PREMIUM PRICING OF PROTOTYPE PRIVATE LONG-TERM CARE INSURANCE POLICIES

U.S. Department of Health and Human Services
Assistant Secretary for Planning and Evaluation
Office of Disability, Aging and Long-Term Care Policy

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EXECUTIVE SUMMARY

The Problem and Research Objectives

Although American society relies heavily on insurance to protect against catastrophic costs, private insurance to protect against the potentially devastating costs of long-term care is relatively rare. As of June 1990, 1.65 million policies have been sold.

The long-term care insurance market has been slow to develop partly because the risk and expected costs of nursing home and home care have not been adequately estimated. The Task Force on Long-Term Health Care Policies, the U.S. Department of Health and Human Services, and the Health Insurance Association of America have all called for better data that could be used to price insurance premiums.

This research helps fill the data gap identified by insurers and others by using a much revised version of the Brookings-ICF Long-Term Care Financing Model to estimate premiums for a variety of prototype private long-term care insurance plans. These prototype premiums will be of use to insurers, prospective purchasers of insurance and public policymakers. The premiums will offer insurers a simple double-check on the estimates of company actuaries. They will also provide an order of magnitude estimate of the cost impact of changing benefit levels. Public policymakers will find the estimates useful as a way to evaluate the potential of private insurance to finance long-term care. Knowing the price of various prototype policies, government officials will be better able to assess the possibility of widespread purchase of insurance.

Research Design and Methods

In this study, all estimated premiums are priced according to initial age of purchase. Special emphasis is placed on the sensitivity of the results to different assumptions (e.g., amount of increased use of nursing home and home care, rate of return on reserves). In particular, we examined the tradeoff between affordability and coverage by pricing policies that vary by:

- Amount of nursing home and home care covered.
- Amount that indemnity levels are indexed for nursing home and home care inflation.
- Whether insurance policies are sold on an individual or group basis.
- Effect of discount rate assumptions.

- Effect of lapse rate assumptions.

Insurance premiums have a benefit portion (known to economists as the “actuarially fair premium” and to actuaries as the "net premium") and an administrative and profit portion. Using output from the Brookings-ICF Long-Term Care Financing Model, the basic pricing strategy was to make the present value of the benefit stream equal to the present value of the premium stream and then apply a factor to account for administrative and profit costs.

The methodology has four main steps:

First, in order to calculate the present value of benefits, it is assumed that different age cohorts (e.g., 65-69, 70-74) purchase an insurance policy with a specific set of benefits. The stream of benefit payments are simulated in the model for each year between 1986 and 2020. The benefit payment stream is discounted back to find the present value of the payment stream in 1986. The benefit stream implicitly discounts for mortality.

Second, in order to calculate the present value of premiums, it is assumed that the same cohort pays annual premiums of $120 per year. An aggregate stream of premium payments is simulated in the model for each age cohort for each year between 1986 and 2020. Like benefits, the premium stream is discounted back to 1986. The premium stream implicitly discounts for mortality.

Third, in order to establish the actuarially fair premium, the ratio of the present value of aggregate benefit payments to the present value of aggregate premiums is calculated for each cohort. This establishes the ratio of benefits to premiums actually paid. Multiplying the ratio by $120 yields the actuarially fair premium per year.

Fourth, to calculate the final premiums, the actuarially fair premium is divided by the loss ratio. A loss ratio of 70 percent is used for individual policies and 80 percent for group products.

Results and Conclusions

Several important implications for long-term care financing can be drawn from this study of prototype private long-term care insurance policies. First, while there is no technical reason why private long-term care insurance cannot offer coverage with fewer restrictions than what is currently on the market, to do so will substantially increase premiums. At age 65-69, the estimated annual premium for a policy that covers four years of nursing home care and four years of home care, indexes indemnity benefits for inflation

on a compound basis, and has a nonforteiture value equal to the full asset share is $2,607 a year. Although indexing benefits for inflation dramatically increases the premium costs, it is essential to maintaining an adequate benefit level. Too often individuals buy a high initial indemnity value, which then erodes in value over time.

Second, the debate over the affordability of private long-term care insurance has been flawed by a failure to specify the adequacy of the policy people are assumed to be "buying." By limiting benefits, private insurance policies can be designed to fit any affordability criteria. The more restricted the benefits, the lower the premiums, the higher the affordability estimates will be. Conversely, the richer the benefits, the higher the premium, the lower the affordability estimates will be. If what people mean by saying that people "can afford" private long-term care insurance is that individuals can buy a high quality policy, then the percentage of the elderly who can afford private insurance is almost certainly less than we and others have previously estimated. Previous analyses were based on premiums that were much less expensive.

Third, these premiums emphasize the desirability of group policies sold to the working age population. Group policies sold to active workers are substantially less expensive than individual policies sold to the elderly population. Changing the age of purchase has a much larger impact on premiums than does changing the number of years of nursing home and home care coverage.

Although much is often made of the lower administrative and marketing costs of group versus individual insurance, dramatic differences have yet to really show up in the marketplace. At this time, current group policies are really more like individual policies sold in a group setting rather than true group policies. Thus, in calculating premiums, most insurers only assume that there is a 10 percentage point difference in the anticipated loss ratio between individual and group plans. While this difference is desirable and serves to lower premiums, it is not a large difference. The real payoff from promoting employer-sponsored plans results from individuals buying policies at younger ages.

Despite the much lower costs of purchase at younger ages, level premiums for quality policies, which index indemnity benefits for inflation, are still fairly expensive, exceeding $800 per year at ages 40-44. To date, insurance companies have tended to minimize premium prices by selling employer-sponsored group policies with unindexed benefits at a fraction of the cost of indexed policies. For example, an unindexed policy costs only about $250 a year at ages 40-44. At the same time, level premiums are less important for the working age population because the incomes of the insured will tend to increase over time. It is also more expensive to pay for the inflation benefit increases totally in current dollars. Indexing premiums can reduce costs at younger ages by more than half, bringing premiums down to a more manageable level.

Fourth, lapse rates can significantly affect premiums. Limited data suggests that long-term care insurance currently has a fairly high lapse rate. Given the newness and rapidly changing nature of the product this is somewhat to be expected, but pricing should not depend on half or more of the insured dropping their policies. Regulations should be considered which require public disclosure of lapse assumptions and experience and which require nonforfeiture values.

Fifth, the expected rate of return on reserves also has a major impact on premium prices. The higher the real interest rate, the lower the premium will be. For policies that index indemnity benefits, the impact of higher real interest rates will be eroded. In other words, the fact that nursing home and home care inflation is likely to be higher than the general consumer price index lessens the premium reducing effect of interest earned on reserves.

Finally, the long time span between initial purchase and use of long-term care services makes the profitability of insurance particularly sensitive to how well the assumptions used to price the policy mirrors future reality. Moreover, unlike acute care insurance where benefits are financed on a pay-as-you-go basis rather than with reserves, insurers cannot as readily increase long-term care premiums when experience does not meet expectations. Thus, setting premiums for private long-term care insurance involves a degree of uncertainty unmatched by any other insurance product currently marketed to consumers.

I. INTRODUCTION

The United States does not have, either in the private or the public sectors, satisfactory mechanisms for helping people anticipate and pay for long-term care. Nursing home costs, which can easily exceed $30,000 a year, are by far the leading cause of catastrophic health care costs for the elderly.[1] The disabled elderly and their families find, often to their surprise, that neither private insurance nor Medicare covers the costs of long-term care to any significant extent. Medicare pays for only 2 percent of nursing home services; private insurance pays only another 1 percent.[2] Instead, the elderly must rely on their own resources to pay for such care or, when these have been exhausted, turn to welfare. The aging of the baby boom generation combined with falling mortality rates for the elderly will lead to sharply increased demand for long-term care that will require substantially greater public and private spending far into the next century.

American society relies heavily on private insurance to protect against such catastrophic events as hospitalization, automobile accidents, home fires, theft and early death. Indeed, two-thirds of the elderly in 1982, including substantial proportions at lower-income levels, purchased health insurance to supplement Medicare.[3] In contrast, private insurance to protect against the potentially devastating costs of long-term care is relatively rare. As of June 1990, only about 1.65 million long-term care insurance policies have been sold.[4] An unknown fraction of these policies are currently in force.

A long-term care insurance market has been slow to develop partly because insurers fear large financial losses. The risk and expected costs of nursing home and home care for an insured population are not really known.[5] For example, the Advisory Committee on Long-Term Care of the National Association of Insurance Commissioners stated that "better data are needed to assist insurers in pricing and underwriting long-term care policies. Insurers might be more willing and certainly more able to develop long-term care

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[1] Thomas Rice and Jon Gabel, "Protecting the Elderly Against High Health Care Costs," Health Affairs vol. 5 (Fall 1986), pp. 5-21. And, Thomas Rice, "The Use, Cost and Economic Burden of Nursing Home Care in 1985," Medical Care vol. 27 (December 1989), pp. 1133-1148.

[2] Office of National Cost Estimates, "National Health Expenditures, 1988," Health Care Financing Review vol. 11 (Summer 1990), Table 19, p. 34.

[3] Sandra Christensen, Stephen H. Long, and Jack Rogers, "Acute Care Costs for the Aged Medicare Population: Overview and Policy Options," Washington, D.C.: U.S. Congressional Budget Office, May 1987.

[4] Susan Van Gelder, Associate Director for Policy and Research, Health Insurance Association of America, personal communication, October 4, 1990.

[5] Marc A. Cohen, Eileen J. Tell and Stanley J. Wallack, "The Lifetime Risks and Costs of Nursing Home Use Among the Elderly," Medical Care, vol. 24 (December 1986), pp. 1162.

products if better actuarial data for estimating potential liabilities were available."[6] The same point has also been made by the Task Force on Long-Term Health Care Policies, the U.S. Department of Health and Human Services, and the Health Insurance Association of America.[7] Social/health maintenance organizations and continuing care retirement communities face similar problems in designing their premium and benefit structures.

Ideally, calculations of long-term care premiums would be made with data accumulated under insurance covering such risks for an extended period of time (that is, "insured lives"). The newness of these insurance products means that few claims have actually been paid and because of the proprietary nature of this information, actual claims data are not likely to be made publicly available.

Faced with a lack of actual claims experience with an insured population, insurers initially tried to protect themselves against financial loss by imposing strict limitations on what policies covered. The net effect of these restrictions was to substantially lessen the probability that a person who used nursing home or home care would actually receive insurance benefits. These so-called "first generation" private long-term care insurance policies were roundly criticized by consumer groups and academics.[8]

Over time, the policies have improved substantially. While many policies in force still have the restrictions described above, new policies provide significantly better coverage. In particular, among newer policies, prior hospitalization requirements are eliminated, policies are guaranteed renewable, Alzheimer's Disease is explicitly covered, all levels of nursing home care are covered, a bit more home care is covered, and indemnity levels are at least partly indexed for inflation. It is important to note that these changes are largely in response to state regulatory requirements and market demand by consumers and not because insurers have gained experience in paying claims.

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[6] National Association of Insurance Commissioners, Advisory Committee on Long-Term Care, Long-Term Care Insurance: An Industry Perspective on Market Development and Consumer Protection, report submitted to NAIC Medicare Supplement, Long Term and Other Limited Benefit Plans Task Force (Kansas City: NAIC, December 1986), p. 16.

[7] Task Force on Long-Term Health Care Policies, Report to Congress and the Secretary by the Task Force on Long-Term Health Care Policies, (Washington, D.C.: U.S. Government Printing Office, September 21, 1987), pp. 55-57; Technical Work Group on Private Financing of Long-Term Care for the Elderly, Report to the Secretary on Private Financing of Long-Term Care for the Elderly, (Washington, D.C.: The U.S. Department of Health and Human Services, November 1986), Chapter 3, p. 34; Arthur Lifson, "Statement of the Health Insurance Association of America on Long-Term Care Insurance," presented to the Private/Public Sector Advisory Committee on Catastrophic Illness, Chicago, Illinois, July 30, 1986, p. 3.

[8] Joshua M. Wiener, Deborah A. Ehrenworth, and Denise A. Spence, "Private Long-Term Care Insurance: cost, Coverage and Restrictions," Gerontologist vol. 27 (August 1987), pp. 487-93; and, Consumers Union, "Who Can Afford a Nursing Home?" Consumer Reports vol. 53 (May 1988), pp. 300-11.

This study helps to fill the data gap identified by insurers and policymakers by using a much revised version of the Brookings-ICF Long-Term Care Financing Model to estimate premiums for a variety of prototype private long-term care insurance plans. The analysis has two public policy goals.

One goal is to estimate order-of-magnitude premiums for a range of private long-term care insurance policies, including those that have fewer restrictions and better benefits than policies currently on the market. Since insurance policy limitations reduce the probability of paying benefits or at least of paying a higher level of benefits, the more restrictions in a policy the lower the premiums. Thus, developing premiums for "quality" policies is critical to meaningfully assessing the affordability of private long-term care insurance and its potential role in the financing of long-term care. Policies examined include those with superior inflation protection, better home care benefits, and nonforfeiture values than products currently on the market. By comparing premiums for more and less restrictive policies, policymakers and insurers will have a better sense of the incremental cost of improving benefits. For example, how much higher are premiums for policies that are indexed for inflation on a compound basis than for policies where the indemnity benefit is unindexed?

The other goal is to estimate the sensitivity of the premiums to different pricing assumptions about lapse rates, rate of return on reserves, and whether the policy is sold on an individual or group basis. Thus, the premium estimates can provide information to insurers and state regulators on the relative importance of specific pricing assumptions.

II. LITERATURE REVIEW

Published estimates of premiums for prototype private long-term care insurance plans have been developed by Meiners and Trapnell, actuaries at the Social Security Administration and the Actuarial Research Corporation.[9] Although invaluable as a starting point, the available literature in the public domain is limited. Most work currently being done to estimate the cost of long-term care insurance policies is for individual companies and is proprietary in nature. Moreover, with the exception of the early study of Meiners and Trapnell, details on the assumptions (e.g., admission rates, lengths of stay) used to calculate the premiums are not available in the published literature.

Previously published estimates also are limited by the use of old data and rather crude models of nursing home and home care use. For example, all three sets of estimates are based on the 1977 rather than 1985 National Nursing Home Survey. Unlike the 1977 National Nursing Home Survey, the 1985 National Nursing Home Survey goes to great lengths to allow analysts to aggregate lengths of nursing home stay interrupted by a hospital admission or short stay at home. Thus, more accurate estimates of "true" lengths of nursing home stay are now possible. Recently available data on home care use from the 1982/1984 National Long-Term Care Survey and the Longitudinal Study of Aging are not incorporated into the earlier estimates. In most previous work, home care benefits are either not covered or are severely restricted, requiring prior use of nursing home care. Premium estimates are not based on an analysis of actual home care use patterns.

An additional drawback is that the earlier estimates did not examine a very wide range of policies making it difficult to compare premiums across analyses. For example, the premiums estimated by Meiners and Trapnell did not include any purchase by individuals under the age of 65 and indemnity benefits were not indexed for inflation. The premiums by the Social Security Administration actuaries were all indexed to increase annually by a fixed percentage rather than being level. The estimates for the nonelderly by the Actuarial Research Corporation were limited to paid-up premiums not requiring additional payments when the insured became elderly.

The existing premium estimates suggest the importance of several areas for additional research and product design. First, nursing home and home care inflation is a critical variable in determining the price of good quality products. As noted above, most current long-term care insurance products do not provide benefits that increase with inflation. Estimates developed by the Actuarial Research Corporation show that at age 65

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[9] Mark R. Meiners and Gordon R. Trapnell, "Long-Term Care Insurance: Premium Estimates for Prototype Policies," Medical Care, vol. 22 (October 1984), pp. 901-11; and, Technical Work Group on Private Financing of Long-Term Care for the Elderly, Report to the Secretary on Private Financing of Long-Term Care for the Elderly, (Washington, D.C.: Department of Health and Human Services, November 1986), Chapter 3, pp. 212-32.

the first-year premiums for a policy where both the premium and indemnity benefit are indexed at 5 percent per year are 30 to 40 percent higher than a policy where the premium is level and the benefit is unindexed.[10] At younger issue ages, the necessary adjustment is dramatically higher--by a factor of four to six times greater.

Second, premiums are very sensitive to the initial age of purchase. For example, premiums estimated by the Social Security Administration actuaries for policies covering six years of nursing home care purchased at age 40 are one-third the annual cost of policies initially purchased at age 70. These findings have focused interest on finding ways to encourage people to purchase policies before they retire, especially through employer-based plans. Several major insurers, including Aetna, John Hancock, Travelers, Prudential, Mutual of Omaha and CNA, are offering policies to the nonelderly population through the workplace.[11] As of June 1990, 153 employers have offered policies to active employees, almost entirely on an employee-pay-all basis.[12]

Relatedly, all three sets of premium estimates found that the differences in premium prices varied much more dramatically by age of purchase than by amount of nursing home care covered. For example, Meiners and Trapnell found that increasing the amount of covered nursing home care from three to five years raised premiums from 19 percent to 26 percent depending on whether policies were initially purchased at age 65 or age 80. On the other hand, the increase in the premiums for the same benefit by initial age of purchase was 100 percent higher at age 80 than at age 65.

