7	0.85	0.36	0.20	0.31	0.60	1.01	1.47	1.92	2.26	2.44	2.37	2.07	1.53	0.74
8	0.85	0.36	0.20	0.30	0.59	1.00	1.46	1.89	2.23	2.40	2.31	2.00	1.46	0.70
9	0.84	0.36	0.20	0.30	0.59	0.99	1.45	1.87	2.20	2.36	2.25	1.94	1.40	0.67
10	0.84	0.36	0.20	0.30	0.58	0.99	1.43	1.85	2.17	2.32	2.20	1.87	1.34	0.63
11	0.84	0.36	0.20	0.30	0.58	0.98	1.42	1.84	2.14	2.27	2.14	1.81	1.28	0.60
12	0.83	0.36	0.20	0.30	0.58	0.97	1.41	1.82	2.11	2.23	2.09	1.75	1.23	0.56
15	0.82	0.35	0.20	0.29	0.56	0.94	1.36	1.74	2.01	2.09	1.91	1.56	1.06	0.47
18	0.80	0.34	0.19	0.29	0.55	0.92	1.32	1.67	1.91	1.96	1.75	1.39	0.92	0.39
21	0.79	0.34	0.19	0.28	0.53	0.89	1.27	1.61	1.82	1.83	1.60	1.24	0.80	0.33
24	0.77	0.33	0.18	0.28	0.52	0.86	1.23	1.54	1.73	1.71	1.46	1.11	0.69	0.27
27	0.76	0.32	0.18	0.27	0.51	0.84	1.19	1.48	1.64	1.60	1.34	0.99	0.60	0.23
30	0.74	0.32	0.18	0.27	0.50	0.81	1.15	1.42	1.56	1.50	1.22	0.88	0.52	0.19
33	0.73	0.31	0.17	0.26	0.48	0.79	1.11	1.37	1.48	1.40	1.12	0.79	0.45	0.16
36	0.71	0.30	0.17	0.26	0.47	0.76	1.08	1.31	1.41	1.31	1.02	0.70	0.39	0.13
48	0.63	0.27	0.15	0.23	0.40	0.64	0.89	1.07	1.09	0.96	0.68	0.43	0.21	0.06
60	0.56	0.24	0.13	0.20	0.35	0.53	0.74	0.87	0.85	0.71	0.46	0.26	0.11	0.03
72	0.50	0.21	0.12	0.18	0.30	0.45	0.61	0.70	0.66	0.52	0.30	0.16	0.06	0.01
84	0.45	0.19	0.11	0.16	0.25	0.37	0.51	0.57	0.51	0.38	0.20	0.10	0.03	0.01
96	0.40	0.17	0.09	0.14	0.22	0.31	0.42	0.46	0.40	0.28	0.13	0.06	0.02	0.00
108	0.35	0.15	0.08	0.13	0.19	0.26	0.35	0.38	0.31	0.21	0.09	0.04	0.01	0.00
120	0.31	0.13	0.07	0.11	0.16	0.22	0.29	0.31	0.24	0.15	0.06	0.02	0.01	0.00

TABLE 24

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLs: 3+; CI: NO; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	4.01	6.36	8.09	9.36	10.30	11.07	11.81	12.68	13.82	15.38	17.51	20.36	24.07	28.80
1	3.86	6.13	7.80	9.05	9.97	10.75	11.49	12.36	13.49	15.00	17.03	19.70	23.19	27.70
2	3.72	5.90	7.51	8.75	9.66	10.45	11.19	12.05	13.16	14.64	16.56	19.06	22.35	26.64
3	3.59	5.69	7.24	8.47	9.36	10.15	10.89	11.75	12.84	14.28	16.10	18.45	21.54	25.63
4	3.45	5.48	6.97	8.19	9.06	9.87	10.60	11.45	12.53	13.93	15.65	17.85	20.76	24.65
5	3.33	5.28	6.72	7.92	8.78	9.59	10.31	11.16	12.23	13.59	15.22	17.27	20.00	23.71
6	3.21	5.09	6.47	7.66	8.50	9.32	10.04	10.88	11.94	13.26	14.80	16.72	19.28	22.81
7	3.09	4.90	6.23	7.41	8.24	9.05	9.77	10.61	11.65	12.93	14.39	16.18	18.57	21.94
8	2.98	4.72	6.01	7.17	7.98	8.80	9.51	10.35	11.37	12.61	14.00	15.65	17.90	21.10
9	2.87	4.55	5.79	6.93	7.73	8.55	9.25	10.09	11.09	12.31	13.61	15.15	17.25	20.30
10	2.76	4.38	5.57	6.71	7.49	8.31	9.01	9.83	10.83	12.01	13.23	14.66	16.62	19.52
11	2.66	4.22	5.37	6.49	7.25	8.07	8.77	9.59	10.57	11.71	12.87	14.18	16.02	18.78
12	2.56	4.07	5.17	6.27	7.02	7.85	8.53	9.35	10.31	11.43	12.51	13.73	15.44	18.06
15	2.26	3.59	4.57	5.61	6.31	7.12	7.78	8.56	9.47	10.46	11.30	12.15	13.45	15.62
18	2.00	3.17	4.03	5.01	5.66	6.46	7.09	7.84	8.69	9.58	10.20	10.76	11.71	13.51
21	1.76	2.80	3.56	4.48	5.09	5.86	6.47	7.18	7.98	8.77	9.21	9.53	10.20	11.68
24	1.56	2.47	3.14	4.00	4.57	5.32	5.89	6.58	7.33	8.03	8.31	8.44	8.89	10.10
27	1.37	2.18	2.77	3.58	4.10	4.83	5.37	6.03	6.73	7.35	7.50	7.47	7.74	8.74
30	1.21	1.92	2.45	3.20	3.68	4.38	4.90	5.52	6.18	6.73	6.77	6.62	6.74	7.56
33	1.07	1.70	2.16	2.86	3.31	3.98	4.47	5.06	5.67	6.16	6.12	5.86	5.87	6.53
36	0.95	1.50	1.91	2.55	2.97	3.61	4.07	4.63	5.21	5.64	5.52	5.19	5.11	5.65
48	0.54	0.86	1.09	1.55	1.84	2.33	2.68	3.11	3.51	3.73	3.41	2.93	2.66	2.84
60	0.31	0.49	0.63	0.94	1.14	1.51	1.76	2.09	2.36	2.46	2.11	1.65	1.38	1.42
72	0.18	0.28	0.36	0.57	0.70	0.98	1.16	1.40	1.59	1.63	1.30	0.93	0.72	0.71
84	0.10	0.16	0.21	0.35	0.44	0.63	0.76	0.94	1.07	1.08	0.80	0.53	0.37	0.36
96	0.06	0.09	0.12	0.21	0.27	0.41	0.50	0.63	0.72	0.71	0.50	0.30	0.19	0.18
108	0.03	0.05	0.07	0.13	0.17	0.26	0.33	0.42	0.48	0.47	0.31	0.17	0.10	0.09
120	0.02	0.03	0.04	0.08	0.10	0.17	0.22	0.28	0.33	0.31	0.19	0.10	0.05	0.05

TABLE 25

NONINSTITUTIONAL DISABILITY DAYS BY ADL/CI STATUS AND DURATION FROM INCURRAL; ADLS: 3+; CI: YES; SEX: FEMALE

Duration (Months)	Percentage of Noninstitutional Disability Days beyond Duration													
	Incurral Age													
	37	42	47	52	57	62	67	72	77	82	87	92	97	102
0	1.30	0.70	0.58	0.83	1.33	1.98	2.66	3.26	3.68	3.79	3.49	2.67	1.21	1.00
1	1.29	0.70	0.58	0.82	1.32	1.96	2.64	3.24	3.65	3.75	3.46	2.64	1.20	0.99
2	1.29	0.70	0.58	0.82	1.31	1.95	2.62	3.21	3.61	3.72	3.42	2.61	1.18	0.97
3	1.28	0.69	0.57	0.81	1.30	1.93	2.60	3.18	3.58	3.68	3.39	2.58	1.17	0.96
4	1.28	0.69	0.57	0.81	1.29	1.92	2.58	3.15	3.55	3.64	3.35	2.55	1.15	0.94
5	1.27	0.69	0.57	0.80	1.28	1.90	2.56	3.12	3.52	3.61	3.32	2.52	1.14	0.93
6	1.27	0.69	0.57	0.79	1.27	1.89	2.54	3.10	3.48	3.57	3.29	2.49	1.13	0.91
7	1.27	0.68	0.57	0.79	1.26	1.87	2.51	3.07	3.45	3.54	3.25	2.47	1.11	0.90
8	1.26	0.68	0.56	0.78	1.25	1.86	2.49	3.04	3.42	3.50	3.22	2.44	1.10	0.89
9	1.26	0.68	0.56	0.78	1.25	1.84	2.47	3.02	3.39	3.47	3.19	2.41	1.09	0.87
10	1.25	0.68	0.56	0.77	1.24	1.83	2.45	2.99	3.36	3.43	3.16	2.38	1.07	0.86
11	1.25	0.67	0.56	0.77	1.23	1.81	2.43	2.96	3.33	3.40	3.13	2.36	1.06	0.85
12	1.24	0.67	0.56	0.76	1.22	1.80	2.41	2.94	3.30	3.36	3.09	2.33	1.05	0.83
15	1.22	0.66	0.55	0.74	1.18	1.74	2.35	2.85	3.19	3.24	2.97	2.23	0.99	0.78
18	1.20	0.65	0.54	0.72	1.15	1.69	2.28	2.76	3.08	3.12	2.86	2.13	0.94	0.74
21	1.18	0.64	0.53	0.70	1.11	1.64	2.22	2.67	2.97	3.00	2.74	2.04	0.90	0.69
24	1.16	0.63	0.52	0.68	1.08	1.59	2.15	2.59	2.87	2.89	2.64	1.95	0.85	0.65
27	1.15	0.62	0.51	0.66	1.05	1.55	2.09	2.51	2.77	2.78	2.53	1.86	0.81	0.61
30	1.13	0.61	0.50	0.65	1.02	1.50	2.03	2.43	2.68	2.68	2.43	1.78	0.77	0.58
33	1.11	0.60	0.50	0.63	0.98	1.46	1.98	2.36	2.59	2.58	2.34	1.70	0.73	0.54
36	1.09	0.59	0.49	0.61	0.96	1.41	1.92	2.28	2.50	2.49	2.24	1.63	0.69	0.51
48	1.00	0.54	0.45	0.53	0.81	1.20	1.64	1.94	2.11	2.07	1.85	1.31	0.54	0.37
60	0.92	0.49	0.41	0.45	0.68	1.02	1.40	1.66	1.78	1.72	1.52	1.06	0.42	0.27
72	0.84	0.45	0.38	0.39	0.58	0.86	1.20	1.41	1.50	1.43	1.25	0.85	0.33	0.20
84	0.77	0.41	0.34	0.33	0.49	0.73	1.02	1.20	1.27	1.19	1.03	0.69	0.26	0.14
96	0.70	0.38	0.32	0.28	0.41	0.62	0.87	1.02	1.07	0.99	0.85	0.56	0.20	0.11
108	0.64	0.35	0.29	0.24	0.35	0.52	0.75	0.87	0.90	0.82	0.70	0.45	0.16	0.08
120	0.59	0.32	0.26	0.21	0.29	0.45	0.64	0.74	0.76	0.68	0.58	0.36	0.12	0.06

D. Considerations in Using the Noninstitutional Tables

In order to use the tables to construct claim costs appropriate for the valuation of noninstitutional benefits, the valuation actuary should consider the following.

- How does the benefit trigger of the policy relate to the ADL/CI definitions used to construct the tables? Different ADL types and definitions of impairment may require translation to use the tables. For each tabular ADL/CI status, the valuation actuary must determine the probability of the policy's benefit trigger being met to the satisfaction of the those responsible for claim administration.
- The valuation actuary must further determine the rate of benefit utilization by the policyholder for each ADL/CI status. Such an assessment might consider the policyholder's perception of service options, available financing, disposition toward use of benefits, availability of spouse or family informal care, and possible interaction with institutional policy benefits. Absent any reasonable basis for determining the impact of such factors, the valuation actuary might conservatively assume that the policyholder will fully utilize policy benefits whenever the benefit trigger is satisfied.
- For examples of testing the valuation actuary may want to consider, see Cases 5, 6, 7, and 8 of Appendix C.
- What is the impact of underwriting, or lack thereof, on the incidence rates and average number of disability days? Similarly, what impact is associated with antiselective lapsation? These are discussed in Section VII.
- In what manner can episodic policy limits for noninstitutional benefits be reflected in the calculations? What is the impact of aggregate lifetime benefit limits for such a policy?
- The tables assume that the onset of a disability period is the point at which the individual failed in at least one ADL or was cognitively impaired, even if the benefit trigger is more restrictive. What adjustments are appropriate for the policy definition of claim incurral? While regroupings of disability months might significantly affect incidence rates and average disability days per episode, the quinquennial claims costs (the product) are not likely to change dramatically. These considerations may be more significant for claim reserve determination.

Claim costs by incurral age are obtained by multiplying the disability episode incidence rates by the corresponding average noninstitutional policy benefit. The latter is determined as the sum over all ADL/CI statuses and payment durations of the tabular percentage of disability days falling in that status/duration and the valuation actuary's estimate of noninstitutional benefits arising in that case.

For example, suppose the policy provides for a two-year home health care benefit of up to \$50 per day after satisfying a three-month elimination period. The benefit trigger is 2 ADLs or CI. If we assume full utilization of benefits while the trigger is satisfied, the valuation actuary might proceed as follows. Assume again a 72-year-old female.

For each ADL/CI status, evaluate the percentage of disability days falling between 3 months and 27 months from incurral. If the actual elimination and benefit periods are measured in cumulative benefit (service) days rather than calendar days, a further adjustment would be necessary. That is, 24 benefit months would correspond to 48 calendar months if benefits were utilized only 15 days per month. This conversion rate would vary with ADL/CI status; that is, benefit utilization would be greater for more severe impairment. (The valuation diskette uses such a technique, allowing the calendar-to-service time conversion rate to vary by duration from incurral and ADL/CI status.) In this example, no adjustments are made.

ADL: 0	CI: yes	$0.3522 - 0.3021 = 0.0501$
ADL: 1	CI: no	$0.2834 - 0.0904 = 0.1930$
ADL: 1	CI: yes	$0.0346 - 0.0233 = 0.0113$
ADL: 2	CI: no	$0.0929 - 0.0417 = 0.0512$
ADL: 2	CI: yes	$0.0200 - 0.0148 = 0.0052$
ADL: 3+	CI: no	$0.1175 - 0.0603 = 0.0572$
ADL: 3+	CI: yes	$0.0315 - 0.0251 = 0.0064$

Excluding the portion associated with 1 ADL and no CI, the total is 18.14% of the 961 noninstitutional disability day average, about 174 days per episode. At \$50 per day and with an incidence rate of 0.02445 per year, the claim cost is equal to $\$50 \times 0.02445 \times 174 = \213 per year.

No simple method can anticipate the many variations in policy specifications and other environmental factors encountered in practice. The valuation actuary must be relied upon to make appropriate adjustments to such baseline calculations.

IV. APPLICATION OF TABLES

Historically, many LTC policies provided only nursing home (institutional) coverage. In more recent years, home health care coverage has been provided. Some have provided home health care alone. Other LTC policies have been developed as what might be called comprehensive LTC policies, providing both basic types of coverage. These two basic types are included in a wide variety of combinations (such as different maximum benefit amounts, different daily benefit amounts, and different benefit triggers). Policies often provide a “pot of money” to be spent in any combination of nursing home and home health care that the eligible insured chooses.

It is clear that there are an unlimited number of ways in which institutional and noninstitutional benefits can be—and are—combined in LTC insurance policies. That presents very real challenges for developing valuation recommendations.

In some comments in other sections in this final report, reference is made to when and how the tables of Sections II and III are to be combined for policies with elements of both institutional and noninstitutional LTC insurance. For those and many other forms of variables to be recognized in the valuation, the valuation actuary should consider the assistance provided by the valuation diskette that is a companion to this final report, which is available from the SOA office. That valuation diskette provides guidance on the use of those basic tables. Assumptions needed to be made are identified, and default assumptions are provided. This is described in Appendixes D and E to this final report.

The LTC valuation actuary will find it beneficial to become familiar with that valuation diskette.

It is instructive to identify some of the LTC insurance product elements for which the valuation actuary may need to make adjustments to these valuation recommendations, including especially the morbidity tables that are found in Sections II and III.

A. Product Features

- Institutional policies may need morbidity adjustments for features of older generations of policies that define eligible benefits related to the requirements of a three-day hospital stay or the institution's levels of care (for example, skilled before lesser level).
- Noninstitutional benefits may require adjustment factors for various features that may not be included in the standard table, such as: respite care; adult day care; hospice care; various definitions of how the elimination period can be satisfied; and homemaker care services.
- All tables may need "integrated frequency adjustment factors" to account for the various combinations of institutional/noninstitutional LTC possibly provided in the policies. These may be:
 - An appropriate load for an institutional-only policy
 - An appropriate load for a noninstitutional-only policy
 - An appropriate reduction for comprehensive (that is, both institutional and noninstitutional) policies.

The Task Force believes that the financial impact of separate elimination periods and benefit periods for institutional and noninstitutional portions of a plan is not significantly different from combined such limits.

- All tables may need an adjustment load for nonforfeiture benefits. (See Section X for discussion of this.)
- All tables may need an adjustment load for an indexed inflation protection feature.
- Some tables may need adjustment for indemnity versus expense-incurred benefit structures.
- All tables may need adjustment for claims-paying policies.
- All tables may need morbidity adjustment for alternative plans of care.
- All tables may need morbidity adjustment for variation in service utilization: noninstitutional for variation in service providers for which benefits would be paid (for example, licensure requirements) or institutional for variation in definition of types of institutions covered (for example, assisted-living facilities, Alzheimer's units).
- All tables may need adjustments for elimination period, maximum benefit amount, and daily benefit amount selection and antiselection (that is, loads or discounts beyond what the pure continuance tables would produce).

Illustrative of adjustments tested by the Task Force are Cases 9 and 10 of Appendix C.

B. Benefit Triggers

Many of today's LTC policies utilize ADLs as a trigger to determine an insured's eligibility for LTC benefits. While the use of ADLs has become very common, the specific ADLs used and the trigger points for benefits vary significantly by LTC product. In addition, some states regulate what ADLs can be used and what their trigger points are (for example, states such as Kansas, Texas, and California). The NAIC currently has a LTC Benefit Triggers Working Group studying the subject, intending some standardization, the outcome of which may lead to changes that the valuation actuary should take into consideration.

To merely illustrate the possible ADL variations, Table 26 shows some of the benefit triggers in use for each of a number of individual products for home health care.

TABLE 26
BENEFIT TRIGGERS USED BY SEVEN INSURERS FOR HOME HEALTH CARE

ADL	Insurer						
	A	B	C	D	E	F	G
Bathing					X		X
Dressing	X	X	X	X	X	X	X
Toileting	X	X	X	X	X	X	X
Transferring	X	X		X	X	X	X
Mobility			X				
Continence	X	X		X		X	X
Feeding	X	X	X	X	X	X	X
Taking Medication			X				
Trigger Number	1	2	2	2	2	2	2
Alternative Trigger(s)*	CI	MN	CI MN	—	CI MN	CI	CI

*CI = cognitive impairment; MN = medical necessity.

The impact of benefit triggers must be considered carefully. In particular, the valuation actuary should consider the following.

- Actual claim practices should be used in setting reserves. For example, an older policy that has a 3-day prior hospital stay trigger but is being administered as if that provision had been waived should be reserved accordingly. Likewise, a 3 ADL trigger that is being administered as if only 2 are required should be valued accordingly.
- The ADL and/or CI trigger is very much secondary to the nursing home placement in evaluating nursing facility utilization. Living in an institution may be presumptive evidence that the benefit trigger, however

defined, has been met. As a result, ADL adjustments may apply only, or to a much greater extent, to noninstitutional tables. (The resistance of the elderly to a nursing home placement may serve as self-policing risk management, although it is not always the elderly insured who makes the decision.)

- ADL adjustment for home health care benefits is more critical. The ADL trigger may be of primary significance in accurately predicting the population that will be eligible for services.
- There is no uniformly agreed-upon wording for any one ADL, and it is not likely that there will be soon. Also, they can be mixed and combined in various ways; this should be recognized.
- Agreement on a “hierarchy” to the ADL losses would be helpful to determine comparability of different triggers.
 - There is literature from research to support a definitive hierarchy to the 6-point Katz ADL scale: the ability to perform ADLs almost always (83%+) fails in the order, from first to last, of bathing, dressing, toileting, transferring, continence, and feeding.
 - Loss of continence often does not follow a predictable order.
 - It is not so clear where “taking medication” or “mobility” fall in the hierarchy.
- The degree of help needed to trigger benefits under an ADL definition is an important consideration. For example, the difference between “stand-by assistance” and “total dependence on human assistance” can be significant.
- Many policies include medical necessity and/or CI as an alternative trigger. This may significantly dampen the importance of the ADL trigger, because insureds will have alternative paths to qualifying for benefits.
- In the absence of any alternative triggers, the differences in the various ADL triggers still can be significant enough to warrant an adjustment in the standard tables.

C. Spousal Discount

Quite often, a discount in the premium is offered to an insured if the spouse of the insured is living or if the spouse of the insured is also insured. Some companies are more restrictive than others about the risk classification of the spouse and the continuation of the discount when the spouse dies. The amount of discount varies by company but is commonly 10% or 15% for both spouses insured.

General population statistics show that there are indeed differences in mortality and morbidity between married people and unmarried people. Lew and Garfinkel's paper, "Mortality at Ages 65 and Over" [*TSA XXXVI* (1984): 257–308], shows lower mortality for married people. The presence of a spouse as a caregiver is the obvious reason for the significantly smaller rate of institutionalization and the shorter length of stay of married people who are institutionalized in the 1985 NNHS. For example, the median duration of stay in the discharge portion of the 1985 NNHS is 41 days for married people, 107 days for widowed people, and 101 days for those who were never married. These are a function, probably, of a combination of both those less likely to be admitted if married, and thus more likely to be discharged dead, and those more likely to be discharged alive to an available spouse.

The presence of a caregiver, who may need help from time to time, may also be the reason for greater use of home health care by married people. Since a person who is married on the issue date of LTC insurance may later be unmarried, the claim cost curve for such a person is steeper than for a person unmarried at issue. Because of this, active life reserves reduced by the same percentage as may be used in discounting premiums may not produce adequate reserves.

Another factor for married couples is contagion. Often, the death or nursing home admission of one spouse is followed shortly by the death or admission of the other. This has been noted in the general population even when no contagious disease is involved.

When LTC insurance is introduced, a person's willingness to be a caregiver or to be the sole caregiver may diminish, because the insurance could be used to reduce the financial strain of having professional help. This situation would have a greater impact on the claim costs of products based on expense incurred—as opposed to disability—model policies, in which charges by professional caregivers do not have an impact on benefits payable.

Even if no premium discounts are offered to insureds with spouses, the valuation actuary ought to consider the impact of spouses, especially if the married versus unmarried mix is significantly different from the general population's distribution underlying the standard reserve tables. Such a distribution can be found in Trowbridge's paper, "Mortality Rates by Marital Status" [*TSA XLVI* (1994): 321–390].

D. Geographic Region

LTC costs and insurance claim costs do vary by the region of the country where the insured person resides. Some of the variation is due to different state regulations and related insurance policy content. Some of the variation is due to differences in the accessibility of services. For example, home health care service agencies are well established in Florida, which may reduce the rate of institutionalization, while the family is often the only source of home care in the rural Midwest. Also, the availability of nursing home beds as a percentage of the population varies significantly by region. Therefore, institutional benefits may need morbidity adjustments on a state-by-state or regional basis.

These possible geographic differences should be considered by the valuation actuary as related to the business being reserved.

E. Other Risk Classes

Some insurers classify LTC insureds as preferred, standard, and/or substandard or with several classes similar to disability income insurance. Related to these classifications, insureds can be identified as smokers versus nonsmokers. Variations among insurers are so widespread that no general statement about the impact of risk class on reserves can be made. Rather, the valuation actuary needs to consider the possible differences in incidence rates, length of claim, mortality, and voluntary lapse of the different risk classes that may be presented.

V. MORTALITY

An appropriate mortality table is one piece of the overall termination assumption to be used in the valuation of LTC insurance. The Task Force knows of no study of the mortality of LTC insurance contract-holders. Typically, insurers will find it impossible to distinguish between a death and a lapse, making such a study unusually difficult.

In the absence of good data, this final report's recommendations rely on Task Force judgment, guided by the following considerations:

- The Task Force judged LTC mortality to be antiselect. That is, lapses likely are to be from the more healthy lives, leaving a relatively higher mortality rate among persisters than would be experienced by lapsers.
- The Task Force believes LTC insurance underwriting is less selective on the basis of mortality than life insurance underwriting.

- The mortality basis should be conservative. That is, the mortality basis adopted for valuation should be lower than the mortality believed to be actually experienced. That is consistent with the conservative nature of statutory reserves, with relatively more insureds living to the higher claim older ages.
- The mortality basis of the valuation recommendation should extend beyond age 100.

The Task Force believed that unloaded life insurance mortality rates would be a good starting point for the recommendation. Consideration was given to constructing a new mortality table by adding conservatism to the unloaded 1980 CSO mortality rates, which would be achieved by lowering them somewhat and extending the table beyond age 100. After a number of attempts at constructing such a modified table had been made, the Task Force observed that the 1983 GAM table had the characteristics very similar to the desired new table. The 1983 GAM rates are a little lower than the unloaded 1980 CSO rates, and the 1983 GAM table extends to age 110. Some testing results are shown in Cases 15 and 16 in Appendix C.

It is important to note that the 1983 GAM table was *not* chosen because of any reasoning that LTC insured mortality was comparable, in principle, to group annuitant mortality. Rather, the 1983 GAM table was chosen because it is an existing, recognized, publicly used table that has the appropriate characteristics relative to the unloaded 1980 CSO rates.

A. Recommendation

The resulting mortality recommendation has the following elements:

- *Choice of Mortality Table.* Mortality is based on the 1983 GAM table.
- *Sex-Distinct Versus Unisex Mortality Rates.* The use of sex-distinct mortality and sex-distinct morbidity (see Sections II and III) is recommended. Sex-blended mortality (and morbidity) can be used if the result is not materially different from that using a sex-distinct calculation. The Task Force tested the sensitivity to blends by sex for mortality and morbidity; see Cases 1 and 2 in Appendix C as examples.
- *Age Basis.* The 1983 GAM mortality table, based on age nearest birthday (ANB), should be adjusted to an age last birthday (ALB) basis, if appropriate for a specific product.
- *Selection, Smoking/Nonsmoking, and the Like.* The effect of factors such as selection or a high prevalence of nonsmokers might make actual mortality less than aggregate mortality at the early policy durations or for

certain mixes of business. Conservatism in the total termination rates usually will be sufficient to provide for effects of mortality selection, even when unadjusted aggregate mortality rates are used for the mortality termination element. The testing done by the Task Force indicated that reserves are fairly insensitive to mortality selection factors. See Case 12 of Appendix C, for example.

B. Sensitivity

The Task Force tested the effect on the reserves of several different choices in the assumptions as compared to a typical average set of assumptions (identified as the “default”).

Sensitivities tested included sex-blended versus sex-distinct mortality rates, different mortality tables, effects of mortality selection at issue, and antiselection on lapse. Some of the testing results are displayed in Cases 12, 13, and 14 in Appendix C.

There were no big surprises in the results. The results appear to be almost unaffected by the choice of mortality selection factors. The results with no antiselection on lapse were not very different from the default results, which included moderate antiselection on lapse. The most sensitivity was to the overall mortality and lapse assumptions.

The testing indicates that the valuation actuary should give particular care to ensure that the total termination assumptions are appropriate.

VI. VOLUNTARY LAPSES

It is appropriate to allow terminations in excess of mortality. The NAIC Model Minimum Reserve Standards for Individual and Group Health Insurance Contracts sets a ceiling of 8% on total terminations. (See Appendix F.) At the older issue ages at which much of this business is sold (above age 65 or 70) and for longer policy durations for which mortality is relatively high, the 8% global termination ceiling would significantly limit or even totally remove terminations for voluntary lapse from being allowed in addition to mortality. That is unduly restrictive.

However, morbidity probably will be affected by antiselection on lapses. That is, those who lapse probably are a better morbidity risk than those who do not lapse. (See Section VII.) Therefore, any allowance for lapses should be somewhat conservative (that is, lower than might be expected).

The effect of lapses on reserves was tested in various combinations of assumptions. Several illustrative test cases (Cases 17–21) are shown in Appendix C.

A. Recommendation

The proposed practice allows 80% of the voluntary lapse assumption used when the policy was filed and priced for state approval to market the product, with a ceiling of 8%. Lapse termination can be used in addition to the mortality decrement without a limit on the combination. If voluntary lapses are used in the valuation, an appropriate increase in morbidity due to the antiselection exhibited by persisters should be considered by the valuation actuary.

B. Treatment of Nonforfeiture Benefits

Reserves should be equal to at least the value of any nonforfeiture benefits. However, this level itself will be insufficient, in most cases, to provide an adequate reserve. (See Section X.)

VII. SELECTION AND ANTISELECTION

A. Selection

Sound underwriting is critical to proper risk management of a block of LTC insurance. Poor underwriting—whether inappropriate, not understood, or very little—leads to excessive early claims and an unstable block of business.

Underwriting must be done at issue, not at time of claim. Regulatory prohibitions against post-claims underwriting and “clean sheeting” of applications are widespread. These prohibitions are supported by consumers, regulators, and the insurance industry.

The impact of underwriting must be considered carefully. In particular, the valuation actuary should consider the following:

- *Select Period.* The impact of underwriting should be expected to level off after a period of time. Selection factors will vary by the degree of underwriting performed.
- *Age Variation.* Selection factors likely will vary by issue age; the effect of selection may be more significant at older issue ages. The select period may be longer for younger issue ages.

- *Rejection Rates.* The impact of underwriting might be considerable in situations in which a significant portion of applicants are rejected. However, if few applicants are rejected, positive selection will be less significant and antiselection by the consumer may be substantial.
- *Marketing Practices.* An insurer's marketing practices will cause rejection rates to vary and should be considered in establishing initial adjustments to claim costs.
- *Group Selection.* In the group market, morbidity can be affected by guaranteed issue provisions, participation rates, and requirements that employees be actively at work.
- *Substandard and Preferred Risk Classifications.* The impact of underwriting will vary by the risk classification system used by an insurer. Substandard risk morbidity may suggest an ultimate selection factor substantially greater than 1.00. Preferred risks likely will have a longer select period.
- *Ultimate or By Duration.* Positive selection during early durations will lower the valuation net premium and increase active life reserves. For statutory reserve purposes, the ultimate selection factor applied to the recommended morbidity basis should be at least 1.00.

B. Selection Recommendation

At a minimum, reserves should be based on the morbidity tables prescribed without select adjustments. The valuation actuary should consider including select morbidity adjustments used in pricing. However, selection factors should grade to an ultimate selection factor of at least 1.00 by duration 10.

The Task Force tested the impact on reserves from selection assumptions; see, for example, Cases 3 and 12 of Appendix C.

C. Antiselection

In the absence of nonforfeiture benefits, voluntary lapses will be more frequent on lower cost (healthier) individuals. As a result, voluntary lapses should be expected to increase claim costs per remaining individual. If lapses are included in the reserve calculation, the valuation actuary should recognize that lapses will have an impact on morbidity. In particular, the valuation actuary should consider the following:

- The level of antiselection should vary based on the level of lapse. For instance, a 10% lapse will produce higher antiselection than a 2% lapse.

- Statutory reserves will be based on lapse assumptions lower than those used in pricing. Therefore, the impact of antiselective lapses on reserve morbidity likely will be less than the impact on pricing morbidity.
- Antiselection on lapse may wear off after a period of time from lapse. In other words, although healthier individuals may lapse their policies while less healthy individuals persist, over time their morbidity may converge.
- In the absence of nonforfeiture benefits, it is clear that lapses will be for a healthier group of risks. The need to recognize antiselection on lapse may be less for policies with nonforfeiture benefits, depending on the richness of the nonforfeiture benefits.
- A minimum level of lapse, perhaps in the 2%–3% range, likely will not produce antiselection. This minimum level should be recognized when the level of antiselection is determined.

The valuation diskette provides the valuation actuary with one possible method for quantifying the effect of assumed antiselective lapses. The method is based on the theory that if insureds could *perfectly* select against the insurer, only individuals who will never require LTC services would lapse. The same number of future claims would be incurred but by a smaller group of insureds. Therefore, incidence rates would be greater. Conversely, if *no antiselective* lapse occurs, the number of claims decreases in the same proportion as the in-force policies and the incidence of claim does not change. In reality, experience will fall between the perfect and no antiselective lapse scenarios.

The valuation diskette allows users to input assumptions for two areas related to lapses: the basic lapse assumption (see Section VI) and factors to recognize the better health of lapsed by duration from lapse (up to 10 durations from lapse). The latter is the antiselective effect.

The valuation diskette calculates the morbidity load for antiselective lapses using the following formula, where A/S means antiselective:

$$\begin{aligned} \text{Morbidity Load}_t = & 1 / [(1 - \text{Lapse Rate}_{t-10} \times \text{A/S Lapse Factor}_{10}) \\ & \times (1 - \text{Lapse Rate}_{t-9} \times \text{A/S Lapse Factor}_9) \\ & \times (1 - \text{Lapse Rate}_{t-8} \times \text{A/S Lapse Factor}_8) \\ & \cdot \\ & \cdot \\ & \cdot \\ & \times (1 - \text{Lapse Rate}_{t-1} \times \text{A/S Lapse Factor}_1)] \end{aligned}$$

The A/S lapse factors reflect the level of antiselection or the proportion of claims retained even though premiums are lost due to lapse. These factors are input by duration from lapse and range between 0 (no antiselection) and 1 (perfect antiselection). The factors should decrease by duration from lapse, to recognize that antiselection wears off from the point of lapse.

See sample test Case 4 of Appendix C for the impact of antiselection.

D. Antiselection Recommendation

If lapses are included in the reserve calculation, the valuation actuary should recognize that lapses will increase the average morbidity for the persisting policyholders. That can be reflected through appropriate choice of A/S lapse factors in the valuation diskette.

VIII. INTEREST RATE

Recognizing the time value of money is an important part of sound actuarial principles and commonly accepted Actuarial Standards of Practice (ASOP). Two relevant references are *ASOP No. 18*, "Long-Term Care Insurance," and *ASOP No. 5*, "Insured Health Claim Liabilities." An interest rate is used to discount future paid premiums, paid claims, and paid expenses. This interest rate quantifies the time value of money and should be related to the projected investment income for related assets.

In LTC valuation, the effect of the discounting process is to give more weight to cash flows in the near future and less weight to the increasingly negative flows that are expected further in the future. Increasing the interest rate results in decreasing the significance of cash flows in the distant future.

Interest rates are given different considerations in three types of reserves. Relatively low interest rates are used for *statutory reserves* shown in the annual statement, because this is in line with the conservative approach used in statutory accounting. For GAAP (generally accepted accounting principles), the inclusion of reasonable provisions for adverse deviations typically results in interest rates for GAAP reserves higher than those used for statutory but somewhat lower than "best estimate" rates. However, using interest rates lower than those prescribed by the Internal Revenue Service for calculating *tax reserves* could disqualify the insurer's tax deductibility of such reserves.

A. *Issues to Consider*

- Substantial assets can build up under a typical LTC policy. Cash from these assets may not be needed for several years or even decades. Therefore, the investment income produced by these assets may be more comparable to that of pension funds, rather than life insurance products where nonforfeiture benefits are required. (Currently, very few LTC policies have nonforfeiture benefits, and the forms of nonforfeiture benefit that appear to be the most likely to be mandated by the NAIC model regulation do not produce a “cash on demand” through lapse.) This argues for generally higher interest assumptions.
- To the contrary, it can also be argued that disability income (DI) insurance is similar to LTC in the way assets are built up and in the nature of the benefits (for example, benefits are not certain as in life insurance, and DI policies rarely contain nonforfeiture benefits). There is no flexibility in model regulations or laws for assuming an interest rate higher for DI than the rate for life, and LTC ought to be consistent with DI in this regard.
- Because of the more limited availability of cash on demand, the C-3 (interest) risk is less with LTC than it is with annuities and life insurance.
- If conservative interest rates are recommended for valuation, it may be argued that higher interest rates should be allowed if adequate cash-flow testing by the valuation actuary demonstrates the adequacy of such reserves.
- One might argue that the interest rate should not be defined on the issue date of the policy. Rather, the time when the premiums are paid, or more specifically, when the cash flows are positive, ought to define the interest rate used. This is similar to the change in fund basis (versus issue-year basis) used in the valuation of annuities.
- The interest rate used in determining the present value of amounts not yet due on claims typically is the rate in effect for life insurance policies that are issued on the incurred date of the claim. Interest rates defined by the issue date of the policy rather than by incurred date of the claim may be more appropriate, because the assets supporting the claim reserves are not invested funds newly made at that time of claim but were generated by prior premiums.
- Some regulators may not approve premium rate increases if morbidity experience is as expected but returns from investments are much lower than expected.

