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LONG-TERM CARE INSURANCE

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Long-term Care Insurance

A Guide to Product Design and Pricing

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1 Introduction

- 1.1 Long-term care and long-term care insurance are subjects that have been much discussed and written about over the last year or two, both in the general media and in actuarial/insurance circles. The majority of this discussion has centred around the growing demand for formal long-term care and the possible ways that it could be financed and delivered.
- 1.2 In political circles a consensus seems to have arisen that some form of insurance could have a significant role to play in providing, or at least financing, long-term care. This has led to a view within the insurance industry that long-term care insurance (LTC insurance) could develop into an important market. This is a consensus with which we agree, although with the market at such an early stage of development and subject to a number of political decisions it is impossible to predict its eventual size or shape with any degree of accuracy.
- 1.3 Rather less has been written on the practicalities of designing, pricing, and underwriting LTC insurance, or upon the areas of uncertainty that must be monitored and controlled if this product is to be successful. However this is an important area for actuaries and for insurance companies involved with these products, and one in which best practice is not yet obvious.
- 1.4 This paper attempts to provide a guide to some of the practical issues of developing and marketing LTC insurance. It is aimed at those who are relatively new to this field, yet need to quickly familiarise themselves with the issues surrounding LTC insurance product design and pricing.
- 1.5 In writing this paper we have concentrated on the sources of data that we have found most useful while working in this field, and tried to address areas where we faced problems. We recognise that in doing so we will not have provided a comprehensive survey of the literature, and that there may be other interesting and valuable sources, which we may have overlooked. Nevertheless we hope this paper will be of use.
- 1.6 The structure of this paper is as follows. In section two we give a brief overview of the demand for long-term care, how it is provided, how it is financed and how this may change in the future. While the focus of this paper is on product design and pricing, we believe that such a background is useful to understand the market for LTC insurance. In this section we also discuss the state of the LTC insurance market today.
- 1.7 Section three considers the basic product designs that exist today and others that may be introduced. While these designs differ in many ways they share a host of features and these are discussed together in section four. While we recognise the importance of immediate care annuity products, the thrust of our discussions is around pre-funded products. This is the area in which there have been most sales to date and which we believe will see most activity in the future.

- 1.8 Section five addresses the complexities of actually pricing a long-term care contract and considers the data sources available and the assumptions required in setting a pricing basis. Again we have focused on pre-funded products, however we hope that the information provided will be of some use to those working with other, related, LTC insurance products.
- 1.9 Despite the efforts that we and many other actuaries working in this field have made to produce appropriate pricing bases, section five brings home the level of judgement that must surround this process. We do not yet know all the answers! We would make a plea that those responsible for developing products remember this point when deciding on the type of product features they include in LTC insurance policies. In particular, this should be read as a warning against offering long term premium guarantees without serious consideration.
- 1.10 In section six we consider valuation, solvency margins, taxation and the other issues which are important to an office writing LTC insurance but may not be given sufficient attention during the pricing process.
- 1.11 Finally, in section seven we discuss the whole issue of effective risk management for LTC insurance. This is a new product and requires some new approaches to underwriting and claims management. It is certain that our initial approaches to these areas, as well as to pricing, product features and marketing can be improved over time. Only by proper monitoring and analysis will we be able to make these improvements.
- 1.12 While this section considers underwriting and claims management, it does so only briefly. The aim of this paper is to cover the actuarial implications of product design and pricing and we felt that the details of underwriting and claims management fell outside of this scope.
- 1.13 We have tried to make this paper readable, and also useful as a reference source. Hence while the body of the text contains our discussion, we have reproduced much of the factual information in full in the appendices.
- 1.14 We would like to thank Steve Nuttall, David Heeney and Carol Randall for their comments on early drafts of this paper, and for their support. Their help has made this paper more readable and reduced the number of errors which have made it through to the final version. Any errors remaining are of course our own responsibility. We would also like to thank Natalie Marks for her efforts in typing so many drafts of this paper, with only minimal complaints.
- 1.15 The views expressed are the authors own and do not necessary reflect those of our employers.