Third, all three sets of premium estimates are fairly expensive if purchased at age 65 or higher. Meiners and Trapnell estimated that at age 65 the cost of a policy covering four years of nursing home care with a 90-day elimination period, paying $50 per day in the nursing home (not indexed for inflation) and providing a modest home care benefit would be $544 a year. The Actuarial Research Corporation estimated the first year's premium at age 65 for a similar policy, but one where the benefit and the premium were indexed 5 percent per year for nursing home inflation, to be between $900 and $1,300 a year. The estimate by the Social Security Administration actuaries is $991 for a four-year policy similar to the one estimated by the Actuarial Research Corporation, but with a slightly higher inflation rate and no home care benefits.

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[10] Technical Work Group on Private Financing of Long-Term Care for the Elderly, Report to the Secretary on Private Financing of Long-Term Care for the Elderly, (Washington, D.C.: U.S. Department of Health and Human Services, November 1986), Chapter 3, p. 220.

[11] Susan Van Gelder, Health Insurance Association of America, personal communication, October 11, 1990.

[12] Susan Van Gelder, Health Insurance Association of America, personal communication, October 11, 1990.

III. METHODOLOGY

In this study, the Brookings-ICF Long-Term Care Financing Model, Version 2.0, is used to estimate private insurance premiums. For specific long-term care insurance products assumed to be purchased by a given cohort, the model simulates a stream of nursing home and home care benefit payments and a stream of premium payments. Once the benefit and premium streams are simulated, standard actuarial techniques are applied to calculate each age-specific premium.

A. The Brookings-ICF Long-Term Care Financing Model

The Brookings-ICF Long-Term Care Financing Model, Version 2.0, simulates the use and financing of nursing home and home care by a nationally representative sample of elderly from 1986 through 2020. A detailed description of the model and its assumptions are presented in Appendix I. The overall objective of the model is to simulate the effects of various financing options on future public and private expenditures for nursing home and home care.

The model is a microsimulation model, meaning that it starts with a sample of actual people and simulates what happens to each of them through time. The model begins with a nationally representative sample of the adult population, with a record for each person's age, sex, income, and other characteristics. It simulates changes in the population from 1986 through 2020, indicating for each person both general changes, such as in age and economic status, and changes specific to long-term care, such as the onset and recovery from disability, use of nursing home and home care services, and method of paying for care.

The model uses a Monte Carlo simulation technique. That is, the model simulates changes in status, or events, by drawing a random number between zero and one and comparing it with the predetermined probability of that event occurring for a person with those particular sociodemographic characteristics. For example, the annual probability of death for an 85-year-old disabled woman who is not in a nursing home is 0.03; that is 3 out of every such 100 women are expected to die in each year. If the random number drawn by the model is less than or equal to 0.03 for a particular 85-year-old woman, she is assumed to die in that year. If the number drawn lies between 0.03 and 1.00, she is assumed to continue to live during that year.

The model consists of six major components:

Population data base. Using data from the Current Population Survey, the first part of the model contains information on a representative sample of adults of all ages in 1979. The 1979 data base was chosen because it contains Social Security earnings histories for each person in the sample. The population projections are based on the Social Security Administration's mid-range mortality assumptions, which assume significant reductions in mortality rates over the next several decades.[13]

Income simulator. Using Lewin/ICF's Pension and Retirement Income Simulation Model (PRISM), the second part of the model simulates labor force activity, marital status, income and assets for each person. The model estimates retirement income from Social Security, the Supplemental Security Income program, private sector defined-benefit pension plans, public pension plans, private sector defined-contribution plans, individual retirement accounts, and Keoghs. Using data from the Survey on Income and Program Participation, the model also simulates asset ownership, including the value of home equity. The economic assumptions, which are based on the Social Security Administration's 1989 Alternative II-B scenario, presume moderate, steady growth in the economy, inflation and real wages.

Disability of the elderly. Using probabilities estimated primarily from the 1982/1984 National Long-Term Care Survey, the Longitudinal Study of Aging and the 1985 National Nursing Home Survey, the model simulates the onset of and recovery from disability for people aged 65 and over. Disability rates are assumed to remain constant over time by age and marital status. Controlling for these variables, the population becomes neither sicker nor healthier.

Use of long-term care services. Using probabilities estimated primarily from the 1985 National Nursing Home Survey, the model simulates admission to and length of stay in a nursing home. For people not in nursing homes, it also simulates use of paid and unpaid home care services from estimates derived from the 1982/1984 National Long-Term Care Survey and the Longitudinal Study of Aging. For the base case (that is, no change in financing), it is assumed that nursing home and home care use rates remain constant controlling for certain demographic characteristics. In modeling various financing options, the user may specify an increase in use.

Sources and levels of payment. The next part of the model simulates the sources of payment and the level of expenditures for every person receiving either nursing home or home care services. The model incorporates the eligibility and coverage provisions of Medicare and Medicaid and the spend-down of persons to Medicaid. Current public program benefit and eligibility rules are assumed to remain constant except to account for

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[13] Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, 1989 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, (Baltimore, MD: Social Security Administration, 1989).

inflation, unless changes in public programs are explicitly being simulated. Given the history of medical care inflation, nursing home and home care reimbursement rates are assumed to increase 1.5 percentage points faster than general inflation, matching assumed economy-wide increases in wages and fringe benefits.

Aggregate expenditures and service use. The final part of the model accumulates expenditures from Medicare, Medicaid, other public programs, insurance, patients' current income and patients' assets and nursing home and home care service use for the simulated persons for each year between 1986 and 2020. To reduce random variation, the data base is run thrcugh the model twice. To smooth year-to-year variability of the estimates, results are usually presented as five-year averages.

B. Actuarial Methodology

Insurance premiums have a benefit portion (known to economists as the “actuarially fair premium” and to actuaries as the "net premium") and an administrative and profit portion. Using output from the Brookings-ICF Long-Term Care Financing Model, the basic strategy is to make the present value of the benefit stream equal to the present value of the premium payment stream and then to apply a factor to account for administrative and profit costs. Appendix 2 discusses the actuarial methodology in detail. In brief, the methodology has four main steps:

First, in order to calculate the present value of the benefit stream, it is assumed that each individual belonging to different age cohorts (e.g., 65-69, 70-74) purchase an insurance policy with a specific set of benefits. The stream of benefit payments is simulated in the model for each year between 1986 and 2020. The stream is discounted to find the present value of the total benefit payment in 1986. The benefit stream implicitly discounts for mortality.

Second, in order to calculate the present value of premiums, all "policyholders" pay annual premiums of $120 per year. The aggregate stream of premium payments for each year between 1986 and 2020 is simulated in the model. The premium stream is then discounted back to 1986. The premium stream implicitly discounts for mortality.
Third, in order to establish the cost of the benefit portion of the premium, the ratio of the present value of aggregate benefit payments to the present value of aggregate premium payments is calculated. Multiplying this ratio by $120 yields the actuarially fair premium per year.

Finally, the actuarially fair premium is divided by the loss ratio to calculate the final premiums. A loss ratio of 70 percent is used for individual policies and 80 percent for group products.

IV. ANALYTIC STRATEGY AND RESULTS

The basic analytic strategy is to take a single "core" policy and vary the parameters. The parameters varied include length of coverage, inflation protection, group vs. individual policies, lapse and discount rates, and whether the premium is level or indexed. Appendix 3 compares our estimated premiums to those of insurance policies actually offered in the marketplace and to premiums for prototype policies estimated by the National Association of Insurance Commissioners Actuarial Task Force and by the Actuarial Research Corporation.

The "core" policy has the following characteristics:

- Covers four years of nursing home care after a 60 day deductible and four years of home care after a 30 visit deductible. Home care is available only to persons who have two or more problems with the activities of daily living or who have cognitive impairments.[14]

- Pays $60 per day in the nursing home and $30 per visit for home care. The benefit is indexed for inflation at 5.5 percent per year (1.5 percent over the projected growth in in the consumer price index).

- Purchased by persons who do not have problems with the activities of daily living or the instrumental activities of daily living.

- Sold individually, rather than group policies.

- Assumes no lapses, which is equivalent to a nonforfeiture value equal to the full asset share.

- Assumes induced demand of 20 percent for nursing home care and 80 percent for home care.

- Has level premiums.

- Assumes a discount rate of 7.5 percent, 3.5 percent above projected general inflation.

[14] For our purposes, the activities of daily living are eating, bathing, dressing, transferring, and toileting.

A. Length of Coverage and Age of Purchase

High quality long-term care insurance--with compounded inflation protection, good home care benefits and nonforfeiture values--is expensive for all age groups (Table 1). A four-year policy costs $829 at ages 40-44, $2,607 per year at ages 65-69 and $4,800 at ages 80-84.

Premiums vary substantially according to the amount of coverage, but the range is small compared to the variation by the age of initial purchase (Table 1). For example, limiting nursing home and home care coverage to two years of coverage decreases premiums by 30 to 35 percent relative to the four-year policy. A policy with an unlimited amount of covered care is 30 to 40 percent higher than the four-year policy. At the same time, however, premiums at age 80-84 are nearly six times what they are at ages 40-44. Thus, improving affordability of long-term care insurance policies is likely to depend more on convincing younger persons to buy policies rather than curtailing the amount of coverage provided.

B. Inflation Adjustment

Unlike virtually all acute care health insurance which covers a given level of service regardless of charges, almost all private long-term care insurance provides fixed indemnity benefits. Because of the potentially very long period of time between initial purchase of a policy and its eventual use, inflation adjustment of the indemnity value of an indemnity benefit is absolutely critical to retain the benefit's purchasing power. According to the Health Care Financing Administration, nursing home rates increased by an average of more than 3 percentage points above the Consumer Price Index between 1977 and 1988.[15] If nursing home inflation is 5.5 percent a year, a $60 a day benefit purchased at age 65 will need to pay over $175 a day at age 85 to represent the same percentage of nursing home daily costs. Full inflation adjustments are absolutely essential for policies sold to active workers, where there could easily be 30 to 40 years between initial purchase and use of long-term care services.

While some policies now have a limited inflation adjustment, they are almost all grossly inadequate. Insurers typically deal with the inflation issue in one of two ways. First, some companies offer policies where the insured can periodically purchase increased indemnity benefit levels without providing new evidence of insurability or good health status. This additional coverage is purchased, however, at the new attained age and will cost more--perhaps considerably more--than if the coverage was bought in an earlier

[15] Office of National Cost Estimates, "Estimated Spending for Nursing Home Care, 1988," unpublished data, (Baltimore, Maryland: Health Care Financing Administration, 1990).

period. Policyholders must regularly take advantage of opportunities to increase coverage or they risk being subject to medical underwriting. For active workers, this approach requires them to monitor nursing home prices and consciously decide every few years to buy more coverage. This approach also ignores the fact that the real incomes of the elderly are stable or decline with age, requiring them to use an increasingly higher percentage of their income for premium payments to maintain the policy's purchasing power.

The other common approach is to provide for the benefit level to increase by a fixed dollar amount each year, usually 5 percent of the initial indemnity value for some period of time, often 10 to 20 years or to age 80 or 85. For example, a policy that initially pays $60 per day in a nursing home will increase by $3.00 per year. Although many consumers undoubtedly confuse this approach with increases that are compounded annually, the results are dramatically different. After twenty years, a policy with this limited kind of inflation adjustment will increase the benefit level by 100 percent. By contrast if the benefit was subject to annual compounding of 5 percent per year, the benefit level would increase by 164 percent over the twenty years. Thus, companies offering this form of adjustment still do not adequately adjust for the full effect of inflation.

There is little doubt that few consumers understand how devastating inflation is to the policy's purchasing power. Anecdotal evidence suggests that consumers want very high initial indemnity values but are reluctant to pay for inflation protection. Indexing the benefit to full nursing home and home care price increases is clearly risky for insurers because they have no way of knowing what these future costs will be. However, companies are also reluctant to offer policies that increase benefits at a fixed percentage compounded annually where there is no uncertainty about future costs.
Protecting policyholders from inflation is expensive--especially at younger ages (Table 2). At age 65-69, a policy with a benefit compounded at 5.5 percent per year costs $2,607 per year compared to $1,103 per year for an unindexed policy--over twice as much. The differences are even more dramatic at younger ages. At age 40-44, the indexed policy costs $829 per year compared to $253 per year for an indexed policy--over three times as much.

Given the price differential between compound indexed and unindexed policies, it is not hard to understand the unwillingness of private insurers to make compound indexed benefits an integral part of their policies. Because indexing requires much higher premiums, there will presumably be a smaller market for these products.

Premiums for policies with simple inflation adjustment--those that increase by a fixed dollar amount per year--fall between unindexed and compound indexed policies. Policies with simple inflation adjustment keep pace with inflation in the first few years. However, as time passes, the simple adjustment offers less and less protection because, in percentage terms, the amount of the increase is falling. Thus, premiums for policies with simple

inflation adjustments are closer to unindexed policies at younger ages because the time period subject to inflation is so long (Table 2). In contrast, premiums at older ages are closer to compound- indexed policies because the time period subject to inflation is shorter.

C. Indexed Premiums

Virtually all current private long-term care insurance policies have level premiums. That is, unless premiums are raised for all persons in a class, the premiums remain the same throughout the life of the policy. This clearly makes sense for the elderly, who tend to have fixed or declining real incomes. Although Social Security benefits are fully indexed for inflation, most private pensions are not. In addition, private pensions are usually substantially reduced or terminated when the spouse of the person who earned the pension dies. Level premiums, however, make less sense for the nonelderly, whose incomes over time will be rising in at least nominal if not real terms.

Indexing premiums by 5.5 percent per year or by 5.5 percent per year to age 65 and then increasing by 4.0 percent or then keeping premiums level substantially lowers first year costs for all age cohorts compared to totally level premiums (Table 3). The longer the period over which the premium is indexed, the lower the first year premium. At ages 40-44, all of the indexing options reduced the first year premiums by over half. There was not a major difference across indexing options examined. As expected, the difference in premiums narrowed among the older age groups.

D. Discount Rate Assumptions

Virtually all private long-term care insurance policies are designed to build up substantial reserves in the early years of premium payments to be used to pay for benefits in later years. Thus, the rate of return earned on reserves is a critical factor in calculating premiums.

Using a range of discount rates of 6.5, 7.5 and 8.5 percent, 2.5, 3.5 and 4.5 percent above the long-run, projected increase in the consumer price index, the choice of discount rate has a major impact on premium levels (Table 4). The longer the period during which reserves build, the greater the differential. At ages 40-44, annual premiums are reduced by half--from $1,094 to $464--when the real discount rate is increased from 2.5 percent to 4.5 percent. Even at ages 65-69, premiums are about a fifth lower when the real discount rate is raised from 2.5 percent to 4.5 percent.

E. Lapse Rates

If long-term care insurance is purchased at age 65, premiums may have to be paid for 20 years or more until death. If purchased at younger ages, the insured may have to pay premiums for 40 years or longer. For a variety of reasons, not all persons who initially purchase a policy will make premium payments until death. Although not much data is available, preliminary evidence suggests that lapses are fairly common, running on the order of 15 percent a year for the first few years the policy is in force.[16] It is unknown what proportion of these lapses represent decisions by the insured to switch to a better policy with fewer restrictions.

Lapses reduce premium levels because fewer benefit payments will be made on behalf of initially insured policyholders. In addition, since insurers will receive premium payments for a period of time without having to pay claims, the premiums paid by those insured who lapse can subsidize the premiums of the policyholders who do not.

The public policy problem is that virtually all policies have level premiums designed to build up substantial reserves in the early years for payout in the later years. Consumers who pay in during the early years and then decide to not renew their policies will have "overpaid" during the period the policy was in effect for the protection actually received. A complicating factor is that while policies sold on a level premium basis do not have scheduled premium increases, the insurance companies reserve the right to raise premiums for all persons in a class, if necessary, sometime in the future. Some actuaries have argued that the policies of some companies are substantially underpriced and will be raised in the future, guaranteeing a high lapse rate.[17] Under these circumstances, companies could make windfall profits and the insured would be left both overcharged and without coverage.

Nonforfeiture provisions are designed to provide policy holders who let their policies lapse with some sort of benefit to account, at least in part, for the accumulated reserves. These provisions return to the policyholder part of the premiums paid in the form of a reduced benefit, continued provide coverage for some fixed period of time at no additional charge, or a lump-sum cash payment.

Premiums were calculated assuming zero, "lower" and "higher" lapse rates. Although zero lapse is unlikely in the real world, it is actuarially equivalent to a nonforfeiture value equal to the "full asset share" (using the reserves to pay either a reduced paid-up

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[16] Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce of the U.S. House of Representatives, Long-Term Care Insurance, (Washington, D.C.: Government Printing Office, 1990), p. 39.

[17] Gordon R. Trapnell, "Testimony on Regulation and Sale of Long-Term Care Insurance," Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, U.S. House of Representatives, Washington, D.C., March 2, 1990.

benefit or an extended term policy). Under the "lower" lapse assumption, 75 percent of policies remain in force when lapses cease after eight years. Under the "higher" lapse assumption, 50 percent of policies remain in force when lapses cease after 15 years.