- The discount rate used in determining anticipated loss ratios for premium rate filings need not be related to the investment income assumed in pricing. (Filing of premium rates is beyond the scope of this final report.) Test cases 22 and 23 of Appendix C show the impact of the interest rate chosen on resulting reserves.

B. Recommendation

The Task Force considered the various issues that influence the potential choices of interest rate for LTC insurance valuation. It also considered the existence of the NAIC model regulation on valuation for health insurance products (see Appendix F). It recognized the significance of the role of interest in LTC insurance reserves and in gross premium valuations in which the valuation actuary tests their adequacy. The Task Force also acknowledges that the role of interest in approaches to valuation is under consideration for other products and valuation generally. On balance, the Task Force sees no reason to depart from the current guidance. Thus, the Task Force makes the following recommendation: The maximum allowable interest rate for active life reserves for LTC policies issued in a given year should be equal to the maximum allowable interest rate for calculating reserves for whole life insurance policies (with maturities 20 or more years after issue) issued in the same year.

The maximum allowable interest rate for claim reserves incurred in a given year should be equal to the maximum allowable interest rate for calculating reserves for whole life insurance policies issued in the year of the claim, for those policies requiring contract reserves. For LTC policies not requiring contract reserves, the interest rate should be equal to that for the valuation of single-premium immediate annuities issued in the same year as claim incurral, less 100 basis points. (See Appendix F.)

Asset adequacy testing should be performed if the product is material to the insurer. Tests involving the sensitivity to declining interest rates are more important than disintermediation, unless significant nonforfeiture benefits payable in the form of cash are available.

IX. METHOD

Whether active life reserves should be calculated on the net level, one-year preliminary term, or two-year preliminary term basis is of some considerable interest. Each method is used by insurers today. Both the one and two-year preliminary term methods are in common usage today. All three

methods were tested by the Task Force; see, for example, Cases 24 and 25 of Appendix C.

In a June 1, 1990 statement to the NAIC Life and Health Actuarial Task Force (Statement No. PS-90H-7), the American Academy of Actuaries opined that the one-year preliminary term method was appropriate for LTC insurance policies. That opinion was somewhat softened by discussion in 1990, allowing two-year preliminary term for policies issued prior to 1990.

As described in Appendix F, the current NAIC Model Minimum Reserve Standards for Individual and Group Health Insurance Contracts, amended in 1991 to include LTC, requires the one-year preliminary term method.

As noted in Section XVI, the Internal Revenue Code (IRC), in the view of many, prescribes reserves according to the two-year preliminary term method as the maximum that may be deducted by insurers for tax purposes.

Although it is recognized that the insurer can be significantly negatively affected by a limitation on reserve deductibility by the IRC, which appears to recognize reserves only on a somewhat weaker basis, the LTC valuation actuary must focus on what is right and best for the financial solvency of the insuring enterprise. The valuation actuary must also serve the needs of statutory accounting.

A. Analysis

Considerable analysis was devoted to this matter by the Task Force. The following points are some of the considerations given to the subject.

- Many of the written comments received as a result of the exposure report commented on this issue. They were not unanimous.
- Oral input at meetings of the Society of Actuaries and at the Valuation Actuary Symposium also were not particularly conclusive.
- The Task Force conducted some analysis of the expenses related to placing LTC insurance in force. This, in turn, suggests some degree of statutory reserve relief in the first (and maybe second) policy year from the strain otherwise produced from net level reserves. Such expenses are the prime reason for using other than net level reserves. We recognized that expenses do vary considerably among insurers. The Task Force's charge did not include expense analysis.
- Several possible criteria for deciding the minimum reserve method were considered by the Task Force. None yielded a clear basis, but all agree that a gross premium test should not be violated.
- The Task Force did considerable analysis using gross premium valuation tests. Many assumptions necessarily were made (premiums, expenses,

lapse, mortality, morbidity, etc.), but differing benefits were not tested and a model office was not constructed (issue ages 45 and 70 for both male and female were calculated). In spite of considerable work, the analysis was, understandably, fairly well simplified. The numerous cash flows and resulting analyses did not lead the Task Force to a clear conclusion. Strain on assumed corporate surplus by using the one-year preliminary term method did not rule out that method. Neither did it seem that the two-year method produced excessive relief.

- The Task Force also reviewed statutory earnings resulting from such cash flow tests. They, too, were inconclusive.
- The results of cash flows in the gross premium reserve analysis are at least as much a function of other assumptions used, especially interest rates, as they are of the reserve method chosen. Any profit pattern that results is dependent upon the degree of conservatism in other assumptions, not just the implied expense allowance.
- The valuation actuary should give consideration to the overall level of reserves and margins. For example, the two-year preliminary term method is more likely to be reasonable if other assumptions are conservative and contribute small margins.

B. Recommendation

There was no clear consensus among Task Force members on the minimum basis. A majority thought that there was no convincing evidence that would support prohibition of the two-year preliminary term method. A sizable minority of the Task Force thought, nevertheless, that one-year preliminary term should be the minimum required.

On balance, the Task Force believes that the two-year preliminary term method is the appropriate statutory minimum reserve method. Allowing that method is not to be interpreted as a default assumption.

The valuation actuary should be satisfied that whatever method is used is appropriate to the circumstances. The valuation actuary also should establish a premium reserve and consider the implications of the current NAIC Model Minimum Reserve Standards for Individual and Group Health Insurance Contracts. This model states that the minimum reserve is the greater of (1) the sum of the unearned premium and active life reserves for all contracts of the insurer subject to contract reserve requirements, and (2) the gross modal unearned premium reserve on all such contracts. This test can be performed on an aggregate basis.

For pieces of additional coverage purchased periodically at attained age premiums, the reserve for such prices should be on the net level basis if only renewal expenses are incurred on the addition. If underwriting is done on additional pieces of coverage or if higher-than-renewal commissions or marketing expenses are incurred on the addition, preliminary term valuation may be appropriate.

X. NONFORFEITURE BENEFITS

It is important to understand the reserving implications of various nonforfeiture benefit options, due to recent and current state and federal legislative activities such as the following:

- The NAIC in 1993 voted to mandate that nonforfeiture benefit options be included in all newly issued LTC policies.
- President Clinton's Health Security Act introduced in late 1993 included a section mandating nonforfeiture benefits in LTC policies, as have some of the other federal LTC bills introduced.
- As this final report is being prepared, the NAIC is finalizing adoption of the model regulation that specifies use of the "benefit bank" form as the required nonforfeiture benefit.
- Certain states (for example, New York) require that LTC insurers offer policyholders the choice of electing or not electing to have a nonforfeiture benefit. It is possible that once the NAIC includes a specific mandated nonforfeiture benefit option in the LTC model regulation, some states will pass that model. Other states may choose their own version of nonforfeiture laws for LTC. In any event, varied state action in this subject can be expected.

Actuaries should be very cautious about using intuition in trying to assess how to determine reserves for LTC nonforfeiture benefit options. What seems to make sense for other products does not necessarily make sense for LTC, because LTC has some unique characteristics.

A. *Description of Various Nonforfeiture Benefit Forms*

The following are the various forms encountered.

- *Shortened Benefit Period.* Upon lapse an insured continues to remain covered for the same daily benefit as prior to lapse. However, the benefit period is reduced to a duration according to a scale in the policy that depends on the time the policy was in force as premium paying prior to lapse. A variation of the above option is the benefit bank approach.

Under this option, the full benefits continue to be payable while there are funds in the benefit bank. The bank includes all or some portion of the premiums paid to date of lapse less any claim payments already made. The valuation diskette handles the SBP form of nonforfeiture, for both its versions, as described in Appendix D, Screen 9.

- *Return of Premium.* Upon voluntary lapse, an insured or the beneficiary receives in cash all premiums paid less any claim payments received. Contrary to options not paid in cash, this must also be paid on death.
- *Extended Term Insurance.* Upon lapse, an insured remains covered for the same benefit period and daily benefit amount as prior to lapse. However, the period of coverage is reduced to reflect the insured's age and policy duration at lapse.
- *Reduced Paid-up Option.* Upon lapse, an insured remains insured for the same benefit period and coverage period as prior to lapse. However, the daily benefit amount is reduced to reflect the insured's age and policy duration at lapse.
- *Cash Value.* Upon lapse or death, an insured receives a cash value that is equal to an amount of cash defined in the policy. That amount can be determined by the policy drafter in any of a number of ways. Contrary to options not paid in cash, this must also be paid on death.
- *Life Annuity.* Upon lapse, an insured receives a life annuity, which theoretically can be determined in any number of ways.
- *Other.* Listed above are some of the more common nonforfeiture benefit options. There are others not listed here, some of which are variations of the above options.

B. Reserve Components

Because of the variety and great number of possible nonforfeiture benefit forms, their amounts and patterns and because of the developing nature and uncertainty of the subject, this final report does not prescribe precise applicability of its recommendations to this subject. Rather, it offers several components of possible reserves to be considered.

1. Active Life Reserve Prior to Lapsation

It is not clear what is a conservative lapse and mortality assumption. Zero lapsation may not produce the highest active life reserves, especially if the

contract has rich nonforfeiture benefits. It is important to test the effect of zero lapsation.

2. Paid-up Nonforfeiture Benefit Reserve after Lapsation

- ***Morbidity Assumption.*** The valuation actuary needs to recognize a hierarchy of risks, from less risky to most risky. The forms of cash options present no reserving risk once lapsation occurs. Nonforfeiture benefits, where paid-up LTC benefits can be adjusted after lapse, present an increase in risk to the extent that such adjustments are constrained. Nonforfeiture benefits, where such benefits cannot be adjusted after lapse, present the greatest risk. It is important to set minimum loadings that vary by that hierarchy of risks. The valuation actuary needs to distinguish between two types of loadings, one for antiselection (expected extra morbidity) and the other for uncertainty of risk.
- ***Expense Risk.*** The valuation actuary must retain in the reserves a proper loading for expected future expenses. This can be set as additional claim expense reserves. Future maintenance expenses should have been loaded in the premium.
- ***Mortality and Interest Assumptions.*** These are not necessarily different from the base LTC reserving assumptions.
- ***Interactions of Claim Reserve and Active Life.*** It may be appropriately conservative to hold both claim and active life reserves in some cases. In others, it may be adequate to hold the greater of a nonforfeiture benefit reserve or the claim reserve.

3. Claim Reserves Arising from Paid-up Nonforfeiture Benefits

This is to be treated as other claim reserves. (See Section XII.)

C. General

When calculating reserves, the valuation actuary must be sure to include values of nonforfeiture benefits at death or lapse corresponding to assumed mortality and voluntary lapse assumptions, respectively.

Unusual patterns of nonforfeiture benefits may cause reserves to be deficient if actual lapses and mortality do not follow assumptions. Sensitivity testing for variations in mortality and lapses should be done when there is any doubt about reserve adequacy.

The active life reserve should not be less than the net single premium for the nonforfeiture benefits at each policy duration.

XI. PREMIUM WAIVER

Waiver of premium product features vary. Waiver upon institutionalization is a common benefit in LTC insurance. Some policies also waive premiums if the insured is approved for home health care.

As with other insurance products, treating the waived premium as a cash benefit when no cash transaction takes place can be confusing.

The approach used to compute active life reserves generally determines which of two techniques should be employed to properly value waiver of premium benefits.

If the active life reserves computation assumes future premiums are received from all in-force policies regardless of benefit status, then a correcting adjustment is necessary. This is commonly accomplished by explicitly recognizing future waived premium as an additional benefit amount. The adjusted benefit amount is applied to active life reserve and claim reserve factors.

If the active life reserves computation omits premiums to be waived from the present value of future premiums, then no additional adjustments may be required.

When properly constructed, either approach can be expected to produce equivalent aggregate reserves. Special consideration may be necessary if the elimination period for waiver differs from that for the policy benefit, for waiver of spousal premium, or for home health care episodes that require ongoing premium payments.

Note the valuation diskette accompanying this final report assumes no premiums are paid once under waiver due to claim status, and therefore it also does not include waived premiums as a benefit.

XII. CLAIM RESERVES

Although many adjustments to the claim costs are permitted in the calculation of active life reserves, most of these adjustments are judged to be applicable to incidence rates. Once someone has become a continuing LTC claimant, continuation in claim is unaffected by most of the factors that may be viewed as affecting the claim costs.

A. Interest

The interest rate to be used in discounting future claim payments for claim reserves should not exceed the maximum rate permitted in the calculation of active life reserves for a contract issued in the same year as the claim is

incurred. (See Section VIII, especially for LTC policies not requiring contract reserves.)

B. Recommended Reserves for Reported Claims

1. Nursing Home (Institutional) LTC Claims

This recommendation uses the continuance tables based on utilization data from the 1985 NNHS as interpreted and developed by the LTC Experience Committee and published in the *TSA 1988-89-90 Reports*. In particular, the reserves for reported institutional claims that have been determined to be payable by the insurer will not be less than disabled life annuities, calculated using the claim termination rates implied in the continuance tables from the *Reports* using the benefit period concept for insurable stays as explained and shown in Table 11 therein. This table is reproduced here as Table 27.

The proportions of admissions still resident for each period can be treated in the same manner as the l_x column of a life table to calculate disabled life annuities.

Appropriate adjustments for claims with inflation protection after the incurred date of claim are to be made.

The valuation actuary can determine and use salvage values if they exist (that is, savings from paying an expense incurred amount lower than the maximum daily amount of benefit that may have been reflected in pricing).

Any generally accepted actuarial method can be used to calculate the liabilities, as long as the reserve aggregate exceeds the minimum.

2. Home Health Care (Noninstitutional) LTC Claims

For claim reserve purposes, any one home health care claim should be defined no more liberally than beginning on the first date of care after the elimination period and ending on the first date on which no covered home health care benefits have been received for the prior 14 days. If a contract provision calls for an earlier recognition of home health care claim incurral, the contract definition should be used. Even if strict contract liability is determined based on home health care service date, all home health care benefits continuing without a 14-day interruption should have incurred dates dated back to the first day of such benefits, and claim reserves should be established based on this incurred date definition.

For all home health care claims for which more than 180 days of service have been received, reserves should be set up on a case-by-case basis, with the reserve being the present value of future expected home health care

TABLE 27

PROPORTION OF ADMISSIONS STILL RESIDENT AT THE END OF THE PERIOD SHOWN
INSURABLE STAYS; BENEFIT PERIOD CONCEPT;
ADJUSTED TO MATCH THE 1985 NNHS RESIDENTS

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
Male							
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	0.8701	0.9103	0.9456	0.9016	0.8915	0.8927	0.9348
20	0.8456	0.8408	0.8640	0.8477	0.8077	0.7950	0.8519
30	0.8160	0.8306	0.8122	0.7785	0.7319	0.7350	0.8088
60	0.6995	0.7017	0.6973	0.6570	0.6107	0.6362	0.6307
90	0.6130	0.6175	0.6163	0.5712	0.5273	0.5608	0.5074
121	0.5482	0.5613	0.5576	0.5095	0.4682	0.5022	0.4195
151	0.4992	0.5233	0.5137	0.4645	0.4250	0.4559	0.3552
182	0.4619	0.4970	0.4799	0.4311	0.3925	0.4190	0.3070
212	0.4333	0.4783	0.4528	0.4061	0.3671	0.3890	0.2702
243	0.4110	0.4641	0.4303	0.3871	0.3465	0.3645	0.2417
273	0.3931	0.4525	0.4109	0.3720	0.3291	0.3442	0.2191
304	0.3782	0.4419	0.3935	0.3597	0.3139	0.3271	0.2011
334	0.3650	0.4312	0.3774	0.3490	0.3001	0.3127	0.1866
365	0.3529	0.4198	0.3621	0.3392	0.2873	0.3002	0.1749
547	0.2856	0.3259	0.2784	0.2808	0.2213	0.2454	0.1405
730	0.2366	0.2355	0.2271	0.2270	0.1670	0.1946	0.1281
912	0.2163	0.1995	0.2141	0.1957	0.1200	0.1384	0.0940
1095	0.2121	0.1789	0.2051	0.1697	0.0852	0.0938	0.0487
1277	0.2113	0.1541	0.1745	0.1378	0.0648	0.0666	0.0290
1460	0.2110	0.1409	0.1456	0.1126	0.0514	0.0496	0.0247
1642	0.2102	0.1377	0.1370	0.0997	0.0396	0.0359	0.0240
1825	0.2100	0.0984	0.1356	0.0842	0.0319	0.0280	0.0221
2190	0.1647	0.0849	0.1039	0.0410	0.0211	0.0117	0.0049
2555	0.1293	0.0715	0.0806	0.0203	0.0132	0.0009	0.0020
2920	0.1012	0.0589	0.0627	0.0102	0.0079	0.0001	0.0011
3285	0.0786	0.0474	0.0487	0.0053	0.0045	0.0000	0.0008
3650	0.0604	0.0373	0.0373	0.0029	0.0026	0.0000	0.0006
4015	0.0457	0.0287	0.0280	0.0016	0.0014	0.0000	0.0005
4380	0.0338	0.0217	0.0203	0.0009	0.0008	0.0000	0.0004
4745	0.0245	0.0160	0.0141	0.0006	0.0005	0.0000	0.0004
5110	0.0172	0.0116	0.0092	0.0004	0.0003	0.0000	0.0003
5475	0.0117	0.0083	0.0056	0.0002	0.0002	0.0000	0.0003
5840	0.0080	0.0059	0.0034	0.0002	0.0001	0.0000	0.0000
6205	0.0054	0.0042	0.0021	0.0001	0.0001	0.0000	0.0000
6570	0.0037	0.0030	0.0012	0.0001	0.0001	0.0000	0.0000
6935	0.0025	0.0021	0.0008	0.0001	0.0000	0.0000	0.0000
7300	0.0017	0.0015	0.0005	0.0000	0.0000	0.0000	0.0000
7665	0.0012	0.0011	0.0003	0.0000	0.0000	0.0000	0.0000
8030	0.0008	0.0008	0.0002	0.0000	0.0000	0.0000	0.0000
8395	0.0005	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000
8760	0.0004	0.0004	0.0001	0.0000	0.0000	0.0000	0.0000
9125	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000

TABLE 27—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
	Female						
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10	0.8969	0.9749	0.9289	0.9323	0.9374	0.9206	0.9162
20	0.8084	0.9193	0.8520	0.8509	0.8641	0.8522	0.8697
30	0.7636	0.8625	0.8185	0.7869	0.7952	0.8033	0.8200
60	0.7414	0.7078	0.6994	0.6676	0.6912	0.6931	0.7476
90	0.7215	0.6113	0.6189	0.5871	0.6167	0.6165	0.6821
121	0.7034	0.5500	0.5637	0.5317	0.5622	0.5622	0.6238
151	0.6866	0.5108	0.5257	0.4932	0.5217	0.5231	0.5724
182	0.6709	0.4860	0.4994	0.4660	0.4909	0.4943	0.5277
212	0.6557	0.4683	0.4807	0.4464	0.4669	0.4725	0.4890
243	0.6410	0.4555	0.4672	0.4320	0.4476	0.4554	0.4555
273	0.6263	0.4461	0.4573	0.4209	0.4317	0.4413	0.4265
304	0.6117	0.4393	0.4491	0.4119	0.4181	0.4291	0.4007
334	0.5971	0.4342	0.4415	0.4040	0.4060	0.4179	0.3779
365	0.5828	0.4293	0.4335	0.3966	0.3951	0.4072	0.3574
547	0.5251	0.3627	0.3737	0.3472	0.3401	0.3450	0.2690
730	0.5068	0.2947	0.3237	0.2854	0.2947	0.2870	0.2146
912	0.4319	0.2685	0.2827	0.2335	0.2560	0.2411	0.1737
1095	0.3336	0.2634	0.2481	0.1996	0.2195	0.2049	0.1425
1277	0.2983	0.2492	0.2322	0.1755	0.1862	0.1695	0.1164
1460	0.2805	0.2244	0.2256	0.1554	0.1570	0.1323	0.0983
1642	0.2298	0.2159	0.2211	0.1400	0.1306	0.1023	0.0890
1825	0.1753	0.2144	0.2199	0.1303	0.1068	0.0866	0.0727
2190	0.1543	0.1901	0.1590	0.0920	0.0675	0.0525	0.0576
2555	0.1347	0.1631	0.1178	0.0643	0.0406	0.0255	0.0342
2920	0.1157	0.1372	0.0894	0.0448	0.0237	0.0100	0.0115
3285	0.0972	0.1145	0.0695	0.0314	0.0136	0.0032	0.0009
3650	0.0790	0.0962	0.0555	0.0223	0.0078	0.0009	0.0001
4015	0.0618	0.0825	0.0455	0.0161	0.0046	0.0002	0.0000
4380	0.0459	0.0731	0.0384	0.0119	0.0029	0.0001	0.0000
4745	0.0321	0.0669	0.0334	0.0091	0.0019	0.0000	0.0000
5110	0.0208	0.0626	0.0300	0.0072	0.0013	0.0000	0.0000
5475	0.0123	0.0596	0.0277	0.0059	0.0010	0.0000	0.0000
5840	0.0073	0.0567	0.0256	0.0049	0.0007	0.0000	0.0000
6205	0.0043	0.0540	0.0236	0.0040	0.0006	0.0000	0.0000
6570	0.0026	0.0514	0.0218	0.0033	0.0004	0.0000	0.0000
6935	0.0015	0.0490	0.0202	0.0027	0.0003	0.0000	0.0000
7300	0.0009	0.0466	0.0186	0.0022	0.0002	0.0000	0.0000
7665	0.0005	0.0444	0.0172	0.0018	0.0002	0.0000	0.0000
8030	0.0003	0.0423	0.0159	0.0015	0.0001	0.0000	0.0000
8395	0.0002	0.0402	0.0147	0.0012	0.0001	0.0000	0.0000
8760	0.0001	0.0383	0.0136	0.0010	0.0001	0.0000	0.0000
9125	0.0001	0.0365	0.0125	0.0008	0.0001	0.0000	0.0000

benefits for each open claim. Explicit assumptions on termination rates from home health care status are to be established by the valuation actuary. Company experience should be the basis for these assumptions, if credible. The valuation actuary may determine salvage values and factors to adjust for intermittent care (covered home health care received for an average of less than seven days a week), as deemed appropriate.

For open home health care claims for which less than 90 days of service have been received, reserves can be set up using any method in conformity with *ASOP No. 5*, "Incurred Health Claim Liabilities," and *ASOP No. 18*, "Long-Term Care Insurance."

3. Ancillary Benefits

For benefits other than institutional LTC and home health care (such as respite care or wellness benefits), reserves should be established using any method in conformity with *ASOP No. 5*, "Incurred Health Claim Liabilities." Home health care benefits of a truly ancillary nature (for example, those with a very small calendar-year maximum) can be valued as ancillary benefits rather than being set up as disabled life reserves.

4. Premium Waiver Reserves

If active life reserves are calculated by assuming net premium funding from all in-force contracts, claim reserves are to be held to cover at least valuation net premiums corresponding to the gross premiums waived. (See Section XI.)

C. Recommended Reserves for Incurred But Not Reported Claims

Reserves for claims incurred but unreported can be established using any method in conformity with *ASOP No. 5*, "Incurred Health Claim Liabilities," and *ASOP No. 18*, "Long-Term Care Insurance."

D. Applicability of Minimum Standards

Claim reserves are required to make good and sufficient provision for future expected claim payments on all claims that have been incurred prior to the valuation date. If such provision results in the need for reserves higher than the minimums described above, then such higher reserves should be held. This provides, for example, for the possibility that an insurer may have only a few open claims for which the average claim termination rates are

inappropriate. In some individual claim instances, straight life annuities might be a more appropriate indicator of liability. For an insurer with many open claims, the supposition is that such claims are offset by claims with higher-than-average expected claim termination rates, but in any particular instance, the use of aggregate termination rates could be inappropriate.

XIII. FUTURE CHANGES IN ASSUMPTIONS AND PRICING

LTC insurance policies are issued, with very rare exceptions, on a guaranteed renewable basis. Premiums on a block of in-force business can be changed on a class basis, either up or down, and usually only with approval of the appropriate regulatory authority. This, coupled with the structure of level premium by issue age for a benefit with substantially increasing claim costs by attained age, presents significant implications for LTC valuation requirements.

Questions have been raised about the manner of handling LTC active life reserves when premium rates are increased (or decreased) or when assumptions underlying existing reserves are materially different from those adopted by authorities as a new valuation standard basis. These questions have to be addressed separately for statutory and GAAP reserves.

A. Statutory Reserves

The needs for rate increases are usually due to claim experience diverging from original assumptions, but they may be caused by different persistency (or other experience) than expected. From a regulatory perspective, the ability of an insurer to increase rates due to changes in persistency or such factors as interest or expense assumptions is not clear. The effect of any rate stabilization regulations (that is, regulations that limit the rate increases permitted on existing policies) should be taken into account.

Claim costs or reserve factors adopted by regulatory authorities may be steeper, by attained age, than those used for existing LTC policies; lapse assumptions may be different; mortality may have different margins by attained ages; and the mortality table may have different terminal ages. New reserve standards are not made retroactive, but existing assumptions may be so far out of line that a prudent valuation actuary may wish to recalculate reserves or establish additional reserves.

For existing business, the valuation actuary should consider whether changes in expected experience may indicate that current reserves are no longer adequate on a gross premium valuation basis. (See Section XVIII.)

The adoption of new valuation standards could indicate that more experience is available now than when the current valuation basis was adopted. The assumptions included in a new standard may provide guidance for conducting gross premium valuations on business written before the new standard was adopted. These assumptions could also provide a basis for strengthening reserves where necessary, as identified by the gross premium tests.

For life insurers, statutory accounting requires that any changes in reserve basis be identified in the statutory annual statement's Exhibit 8A. The impact of the change in reserve basis, also shown in Exhibit 8A, does not affect the gain from operations but rather affects only the capital and surplus account.

For property/casualty insurers, a significant change in reserve basis would appear in the statutory statement as an adjustment to surplus on line 30 of the Underwriting and Investment Exhibit Statement of Income.

B. GAAP Reserves

For GAAP purposes, most LTC policies would fall under the *FAS 60* definition of a long-duration insurance contract. Under *FAS 60*, premium is included in revenues, and benefits and expenses are included in expenses. Original GAAP assumptions would be chosen by using the most likely realistic best estimates, with a provision for adverse deviation. *FAS 60* also includes the lock-in principle, under which original GAAP assumptions would continue to be used unless a premium deficiency is recognized. Given the uncertainty of future experience with LTC products, it is very possible that original GAAP assumptions will not be realized. When assumptions are adjusted corresponding to a change in premium scales, the effect should be prospective with no change in GAAP liability at the premium change date. If any change in reserve assumptions results in a material impact on the company financial statement, further disclosure in its annual report could be required. Actuarial aspects of GAAP for stock life insurers are discussed in *ASOP No. 10*, "Methods and Assumptions for Use in Stock Life Insurance Company Financial Statements Prepared in Accordance with GAAP."

XIV. UPGRADES AND CONVERSIONS

For a product with so many varied features, so recently on the market, and evolving rapidly, there is increasing emphasis on upgrades, internal replacements, and other changes to existing business. This is being increased by regulatory activities. The pace of such changes to in-force business is expected to continue.

Similarly, as true group LTC insurance (see Section I) begins to develop, through tax-clarified assistance to sales and as insurance on covered workers ages, the matter of conversion and portability of benefits will become more prominent.

In all such instances, the manner in which benefits and coverage are continued often will be unique to the specific insurer. Those insurers with internal upgrade or replacement programs to date exhibit no common approach.

When determining the proper level of reserves for the new policy resulting from an upgrade or a conversion, the valuation actuary must consider several elements:

- The difference in benefits in moving from the old policy to the new policy.
- Any nonforfeiture or upgrade or conversion benefits payable.
- The extent to which premiums under new policies issued through the upgrade or conversion differ from premiums under similar policies issued through direct means.
- Whether new premiums are based on (1) original issue age, (2) age at upgrade or conversion, or (3) some combination thereof.
- Whether the insurer employed proof of insurability or some other form of selecting insureds with a lower level of expected morbidity than otherwise might be expected from the original issue's risk pool.
- Expenses incurred due to upgrading or converting.
- Amount of reserves held under the old policy.

If the premiums under the new policy are not adequate to cover future claims and expenses, an initial reserve needs to be established, either from the reserves of the old policy or from surplus.

If an upgrade involves additional coverage that is rated separately (for instance, coverage in the form of an increase in daily benefit with premiums based on the insured's current age), reserves for the additional coverage often can be calculated separately as well. However, policy provisions (for instance, some nonforfeiture benefits earned) or actuarial assumptions (for instance, lapsation dependent on policy duration) may demand that these coverages be considered together for administration and for determining reserves.

Premiums under the old block of policies that do not upgrade or convert may not be adequate if only the best risks participate in the program. In such a case, reserves under the old block would have to be strengthened. If a disproportionate number of the best risks do not upgrade or convert, then

reserves under the old block may be adequate while reserves for the new block may need to be strengthened.

If benefits between old and new are essentially the same, premiums are the same, and the upgrade or conversion is across the board, then reserve amounts may also continue as if there were no upgrade or conversion.

In any event, the ultimate adequacy of a gross premium valuation (see Section XVIII) is a test the valuation actuary should apply, as warranted, to changing blocks of LTC insurance business.

XV. ACTUARIAL STANDARDS OF PRACTICE

Several ASOPs under the auspices of the Actuarial Standards Board (ASB) relate to the development and application of these proposals for LTC valuation.

A. ASOP No. 5, “*Incurred Health Claim Liabilities*”

This standard is intended to apply broadly to the determination of claim liabilities for insured and noninsured health plans. A claim liability is defined as the actuarial present value, as of the valuation date, of future claim payments under the benefit plan for claims that have been incurred on or before the valuation date.

Recommended practices are described in *ASOP No. 5* for development, tabular and other methods of projecting the expected remaining claim payments. Clearly, *ASOP No. 5* applies fully to the valuation of LTC benefits. In fact, such benefits are directly referred to in the text of the standard.

B. ASOP No. 7, “*Performing Cash-Flow Testing for Insurers*”

In general, this standard also applies to LTC policies or riders. Extensive multiscenario cash-flow testing is most important when future flows of insurance liabilities and the related assets are not well matched or are interdependent or dependent (with different impacts) on the same external variable, such as prevailing interest rates.

Cash-flow testing would be useful if the assets purchased to back a stand-alone LTC policy do not produce future cash flows that closely match the liability cash flows. If assets mature after the insurance cash flows occur and interest rates have increased, fixed-income securities may have to be liquidated at a loss. On the other hand, if assets mature too early, the impact of reinvestment at lower interest rates should be examined.

If and as LTC plans are developed that offer competitive cash surrender values, especially if such values are credited with current interest rates, the products would assume characteristics similar to permanent interest-sensitive life insurance. In this case, the applicability of cash-flow testing would be the same as for those products.

Normally, in today's situation, it would appear that for LTC policies without surrender values, backed by reasonably well matched assets, with reasonably predictable maturities, simpler sensitivity testing of the insurance risk assumptions would satisfy *ASOP NO. 7*.

C. ASOP No. 8, "Regulatory Filings for Rates and Financial Projections for Health Plans"

This standard describes recommended practice related to the filing of rates and financial projections for health plans for which actuarial memoranda or similar documents are required. While LTC insurance is not specifically mentioned in the standard, it seems clear that it is directly included in the scope (along with medical, dental, vision, disability income, and accidental death and disability, which are mentioned).

D. ASOP No. 10, "Methods and Assumptions for Use in Stock Life Insurance Companies Financial Statements Prepared in Accordance with GAAP"

The original version of this standard was adopted in 1989. This current version, adopted by the ASB in October 1992, has been expanded to cover several of the American Academy of Actuaries recommendations and interpretations that are being phased out of other documents. This standard applies to all health insurance as well as life insurance.

Most LTC policies would be subject to *FAS 60* methodology, in which the GAAP active life and claim reserves have a provision for adverse deviation and assumptions are "locked in" for the life of a policy, unless the loss recognition test is failed. (See Section XIII.)

E. ASOP No. 11, "The Treatment of Reinsurance Transactions in Life and Health Insurance Company Financial Statements"

The reinsurance of LTC policies is becoming increasingly common. Insurers often wish to transfer a part of their LTC risk due, at least in part, to the scarcity of reliable insured experience for pricing and reserving.

ASOP No. 11 applies fully to LTC coverage as it does to all health and life coverage. Both the ceding and assuming insurers must establish net liabilities that consider all material cash flows, including contractual and contingent cash flows arising from reinsurance treaties.

F. ASOP No. 14, “*When To Do Cash Flow Testing for Life and Health Insurance Companies*”

Most of the comments for *ASOP No. 7* also apply for this standard. For most currently offered stand-alone LTC policies, backed by assets with reasonably predictable cash flows that closely match the liability cash flows, other types of sensitivity testing may be more appropriate. *ASOP No. 14* gives examples of situations in which cash flow testing may not be necessary:

If the actuary can demonstrate that a block of business is relatively insensitive to influences such as changes in economic conditions, the actuary may determine that cash flow testing is not needed in order to support the opinion or recommendation given.

and

Variation in benefit and expense experience for disability income and medical expense reimbursement policies may arise from secular uncertain trends in experience. These variations may appropriately be analyzed using statistical techniques applied to historical data to quantify the risk.

On the other hand, if the asset cash flows are not matched with the liability flows or are sensitive to differing dependent on economic conditions, multicenario cash flow testing may be advisable to sign the Statement of Actuarial Opinion with respect to the related reserves.

Sensitivity and other testing for LTC insurance may be more useful for the C-2 (insurance) risk than cash flow testing for the C-3 (interest) risk.

G. ASOP No. 18, “*Long-Term Care Insurance*”

This standard is much more detailed and explicit than the others referenced in this final report. The last several pages of *ASOP No. 18* provide sound basic instructions for valuing health insurance in general and LTC in particular. Unique features of LTC that have an impact on the valuation process are the steep incurred claim cost curve, the scarcity of insured experience data, and the impact on cost of the many different benefit features and eligibility mechanisms.

The ASB has been advised that a revised and updated ASOP will be pursued beginning in late 1995, based in part on the content of this final report.

H. ASOP No. 22, “Statutory Statements of Opinion by Appointed Actuaries for Life and Health Insurance”

See Section XVIII.

XVI. TAX RESERVES

Currently, the Internal Revenue Code has no specific language for LTC insurance.

However, the code does provide guidelines for noncancelable accident and health insurance products. To the extent that LTC insurance is assumed to fall under this category, then the following are the elements that define the basis for tax reserves for LTC insurance.

A. Morbidity and Mortality

- “. . .the prevailing commissioners’ standard tables for mortality and morbidity” (Section 807 (d)(2)(C) of the IRC).
- There are no prevailing tables (approved by 26 states) for accident and health insurance. Therefore, regulations have been issued by the Internal Revenue Service that define the table to be used. For “benefits issued after 1983 other than disability and accidental death,” use the “tables used for NAIC statement reserves” (Reg. 1.807-1).
- Note that many actuaries are not entirely sure whether the IRC requires the use of 1980 CSO mortality, but that is the general belief. Something other than a life table ending at age 100 is appropriate. (See Section V.) The actuarial profession may eventually want to engage in dialogue with those determining the IRC.

B. Interest Rate

- For policies issued December 31, 1987 and after: Use the greater of the “state prevailing interest rate” and the “applicable Federal interest rate” (for whole life, “applicable Federal interest rate” is greater) (Section 807(d)(2)(B) of the IRC).
- However, there is no “state prevailing interest rate” for accident and health contracts. Therefore, the “applicable Federal interest rate” is used.

- For policies issued prior to January 1, 1988: Use “state prevailing interest rate” for whole life (Section 807(d)(4)(D) of the IRC).

C. Method

- “2-year full preliminary term method” (Section 807(d)(3)(A)(iii) of the IRC)

The language of the IRC requiring a two-year preliminary term method for noncancelable accident and health contracts is viewed by some as conflicting with the intent of the Senate Report from the 1984 Tax Act. Page 541 of that Senate Report makes the following statement:

In general, the Federally Prescribed Reserve Method is the reserve method recommended by the NAIC for a particular type of contract. There is no requirement that the method required be based on the prevailing view of the states. As a general rule in computing any life reserves, a company should take into account any factors specifically recommended by the NAIC.

As noted in Appendix F, for LTC the method prescribed by the NAIC is the one-year preliminary term method.