2 Background to Long-term Care

- 2.1 While the focus of this paper is on the practicalities of LTC insurance it is worthwhile looking at the background first, to understand why we believe there will be an increase in the demand for long-term care and LTC insurance in the UK. This section gives a brief overview.
- 2.2 In this section we first consider what is meant by long-term care and LTC insurance. We next look at the current provision of long-term care in the UK and then consider why we feel this will need to be supplemented by private provision. Finally, we take a brief look at the state of the LTC insurance market today.
- 2.3 There are many other papers which consider the demand for long-term care in greater depth and those readers who are interested will find a number of these listed in the bibliography. This section is merely designed to give an introduction for those new to this subject.

What is Long-term Care and Long-term Care Insurance?

- 2.4 While much is talked about long-term care, it is a phrase that can mean different things to different people. Our definition is that long-term care is care provided to those who are unable to look after themselves without some kind of support. It includes care provided in the home, in sheltered accommodation, residential or nursing homes, but not care provided in hospital unless it is intended to be permanent. Long-term care can range from a couple of hours a week, through to 24 hours a day.
- 2.5 Long-term care may be provided informally, mainly by spouses and children, or formally on a paid basis. Almost all informal care is provided in the home, while formal care is typically provided in a residential or nursing home.
- 2.6 By this definition long-term care is the assistance provided (largely) to the elderly and the infirm, rather than the method of paying for this care. LTC insurance is one method of funding long-term care. While it may impact upon the way in which care is provided, it should not be thought of as a replacement for this provision.
- 2.7 In fact there is no single long-term care insurance product. Rather it is a concept that includes any of a range of insurance products designed to contribute towards the costs of long-term care.
- 2.8 In the UK market, it is normally taken to mean products with a significant protection (as opposed to purely investment) element, which meet some or all the costs of home or nursing care for the elderly, with a claim being defined by reference to failure of activities of daily life (ADLs). However as will be seen later in this paper, these rules are by no means cast in stone.

Current Provision of Long-term Care in the UK

- 2.9 Actual care, as opposed to the financing of it, comes from a number of sources. Residential care is provided on a formal, paid basis in residential and nursing homes. It is provided by local authorities, voluntary organisations and by the private sector. In addition, some care is provided by the NHS in long-stay geriatric beds.
- 2.10 The advent of community care has reduced the number of long stay beds while the last decade has also seen a marked decrease in local authority homes. Laing & Buisson estimate that 59% of total places are now provided by the private sector.
- 2.11 The split of care places in 1996 is given in the table below.

Residential Care Places	Number of Places
- private sector	169,800
- public sector	78,200
- voluntary	54,000
Nursing Care Places	
- private sector	199,800
- public sector	18,000
- NHS long stay	48,200
Total	568,000

- 2.12 An average room in a private nursing home cost £17,472 per annum in 1996/7, while a room in a private residential home cost on average £12,844. Applying these figures to the total number of nursing and residential places set out above gives an approximate cost of £8.9 billion per year.
- 2.13 With the current number of people needing some form of regular or continuous care estimated at over 2 million (London Economics/IPPR), formal residential care only provides about 25% of all care. The remainder is currently provided on a largely informal basis by relatives and friends.
- 2.14 According to the 1990 General Household Survey there were around 6.8 million informal carers. Laing & Buisson estimate that the cost of providing on a formal basis care equivalent to that provided informally would have been £42 billion in 1996. This dwarfs the estimated £3 billion spent annually as formal domiciliary care (ie care delivered in the recipient's own home).

Current Funding of Long-term Care in the UK

- 2.15 Long-term care is currently funded from a mixture of sources, including the NHS (for geriatric beds and some homecare), local authorities, private individuals and the DSS (via income support). About 30% of formal care is paid for privately, with the rest being met by the state.
- 2.16 The rules regarding the circumstances in which the State will pick up long-term care costs are complex. Broadly care provided by the NHS, in hospitals or by visiting health workers, will be provided free at the point of delivery.
- 2.17 Formal residential care will be subject to a needs assessment and a means test. The means test includes income and asset allowances, and broadly sets against care costs any income above £14.10 per week and any assets above £10,000, including the value of the claimants house.
- 2.18 There are rules concerning when the house can be so assessed which protect dependent relatives and spouses still living in the house. However, if someone needing care is able to fund it themselves, the rules broadly set out that they should do so.