Our methodology implicitly assumes that the people likely to drop the policy are no different from those who are likely to retain the policy (i.e., no adverse or favorable selection). This assumption does not conform to standard actuarial assumptions that presume adverse selection. Thus, for the range of lapse rates investigated, the effect on premium prices is an upper-bound estimate.

Lapse rates have a substantial impact on premiums (Table 5). Under the "lower" and "higher" lapse assumptions, policies at ages 65-69 are about 10 and 25 percent lower, respectively, than a policy assuming no lapses. At younger ages, the effect of lapses is much less with premiums at age 40-44 about 5 and 16 percent, respectively, less than a policy with no lapses.

F. Group vs. Individual

Unlike most acute care insurance, over 90 percent of long-term care insurance has been sold on an individual rather than group basis.[18] Many advocates of private long-term care insurance are promoting employer-sponsored group products, partly on the theory that administrative and marketing costs are much lower for employer-sponsored group products. Thus, a purchaser can obtain more benefits for the dollar.

The difficulty is that current employer-sponsored products are more properly thought of as individual products sold in a group setting rather than a "true" group product. For example, unlike acute care insurance, where almost all employees will elect coverage, the average enrollment rate for employer-sponsored policies is about 5 percent.[19] Thus, active marketing is required and most is "wasted" in the sense that the vast majority of employees do not enroll. In addition, medical underwriting costs remain for spouses, parents and active employees who do not enroll during the first offering. Savings mostly accrue from the reduction or elimination of agent commissions and the use of payroll deductions rather than direct billing. Ultimately, the distinction between individual and group products is lessened. Discussions with private insurers confirm only about a 10 percentage point differential in loss ratios between individual and group policies.

Policies sold in group settings are less expensive than those sold individually, but a 10 percentage point difference in the loss ratio does not result in a large difference in

[18] Susan Van Gelder, Health Insurance Association of America, personal communication, October 11, 1990.

[19] Susan Van Gelder, Health Insurance Association of America, personal communication, October 11, 1990.

premiums at working ages (Table 6). For example, there is only a $104 a year difference between group and individual policies purchased at ages 40-44. At ages 60-64, the differential is only $226. Thus, the really important factor about current employer sponsored plans is that people buy them at much younger ages, not that administrative and other loading costs are lower. If employers start contributing to the cost and enrollment rates increase, this differential may increase in the future.

G. Extreme Combinations

One of the principal barriers to the supply of long-term care insurance is associated with the fact that long-term care is needed principally by the very elderly, those age 85 and older. The very long time horizon between initial purchase of insurance and ultimate use of nursing home and home care involves great uncertainty and financial risk. A policy bought at age 65 probably will not be used until age 85, 20 years into the future. A policy bought at age 45 probably will not be used for 40 years. Unforeseen changes in disability or mortality rates, utilization patterns, inflation in service costs, or the rate of return on financial reserves can dramatically change a profitable policy into an unprofitable one.

To test the sensitivity of the premiums to the interaction of a number of factors, a constellation of assumptions were constructed to create a "high" and "low" premium for the same set of benefits. The differences are dramatic (Table 7). For the age 40-44 cohort, the "high" premium of $1,094 per year is over five times the "low" premium of $171. Even for the 80-84 age group, the "high" premium is almost twice the "low" premium. Unfortunately for insurers, it is impossible to say which of these premium estimates is nearer "the truth."

IV. CONCLUSIONS

Several important conclusions for long-term care financing can be drawn from this study of prototype private long-term care insurance policies. First, while there is no technical reason why private long-term care insurance cannot offer coverage with fewer restrictions than what is currently on the market, to do so will substantially increase premiums. At ages 65-69, the estimated annual premium for a policy that covers four years of nursing home care and four years of home care, indexes indemnity benefits for inflation on a compound basis and has a nonforfeiture value equal to the full asset share is $2,607 a year. In particular, indexing indemnity benefits for inflation dramatically increases the costs, but is essential to maintaining a nonillusory benefit. Too often individuals buy a high initial indemnity value, which then erodes in value over time.

Second, the debate over the affordability of private long-term care insurance has been flawed by a failure to specify what kind of policy people are assumed to be "buying." Private insurance policies can be designed to fit any affordability criteria. The more restricted the benefits, the lower the premiums, the higher the affordability estimates will be. Conversely, the richer the benefits, the higher the premium, the lower the affordability estimates will be. If what people mean by saying that people can afford private long-term care insurance is that they can buy a high quality policy that covers a fairly long period of care, maintains its purchasing power over time, covers home care as well as nursing home care, and does not depend on high percentages of insured's dropping their policy, then the percentage of the elderly who can afford private insurance is almost certainly less than we and others have previously estimated. Previous analyses were based on premiums that were much less expensive.[20]

Third, these premiums emphasize the desirability of group policies sold to the working age population. Group policies sold to active workers are substantially less expensive than individual policies sold to the elderly population. Changing the age of purchase has a much larger impact on premiums than does changing the number of years of nursing home and home care coverage.

Although much is often made of the lower administrative and marketing costs of group versus individual insurance, substantial differences have yet to show up in the

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[20] Alice M. Rivlin and Joshua M. Wiener, with Raymond J. Hanley and Denise A. Spence, Caring for the Disabled Elderly: Who Will Pay? (Washington, D.C.: The Brookings Institution, 1988), pp. 59-82.; Sheila R. Zedlewski and others, The Needs of the Elderly in the 21st Century, Urban Institute Report 90-5, (Washington, D.C.: Urban Institute Press, 1990), pp. 157-163; Robert B. Friedland, Facing the Costs of Long-Term Care, (Washington, D.C.: Employee Benefit Research Institute, 1990), pp. 278-290; Families USA, "The Unaffordability of Nursing Home Insurance," (Washington, D.C.: Families USA, 1990); and, Marc A. Cohen and others, "The Financial Capacity of the Elderly to Insure for Long-Term Care," The Gerontologist, vol. 27 (August 1987), pp. 494-502.

marketplace. At this time, current group policies are really more like individual policies sold in a group setting rather than true group policies. Thus, in calculating premiums, most insurers only assume that there is a 10 percentage point difference in the anticipated loss ratio between individual and group plans. While this difference is desirable, it does not dramatically lower premiums. The real payoff from promoting employer-sponsored plans results from.individuals buying policies at younger ages.
Despite the much lower costs of purchase at younger ages, level premiums for high quality policies, which are indexed for inflation, are still fairly expensive, exceeding $800 per year at ages 40-44. To date, insurance companies have tended to minimize premium prices by selling employer-sponsored group policies with unindexed benefits at a fraction of the cost of policies with indexed benefits. For example, an unindexed policy costs only about $250 a year at ages 40-44. At the same time, level premiums are less important for the working age population because the incomes of the insured are likely to increase over time and it is more expensive to pay for the inflation benefit increases totally in current dollars. Indexing premiums can reduce costs at younger ages by more than half, bringing premiums down to a more manageable level.

Fourth, lapse rates can significantly affect premiums. Limited data suggests that long-term care insurance currently has a fairly high lapse rate. Given the newness and rapidly changing nature of the product, this is somewhat to be expected. Ultimately, however, the market cannot depend on half or more of the insured dropping their insurance. Regulations should be considered which require public disclosure of lapse assumptions and experience and which require nonforfeiture values.

Fifth, the expected rate of return on reserves also has a major impact on premium prices. The higher the real interest rate, the lower the premiums will be. For policies that index indemnity benefits, the impact of higher real interest rates will be eroded somewhat. In other words, the fact that nursing home and home care inflation is likely to be higher than the general consumer price index lessens the premium reducing effect of interest earnings.

Finally, the long time span between initial purchase and use of long-term care services makes the profitability of insurance particularly sensitive to how well the assumptions used to price the policy mirror future reality. Moreover, unlike acute care insurance where benefits are financed on a term basis rather than with reserves, insurers cannot as readily increase long-term care premiums when experience does not meet expectations. Thus, setting premiums for private long-term care insurance involves a degree of uncertainty unmatched by any other insurance product currently marketed to consumers.

TABLE 1. Estimated Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Length of Covered Nursing Home and Home Care

Age of Purchase	2 Years	4 Years	Unlimited
40-44	$574	$829	$1,101
50-54	777	1,120	1,479
60-64	1,251	1,809	2,373
65-69	1,799	2,607	3,413
70-74	2,326	3,427	4,699
75-79	2,747	4,073	5,366
80-84	3,073	4,800	6,860

- Coverage = Number of years of covered nursing home care after a 60 day deductible and number of years of covered home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year, 1.5 percent above long-run general inflation.
- Lapses = 0 percent, which is equivalent to a forfeiture value equal to the full asset share.
- Discount rate = 7.5 percent, 3.5. percent above general inflation over the long run.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.
- Individual product = 70 percent loss ratio.
- Type of premium = Level.

TABLE 2. Estimated Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Amount of Inflation Protection

Age of Purchase	Unindexed	Simple	Compound
40-44	$253	$297	$829
50-54	391	560	1,120
60-64	720	1,214	1,809
65-69	1,103	1,989	2,607
70-74	1,770	2,870	3,427
75-79	2,343	3,576	4,073
80-84	3,284	4,477	4,800

- Coverage = Four of years of nursing home care after a 60 day deductible and four of years of home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Unindexed: no adjustment to reimbursement rate; simple: reimbursement rate increases $3.30 per year for nursing home care and $1.65 per year for home care for all years; compound: reimbursement rate increases at 5.5 percent per year.
- Lapses = 0 percent, which is equivalent to a nonforfeiture value equal to the full asset share.
- Discount rate = 7.5 percent, 3.5. percent above long-run general inflation.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.

TABLE 3. Estimated Annual First-Year Premiums For Prototype Private Long-Term Care Insurance Policies: Level vs. Indexed Premiums				
Age of Purchase	**Level**	**5.5% Under 65; Level After Retirement**	**5.5% Until 65; 4.0% After Retirement**	**5.5% During All Years**
40-44	$829	$396	$350	$330
50-54	1,120	703	599	556
60-64	1,809	1,580	1,226	1,094
65-69	2,607	2,607	1,940	1,713
70-74	3,427	3,427	2,663	2,399
75-79	4,073	4,073	3,290	3,013
80-84	4,800	4,800	4,029	3,753

- Coverage = Four years of nursing home care after a 60 day deductible and four of years of home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year, 1.5 percent above long-run general inflation.
- Lapses = 0 percent, which is equivalent to a nonforfeiture value equal to the full asset share.
- Discount rate = 7.5 percent, 3.5. percent above general inflation over the long run.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.
- Individual product = 70 percent loss ratio.
- Type of premium = Level and indexed.

TABLE 4. Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Discount Rates			
Age of Purchase	**6.5%**	**7.5%**	**8.5%**
40-44	$1,094	$829	$464
50-54	1,383	1,120	910
60-64	2,089	1,809	1,573
65-69	2,906	2,607	2,349
70-74	3,699	3,427	3,181
75-79	4,333	4,073	3,834
80-84	4,973	4,800	4,637

- Coverage = Four of years of nursing home care after a 60 day deductible and four of years of home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year, 1.5 percent above long-run general inflation.
- Lapses = 0 percent, which is equivalent to nonforfeiture value equal to the full asset share.
- Discount rate = 6.5 percent, 7.5 percent and 8.5 percent which is equal to 2.5, 3.5 and 4.5 percent above long-run general inflation.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.
- Individual product = 70 percent loss ratio.

TABLE 5. Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Lapse Rates			
Age of Purchase	**None**	**Lower**	**Higher**
40-44	$829	$784	$700
50-54	1,120	1,044	919
60-64	1,809	1,651	1,427
65-69	2,607	2,357	2,051
70-74	3,427	3,101	2,741
75-79	4,073	3,677	3,281
80-84	4,800	4,404	4,051

- Coverage = Four years of nursing home care after a 60 day deductible and four years of home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year, 1.5 percent above projected general inflation over the long run.
- Lapses = 0 percent, which is equivalent to a policy that has a nonforfeiture value equal to the full asset share. Lower = 5 percent a year for two years, 3 percent a year for six years, then 0 percent. Higher = 15 percent a year for three years, 5 percent a year for three years, 2 percent a year for ten years, then 0 percent.
- Discount rate = 7.5 percent, which is 3.5 percent above projected general inflation over the long run.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.
- Individual product = 70 percent loss ratio.

TABLE 6. Estimated Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Group vs. Individual		
Age of Purchase	**Group**	**Individual**
40-44	$725	$829
50-54	980	1,120
60-64	1,583	1,809
65-69	2,281	2,607
70-74	2,999	3,427
75-79	3,564	4,073
80-84	4,200	4,800

- Coverage = Four of years of nursing home care after a 60 day deductible and four of years of home care after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year, 1.5 percent above long-run general inflation.
- Lapses = 0 percent, which is equivalent to a nonforfeiture value equal to the full asset share.
- Discount rate = 7.5 percent, 3.5. percent above long-run general inflation.
- Moral hazard = 80 percent for home care; 0 to 20 percent after 10 years for nursing home care.
- Individual product = 70 percent loss ratio. Group product = 80 percent loss ratio.

TABLE 7. Annual Premiums for Prototype Private Long-Term Care Insurance Policies: Extreme Combinations		
Age of Purchase	**Low***	**High+**
40-44	$233	$1,157
50-54	400	1,461
60-64	814	2,207
65-69	1,324	3,063
70-74	1,909	3,859
75-79	2,396	4,503
80-84	3,180	5,087

* Low = 4 years of nursing home care after a 60 day deductible, 4 years of home care after a 30 day deductible, payment of $60 for nursing home care and $30 for home care, indexed at 5.5 percent per year, high lapse rate, 4.5 percent discount rate. Moral hazard: 60 percent for home care; 0 to 10 percent after 10 years for nursing home care.
+ High = 4 years of nursing home care after a 60 day deductible, 4 years of home care after a 30 day deductible, $60 for nursing home care and $30 for home care indexed at 5.5 percent per year, zero lapse rate, 2.5 percent discount rate. Moral hazard: 100 percent for home care; 0 to 25 percent after 15 years for nursing home care.

APPENDIX 1. BROOKINGS-ICF LONG-TERM CARE FINANCING MODEL: VERSION 2 TECHNICAL DOCUMENTATION

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Lewin/ICF, 1090 Vermont Avenue, N.W., Suite 700, Washington, D.C. 20005
September 1990

The Brookings-ICF Long-Term Care Financing Model simulates the use and financing of nursing home and home care by a nationally representative sample of elderly from 1986 through 2020. The overall objective of the model is to simulate the effects of various financing and organizational reform options on future public and private expenditures for nursing home and home care. In addition to research at the Brookings Institution, the model has been used by the Department of Health and Human Services, the General Accounting Office, the Pepper Commission, the American Association of Retired Persons, and Merrill Lynch. Originally developed in 1986 and 1987 as a joint project of the Brookings Institution and Lewin/ICF, the model was extensively refined and updated in 1988 and 1989 using newly available data. The second version of the model is substantially more sophisticated than the first model.

Figure 1 shows a flowchart of the model. The first part of the model, Lewin/ICF's Pension and Retirement Income Simulation Model (PRISM), simulates future demographic (age, sex, and marital status) characteristics, income, and assets of the elderly. In general, PRISM uses mortality and economic assumptions consistent with the Social Security Administration's mid-range II-B assumptions. The second part of the model simulates disability, admission to and use of nursing home and home care, and methods of financing long-term care services. It is based upon analyses of the 1982 and 1984 National Long-Term Care Surveys, the 1985 National Nursing Home Surveys, the 1984 Survey of Income and Program Participation, and medicare and medicaid program data from the Health Care Financing Administration. The model uses national data and does not take into account regional, state or local variation.

The model operates on individual records from the May 1979 Current Population Survey Special Pension Supplement. The records include earnings history data provided by the Social Security Administration for the surveyed people. Thus, the model begins the simulation period with a nationally representative sample of 28,000 adults. To reduce random variation, the data base is run through the model twice. To smooth year-to-year variability of the estimates, results are presented as five-year averages. The final output from the model provides detailed information for each person aged 65 and older, for each year from 1986 to 2020, on age, marital status, disability, amount and sources of income, assets, use of and payment source for nursing home and home care services.

The model uses a Monte Carlo simulation approach. For each person in each year of the projection period, it simulates changes in status based on their demographic and economic characteristics. Each change in status, such as marriage, admission to a nursing home, and death is called an event.

The model simulates events by drawing a random number between zero and one and comparing it to with the predetermined probability of that event occurring for a person with particular sociodemographic characteristics. For example, the annual probability of death for an 85-year-old woman requiring help with two or more of the Activities of Daily Living or "ADLs" (i.e. bathing, dressing, eating, transferring,.and toileting) not residing in a nursing home is 0.03. In other words, 3 out of every such 100 women are expected to die each year. If the random number drawn by the model is less than or equal to 0.03 for this 85-year-old woman, she is assumed to die in that year. If the number drawn lies between 0.03 and 1.0, she is assumed to continue to live during that year.