This final report of course will become dated on many topics, at various paces. The basis for tax reserves well may be one of those areas in which significant change occurs soon. For example, an early bill (HR 8) introduced in Congress in 1995 addresses several aspects of LTC insurance. One was the matter of the method allowed for tax reserves, which it would explicitly make consistent with the NAIC prescribed method. The American Academy of Actuaries submitted a statement in support of such a change.

XVII. RISK-BASED CAPITAL

The NAIC risk-based capital formula gives the following instructions for the handling of LTC insurance related to the insurance risk (C-2) for health insurance (“NAIC Life Risk-Based Capital Report Including Overview and Instructions for Companies,” July 27, 1994, p. 20):

Premiums for Long-Term Care Insurance should be included for purposes of the RBC calculation with the line of business with which it is currently reported.

It is silent elsewhere regarding LTC.

The annual statement categories identified there are as follows:

- Medical Insurance Premium
 - Individual Morbidity
 - Usual and Customary Major Med and Hospital Med Supp, Dental, and Other Limited Benefits Anticipating Rate Increases
 - Hospital Indemnity, AD&D, and Other Limited Benefits Not Anticipating Rate Increases
 - Group and Credit Morbidity
 - Usual and Customary Major Med, Hospital and Dental Stop Loss and Minimum Premium
 - Med Supp, and Other Limited Benefits Anticipating Rate Increases
 - Hospital Indemnity, AD&D, and Other Limited Benefits Not Anticipating Rate Increases
- Disability Income Premium
 - Individual Morbidity
 - Group and Credit Morbidity
- Claim Reserves

LTC has been reported in several of these categories. It seems that the instructions for the treatment of LTC in the risk-based capital formula provide little direct guidance.

A small and informal survey indicates that companies have classified LTC insurance with disability income. The C-2 (insurance) risk component for disability income that is other than noncancellable of the risk-based capital formula is 25% of the first \$50 million of earned premium and 15% of the excess. These two coverages, LTC and DI, would seem to have similar risk characteristics, being long term in nature and developing substantial active life reserves.

The NAIC's factors for DI were developed to provide the desired level of safety based on analysis of the variability of claim costs on large blocks of business in several companies. The experience of LTC claim costs reflects a much smaller data bank and may be changing due to innovations in methods of providing the care and new variations of the coverage being introduced. One may therefore argue that somewhat larger factors should be required for LTC in order to provide the same level of confidence. On the other hand, LTC claims could be more stable than DI claims during volatile economic periods.

As a global (not just LTC) observation, it would seem the required risk-based capital should be lower if a reserve is higher; the risk-based capital should not be independent of the reserve level.

The Health Organizations Risk-Based Capital effort by the American Academy of Actuaries for the NAIC has recently considered LTC insurance, though not as a primary focus of that large total effort. The work by the NAIC was still in progress when this final report was being written.

Until more is learned, the best course for developing LTC risk-based capital would be to apply the DI factors to LTC earned premiums. In addition, the 5% of claim reserves component prescribed for all health insurance should apply to LTC.

Separate explicit studies for LTC should be undertaken in the future, when the patterns of care and coverage have become more stabilized and the volume of available data provides greater credibility.

XVIII. RESERVE ADEQUACY

This subject generally refers to possible deficiency reserves and gross premium valuations.

The requirement for deficiency reserves in general is found in Section 8 of the NAIC Model Standard Valuation Law. Under this section, additional reserves may be required when

... in any contract year the gross premium charged by any life insurance company on any policy or contract is less than the valuation net premium for the policy or contract calculated by the method used in calculating the reserve thereon but using minimum standards of mortality and the rate of interest....

The section seems to apply to life insurance policies with guaranteed (as opposed to indeterminate) premiums.

Section 9 requires that for indeterminate premium life insurance plans reserves held must:

... be appropriate in relation to the benefits and the pattern of premiums for that plan;

and

... be computed by a method which is consistent with the principles of this Standard Valuation Law...

Section 10 states that

... the commissioner shall promulgate a regulation containing the minimum standards applicable to the valuation of health [disability, sickness and accident] plans.

There are no specific references to deficiency reserves in either the NAIC Model Minimum Reserve Standards for Individual and Group Health Insurance Contracts or the NAIC Model LTC Act or Model LTC Regulation.

The function of deficiency reserves is to capitalize anticipated losses under valuation assumptions. Expected profits are matched against future premium, while expected losses are recognized immediately. This approach is consistent with the conservative nature of statutory accounting. This principle is reasonable regardless of the form of premium guarantee.

Implementation of this principle is straightforward when policy features are fixed in advance. When premiums are not guaranteed, however, application of this principle is subject to interpretation.

The usual interpretation has been that a lack of premium guarantees eliminates the need for deficiency reserves. If conservative valuation assumptions prove correct, rather than the assumptions in pricing, the insurer simply increases gross premiums as needed.

There is nothing unique to LTC insurance with respect to the previous comments. The points are equally applicable to any insurance product.

However, with respect to deficiency reserves, the LTC valuation actuary should give appropriate consideration to the nature of the premium guarantees, other policy provisions constraining premium rate changes, premium rate regulations, the impact of premium rate changes on policy lapsation, and the level of benefit utilization of persisting policies.

Deficiency reserves are not necessarily needed when the gross premium is less than the net.

ASOP No. 22, "Statutory Statements of Opinion by Appointed Actuaries for Life or Health Insurance," provides guidance on when additional reserves are required due to deficiency situations:

5.5.3 Adequacy of Reserves and Related Items. In addition to meeting appropriate regulatory requirements, the appointed actuary should use professional judgment to be satisfied that the assets supporting the reserves and related items, plus related future revenues, are adequate to cover obligations under moderately adverse conditions. To hold reserves so great that a company could withstand any conceivable circumstances, no matter how adverse, would usually imply an excessive level of reserves.

The valuation actuary should keep in mind especially these portions of *ASOP No. 22*:

5.3 Statement of Opinion. The form, content, and recommended language of the statement of opinion are specified in Section 8 of the

Model Regulation (relevant to the Standard Valuation Law). The opinion must include a statement on reserve adequacy based on an asset adequacy analysis, the details of which are contained in the supporting memorandum to the company.

5.3.1. Asset Adequacy Analysis. Both the type and depth of asset adequacy analysis will vary with the nature and significance of the asset, obligation, and/or investment-rate-of-return risks. The appointed actuary may use a single analysis for reserves in aggregate or a number of analyses for each of several blocks of business. In either case, a number of considerations may bear on the actuary's work. The actuary should use professional judgment in determining which of the following, or other, considerations apply:

a. Analysis Methods. A number of asset adequacy analysis methods are available to, and used by, actuaries. The most widely used method is cash flow testing (see *ASOP No. 7*, "Performing Cash Flow Testing for Insurers," and *ASOP No. 14*, "When To Do Cash Flow Testing for Life and Health Insurance Companies"). This method is generally appropriate for products and/or investment strategies where future cash flows may differ under different economic or interest-rate scenarios. Such differences are associated with, for example, call options and prepayment risk for assets, and with policyholder withdrawal rights in the case of products. Among other acceptable methods described in actuarial literature are:

- i. Demonstration that a block of business being tested is highly risk-controlled or that the degree of conservatism in the reserve basis is so great that reasonably anticipated deviations from current assumptions are provided for. For example, such methods might be appropriate for a block of accidental death and dismemberment insurance.
- ii. Gross premium reserve tests, which may be appropriate when the business is not highly sensitive to economic or interest-rate risks, but is sensitive to obligation risk. If the reserve held is not materially greater than the gross premium reserve, sensitivity testing of variables such as expenses, mortality, morbidity, or lapse should be done to determine whether additional reserves are needed.

- iii. Loss-ratio methods, development methods, or follow-up studies as described in *ASOP No. 5*, "Incurred Health Claim Liabilities."

The appointed actuary should be satisfied that the analysis methods chosen are appropriate to support the opinion.

This indicates that, for the valuation actuary to provide a clean opinion, the reserves held should not only satisfy the formulas and assumptions required by law but also, at a high probability level when combined with future expected premiums, be able to provide all benefits and expenses expected to be paid under the policies. This is applicable for LTC insurance.

Some LTC policies are issued with limited premium payment periods, such as 10 or 20 years or even with a single premium. These present unique future risks for the insurer. Similarly, policies may contain restraints on when, how often, and to what extent the policy's guaranteed renewable premium may be changed after issue. The NAIC Model LTC Regulation and various bills for federal LTC proposed legislation all currently propose versions of those restraints. The valuation actuary must assure that reserves are adequate within the provisions of the LTC policies being valued and the environment within which that is done.

In addition to the areas of advice and guidance identified in the sections of this final report, the LTC valuation actuary should deviate from well-established or soundly emerging practices and standards only when that deviation is necessary to be responsible in valuing LTC insurance.

This means the LTC valuation actuary must become familiar with the current relevant environment, both within and outside of the actuarial profession.

XIX. TASK FORCE MEMBERSHIP

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During the Task Force's existence, two members were added and four (Stephen R. Atkins, FSA, Mark E. Litow, FSA, Lew H. Nathan, FSA, and Morris Snow, FSA) were replaced by associates from their offices.

NAIC Liaison

Mark D. Peavy, FSA
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APPENDIX A

PRODUCT FEATURES

LTC insurance is varied, evolving, and complex, and thus it is difficult to accurately characterize product features. It is exactly those characteristics of the product that make this appendix a useful part of this final report.

I. Nursing Home (Institutional Care) Benefit

This is the cornerstone of most LTC policies. In general, a daily indemnity benefit is paid for each day of confinement in a licensed nursing facility. There is usually a secondary benefit trigger of either (1) a determination by a physician that the confinement is "medically necessary," (2) loss of a specified number of ADLs, and/or (3) some type of CI.

Early generations of LTC policies made distinctions on the level of care provided in the nursing home (skilled/intermediate/custodial) and whether the stay was preceded by a three-day hospital stay. These distinctions have essentially been eliminated for new policies now being issued.

II. Noninstitutional Care Benefits

A. Home Health Care (HHC) Benefit

This benefit is generally offered in conjunction with the nursing home benefit and typically (but not always) pays a daily indemnity amount equal to one-half of the nursing home benefit. Benefits are paid for each day the insured receives services from a licensed home health care agency. There is generally a requirement that the care be provided by a registered nurse (RN), licensed practical nurse (LPN), licensed therapist, or home health aide, and many policies now have ADL loss requirement as well.

A few insurers offer this as a stand-alone benefit, and benefit amounts are now offered for amounts other than 50% of the nursing home benefit.

B. Home Care (Personal) Benefit (Part of HHC)

This benefit is an extension of the benefit described above. The benefits provided under this coverage can range from limited homemaker services (laundry, cleaning) to a cash indemnity for insureds with a given ADL loss (for example, 2 of 5 or 2 of 6).

C. Adult Day Care Benefit (Part of HHC)

This benefit is generally an amount equal to or less than the home health care benefit and pays a daily benefit for each day the insured receives care in an adult day care (ADC) facility. The definition of what constitutes an ADC facility is fairly standard and generally includes requirements for the minimum and maximum hours a day that the facility operates and minimum staffing requirements (RNs, a physical therapist, a speech therapist, dietician, and so on).

D. Other Benefits

Benefits are also sometimes provided by a LTC policy for prescription drugs, ambulance, hospice services, and medical equipment usage.

III. Respite Care

This benefit is generally a daily indemnity in the same amount as the home health care benefit and is intended to provide short-term relief to a family member or other informal caregiver of the insured. The benefits provided under this type of coverage can range from professional home care services to unskilled homemaker services or short stays in institutional care settings. Benefits are usually limited to 15 or 20 days per year, maybe even less, and may be available prior to meeting the policy's elimination period requirement for other benefits.

IV. Elimination Period

An elimination period refers to the period after an insured has been deemed to have met the benefit eligibility criteria but prior to the inception of the period during which benefits become payable.

Policies tend to vary in their definition of elimination period in two major ways:

- Number of days after benefit eligibility met but without regard to services received (that is, by calendar days). For individual policies, this is often 20 days or 100 days; for group policies, this is often 30, 60, 90, or 120 days.
- Number of days after benefit eligibility met and during which services must be actually received.

Most individual policies tend to require that insureds receive LTC services during the elimination period. Such days of service, however, need not be

consecutive. Some group policies, especially, do not require that actual services be received during the elimination period.

V. Benefit Period

The benefit period refers to the period during which benefits are payable. This period begins after the insured has met the elimination period requirement and lasts for as long as the insured receives LTC insurance benefits.

Note that this is not the same as the period of coverage. The period of coverage begins on the policy issue date and continues for as long as the insurance is in force (that is, for as long as the policy has not lapsed and benefits have not exceeded the policy's maximum benefit).

Benefit periods may apply separately to institutional and noninstitutional care, or there may be one combined benefit period for both.

Most policies prescribe maximum benefit periods of 3 years, 4 years, 5 years, or 6 years. Some have included lifetime benefits, thereby not limiting the policy to any prescribed period.

Most group plans as well as newer individual policies no longer use benefit periods expressed in time but instead use maximum benefit amounts in dollars. Such maximum benefit amounts are typically equal to a benefit period times a daily maximum. For example, a maximum benefit amount of \$182,500 is calculated from a benefit period of 5 years and a daily maximum of \$100. This plan design encourages insureds to use less expensive LTC services, thereby potentially increasing the period of time during which benefits are payable. It also eliminates the negative feelings that some insureds may have when they realize that they do not receive any "credit" for having a benefit payment that is actually less than the nursing home daily maximum.

VI. Nonforfeiture Benefits

Various types of nonforfeiture benefits have been offered to provide the insured a return of some of the prefunding that otherwise would be forfeited at time of voluntary lapsation (or, in some policies, death). See Section X of this final report for a description of these types and their relevance to reserves.

VII. Inflation Protection

Most LTC policies are available with some type of protection against the rising cost of LTC services due to "inflation." The NAIC Model Regulation requires an insurer to offer this at time of purchase. Two basically different types of inflation protection are as follows.

A. Option to Purchase Attained Age Increments

Under this option, the insured will be guaranteed the right to increase periodically both the nursing home maximum daily benefit and the home health care maximum daily benefit, where the premium for the increase is based on the insured's age at the time of increase. The right to purchase increases usually is restricted, for example, to the third policy anniversary and every third policy anniversary up to the insured's 85th birthday. If the insured declines the option, future offers sometimes may still be made. Offers may be withheld if a period of care was in effect any time during a certain period prior to the offer. The amount of the increase sometimes is based on the Consumer Price Index, or its medical component, and sometimes it is fixed at the time the policy is issued, to such as 5% per year.

B. Automatic Inflation Option

Under this option, the nursing home maximum daily benefit and home health care maximum daily benefit will increase by a fixed percentage (for example, 5%) on each policy anniversary. The percentage may be applied to the original benefit level (simple) or to the previous year's benefit level (compound). Increases may continue for a specified duration (for example, 20 years), up to a specified age (for example, 85), or for life. If expressed in dollars, the lifetime policy limit for nursing home care and/or home health care will be increased by the same percentage as the increase in the maximum daily benefit on each policy anniversary. The increase is automatic and will be made even if the insured is on claim. Premiums may remain level under this option or they may be increasing.

VIII. Benefit Triggers

The earlier generations of LTC policies used benefit triggers that were linked to "medical necessity." The more recently issued policies use a "functional necessity" type of benefit trigger and, often, CI, or some combination of these and medical necessity.

A. Medical Necessity

Some LTC policies require a certification from an attending physician to determine that the insured needs medically necessary care. The physician prescribes a diagnosis for a patient, which an insurer uses to determine the critical nature of the insured's ailment. In addition, the insurer may require

a prior hospital stay (in earlier policies) or that the type of care required be of a skilled nature for at least the first 30 days (in earlier policies).

B. Functional Necessity

Today, many LTC policies use some type of ADL measurement to determine whether an insured needs help in performing the daily functions of life. Policies vary in their use of ADL criteria. Some require that the insured be dependent in at least 3 out of 6; others use 2 out of 5; and still others use 2 out of 6. The specific ADLs included among the 5 or 6 vary. They also vary in their exact definition of each of the ADLs. The definition of "inability to perform" varies by policy; some require assistance of mechanical devices, or standby or occasional human assistance, or full-time human assistance.

Below is an example of how one policy uses an ADL definition as a benefit trigger.

An insured will be eligible for benefits under the LTC insurance policy if the insurer's LTC case manager certifies that the insured qualifies for benefits due to functional necessity. To qualify for functional necessity, an insured must be totally dependent on human assistance in performing at least three out of the following six activities of daily living.

- a. Bathing. Refers to the person's ability to get into and out of the tub or shower, turning on the water, getting the soap or other cleansing product, and bathing the entire body (including back and feet).
- b. Eating. Refers to the person's ability to bring food to his or her mouth (or to hold a glass to the mouth), and to be able to chew and swallow the food. (Eating does not include preparing or serving the food.)
- c. Dressing. Refers to a person's ability to get clothes from closets or drawers and putting them on or taking them off.
- d. Toileting. Refers to the person's ability to get to and from the toilet, onto and off the toilet, cleaning oneself after elimination, and adjusting his or her clothes after toileting.
- e. Transferring. Refers to a person's ability to get into or out of a bed or a chair.
- f. Continence. Refers to a person's ability to maintain control of urination and bowel movement.

A person is generally considered to be totally dependent in an ADL if during the previous seven days, the person needed the help of another person to perform a major part of the activity.

C. Cognitive Impairment

An assessment is made, often using one of several recognized tests, whether the insured is cognitively impaired. If a certain number of wrong answers are experienced, the insured is assumed impaired and eligible for benefits. Some insurers look for certain behaviors as an indication of CI.

IX. Expense Incurred Versus Disability Income Products

An expense incurred product usually will pay actual expenses up to a specified limit in the policy. Sometimes actual expenses are reimbursed at 100%, other times at lower percentages, such as 80%.

The disability income policies typically pay benefits regardless of whether the insured is actually receiving LTC services. However, the insured must meet the benefit trigger, whether the trigger is medical necessity, ADL, and/or a CI trigger. In addition, the benefits payable may vary depending on whether the insured is in a nursing home or not.

The expense incurred approach and the disability income approach represent the two ends of a spectrum involving various methods of defining the amount of benefits payable. Somewhere in between the two are indemnity products. Some insurers define their indemnity approach as paying specified benefits as long as approved home health care services are provided; the specified benefit is not based on the actual cost of the service.

Note that if a policy pays 100% of actual costs up to a daily cap, and especially if it has no inflation rider, then over an extended period payments may end up at the cap and thus resemble an indemnity plan. Even though such payments may not directly be thought of as an indemnity benefit, such payments may still have very similar characteristics.

X. Limited Pay Policies

Policies can have premium payments limited to a predefined number of years (for example, 20 years, to age 65, or even single premium) or by a contingent event (for example, the policy is paid up upon the later of 10 years after issue and the first death of two jointly insured lives). These are not common.

XI. Alternative Plan of Care

Some policies provide for payment of services related to LTC outside of traditional covered services (for example, remodeling of the residence) if it

is cost effective and of use to the insured, as jointly determined by the insured, the insured's physician, and the insurer.

XII. Bed Reservation Benefit

The policy will reserve a bed in the nursing facility if the insured is transferred to a hospital for care. The period of time for which it is reserved is usually measured in days and is limited to, at most, a few weeks.

While benefits are described here in isolation, it is important to realize that the morbidity experience for the benefits described above can be expected to vary significantly, depending on whether the benefits are offered alone or in conjunction with each other. For example, when the home health care benefits are offered as a stand-alone coverage separate from any nursing home coverage, a load should be applied to the morbidity costs to reflect the effects of substitution that can be expected to take place. A load also should be applied in the situation in which a policy is sold with nursing home coverage alone, because in some instances it could be expected that the nursing home utilization would be higher if the insured does not have coverage for home health care (again, due to substitution effects).

While the above only generally describes some of the more significant policy features that must be considered for appropriate LTC insurance valuation, it does provide some understanding of the complexities, possible variations, and the product issues the valuation actuary must consider.

APPENDIX B

MIGHTY FINE INSURANCE COMPANY: A CASE STUDY FOR APPLICATION OF THE TABLES

This appendix has two purposes:

- It illustrates the type of thinking the valuation actuary might go through in applying this final report and companion valuation diskette
- It describes as the case study the default set of assumptions contained in the valuation diskette. It is also the default or base case against which results for selective different sets of assumptions are displayed in Appendix C.

Mighty Fine Insurance Company markets an LTC insurance product. The product is marketed to individuals by the company's own agents and carefully selected brokers. Mighty Fine watches for sales abuses and removes an agent's writing privileges whenever there is good reason to believe the

agent is placing business with a below-average number of good risks. Mighty Fine has strict underwriting standards. The agents frequently complain that Mighty Fine is too strict, but the company believes the careful underwriting is critical to its success.

The product is a daily indemnity, paying a specified amount for each day an insured qualifies for benefits and resides in a nursing home and 50% of the specified amount for each day the insured receives qualified home health care. Nursing home qualification is based on the inability to perform three of six specified ADLs without the assistance of another person. The ADLs used are eating, bathing, dressing, toileting, transference, and mobility. Home health care qualification is based on the inability to perform two of the six ADLs. In addition, insureds can qualify for either type of care if they have a CI requiring continual supervision.

The most common plan Mighty Fine sells has a four-year benefit period and a 100-day elimination period. The elimination period can be satisfied by either home care or nursing home days, or a combination. The insured must actually receive home health care or nursing home care to accrue a benefit day. This is also true for the benefit period. A home health care day counts as a full day, though the benefit is only 50%. The benefits are counted in service days and are accumulated regardless of where the care is received.

The following is a discussion of how a valuation actuary might use the new valuation tables from this final report to study the statutory reserves needed for this plan.

Insured

You decide to study reserves for females to simplify the study. You also decide to study issue age 70.

Morbidity

An insurance plan like this one is best modeled by insurable stays from the 1985 NNHS, so you select insurable stays. The plan is very carefully underwritten, and morbidity selection has yielded losses of 50% of the ultimate in the first duration, 60% in the second, 70% in the third, 80% in the fourth, 90% in the fifth, and 100% thereafter. No overall incidence rate adjustment is entered (1.0 is used), since the company has no compelling evidence from its own experience to justify any overall loading or reduction.

Mortality

You use the suggested 83 GAM table and no mortality adjustment (1.0 is used), since you have no compelling evidence Mighty Fine mortality is better or worse than the 83 GAM. You decide to use the same mortality selection factors as those you used for morbidity selection (50%, 60%, 70%, 80%, 90%, 100% thereafter).

Interest

You decide to use the reserve interest rate that is the statutory maximum (5%) for 1994 issues.

Method

You decide to use the minimum reserve method currently required by your state, one-year preliminary term.

Policy

You decide to define a unit as \$100 daily benefit for nursing home and \$50 for home health care. You conduct some studies of the impact of the integrated benefits. You discover that you have insufficient claim data to determine with confidence how the elimination period and benefit period should be adjusted. You also notice that any adjustment for the elimination period largely will be offset by any adjustment for the benefit period. (See Appendix C for information relating to such an analysis.) Thus, though the plan has elimination and benefit periods that are integrated between nursing home and home health care, you decide to determine reserves as if those periods apply separately to the two types of benefit coverage provided.

The premium is waived whenever the elimination period has been met and the insured resides in a nursing home. Therefore, zero days is entered as the base elimination period variable.

The plan is level premium and level benefit, so no inflation adjustment is needed.

Lapsation

Gross premiums were calculated assuming lapses of 15% in the first year, 9% in the second, 8% in the third, 7% in the fourth, and 5% thereafter. These are still reasonable in light of recent experience. Because lapses for valuation are limited to 80% of pricing assumptions, and you want to somewhat conservatively hold back from the limit, you use rates of 8% first year,

7% second year, 6% third year, 5% fourth year, and 4% thereafter. Your experience leads you to know that lapses are antiselective, and the higher the lapse rate the higher the antiselection. You decide that though lapsers take 100% of their future premiums with them, their departure reduces their otherwise future assumed claims by only 30% in the first year after lapse, 50% in the second, 70% in the third, 80% in the fourth, 90% in the fifth, and 100% by the sixth year after they lapse. Accordingly, you enter 70% in first-year antiselection, 50% in second, 30% in third, 20% in fourth, 10% in the fifth, and none thereafter. Finally, your state valuation law allows you to compute the reserves so that both mortality and voluntary lapses are counted as separate decrements, so you chose the option "Lapse rates exclude mortality."

Home Health Care Utilization

A study of your limited claims experience shows that when an insured has a single ADL and no CI, 10% of insureds will receive home health care services an average of two days per week; though your product has a two-ADL trigger, your experience shows some insureds with one ADL will be successful in applying for benefits. When there are two ADLs and no CI, 70% will receive services an average of four days per week. When there are three ADLs with no CI, 100% will use services an average of six days per week. When there are no ADLs but there is a CI, 30% use services an average of one day per week; one ADL and CI, 50% for three days; two ADLs and CI, 70% for five days; and three ADLs and CI, 100% for seven days.

Nonforfeiture

Since this product has no nonforfeiture values, zeros are entered in all fields.

Results

You compute the reserves on the valuation diskette and find the values shown in Table B-1.

TABLE B-1
MIGHTY FINE LTC RESERVE OUTPUT

Mighty Fine LTC Reserve Output

Default Specifications

Summary of 1-Year Preliminary Term Reserves at 5.000% for Issue Age 70 Assuming Females Are 100% of Sales

Net Premium: 1,641.93	Daily Benefit: 100.00	NI	HC	Home Care ED/ED in Service Days
Lifetime Pay	Deductible Period: 100	50.00	50.00	Inflation Protection: NONE
	Lifetime Maximum: 1460	100	100	
	W/P Days in Ben: 0	1460	1460	

Mortality Table: S3 GM

Adjustment Factor: 1.000
Mort. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000

Morbidity Table: S5 HHSB (Insurable State) and S2/S4 LTCX

Adjustment Factor: 1.000
Morb. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000
Anti-selection Factors: 0.700 0.500 0.300 0.200 0.100 0.000 0.000 0.000 0.000 0.000 (10) 0.000

Home Care Service Utilization Rates by ADL/CI Status:

NI Cognitive Department: (0 ADLs) 0.000 (1 ADLs) 0.100 (2 ADLs) 0.700 (3 ADLs) 1.000
Cognitively Depaired: 0.100 0.500 0.700 1.000

Home Care Service Frequency (per week) by ADL/CI Status:

NI Cognitive Department: (0 ADLs) 0.000 (1 ADLs) 2.000 (2 ADLs) 4.000 (3 ADLs) 6.000
Cognitively Depaired: 1.000 3.000 5.000 7.000

Lapse rates are in addition to mortality - Maximum aggregate termination rate: 1.000

Lapse Rates: (1) 0.080 (2) 0.070 (3) 0.060 (4) 0.050 (5) 0.040 (6) 0.040 (7) 0.040 (8) 0.040 (9) 0.040 (10+) 0.040

Manufacture benefits: SBD Cost Factor: 1.200 Reserves to exceed SBD cost per lapseur
(3) .000 (4) .000 (5) .000 (10) .000 (15) .000 (20) .000 (25) .000 (30) .000 (35) .000 (40) .000 (45) .000 (50+) .000

Age	NI Inforce	NI Waiver Inforce	NI Inforce	NI Admiss.	HC Admiss.	EDY Lapses	Deaths	Net Prem. per Payer	NI Cost per Mid Lx	HC Cost per Mid Lx	MPO Cost per Lapse	Thermal Reserve	Mid-Term Reserve
1	100,000	0	0	839	1,937	7,980	619	287.43	302.47	72.50	0.00	0.00	0.00
2	91,431	199	295	698	1,636	6,344	775	1,641.93	185.77	100.26	0.00	1,436.39	667.92
3	84,309	189	823	689	1,872	5,001	953	1,641.93	190.07	130.96	0.00	2,900.92	2,081.63
4	78,354	573	740	1,066	1,941	1,860	1,158	1,641.93	517.71	183.69	0.00	4,247.95	3,515.73
5	73,316	763	970	1,295	2,108	2,078	1,392	1,641.93	877.48	198.05	0.00	5,728.45	4,922.19
6	69,067	977	1,226	1,568	2,370	2,696	1,657	1,641.93	880.43	233.60	0.00	7,043.61	6,243.66
7	64,713	1,220	1,522	1,713	2,379	2,518	1,789	1,641.93	1,039.02	246.09	0.00	8,346.43	7,537.70
8	60,432	1,437	1,766	1,896	2,387	2,343	1,853	1,641.93	1,240.37	259.15	0.00	9,662.61	8,821.27
9	56,239	1,646	2,006	2,060	2,389	2,178	1,938	1,641.93	1,478.91	273.63	0.00	10,908.09	10,063.75
10	52,129	1,849	2,246	2,231	2,382	2,005	2,010	1,641.93	1,758.22	287.34	0.00	12,066.31	11,244.38
11	48,115	2,053	2,482	2,387	2,263	1,942	2,067	1,641.93	2,069.27	301.20	0.00	13,116.53	12,329.09
12	44,206	2,249	2,709	2,518	2,227	1,696	2,107	1,641.93	2,409.40	312.87	0.00	14,036.82	13,295.94
13	40,415	2,432	2,917	2,611	2,277	1,531	2,129	1,641.93	2,766.06	325.84	0.00	14,816.50	14,130.33
14	36,755	2,593	3,095	2,664	2,211	1,385	2,134	1,641.93	3,145.74	336.68	0.00	15,437.61	14,818.30
15	33,235	2,723	3,235	2,674	2,130	1,245	2,121	1,641.93	3,544.01	345.89	0.00	15,885.27	15,243.74
16	29,870	2,817	3,332	2,629	2,035	1,111	2,088	1,641.93	3,949.75	354.61	0.00	16,151.42	15,695.31
17	26,670	2,872	3,380	2,561	1,928	988	2,042	1,641.93	4,371.28	360.83	0.00	16,222.61	15,862.56
18	23,643	2,883	3,377	2,443	1,809	866	1,983	1,641.93	4,789.91	364.42	0.00	16,098.45	15,828.56
19	20,794	2,854	3,324	2,287	1,681	758	1,912	1,641.93	5,199.95	369.29	0.00	15,784.80	15,625.93
20	18,127	2,781	3,221	2,100	1,543	653	1,827	1,641.93	5,607.13	370.49	0.00	15,280.58	15,230.92
21	15,638	2,668	3,072	1,891	1,399	556	1,748	1,641.93	6,003.05	370.58	0.00	14,611.71	14,657.91
22	13,328	2,518	2,882	1,647	1,250	468	1,641	1,641.93	6,312.87	367.84	0.00	13,816.90	13,927.01
23	11,226	2,338	2,659	1,437	1,100	388	1,523	1,641.93	6,540.79	363.85	0.00	12,927.69	13,122.74
24	9,315	2,136	2,410	1,211	952	317	1,394	1,641.93	6,622.42	361.20	0.00	11,966.35	12,204.73
25	7,605	1,914	2,146	996	808	284	1,256	1,641.93	6,634.80	357.58	0.00	10,943.08	11,234.85
26	6,095	1,685	1,876	794	671	199	1,112	1,641.93	7,222.70	353.69	0.00	9,879.99	10,213.94
27	4,784	1,454	1,609	615	546	133	965	1,641.93	7,376.89	346.72	0.00	8,801.05	9,164.50
28	3,666	1,235	1,383	460	430	114	814	1,641.93	7,513.87	338.28	0.00	7,708.61	8,100.46
29	2,718	1,026	1,133	330	330	83	648	1,641.93	7,620.13	334.37	0.00	6,627.96	7,030.93
30	1,987	834	897	226	245	58	533	1,641.93	7,732.26	329.00	0.00	5,542.91	5,969.87
31	1,396	664	707	145	176	39	412	1,641.93	7,835.88	321.03	0.00	4,511.76	4,946.70
32	945	516	543	86	121	25	307	1,641.93	7,926.89	312.10	0.00	3,678.47	4,021.54
33	612	391	407	44	79	16	220	1,641.93	8,020.85	304.26	0.00	3,197.36	3,272.96
34	377	264	264	25	49	9	149	1,641.93	8,120.31	288.09	0.00	2,820.70	2,982.62
35	218	153	153	14	29	5	84	1,641.93	8,229.81	265.89	0.00	2,390.18	2,557.64
36	118	82	82	8	15	2	57	1,641.93	8,323.85	243.48	0.00	1,822.95	2,074.91
37	58	42	41	4	7	1	32	1,641.93	7,882.37	211.76	0.00	1,223.68	1,503.94
38	35	18	18	2	3	0	15	1,641.93	6,943.92	170.21	0.00	841.23	871.63
39	9	7	7	1	1	0	6	1,641.93	5,316.56	107.66	0.00	0.00	270.61
40	3	2	2	0	0	0	2	1,641.93	1,827.99	9.79	0.00	0.00	0.00

PREMIUM & BENEFIT TOTALS (\$000) 1,420,490 2,102,167
PRESENT VALUES (\$ 000) 1,136,343 1,136,343

APPENDIX C

INPUT/OUTPUT OF SOME CASES TESTED

This appendix contains four tables of sample LTC reserve values. While the information is designed to support other parts of this final report, useful insights can be derived by studying this appendix apart from the references in the body of this final report. Of course, many other variations of assumptions are possible beyond those illustrated in this material. The reader is encouraged to use the valuation diskette software to explore further.

Table C-1 shows output from the valuation diskette software for the default case (see Appendix B) for issue ages 45 and 70. These values provide a comparison base for variations in assumptions.

Table C-2 provides selected output resulting from variations from the default elimination and benefit periods for issue ages 45 and 70.

Table C-3 summarizes the impact of home health care utilization assumptions on net premiums and mid-terminal reserves. The first two pages correspond to an integrated benefit plan (nursing home and home health care) and the last two pages assume home health care benefits only. The tables attempt to uncover the role of each ADL/CI status by setting the utilization rates to either zero or 100% in various combinations. For example, the entry labeled "2+ ADLs or CI" sets utilization rates for those with one ADL impaired and without CI to zero. Utilization rates for those with two *or more* ADLs impaired *or* who are cognitively impaired are set to 100%. Other combinations focus on specific cells, for example, "2 ADLs *and* CI." Output is provided assuming frequency of service use of 7 days per week (top of each page) and 3.5 days per week (bottom of each page) for those assumed to be using home health care services.

Table C-4 documents results of 25 cases with variations of assumptions from those of the default case. The variations range over a variety of assumptions. The first page of the table briefly describes each case. Each page that follows compares a case with the default. Mid-terminal reserves per surviving policy and per policy issued are graphically displayed on each page.