The Future Demand for Long-term Care

- 2.19 The demand for long-term care is set to increase substantially over the next 30 to 40 years. Nuttall et al forecast that the number of people needing some form of care will increase from 6.5 million in 1995 to 8.8 million in 2031. A more detailed breakdown is given in the table below, in thousands.

Level of Care	1995	2001	2011	2021	2031
Low	2,248	2,392	2,602	2,844	3,041
Moderate	2,177	2,082	2,161	2,336	2,461
Regular	1,516	1,564	1,720	1,925	2,141
Continuous	630	706	840	993	1,185
Total	6,571	6,745	7,324	8,098	8,828

- 2.20 Those needing regular or continuous care, which equates to formal long-term care, increase more quickly, from 2.1 million to 3.3 million.
- 2.21 London Economics and the Institute of Public Policy Research (IPPR) estimate that in 2031 this group of people will require 9.7 billion hours of care. This is a 47% increase over 1995.
- 2.22 This increase in the demand for care is driven by improving mortality experience and an ageing population. The aged dependency ratio (population over pension age as a percentage of the population of working age) is projected to rise from 30% to today to 50% by 2035.

Funding the Cost of Future Long-term Care

2.23 Perhaps more important than the demand for care is what that care will cost and who will pay for it. There are various estimates for the cost of long-term care in the future, all of which differ to some extent. However, all agree that the costs will increase substantially.

2.24 As one example, the IPPR give the following projections, in real terms (£billions).

	1995	2001	2011	2021	2031
Formal Care	12.0	13.2	17.6	24.8	33.5
Notional cost of informal care	33.8	34.2	34.6	33.3	31.7
Total	45.8	47.4	52.2	58.1	65.2

2.25 Formal care costs bear the brunt of the increase, with informal care remaining fairly static. In fact this may understate the case. Increasing proportions of working women and more single person households may lead to a reduction in informal care. This gap would need to be picked up by a further increase in formal care provision.

2.26 There is a strong feeling in the general population that the state should pay for long-term care. In a survey (Swiss Re Life & Health, 1995) approximately 90% of respondents thought the State should provide for the care of the elderly.

2.27 However, governments are also aware of the electorate's antipathy towards higher taxation, and this may restrain any loosening of current rules. If the current regime of means testing continues, IPPR project that the proportion of formal long-term care costs met privately will grow from 27% in 1995 to 61% in 2031.

2.28 This increase is driven by the increasing wealth of the elderly population, particularly the possession of occupational pensions and the spread of home ownership.

2.29 Such an increase in the requirement to make private provision, together with the financial means to do so suggests a significant potential role for private insurance.

Long-term Care Insurance Today

2.30 The current LTC insurance market in the UK is tiny. There are very few published figures on market size, although total sales are often quoted at between 25 thousand and 35 thousand policies to date.

2.31 We understand that the majority of these sales have been for conventional pre-funded policies, with the remainder being immediate care annuities and unit-linked products. However, the much higher average premiums seen on the latter products may reduce the importance of conventional products in terms of total premium.

- 2.32 Sales seem to be split fairly evenly between regular and single premium policies.
- 2.33 If there is a typical purchaser of LTC insurance she (for women have purchased over 50% of policies), would be aged 65 to 70 and be single or widowed. Typically, she would have had a vocational career; teaching and the civil service are common backgrounds.
- 2.34 Most policies will be for a sum assured less than the expected cost of care. Purchasers appear to expect to fund some costs from other sources - savings or their pension - and use LTC insurance to make up the difference.
- 2.35 While a number of companies have recently entered the LTC insurance market, until recently it has been dominated by one or two players. As such, the details given above could be distorted by one companies particular approach, rather than being representative of the market to come.