Demographic Assumptions

For each year in the projection period, the model simulates individuals becoming married or divorced, bearing children, becoming disabled or recovering from disability, and dying, based on a variety of assumptions. Changes in marital status are based on vital statistics data from the National Center for Health Statistics; aggregate marriage rates are kept consistent with the Social Security Administration's Alternative II-B (mid-range) forecast in the 1989 Trustee's Report.[1] Marriage rates vary by age, sex, education and previous marital experience (i.e. widowed, divorced, never married), and divorce rates vary by age. Marriage and divorce rates remain constant in the simulation period.

Childbearing rates are based on Census Bureau data for 1976-80, and aggregate fertility rates are constrained to the Alternative II-B forecast. Chidbearing varies by age, marital status, employment status and number of children. The model does not follow children as they grow older.

Work disability rates for people under age 65 are based on the 1989 Trustee's Report, and working age disability remission rates were developed by the Social Security Actuary for 1979-80. Rates for becoming disabled vary by age and sex and remain constant over time. Recovery from disability also varies by years since becoming disabled. (For the disability assumptions for persons age 65 and older, see the later section on Disability Status).

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[1] 1989 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds, (Baltimore, MD: Social Security Administration, 1989).

The overall mortality rates are based on Alternative II-B projections, which assume substantial improvements in longevity over time. For persons under age 65, rates vary by age, sex, work disability status, and years since becoming disabled. After age 65, the model sets differential age-sex mortality rates for persons living in the community by functional disability level and for nursing home residents. (For the mortality assumptions for persons age 65 and older, see the later section on Mortality).

Labor Force and Economic Assumptions

The model simulates an employment history for each person from 1979 through his or her date of retirement (Figure 2). Each year the model calculates wage rates, hours worked, job change, and industry of employment. Average wage rates are based on Alternative II-B projections from the 1989 Trustee's Report and aggregate work force and industry composition follow the 1987 Bureau of Labor Statistics forecast.[2] Inflation increases at the projected consumer price index annual rate specified under Alternative II-B, about 4 percent a year in the long run.

Overall unemployment rates reflect actual data through 1986 and then follow the Alternative II-B projections. Long run unemployment is assumed to be 6 percent. Labor force participation rates follow the Bureau of Labor Statistics age-sex specific forecasts until the year 2000 and then remain constant, except for the group aged 62 to 67. Under these projections, labor force participation by women will grow substantially.

The Social Security Amendments of 1983, which will eventually raise the age at which full Social Security benefits are available, are assumed to increase the labor force participation of persons aged 62 to 67 starting in the year 2000. When the normal retirement age increases from 65 to 66, retirement rates for persons aged 62 to 65 are assumed to decline 10 percent, and their labor force participation rates are assumed to increase 10 percent. The scheduled increase in retirement age from 66 to 67 due to occur after 2017 is addressed the same way in the model.

Given the aggregate levels of labor force participation for different age-sex groups, the model simulates the number of hours each person will work during a year based on Census Bureau employment pattern data that vary by age, sex, marital status, presence of children, hours worked in the previous three years, and pension and Social Security benefit receipt status. Wage growth reflects aggregate actual rates for until 1986 and then follows the macroeconomic projections shown in Table 1. Individual hourly wage rate adjustments

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[2] Howard N. Fullerton, Jr., "Labor Force Projections 1986-2000," Monthly Labor Review, vol. 110, no. 9, September 1987, pp.19-29; George T. Silverstri and John L. Lukasiewicz, "A Look at Occupational Employment Trends to the Year 2000," Monthly Labor Review, vol. 110, no. 9, September 1987, pp. 46-63.

are based on Census Bureau data. These rates vary by age, sex, and whether the person changed jobs during the year.

Job change rates are based on Census Bureau data on employment patterns for 1979 and vary by age, tenure, and part- or full-time status. These rates remain constant over time. People are assigned to an industry whenever they change jobs or enter or re-enter the labor force. This assignment is based on Bureau of Labor Statistics projections of industry work force composition through 2000, remaining constant thereafter (Table 2). The projections assume an increasing proportion of employment in service industries and a falling proportion in manufacturing. The industry, assigned to a person varies by age, part- or full-time status, and prior sector of employment.

Pension Coverage and Retirement Assumptions

As a person changes jobs during the simulation period, the model determines whether he or she is covered by a pension plan and assigns covered workers to an actual plan. The model simulates early, normal, and late retirement. Retirement income sources simulated by the model include private sector defined-benefit pension plans, defined-contribution plans, keoghs, individual retirement accounts, social security, and supplemental security income. Social security law, including the changes provided by the 1983 amendments are included. Interest rates for the defined-contribution plans and individual retirement accounts have an average annual rate of 7 percent which is the Alternative II-B forecast of interest rates for 1989 through 2005.

Pension coverage rates vary by industry of employment, part- or full-time status, age and wage rate. Pension coverage rates are based on the May 1979 Current Population Survey Special Pension Supplement and the 1983 Employee Benefit Research Institute-Department of Health and Human Services Current Population Survey Pension Supplement (Table 3). Plan coverage on an industry basis is assumed not to change after 1989.

People are assigned to pension plans on the basis of industry of employment, firm size, social security coverage status, union coverage status multi- or single-employer plan status, and hourly or salary employee status. Pension plan assignment-takes into account the number of people covered by that plan sponsor. Thus, the model takes into account reported participation and vesting status of the worker as well as plan contribution requirements and participation in a supplemental plan.

Using the actual provisions of the pension plans assigned, the model calculates each person's eligibility and benefit amount. In general, pension plan provisions are assumed to remain unchanged except in instances where plan rules must be changed to come into compliance with the Retirement Equity Act of 1984. Starting in 1985, the Retirement

Equity Act mandates the minimum age requirement for pension participation be reduced from age 25 to 21 and that service between the ages of 19 and 22 be considered for determining vesting.

Benefit formulas in defined pension plans and salary bend points are indexed to growth in wages throughout the simulation period. Private defined-benefit plans are indexed at half the rate of inflation annually (maximum 2 percent per year); early and normal retirement benefits for public sector retirement plans increase at the rate of inflation (maximum 4 percent a year). These cost-of-living adjustments for pension benefits are based on an analysis by Lewin/ICF of cost-of-living adjustments over a ten-year period for a representative sample of pension plans.

Acceptance of social security benefits is based on Social Security Administration data for 1980. Eligible persons aged 62 and older are automatically assumed to accept benefits when they become disabled or unemployed, or when they receive an employer pension. Acceptance also varies by age and sex. Social Security survivors' benefits accrue to people in the first year they are eligible.

Pension benefit acceptance for employees meeting their assigned plan's eligibility provisions differs between defined-benefit and defined-contribution plans. Pension acceptance also varies by age, sex, and vesting status. In general, the rates are based on data from the Census Bureau's Current Population Survey Special Pension Supplement.

The model's treatment of individual retirement accounts (IRAs) are derived primarily from the May 1983 Employee Benefit Research Institute Health and Human Services Current Population Supplement Survey updated to reflect the impact of the 1986 Tax Reform Act. In the model, IRA adoption for each individual varies by family income, age, and whether or not the person is covered by a pension plan. Once an IRA is adopted for an individual, the annual probability of making a contribution varies by family income and the pension coverage status. The amount contributed, constrained to the tax deductible maximum and indexed to growth in real wages after 1983, varies by a person's family income, age, sex, and marital status. The model assumes individuals will contribute to their IRA only if the contribution is tax deductible. Hence, beginning in 1987, the full contribution amount, up to the amount deductible under tax law in 1986 (typically $2,000), is considered tax deductible for persons with an adjusted gross income of less than $25,000 ($40,000 for joint filers). The deductibility is phased out over the next $10,000 of adjusted gross income. Also beginning in 1987, the maximum contribution amounts specified by law are indexed at 80 percent of the consumer price index over the projection period. At the time of pension or Social Security benefit acceptance, but not before age 60, IRA funds are converted to an annuity.

Levels of Assets

Because assets can be an important source of income for the elderly and therefore a source of financing for their long-term care, the model simulates both level of housing equity and the value of nonhousing (financial) assets for individuals and couples aged 65 and older. The model assigns actual asset data records from the 1984 Survey of Income and Program Participation Wave 4, adjusted for inflation, to people in the model on the basis of age, marital status and income level. Assigning the assets provides a distribution of assets rather than just an average amount for different demographic subgroups.

The asset assignment process in the model has two steps. Beginning in in 1979, all family units aged 65 and over are assigned actual assets records that are deflated by the consumer price index change from 1979 to 1984. After 1979, as people reach age 65, the model assigns assets using data from records of persons age 63 to 67 in the 1984 Survey of Income and Program Participation Wave 4. The value of all assets is adjusted by the actual or expected rate of change in the consumer price index projected under Alternative II-B.

After assets are assigned to persons aged 65 and older in the model, the value of the assigned assets is adjusted over time. The value of housing equity increases by 1.5 percentage points faster than the actual and projected rate of change in the consumer price index. Nonhousing assets are adjusted to reflect actual change observed longitudinally between Waves 4 and 7 of the 1984 Survey of Income and Program Participation. The model assumes 35 percent of individuals increase their nonhousing assets annually by 2 percentage points above than the consumer price index, 40 percent neither save nor dissave, and 25 percent decrease their nonhousing assets by 2 percent each year in real terms.

The assigned nonhousing assets are a source of elderly income in the model. Asset income is assumed to be 7 percent per year. All asset income produced during a year is assumed to be spent in that year. When a person dies, his or her spouse is assumed to receive all assets.

Disability Status

The likelihood of an elderly person using nursing home or home care services is affected by his or her disability status. For people age 65 and older, disability rates are derived from the 1982 and 1984 National Long-Term Care Surveys and the 1982 New Beneficiary Survey. Disabled individuals are defined as persons who need help, for a health-related reason, with at least one instrumental activity of daily living or "IADL" (i.e. doing heavy work, doing light work, preparing meals, shopping for groceries or other personal items, getting around inside, walking outside, managing money, and using the

telephone) or who need help with at least one of five of the activities of daily living or "ADLs" (i.e. eating, bathing, dressing, toileting, and getting in and out of bed) which has lasted for at least 90 days. In the model, each person turning 65 is assigned one of four disability levels: no disability, requires IADL help only, requires help with only one ADL, or requires help with at least two ADLs.

After age 65, the model simulates a disability level for each individual in each simulated year. The model assumes the disability prevalence rates which are based on the 1984 National Long-Term Care Survey (Table 4). Disability rates remain constant over the projection period for each age-marital status group.

The model also assumes annual changes in disability levels based on a set of transition matrices constructed from the 1982 and 1984 National Long-Term Care Surveys. Annual changes in disability level happen at the beginning of the year and vary by age, marital status and prior level of disability (Table 5). Changes in disability status include nondisabled persons becoming disabled and disabled persons becoming either more disabled, less disabled, or nondisabled. The model takes the outcome of annual disability transitions into account and then simulates additional persons to become disabled to meet the disability prevalence rates discussed above (Table 4). This allows the model to maintain a proportion of disabled in the community which matches the age-marital status disability rates after adjusting the total disabled count for death and remission from disability. Disability transition rates remain constant over the simulation period on an age-marital status basis.

Separate from the annual disability transitions, the model assumes that most individuals receiving social security disability insurance before age 65 will be chronically disabled in ADL or IADL at age 65. Reflecting the substantial difference between work disability and functional disability observed in the Social Security Administration 1982 New Beneficiary Survey, the model assumes that 60 percent of individuals eligible for disability insurance at age 62 meet the more restrictive ADL or IADL definition of disability used upon reaching age 65.

Mortality

The model uses Alternative II-B mortality assumptions from the 1989 Social Security Trustee's Report to estimate deaths for the projection period. As mentioned above, separate rates that vary by age and sex are applied to disabled and nondisabled persons under age 65. For persons aged 65 and older, age-sex mortality rates are further disaggregated for: elderly nursing home residents, disabled elderly in the community, and nondisabled elderly in the community. In addition, mortality rates for disabled elderly in the community varies by their disability level.

For nursing home residents, the model assumes each individual survives for their entire assigned length of stay. As described more fully below, data from the 1985 National Nursing Home Survey is used to simulate whether individuals simulated to be admitted to a nursing home will be discharged alive or dead (Table 8). The model then subtracts the age-sex specific mortality for persons who die in a nursing home from the overall Alternative II-B mortality rate for each year in the projection period and distributes the residual mortality to each age-sex group in the community.

The relative mortality rates for each disability group in the community were based on information about the disability level of persons in 1982 who were subsequently deceased by 1984 obtained from the 1982-1984 National Long-Term Care Survey. The disability level adjustment for residual mortality rates (i.e., net of deaths in nursing homes) are shown in Table 6. In general, for each age-sex group, nursing home residents have the highest mortality rate which then decreases with level of disability in the community so that nondisabled persons end up with the lowest mortality rate. This is not true for persons age 85 and older in the community, probably because mortality rates are so high for this age group.

Nursing Home Use

For each year of the simulation, the model selects people to enter a nursing home. The model then determines the patient's length of stay and whether he or she is discharged dead or alive. The model uses nursing home admission probabilities estimated form longitudinal data in the 1982-1984 National Long-Term Care Survey adjusted by data from the 1985 National Nursing Home Discharge Survey. Nursing home length of stay probabilities were developed from the 1985 National Nursing Home Discharge Survey and then adjusted upwards to reflect growth in nursing home residents by age.

The model simulates the entry of individuals to a nursing home using probabilities which vary by age, sex, disability level, and prior nursing home admission for the disabled; and by age, marital status, and prior nursing home admission for the nondisabled (Table 7). Nursing home entry by nondisabled persons reflects admissions by persons who are nondisabled at the beginning of the year but become disabled at some time during the course of the year. Fully 46 percent of all elderly nursing home admissions in the 24-month period covered between the 1982 and 1984 National Long-Term Care Surveys were by persons who were not chronically disabled in 1982.[3] Sex was not used to vary entry for disabled persons because it was found not to be a statistically significant determinant of

[3] Raymond J. Hanley, Lisa Maria B. Alecxih, Joshua M. Wiener and David L. Kennell, "Predicting Elderly Nursing Home Admissions: Results From the 1982-1984 National Long-Term Care Survey," Research on Aging, vol. 12, no. 2, June 1990, pp.199-228.

nursing home admission in the regression model developed to estimate the entry probabilities.

The probabilities of nursing home entry in the model are estimated for-Individual years of age based on analyses of the 1982-1984 National Long-Term Care Surveys and the 1985 National Nursing Home Survey. To develop the probabilities, separate regression models of nursing home entry were estimated for disabled and nondisabled persons from the 1982-1984 National Long-Term Care Survey. These 24-month probabilities were then annualized and adjusted to correspond to totals in the 1985 National Nursing Home Survey. The model assumes rates of nursing home entry remain constant over the simulation period unless some level of induced demand is specified by the model's user. The model also assumes persons can enter nursing homes only once during each simulated year.

Keeping nursing home admission rates constant throughout the projection period implicitly assumes that nursing home bed supply will increase throughout the simulation as necessary to accomodate admissions from an increasingly larger elderly population. Thus, the model does not assume that demand for nursing home care in the future will be more constrained by the bed supply than it is now.

Both length of stay assigned by the model to nursing home entrants and mortality status of residents at time of discharge are based on estimates from the 1985 National Nursing Home Survey discharge file and vary by age and marital status at admission (Table 8). To estimate length of stay for individuals, the discharged resident survey had to be converted from a file of discharges to a file of persons.[4] This was required because it is possible to be discharged from a nursing home more than once during the survey year. Thus, a person could be counted more than once in the discharge file. In converting discharges to persons, only those persons for which the survey discharge was the last nursing home stay in the survey year are included. This provided a completed length of stay for each patient.

Although the length of stay for the reference nursing home discharge is complete, it does not capture total length of stay for patients transferred from another nursing home or those whose stay was interrupted by a period of hospitalization. To account for this underestimate, nursing home stays were aggregated if the previous discharge was within 30 days of the subsequent admission. As many as three of these types of previous stays were linked together with the reference discharge length of stay.

To finish the conversion of discharges to admissions, the unduplicated discharges with aggregated length of stays were adjusted to account for the cohort effect of growth in

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[4] Denise A. Spence and Joshua M. Wiener, "Nursing Home Length of Stay Patterns: Results from the 1985 National Nursing Home Survey," Gerontologist, vol. 30, no. 1, 1990, pp.16-20.

nursing home beds. That is, the discharge survey undercounts the number of people with long length of stays because there were fewer nursing home beds when people with long length of stays were admitted, and thus fewer people in the survey could have long length of stays. The number of people in each length of stay group was increased by a growth factor calculated from total growth in nursing home residents from 1977 to 1985 (1.402 million to 1.624 million).

In the model, nursing home entrants are assigned a length of stay equal to the midpoint of the number of days within the range to which they are assigned (i.e., 1 to 30 day length of stay becomes 15 days). Individuals with a length of stay of more than 2,191 days are assumed to have a length of stay of nine years.