TABLE C-1
DEFAULT CASE LTC RESERVE OUTPUT

Summary of 1-Year Preliminary Term Reserves at 5.000% for Issue Age 45 Assuming Females Are 100% of Sales

Net Premium:	202.76	Daily Benefit:	100.00	NI	50.00	Home Care EP/SP in Service Days:	
Lifetime Pay		Deductible Period:	100	NC	100	Inflation Protection:	NONE
		LifeTime Maximum:	1440		1440		
		W/P Days in Ben:	0				

Mortality Table: 81 CSM

Adjustment Factor: 1.000
Mort. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000

Morbidity Table: 85 HHSB (Insurable States) and 82/86 HATCS

Adjustment Factor: 1.000
Morb. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000
Anti-selection Factors: 0.700 0.800 0.300 0.200 0.100 0.000 0.000 0.000 0.000 (10) 0.000

Home Care Service Utilization Rates by ADL/CI Status:

No Cognitive Impairment: (0 ADLs) 0.000 (1 ADLs) 0.100 (2 ADLs) 0.700 (3 ADLs) 1.000

Cognitively Impaired: 0.300 0.500 0.700 1.000

Home Care Service Frequency (per week) by ADL/CI Status:

No Cognitive Impairment: (0 ADLs) 0.000 (1 ADLs) 2.000 (2 ADLs) 4.000 (3 ADLs) 6.000

Cognitively Impaired: 1.000 3.000 5.000 7.000

Lapse rates are in addition to mortality - Maximum aggregate termination rate: 1.000

Lapse Rates: (1) 0.050 (2) 0.070 (3) 0.050 (4) 0.050 (5) 0.040 (6) 0.040 (7) 0.040 (8) 0.040 (9) 0.040 (10+) 0.040

Manufacture benefits: \$EP Cost Factor: 1.200 Reserves to exceed \$EP cost per lapse:

(1) 0.000 (4) 0.000 (5) 0.000 (10) 0.000 (15) 0.000 (20) 0.000 (25) 0.000 (30) 0.000 (40) 0.000 (45) 0.000 (50+) 0.000

BOY	Waiver	NI	NI	NC	BOY	Net Prem.	NI Cost	NC Cost	WFO Cost	Terminal	Mid-Term
t	Enforce	Enforce	Admins.	Admins.	Lapses	per Payer	per Mid lx	per Mid lx	per Lapse	Reserve	Reserve
1	100,000	0	0	15	64	7,994	81	19.61	9.13	3.78	0.00
2	91,954	8	8	23	84	6,432	52	102.76	11.81	6.34	0.00
3	85,489	12	16	26	107	5,123	74	102.76	13.91	7.32	0.00
4	80,742	18	22	28	131	4,009	88	102.76	15.68	9.84	0.00
5	76,163	22	27	30	157	3,042	103	102.76	17.40	12.24	0.00
6	73,020	29	35	40	187	2,316	121	102.76	22.80	15.11	0.00
7	69,983	33	41	46	200	2,794	126	102.76	27.81	16.95	0.00
8	67,042	39	47	51	216	2,677	131	102.76	32.31	19.10	0.00
9	64,355	44	54	49	229	2,828	137	102.76	35.53	21.49	0.00
10	61,854	47	56	53	247	2,454	142	102.76	37.30	24.21	0.00
11	59,555	51	61	57	265	2,323	150	102.76	42.31	27.57	0.00
12	56,453	55	64	61	283	2,283	158	102.76	46.89	31.31	0.00
13	54,043	59	70	64	305	2,188	167	102.76	51.49	35.54	0.00
14	51,721	63	75	72	329	2,062	178	102.76	60.46	40.49	0.00
15	49,481	69	83	80	351	1,972	189	102.76	69.11	46.10	0.00
16	47,321	76	91	91	375	1,885	201	102.76	82.03	52.86	0.00
17	45,235	85	102	107	400	1,801	212	102.76	99.28	59.83	0.00
18	43,222	96	115	128	425	1,720	225	102.76	120.36	67.80	0.00
19	40,377	111	134	180	452	1,642	238	102.76	149.29	76.39	0.00
20	39,397	129	158	177	479	1,564	252	102.76	181.72	85.78	0.00
21	37,880	152	185	204	506	1,493	268	102.76	217.29	95.78	0.00
22	35,822	177	218	233	533	1,422	280	102.76	264.09	106.50	0.00
23	34,120	204	249	261	561	1,353	296	102.76	298.54	117.79	0.00
24	32,471	232	282	286	588	1,284	315	102.76	340.79	129.97	0.00
25	30,869	260	315	310	614	1,212	337	102.76	387.41	142.72	0.00
26	29,311	288	347	331	639	1,189	363	102.76	435.47	155.94	0.00
27	27,790	315	378	354	664	1,096	392	102.76	485.89	169.63	0.00
28	26,302	341	409	376	686	1,028	425	102.76	545.11	183.66	0.00
29	24,842	367	439	406	706	978	459	102.76	627.88	198.84	0.00
30	23,407	396	473	442	724	937	494	102.76	739.58	213.40	0.00
31	21,997	429	513	485	739	859	528	102.76	861.68	228.68	0.00
32	20,610	467	548	518	750	802	560	102.76	1,000.88	243.62	0.00
33	19,248	513	616	596	757	746	590	102.76	1,238.38	258.21	0.00
34	17,912	564	678	654	760	692	617	102.76	1,477.43	273.25	0.00
35	16,402	620	745	709	759	638	640	102.76	1,758.22	287.36	0.00
36	15,324	678	814	759	752	587	658	102.76	2,069.27	301.20	0.00
37	14,079	728	880	801	741	534	671	102.76	2,469.40	313.67	0.00
38	12,972	789	942	821	715	478	678	102.76	2,964.06	325.84	0.00
39	11,704	836	895	848	704	441	680	102.76	3,145.74	336.68	0.00
40	10,583	875	1,037	851	678	394	675	102.76	3,844.01	348.89	0.00
41	9,513	902	1,064	840	648	354	663	102.76	3,969.75	354.61	0.00
42	8,494	918	1,079	815	614	314	680	102.76	4,271.28	360.82	0.00
43	7,530	921	1,077	778	576	276	631	102.76	4,779.91	366.42	0.00
44	6,623	910	1,040	728	535	241	609	102.76	5,199.95	369.29	0.00
45	5,772	886	1,026	669	491	208	565	102.76	5,607.13	370.45	0.00
50	2,422	609	680	317	257	81	406	102.76	7,094.80	357.88	0.00
55	633	266	285	72	78	19	170	102.76	7,732.24	329.00	0.00
60	70	48	49	5	9	2	11	102.76	8,229.81	369.89	0.00
65	1	1	1	0	0	0	1	102.76	1,087.99	9.79	0.00

PREMIUM & BENEFIT TOTALS (\$000)	338,162	853,909
RESERVE VALUES (\$000)	186,152	186,253

TABLE C-2
ELIMINATION AND BENEFIT PERIOD VARIATIONS

Daily Benefit NH/HC	Elim. Period NH/HC	Ben. Period NH/HC	Net Premium Age 45	Mid-Terminal Reserves			
				Issue Age 45 by Duration from Issue			
				5	10	20	30
100/100	0/0	20/20	\$359.40	\$1,359.54	\$3,838.02	\$11,831.52	\$23,168.29
100/100	0/0	4/0	182.23	724.70	2,125.47	7,141.96	15,678.41
100/100	0/0	4/2	263.73	1,015.57	2,903.11	9,185.27	18,766.99
100/100	0/0	4/3	280.84	1,078.49	3,074.23	9,639.92	19,414.25
100/100	0/0	4/4	289.69	1,113.01	3,169.04	9,894.07	19,764.85
100/100	0/100	20/20	342.12	1,298.76	3,676.48	11,407.28	22,503.95
100/100	0/100	4/0	182.23	724.70	2,125.47	7,141.96	15,678.41
100/100	0/100	4/2	252.09	975.74	2,798.43	8,911.65	18,319.15
100/100	0/100	4/3	266.53	1,029.85	2,945.92	9,303.29	18,871.14
100/100	0/100	4/4	274.02	1,058.38	3,024.48	9,514.56	19,159.58
100/100	100/0	20/20	328.86	1,237.14	3,478.79	10,614.03	20,485.87
100/100	100/0	4/0	156.90	622.46	1,824.33	6,110.79	13,387.77
100/100	100/0	4/2	238.34	913.09	2,601.23	8,151.57	16,470.67
100/100	100/0	4/3	255.24	975.95	2,772.19	8,605.71	17,116.76
100/100	100/0	4/4	264.28	1,010.45	2,866.92	8,859.56	17,466.73
100/100	100/100	20/20	311.59	1,176.40	3,317.38	10,190.33	19,822.52
100/100	100/100	4/0	156.90	622.46	1,824.33	6,110.79	13,387.77
100/100	100/100	4/2	226.71	873.29	2,496.64	7,878.31	16,023.65
100/100	100/100	4/3	241.14	927.35	2,644.02	8,269.52	16,574.63
100/100	100/100	4/4	248.62	955.86	2,722.51	8,480.55	16,862.56
100/100	50/50	20/20	333.43	1,259.71	3,553.63	10,929.07	21,319.38
100/100	50/50	4/0	167.53	665.43	1,951.16	6,545.69	14,359.71
100/100	50/50	4/2	243.49	937.46	2,679.20	8,458.34	17,232.58
100/100	50/50	4/3	258.87	994.77	2,835.02	8,873.12	17,819.39
100/100	50/50	4/4	267.12	1,026.26	2,921.87	9,105.85	18,138.78
100/50	0/0	20/20	299.35	1,142.03	3,251.99	10,285.71	20,913.50
100/50	0/0	4/0	182.23	724.70	2,125.47	7,141.96	15,678.41
100/50	0/0	4/2	222.98	870.14	2,514.29	8,163.62	17,222.70
100/50	0/0	4/3	231.43	901.59	2,599.85	8,390.94	17,548.33
100/50	0/0	4/4	235.96	918.85	2,647.25	8,518.01	17,721.64
100/50	0/100	20/20	290.71	1,111.63	3,171.20	10,073.58	20,581.33
100/50	0/100	4/0	182.23	724.70	2,125.47	7,141.96	15,678.41
100/50	0/100	4/2	217.16	850.21	2,461.95	8,026.80	16,998.79
100/50	0/100	4/3	224.38	877.27	2,535.69	8,222.62	17,274.78
100/50	0/100	4/4	228.12	891.54	2,574.98	8,328.26	17,419.00
100/50	100/0	20/20	268.85	1,019.81	2,893.30	9,070.08	18,235.05
100/50	100/0	4/0	156.90	622.46	1,824.33	6,110.79	13,387.77
100/50	100/0	4/2	197.62	767.77	2,212.77	7,131.18	14,929.22
100/50	100/0	4/3	206.07	799.20	2,298.26	7,358.25	15,252.27
100/50	100/0	4/4	210.59	816.45	2,345.61	7,485.18	15,427.25
100/50	100/100	20/20	260.22	989.44	2,812.59	8,858.23	17,903.48
100/50	100/100	4/0	156.90	622.46	1,824.33	6,110.79	13,387.77
100/50	100/100	4/2	191.80	747.87	2,160.48	6,994.55	14,705.70
100/50	100/100	4/3	199.02	774.90	2,234.17	7,190.16	14,981.20
100/50	100/100	4/4	202.76	789.15	2,273.42	7,295.67	15,125.16
100/50	50/50	20/20	277.73	1,057.52	3,008.33	9,490.51	19,233.37
100/50	50/50	4/0	167.53	665.43	1,951.16	6,545.69	14,359.71
100/50	50/50	4/2	205.51	801.46	2,315.18	7,502.02	15,796.15
100/50	50/50	4/3	213.20	830.10	2,393.09	7,709.41	16,089.55
100/50	50/50	4/4	217.32	845.85	2,436.52	7,825.77	16,249.24

TABLE C-2—Continued

ELIMINATION AND BENEFIT PERIOD VARIATIONS

Daily Benefit NH/HC	Elim. Period NH/HC	Ben. Period NH/HC	Net Premium Age 70	Mid-Terminal Reserves			
				Issue Age 70 by Duration from Issue			
				5	10	20	30
100/100	0/0	20/20	\$2,611.55	\$7,365.55	\$16,305.74	\$21,737.18	\$9,132.68
100/100	0/0	4/0	1,662.48	5,299.34	12,487.23	17,524.50	7,065.64
100/100	0/0	4/2	2,068.54	6,104.42	13,888.21	18,167.60	8,081.31
100/100	0/0	4/3	2,155.42	6,259.38	14,114.50	18,326.21	8,155.38
100/100	0/0	4/4	2,203.00	6,338.94	14,218.15	19,365.88	8,174.10
100/100	0/100	20/20	2,525.53	7,184.79	15,965.73	21,257.13	8,800.27
100/100	0/100	4/0	1,662.48	5,299.34	12,487.23	17,524.50	7,065.64
100/100	0/100	4/2	2,011.46	5,976.27	13,628.31	18,753.77	7,776.82
100/100	0/100	4/3	2,085.86	6,106.47	13,811.06	18,859.63	7,832.99
100/100	0/100	4/4	2,125.18	6,170.88	13,892.45	18,888.01	7,841.99
100/100	100/0	20/20	2,313.56	6,409.90	14,035.34	18,345.67	7,483.67
100/100	100/0	4/0	1,412.23	4,492.02	10,555.49	14,572.27	5,594.30
100/100	100/0	4/2	1,815.40	5,287.27	11,932.38	16,174.82	6,587.33
100/100	100/0	4/3	1,901.66	5,440.12	12,153.52	16,324.77	6,656.54
100/100	100/0	4/4	1,948.90	5,518.53	12,254.34	16,359.49	6,672.61
100/100	100/100	20/20	2,228.16	6,231.22	13,700.44	17,874.22	7,156.05
100/100	100/100	4/0	1,412.23	4,492.02	10,555.49	14,572.27	5,594.30
100/100	100/100	4/2	1,758.73	5,160.50	11,675.85	15,766.70	6,286.01
100/100	100/100	4/3	1,832.59	5,288.90	11,854.21	15,865.12	6,338.03
100/100	100/100	4/4	1,871.63	5,352.35	11,933.26	15,889.58	6,344.85
100/100	50/50	20/20	2,397.59	6,728.07	14,837.31	19,586.76	8,045.82
100/100	50/50	4/0	1,516.57	4,830.40	11,367.92	15,830.18	6,242.82
100/100	50/50	4/2	1,893.77	5,568.10	12,627.68	17,238.89	7,089.80
100/100	50/50	4/3	1,972.45	5,706.24	12,824.52	17,366.93	7,156.68
100/100	50/50	4/4	2,015.70	5,777.54	12,915.42	17,398.98	7,165.77
100/50	0/0	20/20	2,310.82	6,804.17	15,402.21	20,833.05	8,594.98
100/50	0/0	4/0	1,662.48	5,299.34	12,487.23	17,524.50	7,065.64
100/50	0/0	4/2	1,865.51	5,701.88	13,187.73	18,348.05	7,573.47
100/50	0/0	4/3	1,908.95	5,779.36	13,300.87	18,425.36	7,610.51
100/50	0/0	4/4	1,932.74	5,819.14	13,352.69	18,445.10	7,619.86
100/50	0/100	20/20	2,267.81	6,713.79	15,232.22	20,593.03	8,428.78
100/50	0/100	4/0	1,662.48	5,299.34	12,487.23	17,524.50	7,065.64
100/50	0/100	4/2	1,836.97	5,637.81	13,057.77	18,139.14	7,421.22
100/50	0/100	4/3	1,874.17	5,702.91	13,149.15	18,192.06	7,449.31
100/50	0/100	4/4	1,893.83	5,735.11	13,189.84	18,206.25	7,453.81
100/50	100/0	20/20	2,014.97	5,855.80	13,149.65	17,471.58	6,962.74
100/50	100/0	4/0	1,412.23	4,492.02	10,555.49	14,572.27	5,594.30
100/50	100/0	4/2	1,813.82	4,889.65	11,243.93	15,373.54	6,090.81
100/50	100/0	4/3	1,656.95	4,966.07	11,354.51	15,448.52	6,125.42
100/50	100/0	4/4	1,680.57	5,005.28	11,404.91	15,465.88	6,133.46
100/50	100/100	20/20	1,972.27	5,766.46	12,982.21	17,235.85	6,798.94
100/50	100/100	4/0	1,412.23	4,492.02	10,555.49	14,572.27	5,594.30
100/50	100/100	4/2	1,585.48	4,826.26	11,115.68	15,169.48	5,940.16
100/50	100/100	4/3	1,622.41	4,890.46	11,204.85	15,218.69	5,968.17
100/50	100/100	4/4	1,641.93	4,922.19	11,244.38	15,230.92	5,969.57
100/50	50/50	20/20	2,119.75	6,216.60	14,030.37	18,802.13	7,602.05
100/50	50/50	4/0	1,516.57	4,830.40	11,367.92	15,830.18	6,242.82
100/50	50/50	4/2	1,705.17	5,199.25	11,997.79	16,534.54	6,666.31
100/50	50/50	4/3	1,744.51	5,288.32	12,096.21	16,598.55	6,699.75
100/50	50/50	4/4	1,766.13	5,303.97	12,141.67	16,614.58	6,704.30

TABLE C-3

HOME HEALTH CARE UTILIZATION VARIATIONS FOR AN INTEGRATED BENEFIT PLAN

Integrated Benefit Plan		Net Premium Age 45	Mid-Terminal Reserves			
Frequency Per Week	Utilization 100% Use For		Issue Age 45 by Duration from Issue			
			5	10	20	30
7 days	1+ADLs or CI	\$330.86	\$1,228.27	\$3,418.55	\$10,151.67	\$19,090.67
	2+ADLs or CI	245.15	941.93	2,690.58	8,467.48	17,061.74
	3+ADLs or CI	221.43	858.66	2,471.85	7,918.36	16,282.23
	1+ADLs	302.53	1,127.01	3,141.20	9,362.05	17,782.87
	2+ADLs	212.58	822.78	2,360.44	7,512.24	15,471.65
	3+ADLs	186.77	730.60	2,114.98	6,877.09	14,537.33
	1 ADLs and no CI	242.61	908.80	2,552.29	7,794.97	15,416.70
	2 ADLs and no CI	180.62	705.73	2,043.06	6,659.91	14,167.27
	3 ADLs and no CI	183.97	718.91	2,081.19	6,778.92	14,387.47
	0 ADLs and CI	185.23	723.72	2,101.67	6,900.41	14,695.56
	1 ADLs and CI	161.13	640.35	1,877.11	6,276.41	13,670.05
	2 ADLs and CI	159.00	631.36	1,851.05	6,196.82	13,542.58
	3 ADLs and CI	159.70	634.14	1,858.11	6,208.96	13,537.63
	3.5 days	1+ADLs or CI	252.70	956.38	2,703.85	8,332.20
2+ADLs or CI		212.57	823.73	2,370.29	7,588.18	15,605.51
3+ADLs or CI		200.62	781.65	2,259.73	7,312.58	15,231.46
1+ADLs		229.66	875.61	2,485.02	7,727.59	15,490.81
2+ADLs		186.81	731.63	2,118.47	6,884.48	14,513.46
3+ADLs		173.41	683.44	1,989.70	6,552.04	14,044.79
1 ADLs and no CI		197.03	755.11	2,157.89	6,854.81	14,211.50
2 ADLs and no CI		168.85	664.54	1,934.89	6,386.38	13,761.81
3 ADLs and no CI		171.28	674.60	1,964.22	6,478.66	13,935.58
0 ADLs and CI		179.94	703.23	2,043.16	6,715.40	14,326.21
1 ADLs and CI		159.62	633.79	1,857.30	6,209.89	13,541.37
2 ADLs and CI		158.35	628.56	1,842.53	6,167.63	13,482.40
3 ADLs and CI		159.03	631.30	1,849.80	6,184.18	13,496.96

TABLE C-3—Continued

HOME HEALTH CARE UTILIZATION VARIATIONS FOR AN INTEGRATED BENEFIT PLAN

Integrated Benefit Plan		Net Premium Age 70	Mid-Terminal Reserves			
Frequency Per Week	Utilization 100% Use For		Issue Age 70 by Duration from Issue			
			5	10	20	30
7 days	1+ADLs or CI	\$2,192.87	\$5,880.30	\$12,712.46	\$16,517.48	\$6,547.49
	2+ADLs or CI	1,882.45	5,450.41	12,183.00	16,157.20	6,294.34
	3+ADLs or CI	1,776.26	5,257.47	11,865.52	15,810.20	6,068.90
	1+ADLs	2,030.36	5,526.26	12,107.66	16,019.29	6,478.06
	2+ADLs	1,686.56	5,021.23	11,453.13	15,576.94	6,222.01
	3+ADLs	1,562.52	4,785.38	11,059.48	15,168.35	5,989.17
	1 ADLs and no CI	1,722.65	4,921.92	11,084.95	14,932.55	5,847.46
	2 ADLs and no CI	1,518.43	4,684.97	10,872.96	14,919.26	5,819.75
	3 ADLs and no CI	1,543.69	4,749.43	11,008.62	15,153.57	5,996.01
	0 ADLs and CI	1,574.74	4,846.06	11,160.29	15,070.46	5,663.73
	1 ADLs and CI	1,445.61	4,567.17	10,680.57	14,654.33	5,597.21
	2 ADLs and CI	1,430.08	4,534.93	10,631.66	14,633.85	5,601.70
	3 ADLs and CI	1,431.06	4,527.97	10,606.34	14,587.04	5,587.47
	3.5 days	1+ADLs or CI	1,835.45	5,204.81	11,575.51	15,277.67
2+ADLs or CI		1,701.83	5,046.53	11,423.98	15,250.48	5,831.12
3+ADLs or CI		1,649.61	4,958.92	11,294.71	15,138.24	5,764.70
1+ADLs		1,714.25	4,964.23	11,199.69	15,033.31	5,836.37
2+ADLs		1,561.56	4,768.58	10,993.84	14,983.16	5,830.58
3+ADLs		1,498.01	4,656.54	10,825.59	14,847.63	5,764.91
1 ADLs and no CI		1,545.85	4,650.32	10,707.02	14,599.47	5,607.07
2 ADLs and no CI		1,464.46	4,579.65	10,684.76	14,684.50	5,660.73
3 ADLs and no CI		1,484.12	4,630.93	10,790.52	14,839.96	5,771.60
0 ADLs and CI		1,533.43	4,732.62	10,931.31	14,816.64	5,601.81
1 ADLs and CI		1,431.30	4,529.39	10,609.81	14,595.21	5,587.33
2 ADLs and CI		1,423.56	4,516.44	10,594.46	14,595.56	5,593.55
3 ADLs and CI		1,426.12	4,517.65	10,590.56	14,579.93	5,587.61

TABLE C-3—Continued

HOME HEALTH CARE UTILIZATION VARIATIONS FOR HOME HEALTH CARE ONLY PLAN

Home Health Care Only Plan		Net Premium Age 45	Mid-Terminal Reserves			
Frequency Per Week	Utilization 100% Use For		Issue Age 45 by Duration from Issue			
			5	10	20	30
7 days	1+ADLs or CI	\$173.96	\$605.82	\$1,594.22	\$4,040.88	\$5,702.91
	2+ADLs or CI	88.25	319.48	866.26	2,356.70	3,673.97
	3+ADLs or CI	64.53	236.20	647.52	1,807.58	2,894.47
	1+ADLs	145.63	504.55	1,316.88	3,251.26	4,395.10
	2+ADLs	55.69	200.32	536.12	1,401.46	2,083.89
	3+ADLs	29.87	108.15	290.65	766.31	1,149.57
	1 ADLs and no CI	85.71	286.34	727.96	1,684.18	2,028.94
	2 ADLs and no CI	23.72	83.27	218.74	549.11	779.51
	3 ADLs and no CI	27.07	96.46	256.87	668.13	999.71
	0 ADLs and CI	28.33	101.26	277.34	789.61	1,307.80
	1 ADLs and CI	4.23	17.89	52.80	165.62	282.29
	2 ADLs and CI	2.10	8.91	26.73	86.03	154.81
	3 ADLs and CI	2.80	11.69	33.78	98.17	149.87
	3.5 days	1+ADLs or CI	95.80	333.93	879.54	2,221.41
2+ADLs or CI		55.67	201.27	545.96	1,477.39	2,217.76
3+ADLs or CI		43.72	159.19	435.40	1,201.79	1,843.70
1+ADLs		72.76	253.16	660.70	1,616.80	2,103.04
2+ADLs		29.91	109.17	294.14	773.68	1,125.70
3+ADLs		16.52	60.99	165.38	441.26	657.02
1 ADLs and no CI		40.13	132.66	333.57	744.02	823.73
2 ADLs and no CI		11.95	42.08	110.56	275.59	374.06
3 ADLs and no CI		14.38	52.14	139.90	367.87	547.82
0 ADLs and CI		23.04	80.77	218.84	604.60	938.44
1 ADLs and CI		2.72	11.33	32.98	99.09	153.61
2 ADLs and CI		1.45	6.11	18.21	56.84	94.63
3 ADLs and CI		2.13	8.84	25.48	73.40	109.20

TABLE C-3—Continued

HOME HEALTH CARE UTILIZATION VARIATIONS FOR HOME HEALTH CARE ONLY PLAN

Home Health Care Only Plan		Net Premium Age 70	Mid-Terminal Reserves			
Frequency Per Week	Utilization 100% Use For		Issue Age 70 by Duration from Issue			
			5	10	20	30
7 days	1+ADLs or CI	\$780.63	\$1,388.27	\$2,156.97	\$1,945.21	\$953.19
	2+ADLs or CI	470.21	958.38	1,627.51	1,584.93	700.03
	3+ADLs or CI	364.02	765.44	1,310.04	1,237.93	474.59
	1+ADLs	618.12	1,034.23	1,552.17	1,447.02	883.76
	2+ADLs	274.32	529.20	897.64	1,004.87	627.70
	3+ADLs	150.29	293.36	503.99	596.09	394.86
	1 ADLs and no CI	310.42	429.89	529.46	360.28	253.15
	2 ADLs and no CI	106.19	192.94	317.48	346.99	225.44
	3 ADLs and no CI	131.46	257.41	453.14	581.30	401.69
	0 ADLs and CI	162.51	354.04	604.80	498.20	69.43
	1 ADLs and CI	33.38	75.15	125.08	82.06	2.90
	2 ADLs and CI	17.85	42.90	76.17	61.59	7.40
	3 ADLs and CI	18.83	35.95	50.86	14.78	0.00
	3.5 days	1+ADLs or CI	423.21	712.79	1,020.02	705.42
2+ADLs or CI		289.60	554.51	868.49	678.21	236.82
3+ADLs or CI		237.38	466.89	739.22	565.98	170.39
1+ADLs		302.01	472.19	644.20	461.04	242.07
2+ADLs		149.33	276.54	438.35	410.89	236.28
3+ADLs		85.78	164.51	270.10	275.35	170.61
1 ADLs and no CI		133.62	158.29	151.53	27.20	12.76
2 ADLs and no CI		52.22	87.62	129.28	112.24	66.43
3 ADLs and no CI		71.89	138.89	235.03	267.69	177.29
0 ADLs and CI		121.20	240.59	375.82	244.38	7.51
1 ADLs and CI		19.07	37.36	54.32	22.95	0.00
2 ADLs and CI		11.33	24.42	38.97	23.30	0.00
3 ADLs and CI		13.89	25.61	35.08	7.67	0.00

TABLE C-4
 SAMPLE VARIATIONS FROM DEFAULT ASSUMPTIONS

Dimension	Default	Variation 1	Variation 2	Variation 3
Insured Sex	100% Female	(1) 100% Male	(2) 60% Female	
Morbidity				
Selection Factors	0.5, 0.6, 0.7, 0.8, 0.9, 1.0,...	(3) 1.0, 1.0,...		
Antiselection at Lapse Factors	0.7, 0.5, 0.3, 0.2, 0.1, 0.0,...	(4) 0.0, 0.0,...		
Home Care Utilization	0.0 0.3 0.1 0.5 0.7 0.7 1.0 1.0	(5) 0.0 1.0 0.0 1.0 1.0 1.0 1.0 1.0	(6) 0.0 0.1 0.0 0.3 0.5 0.5 0.7 0.7	
Home Care Frequency	0 1 2 3 4 5 6 7	(7) 7 7 7 7 7 7 7 7	(8) 0 1 1 2 3 4 5 6	
Incidence Adjustment Factor	1.0	(9) 0.8	(10) 1.2	
Type of NH Stays	Insurable Stays	(11) All Stays		
Mortality				
Selection Factors	0.5, 0.6, 0.7, 0.8, 0.9, 1.0,...	(12) 1.0, 1.0,...		
Adjustment Factor	1.0	(13) 0.8	(14) 1.2	
Mortality Table	83 GAM	(15) 80 CSO	(16) 80 Basic	
Lapsation				
Lapse Rates	8%, 7%, 6%, 5%, 4%,...	(17) Zero lapse	(18) 4.0%, 3.5%, 3.0%, 2.5%, 2.0%,...	(19) 12.0%, 10.5%, 9.0%, 7.5%, 6.0%,...
Coordination with Mortality	Lapse rates exclude mortality	(20) Lapse rates include mortality		
Maximum Total Termination Rate	100%	(21) 8%		
Interest	5%	(22) 4.5%	(23) 5.5%	
Reserve Method	One Year Preliminary Term	(24) Two Year Preliminary Term	(25) Full Net Level	

TABLE C-4—Continued

CASE I

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$26	\$184	244%	69%	Variant Test Variations from Base Assumptions Sex: 100% Male at Issue	
1	263	1,642	138	901	68	35		
2	293	1,642	138	901	68	35		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	30	30	30	30	NA	NA	30	30	30	30	NA	NA
2	98	668	32	394	34%	50%	83	360	45	274	33%	49%
5	789	4,922	393	2,273	50	46	576	3,359	286	1,442	50	43
10	2,273	11,244	1,103	4,697	49	42	1,339	5,294	633	1,800	47	34
15	4,408	15,344	2,051	7,166	47	47	2,082	4,423	928	1,369	45	31
20	7,296	15,231	3,342	8,680	46	37	2,732	2,249	1,161	639	42	28
25	10,799	11,235	5,125	7,299	47	65	3,146	622	1,304	145	41	23
30	15,125	5,970	6,948	3,832	46	64	3,287	71	1,204	13	37	18
35	19,717	2,558	8,504	2,087	43	82	2,957	2	890	1	30	22
40	22,039	0	10,199	21	46	NA	2,023	0	529	0	26	NA
45	20,168	0	10,846	0	34	NA	948	0	218	0	23	NA

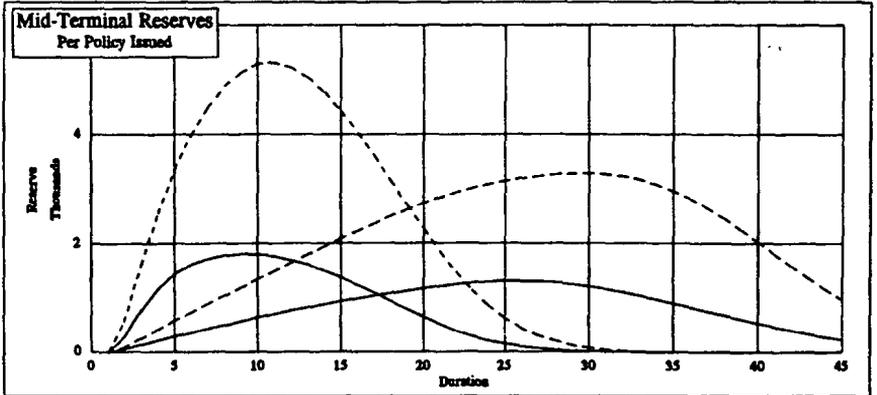
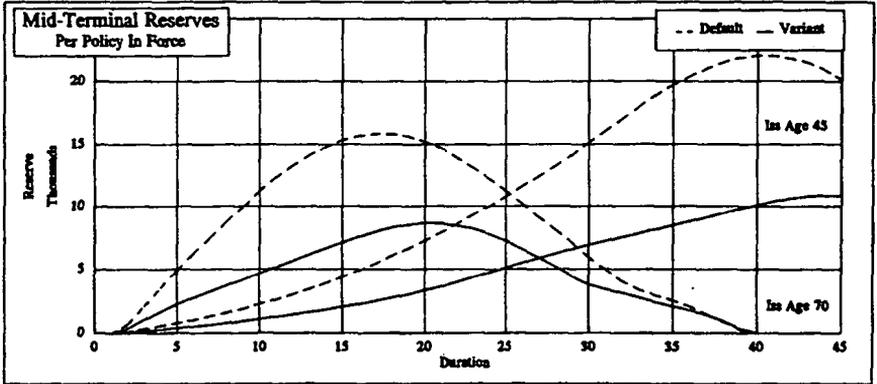


TABLE C-4—Continued

CASE 2

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$19	\$232	175%	87%		Variant Test Variations from Base Assumptions Sex: 60% Female at Issue
1	203	1,642	179	1,359	88	83		
2	202	1,642	179	1,359	88	83		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	79	544	81%	81%	83	560	68	452	81%	81%
5	789	4,922	827	3,948	79	80	376	3,399	456	2,619	79	78
10	2,273	11,244	1,790	8,967	79	80	1,399	5,294	1,045	3,912	78	74
15	4,408	15,346	3,443	12,946	78	84	2,082	4,623	1,388	3,236	77	73
20	7,296	15,231	5,710	15,930	78	91	2,732	2,249	2,077	1,650	76	73
25	10,799	11,235	8,614	10,964	80	98	3,146	622	2,383	454	76	73
30	15,125	5,970	12,143	5,993	80	100	3,287	71	2,626	51	74	72
35	19,717	2,358	15,887	2,894	81	113	2,957	2	2,095	2	71	81
40	22,039	0	18,498	0	84	NA	2,023	0	1,406	0	69	NA
45	20,168	0	18,028	0	82	NA	248	0	654	0	69	NA

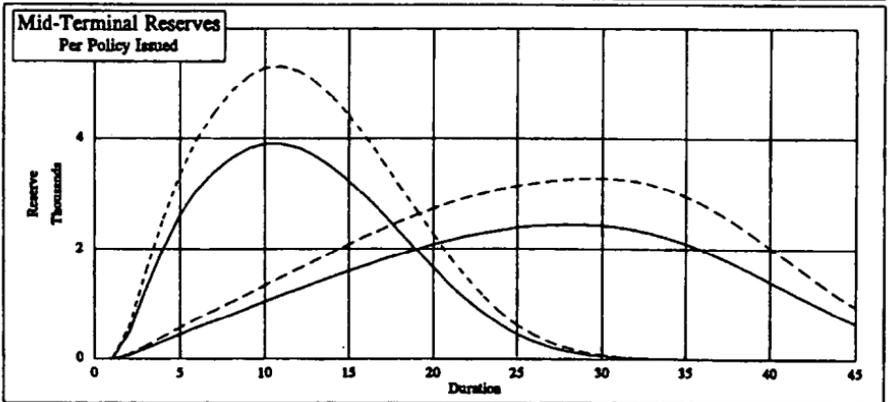
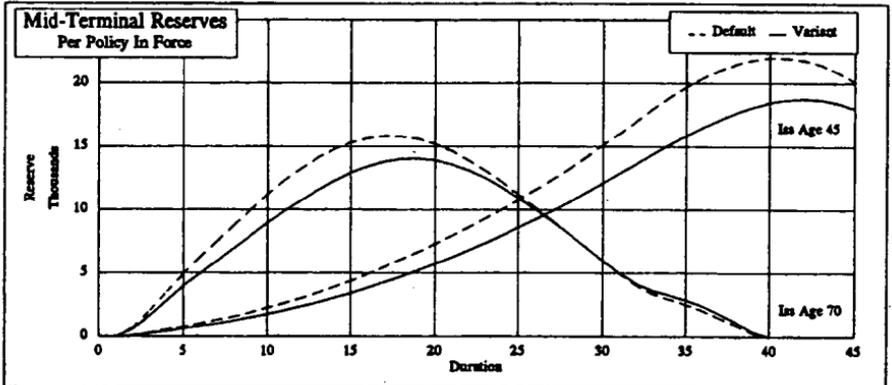


TABLE C-4—Continued

CASE 3

Duration	Net Premiums						Default	Base Assumptions See Mighty Plan Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$21	\$535	200%	200%	Variant Test Variations from Base Assumptions Morbidity: No Selection at Issue	
1	209	1,642	205	1,725	101	103		
2	209	1,642	205	1,725	101	103		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	92	378	95%	86%	83	360	80	444	95%	86%
5	789	4,922	764	4,382	97	89	576	3,359	557	2,990	97	89
10	2,273	11,244	2,247	10,751	99	96	1,339	5,294	1,323	5,062	99	96
15	4,408	15,344	4,383	14,953	99	97	2,082	4,423	2,070	4,310	99	97
20	7,296	15,231	7,273	14,945	100	98	2,732	2,249	2,723	2,207	100	98
25	10,799	11,235	10,779	11,046	100	98	3,146	622	3,140	612	100	98
30	15,125	5,970	15,107	5,871	100	98	3,287	71	3,283	70	100	98
35	19,717	2,558	19,702	2,513	100	98	2,957	2	2,954	2	100	98
40	22,039	0	22,027	0	100	NA	2,023	0	2,022	0	100	NA
45	28,168	0	28,152	0	100	NA	248	0	248	0	100	NA

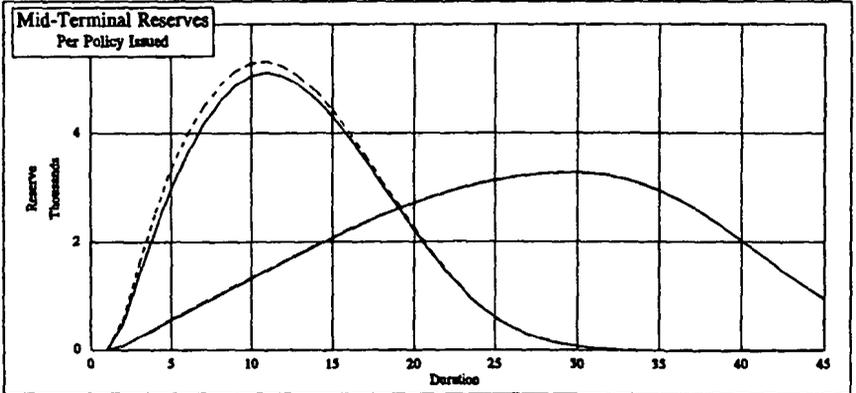
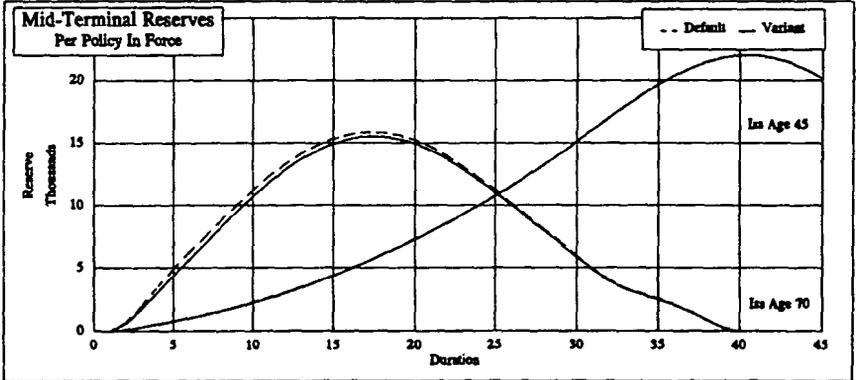