3 Product Design

- 3.1 LTC insurance is a concept rather than one single product, and is therefore offered in a variety of forms. The product appropriate for a particular individual will depend on a number of factors, including their age, their income/asset level and their current state of health. These varying needs require different solutions, and this has led to providers offering many different products.
- 3.2 This section gives an overview of the main products currently sold or being developed in the UK. While differing in basic design they have many similar product features, and these specific features are considered in section 4.

Conventional Pre-funded LTC Insurance

- 3.3 These plans are aimed at those currently in reasonably good health who are concerned about the future. Their purpose is to offer some form of protection against costs arising from future deterioration in health. Most companies in the market base claim payments on either inability to perform a certain number of ADLs (Activities of Daily Living) or a significant cognitive impairment. The ADLs are those basic tasks upon which personal hygiene, basic health and even survival depend.
- 3.4 Pre-funded plans fall into the following categories :
- Stand-alone policies
 - LTC as a rider to other policies
 - LTC as an extension to PHI (in development stages only).

Stand Alone Policies

- 3.5 The stand alone products started to appear in the UK in 1991, and form the bulk of the policies sold in the UK to date. They generally provide for an income payable in the event of a valid claim. Premiums can be either regular (payable until time of claim or death) or single, with the latter generally aimed at the more elderly, while regular premiums are targeted at the younger end of the market. Normally there is a choice of cover, based on various degrees of disability and care needs. For example, a contract may pay up to 50% of the benefit on failure of two out of six (2/6) ADLs but increase to up to 100% of the benefit upon failure of three out of six (3/6) ADLs.
- 3.6 There is also typically an option to choose between level and escalating benefits, where the benefits can escalate by a fixed amount, retail price index (RPI) or national average earning index (NAEI).

- 3.7 Policies have a deferred period, generally three months, but longer deferred periods are being introduced, as a means of reducing the cost. Benefits are generally payable until death or recovery.
- 3.8 These products are pure protection policies and are not intended as investment vehicles. In particular the policyholder generally cannot take a surrender value.

LTC Insurance as a Rider to Other Policies

- 3.9 A LTC benefit can be written as a rider to a whole life plan. In the event of satisfying the claims criteria, an accelerated death benefit is payable by monthly instalments. This rider has been popular in the US market. The same concept was introduced in the UK, but it was not well received.
- 3.10 One can also argue that LTC insurance is a natural addition to critical illness cover, with LTC being an additional illness. Of course, the benefit would need to be payable in instalments rather than as a lump sum, but the principles remain the same.

LTC Insurance as an Extension to PHI

- 3.11 A logical extension to a conventional Permanent Health Insurance (PHI) plan is a disability package which pays out either :
- if the planholder is unable to work through sickness or accident, or
 - if the planholder needs care, as defined by ADL criteria or cognitive failure.
- 3.12 One approach would be to have an additional LTC benefit running alongside the PHI, so that if the stricter LTC criteria were met, the planholder would receive a greater benefit than from the PHI alone. Product design and pricing considerations are then essentially the same as for stand-alone plans. There would need to be restrictions on the actual benefit amounts for PHI and LTC, so as to avoid overinsurance.
- 3.13 It is perfectly plausible that the cost of LTC will exceed the PHI benefit (normally related to income), so this is a logical package. In addition, the risk cost associated with the LTC benefit prior to retirement will be very modest.
- 3.14 An alternative approach is to only pay out the PHI benefit below normal expiry age (say, 60 or 65). A need for LTC under this age would almost certainly trigger the PHI benefit, which would be paid as normal. At, say, age 65, the definition of disability switches from occupation related to ADL related and the plan continues as an LTC plan throughout life.
- 3.15 If a PHI claim is in payment at age 65, some thought needs to be given to the circumstances that would allow the claim to continue. It would seem logical to

continue the benefit payment only if the claimant then meets the stricter ADL criteria, as the occupation-based definitions will not be relevant after retirement age. So it may be possible for a claim to terminate at this age, even though the plan continues.