The model can simulate an increase in nursing home use as a result of changes in the way a nursing home stay is financed. The increase in use is often referred to as moral hazard or induced demand. Induced demand is simulated by inflating the nursing home admission probabilities by the assumed level of induced demand specified by a user. For example, if a new public program is assumed to increase the demand for nursing home care by 20 percent, each of the entry probabilities shown in Table 5 are multiplied by 1.2. Individuals who enter a nursing home due to induced demand have the same length of stay distribution as other entrants but their mortality status at discharge is unchanged from the base case simulation. Mortality is unchanged because otherwise increased nursing home admissions would result in too many deaths.

Home Care Use

Home care services in the model include home health services, chore and homemaker services, personal care, and meal preparation services. Using data from the 1982-1984 National Long-Term Care Survey of noninstitutionalized, chronically disabled elderly and medicare program statistics, three separate groups of persons are simulated to use paid home care services in each year: 1) persons who were disabled at the beginning the year; 2) persons who are not chronically disabled at the beginning of, the year but who become disabled during the course of the year; and, 3) persons who are not chronically disabled but who use medicare home health services as part of their recovery from acute illness. The likelihood of using home care is simulated separately for each of these groups.

Developing probabilities of annual use of paid home care services was difficult because, in contrast to nursing home use, longitudinal data from the 1982-1984 National Long-Term Care Survey does not provide information on whether a person used home care in the 24-month period between the two surveys. The only information provided is whether a person is using home care at the time of each interview. Thus, based on the 1982-1984 National Long-Term Care Survey, the model incorporates estimates of the

likelihood of a person using services in 1984 based on their characteristics in 1982. A problem with this data is that cross sectional estimates undercount the number of persons using services for a short time. To correct for the undercount based on prevalence estimates, incidence rates (the number of new service users in a year) were computed by dividing the prevalence rate of paid in-home service use by the duration of use reported in the survey.

The 1982-1984 National Long-Term Care Survey was used to develop separate probabilities of using paid home care in 1984 for two groups of community-based elderly in 1982, chronically disabled and nondisabled persons. For the nondisabled group, probability of home care use varies by age, sex and marital status (Table 9). For the chronically disabled group, home care varies by level of disability and sex since age and marital status were not significant predictors of home care use for this group (Table 10). Home care use is assumed to be independent of nursing home use.

Once a person from one of these two groups is selected to receive paid home care, he or she is assigned a disability status estimated from users of paid home care in the 1984 National Long-Term Care Survey. The assigned disability level of home care users varies by age and marital status. As discussed below, this new disability status is used to vary the number of visits received by these two groups of home care users.

Medicare Coverage

After the model simulates individuals to receive paid home care, it determines whether he or she will receive medicare reimbursement. Based on an analysis of the 1984 National Long-Term Care Survey, approximately half of the elderly receiving medicare reimbursed home care are chronically disabled. For this half of medicare home care users, the model assigns a number of months to receive services based on data from the 1984 National Long-Term Care Survey which were adjusted to reflect a more complete episode of use (Table 11).

Once the number of months of any paid home care is determined, the model assigns the total number of visits based on a person's disability status (Table 12). The model then apportions a number of the total visits to be reimbursed by medicare using Health Care Financing Administration program data. The actual number of visits covered by medicare in the model is the midpoint of each range shown in Table 13, and 150 visits for the 100 or more visits category. If the total number of visits assigned is greater than the number of visits allocated to be medicare, the remainder are financed by another payment-source as described below.

For the half of all elderly medicare home care users that are not chronically disabled (and thus were not part of the National Long-Term Care Survey sample), the model uses a

separate set of probabilities of use based on medicare program statistics that vary by age and sex (Table 14). When a member of this group is selected to receive medicare home visits, the person is assigned a length of use based on medicare program data (Table 15). This group of medicare home care beneficiaries receive 17 visits per month and all of their visits are paid for by medicare.

Non-Medicare Home Care

After the model has simulated use of medicare home care, it determines which chronically disabled individuals pay out-of-pocket for home care and which receive reimbursement from medicaid or "other payers" (i.e., state and local expenditures, social services block grant, Older Americans Act, Veterans Administration and charity). The model assumes the same distribution of home care visits per month, which vary by disability level, as it did for the chronically disabled half of all medicare home care users (Table 12). Length of use for non-medicare home care users are also identical to those used for disabled persons receiving medicare (Table 11).

The model can simulate an increase in home care use as a result of changes in the way home care is financed. Induced demand is simulated by inflating the home care use probabilities by the assumed level of induced demand specified by a user. For example, if a new public program is assumed to increase the demand for home care by 80 percent, each of the probabilities shown in Tables 9 and 10 are multiplied by 1.8 (or the subset of probabilities which reflect the new program's eligibility requirements). Individuals who use home due to induced demand have the same length of use distribution as other home care users (Table 11).

Financing Nursing Home Care

The model simulates expenditures for nursing home care and source of payment for that care for all patients on a month-by-month basis. Expenditures are set equal to the person's simulated number of nursing home days multiplied by payments each day. In the base case, nursing home patients pay for their care with reimbursements from medicare and medicaid, annual income, and assets. Spend-down to medicaid and other financial eligibility requirements are simulated by the model. Each person's payments are accumulated by source.

For non-medicare admissions, and when medicare nursing home coverage ends, the model uses patient income and assets (in that order) to pay for care. If a person does not have sufficient income to pay the private payment charge, then the model subtracts remaining expenses to cover the costs from a person's nonhousing assets. If a person does not have sufficient income to pay the private payment charge, then the model

subtracts remaining expenses to cover to cover the costs from the person's nonhousing assets. Once these nonhousing assets are drawn down to the medicaid asset level, medicaid pays the difference between patient income and the medicaid payment rate less a personal needs allowance ($30 a month in 1986). After 1986, the personal needs allowance increases at half the rate of change of the consumer price index.

Daily charges for nursing home care vary by source of payment (Table 16). The medicare rate is based on the average daily medicare skilled nursing facility rate for 1988 developed by the Health Care Financing Administration to estimate coinsurance for skilled nursing facilities under the Medicare Catastrophic Coverage Act. The medicaid rate is based on average of skilled nursing facility and intermediate care facility rates for 1985, weighted by the number of medicaid patients, estimated from the 1985 National Nursing Home Survey Facility file, and inflated to 1988 using HCFA program data. The private pay rate, also estimated from the 1985 National Nursing Home Survey Facility file, is the average skilled nursing facility and intermediate care facility private charges in 1985 weighted by the total number of skilled nursing facility and intermediate care facility beds, inflated by growth in nursing home revenue per day to 1988 taken from HCFA Office of National Cost Estimates data.

After 1988 all payment rates are assumed to increase 5.5 percent a year. This projected rate of growth is based on the Social Security Administration Office of the Actuary's long-run assumption that the consumer price index will increase at 4.0 percent a year, real wages at 1,.3 percent a year, and fringe benefits at 0.2 percent a year. This assumption presumes nursing home prices will continue to increase in the future to keep pace with the projected wage growth due to the heavy labor component in nursing home costs. In essence, providers will need to increase wages at a rate roughly comparable to the rest of the economy in order to obtain workers and to promote the well being of patients in their care. Implicit in this assumption is that there will be no significant productivity improvements in nursing home care.

Nursing home patients generally incur other health care expenses affecting the amount of income and assets they have available to pay for nursing home care. To account for the additional expenses, each nursing home admission is assumed to have out-of-pocket acute care costs of $68 a month in 1989, which is indexed by the nursing home inflation rate. This includes the Medicare Part B premium, medicare deductibles and coinsurance, and other health care costs. This expense approximates the cost of a comprehensive medigap policy.

Medicaid Coverage

The model assumes that a portion of a patient's income and assets is available to pay the costs of nursing home care. The entire income of single persons is considered

available to pay for health care expenditures. For married couples, the model assumes that one-half of the couple's combined Social Security and asset income is available to the institutionalized spouse. Pension and individual retirement account income is assigned to the spouse who earned or owns the benefit.

The model also simulates intra-family transfers of income from one spouse to another in accordance with the Medicare Catastrophic Coverage Act spousal impoverishment provisions. When the spouse remaining at home has individual income below 122 percent of the poverty level for a couple in 1989 (133 percent in 1990, 150 percent in 1992), the model assumes an income transfer from the nursing home patient to raise his or her spouse's income to the amount specified above. The federal monthly poverty level income for elderly couples in 1988 was $597 and is assumed to increase annually by the consumer price index.

Through 1988, all of a person's nonhousing assets, less the Supplemental Security Income level of protected assets, are assumed to be available for nursing home costs. As mandated by the Deficit Reduction Act of 1984, beginning in 1984 the asset limit for single individuals increases by $100, and the limit for married couples increases by $150, each year until 1989 when they are equal to $2,000 and $3,000, respectively. After 1989, the the asset limits for individuals are assumed to increase at one-half the annual rate of increase in the consumer price index.

Starting in 1989, as a result of the Medicare Catastrophic Coverage Act spousal impoverishment provisions, the community spouse of a married couple may keep $12,000 or half of the couple's nonhousing assets up to $60,000, whichever is higher. The remainder less $2,000 is available to pay for nursing home care. After 1989, the asset limit for married couples is assumed to increase annually by the consumer price index. When both the individual and his or her spouse are in a nursing home during the year, assets are divided equally between the couple, each retaining $2,000.

In an effort to more closely replicate recent estimates of medicaid spend-down, the model adjusts the financial resources of certain nursing home patients to make simulated results consistent with national data. A number of recent studies have found the proportion of elderly nursing home patients who spend down to medicaid eligibility is smaller than commonly thought--in the range of 15-25 percent.[5] Conversely, the proportion of elderly

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[5] Denise A. Spence and Joshua Wiener, "Estimating the Extent of Spend-Down in Nursing Homes," Journal of Health, Politics, Policy and Law, (forthcoming); Korbin Liu, Pamela Doty and Kenneth Manton, "Medicaid Spend-Down in Nursing Homes," The Gerontologist, vol. 30, no. 1, February 1990, pp.7-15; Brian Burwell, E. Kathleen Adams, and Mark Meiners, "Spend-down to Medicaid Eligibility Among Nursing Home Recipients in Michigan," prepared by SysteMetrics, McGraw-Hill for the Office of Research, Health Care Financing Administration under contract 500-86-0016, 1989; Leonard Gruenberg, Ken Farbstein, Paul Hughes-Cromwick, Christine Pattee, and Kevin Mahoney, "An Analysis of the Spend-Down Patterns of Individuals Admitted to Nursing Homes in the State of Connecticut," Research Institute Discussion Papers, Office of Policy and Management, State of Connecticut, DP #1-

nursing home patients who are medicaid eligible at admission is higher than previously assumed.

In order to make the model results more closely conform to these recent estimates, three adjustments were made. First, the model assumes some unmarried nursing home residents sell their homes to pay for care. Although the "homestead" is generally an excluded asset when determining medicaid eligibility, it is hard to see how many people could avoid spend-down without using this asset to help pay for their care. Thus, to increase available resources and thereby reduce the level of medicaid spend-down, the model assumes a certain proportion of single nursing home patients sell their homes upon entry based on their length of stay and source of payment for care. Among unmarried medicaid patients, 5 percent with 3 to 6 month lengths of stay liquidate their housing equity to pay for care. The proportion increases to 10 percent for persons with 6 to 12 month stays, and 15 percent of those staying more than 12 months. For unmarried non-medicaid patients, 25 percent with 3 to 6 month lengths of stay sell their homes, rising to 50 percent of those with 6 to 12 month stays, and 75 percent who stay over 12 months.

The second adjustment also increases the resources available to nursing home residents. Based on an analysis of the 1984 Survey of Income and Program Participation, the model assumes 10 percent of single nursing home residents who are paying privately for their care receive an additional $200 a month of income from their relatives.

Third, the model increases the proportion of nursing home entrants who are medicaid at admission by reducing their level of financial assets. This. adjustment is intended to proxy asset transfers, major medical expenses in the community, legally allowable deductions (i.e., burial plot) and repayment of debts. In general, the model assumes a higher percentage of persons with a lower level of assets and a longer length of stay are more likely to reduce their assets. The proportion of entrants assigned a stay of less than 6 months who reduce assets at admission to the $2,000 medicaid eligibility level are: 90 percent of those with nonhousing assets between $2,000 and $5,000, 20 percent with $5,000 to $10,000 in nonhousing assets, and 10 percent with more than $10,000 in nonhousing assets. For persons assigned a length of stay of more than 6 months, 90 percent with nonhousing assets between $2,000 and $5,000 reduce their assets to $2,000, 50 percent with $5,000 to $10,000 in nonhousing assets, and 25 percent with more than $10,000 in nonhousing assets.

89, September 1989.

Medicare Coverage

Except for 1989, the only year in which Medicare Catastrophic Coverage Act provisions were in effect, the model assumes a predetermined proportion of all nursing home admissions receive full medicare skilled nursing facility coverage for their first 20 days. After day 20 in a nursing home, the model assumes medicare pays only the residual daily costs after a patient pays the required coinsurance (set at one-eighth of the deductible under Medicare Part A, $74 in 1990) for the remainder of their medicare covered stay. The medicare coinsurance requirement is assumed to increase at 5.5 percent a year.

The predetermined proportion of nursing home admissions assumed to receive medicare coverage varies by their assigned length of stay. Before 1989, the model assumes medicare covers 33 percent of persons assigned a length of stay of less than 3 months, 21 percent with 3 to 6 month length of. stays, 14 percent with 6 to 12 month length of stays, and 10 percent with length of stays over 12 months. All of these patients receive 30 days of medicare coverage.

In 1989, the model assumes medicare skilled nursing facility benefits follow the provisions of the Medicare Catastrophic Coverage Act. After 1989 and the repeal of the Medicare Catastrophic Coverage Act, the medicare skilled nursing facility benefit returns to its pre-1989 structure. However, in 1988 just prior to the implementation of the Medicare Catastrophic Coverage Act, certain administrative changes were made in medicare benefits which liberalized coverage guidelines for skilled nursing facility care. Thus, after 1989, the model assumes medicare covers more admissions than before 1989. Medicare skilled nursing facility benefits are assigned to 45 percent of persons with a length of stay of less than 3 months, 28 percent with 3 to 6 month length of stays, 20 percent with 6 to 12 month length of stays, and 15 percent with length of stays over 12 months. All of these patients receive 45 days of medicare coverage.

Financing Home Care Services

The model simulates expenditures and sources of payment for home care. Expenditures are set equal to the number of visits multiplied by the price per visit. Sources of payment are out-of-pocket, medicare, other payers and medicaid. Other payer is a residual home care payment category that includes all funding from state and local programs, Older Americans Act and social services block grant monies, Veterans Administration programs and charity. The out-of-pocket price per visit is based on data from the 1984 National Long-Term Care Survey; medicare and medicaid visit rates are based on Health Care Financing Administration program data; and other payer rate is a weighted average of the medicare and out-of-pocket rates (one-third medicare, two-thirds out-of-pocket) (Table 17).

When the model selects a person to start receiving non-medicare home care services or when an individual receiving medicare reimbursed home care exceeds the maximum number of visits covered by medicare, the model assigns him or her to medicaid, out-of-pocket, or other payers payment categories based on data from the 1982-1984 National Long-Term Care Survey, the 1984 Survey of Income and Program Participation and medicare and medicaid program data.

The model first assigns home care users to medicaid reimbursement and then to out-of-pocket and other payers. The percentage of persons receiving home care reimbursed by medicaid was estimated from the 1982 National Long-Term Care Survey. However, because the 1982 National Long-Term Care Survey does not have detailed asset information, the 1984 Survey of Income and Program Participation was used to adjust the final probabilities by determining the proportion of persons in each income category with nonhousing assets sufficiently low enough to qualify for medicaid coverarge (i.e. below the Supplemental Security Income level of $2,000 for single individuals and $3,000 for couples in 1989). These probabilities vary by income and marital status.

The model assumes out-of-pocket and other payer financing of home care by persons not selected for medicaid coverage also varies by income. People selected to pay out-of-pocket for home care are assumed to use up to 30 percent of their income to pay for care before drawing on their nonhousing assets. If nonhousing assets are depleted, the model assumes individuals return to their income to pay for home care.