TABLE C-4—Continued

CASE 4

Duration	Net Premiums						Default	Base Assumptions See Mighty Fit Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant	Test Variations from Base Assumptions
1	203	1,642	189	1,923	93	93		Morbidity: No Antiselection on Lapse
2	203	1,642	189	1,923	93	93		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$1	\$1	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	91	617	93%	92%	83	560	78	517	93%	92%
5	789	4,922	737	4,606	93	94	576	3,339	538	3,143	93	94
10	2,273	11,244	2,124	10,579	93	94	1,339	5,294	1,251	4,981	93	94
15	4,408	15,344	4,118	14,468	93	94	2,082	4,423	1,944	4,170	93	94
20	7,296	15,231	6,816	14,435	93	95	2,752	2,249	2,553	2,131	93	95
25	10,799	11,235	10,997	10,741	93	96	3,146	622	2,941	395	93	96
30	15,125	5,970	14,158	5,799	94	97	3,287	71	3,077	69	94	97
35	19,717	2,558	18,494	2,379	94	95	2,957	2	2,779	2	94	93
40	22,099	0	20,747	0	94	NA	2,023	0	1,905	0	94	NA
45	20,168	0	19,092	0	95	NA	248	0	894	0	95	NA

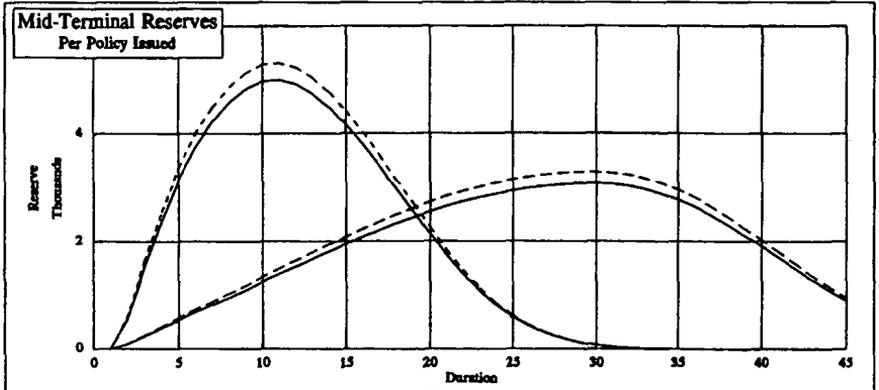
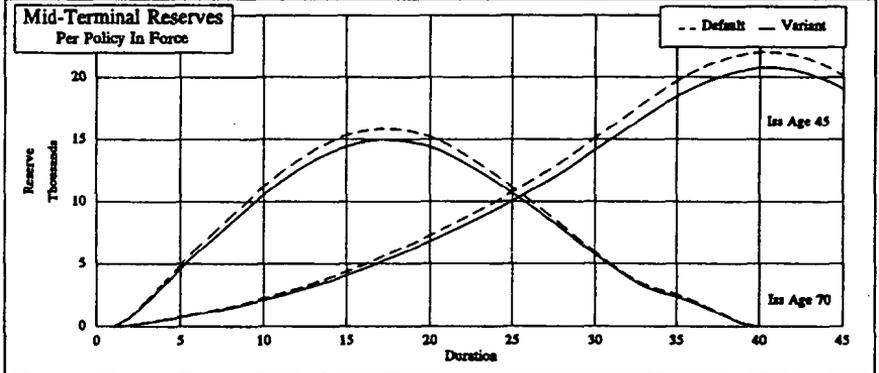


TABLE C-4—Continued

CASE 5

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$12	\$285	110%	107%	Variant Test Variations from Base Assumptions Morbidity: Home Care Utilization 0%, 0%, 100%, 100% 100%, 100%, 100%, 100%	
1	203	1,642	214	1,703	106	104		
2	203	1,642	214	1,703	106	104		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	80	80	80	80	NA	NA	80	80	80	80	NA	NA
2	98	668	103	687	103%	103%	83	560	88	576	105%	103%
5	789	4,922	830	3,036	105	102	576	3,359	605	3,436	105	102
10	2,273	11,244	2,385	11,408	105	101	1,339	5,294	1,404	5,371	105	101
15	4,408	15,344	4,612	15,489	105	101	2,082	4,423	2,178	4,465	105	101
20	7,296	15,231	7,606	15,318	104	101	2,792	2,249	2,848	2,262	104	101
25	10,799	11,235	11,207	11,273	104	100	3,146	622	3,265	624	104	100
30	15,125	5,970	15,590	5,984	103	100	3,287	71	3,388	71	103	100
35	19,717	2,458	20,173	2,559	102	100	2,957	2	3,025	2	102	100
40	22,039	0	22,414	0	102	NA	2,023	0	2,058	0	102	NA
45	20,164	0	20,425	0	101	NA	948	0	960	0	101	NA

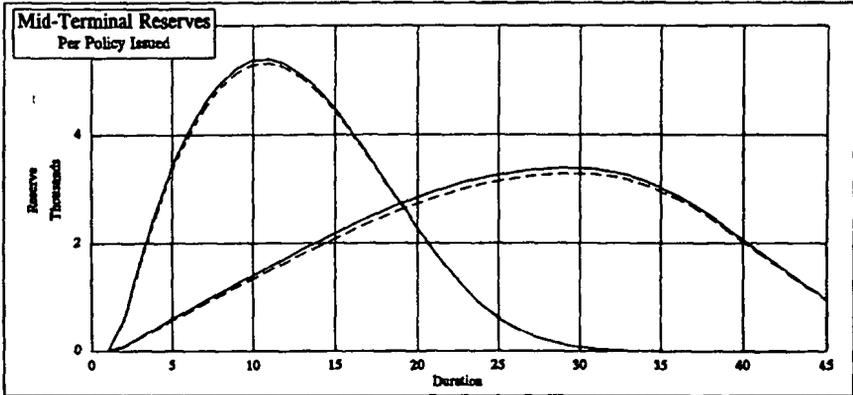
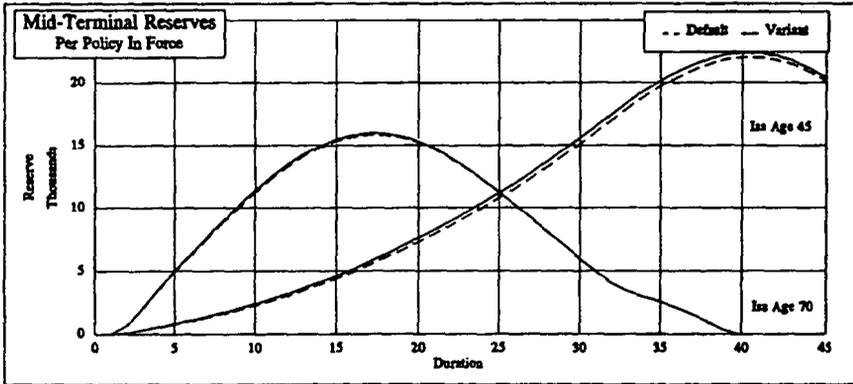


TABLE C-4—Continued

CASE 6

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$9	\$242	87%	90%	Variant Test Variations from Base Assumptions Morbidity: Home Care Utilization 0% 0% 50% 70% 10% 30% 50% 70%	
1	203	1,642	186	1,561	92	93		
2	203	1,642	186	1,561	92	93		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	90	644	92%	96%	83	560	77	540	92%	96%
5	789	4,922	729	4,777	92	97	576	3,359	532	3,260	92	97
10	2,273	11,244	2,113	11,022	93	98	1,339	5,204	1,244	5,190	93	98
15	4,408	15,344	4,123	15,111	94	98	2,082	4,423	1,947	4,356	94	98
20	7,296	15,231	6,877	15,041	94	99	2,732	2,249	2,575	2,221	94	99
25	10,799	11,233	10,266	11,100	95	99	3,146	622	2,990	613	95	99
30	15,125	5,970	14,926	5,870	96	98	3,287	71	3,137	70	96	98
35	19,717	2,358	19,119	2,511	97	98	2,957	2	2,867	2	97	98
40	22,039	0	21,509	0	98	NA	2,023	0	1,975	0	98	NA
45	20,168	0	19,759	0	98	NA	948	0	929	0	98	NA

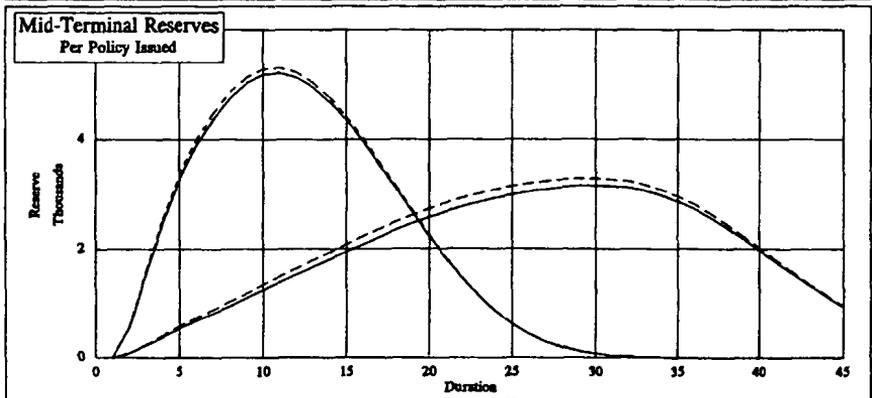
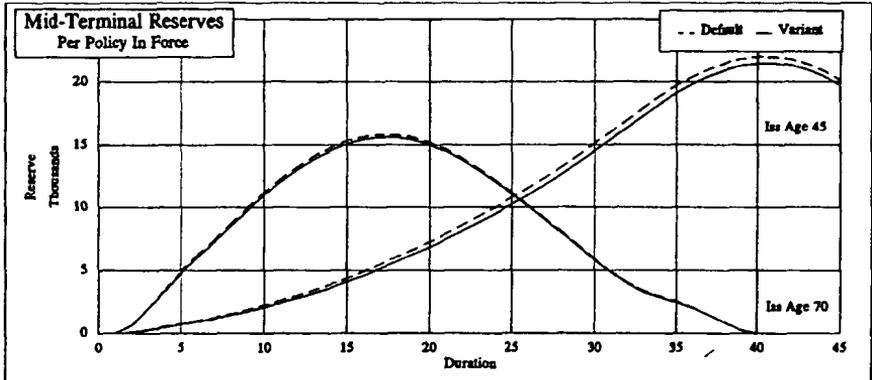


TABLE C-4—Continued

CASE 7

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$13	\$297	120%	111%	Variant Test Variations from Base Assumptions Home Care Frequency 7.7.7.7 7.7.7.7 per week	
1	203	1,642	224	1,786	110	106		
2	203	1,642	224	1,786	110	106		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	107	701	110%	105%	83	560	92	588	110%	105%
5	789	4,922	863	5,137	109	104	576	3,359	630	3,506	109	104
10	2,273	11,244	2,469	11,632	109	103	1,339	5,294	1,454	5,477	109	103
15	4,468	15,344	4,735	15,820	108	109	2,082	4,423	2,245	4,560	108	109
20	7,296	15,231	7,810	15,681	107	103	2,732	2,249	2,925	2,315	107	105
25	10,799	11,235	11,473	11,582	106	103	3,146	622	3,342	642	106	105
30	15,125	3,970	15,928	6,200	105	104	3,287	71	3,462	74	105	104
35	19,717	2,558	20,592	2,684	104	105	2,937	2	3,058	2	104	105
40	22,039	0	22,500	0	104	NA	2,023	0	2,102	0	104	NA
45	20,168	0	20,591	0	104	NA	248	0	283	0	104	NA

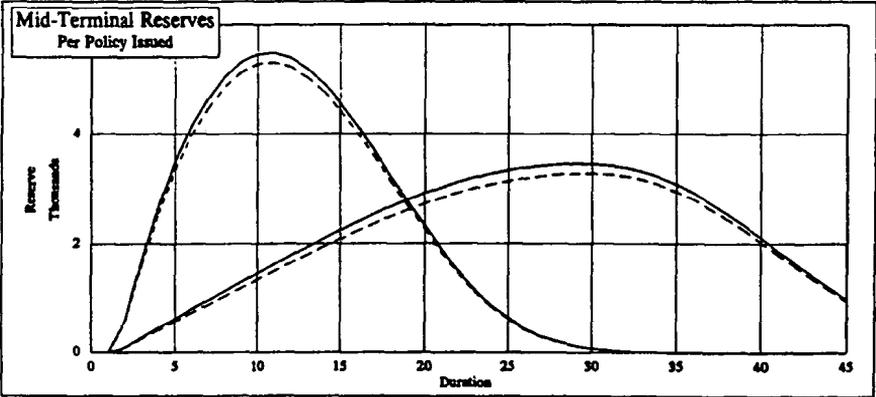
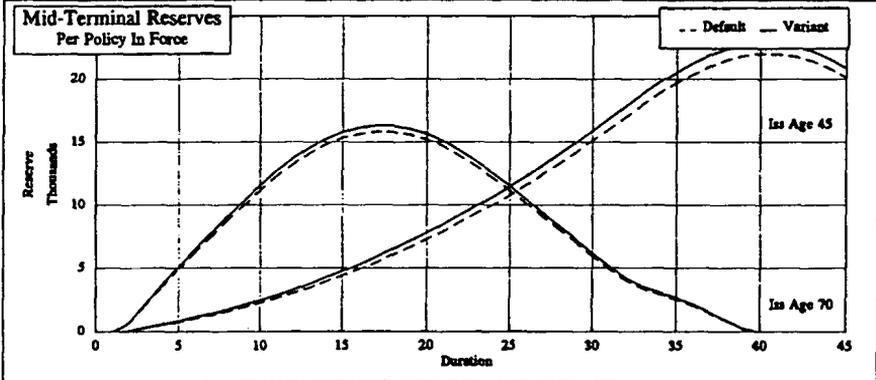


TABLE C-4—Continued

CASE 8

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$10	\$254	93%	95%	Variant	Test Variations from Base Assumptions
1	203	1,642	194	1,599	96	97		Home Care Pregnancy
2	201	1,642	194	1,599	96	97		0.1, 1.5, 1.2, 4.6 per week

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	94	653	96%	98%	83	560	80	549	96%	98%
5	789	4,922	757	4,839	96	98	576	3,359	552	3,302	96	98
10	2,273	11,244	2,188	11,103	96	99	1,399	5,294	1,288	5,227	96	99
15	4,408	15,344	4,258	15,175	97	99	2,082	4,423	2,011	4,374	97	99
20	7,296	15,231	7,076	15,072	97	99	2,732	2,249	2,650	2,225	97	99
25	10,799	11,235	10,517	11,103	97	99	3,146	622	3,063	615	97	99
30	15,125	5,970	14,799	5,871	98	98	3,287	71	3,216	70	98	98
35	19,717	2,558	19,374	2,504	98	98	2,937	2	2,903	2	98	98
40	22,039	0	21,711	0	99	NA	2,023	0	1,993	0	99	NA
45	20,168	0	19,892	0	99	NA	948	0	933	0	99	NA

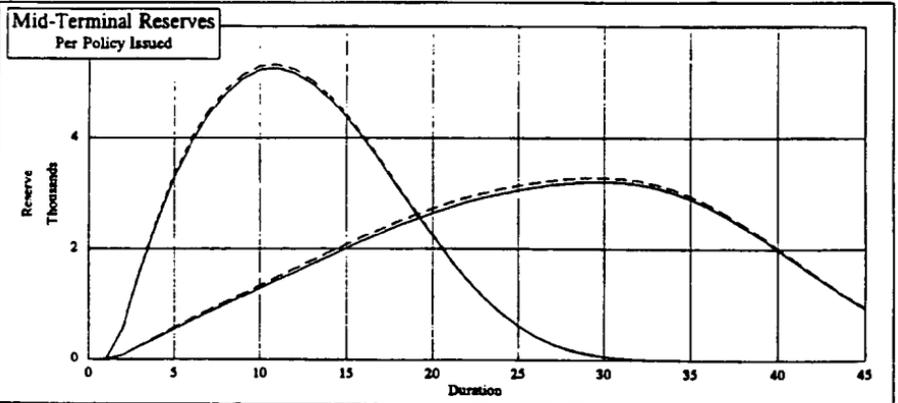
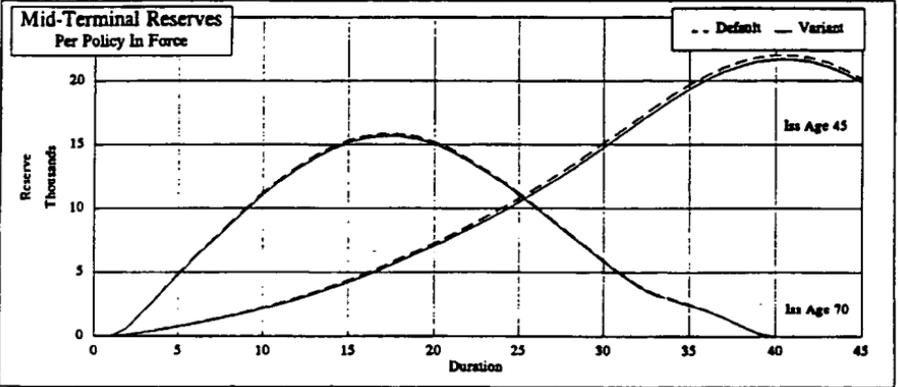


TABLE C-4—Continued

CASE 9

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70		
0	\$11	\$267	\$8	\$214	80%	80%	Variant Test Variations from Base Assumptions Morbidity: 50% Incidence Factor	
1	203	1,643	164	1,326	81	81		
2	203	1,643	164	1,326	81	81		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70	Ins Age 43	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	79	541	81%	81%	83	360	67	454	81%	81%
5	789	4,922	638	3,998	81	81	576	3,359	465	2,728	81	81
10	2,273	11,244	1,839	9,198	81	82	1,339	5,294	1,083	4,330	81	82
15	4,404	15,344	3,568	12,691	81	83	2,682	4,423	1,685	3,658	81	83
20	7,296	15,231	5,913	12,809	81	84	2,732	2,249	2,214	1,891	81	84
25	10,799	11,233	8,773	9,695	81	86	3,146	622	2,356	537	81	86
30	15,125	5,970	12,331	5,395	82	90	3,287	71	2,680	64	82	90
35	19,717	2,558	16,171	2,059	82	80	2,957	2	2,423	2	82	80
40	22,039	0	18,266	0	83	NA	2,023	0	1,677	0	83	NA
45	20,168	0	16,989	0	84	NA	948	0	799	0	84	NA

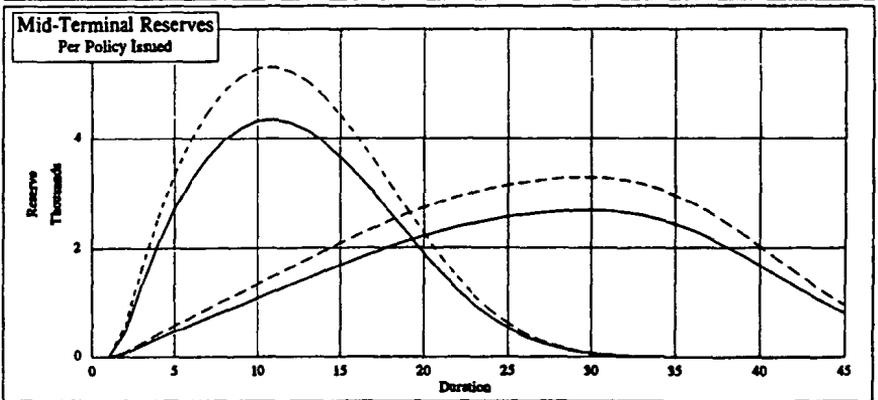
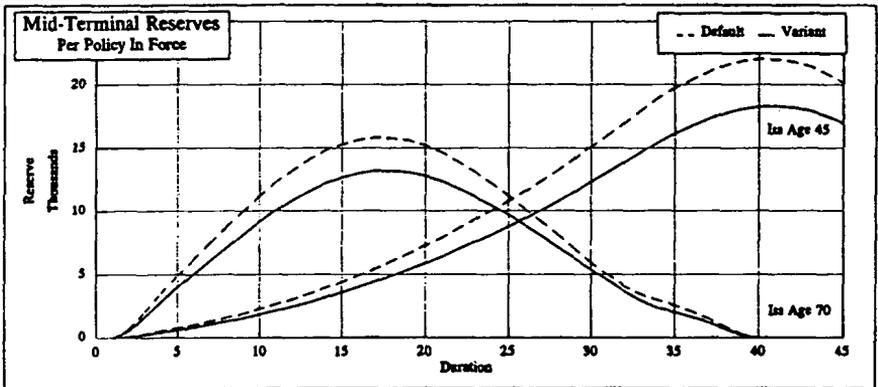


TABLE C-4—Continued

CASE 10

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$13	\$321	120%	120%	Variant	Test Variations from Base Assumptions Morbidity: 120% Incidence Factor
1	203	1,642	241	1,952	119	119		
2	203	1,642	241	1,952	119	119		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	116	792	119%	119%	83	560	99	664	119%	119%
3	789	4,922	934	5,821	119	118	576	3,359	684	3,972	119	118
10	2,273	11,244	2,700	13,206	119	117	1,339	5,294	1,390	6,218	119	117
15	4,408	15,344	5,231	17,828	119	116	2,082	4,423	2,470	5,139	119	116
20	7,296	15,231	8,646	17,422	119	114	2,732	2,249	3,238	2,572	119	114
25	10,799	11,235	12,769	12,553	118	112	3,146	622	3,720	695	118	112
30	15,125	5,970	17,822	6,461	118	108	3,287	71	3,873	77	118	108
35	19,717	2,358	23,099	3,079	117	120	2,957	2	3,464	3	117	120
40	22,039	0	25,358	0	116	NA	2,023	0	2,346	0	116	NA
45	20,168	0	23,033	0	114	NA	948	0	1,083	0	114	NA

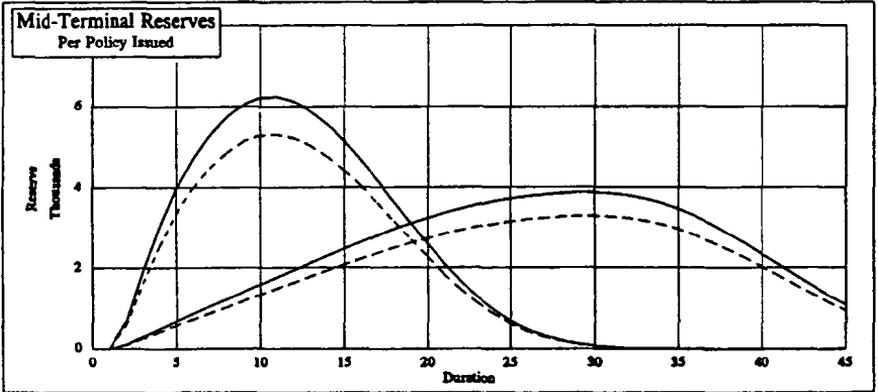
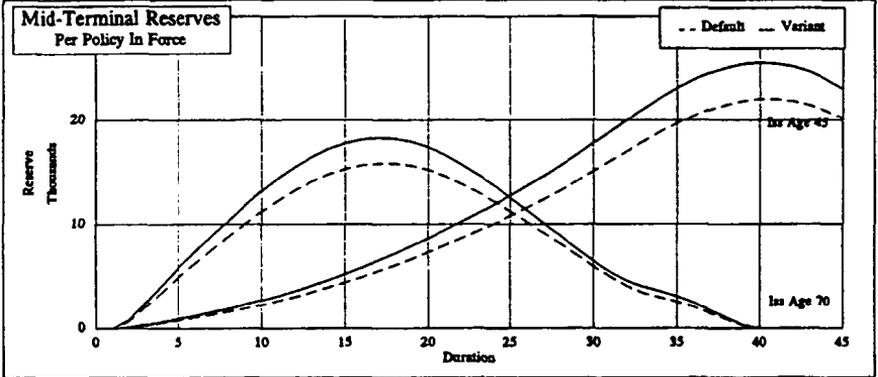


TABLE C-4—Continued

CASE 11

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70		
0	\$11	\$267	\$12	\$291	112%	109%	Variant	Test Variations from Base Assumptions
1	203	1,642	217	1,726	107	103		Morbidity: All NH Stays
2	203	1,642	217	1,726	107	103		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	106	698	108%	104%	83	560	90	585	108%	104%
3	789	4,922	843	5,136	107	104	576	3,339	616	3,505	107	104
10	2,271	11,244	2,413	11,686	106	104	1,339	2,294	1,421	3,502	106	104
15	4,408	15,344	4,659	15,833	106	103	2,682	4,423	2,300	4,863	106	103
20	7,296	15,231	7,701	15,708	106	103	2,732	2,269	2,884	2,319	106	103
25	10,799	11,235	11,341	11,653	105	104	3,146	622	3,304	646	105	104
30	13,123	5,970	15,811	6,231	105	104	3,287	71	3,436	74	105	104
35	19,717	2,338	20,337	2,819	104	110	2,957	2	3,079	3	104	110
40	22,039	0	22,811	0	104	NA	2,023	0	2,994	0	104	NA
45	20,164	0	20,439	0	102	NA	248	0	290	0	102	NA

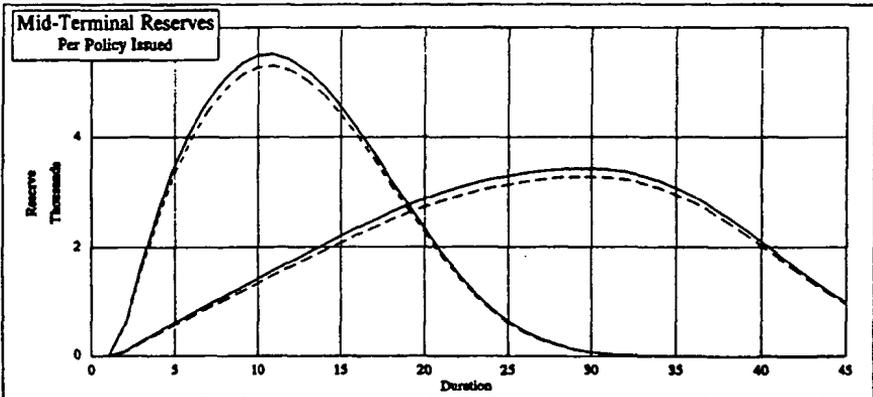
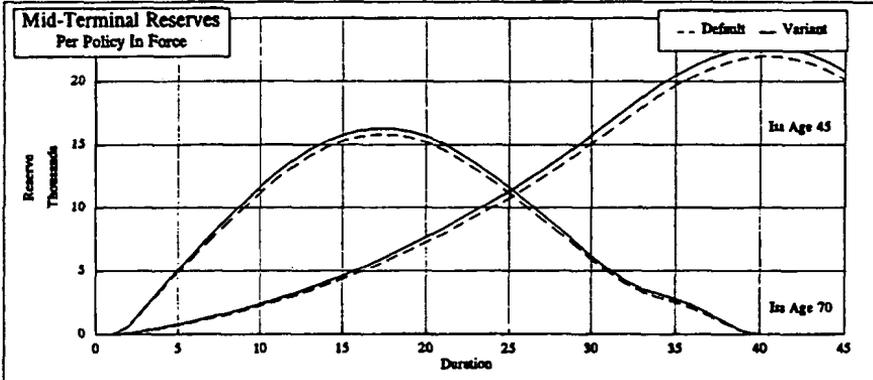


TABLE C-4—Continued

CASE 12

Net Premiums							Default	Base Assumptions See Mighty Plus Description in Appendix B
Duration	Default		Variant		Variant / Default			
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Variant: Test Variations from Base Assumptions Mortality: No Selection at Issue	
0	\$11	\$267	\$11	\$267	100%	100%		
1	203	1,642	203	1,637	100	100		
2	203	1,642	203	1,637	100	100		

Comparison of Mid-Terminal Reserves												
Duration	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	98	670	100%	100%	83	560	83	553	100%	99%
5	789	4,922	790	4,954	100	101	576	3,359	575	3,304	100	98
10	2,273	11,244	2,274	11,275	100	100	1,399	5,294	1,396	5,189	100	98
15	4,408	15,344	4,408	15,368	100	100	2,082	4,423	2,078	4,330	100	98
20	7,296	15,231	7,296	15,249	100	100	2,732	2,249	2,727	2,201	100	98
25	10,799	11,235	10,800	11,247	100	100	3,146	622	3,140	609	100	98
30	15,125	5,970	15,125	5,974	100	100	3,287	71	3,281	70	100	98
35	19,717	2,558	19,717	2,560	100	100	2,957	2	2,951	2	100	98
40	22,039	0	22,038	0	100	NA	2,023	0	2,020	0	100	NA
45	20,168	0	20,167	0	100	NA	948	0	947	0	100	NA

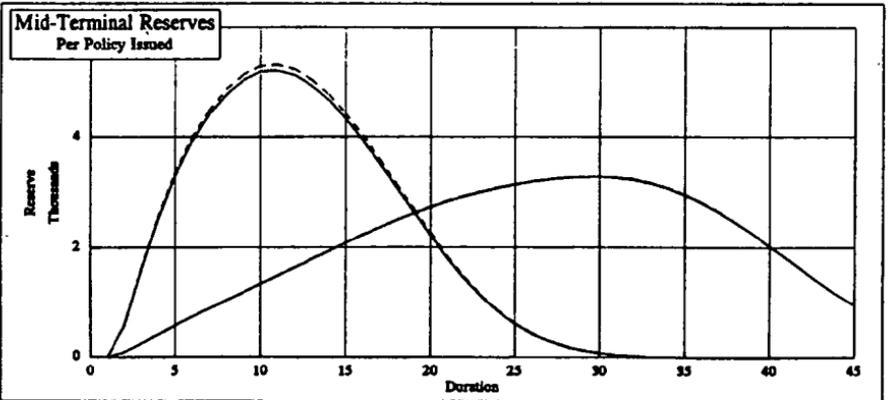
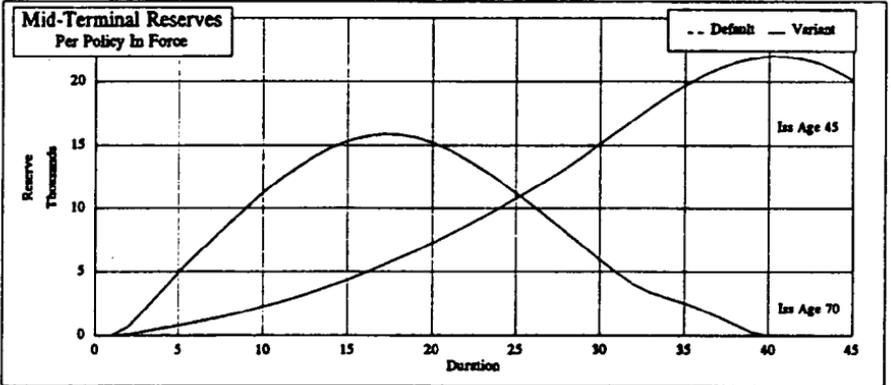


TABLE C-4—Continued

CASE 13

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$257	\$11	\$258	100%	100%	Variant Test Variations from Base Assumptions Mortality: 80% Adjustment Factor	
1	293	1,642	217	1,740	107	106		
2	293	1,642	217	1,740	107	106		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	28	668	105	718	108%	108%	83	560	90	602	108%	108%
5	789	4,922	850	5,321	108	108	376	3,339	621	3,684	108	110
10	2,273	11,244	2,456	12,268	108	109	1,339	5,294	1,451	6,062	108	115
15	4,408	15,344	4,776	16,946	108	110	2,082	4,423	2,270	3,436	109	123
20	7,296	15,231	7,937	17,234	109	113	2,732	2,249	3,008	3,118	110	139
25	10,799	11,235	11,832	13,443	110	120	3,146	622	3,521	1,076	112	173
30	15,125	5,970	16,679	8,276	110	139	3,287	71	5,770	191	115	269
35	19,717	2,538	21,853	3,185	111	125	2,957	2	3,526	10	119	430
40	22,039	0	24,672	0	112	NA	2,023	0	2,584	0	128	NA
45	20,168	0	23,028	0	115	NA	948	0	1,365	0	144	NA

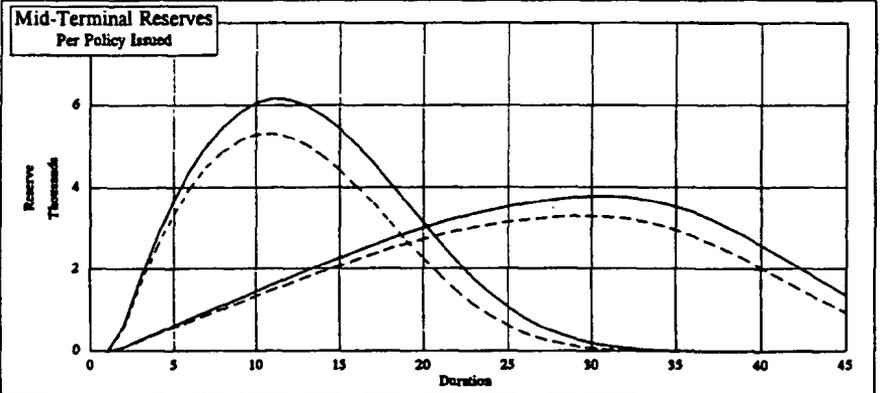
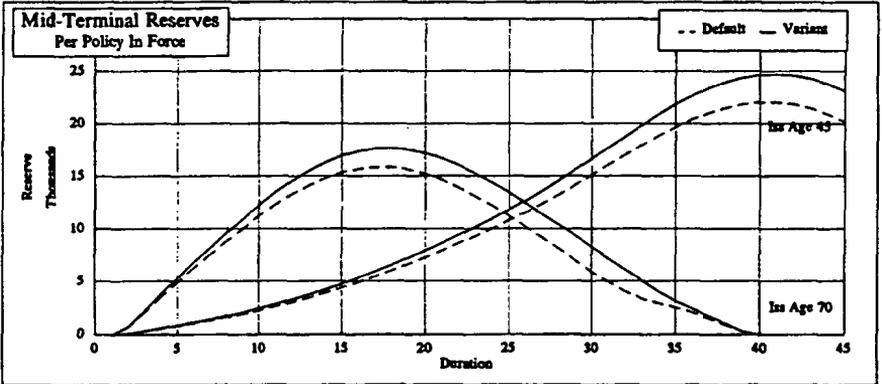


TABLE C-4—Continued

CASE 14

Net Premiums								Default	Base Assumptions See Mighty Fire Description in Appendix B
Duration	Default		Variant		Variant / Default		Variant		
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70			
0	\$11	\$267	\$11	\$267	100%	100%		Test Variations from Base Assumptions Mortality: 120% Adjustment Factor	
1	203	1,642	191	1,539	94	95			
2	201	1,642	191	1,539	94	95			

Comparison of Mid-Terminal Reserves													
Duration	Per Policy In Force						Per Policy Issued						
	Default		Variant		Variant / Default		Default		Variant		Variant / Default		
	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	Iss Age 45	Iss Age 70	
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA	
2	98	668	97	625	94%	94%	83	560	78	522	94%	93%	
3	789	4,922	792	4,587	94	93	576	3,359	539	3,083	94	92	
10	2,273	11,244	2,122	10,391	92	92	1,339	5,294	1,246	4,660	93	88	
15	4,408	15,344	4,104	14,021	93	91	2,082	4,423	1,926	3,628	93	82	
20	7,296	15,231	6,767	13,598	92	89	2,732	2,269	2,504	1,534	92	75	
25	10,799	11,235	9,950	9,441	92	84	3,146	623	2,837	359	90	58	
30	13,125	5,970	13,651	4,233	92	71	3,287	71	2,894	25	88	26	
35	19,717	2,358	17,974	2,133	91	84	2,957	2	2,504	1	85	22	
40	22,039	0	19,903	0	90	NA	2,023	0	1,600	0	79	NA	
45	20,168	0	17,823	0	88	NA	943	0	665	0	70	NA	