- 3.16 If the premiums are to terminate at retirement age, the additional cost of the LTC benefit will have to be funded before this age. It is also worth noting that, in this situation, as for any paid up or single premium LTC plan, policy reviews can only apply to the benefits.
- 3.17 It may be a more attractive proposition if the premiums continue throughout life at the same level. In this case the post retirement LTC benefit can be added in for a modest additional cost. The result will be an additional feature on a PHI plan which should enhance its marketability.
- 3.18 Of course other variations, such as reducing premiums by, for example, 50%, are also possible.
- 3.19 This package could offer complete disability cover throughout life, at a cost which is not much greater than for a normal PHI plan, provided the premiums start at an early enough age and are payable throughout life.

Unit-linked LTC Insurance (Investment Bonds)

- 3.20 These products allow individuals to invest capital in a number of unit-linked investment funds. The value of these grow with the growth in the underlying investments and charges are deducted to cover the risk of a long-term care claim and other expenses.
- 3.21 Typically, these charges are not guaranteed and so policyholders accept the risk that they may be revised, along with the fund investment risk.
- 3.22 Frequently, such products are written off-shore, for the tax advantage this approach can offer.
- 3.23 When an individual requires care, the value of the bond, including the increases from investment, is potentially available to pay for the care. The actual amount of the fund spent on care when a claim occurs will depend on the design of the product. These policies have a number of options which offer varying degrees of protection of the initial capital investment.
- 3.24 At one extreme, the total value of the fund is protected (to be returned on death or surrender) and the insurer accepts all longevity risk. Alternatively, the fund (or some proportion of it) can be used to meet the initial costs of care, with insurance only meeting the cost once this is exhausted.

- 3.25 While unit-linked products such as these provide less in the way of guarantees to policyholders, they provide a good deal more flexibility. In particular, the ability of these products to pay surrender values and death benefits addresses one of the major shortcomings of conventional pre-funded policies.

Immediate Care Annuities

- 3.26 There are a few products available which are aimed at people who are just about to go into care or are already receiving care and who need to provide for future costs. These are essentially impaired life annuities and are attractive for those whose health has deteriorated and who need an immediate guaranteed income. Their reduced life expectancy means that they benefit from better rates than standard annuitants.
- 3.27 These products provide guaranteed monthly payments to cover all or part of the care costs in exchange for a single premium. Payments continue as long as care is needed.
- 3.28 The minimum age for such contracts is usually 60, with the maximum between ages 90 and 100. A maximum annual benefit of £25,000 to £36,000 per annum is usually imposed. It has marketing appeal in that it meets a need that is demonstrably present.
- 3.29 Such annuities normally need to be priced on an individual basis, allowing for factors such as age, sex and state of disability. The correct price is almost as much a question of underwriting judgement as it is of actuarial technique, although we are able to provide some guidance here. This is discussed more fully in section five.
- 3.30 Realistic and confident risk assessment is fundamental to both marketability and profitability for this product. There is little past experience and it is much more speculative than standard annuity business.

Equity Release

- 3.31 While not a form of long-term care insurance per se, Equity Release plans seem likely to have an important role to play in providing the funds to meet the cost of LTC insurance. Hence they are considered briefly here.
- 3.32 Equity Release schemes have existed for more than 25 years. They enable part of the value of a home to be realised without having to sell it or move out. For most elderly people the home is their main source of capital.
- 3.33 Unfortunately, these plans are still suffering from the adverse publicity of the late 1980's when the industry was hit by a £50 million scandal. The sales techniques used in some cases have also been heavily criticised.
- 3.34 There is, however, renewed interest in Equity Release schemes as a method of funding for individual's long-term care needs.

3.35 There are 2 main types of equity release schemes currently offered :-

- Mortgage and Annuity Schemes; Home Income Plans (HIP) - these involve taking out a mortgage and using the proceeds to purchase an annuity. This produces an income which partly is used to meet the interest payments on the mortgage, and the balance of which can be used to fund long-term care needs.
- Home Reversion (HR) - these involve the sale of all or part of the property at a discount to its current value, in exchange for which, the resident retains the right to live rent free. The income produced from the reversion is a potential source of funding for long-term care needs.