FIGURE 1

BROOKINGS-ICF LONG-TERM CARE FINANCING MODEL

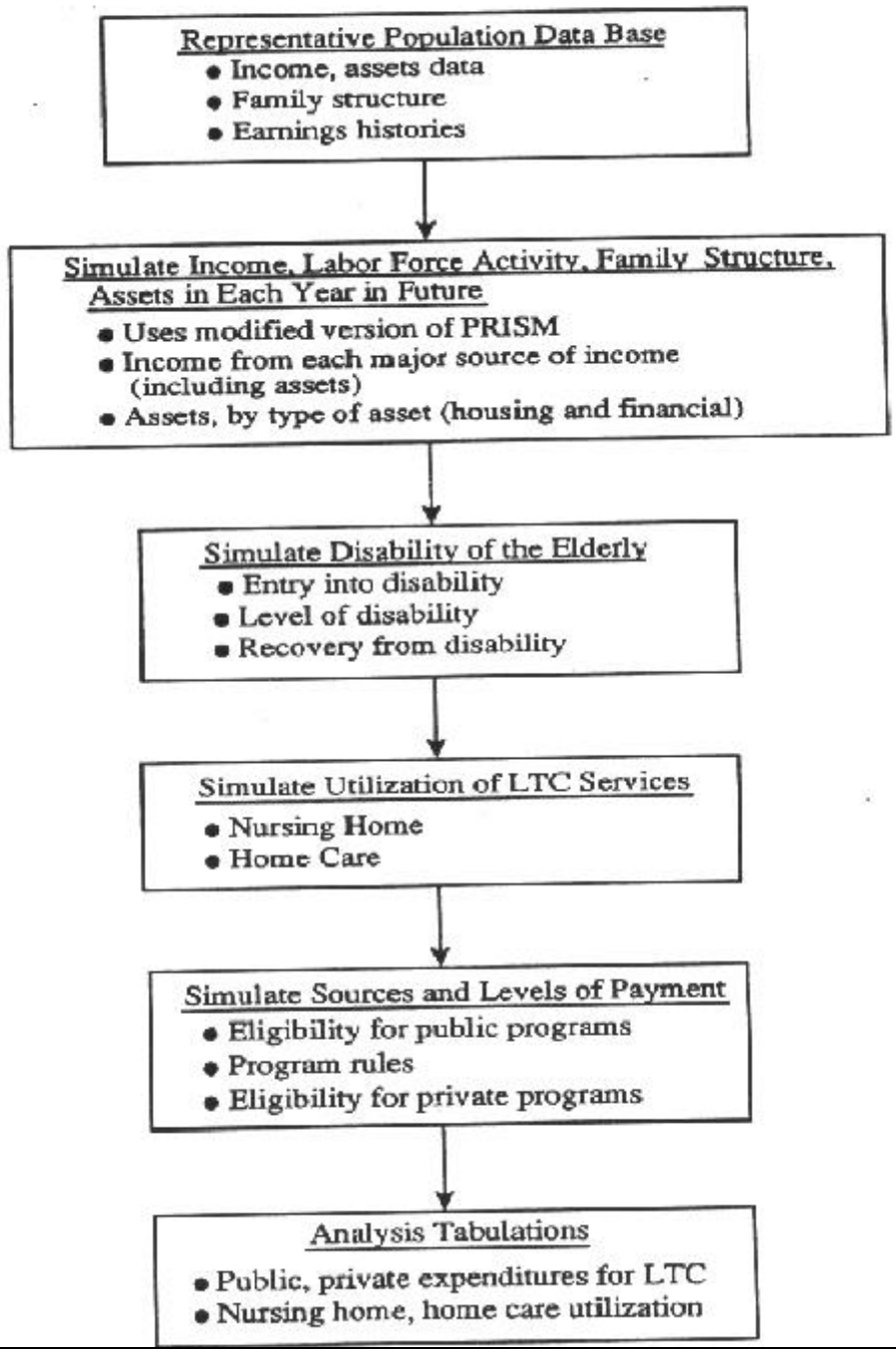

FIGURE 2

PENSION AND RETIREMENT INCOME SIMULATION MODEL (PRISM) FLOW DIAGRAM

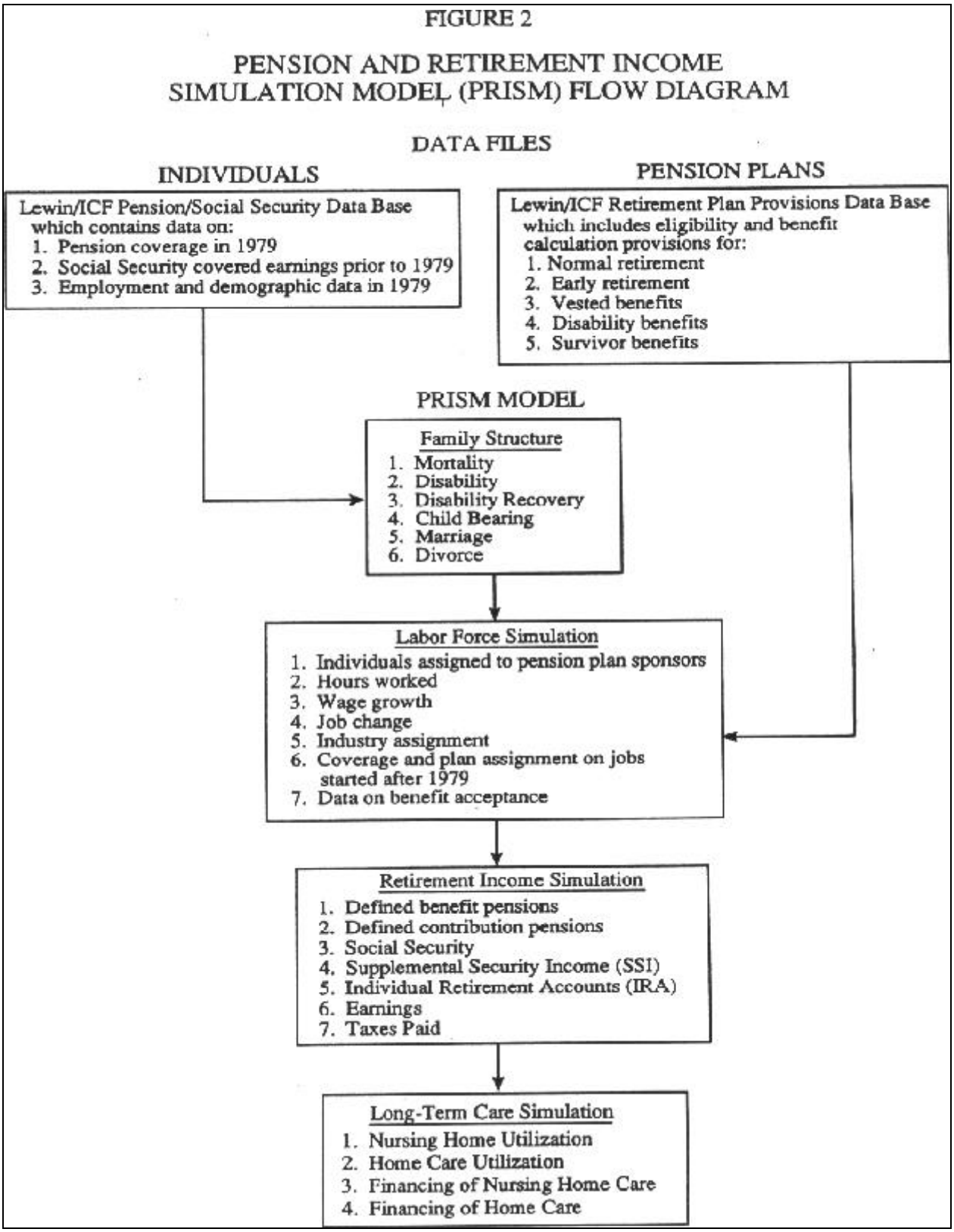

TABLE 1. Assumed Real Wage Growth	
Year	**Real Wage Growth**
1984	3.0
1985	0.8
1986	2.5
1987	2.2
1988	2.4
1989	1.4
1990	0.8
1991	1.0
1992	1.2
1993	1.6
1994	1.6
1995	1.5
1996	1.5
1997	1.6
1998	1.4
1999	1.4
2000 and later	1.3
SOURCE: Alternative II-B assumptions from the 1989 Annual Report of the Board of Trustees of the Federal Old Age and Survivors Insurance and Disability Insurance Trust Funds, April 1989.	

TABLE 2. Percent Distribution of Workers by Industry of Employment Assumed in PRISM for Selected Years (in percent)					
Industry	**1980**	**1982**	**1984**	**1990**	**2000 and After**
Mining	0.89	0.95	1.30	0.88	0.78
Construction	4.53	4.20	4.44	4.81	4.62
Manufacturing	20.78	19.08	18.73	16.32	14.09
Transportation	5.02	5.03	5.32	4.96	4.74
Trade	18.71	19.24	19.28	19.86	20.58
Finance	5.09	5.32	5.38	6.09	9.06
Service	17.55	18.50	18.50	20.34	23.08
State & Local	12.96	12.96	12.61	12.29	11.73
Federal	3.28	3.28	3.26	3.07	2.79
Self-Employed	9.55	9.85	9.63	10.08	10.45
Agriculture	1.64	1.65	1.55	1.29	1.07
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%

SOURCE: Lewin/ICF estimates based upon George T. Silverstri and John M. Ludasiewicz, "A Look at Occupational Employment Trends to the Year 2000," Bureau of Labor Statistics' Monthly Labor Review, vol. 110, no. 9, September 1987, pp. XX. (NOTE: NEED PAGE NUMBERS)

TABLE 3. Pension Coverage Assumptions			
	Industry Coverage Rate, 1979	**Industry Coverage Rate, 1983**	**Industry Coverage Rate, 1989**
Federal Government	.93	.93	.93
State and Local Government	.88	.83	.83
Mining	.82	.75	.79
Manufacturing	.76	.70	.73
Transportation	.75	.75	.77
Finance	.67	.67	.75
Construction	.43	.41	.43
Trade	.43	.46	.51
Services	.43	.47	.52
Agriculture	.19	.22	.22
Self-Employed	.14	.14	.14
SOURCE: Coverage rates for 1979 were derived from an ICF analysis of the May 1979 Current Population Survey. Coverage rates for 1983 are based on a Lewin/ICF analysis of the May 1983 EBRI/HHS CPS Pension Supplement. Coverage rates for 1989 were estimated by ICF by adjusting the 1983 coverage rates to reflect the potential impact of the nondiscrimination rules in the Tax Reform Act of 1986.			

TABLE 4. Disability Prevalence Rates for Elderly in the Community (in percent)						
	IADL Only		**1 ADL**		**2+ ADLs**	
	Married	**Unmarried**	**Married**	**Unmarried**	**Married**	**Unmarried**
65-69	3.79	4.96	1.74	2.69	3.45	3.67
70-74	5.01	6.62	2.68	3.73	5.11	4.66
75-79	6.90	8.64	3.24	5.77	7.71	7.15
80-84	10.34	11.25	6.03	8.07	12.93	11.35
85-89	11.36	13.64	7.57	11.21	21.77	15.81
90+	7.50	15.45	20.00	13.69	26.25	31.35
SOURCE: Brookings Institution and Lewin/ICF calculations using data from the 1982-84 National Long-Term Care Survey.						

TABLE 5. Annual Disability Transition Probability Matrices for Community-Based Elderly (in percent)				
Disability Level T1	**Disability Level T2**			
	Non-Disabled	**IADL Only**	**1 ADL**	**2+ ADLs**
MARRIED				
Age 65-74				
Non-Disabled	97.00	1.46	0.59	0.95
IADL Only	11.86	70.10	9.79	8.25
1 ADL	7.01	18.55	56.30	18.14
2+ ADLs	2.52	7.36	10.31	79.80
Age 75-84				
Non-Disabled	93.50	3.57	1.08	1.85
IADL Only	7.16	71.00	8.87	12.96
1 ADL	4.36	19.20	48.50	27.93
2+ ADLs	2.41	6.84	10.05	80.70
Age 85+				
Non-Disabled	82.60	7.51	3.75	6.14
IADL Only	2.37	69.20	11.85	16.58
1 ADL	3.96	7.92	48.50	39.62
2+ ADLs	0.00	6.40	8.00	85.60
UNMARRIED				
Age 65-74				
Non-Disabled	95.80	2.26	1.02	0.92
IADL Only	9.58	71.90	12.20	6.32
1 ADL	4.27	25.15	49.70	20.88
2+ ADLs	2.48	8.87	13.84	74.80
Age 75-84				
Non-Disabled	90.80	4.71	2.67	1.82
IADL Only	5.91	66.10	16.16	11.83
1 ADL	3.13	19.10	59.60	18.16
2+ ADLs	0.53	6.88	8.99	83.60
Age 85+				
Non-Disabled	25.30	28.51	24.50	21.69
IADL Only	0.45	69.10	15.23	15.23
1 ADL	0.62	11.13	56.70	31.55
2+ ADLs	0.46	2.77	7.37	89.40
SOURCE: Lewin/ICF and Brookings calculations using the 1982-84 National Long-Term Care Survey.				

TABLE 6. Mortality Adjustments Used in the Model (Ratio of Disabled Mortality Rate to Nondisabled Mortality Rate)			
Disability Level	**Age**		
	65-74	**75-84**	**85+**
IADL Only	1.9	1.2	1.0
1 ADL	2.6	1.5	1.0
2+ ADLs	3.8	2.1	1.0
SOURCE: Brookings Institution and Lewin/ICF calculations using the 1982-84 National Long-Term Care Survey.			

TABLE 7. Annual Probability of Nursing Home Entry[a]				
Age	**Prior Nursing Home Stay**		**No Prior Nursing Home Stay**	
	Single	**Married**	**Single**	**Married**
PERSONS WITH 2+ ADLS				
65	12.9	8.9	5.2	3.3
70	18.6	13.1	7.8	5.1
75	25.8	18.5	11.3	7.4
80	34.3	25.4	15.9	10.6
85	44.4	33.6	21.8	14.8
90	55.9	43.5	29.1	20.2
95	68.7	54.9	37.9	26.9
100	82.7	67.7	48.4	35.2
PERSONS WITH 1 ADL				
65	9.1	6.1	3.4	2.2
70	13.5	9.1	5.2	3.3
75	19.0	13.1	7.7	4.9
80	26.0	18.3	11.0	7.1
85	34.4	24.9	15.3	10.0
90	44.4	32.9	20.8	13.9
95	55.9	42.5	27.7	18.9
100	68.8	53.8	36.1	25.2
PERSONS WITH IADLS ONLY				
65	7.8	5.1	2.9	1.8
70	11.6	7.8	4.4	2.8
75	16.6	11.3	6.5	4.1
80	22.8	15.8	9.3	6.0
85	30.5	21.6	13.0	8.5
90	39.8	28.9	17.8	11.8
95	50.6	37.7	24.0	16.1
100	62.9	48.2	31.6	21.7

NON-DISABLED PERSONS								
Age	**Prior Nursing Home Stay**				**No Prior Nursing Home Stay**			
	Males		**Females**		**Males**		**Females**	
	Single	**Married**	**Single**	**Married**	**Single**	**Married**	**Single**	**Married**
65	7.9	3.0	6.0	2.2	0.6	0.2	0.4	0.1
70	15.2	6.2	11.9	4.7	1.3	0.4	0.9	0.3
75	26.4	12.1	21.4	9.2	2.6	0.9	1.9	0.7
80	41.8	21.7	35.3	17.1	5.2	1.8	3.8	1.3
85	60.6	35.9	53.3	29.3	10.0	3.6	7.5	2.7
90	60.6	35.9	53.3	29.3	18.2	7.0	13.9	5.2
95	60.6	35.9	53.3	29.3	31.3	13.1	24.7	9.9
100	60.6	35.9	53.3	29.3	49.8	23.4	40.8	17.9

a. Model actually uses probabilities which vary by individual year from age 65 to 100.

TABLE 8. The Probability of Nursing Home Length of Stay by Age of Entry, Marital Status and Mortality Status at Discharge						
Length of Stay (in days)	**Age of Entry**					
	65-74		**75-84**		**85+**	
	Live	**Dead**	**Live**	**Dead**	**Live**	**Dead**
1-29	11.22	17.28	14.10	18.07	14.08	15.54
30-59	3.59	9.52	7.11	6.92	6.25	7.33
60-89	1.82	5.99	1.55	3.89	2.83	2.25
90-179	7.10	7.19	3.38	6.22	3.32	5.75
180-364	2.75	8.39	2.11	7.02	2.52	7.44
365-729	1.35	6.85	1.65	8.29	1.34	9.02
730-1,094	1.16	4.33	0.74	3.69	1.59	3.74
1,095-1,469	0.60	2.60	0.81	1.96	0.62	3.66
1,470-1,824	0.51	2.20	0.29	2.09	0.49	4.23
1,825-2,189	1.30	1.30	0.00	3.11	0.20	1.61
2,190+	1.48	3.46	0.22	6.77	0.67	5.52
TOTAL	30.88	69.12	31.97	68.03	33.91	66.09
1-29	13.03	8.05	10.95	8.86	8.05	11.31
30-59	8.89	2.79	5.75	4.90	4.60	4.89
60-89	3.86	3.18	2.42	2.94	2.11	3.34
90-179	5.54	4.02	4.34	5.47	4.61	6.85
180-364	4.64	4.44	3.98	8.10	2.22	9.61
365-729	2.14	7.02	2.05	8.71	3.06	10.14
730-1,094	1.53	5.57	1.52	5.64	0.92	6.61
1,095-1,469	0.70	3.31	1.02	5.27	0.77	5.01
1,470-1,824	0.44	2.09	0.50	3.88	0.94	3.39
1,825-2,189	0.70	2.61	0.29	2.98	0.02	2.67
2,190+	1.01	14.43	1.04	9.39	0.97	7.91
TOTAL	42.49	57.51	33.87	66.13	28.27	71.73

SOURCE: Brookings Institution and Lewin/ICF calculations using data from 1985 National Nursing Home Survey.