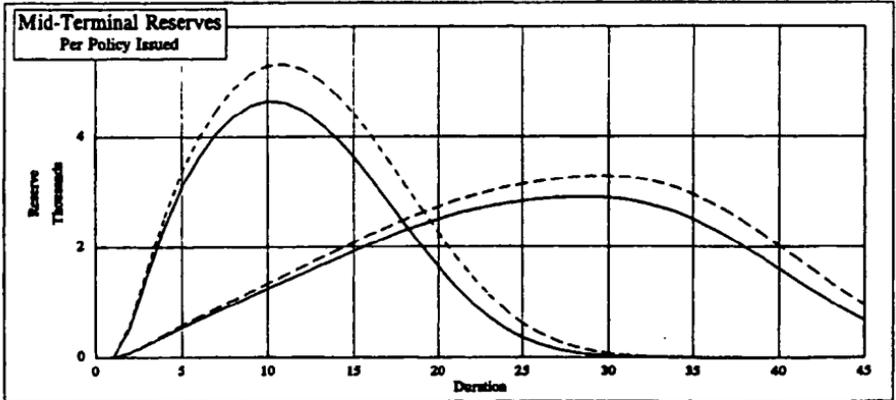
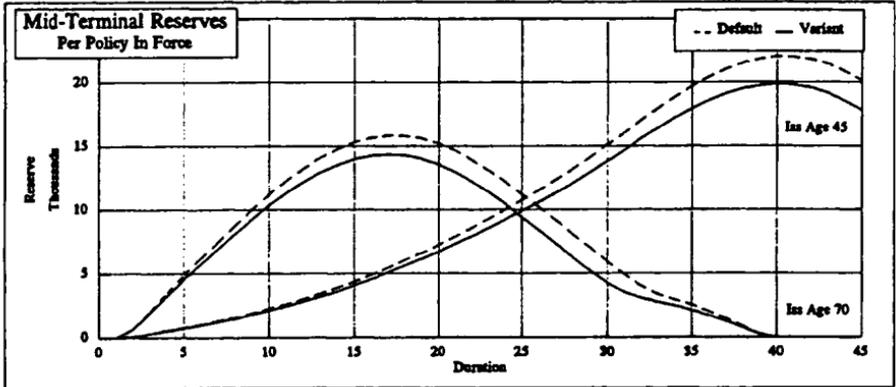


TABLE C-4—Continued

CASE 15

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant Test Variations from Base Assumptions Mortality: SOCSO Table	
1	203	1,642	164	1,577	81	83		
2	203	1,642	164	1,577	81	83		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	80	80	80	80	NA	NA	80	80	80	80	NA	NA
2	93	668	77	543	79%	81%	83	260	66	447	79%	80%
3	789	4,922	622	3,940	79	80	378	3,359	449	2,346	78	76
10	2,273	11,244	1,786	8,687	79	77	1,339	5,294	1,017	3,469	76	66
15	4,408	15,344	3,462	11,127	79	73	2,582	4,423	1,941	2,216	74	50
20	7,296	15,231	5,702	10,004	78	66	2,732	2,249	1,946	686	71	31
25	10,799	11,235	8,353	5,090	77	45	3,146	622	2,112	64	67	10
30	15,123	5,970	11,523	856	76	14	3,287	71	2,052	0	62	0
35	19,717	2,558	14,695	419	75	16	2,957	2	1,601	0	54	0
40	22,039	0	15,521	419	70	NA	2,023	0	844	0	42	NA
45	20,168	0	12,908	0	64	NA	948	0	262	0	25	NA

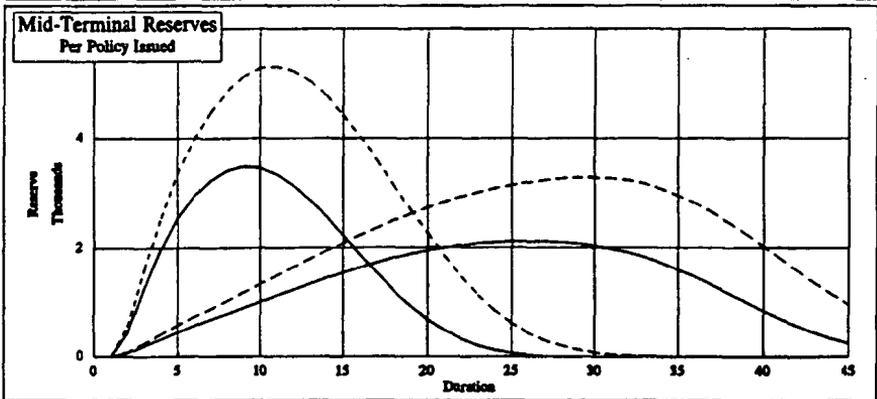
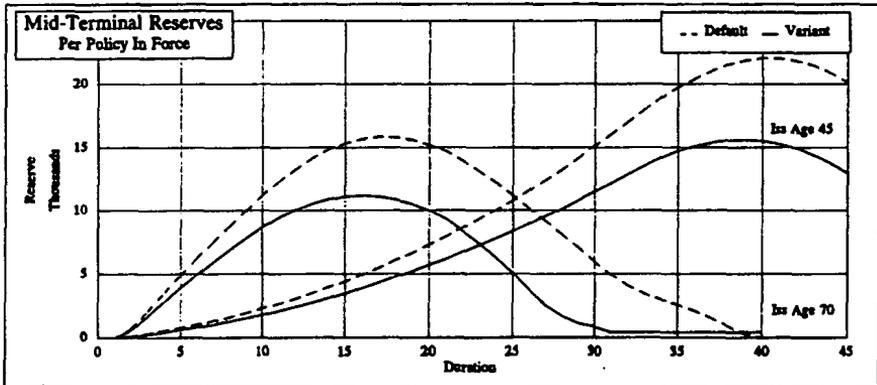


TABLE C-4—Continued

CASE 16

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70		Variant Test Variations from Base Assumptions Mortality: 80 Basic Table
0	\$11	\$267	\$11	\$267	100%	100%		
1	203	1,642	179	1,490	88	91		
2	203	1,642	179	1,490	88	91		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	664	85	590	87%	88%	89	560	78	491	87%	88%
5	789	4,922	684	4,302	87	87	576	3,339	499	2,961	87	83
10	2,273	11,244	1,979	9,566	87	85	1,399	5,294	1,145	4,154	86	78
15	4,408	15,344	3,838	12,443	87	81	2,082	4,423	1,753	2,957	84	67
20	7,296	15,231	6,328	11,673	87	77	2,782	2,249	2,235	1,113	83	50
25	10,799	11,233	9,310	7,133	86	64	3,146	622	2,515	173	80	28
30	13,123	5,970	12,873	1,199	82	20	3,287	71	2,514	1	76	1
35	19,717	2,534	16,452	411	83	16	2,957	2	2,097	0	71	0
40	22,039	0	17,583	411	80	NA	2,023	0	1,227	0	61	NA
45	20,168	0	15,221	0	73	NA	948	0	427	0	45	NA

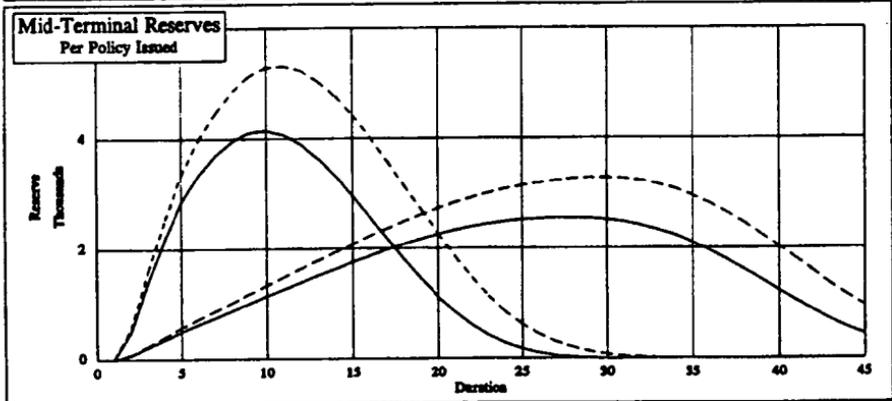
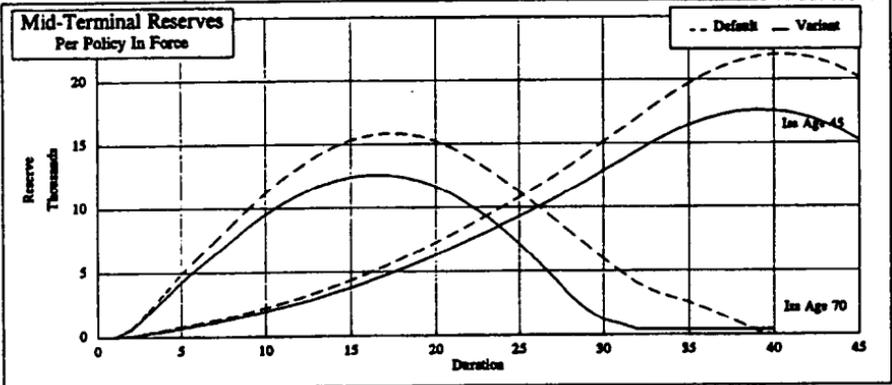


TABLE C-4—Continued

CASE 17

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant	Test Variations from Base Assumptions
1	203	1,642	408	1,881	201	113		Lapse: No Lapse
2	201	1,642	408	1,881	201	113		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	35	30	30	30	NA	NA	30	30	30	30	NA	NA
2	88	668	206	805	211%	121%	83	360	205	789	246%	161%
5	789	4,923	1,521	5,545	193	113	576	3,359	1,313	5,158	263	154
10	2,373	11,244	4,093	12,323	180	110	1,399	5,294	4,090	9,701	301	183
15	4,408	15,344	7,344	16,262	164	106	2,082	4,423	7,015	9,613	337	217
20	7,296	15,231	10,940	15,803	150	104	2,782	2,249	10,305	5,868	377	261
25	10,799	11,233	14,911	11,669	138	104	3,146	622	15,398	1,994	426	320
30	15,125	5,970	19,231	6,570	127	110	3,287	71	15,810	296	481	416
35	19,717	2,558	23,265	2,281	118	89	2,937	2	16,183	9	347	414
40	22,039	0	24,670	0	112	NA	2,023	0	12,887	0	637	NA
45	20,164	0	21,821	0	102	NA	948	0	7,183	0	757	NA

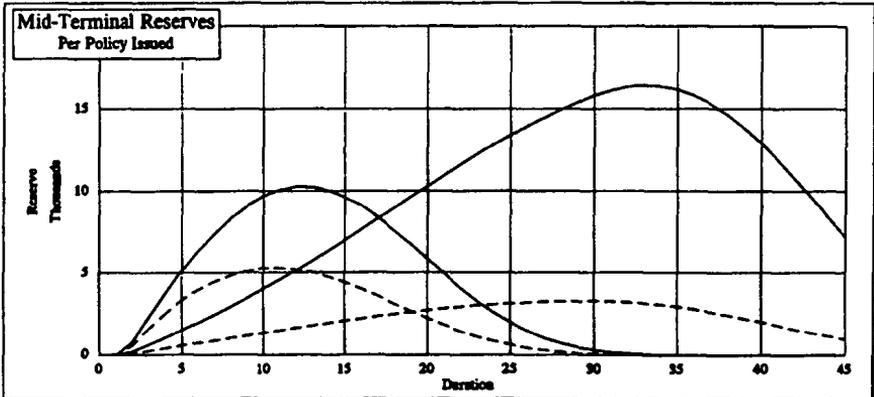
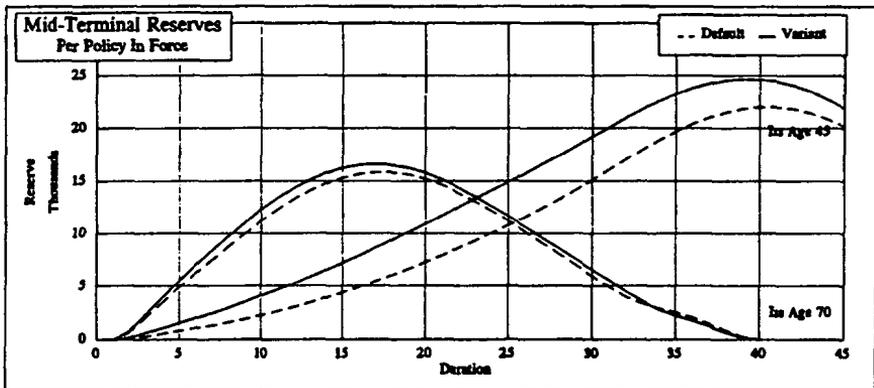


TABLE C-4—Continued

CASE 18

Duration	Net Premiums						Default	Base Assumptions See Mgmt Plan Description in Appendix B
	Default		Variant		Variant / Default			
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant	Test Variations from Base Assumptions Lapses: 4%, 3.5%, 3%, 2.5%, 2%...
1	203	1,642	285	1,755	141	107		
2	203	1,642	285	1,755	141	107		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	142	734	143%	110%	83	560	131	666	157%	118%
5	789	4,922	1,095	5,237	139	106	576	3,559	926	4,173	182	124
10	2,273	11,244	3,053	11,790	134	105	1,339	5,294	2,334	7,204	174	136
15	4,408	15,344	5,661	15,834	128	103	2,082	4,423	3,846	6,566	185	148
20	7,296	15,231	8,952	15,569	123	102	2,732	2,249	5,347	3,666	196	163
25	10,799	11,233	12,723	11,514	118	102	3,146	622	6,533	1,128	208	181
30	15,125	5,970	17,103	6,315	113	106	3,287	71	7,285	147	222	207
35	19,717	2,358	21,479	2,424	109	95	2,957	2	6,998	3	237	206
40	22,039	0	23,395	0	106	NA	2,023	0	5,174	0	256	NA
45	20,168	0	21,102	0	105	NA	248	0	2,650	0	272	NA

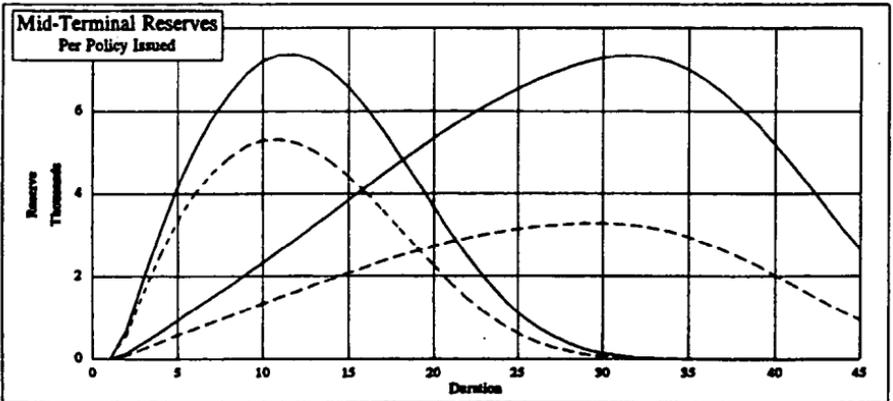
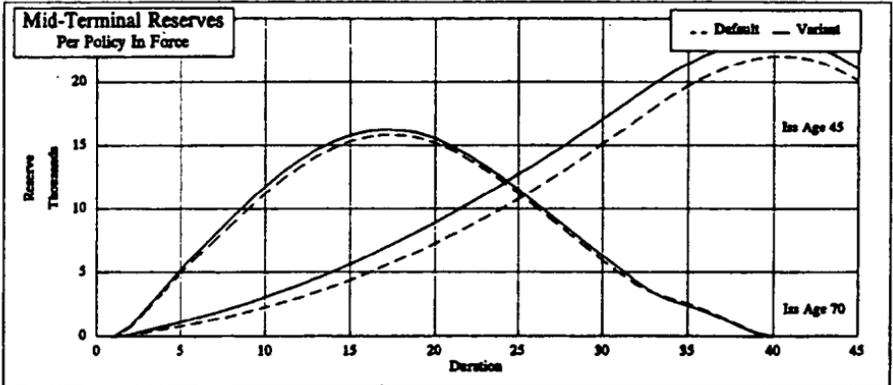


TABLE C-4—Continued

CASE 19

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant Test Variations from Base Assumptions Lapse: 12%, 10.5%, 9%, 7.5%, 6%, ...	
1	203	1,642	147	1,541	73	94		
2	203	1,642	147	1,541	73	94		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70	In Age 43	In Age 70
1	80	80	80	80	NA	NA	80	80	80	80	NA	NA
2	91	668	64	608	70%	91%	83	560	54	469	64%	84%
5	783	4,922	573	4,633	73	94	576	3,352	357	2,667	62	80
10	2,273	11,244	1,704	10,699	75	93	1,399	5,294	767	3,852	57	73
15	4,404	15,344	3,449	14,806	78	96	2,062	4,423	1,121	2,938	54	66
20	7,296	15,231	5,964	14,796	82	97	2,732	2,249	1,384	1,353	51	60
25	10,799	11,233	9,173	10,824	85	96	3,146	622	1,490	334	47	54
30	13,125	5,970	13,362	5,534	88	93	3,287	71	1,458	33	44	47
35	19,717	2,554	18,060	2,684	92	105	2,957	2	1,223	1	41	47
40	22,039	0	20,677	0	94	NA	2,023	0	772	0	38	NA
45	20,168	0	19,142	0	92	NA	944	0	329	0	35	NA

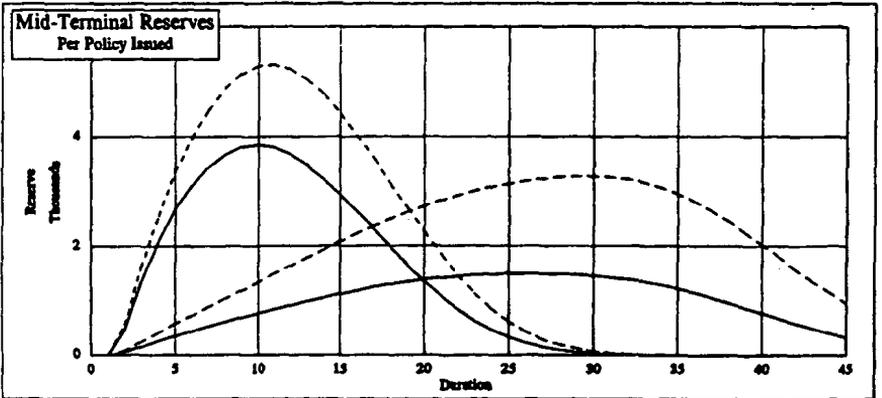
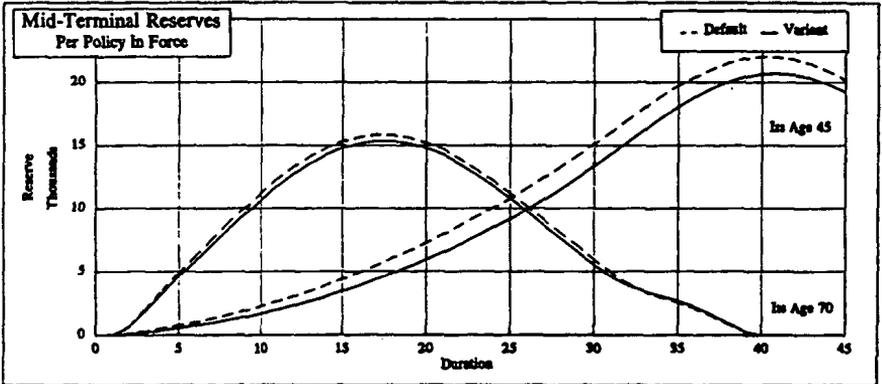


TABLE C-4—Continued

CASE 20

Duration	Net Premiums					Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default		
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	
0	\$11	\$267	\$11	\$267	100%	100%	Variant Test Variations from Base Assumptions Lapse rates include mortality
1	203	1,642	263	1,942	130	118	
2	203	1,642	263	1,942	130	118	

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70	Ins Age 45	Ins Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	129	627	132%	124%	83	560	111	709	132%	126%
3	789	4,922	1,030	6,118	133	124	576	3,399	769	4,434	134	132
10	2,273	11,244	3,034	13,670	134	122	1,339	5,294	1,824	8,000	136	131
15	4,408	15,344	5,962	17,713	135	115	2,082	4,423	2,901	7,784	139	176
20	7,296	15,231	9,930	17,031	136	112	2,782	2,249	3,942	4,701	144	209
25	10,799	11,235	14,907	12,466	138	111	3,146	622	4,803	1,583	153	254
30	15,125	5,970	20,814	5,928	138	116	3,287	71	5,436	232	165	326
35	19,717	2,558	26,043	2,498	132	98	2,957	2	5,493	8	186	357
40	22,039	0	27,205	0	123	NA	2,023	0	4,309	0	213	NA
45	20,168	0	23,873	0	118	NA	948	0	2,373	0	250	NA

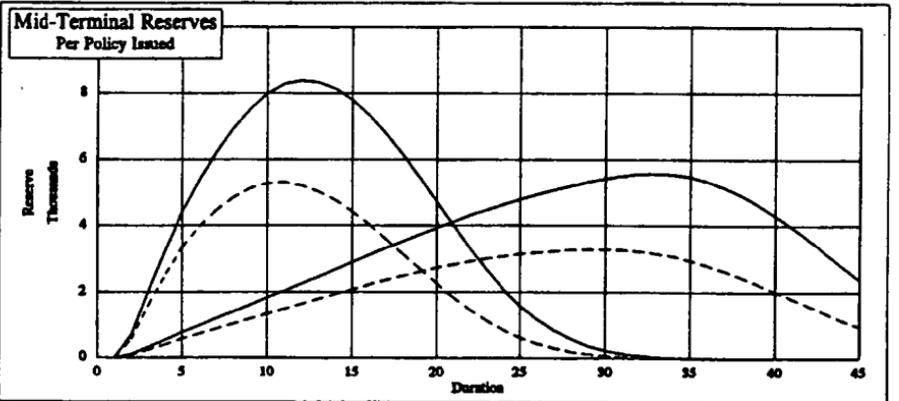
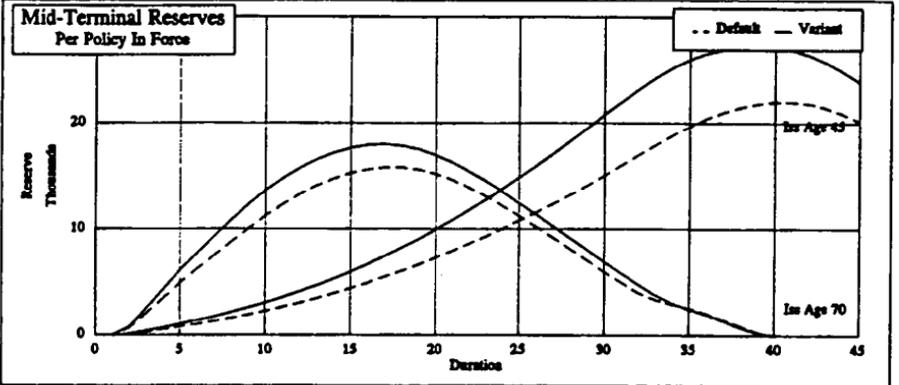


TABLE C-4—Continued

CASE 21

Duration	Net Premiums						Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant	Test Variations from Base Assumptions Liquation: Terminations less than 8%
1	203	1,643	212	1,739	103	106		
2	203	1,643	212	1,739	103	106		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	30	30	30	30	NA	NA	30	30	30	30	NA	NA
2	34	668	109	719	105%	108%	33	360	33	607	105%	108%
3	789	4,922	830	5,354	105	109	376	3,359	306	3,679	103	110
10	2,273	11,244	2,400	12,716	106	113	1,339	5,294	1,414	6,024	106	114
15	4,404	15,344	4,671	18,273	106	119	2,082	4,423	2,207	5,657	106	127
20	7,290	15,231	7,780	17,830	107	117	2,732	2,249	2,913	3,999	107	151
25	10,799	11,213	11,653	13,004	108	116	3,146	622	3,996	1,141	108	183
30	13,125	5,970	16,634	7,213	110	121	3,287	71	3,617	167	110	235
35	19,717	2,558	22,324	2,613	114	102	2,937	2	3,379	6	114	243
40	22,099	0	26,641	0	121	NA	2,023	0	2,994	0	124	NA
45	20,168	0	24,041	0	119	NA	248	0	1,451	0	153	NA

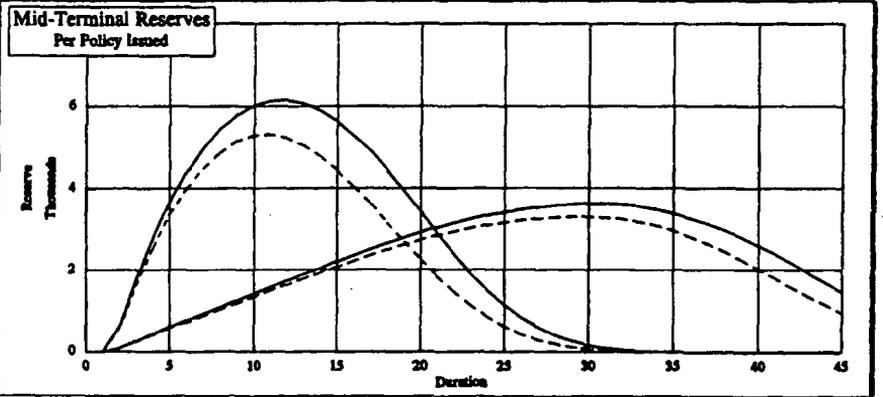
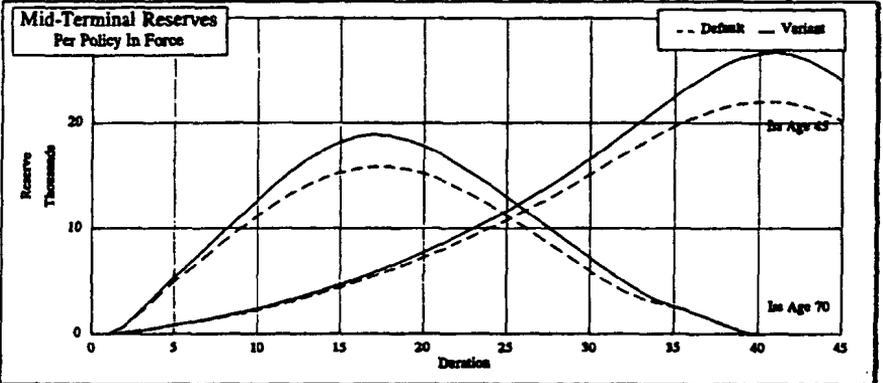


TABLE C-4—Continued

CASE 22

Duration	Net Premiums					Default	Base Assumptions See Mighty Plus Description in Appendix B
	Default		Variant		Variant / Default		
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	
0	\$11	\$267	\$11	\$271	101%	101%	Variant Test Variations from Base Assumptions Interest: 4.5%
1	203	1,642	223	1,697	110	103	
2	203	1,642	223	1,697	110	103	

Duration	Comparison of Mid-Terminal Reserves									
	Per Policy In Force					Per Policy Issued				
	Default		Variant		Variant / Default	Default		Variant		Variant / Default
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0
2	98	668	108	692	110%	104%	83	560	92	580
5	789	4,922	867	5,080	110	103	576	3,352	632	3,466
10	2,273	11,244	2,474	11,540	109	103	1,399	3,294	1,457	5,433
15	4,408	15,344	4,746	15,664	108	102	2,082	4,423	2,241	4,513
20	7,296	15,231	7,771	15,473	107	102	2,732	2,249	2,910	2,283
25	10,799	11,235	11,393	11,364	105	101	3,146	622	3,319	630
30	15,125	5,970	15,799	6,015	104	101	3,287	71	3,434	72
35	19,717	2,558	20,404	2,567	103	100	2,937	2	3,059	2
40	22,059	0	22,639	0	103	NA	2,023	0	2,078	0
45	20,168	0	20,597	0	102	NA	948	0	969	0

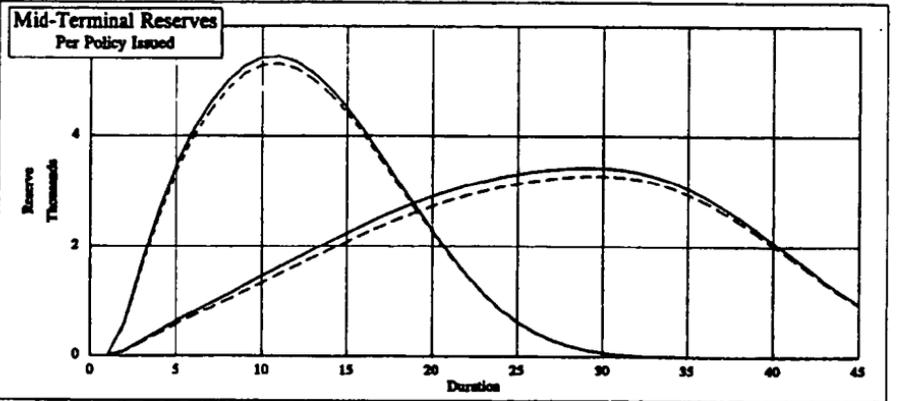
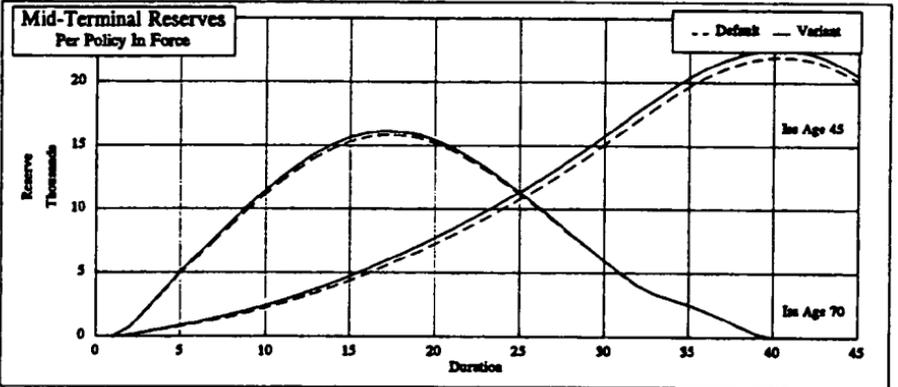


TABLE C-4—Continued

CASE 23

Duration	Net Premiums						Default	Base Assumptions See Mighty Risk Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70		
0	\$11	\$267	\$10	\$264	99%	99%	Variant	Test Variations from Base Assumptions Interest: 5.5%
1	203	1,542	183	1,589	91	97		
2	203	1,642	183	1,589	91	97		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	\$0	\$0	\$0	\$0	NA	NA	\$0	\$0	\$0	\$0	NA	NA
2	98	668	89	643	91%	97%	83	560	76	541	91%	97%
3	789	4,922	720	4,771	91	97	576	3,359	525	3,235	91	97
10	2,273	11,244	2,091	10,954	92	97	1,339	5,294	1,231	5,159	92	97
15	4,408	15,344	4,097	15,030	93	98	2,082	6,423	1,953	4,333	93	98
20	7,296	15,231	6,854	14,990	94	98	2,782	2,249	2,566	2,213	94	98
25	10,799	11,233	10,241	11,103	95	99	3,146	622	2,983	615	95	99
30	15,125	5,970	14,484	5,923	96	99	3,287	71	3,144	70	96	99
35	19,717	2,358	19,057	2,348	97	100	2,957	2	2,858	2	97	100
40	22,039	0	21,456	0	97	NA	2,023	0	1,970	0	97	NA
45	20,168	0	19,748	0	98	NA	948	0	929	0	98	NA

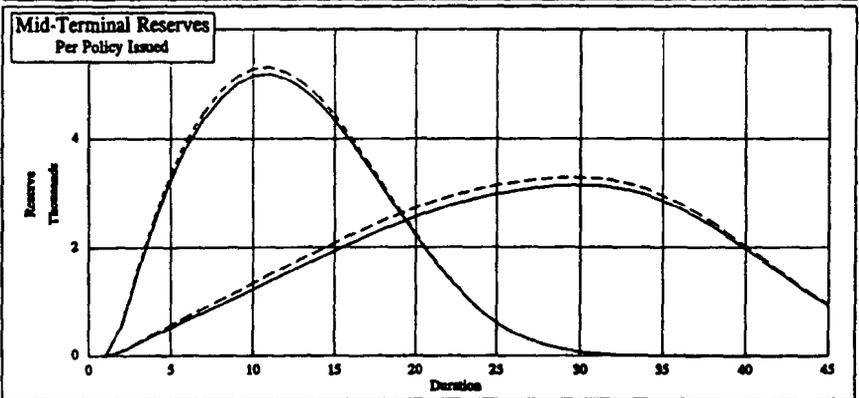
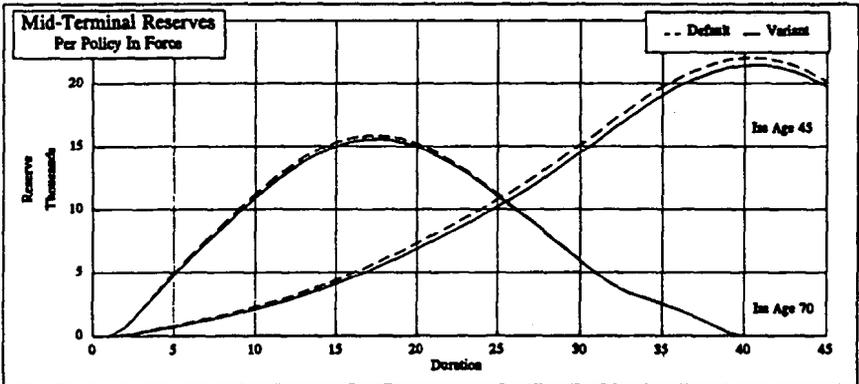


TABLE C-4—Continued

CASE 24

Duration	Net Premiums						Default	Base Assumptions See Mighty Fine Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70		Variant
0	\$11	\$267	\$184	\$1,465	1723%	248%		Test Variations from Base Assumptions
1	203	1,642	184	1,465	91	89		Method: Net Level
2	203	1,642	184	1,465	91	89		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	80	80	\$91	\$613	NA	NA	80	80	\$84	\$594	NA	NA
2	98	668	291	1,920	297%	298%	81	560	248	1,668	297%	298%
5	789	4,922	990	6,183	123	126	576	3,359	722	4,219	124	126
10	2,273	11,244	2,467	12,289	109	109	1,539	5,294	1,453	5,796	108	109
15	4,408	15,344	4,393	16,168	104	105	2,682	4,421	2,169	4,661	104	105
20	7,296	15,231	7,467	15,838	102	104	2,732	2,349	2,796	2,358	102	104
25	10,799	11,235	10,254	11,637	101	104	3,146	622	3,181	645	101	104
30	15,125	5,970	15,280	6,180	101	104	3,287	71	2,316	74	101	104
35	19,717	2,558	19,829	2,653	101	104	2,927	2	2,379	2	101	104
40	22,039	0	22,127	0	100	NA	2,023	0	2,051	0	100	NA
45	20,168	0	20,233	0	100	NA	948	0	951	0	100	NA

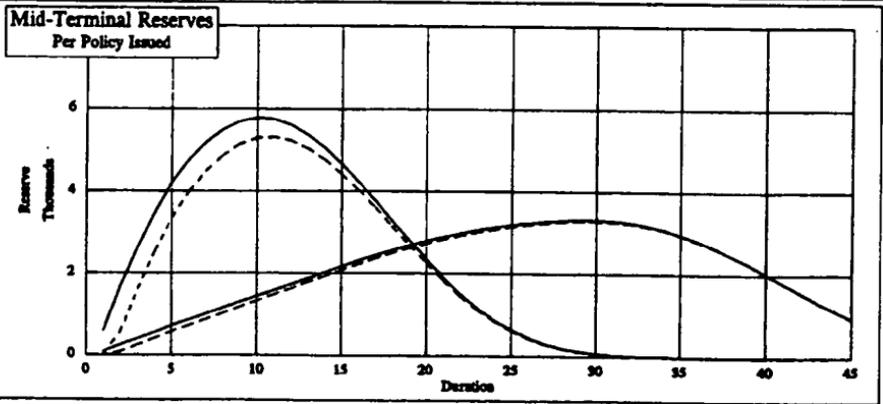
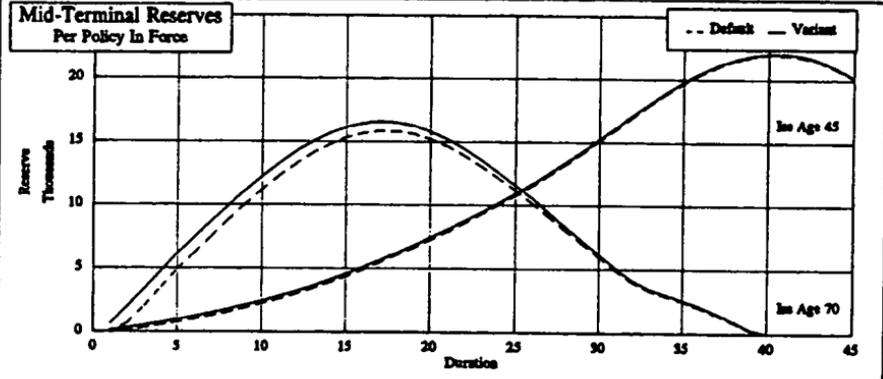
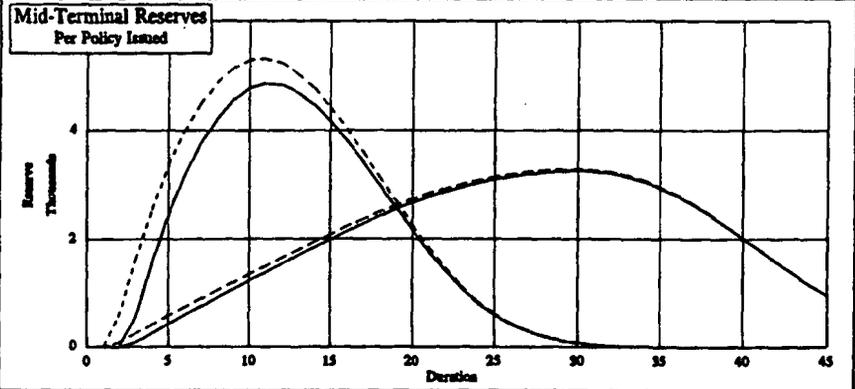
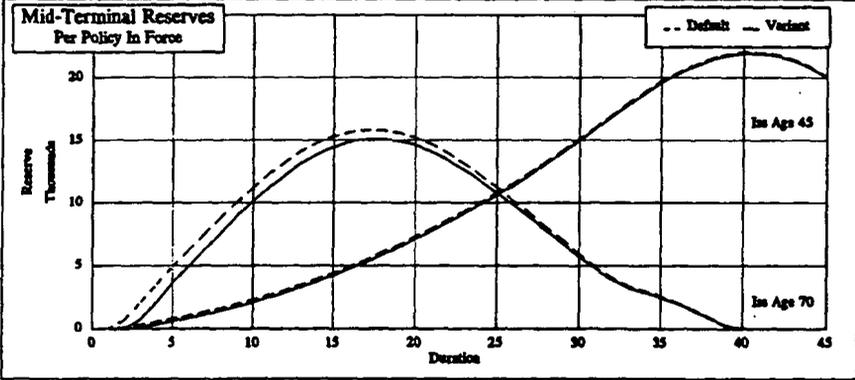


TABLE C-4—Continued

CASE 25

Duration	Net Expenditure						Default	Base Assumptions See Midway Plan Description in Appendix B
	Default		Variant		Variant / Default			
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70		
0	\$11	\$267	\$11	\$267	100%	100%	Variant	Ten Variations from Base Assumptions Method: 2 Year Preliminary Term
1	203	1,642	17	378	8	23		
2	203	1,642	222	1,828	110	111		

Duration	Comparison of Mid-Terminal Reserves											
	Per Policy In Force						Per Policy Issued					
	Default		Variant		Variant / Default		Default		Variant		Variant / Default	
	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70	In Age 45	In Age 70
1	80	80	80	80	NA	NA	80	80	80	80	NA	NA
2	98	668	0	0	0%	0%	83	560	0	0	0%	0%
5	789	4,922	380	3,263	74	78	576	3,539	423	2,451	74	73
10	2,273	11,244	2,072	10,143	91	90	1,839	5,294	1,220	4,176	91	90
15	4,408	15,344	4,216	14,478	95	94	2,062	4,623	1,991	4,171	96	94
20	7,286	15,231	7,117	14,592	98	95	2,782	2,249	2,563	2,154	98	95
25	10,799	11,233	10,634	10,811	99	95	3,146	623	3,099	399	99	96
30	15,124	3,970	14,983	3,744	99	95	3,287	71	3,287	64	99	95
35	19,717	2,558	19,601	2,457	99	95	2,957	2	2,959	2	99	95
40	22,039	0	21,947	0	100	NA	2,023	0	2,515	0	100	NA
45	20,168	0	20,101	0	100	NA	948	0	945	0	100	NA



APPENDIX D**SCREENS OF VALUATION DISKETTE WITH USERS MANUAL**

Reserve Program - Version 1.3b

March 20, 1995

Keep in mind that this software is only one reasonable implementation of the recommendations outlined in this final report. The software is not the set of recommendations to follow.

A. Using the Program

The LTC reserve program is executed by typing LTCRES at the DOS prompt.

The program consists of several input screens that are accessed from the main screen. Using a mouse, simply click on the appropriate button to activate an input screen. You may also use the TAB and arrow keys to position the button highlight and press the ENTER key if your computer lacks a mouse.

The input fields of each screen are intended to be largely self-explanatory. Nevertheless, a few comments are provided here. Once the input fields have been filled, the entries can be saved as a *.INP file using the SAVE button. Later, you can recall the entries using the RETRIEVE button. The input specifications are displayed later along with the output.

When the COMPUTE button is selected, you are asked to indicate the output destination. Choices include screen display, printer, text file, and Lotus worksheet (abbreviated output). The FILE VIEWER allows you to inspect the contents of any text file. Note that the screen display output option stores the program output temporarily in the file OUTPUT.SHL. You can view, rename, copy, etc. this file until the COMPUTE button is pressed again.

Batch processing is possible through optional command line parameters that indicate the names of input and output files. See Section 14 of this Appendix for more information.

B. Screen Images

Rough copies of the various input screens follow with comments where appropriate.

1. Opening Screen

```

+-----LTC Reserve Program - Test Version 1.3-----+
|
|  +-----+      +-----+
|  | Insured |      | Home Care Util. |
|  +-----+      +-----+
|  | Morbidity |    | Nonforfeiture |
|  +-----+      +-----+
|  | Mortality |    | Save Input |
|  +-----+      +-----+
|  | Interest / FPT |  | Retrieve Input |
|  +-----+      +-----+
|  | Policy |        | Compute Reserves |
|  +-----+      +-----+
|  | Lapsation |     | File Viewer |
|  +-----+      +-----+
|  | Help |         | Exit |
|  +-----+      +-----+
|
+-----+

```

This is the main dialog screen from which you enter the other screens. The HELP button will allow you to view the file HELP.IN, which contains this introduction to the program.

2. Insured Ages and Percent Female Screen

-----Insured-----			
	Issue Age	Female Fraction	Benefit Bank Gross Premium
1	45	1	0
2	70	1	0
3	0	1	0
4	0	1	0
5	0	1	0
6	0	1	0
7	0	1	0
8	0	1	0
9	0	1	0
10	0	1	0

+-----+	+-----+
Okay	Cancel
+-----+	+-----+

You may indicate up to 10 issue ages for which reserve factors are to be computed. The input specifications from the other input screens will apply to each issue age. A zero issue age is skipped. Issue ages are forced into the range from 30 to 85.

The percent female field governs the mix of males and females at issue. Since females outlive males, the population becomes increasingly more female with time. Unisex morbidity assumptions are obtained by blending sex-distinct values using these mixed percentages.

The benefit bank gross premiums, if specified, are used to determine policy nonforfeiture benefit values at lapsation. See Section 9 of this Appendix.

3. Morbidity Screen

---Morbidity---		
+ 85 NNHS Screening ---+		+-----+ Okay +-----+
() All Stays		
(*) Insurable Stays		
+-----+		
+ Selection Factors ---+		+-----+
1	.5	
2	.6	
3	.7	
4	.8	
5	.9	
6	1	
7	1	
8	1	
9	1	
10	1	
+-----+		
Incidence Rate		+-----+
Adjustment Factor :		1
		+-----+
+-----+		

On this screen you select the type of institutional experience, all stays or insurable stays, from the 1985 National Nursing Home Survey as reported by the SOA LTC Experience Committee in the *TSA 1988-89-90 Reports*.

The selection factors and incidence rate adjustment factors are applied to the policy year institutional and noninstitutional admission rates. The selection factors are forced to unity after 10 policy years. The incidence rate adjustment factor applies uniformly to all policy years.

4. Mortality Screen

Mortality	
Mortality Table	Selection Factors
(*) 83 GAM	1 .5
() 80 CSO	2 .6
() 58 CSO	3 .7
() 79-81 US	4 .8
() 80 Basic	5 .9
() 75-80 Basic	6 1
() 83 Basic	7 1
() 83 IAM	8 1
	9 1
	10 1

Okay	Mortality Adjustment Factor : 1
------	---------------------------------

On this screen you select the mortality table to be used in the reserve computation. As with the morbidity selection factors, the mortality selection factors are forced to unity after 10 policy years. The mortality adjustment factor applies uniformly to all policy years.

5. Interest Rate and Preliminary Term Period Screen

Interest		
Interest Rate	Yrs of FPT	
5 %	1	Okay

The annual effective interest rate is constant across all policy years. The years of full preliminary term may be zero, 1 or 2. The program computes and displays the annual claim cost as the net premium for each year of the preliminary term period.

6. Policy Specifications Screen

-----Policy Specifications-----			
	NH	HC	
Max Daily Benefit (\$)	100	50	
Elimination Period	100	100	days
Max Benefit	4	4	years/days/\$
Premium Period	0	yrs/age	
<input checked="" type="checkbox"/> Waiver of Premium			Okay
W/P Waiting Period	0	days	
<input type="checkbox"/> Inflation Protection			Cancel
Inflation Period	0	yrs/age	
Inflation Rate	5	percent	Compound
<input type="checkbox"/> Inflate Premium			

The nursing home (NH) and home health care (HC) elimination period and maximum benefit are applied separately.

The home health care elimination and benefit periods are specified in terms of service time from disability onset. To translate from service time to calendar time, the program computes the average frequency of service (see Section 8 of this Appendix) for each policy year following disability onset. For example, if the service frequency is 3 days per week for the policy year of disability, then a 30-service-day elimination period requires 70 calendar days of disability before benefits are payable. The program subsequently accumulates service time year-by-year to determine when the service-time benefit period is exhausted.

The maximum benefit may be entered in years, days or dollars. Values less than 100 are treated as years, less than 7500 as days, and otherwise as dollars. The program translates the benefit period into days for the computation and displays the limit as days in the output. Note that the dollar limit is inflated with the daily benefit limit if you indicate inflation protection.

Premium and inflation protection periods of zero are treated as lifetime. Values less than 65 are interpreted as years, while larger values are treated as paid-to ages.

Waiver of premium, if indicated, applies only while institutionalized. The W/P waiting period is in addition to the elimination period for the NH benefits.

The type of inflation protection can be toggled between compound and simple.

7. Lapsation and Antiselection Screen

Lapse Rates			Lapsation Anti-Selection			
1	8	‡	1	70	‡	Okay
2	7		2	50		
3	6		3	30		
4	5		4	20		
5	4		5	10		
6	4		6	0		
7	4		7	0		
8	4		8	0		
9	4		9	0		
10	4		10	0		
(*) Lapse rates exclude mortality						
() Lapse rates include mortality						
100.00 ‡ Maximum Aggregate Term. Rate						

Policy-year lapse rates can be entered separately for the first nine years. The tenth entry is applied to all subsequent years.

You may elect to treat the values as voluntary lapse rates, which are added to the mortality rates, or as aggregate policy termination rates, which include mortality. If you indicate that the values include mortality, the program will use the greater of the specified value or the mortality rate for each policy year.

The antiselection factors are described in Section VII of this final report. Roughly speaking, if you enter 50% in the fifth position, the program will assume that 50% of the claim incurrals that would have been generated from each year's lapses five years after lapse will be retained, even though 100% of the premium is lost.

You may also specify a maximum aggregate (lapse plus mortality) termination rate. If the aggregate exceeds the limit, the voluntary lapse rate is

reduced appropriately. If the mortality rate alone exceeds the limit, then the voluntary lapse rate is set to zero.

8. Home Care Utilization Rate Screen

-----Home Care Utilization-----					
	No CI			CI	
No ADL's	No Utilization			30 %	1.0 /wk
1 ADL	10 %	2.0 /wk	50 %	3.0 /wk	
2 ADL's	70 %	4.0 /wk	70 %	5.0 /wk	
3+ ADL's	100 %	6.0 /wk	100 %	7.0 /wk	
	Cancel			Okay	

This screen allows you to specify home care (HC) service utilization and frequency rates for noninstitutional disability days, by ADL/CI status. These rates apply uniformly to all issue ages, incurral ages, policy durations, and durations from incurral. The program estimates the number of noninstitutional disability days, policy year by policy year, for each year's incurrals, by ADL and CI status. You must indicate what portion of these days generate home care benefits and the frequency of use per week. For example, the sample screen above indicates that 70% of noninstitutionalized insureds with two ADL impairments and no CI use home care services. These individuals receive services 4 days per week. The program accumulates, by incurral year, the product of the disability days, the utilization rates, the frequency rates and the HC daily benefit, considering the HC elimination and benefit periods. These HC claim costs are displayed in the output per policy in force in the middle of each policy year. (See Section 15 of this Appendix.)

9. Nonforfeiture Benefits Screen

```

+-----Nonforfeiture Values-----+
|
|   Dur   SBP%   Dur   SBP%   [ ] Benefit Bank
|   +----+   +----+   +----+   +----+
|   3     |0|    25  |0|    First Year
|   +----+   +----+   +----+   +----+
|   4     |0|    30  |0|    |3|
|   +----+   +----+   +----+   +----+
|   5     |0|    35  |0|    Min NFO Ben Days
|   +----+   +----+   +----+   +----+
|  10     |0|    40  |0|    |30|
|   +----+   +----+   +----+   +----+
|  15     |0|    45  |0|    +-----+
|   +----+   +----+   +----+   +----+
|  20     |0|    50  |0|    |
|   +----+   +----+   +----+   +----+
|  [X] Post Lapse Inflation
|  [X] Reserve > SBP Cost
|
| NFO Loading Factor |1.1| |
|   +----+   +----+   +----+   +----+
|
+-----+
  
```

Two forms of shortened benefit period (SBP) are supported by the program.

The first form expresses the paid-up benefit period after lapsation as a percentage of the premium-paying maximum benefit period. The same percentage is applied to both the nursing home and home care benefit periods. You enter SBP percentages at the indicated policy durations and the program interpolates to fill in the gaps. The entry for year 50 is applied to all subsequent years.

The second form limits the post-lapse benefit to the sum of gross premiums paid prior to lapse. The gross premiums used by the program exclusively for the benefit bank are entered on the insured screen described in Section 2 of this Appendix. You may specify the initial year of lapsation this benefit is available and impose a minimum value on the resulting shortened benefit period. Note that the benefit bank SBP as a percentage of the premium-paying benefit period may be different for nursing home and home health care benefits when the daily benefit amounts for these benefits differ.

You may indicate whether inflation protection, if present, continues after lapsation. If post-lapse inflation is elected, both the daily benefit amount and the benefit bank balance increase with inflation (that is, the benefit periods are frozen at lapse).

You may also indicate whether the terminal reserves must exceed the net single premium for the current SBP benefit. If you check this box, the displayed terminal reserve will be unaffected, but the mid-terminal will average the greater of the terminal reserve and the "cost per lapses" at the start and end of each policy year.

The NFO loading factor is applied to the net single premium for the SBP benefits associated with each year's lapses. This provides a risk margin since the policy becomes noncancellable at lapse.

10. Save Specifications Screen

```

+-----Save Input-----+
|
| File Name:  DEFA244.INP  |
|-----+-----+-----+
| {C:  }      |
|-----+-----+-----+
| C:\         |
| ACTUARY    |
| LTCDEV     |
| SOATF      |
| LTCRES     |
| VAR EPBP   |
|-----+-----+-----+
| DEFA234.INP
| DEFA235.INP
| DEFA241.INP
| DEFA242.INP
| DEFA243.INP
| DEFA244.INP
| DEFA245.INP
| DEFA251.INP
| DEFA252.INP
| DEFA253.INP
| DEFA254.INP
| DEFA255.INP
| DEFAULT.INP
|-----+-----+-----+
|
| Okay
|-----+-----+-----+
|
| Cancel
|-----+-----+-----+
|
+-----+-----+-----+

```

You can save the specifications to a *.INP file from this screen. To create a new file, simply type a new name in the FILE NAME box. You need not enter the .INP extension. To reuse an existing file, click on the filename in the listing below. The filename will be copied to the FILE NAME box.

11. Retrieve Specifications Screen

```

+-----Retrieve Input-----+
|
|                                     +-----+
|                                     |DEFA121.INP|
|                                     +-----+
| [C:      ]                         +-----+
|                                     |DEFA111.INP|
|                                     |DEFA112.INP|
|                                     |DEFA113.INP|
|                                     |DEFA114.INP|
|                                     |DEFA115.INP|
|                                     |DEFA121.INP|
|                                     |DEFA122.INP|
|                                     |DEFA123.INP|
|                                     |DEFA124.INP|
|                                     |DEFA125.INP|
|                                     |DEFA131.INP|
|                                     |DEFA132.INP|
|                                     |DEFA133.INP|
|                                     +-----+
|
| C:\
|  ACTUARY
|  LTCDEV
|  SOATF
|  LTCRES
|  VAR EPBP
|
|                                     +-----+
|                                     |      Okay      |
|                                     +-----+
|                                     +-----+
|                                     |      Cancel      |
|                                     +-----+
|
+-----+

```

You may recall specifications you previously saved using this screen. The current specifications will be overwritten with the values from the *.INP file you select.

12. Output Destination Screen

```

+-----Output-----+
|
| ( ) LPT1
| ( ) LPT2
| ( ) LPT3
| ( ) View on Screen
| (*) Print to File (.TXT)
|
| File Name: |output|
|
| [X] Create Lotus File (.WK1)
|
| Comment:
| [Comment line 1      ]
| [Comment line 2      ]
| [Comment line 3      ]
|
+-----+

```


14. Batch Processing

You can create a DOS batch file (.BAT) to repeatedly execute the program with previously saved .INP files. Each line of the batch file would have the syntax,

```
LTCRES TESTIN TESTOUT.TXT
```

or

```
LTCRES TESTIN TESTOUT.WK1 .
```

The first form executes LTCRES, reads in TESTIN.INP and creates the output file TESTOUT.TXT. The second form does the same, but creates two output file, TESTOUT.TXT and TESTOUT.WK1. The program runs, unattended, once for each such line in the batch file.

15. Sample Program Output

Table D-1 is sample .TXT output from LTCRES.

TABLE D-1
SAMPLE .TXT OUTPUT FROM LTCRES

{Comment line 1}
{Comment line 2}
{Comment line 3}

Summary of 1-Year Preliminary Term Reserves at 5.000% for Issue Age 70 Assuming Females Are 100% of Sales

Net Premium: 1,641.93	Daily Benefit:	NH 100.00	HC 50.00	Home Care SP/BP in Service Days
Lifetime Pay	Deductible Period:	100	100	Inflation Protection: NONE
	Lifetime Maximum:	1460	1460	
	W/P Days in Ben:	0		

Mortality Table: 83 GAM

Adjustment Factor: 1.000

Morb. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000

Morbidity Table: 85 NNHS (Insurable Stays) and 82/84 NLTCB

Adjustment Factor: 1.000

Morb. Selection Factors: (1) 0.500 (2) 0.600 (3) 0.700 (4) 0.800 (5) 0.900 (6) 1.000 (7) 1.000 (8) 1.000 (9) 1.000 (10) 1.000

Antiselection Factors: 0.700 0.500 0.300 0.200 0.100 0.000 0.000 0.000 0.000 0.000 (10) 0.000

Home Care Service Utilization Rates by ADL/CI Status:

No Cognitive Impairment: (0 ADLs) 0.000 (1 ADLs) 0.100 (2 ADLs) 0.700 (3 ADLs) 1.000

Cognitively Impaired: 0.300 0.500 0.700 1.000

Home Care Service Frequency (per week) by ADL/CI Status:

No Cognitive Impairment: (0 ADLs) 0.000 (1 ADLs) 2.000 (2 ADLs) 4.000 (3 ADLs) 6.000

Cognitively Impaired: 1.000 3.000 5.000 7.000

Lapse rates are in addition to mortality - Maximum aggregate termination rate: 1.000

Lapse Rates: (1) 0.080 (2) 0.070 (3) 0.060 (4) 0.050 (5) 0.040 (6) 0.040 (7) 0.040 (8) 0.040 (9) 0.040 (10+) 0.040

Nonforfeiture benefits: SBP Cost Factor: 1.200 Reserves to exceed SBP cost per lapse

(3) .000 (4) .000 (5) .000 (10) .000 (15) .000 (20) .000 (25) .000 (30) .000 (35) .000 (40) .000 (45) .000 (50+) .000

TABLE D-1—Continued

	BOY t Inforce	Waiver Inforce	NI Inforce	NI Admiss.	HC Admiss.	BOY Lapses	Deaths	Net Prem. per Payor	NI Cost per Mid Lx	HC Cost per Mid Lx	NFO Cost per Lapse	Terminal Reserve	Mid-Term. Reserve
1	100,000	0	0	533	1,017	7,950	619	267.43	202.47	72.50	0.00	0.00	0.00
2	91,431	193	295	698	1,294	6,346	775	1,641.93	288.77	100.26	0.00	1,436.39	667.92
3	84,309	389	523	869	1,572	5,001	953	1,641.93	390.07	130.96	0.00	2,900.92	2,081.63
4	78,354	573	740	1,066	1,841	3,860	1,158	1,641.93	517.71	163.69	0.00	4,347.95	3,515.73
5	73,336	765	970	1,295	2,108	2,878	1,392	1,641.93	677.48	198.05	0.00	5,725.45	4,922.19
6	69,067	977	1,226	1,568	2,370	2,696	1,657	1,641.93	880.43	233.60	0.00	7,043.61	6,243.66
7	64,713	1,220	1,522	1,713	2,379	2,518	1,759	1,641.93	1,039.02	246.09	0.00	8,366.45	7,537.70
8	60,436	1,437	1,766	1,894	2,387	2,343	1,853	1,641.93	1,240.37	259.35	0.00	9,662.61	8,821.27
9	56,239	1,644	2,006	2,060	2,389	2,172	1,938	1,641.93	1,478.91	273.63	0.00	10,905.09	10,065.75
10	52,129	1,849	2,246	2,231	2,382	2,005	2,010	1,641.93	1,755.22	287.36	0.00	12,066.31	11,244.38
11	48,115	2,053	2,482	2,387	2,363	1,842	2,067	1,641.93	2,069.27	301.20	0.00	13,116.53	12,329.09
12	44,206	2,249	2,709	2,518	2,327	1,684	2,107	1,641.93	2,409.40	313.87	0.00	14,036.82	13,295.94
13	40,415	2,432	2,917	2,611	2,277	1,531	2,129	1,641.93	2,766.06	325.54	0.00	14,816.50	14,130.33
14	36,755	2,593	3,095	2,664	2,211	1,385	2,134	1,641.93	3,145.74	336.68	0.00	15,437.61	14,818.30
15	33,235	2,723	3,235	2,674	2,130	1,245	2,121	1,641.93	3,544.01	345.89	0.00	15,885.27	15,343.74
16	29,870	2,817	3,332	2,639	2,035	1,111	2,088	1,641.93	3,949.75	354.61	0.00	16,151.42	15,695.31
17	26,670	2,872	3,380	2,561	1,928	985	2,042	1,641.93	4,371.25	360.83	0.00	16,222.61	15,862.56
18	23,643	2,885	3,377	2,443	1,809	866	1,983	1,641.93	4,789.91	366.42	0.00	16,098.45	15,838.56
19	20,794	2,854	3,324	2,287	1,681	755	1,912	1,641.93	5,199.95	369.29	0.00	15,784.80	15,625.93
20	18,127	2,781	3,221	2,100	1,543	652	1,837	1,641.93	5,607.12	370.49	0.00	15,288.58	15,230.92
21	15,638	2,668	3,072	1,891	1,399	556	1,748	1,641.93	6,003.05	370.08	0.00	14,611.71	14,657.91
22	13,335	2,518	2,882	1,667	1,250	468	1,641	1,641.93	6,312.87	367.84	0.00	13,034.90	13,937.01
23	11,226	2,338	2,659	1,437	1,100	388	1,522	1,641.93	6,580.79	363.85	0.00	12,927.69	13,112.74
24	9,315	2,134	2,410	1,211	952	317	1,394	1,641.93	6,822.42	361.30	0.00	11,964.35	12,206.73
25	7,605	1,914	2,146	994	808	254	1,256	1,641.93	7,034.80	357.58	0.00	10,943.08	11,234.85
26	6,095	1,685	1,876	794	671	199	1,112	1,641.93	7,222.70	352.69	0.00	9,879.99	10,213.94
27	4,784	1,456	1,609	615	544	153	965	1,641.93	7,376.59	346.72	0.00	8,801.05	9,164.50
28	3,666	1,235	1,352	460	430	114	814	1,641.93	7,513.87	338.28	0.00	7,708.61	8,100.66
29	2,738	1,026	1,113	330	330	83	668	1,641.93	7,620.12	334.37	0.00	6,617.96	7,030.93
30	1,987	834	897	226	245	58	533	1,641.93	7,732.26	329.00	0.00	5,542.91	5,969.57
31	1,396	664	707	145	176	39	412	1,641.93	7,835.88	321.03	0.00	4,531.76	4,946.70
32	945	516	543	86	121	25	307	1,641.93	7,924.89	312.10	0.00	3,678.47	4,031.54
33	612	391	407	44	79	16	220	1,641.93	8,030.85	304.26	0.00	3,197.36	3,373.96
34	377	264	264	25	49	9	149	1,641.93	8,120.31	288.09	0.00	2,820.70	2,952.62
35	218	153	153	14	29	5	96	1,641.93	8,229.81	269.89	0.00	2,390.18	2,557.64
36	118	82	82	8	15	2	57	1,641.93	8,323.85	243.48	0.00	1,832.95	2,074.91
37	58	41	41	4	7	1	32	1,641.93	7,852.37	211.76	0.00	1,223.68	1,503.84
38	25	18	18	2	3	0	15	1,641.93	6,943.92	170.21	0.00	541.22	871.63
39	9	7	7	1	1	0	6	1,641.93	5,314.56	107.66	0.00	0.00	270.61
40	3	2	2	0	0	0	2	1,641.93	1,657.99	9.79	0.00	0.00	0.00

PREMIUM & BENEFIT TOTALS (\$000)

1,630,490

2,102,167

PRESENT VALUES (5.00%) (\$000)

1,136,343

1,136,343

TABLE D-1—Continued

The top of the output displays the input assumptions.

The various columns of numeric data include:

- (1) Policy year
- (2) Beginning of year (BOY) number of policies
- (3) Number of policies with waived premiums - BOY
- (4) Number of policies institutionalized - BOY
- (5) Mid-year nursing home admissions
- (6) Mid-year ADL/CI disability episode incurrals
- (7) End of year (EOY) lapses
- (8) Policy year deaths
- (9) Net premium per premium-paying policy - BOY
- (10) Nursing home claim cost per mid-year noninstitutionalized policy
- (11) Home care claim cost per mid-year policy (all)
- (12) Loaded net single premium for SBP benefits per lapses - EOY
- (13) Terminal reserve per EOY policy inforce
- (14) Mid-terminal reserve

The mid-terminal is the average of the prior yearend's post-lapse reserve factor and the next yearend's pre-lapse reserve factor. At the user's option, each factor can be forced to be greater than the net single premium for nonforfeiture benefits.

APPENDIX E

DOCUMENTATION OF VALUATION DISKETTE PROGRAMS

I. Overview

This appendix summarizes the major formulas used in the calculation of net premiums and reserve factors in the diskette developed by the SOA LTC Insurance Valuation Methods Task Force. This appendix is written for valuation actuaries who will be taking the responsibility for the adequacy of the reserve factors calculated.

The model is divided into three sections: (1) input files (which the computer program reads), (2) the computer program, and (3) output files (which the computer program generates). Each section is discussed below. In addition, the sample calculations of the default case nursing home and home health care admissions and claim costs are presented in Section V of this Appendix.

II. Input Files

There are seven input files. Each file is in ASCII format and can be edited with any DOS editor, as long as the exact position of the numbers is not changed. The input files and a brief description of the data in each file are summarized in Table E-1.

TABLE E-1
SUMMARY OF INPUT FILES

No.	DOS Name	Data
1	CONTIN.IN	Nursing home continuance tables from <i>TSA 1988-89-90 Reports</i> (Tables 16 and 17)
2	CONTINHC.IN	Home care continuance tables developed by the Task Force
3	HCRTALOS.IN	Home care incidence rates and average lengths of frailty (Task Force)
4	HCUTIL.IN	Utilization of home care disability days by ADL/CI status (default = 100%)
5	HELP.IN	Help information
6	MORTAL.IN	Mortality rates from 8 tables
7	NHRTALOS.IN	Nursing home admission rates and average lengths of stay from <i>Reports</i> (Tables 1 and 2)

III. Computer Program

The computer program, LTCRES, is written in Visual Basic for DOS and is divided into 12 “forms.” A “form” in the parlance of Visual Basic refers to the program code that creates a screen image and the actions to be performed by the program in response to a user’s interaction with the screen. Table E-2 summarizes the 12 forms. Although all these forms can be printed, all but the main form, LTCRES.FRM, contain limited information on understanding the equations used to calculate reserves. The information in these 11 forms consists of that necessary to produce the screen image and the code to store the input parameters into variable names. LTCRES.FRM contains the actual equations used to produce the reserve factors.

TABLE E-2
SUMMARY OF FORMS IN LTCRES COMPUTER PROGRAM

No.	Form	Description
1	COMPUTIN.FRM	Computer reserves screen
2	HC_UTIL.FRM	Home care utilization screen
3	INSURED.FRM	Issue age, % female screen, benefits bank gross premium screen
4	INTEREST.FRM	Interest rate, years of FPT screen
5	LAPSE.FRM	Lapse rate, antiselection on lapse screen
6	MORBID.FRM	Nursing home admission rates, morbidity selection factors, and morbidity adjustment factor
7	MORTAL.FRM	Mortality table, mortality selection factors, and mortality adjustment factor
8	NFO.FRM	Nonforfeiture value screen (SBP or benefits bank)
9	POLICY.FRM	Policy specification screen
10	PRNTVIEW.FRM	Output screen
11	SAVEFILE.FRM	Save input screen
12	LTCRES.FRM	Main screen and computation subroutines

A. Organization of the Main Form LTCRES.FRM

The main form of the computer program is LTCRES.FRM. It contains 26 subroutines and five functions. The 26 subroutines can be grouped as follows:

- One (Form_Load) starts the program
- 14 respond to a user’s “click” on the main screen (Compute_btn_Click starts the calculations)
- Eight perform the reserve calculations

- Two (lotlabel and lotnum) format output variables in the standard required to be recognized by spreadsheet software, such as LOTUS™
- 1 (comline) simply accesses a command line when the program is executed.

Of the five functions, two simply create the MAX and MIN functions. The other three perform calculations relevant to the determination of the reserve factors. The ten subroutines and the three functions that contain the important reserve calculations are summarized in Table E-3.

The premium is calculated with a present value formula that first accumulates the present value of benefit payments and \$1 for each premium payment and then calculates the premium that will equate the two. The calculation flow through the most important subroutines is presented below.

B. Subroutine UNISQD

This subroutine opens "mortal.in" and skips all lines before the issue age (isag&). In order to calculate the unisex mortality table, it sets the radix of the unisex table to 100000 and splits this between females and males according to the user-defined percentage female (pfemale#).

$$\begin{aligned} \text{lxa}\&(3) &= 100000 \\ \text{lxa}\&(2) &= \text{lxa}\&(3) * \text{pfemale}\# \\ \text{lxa}\&(1) &= \text{lxa}\&(3) - \text{lxa}\&(2) \end{aligned}$$

where

$$\begin{aligned} \text{lxa}(sx\%) &= \text{number alive at the beginning of the year for sex } sx\% \\ sx\% = 1 &= \text{male, } 2 = \text{female, } 3 = \text{total} \end{aligned}$$

The program then performs the following for each attained age (aa%) from the issue age until age 110. It reads the mortality rates per 1000, rqds#(sx%,itb%), for all the mortality tables in mortal.in, and then adjusts these rates by the mortality adjustment factor selected by the user (mort_adj#). It then uses the rates from the table selected by the user (istmt&) to calculate the number of lives at the end of the year separately for males and females. The total lives at the end of the year is obtained by summing the males and the females, and the unisex mortality rate is obtained as the complement of the probability of survival for all lives.

$$\begin{aligned} \text{lxb}\&(sx\%) &= \text{lxa}\&(sx\%) * (1 - \text{rqds}\#(sx\%, \text{istmt}\&)) / 1000\# \\ \text{lxb}\&(3) &= \text{lxb}\&(1) + \text{lxb}\&(2) \\ \text{qd}\#(aa\%) &= 1\# - \text{lxb}\&(3) / \text{lxa}\&(3) \end{aligned}$$

TABLE E-3
SUMMARY OF MAIN SUBROUTINES AND FUNCTIONS IN LTCRES.FRM

No.	Subroutine / Function	Description
1	form_load	(1) Initializes variables, (2) reads "nhrtalos.in", "hcrtaalso.in" and "contin.in", and (3) calls "readhc"
2	readhc	Reads "continhc.in" and "hcutil.in"
3	compute_btn_click	Opens output files and calls calculation subroutines
4	unisqd	Reads "mortal.in" and projects the number of policies in force by sex and duration for the purpose of computing unisex admission rates, lengths of stay and continuance tables
5	factors	Projects the benefit and premium inflation factors, and, if applicable, determines the duration that the policy is paid up
6	demo	Projects the number of policies in force by duration using mortality and lapse assumptions and calculates the number of new claims (nursing home and home care separately), the number of active claims, and the number in premium waiver status for each duration
7	dayinh	Calculates the number of days qualifying for a nursing home benefit
8	dayihc	Calculates the number of days qualifying for a home care benefit
9	calc	(1) Determines the amount of benefit payments at each duration from days of benefit and policy specifications, (2) calculates the net premium necessary to match the present value of benefit payments, and (3) determines the reserve at each duration
10	outpt	Prints the output tables
11	sbp	Determines the value of nonforfeiture benefits in the form of a shortened benefit period or benefits bank
12	ftk	Interpolates between thresholds in the nursing home continuance table. This function is used in the "dayinh" subroutine
13	gtk	Interpolates between thresholds in the home care continuance table. This function is used in the "dayihc" subroutine

The unisex incidence rates and average lengths-of-stay are obtained by weighing the sex-distinct rates by the number alive at each attained age. For example, the unisex nursing home admission rate for insured stays at attained age aa% is calculated as follows:

$$\text{nharis}(aa\%,3) = (\text{nharis}(aa\%,1) * l_{x\&(1)} + \text{nharis}(aa\%,2) * l_{x\&(2)}) / l_{x\&(3)}$$

The same calculation is performed for the average length-of-stay for insured stays [alosis(aa%,sx%)], the nursing home admission rate for all stays [nharas(aa%,sx%)], the average length-of-stay for all stays [alosas(aa%,sx%)], the home care incidence rate for all [hcar(aa%,sx%)], and the average length-of-stay in home care [aloshc(aa%,sx%)]. Each of the incidence rates are adjusted by a user-defined adjustment factor (inc_adj#).

Finally, a unisex continuance table is calculated by the weighted average of the days in disability status in each of the age groups for which the continuous tables apply. There are four continuance tables represented by the variables: (1) podis(k1, jage, sx) [percentage of days above threshold(k1) for insured stays in a nursing home by admission age group (jage) and sex (sx)], (2) podas(k1, jage, sx) [percentage of days above threshold in a nursing home for all stays], (3) podhc(k1, jage, sx) [percentage of service days (% using times frequency) above threshold in home care], and (4) podhct(k1, jage, sx) [percentage of impairment days (% using) above threshold in home care total].

C. Subroutine Factors

This subroutine sets the paid-up factors, inflation factors, and discount factors for each duration.

dr% = duration (1=first duration)

pdup(dr%) = 0 if paid-up, =1 if premium paying

fctb#(dr%) = inflation factor for daily benefits (indexed to the initial benefit level)

fctp#(dr%) = inflation factor for premiums (indexed to the initial premium level)

lip& = length of inflation protection. If < 65, then lip& is number of years of inflation protection. If => 65, lip& is the attained age of the last increase.

tip\$ = the type of inflation protection. S=simple, C=compound

rindb# = rate of increase in benefits.

If the type of inflation protection is simple, then

$$fctb\#(dr\%) = 1 + rindb\# * (dr\% - 1).$$

If the type of inflation protection is compound, then

$$fctb\#(dr\%) = (1 + rindb\#)^{\wedge}(dr\% - 1).$$

If premiums inflate with benefits, then

$fctp\#(dr\%) = fctb\#(dr\%);$

otherwise all $fctp\#$'s equal 1.0.

There are two sets of discount factors: $vfy\#(dr\%)$ is a full year's discount for every duration (the first duration has no discount), and $vhy\#(dr\%)$ is for one-half year additional discount.