TABLE 9. Annual Probability of Starting to Use Paid Home Care for Persons Who are Nondisabled at the Start of the Year[a] (in percent)				
Age	**Males**		**Females**	
	Single	**Married**	**Single**	**Married**
65	1.56	0.92	2.14	1.26
70	2.29	1.35	3.14	1.86
75	3.36	1.99	4.59	2.73
80	4.91	2.92	6.67	4.00
85	7.12	4.28	9.61	5.82
90	10.25	6.22	13.70	8.42
95	14.57	8.98	19.23	12.05
100	20.39	12.83	26.46	17.02
a. Model actually uses probabilities based on individual years of age from 65 to 100. SOURCE: Brookings Institution and Lewin/ICF estimates based on data from the 1982-84 National Long-Term Care Survey.				

TABLE 10. Annual Probability of Starting to Use Paid Home Care Services for the Community-Based, Chronically Disabled Elderly (in percent)		
Disability Level	**Males**	**Females**
IADL Only	12.9	22.0
1 ADL	15.9	26.6
2+ ADLs	16.6	27.7
SOURCE: Brookings Institution and Lewin/ICF estimates based upon analysis of the 1982-84 National Long-Term Care Survey.		

TABLE 11. Paid Home Care Length of Use for Community-Based Elderly		
Duration	**Percentage Distribution**	**Assigned Number of Months**
Less than 3 months	59.0	2.0
3-6 months	14.2	4.5
6-12 months	9.6	9.0
12-36 months	7.1	24.0
36-60 months	7.0	48.0
60+ months	3.1	72.0
SOURCE: Brookings Institution estimates based on data from the 1984 National Long-Term Care Survey.		

TABLE 12. Monthly Number of Formal Visits by Paid Home Care Disability Level (in percent)			
Monthly Number of Visits	**Formal Home Care Disability Level**		
	IADL Only	**1 ADL**	**2+ ADLs**
1-10	69.9	59.1	38.7
11-20	8.4	8.0	11.8
21+	21.7	32.9	49.5
TOTAL	100.0%	100.0%	100.0%
SOURCE: Brookings Institution and Lewin/ICF calculations using data from 1982-84 National Long-Term Care Survey.			

TABLE 13. Percentage Distribution of Medicare Visits for Persons Receiving Medicare Home Health Visits (in percent)	
Number of Reimbursed Visits	**Probability**
1-9	39.9
10-20	23.3
21-30	12.1
31-40	7.1
41.50	4.6
51-99	8.5
100+	4.1
	100.0
SOURCE: Brookings Institution and Lewin/ICF calculations using Health Care Financing Administration data from the Medicare statistical system.	

TABLE 14. Annual Medicare Home Health Admission Rate for Community-Based, Non-Chronically Disabled Persons (in percent)		
Age	**Male**	**Females**
65-74	3.06	3.32
75-84	4.77	4.75
85+	9.35	16.41
SOURCE: Brookings Institution and Lewin/ICF calculations using the 1982-84 NLTCS data and 1984 Medicare statistical system data.		

TABLE 15. Medicare Home Health Length of Use Distribution for Non-Chronically Disabled Users	
Length of Use	**Percentage Distribution**
1 month	58.6%
2 months	19.6
3 months	9.2
4 months	3.0
5 months	3.0
6 months	2.6
7 months	0.6
8 months	0.7
9 months	0.7
10 months	0.7
11 months	0.7
12 months	0.6
TOTAL	100.0%
SOURCE: Brookings Institution and Lewin/ICF calculations using HCFA Medicare Statistical System data.	

TABLE 16. Average Daily Rates for Nursing Home Care by Source of Payment in 1988	
Payer	**Charge Per Day**
Medicaid	$55.30
Private Payer	$75.90
Medicare	$129.50
SOURCE: Brookings Institution and Lewin/ICF calculations using data from the 1985 National Nursing Home Facility File. Medicare estimates taken from HCFA cost estimates for the Medicare Catastrophic Coverage Act, 1988.	

TABLE 17. Average Price Per Visit for Home Care by Source of Payment in 1988	
Payer	**Charge per Visit in 1988**
Medicaid	$48.70
Medicare	$51.10
Out-of-Pocket	$12.50
Other Payer	$25.20
SOURCE: Brookings Institution and Lewin/ICF calculations using data from the 1982-84 NLTCS.	

APPENDIX 2. DETAILED ACTUARIAL METHODOLOGY

Insurance premiums have a benefit portion (known to economists as the “actuarially fair premium" and to actuaries as the "net premium") and an administrative and profit portion. Using output from the Brookings-ICF Long-Term Care Financing Model, the basic pricing strategy is to make the present value of the benefit stream equal to the present value of the benefit portion of the premium and then to apply a factor to account for administrative and profit costs. In brief, the methodology has four main steps:

First, in order to calculate the present value of benefits, it is assumed that different age cohorts (e.g., 65-69, 70-74) purchase an insurance policy with a specific set of benefits. The stream of benefit expenditures is simulated in the model for each year between 1986 and 2020. The benefits are then discounted to find the present value of the payment stream in 1986. The benefit stream implicitly discounts for mortality.

Second, in order to calculate the present value of premiums, it is assumed that each cohort pays annual premiums of $120 per year. The aggregate stream of premium payments for each cohort is simulated in the model for each year between 1986 and 2020. Again, the premium stream is discounted back to 1986. The premium stream also implicitly discounts for mortality.

Third, in order to estimate the cost of the actuarially fair premium, the ratio of the present value of aggregate benefit payments to the present value of aggregate premiums is calculated. This establishes the ratio of benefits to premiums actually paid. Multiplying the ratio by $120 yields the actuarially fair premium per year.

Fourth, to calculate the final premiums, the actuarially fair premium is divided by the loss ratio. A loss ratio of 70 percent is used for individual policies and 80 percent for group products.

I. Issues in the Calculation of the Actuarially Fair Premium

There are numerous issues that must be addressed in the calculation of the actuarially fair premium, including benefit structure, payment rates and inflation adjustments, type of premium, medical underwriting, lapse rates, induced demand, discount rates, and other issues that are unique to the use of the Brookings-ICF Long-Term Care Financing Model.

A. Benefits

Policies examined cover two, four, or unlimited years of nursing and home care after a deductible (60 days for nursing home care and 30 visits for home care). The benefit stream excludes any Medicare nursing home and home care services. Home care benefits are available only to persons with problems with two or more activities of daily living (out of a possible five--eating, bathing, dressing, toileting and transferring) or who are cognitively impaired. These policies have a lifetime maximum equal to the length of covered stay for each service. That is, there are separate lifetime maximums for nursing home care and for home care (e.g., the two year policy would have a lifetime maximum of two years of nursing home care and two years of home care).

The deductible is applied on a spell-of-illness basis. Thus, nursing home stays interrupted by a hospital stay or a short discharge is subject to a single deductible. There is a "waiver of premium" for people receiving nursing home care under the policy. People receiving home care continue to pay premiums.

B. Payment Rates and Inflation Adjustments

Initial payment rates for all policies are $60 per day for nursing home care and $30 per visit for home care. Three different approaches to inflation protection were examined. The first approach does not index benefits. That is, payment rates are $60 for nursing home care and $30 for home care for all years. The second approach is simple-inflation adjustment, where benefits increase by a fixed dollar amount each year. Nursing home and home care payment rates increase by $3.30 and $1.65 a year, respectively, which represents 5.5 percent of the initial indemnity amount. Unlike most currently marketed policies which offer this adjustment only for 10 to 20 years or up to ages 80 or 85, the simulated policy provides this adjustment for an unlimited number of years. Finally, the third approach provides a compound adjustment, where the payment rate was indexed by a predetermined annual percentage that compound over time. The fixed percentage is 5.5 percent per year, which is the assumed rate of increase in long-term care prices in the Brookings-ICF Long-Term Care Financing Model.

C. Level or Indexed Premiums

Virtually all current long-term care insurance policies have level premiums. That is, unless premiums are raised for all persons in a class, the premiums remain the same throughout the life of the policy. From an affordability standpoint, this clearly makes sense for the elderly, who tend to have fixed or declining real incomes. Level premiums make less sense for the nonelderly whose incomes over time will be rising in real or at least in nominal terms. In our premium estimates, most policies are calculated assuming level premium payments. However, some premiums were estimated that increase at 5.5 percent per year and others that increase at 5.5 percent a year until age 65 and then

increased more moderately at 4.0 percent or then held level. Indexed premiums are estimated by adjusting the stream of $120 premium payments by the indexing factor.

D. Medical Underwriting

Private insurers do not sell policies to people they think have good chance of using covered services in the near future. This medical underwriting is approximated in the Brookings-ICF Long-Term Care Financing Model by allowing only nondisabled persons to buy policies. Nondisabled individuals include persons with no problems with the activities of daily living or the instrumental activities of daily living.

Most insurance companies are more restrictive than this and also exclude people with certain medical diagnoses, which may not manifest themselves in functional problems. These additional restrictions were not simulated because medical condition data are not in the model and randomly dropping some percentage of individuals to account for these restrictions seemed too arbitrary. Moreover, it is not clear that the conventional medical underwriting identifies the population most likely to use long-term care services. Acute medical conditions and need for long-term care services are only weakly correlated. For example, in an analysis using the 1986 National Mortality Followback Survey, Murtaugh and Kemper found that persons likely to be excluded form purchasing private long-term care insurance were no more likely to use nursing home care than persons likely to be accepted.[1] In another analysis by the authors of the 1982 National Long-Term Care Survey, medical conditions were relatively poor predictors of paid home care use. Liu and others found similar results based upon Channeling data.[2]

The practical effect of not simulating medical restrictions may be minimal. A standard actuarial assumption is that the effects of medical underwriting wear off after 5 to 15 years and then service use approximates that of the general population. Our own comparisons of simulations where only the nondisabled may buy policies with those where the total population may buy produce a stream of benefits that is consistent with this actuarial assumption.

E. Lapse Rates

For a variety of reasons, not all persons who initially purchase a policy make premium payments until death. Any lapse reduces premiums because fewer benefit payments must be paid. In addition, since insurers will receive premium payments for a period of time without having to pay claims, they can "subsidize" the premiums of policyholders who do

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[1] Christopher M. Murtaugh and Peter Kemper, “Risky Business: Long-Term Care Insurance Underwriting,” presented at the American Public Health Association Annual Meeting, New York, NY, October 3, 1990.

[2] Korbin Liu, Tim McBride, and Terri Caughlin, “Community Care Costs of Disabled Elderly Persons: Implications for Policy Options,” Urban Institute Working Paper 3805-01 (Washington, DC: The Urban Institute, 1989), Table 2, p. 11.

not lapse. Most of the premium estimates are calculated assuming no lapses. Although this is unlikely in the real world, it is actuarially equivalent to a nonforfeiture value equal to the "full asset share."

Premiums were also calculated using a nonzero "lower" and a "higher" lapse rate. Lapses are calculated as a percent of existing policies for that year. The "lower" lapse rate assumes 5 percent lapses a year for two years, then 3 percent a year for six years, and then 0 percent lapse. The "higher" lapse rate assumes 15 percent a year for three years, 5 percent a year for six years, and then 2 percent a year for the next ten years, then 0 percent lapses per year.

The effect of lapse rates were calculated outside of the model. The effect of lapse rates were calculated by multiplying the aggregate benefit and premium stream by the percent lapses. For example, assuming a 5 percent annual lapse rate for the first two years and then a 3 percent annual lapse rate, the premium streams are adjusted by multiplying the first year's aggregate premiums by .95, the second year's aggregate premiums by .90 (i.e., .95 x .95), the third year's premiums by .88 (ie., .95 x .95 x .97), etc. A similar procedure is applied to the benefits stream.

This procedure implicitly assumes that the people likely to drop the policy are no different from those who are likely to retain the policy (i.e., no adverse or favorable selection). There are two competing scenarios that probably make this assumption valid in the aggregate. On the one hand, one might expect the healthier people to be more likely to drop their policies. On the other hand, people developing Alzheimer's Disease and other cognitive problems are less likely to keep their policies in force through timely payment of premiums.

Most insurers, however, assume some adverse selection in their lapse assumptions. That is, the healthier population is more likely to drop the policies. Thus within the range of lapses examined, our estimates probably reflect an upper-bound estimate of the effect of lapse rates.

F. Induced Demand

Private insurance will almost certainly increase use of nursing homes and home care services, largely because the out-of-pocket cost of services will decline and conventional economics argues that people buy more of a good or service when it costs less. How much use will increase is uncertain and the empirical evidence on which to base the assumptions is very weak.[3] In estimating these premiums, it was assumed that there would be a 20 percent increase in nursing home use by the insured and an 80 percent

[3] Teresa Fama and David L. Kennell, "Should We Worry About Induced Demand?" Generations, vol. 14 (Spring 1990), pp. 37-41.

increase in home care use. Based on judgments on how quickly the supply of nursing home and home care services could change, the increase in nursing home use was phased in over 10 years but the increase in home care use was immediate. This percentage increase represents a combination of an increase in the number of users, length of nursing home stays or number of home care visits by users of the service, as well as disability "creep" (i.e., people with lower levels of disability who claim to have a higher level of disability in order to qualify for benefits). In order to calculate this increase, the present value of the benefits was multiplied by the applicable increase in use.

G. Discount Rates

Virtually all private long-term insurance policies are designed to build up substantial reserves in the earl years for payout in the later years. Thus, the rate of return earned on the reserves is a critical factor in calculating premiums. Obviously, there is no way to know how well the economy will function 30 to 60 years into the future. Between 1974 and 1982, the average real interest rate on 90-day Treasury bills and AAA corporate bonds were 0.5 and 2.2 percent, respectively.[4] Between 1983 and 1988, the average real rate of return on 90-day Treasury bills and AAA corporate bonds were 4.1 and 7.4 percent, respectively. The Technical Panel to the 1991 Advisory Panel on Social Security urged that the real interest rate assumption used by the Social Security Actuaries for their mid-range, assumption II-B projection be raised from 2.0 percent to 2.8 percent.[5]

For our premiums, we used a range of 6.5, 7.5 and 8.5 percent, which represents 2.5, 3.5 and 4.5 percent above the projected consumer price index over the long-run. We used 7.5 percent, 3.5 percent real interest, as our parameter to estimate most of our premiums.

H. Completing the Benefit and Premium Stream for the Young Elderly

A few people who are age 65-69 in 1986 will not have completed their long-term care use or premium payments by 2020 when the Brookings-ICF Long-Term Care Financing Model simulation ends. We base their subsequent experience on the rate of decline in the premium and benefit streams at very old ages by using model data on the older cohorts (75-79 and 80-84) who have finished their experience.

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[4] Charles L. Schultze, "The Federal Budget and the Nation's Economic Health," Setting National Priorities: Policy for the Nineties, Henry J. Aaron, editor, (Washington, D.C.: The Brookings Institution, 1990), Table 2-4, p. 28.

[5] Social Security Technical Panel, Report to the 1991 Advisory Panel on Social Security, (Baltimore, MD: U.S. Government Printing Office, 1990), p. 24.

I. Calculating Premiums for Under-65 Population

The Brookings-ICF Long-Term Care Financing Model simulates long-term care use and premium payments of persons aged 65 and older from 1986 through 2020. This means that the premium and benefit streams of the under-65 population must be calculated outside the model. These calculations require a complicated methodology which adjusts the experience of the 65-69 year old cohort to proxy the long-term care use of the three under-65 cohorts (ages 40-44, 50-54, and 60-64) for which premiums are calculated.

1. Completing the Experience of the 65-69 Cohort

The methodology requires completing the experience of the 65-69 cohort by extending their premium and benefit streams beyond the simulated time period--both back to the time when they were age 40-44 and forward through death. This requires separate adjustments for both the premium and benefit streams. On the premium side, adjustment is made for the fact that within a given cohort there are more people alive at younger ages to pay premiums. Using the Social Security Administration II-B life table unique to the 65-69 cohort, the premium stream for each age between 42 and 66 is calculated by computing the ratio of people alive at younger ages relative to the number alive at age 67 (the mid-point between age 65 and 69).[6] For example, if the life table estimates that there are 18 percent more people alive at age 55 than at age 67, then we would multiply the premium payments at age 67 by 1.18 to estimate the premium payment at age 55.

On the benefit side, the use of long-term care services by the nonelderly population must be estimated. Although use is extremely low at younger ages, there is some utilization for which insurance benefits would be paid. Using data from the Health Care Financing Administration, aggregate nursing home expenditures for each age between age 42 and 66 were estimated.[7] With these estimates, the ratio of nursing home expenditures at each age relative to expenditure at age 67 was computed. A benefit stream for both nursing home and home care for each age between 42 and 66 using the age-specific ratios. For example, the nursing home expenditure at age 42 is 41 percent of the expenditure at age 67. We estimate the expenditure at age 42 by multiplying the age 67 expenditure by 0.41. To simulate underwriting at earlier ages, we reduce this newly estimated expenditure by a third to account for persons with congenital or early onset disability (e.g., mental retardation, multiple sclerosis, spinal cord injury) who would not be able to purchase private insurance.