D. Subroutine DEMO

This subroutine calculates the number of policies in force, the number paying premiums, the number of nursing home admissions, the number of home care incidences, and an estimate of the number of nursing home residents.

The subroutine initializes the number of policies in force at the issue age with a radix of 100,000 and the number of nursing home residents at 0.

$lx(isag\&) = 100000$
 $resnh(0) = 0$

The rest of the entire subroutine is in a FOR-NEXT loop that goes through all of the durations from the first through the duration at which age 110 is obtained ($=mxdr$). ($mxdr = 110 - isag\&$, which was calculated in subroutine *unisqd*.) For each duration ($dr\%$) the attained age ($aa\%$) is calculated. Since the selection factors go for 10 years, the ultimate duration is 11. The variable " ldr ," (which is limited to 11) is used as the subscript in variables that change during the first 10 years.

$aa\% = isag\& + dr\% - 1$

The number in force is projected by applying the double decrements of lapse (qw) and death (qdx). For each duration, the death rate is set to the total unisex death rate at the attained age times the mortality selection factor. The lapse rate is set to the user-defined lapse rate ($stlr\#$), unless the user has indicated that the lapse rate includes the mortality rate. The variable " $lpse\%$ " equals 0 if lapses are in addition to mortality, and it equals 1 if lapses include mortality. Thus, if $lpse\%$ equals 1, then the "pure" lapse rate (qw) is calculated as the total lapse rate adjusted for deaths, but is not allowed to be negative. Also, if the total termination rate (lapses plus deaths) is greater than the user-defined maximum termination rate ($maxterm\#$), then the lapse rate is adjusted again (but not below zero), so that the total termination rate is the greater of the maximum termination rate or the death rate. Finally, if the policy is fully paid-up ($pdup=0$), then no lapses are possible, and the lapse rate is set to 0.

$$qdx = qd\#(aa\%)*mtsf\#(ldr)$$

$$qw = stlr\#(dr\%)$$

If $lpse\% = 1$, then

$$qw = \max(0, 1 - (1 - qw)/(1 - qdx))$$

If $1 - (1 - qw)*(1 - qdx) > \text{maxterm}$, then

$$qw = 1 - (1 - \text{maxterm})/(1 - qdx)$$

If $qw < 0$, then

$$qw = 0$$

If $pdup(dr\% + 1) = 0$, then

$$qw = 0$$

The number of policies in force at the beginning of the next duration is then calculated.

$$lx(aa\% + 1) = lx(aa\%)*(1 - qw)*(1 - qdx)$$

The terminations are split between the number of lapses (wx) and the number of deaths (dx).

$$ddqd = qdx$$

$$ddqw = (1 - qdx)*qw$$

$$dx(aa\%) = (lx(aa\%) - lx(aa\% + 1))*ddqd / (ddqw + ddqd)$$

$$wx(aa\%) = (lx(aa\%) - lx(aa\% + 1))*ddqw / (ddqw + ddqd)$$

The number in force at midyear (la) is estimated by subtracting one-half the deaths during the year from the number in force at the beginning of the year. Premiums are assumed to be paid annually, so there are no midyear lapses. The active number (that is, not in a nursing home) at midyear ($actla$) is estimated by applying the percentage noninstitutionalized at the beginning of the year to the midyear in force.

$$la(aa\%) = lx(aa\%) - 0.5*dx(aa\%)$$

$$actla(aa\%) = la(aa\%)*(lx(aa\%) - resnh(dr\% - 1))/lx(aa\%)$$

To calculate the number of nursing home admissions during the year ($nhadm$), the admission rate is applied to the number in force at midyear. The admission rate is the base rate times the user-defined morbidity selection

factor (mbsf) and the lapse antiselection factor (antilp). The base rate includes the user-defined adjustment factor and is either for insured stays (nharis) or for all stays (nharas) as specified by the user. The indicator "nhas&" is 0 if insured stays apply, and it is 1 if all stays apply. The antiselection-on-lapse factor is calculated as the compound effect of the number of lapses during the prior 10 years and the strength of the antiselection as specified by the user-defined antiselection-on-lapse factors (asolf#).

$$\text{antilp} = \prod_{t=1}^{10} 1/(1 - \text{stlp}(\text{dr}\% - t) * \text{asolf}(t))$$

$$\text{nhadm}(\text{dr}\%) = \text{actla}(\text{aa}\%) * \text{nharis}(\text{aa}\%, 3) * \text{mbsf}\#(\text{dr}\%) * \text{antilp}$$

The number of new episodes of frailty for those at home (hcadm) is calculated in a similar manner. The home care probabilities are based on the number in force at the beginning of the year.

$$\text{hcadm}(\text{dr}\%) = \text{la}(\text{aa}\%) * \text{hcar}(\text{aa}\%, 3) * \text{mbsf}\#(\text{dr}\%) * \text{antilp}$$

The final calculations in "subroutine demo" is to estimate the number of nursing home residents at the end of the year (nhres) and the number in premium waiver status. The number of residents is estimated by summing the product of the number of admissions during the prior 20 years and the probability of those admissions still being resident. The number in waiver status is estimated as the percentage of total residents that have been in the nursing home for durations greater than the waiver requirement. The waiver requirement is the sum of the elimination period (nhelpd) and the days of benefits required for waiver (wopdib).

E. Subroutine DAYINH and Subroutine DAYIHC

Subroutine "dayinh" determines the number of days in a nursing home that qualify for a benefit payment, that is, after the elimination period and before the lifetime maximum. The number of days for each admission age and each year in the length of stay (grouped by policy year) is calculated from the continuance table. The number of days is stored in the variable "days(los, adag)." The continuance table look-up procedure is performed by the function "ftk."

A similar process is performed for home care beneficiaries in the subroutine "dayihc." The number of days in benefit status is stored in the variable "dayshc(los, adag)" and the continuance table look-up is performed by the function "gtk."

For home care, days impaired in each policy year following impairment are available by ADL/CI status from the average number of noninstitutional days and the continuance tables in Section III of this final report. The user's utilization rates by ADL/CI status are applied and summed to obtain "home care utilization days" by duration from impairment. These values represent the portion of total noninstitutional impairment days associated with insureds electing to use home health care services at any non-zero level. The program also computes "home care service days" by duration from impairment. These are obtained by applying both utilization rates *and* frequency-of-use rates to noninstitutional impairment days by ADL/CI status and summing the results for each policy year following impairment. (To save space, some of these computations are applied as the home care continuance tables and are read in by the READHC subroutine.)

For each policy year following impairment, the program divides "home care service days" by "home care utilization days" to obtain weekly use rates. If the ratio is 40%, for example, the service use rate is 2.8 days per week. This ratio is used to convert calendar time to service time during that policy year. This translation is used to apply the policy home health care elimination and benefit periods, assumed to be expressed in service time.

F. Subroutine CALC

This subroutine calculates the net premium for the specified policy with the specified assumptions. It then calculates the terminal reserves at each duration. The first variable assigned a value is the number of years of full preliminary term (fpt&). This is set to the user-specified number of years (nyfptr&), but it is not allowed to be greater than two or greater than the number of years of premium payments (ppd&). The variable "pomit(dr%)" is then assigned the value of one (if past the preliminary term period) or zero (if in the preliminary term period).

The reserve at the end of each policy duration will be calculated with two variables. One of these, *eoysvld#(dr%)*, depends on the premium and, therefore, initially contains values per dollar of premium. The other, *eoysv#(dr%)*, contains the full dollar amounts. Two variables are used to accumulate present values: *pvpb#* accumulates benefit payments and *pvpml#* accumulates the present value of premium payments based on a premium of \$1. The variable "lfix&" represents the nursing home lifetime maximum benefit in dollars, and "hclfix&" represents the home care lifetime maximum benefit in dollars. The variable *dr%* is the policy

year and $aa\%$ is the attained age in policy year $dr\%$. This subroutine accumulates benefits and premiums for all durations from the issue age to age 110. The premiums paid in each year (if the full rate initial premium were \$1) are calculated in $pp1d\#(dr\%)$. This is equal to the number of premium payers ($prmpay$) times the paid-up indicator ($pdup(dr\%)$) times the premium inflation factor ($fctp\#(dr\%)$). The number of premium payers is equal to the number in force minus the number in premium waiver status.

$$prmpay = lx(aa\%) - wopn(dr\% - 1)$$

$$pp1d\#(dr\%) = prmpay * pdup(dr\%) * fctp\#(dr\%)$$

The nursing home benefit incurred in policy year $dr\%$ is the product of three factors:

- (1) $panhb\#(dr\%)$, which is the present value of nursing home days for admissions in year $dr\%$ (that is, with admission age $aa\%$), increased for any applicable inflation protection benefits
- (2) $mxd\#$, which is the user-specified maximum daily benefit
- (3) $nhadm(dr\%)$, which is the number of nursing home admissions in year $dr\%$.

$$panhb\#(dr\%) = mxd\# * nhadm(dr\%) * \sum_{lyr\%=1}^{20} days(yr\%, aa\%) * fctb\#(lyr\%) * (vhy\#(lyr\%) / vhy\#(dr\%))$$

A similar calculation is performed to determine the incurred home care benefits in policy year $dr\%$, which is stored in the variable " $pahcb\#(dr\%)$." The nonforfeiture benefit section uses several user-specified variables:

- $pli\%$ = indicates whether inflation protection continues after lapse (1=yes, 0=no)
- $sbpres\%$ = indicates whether terminal reserve (in the mid-terminal reserve calculation shown in the output) should be at least equal to the single premium value of the nonforfeiture benefit available at that duration (0=no, 1=yes)
- $bbfyr\%$ = indicates the end of the policy year in which nonforfeiture benefits are first available
- $bbmin\%$ = indicates the minimum number of days of a benefits bank nonforfeiture benefit
- $bb\%$ = indicates whether the nonforfeiture benefit is in the form of a benefits bank (BB) or shortened benefit period (SBP), 1=BB, 0=SBP

nfofact = the loading factor placed on nonforfeiture benefits
sbpscale(I%) = the shortened benefit period percentages by duration that specify the percentage of the original lifetime maximum benefit that a lapses receives. These percentages are not used for the benefit bank. The duration corresponding to the subscript I% is as follows:

Duration Corresponding to the Value
of Subscript for "sbpscale"

I%	Duration (policy year)
0	3
1	4
2	5
3	10
4	15
5	20
6	25
7	30
8	35
9	40
10	45
11	50+

If the policy has the SBP benefit, the "sbpscale(I%)" percentages are interpolated for each duration to obtain "sbpfact," which is applied to the original lifetime maximum to obtain the nonforfeiture benefit. If the policy has the BB benefit, "sbpfact" is calculated as the ratio of the accumulated past premiums divided by the original lifetime maximum, subject to the minimum value. Because the lifetime maximum benefit for nursing home and for home care may be different, under the BB option this ratio is calculated separately for nursing home and home care benefits ("sbpfactnh" and "sbpfacthc," respectively). Under the SBP option, both of these factors are set equal to "sbpfact." The present value of the nonforfeiture benefit per lapses (adjusted by the nonforfeiture factor, "nonfact") is then stored in "panfn#(dr%)."

$$\text{panfb}\#(\text{dr}\%) = \text{sbp}(\text{aa}\% + 1, \text{dr}\%, \text{sbpfactnh}, \text{sbpfacthc}) * \text{nonfact}$$

The present value of the nonforfeiture benefit is calculated in the function "sbp," which depends on the attained age at lapse, the duration at lapse, and the SBP factors "sbpfactnh" and "sbpfacthc." This function is explained in the next section.

The present value of premiums (with a full-rate initial premium of \$1) and the present value of benefits are accumulated, excluding those during the preliminary term period. The premiums are discounted by the factor applicable at the beginning of the policy year, full-rate benefits by the factor for midyear, and reduced nonforfeiture benefits by the factor for the end of the year. The dollar value of the nonforfeiture benefit is obtained by multiplying the value per lapses, "panfb," times the number of lapses, "wx."

$$\begin{aligned} \text{pvpmld}\# &= \text{pvpmld}\# + [\text{ppld}\# * \text{vfy}\#(\text{dr}\%) * \text{pomit}(\text{dr}\%)] \\ \text{pvbp}\# &= \text{pvbp}\# + \{ [\text{panhb}\#(\text{dr}\%) + \text{pahcb}\#(\text{dr}\%)] * \text{vhy}\#(\text{dr}\%) \\ &\quad + [\text{panfb}\#(\text{dr}\%) * \text{wx}(\text{dr}\%) * \text{vfy}\#(\text{dr}\% + 1)] \} * \text{pomit}(\text{dr}\%) \end{aligned}$$

The end-of-year reserve factors for each duration are:

$$\begin{aligned} \text{eoyrsvld}\#(\text{dr}\%) &= \text{pvpmld}\# / \text{vfy}\#(\text{dr}\% + 1) \\ \text{eoyrsv}\#(\text{dr}\%) &= \text{pvbp}\# / \text{vfy}\#(\text{dr}\% + 1) \end{aligned}$$

After accumulating through all policy years up to age 110, the net premium can be calculated as follows:

$$\text{pnetprm}\# = \text{pvbp}\# / \text{pvpmld}\#$$

The preliminary term active life reserve and the dollar value of the premium payments for all durations after the preliminary term period can be calculated as follows:

$$\begin{aligned} \text{pactrsv}\#(\text{dr}\%) &= [\text{pnetprm}\# * \text{eoyrsvld}\#(\text{dr}\%)] - \text{eoyrsv}\#(\text{dr}\%) \\ \text{pp}\#(\text{dr}\%) &= \text{pnetprm}\# * \text{ppld}\#(\text{dr}\%) \end{aligned}$$

Finally the premium assumed to be paid during the preliminary term period (which matches the incurred benefits during that period) is determined for each duration that is applicable.

$$\begin{aligned} \text{pp}\#(1) &= \text{ppld}\#(1) * \{ [\text{panhb}\#(1) + \text{pahcb}\#(1)] * \text{vhy}\#(1) \\ &\quad + \text{panfb}\#(1) * \text{vfy}(2) \} / [\text{ppld}\#(1) * \text{vfy}\#(1)] \end{aligned}$$

$$pp\#(2) = pp1d\#(2) * \{ [panhb\#(2) + pahcb\#(2)] * vhy\#(2) + panfb\#(2) * vfy(3) \} / [pp1d\#(2) * vfy\#(2)]$$

G. Function SBP

This function calculates the present value (at the time of lapse) per lapsers of the nonforfeiture benefit for each cohort of lapsers. The function is transferred the attained age at lapse ("atage"), the duration at lapse ("t"), the fraction of the original lifetime maximum for nursing home benefits ("bpnh"), and the fraction of the original lifetime maximum for home care benefits ("bphc"). The function first determines the full-rate lifetime maximum in dollars for nursing home benefits ("lfmx&") and for home care benefits ("hclfmx&"). Then, for each duration from lapse ("jdur") until age 110, it projects the probability of survival ("lx"), the nursing home admissions, and the incidences of frailty in home care. For the year of lapse, $lx=1$. The midyear survivors ("midlx") are estimated by applying one-half year's mortality, taking into account mortality selection factor ("fct").

$$fct = mtsf\#(t + jdur)$$

$$midlx = lx * [1 - 0.5 * fct * qd\#(atage + jdur - 1)]$$

The number of nursing home admissions ("adnh") is calculated by applying the appropriate admission rate ("nharis" for insured stays or "nharas" for all stays) to the midyear survivors, taking into morbidity account selection ("fct"). The number of incidences of frailty in home care is calculated in a similar manner using the home care incidence rate ("hcar").

$$adnh = midlx * nharis(atage + jdur - 1, 3) * fct$$

$$adhc = midlx * hcar(atage + jdur - 1, 3) * fct$$

The number of days of benefit for these admissions is obtained from the "ftk" and "gtk" functions and the applicable benefit period. The benefit period starts after the elimination period ("lower") and ends after an additional number of days equal to the maximum number of days benefits can be paid ("upper"). The maximum number of days of benefit is the original lifetime maximum in dollars ("lfmx&") divided by the maximum daily benefit ("mxdB#") times the fraction of the original benefit applicable to the lapses in year "t."

$$lower = nhelPd\&$$

$$upper = lower + (lfmx\& / mxdB\#) * bpnh$$

The function "ftk" is called to determine the days of benefit payments in each policy year so that the appropriate discount factor and benefit inflation factor can be applied. The sum is stored in the variable "bentot." The present value of all admissions in all years after lapse is accumulated in the variable "sp." For each year, the present value of the incurred benefit payments is equal to the number of admissions times the discounted days of benefit payments times the maximum daily benefit.

$$sp = sp + (adnh * bentot * mxdb\#)$$

Similar calculations are performed for home care benefits that are accumulated in the same variable "sp." Finally the value calculated by the function "sbp" is equated to the accumulated "sp."

H. Subroutine OUTPT

While the primary purpose of this subroutine is to format the computations for output to the screen or to disk, some calculations are performed in this code. In particular, the mid-terminal reserve factors are derived from the terminal reserves obtained from CALC.

Since the program assumes annual premium mode, all lapsation occurs at the end of the policy year. This produces a jump in the terminal reserve factor at the point of lapsation. In computing the mid-terminal reserve factor, the program identifies a modified terminal reserve just prior to lapsation at the end of the policy year. This is accomplished by multiplying the conventional terminal reserve factor by the post-lapse in force, adding back in the net single premiums associated with the NFO benefits of those lapsing, and dividing by the pre-lapse in force. This modified terminal reserve is compared to the net single premium for the year end NFO benefit. If the user has indicated, the greater of these two values is used in the mid-terminal calculation.

The reserve at the start of the policy year is the post-lapse terminal reserve from the prior policy year. This value is compared to the NFO net single premium per lapses at the end of the prior year. If the user has indicated, the greater of these two values is used in the mid-terminal calculation.

IV. Output Files

The program produces three types of output files. When the user saves specifications, the program creates a file named filename.INP, where "filename" is provided by the user. The other two types of files created are

associated with the output. The user may elect to store the program output in a text file, filename.TXT, and/or a spreadsheet file, filename.WK1.

V. Sample Calculations

Five values from the default case reserve output (see Appendixes B and C) are rederived in this section to provide a “trail” from the tables in Sections II and III of this final report to the valuation diskette output. We consider the fifth policy year for females issued at age 70.

A. Nursing Home Admissions

(1) Start of year population	73,336
(2) Start of year NH population	<u>970</u>
(3) Difference	72,366
(4) Probability of surviving to mid-year (1 - 1,392/2 × 73,336)	<u>0.99051</u>
(5) Product	71,679.2
(6) Admission rate (Section II)	0.0181
(7) Selection factor	0.9
(8) Antiselection factor 1 / [(1 - 0.05 × 0.7)(1 - 0.06 × 0.5) (1 - 0.07 × 0.3)(1 - 0.08 × 0.2)] =	<u>1.109</u>
(9) Nursing home admissions (5) × (6) × (7) × (8)	<u><u>1,295</u></u>

B. Nursing Home Cost per Mid-*t*_x

(1) Average number of NH days (Section II)	633
(2) Allocation of NH days by duration from admission	

(1) Duration	(2) % Days Beyond	(3) Differences	(4) Days = 633 × (3)	(5) Discount at 5%
100 days	88.417%	88.417%		v ⁰
182.5	81.710	6.71	42.47	v ¹
547.5	59.055	22.65	143.40	v ²
912.5	42.579	16.48	104.30	v ³
1,277.5	30.725	11.85	75.03	v ⁴
1,560	23.703	7.02	44.45	

- (3) NH days (discounted with interest) per admission
 $42.47 \times v^0 + \dots + 44.45 \times v^4 =$ 375.03
- (4) NH cost per mid- t_x
 $375.03 \times \$100 \times 0.181 \times 0.9 \times 1.109 =$ \$677.51

C. Home Care Admissions

- (1) Start-of-year population 73,336
- (2) Half of deaths = 1,392/2 696
- (3) Difference 72,640
- (4) Impairment rate (Section III see input file to diskette
for age-specific values) 0.02907
- (5) Selection factor 0.9
- (6) Antiselection factor 1.109
- (7) HC admissions
 $(3) \times (4) \times (5) \times (6)$ 2,108

D. Home Care Cost per Mid t_x

- (1) Average number of noninstitutional days impaired
(Section III, see diskette input file for age-specific values.) 905 days
- (2) Allocation of impairment days by duration from impairment.

Duration	(1) % Utilization Days	(2) % Service Days	(3) Service Days per User	(4) % Service Days in Benefit Period	(5) Benefit Days $905 \times (2) \times (4)$	(6) Discount at 5%
182.5	4.70%	2.87%	111.44	10.2%	2.7	v^0
547.5	7.93	4.90	225.54	100.0	44.3	v^1
912.5	6.09	3.77	225.95	↓	34.1	v^2
1,277.5	4.51	2.77	224.18	↓	25.1	v^3
1,642.5	3.67	2.21	219.80	↓	20.0	v^4
2,007.5	2.67	1.57	214.63	↓	14.2	v^5
2,372.5	2.00	1.13	206.23	100.0	10.2	v^6
2,737.5	1.53	.83	197.05	67.1	5.0	v^7

(3) HC benefit days (discounted with interest) per impairment	
$2.7 \times v^0 + \dots + 5.0 \times v^7 =$	136.52 days
(4) HC cost per mid- l_x	
$136.52 \times \$50 \times 0.02907 \times 0.9 \times 1.109 =$	<u>\$198.05</u>

E. Mid-Terminal Reserve Factor

(1) EOY terminal reserve	\$ 5,725.45
(2) EOY post-lapse in force	69,067.00
(3) EOY pre-lapse in force	
$69,067 + 2,878 =$	71,945.00
(4) EOY pre-lapse terminal reserve	
$(1) \times (2) / (3) =$	\$ 5,496.42
(5) BOY reserve	\$ 4,347.95
(6) Mid-terminal reserve	
$[(4) + (5)] / 2 =$	<u>\$ 4,922.19</u>

APPENDIX F

CURRENT NAIC MODELS

There are two official groups within the NAIC that have adopted model regulations related to this final report: the NAIC LTC Senior Issues Task Force and the NAIC Life and Health Actuarial Task Force.

I. NAIC LTC Senior Issues Task Force

The NAIC LTC Senior Issues Task Force (in 1994 renamed from the NAIC LTC Insurance (B) Task Force) continues to develop the NAIC Model LTC Insurance Act and the Model LTC Insurance Regulation. These were first adopted in the mid-1980s and deal with all subjects pertaining to the product. However, the model act is silent on valuation, and the model regulation in its Section 15 (quoted in its entirety below) provides only very general guidance. It provides a lengthy Subsection A, describing how to value LTC benefits that are accelerated life insurance benefits and a much shorter Subsection B for other LTC benefits (that is, stand-alone) consisting of one sentence.

Section 15. Reserve Standards

A. When long-term care benefits are provided through the acceleration of benefits under group or individual life policies or riders to such policies, policy reserves for such benefits shall be determined in accordance with [cite the standard valuation law for life insurance, which contains a section referring to "special benefits" for which tables must be approved by the commissioner]. Claim reserves must also be established in the case when such policy or rider is in claim status.

Reserves for policies and riders subject to this subsection should be based on the multiple decrement model utilizing all relevant decrements except for voluntary termination rates. Single decrement approximations are acceptable if the calculation produces essentially similar reserves, if the reserve is clearly more conservative, or if the reserve is immaterial. The calculations may take into account the reduction in life insurance benefits due to the payment of long-term care benefits. However, in no event shall the reserves for the long-term care benefit and the life insurance benefit be less than the reserves for the life insurance benefit assuming no long-term care benefit.

In the development and calculation of reserves for policies and riders subject to this subsection, due regard shall be given to the applicable policy provisions, marketing methods, administrative procedures and all other considerations which have an impact on projected claim costs, including, but not limited to, the following:

- (1) Definition of insured events;
- (2) Covered long-term-care facilities;
- (3) Existence of home convalescence care coverage;
- (4) Definition of facilities;
- (5) Existence or absence of barriers to eligibility;
- (6) Premium waiver provision;
- (7) Renewability;
- (8) Ability to raise premiums;
- (9) Marketing method;
- (10) Underwriting procedures;
- (11) Claims adjustment procedures;
- (12) Waiting period;
- (13) Maximum benefit;
- (14) Availability of eligible facilities;
- (15) Margins in claim costs;
- (16) Optional nature of benefit;
- (17) Delay in eligibility for benefit;
- (18) Inflation protection provisions; and
- (19) Guaranteed insurability option.

Any applicable valuation morbidity table shall be certified as appropriate as a statutory valuation table by a member of the American Academy of Actuaries.

- B. When long-term care benefits are provided other than as in Subsection A above, reserves shall be determined in accordance with [cite law referring to minimum health insurance reserves, the NAIC version of which requires reserves “using a table established for reserve purposes by a qualified actuary and acceptable to the commissioner”].

Other than adopting this model regulation (and wishing there were some useful valuation standards to relate to as they develop regulations for LTC insurance nonforfeiture benefits), the NAIC Senior Issues (B) Task Force has deferred to the NAIC Life and Health Actuarial Task Force on valuation matters.

II. NAIC Life and Health Actuarial Task Force

This SOA Task Force has informed the regulators through the NAIC Life and Health Actuarial Task Force.

The current model regulation that pertains to LTC insurance statutory valuation is the NAIC Model Minimum Reserve Standards for Individual and Group Health Insurance Contracts. This was amended in June 1991 to include provisions specific to LTC. (Few states have officially adopted this model, although most states look to the NAIC model for guidance.) The following are the relevant provisions.

Morbidity

Since there is no morbidity standard for LTC, it

... shall be valued using tables established for reserve purposes by a qualified actuary and acceptable to the Commissioner. (Section 4.B.(1)(a))

Termination Rates

The NAIC model provides the following:

Termination Rates. Termination rates used in the computation of reserves shall be on the basis of a mortality table as specified in Appendix A except as noted in the following paragraph. (Section 4.B. (1)(c)).

That referenced Appendix A reads:

The mortality basis used shall be according to a table (but without use of selection factors) permitted by law for the valuation of whole life

insurance issued on the same date as the health insurance contract. (Appendix A, Section III.)

The important exception cited above reads in whole as follows:

Under contracts for which premium rates are not guaranteed, and where the effects of insurer underwriting are specifically used by policy duration in the valuation morbidity standard, total termination rates may be used at ages and durations where these exceed specified mortality table rates, but not in excess of the lesser of:

- (i) Eighty percent of the total termination rate used in the calculation of the gross premiums, or
- (ii) Eight percent.

Where a morbidity standard specified in Appendix A is on an aggregate basis, such morbidity standard may be adjusted to reflect the effect of insurer underwriting by policy duration. The adjustments must be appropriate to the underwriting and be acceptable to the Commissioner. (Section 4.B.(1)(c))

Interest Rate

The maximum interest rate is specified in Appendix A. (Section 4.B.(1)(b))

The relevant section of Appendix A reads as follows:

II. Interest

- A. For contract reserves the maximum interest rate is the maximum rate permitted by law in the valuation of whole life insurance issued on the same date as the health insurance contract.
- B. For claim reserves on policies that require contract reserves, the maximum interest rate is the maximum rate permitted by law in the valuation of whole life insurance issued on the same date as the claim incurral date.
- C. For claim reserves on policies not requiring contract reserves, the maximum interest rate is the maximum rate permitted by law in the valuation of single-premium immediate annuities issued on the same date as the claim incurral date, reduced by 100 basis points. (Appendix A, Section II.)

Method

For long-term care insurance, the minimum reserve is the reserve calculated on the one-year full preliminary term method. (Section 4.B.(1)(d)(ii))

DISCUSSION OF PRECEDING PAPER

DIANA S. WRIGHT:

The Society of Actuaries Long-Term Care Insurance Valuation Methods Task Force has done an excellent job of bringing together the complicated and diverse issues associated with long-term care (LTC) valuation. Also, I had an opportunity to use the diskette mentioned in the report when Bart Munson, Jim Robinson, and I provided some additional information to the Accident and Health Working Group of the National Association of Insurance Commissioners (NAIC) on the impact of one recommendation in the report. The working group was considering revising the NAIC Model on Minimum Reserve Standards for Individual and Group Health Insurance Contracts for LTC in light of recommendations in the Society's report. I found the diskette to be user-friendly and very helpful in the analysis of contract reserves. In these comments, I focus on the scope of the report as described in Section I, Introduction, and in Section IV, Application of Tables.

The Introduction states that the recommendations apply to individual (or quasi-individual) stand-alone insurance products or LTC riders attached to life insurance products in which the death benefits are not reduced. The report's recommendations do not address true group policies in which the employer pays a substantial portion of the premium, LTC riders on life insurance policies in which LTC benefit reduces the death benefit and/or cash surrender value, LTC options on annuity products, and LTC insurability guarantees attached to other products. The report indicates that many of its elements could appropriately be applied to employer-paid true-group policies. I agree with this approach and the reason for placing further consideration of this as a low priority. Also, because annuity products with LTC options are rare, I understand why this was not addressed, and as indicated, the reserve for LTC insurability guarantees would only be an accumulation of an antiselection risk. However, the report indicates that the recommendations for reduced-benefit LTC-ridered life policies should be generated after those for stand-alone products. I believe that it is desirable to generate recommendations on these products as soon as possible. The market is growing and changing, and this is an active part of that market. Everyone agrees that regulations should not suppress development; however, it is also important to not unduly influence the market through selective regulation and to keep a level playing field as much as possible.

The SOA LTC Insurance Valuation Methods Task Force faced many challenges in developing data. This was excellently summed up on page 611 of the report. One reason is that the product is relatively new, and I would like to add that the long duration before claim experience develops further complicates analysis. Also, as mentioned in the report, many significant benefit design changes have taken place, and little is known about the impact of antiselection, lapses, policy definitions, and medical advances. This made for a truly challenging assignment. Acknowledging that there are yet many unknowns, I direct the remainder of my comments to Section IV, Application of Tables.

Section IV-A, Product Features, indicates that "some tables may need adjustment for indemnity vs. expense incurred benefit structures." If this is done, then the adjustment needs to be based on more than whether the benefit structure is indemnity or expense incurred. The relativity of the allowable benefits to reasonable charges needs to be considered. Some expense-incurred policies also have maximum daily benefits, and those maximum daily benefits are at levels that are equal to or less than the reasonable charge level for that benefit. Such policies function the same as indemnity policies and should be reserved accordingly. Because currently there is no definitive source for reasonable charges, it would be a challenge to develop more specific factors for statutory regulations.

Section IV-B, Benefit Triggers, mentions that "there is no uniformly agreed wording for any one ADL." Note that since the release of the Society's report, the NAIC addressed this issue in the October 1995 revision of the Long-Term Care Insurance Model Regulation. A comment incorporated into the model regulation after the definitions states that "this section is intended to specify required definitional elements of several terms commonly found in long-term care insurance policies, while allowing some flexibility in the definitions themselves." The model contains definitions for bathing, cognitive impairment, continence, dressing, eating, hands-on assistance, toileting, and transferring.

The report addresses both the pros and cons of spousal discounts in Section IV-C. The report further states that "active life reserves reduced by the same percentage as may be used in discounting premiums may not produce adequate reserves." In spite of this statement, the final paragraph for this section recommends that if the married versus unmarried mix is significantly different from the general population, then an adjustment should be considered. There is no separate recommendation for statutory reserves. While it is desirable to make the reserves as accurate as possible, the primary focus

for statutory purposes is financial adequacy. Because of this primary statutory purpose and because of the aforementioned statement in the report, unless statutory adjustments for spousal discounts are explicitly proposed, perhaps spousal discounts should not be allowed for statutory reserves.

Section IV-D pertains to geographic region. It indicates that institutional benefits may need morbidity adjustments on a state-by-state or regional basis, but no adjustment factors are recommended. No mention is made of whether this is for utilization or cost. Cost variation by state would be needed for incurred expense policies that did not behave as indemnity policies. Utilization variation, on the other hand, could be applicable to either indemnity or expense-incurred policies. I did a cursory review to determine the difficulty of locating institutional data by state/region that could be useful to indicate utilization variations. There are at least three sources. The sources that I found are as follows:

1. Table 5.18, "Nursing Care Facilities and Utilization, by State, 1991" from the *HIAA Source Book of Health Insurance Data, 1994*. The source data for this table are from the Health Care Financing Administration, unpublished data.
2. "Nursing Home Beds in 1991 and the Rate of Nursing Home Beds in 1991" from *Health Care State Rankings, 1995*. The source data are from the National Center for Health Statistics, unpublished data.
3. "Nursing Home Bed Distribution, 1986" from the *State-Level Data Book on Health Care Access and Financing* (1993). The source data are from the National Center for Health Statistics, 1986 Inventory of Long-Term Care Plans.

The table in the third source, "Nursing Home Bed Distribution," contains a column for which nursing home beds are expressed as per 1,000 population. This provides some indication of utilization; however, I prefer the ratio provided in the table of the second source entitled "Rate of Nursing Home Beds in 1991." The denominator in this ratio is not the entire state population; rather the denominator is the state population age 65 and older. Even though LTC policies are purchased by individuals younger than 65 and sometimes individuals younger than 65 are in nursing homes, the vast majority of nursing home care utilizers will be over age 65.

A complication develops when the data are examined more closely, however. The number of nursing home beds reported in the second source, which I believe is the basis for the associated Rate of Nursing Home Beds Table, is consistently less than the number of population in nursing care facilities reported in Table 5.18 of the first source. I am not sure whether the

discrepancies are attributable to differences in definitions and/or estimation techniques. This might not be too bad if the relationships among the states stay consistent. Unfortunately this is not the case. When the nursing home population counts in the first source are divided by the state-specific over-65 population, the relativities between the states are different from those of the second source. Thus, further investigation into the development of the data for these tables is required, and there is no one easily obtainable definitive source. Medicare/Medicaid data would not be sufficient because they would exclude some nursing home utilization. For any statutory regulation to be more specific than requiring valuation actuarial judgment and to allow the reserves to reflect state variation, a definitive source would need to be developed.

I would also argue that there are probably state/regional differences for the utilization and cost of home health services. Data for this benefit are even more difficult to find than state institutional nursing home data.

In conclusion, the report of the SOA LTC Insurance Valuation Methods Task Force is a good first step toward developing statutory valuation methods, but many unknowns remain. I look forward to seeing future updates as the products and experience develop.

(AUTHORS' REVIEW OF DISCUSSION)

BARTLEY L. MUNSON:

We appreciate the generally kind words about both our final report and its companion valuation diskette. It was difficult to make both of them useful to valuation actuaries who must apply them to a wide variety of products.

It is good to hear from an actuary who understands those challenges and the regulators' needs for these tools to be user-friendly and helpful.

The actuarial profession seems to agree with the discussant's call for addressing non-stand-alone LTC products, especially accelerations in life insurance policies. While there are no plans to develop a successor LTC valuation report, the LTC Task Force of the Actuarial Standards Board has been resurrected to update *ASOP No. 18*, dated July 1991, among other changes, it will address the actuary's standards of practice for acceleration of life benefits, a subject largely omitted from *ASOP No. 18*.

The valuation actuary does indeed need to contemplate how a product's benefit limits work in relation to reasonable service charges. We, too, thought

it is not reasonable to develop more specific guidelines for valuation regulations. For this and many other considerations, for a product without insured morbidity experience adequate to produce specific tables, and a product so varied and still evolving, we found no way to responsibly avoid relying on “the Valuation Actuary should consider. ...”

If in time benefit triggers, as defined in the NAIC’s LTC Model Regulation subsequent to the release of our final report, are widely adopted, a successor report and even valuation requirements can address them. However, with state variations in benefit triggers to be expected even after they are specified by model regulation, it appears it will be some time before even that standardization finds its way into LTC insurance policies and thus might suggest some narrowing of specified valuation standards. Standard language will narrow but not eliminate differences in interpretation among carriers and jurisdictions.

Spousal discounts is a complex subject, sometimes deceptively simple in appeal. It acts differently for institutional and noninstitutional products, for example. Our report intended to alert the valuation actuary to ponder the implications of this subject, if applicable. We did not intend to imply that reserves can be “discounted” similarly to premiums, without justification. If analysis of expenses and morbidity suggests some recognition in the reserves, that could be considered; more likely, as the discussant suggests, no reserve adjustment should be made. The overriding test for the primary goal of financial adequacy is a gross premium test, which we do comment upon later in the report. The valuation actuary’s analysis may show the need for considering even a strengthening of reserves due to the steepening of the morbidity curve or the eventual absence of the spouse.

The discussant’s research into regional LTC cost and utilization of services is a useful addition to our report. Regional differences, we thought, could be considered for a block of business that is geographically confined or for which demonstrable differences are available from or for the valuation actuary. However, in addition to the challenges the discussant observes, there are questions about the location of the insured when receiving services compared with the location at the time of the policy’s purchase.

We appreciate the discussant’s compliments on a “good first step.” Undoubtedly, there is a need for our profession and the regulators to take future ones. We join the reviewer, and all LTC valuation actuaries and regulators, in looking forward to those times.