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[6] This life table was provided by Alice Wade, Office of the Actuary, Social Security Administration.

[7] Daniel R. Waldo and others, "Health Expenditures by Age Group, 1977 and 1987," Health Care Financing Review, vol. 10 (Summer 1989, pp. 111-120, Tables 3 and 4.

2. Constructing Experience of the Under-65 Population

The experience of the 65-69 cohort from the time that they were age 40-44 through death is used as a "blueprint" from which the experience of younger cohorts is constructed, taking into account that younger cohorts will live longer and presumably have greater long-term care use than the 65-69 cohort. Age-specific changes in mortality are calculated using Social Security Administration II-B life tables unique to each of these younger cohorts.[8] Premium and benefit streams were adjusted from our "blueprint" to account for improvements in mortality between the younger cohorts and the 65-69 cohort. For example, comparing life table projections, there will be 28 percent more people alive at age 85 in the 40-44 cohort than in the 65-69 cohort. The 40-44 cohort's expenditures at age 85 were estimated by multiplying the 65-69 expenditure at age 85 by 1.28.

3. Insuring Only Non-Disabled vs. Total Population

Even though we can construct the experience of people purchasing insurance under the age of 65 from the medically underwritten 65-69 cohort, we have not yet accounted for the effects of medical underwriting at different ages. Since disability is strongly related to age, fewer people will be able to purchase insurance at ages 65-69 than at younger ages. Only a very small percentage of people under the age of 65 are disabled. Therefore, the future long-term care use of the population buying insurance under age 65 is best approximated by the long-term care use of the 65 and older population as a whole, rather than by the use of a medically-underwritten population. To account for this, we adjust the benefit streams of the under age 65 cohorts by a factor that accounts for their additional long-term care use. This factor is the ratio of the premium for a policy where the entire population is allowed to purchase long-term care insurance to the premium for a policy where only the nondisabled may buy. Starting with the 40-44 cohort, there is a gradual transition from a non-underwritten based set of benefits to a medically underwritten set of benefits by age 65-69.

4. Inflation

When benefits are indexed for inflation in the model, the experience of the 65-69 cohort cannot be used as a proxy for the under-65 population until adjusted for the fact that younger cohorts will be using long-term care farther into the future and, thus, will be subject to a longer period of inflation. The long-term care use of the 40-44 cohort by the time they are at highest risk of needing long-term care in their eighties, will be reimbursed at a higher rate than the use of the 65-69 cohort. For example, the benefit stream for the 40-44 cohort must account for the fact that they will use long-term care most intensively 25 years after the 65-69 cohort. Therefore, an additional 25 years of inflation adjustment must be added to the benefit stream of the 65-69 cohort.

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[8] This life table was provided by Alice Wade, Office of the Actuary, Social Security Administration.

II. Administrative and Other Load Factors

In addition to paying benefits, the insurance premium charged consumers must cover administrative and marketing costs, profits and taxes. The percentage of the total premium that goes to pay benefits is known as the "loss ratio." The National Association of Insurance Commissioners' model regulation suggests a minimum loss ratio of 60 percent for individual products and there has been discussion of a 70 percent loss ratio for group products.[9] Since the goal of this analysis is to estimate premiums for better-than-the-current-market policies, a higher loss ratio was assumed--70 percent for individual policies and 80 percent for group products. To derive the final premium to be paid by consumers, the estimated actuarially fair premium was divided by .7 and .8, respectively.

[9] National Association of Insurance Commissioners, Long-Term Care Insurance Model Regulation (Kansas City, Mo.: December 7, 1990), p. 16.

APPENDIX 3. COMPARISON OF PROTOTYPE PREMIUMS WITH CURRENTLY MARKETED LONG-TERM CARE INSURANCE POLICIES AND WITH NAIC ACTUARIAL TASK FORCE'S AND ACTUARIAL RESEARCH CORPORATION'S ESTIMATED PREMIUMS

One partial test of the reasonableness of the estimated premiums for. private long-term care insurance policies is to compare them with currently marketed insurance products and with other estimates of prototype policies. Our prototype policies are likely to be somewhat higher in cost than current policies in the market place because they provide better inflation protection, more home care, assume a lower lapse rate, have higher lifetime benefits, and do less medical underwriting marketplace. Somewhat offsetting these factors is the use of higher loss ratios than are commonly used for actual products.

Comparisons with currently marketed policies are, by necessity, very rough because no two policies are exactly alike. Policies vary in the initial indemnity benefit, deductible periods, length of coverage, treatment of lifetime maximums, and so on. Reflecting the lack of actual experience to date, there is a tremendous variation across premiums for currently marketed insurance policies. There is no evidence that any of the premiums associated with existing policies are necessarily the "right" or "correct" ones. To make the policies more comparable, we have used our "higher" lapse rate assumptions.[1] Informal conversations with insurers suggest that their market experience to date is roughly in line with these assumptions.

Based on a comparison with "real world" policies, our estimated premiums for prototype policies appear reasonable. Table 1, which compares the prototype to the Health Insurance Association of America-calculated average for four-year unindexed policies and policies where the indemnity benefit increases by a fixed amount per year, shows that the prototype policy and the average policy have roughly the same premiums.[2] Table 2, which examines policies that provide inflation protection on a compounded basis, shows that our prototype premiums are somewhat more expensive than the Prudential policy but somewhat less expensive than the UNUM policy. Table 3, which compares

[1] The high lapse assumption is 15 percent a year lapses for the first three years, 5 percent a year for six years, then 2 percent a year for 10 years, then 0 percent, thereafter.

[2] Health Insurance Association of America, "Highlights of HIAA Long-Term Care Insurance Survey," (Washington, D.C.: Health Insurance Association of America, 1990), Table 4.

policies with unlimited benefits, shows the prototype policies to have premiums between those for the AMEX and CNA policies. In Table 4, which compares policies with unindexed reimbursement levels, the prototype premiums are less expensive than the Midland and AMEX product but more expensive than the CNA policy. Finally, Table 5, which compares group products, shows that the prototype premiums are more expensive than Traveler's (although less so at older ages) and less expensive than the Principal Group's product.[3]

Premium estimates by the National Association of Insurance Commissioners (NAIC) Actuarial Task Force provide a second comparison (Table 6). Brookings premiums are higher than NAIC Task Force estimates, but are generally in the same range. There are several pricing assumption differences that may account for the variation. First, the Brookings policy offers a more generous home care benefit. Second, Brookings premiums provide a .5 percent higher inflation adjustment rate. Third, Brookings premiums assume a .5 percent lower discount rate. Fourth, the NAIC Task Force premiums are priced for a slightly younger ages. Finally, although it is not certain, the NAIC Task Force appears to assume a higher loss ratio.

Comparisons were also made with other prototype policy estimates. In particular, the Actuarial Research Corporation (ARC) estimated premiums for our policies covering 2, 4 and unlimited years of nursing home and home care. Table 7, which compares the Brookings and ARC estimates, shows that the ARC premiums are uniformly more expensive than our estimates. This is mostly due to their higher estimates of the costs of home care and to the higher cost of nursing home care at younger ages of purchase.

In sum, the premiums estimated in this study appear to be in the "ballpark" of currently marketed policies, once higher lapse rates are assumed. In most cases, they are also of the same order of magnitude as premiums estimated by the NAIC Actuarial TAsk Force. As expensive as they are, our premiums are below those estimated for the prototype policies by the Actuarial Research Corporation, a well-known and respected actuarial firm. Thus, there is little reason to believe that our premiums are higher than they should be.

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[3] All of the comparison products had some type of nonforfeiture value. While we could not model it directly, we tried to approximate its effect by using a "lower" lapse rate assumption than we used in calculating individual products with no nonforfeiture value. In addition, the use of a payroll deduction system in group products should also reduce lapse rates somewhat.

TABLE 1. Comparison of Brookings Premium Estimates With Health Insurance Association of America's (HIAA) Survey of Premiums				
Age	**Unindexed**		**Simple Inflation Adjustments**	
	Brookings*	**HIAA Average***	**Brookings***	**HIAA Average+**
50-54	$431	$483	$616	$658
65-69	1,195	1,135	2,105	1,395
75-79	2,605	3,841	3,874	4,199

SOURCE: Health Insurance Association of America.
* = $80 per day reimbursement, 60 day deductible, and 4 years of coverage. Lapse rate assumptions: 15 percent for three years, 5 percent for six years, 2 percent for ten years, then 0 percent thereafter.
+ = $80 per day reimbursement, 20 day deductible, and 4 years of coverage. Policies are priced at ages 50, 65, and 79.

TABLE 2. Comparison of Individual Policies with Compound Inflation Adjustments (Nursing Home and Home Care)			
Age Range	**Brookings***	**Prudential+**	**UNUM#**
40-44	$700	N/A	N/A
50-54	919	$999	$989
60-64	1,427	1,446	1,796
65-69	2,051	1,914	2,539
70-74	2,741	2,694	3,976
75-79	3,281	3,534	6,800
80-84	4,051	N/A	N/A

SOURCE: Lewin/ICF, "Comparison of Private Long-Term Care Insurance Policies," (Washington, D.C.: Lewin/ICF, August 6, 1990).
* = $60 per day, 60 day deductible, 4 years of coverage, 5.5 percent indexing. Lapse rate assumptions: 15 percent for three years, 5 percent for six years, 2 percent for ten years, then 0 percent thereafter.
+ = $75 per day, 90 day deductible, 3 years of coverage, 5 percent indexing. Policies are priced for ages 52, 62, 67, 72, and 77.
# = $82 per day, 90 day deductible, 3 years of coverage, 3 percent indexing. Policies are priced for ages 52, 62, 67, 72, and 77.

TABLE 3. Comparison of Individual Unlimited Benefit Policies (Nursing Home and Home Care)			
Age Range	**Brookings***	**AMEX+**	**CNA#**
40-44	$931	N/A	N/A
50-54	1,210	$1,912	$398
60-64	1,862	2,526	1,043
65-69	2,657	3,007	1,556
70-74	3,700	3,936	2,582
75-79	4,229	5,832	4,370
80-84	5,560	N/A	N/A

SOURCE: Lewin/ICF, "Comparison of Private Long-Term Care Insurance Policies," (Washington, D.C.: Lewin/ICF, August 6, 1990).
* = $60 per day, 60 day deductible, 5.5 percent compounded inflation adjustment. Lapse rate assumptions: 15 percent for three years, 5 percent for six years, 2 percent for ten years, then 0 percent thereafter.
+ = $80 per day, 20 day deductible, 5 percent simple inflation adjustment. Policies are priced for ages 52, 62, 67, 72, and 77.
# = $60 per day, 15 day deductible, 5 percent simple inflation adjustment. Policies are priced for ages 52, 62, 67, 72, and 77.
NOTE: CNA premiums are based on placement into one of four health status groups. The premiums shown are for the healthiest group. Depending on health status of the applicant, premiums may be up to two times higher.

TABLE 4. Comparison of Unindexed Individual Policies (Nursing Home and Home Care)				
Age Range	**Brookings***	**Amex+**	**CNA#**	**Midland@**
40-44	$217	$N/A	$N/A	$N/A
50-54	324	407	181	N/A
60-64	578	636	425	N/A
65-69	899	937	587	1,604
70-74	1,469	1,442	955	2,462
75-79	1,959	2,530	1,676	3,696
80-84	2,863	N/A	N/A	N/A

SOURCE: Lewin/ICF, "Comparison of Private Long-Term Care Insurance Policies," (Washington, D.C.: Lewin/ICF, August 6, 1990).
* = $60 per day, 60 day deductible, 4 years of coverage and unindexed. Lapse rate assumptions: 15 percent 1 year for 3 years, 5 percent a year for 6 years, 2 percent a year for 10 years, 0 percent thereafter.
+ = $60 per day, 100 day deductible, 4 years of coverage, and unindexed indemnity benefit. Policy is prices for ages 52, 62, 67, 72, and 77.
# = $60 per day, 90 day deductible, 4 years of coverage and unindexed indemnity benefit. Policy is prices for ages 52, 62, 67, 72, and 77.
@ = $60 per day, 60 day deductible. Four years of coverage, and unindexed indemnity benefit. Policy is prices for ages 52, 62, 67, 72, and 77.
NOTE: CNA premiums are based on placement into one of four health status groups. The premiums shown are for the healthiest group. Depending on health status of the applicant, premiums may be up to two times higher.

TABLE 5. Comparison of Group Policies				
Age Range	**Brookings***	**Brookings+**	**Principal Group#**	**Travelers@**
40-44	$209	$686	$197	$209
50-54	320	913	413	419
60-64	576	1,445	857	951
65-69	879	2,662	1,209	1,477
70-74	1,420	2,713	1,765	2,161
75-79	1,880	3,217	3,317	2,984
80-84	2,679	3,854	N/A	N/A

SOURCES: Marketing materials for PrinCare Long Term Care program sent to authors from Peggy Blake, Assistant Underwriter, Sponsored Benefits, The Principal Financial Group, Des Moines, IA, October4, 1990.

Marketing materials for Travelers Long Term Care sent to authors from Linda Stent, Manager, Long Term Care, Employee Benefits Department, The Travelers Companies, Hartford, CT, October 6, 1989.

* = $60 per day, 60 day deductible, 4 years of coverage and unindexed, indemnity benefit. Lapse rate assumptions: 5 percent a year for 2 years, 3 percent a year for 6 years, 0 percent thereafter. Loss ration = 80 percent.
+ = $60 per day, 60 day deductible, 4 years of coverage and 5.5 percent compound adjustment to indemnity benefit. Lapse rate assumptions: 5 percent a year for 2 years, 3 percent a year for 6 years, 0 percent thereafter.
# = $60 per day, 60 day deductible, 5 years of coverage, and simple inflation adjustment to indemnity benefit. Policy is priced for ages 42, 52, 62, 67, 72, and 77.
@ = $60 per day, 90 day deductible, based on CPI up to 5 percent compounded inflation adjustment to indemnity benefit. Policy is priced for ages 42, 52, 62, 67, 72, and 77.
NOTES: Travelers, and Principal Group premiums derived from marketing materials, not actual policies. Rates vary depending on plan design and state insurance regulations.

TABLE 6. Comparison of Brookings Premium Estimates with National Association of Insurance Commissioners' Actuarial Task Force Premiums

Unindexed				Simple Adjustments				Compound Adjustment			
NAIC+ Age		Brookings* Age		NAIC+ Age		Brookings* Age		NAIC+ Age		Brookings* Age	
50	$167	50-54	$431	50	$312	50-54	$616	50	$480	50-54	$1,222
65	1,078	65-69	1,195	65	1,656	65-69	2,105	65	1,920	65-69	2,728
75	2,873	75-79	2,605	75	3,816	75-79	3,874	75	4,080	75-79	4,364

SOURCE: National Association of Insurance Commissioners Long-Term Care Actuarial Task Force, Inflation Protection and Nonforfeiture Benefits in Long-Term Care Insurance Policies (Kansas City, MO.: November 30, 1990).

* = $80 per day, 4 years of coverage, nursing home and home care. Inflation adjustment = unindexed: no adjustment to reimbursement rate; simple: reimbursement rate increases by 5.5 percent of initial indemnity value; compound: reimbursement rate increases at 5.5 percent per year. Lapse rate: 15 percent for three years, 5 percent for six years, 2 percent for ten years, then 0 percent thereafter; 60 day deductible; 5.5 percent inflation adjustment. 7.5 percent nominal discount rate.

+ = $80 per day, 4 years of coverage, nursing home and home care. Inflation adjustment = unindexed: no adjustment to reimbursement rate; simple: reimbursement rate increases at 5 percent of initial indemnity value; compound: reimbursement rate increases at 5 percent per year. Lapse rates: 2 percent first year; 15 percent second year; 10 percent third year; 5 percent fourth year; 30 day deductible; 5.0% inflation adjustment. 8.0 percent discount rate. Authors' calculations of NAIC Task Force data.

TABLE 7. Comparison of Prototype Premium Estimates: Brookings and Actuarial Research Corporation (ARC)

Age	2 Years		4 Years		Unlimited	
	Brookings	ARC	Brookings	ARC	Brookings	ARC
40-44	$574	$1,317	$829	$1,808	$1,101	$2,182
50-54	777	1,570	1,120	2,164	1,479	2,625
60-64	1,251	2,113	1,809	2,927	2,373	3,585
65-69	1,799	2,547	2,607	3,536	3,413	4,382
70-74	2,326	3,037	3,424	4,227	4,699	5,306
75-79	2,747	3,609	4,073	5,037	5,366	6,405
80-84	3,073	4,159	4,800	5,804	6,860	7,393

SOURCE: Actuarial Research Corporation.

- Coverage = Number of years of covered nursing home care after a 60 day deductible and number of years of covered home care coverage after a 30 visit deductible.
- Reimbursement rate = Pays $60 per day for nursing home care and $30 per visit for home care.
- Inflation adjustment = Benefits increase at 5.5 percent per year.
- Individual product = 70 percent loss ratio.
- Type of premium = Level.