3.36 Variations on these themes have been developed. From the point of view of long-term care provision the most promising may be PERIs, which have an LTC insurance element built in.

Partial Equity Release Insurance (PERI)

3.37 The PERI concept was first introduced by the Institute of Public Policy Research, in the publication 'Paying for Long Term Care'. The proposal was that in return for the insurance company receiving a reversionary interest in part of the policyholder's property, the policyholder would be granted cover under a LTC insurance policy. The cost to the insurer of the cover would be recovered on sale of the house following the death of the policyholder.

3.38 Since then, the concept has been modified somewhat and it would now include schemes whereby the insurer would recover a fixed sum on the sale of the property or would take a share in the appreciation of the property, rather than a fixed proportion of the sale price.

3.39 The PERI approach solves the problem of asset rich, cash poor pensioners being unable to afford an insurance cover that they would otherwise be inclined to buy. A PERI allows a homeowner to give up a fixed proportion of the value of their home, in return for insuring that they will not risk losing it all should care be required. This has particular appeal to those who may be seeking to protect an inheritance. In addition, the cashless nature of the transaction is also attractive, and market research suggests that, were such a product available, it would be one of the most popular methods of purchasing LTC insurance. Hence, there is considerable interest among insurance companies in developing such a product.

3.40 A PERI could be constructed using a normal single premium, LTC insurance policy purchased from one company, and a home reversion policy purchased from another, but it would obviously be easier if a single company provided both. To date, we are not aware of any company offering such a product.

Shared Appreciation Mortgage (SAM)

- 3.41 A new product which has recently been launched seems particularly well designed to fund LTC insurance. This is the shared appreciation mortgage, which comes in two forms :
- A zero interest mortgage
 - A 5% interest mortgage.
- 3.42 Under the first option 25% of the property value could be taken as an immediate mortgage on which no interest was payable, with the sum recoverable on the death of a policyholder. In order to compensate the company for writing this zero interest mortgage, they would receive three quarters of the growth in the entire property value between the issue of the mortgage and the death of the policyholder.
- 3.43 For example, on a property valued at £100,000 an immediate interest free mortgage of £25,000 could be granted. If the property value rises to £180,000 before the client's death, then the total repayment to the lender would be £25,000 capital plus 3/4 of the £80,000 gain in value = £25,000 + £60,000 = £85,000 of the total £180,000 proceeds.
- 3.44 The 5% product worked in a similar way with a proportion of the property growth in exchange for a subsidised, fixed mortgage interest rate.

Pension Linked Products

- 3.45 Long-term care has a natural link with pensions, as they are both dealing with the needs and funding requirements for those in their retirement years. It is therefore rational that products should be developed which seek to combine the two. In doing so, these products should not seek to divert current pension funds to the funding of long-term care needs, as current pension provision is deemed to be inadequate. They should provide additional funding within the pension vehicle.
- 3.46 A product was previously developed that made this link. An annuity was purchased upon retirement that provided a pension as normal. However the level of this pension increased (by up to 100%) on the failure of a defined number of ADLs. This product was discontinued after being challenged by Inland Revenue for tax reasons. They were unhappy with a health benefit being paid out of a pension fund. However, this issue should be revisited during the current pensions review and the LTC Royal Commission.

Home Care Only

- 3.47 The US market has offered products that provide for home care only. The UK market has not yet gone down this route. Research has shown that consumers want to be able to choose whether they stay in their own home or enter into a nursing home. Most would prefer to stay in their own homes for as long as possible. Also, by offering home care only, the insurance company could be opening themselves up to bad publicity if a policyholder requires nursing home care, but the policy was limited to home care.

Discussion of Product Designs

- 3.48 The products already in the market provide a wide range of choice to UK purchasers of LTC insurance, and this will undoubtedly be increased as new products are developed. However, all products designed so far fall short of consumer requirements in one way or another.
- 3.49 By and large, potential purchasers want to see some return on their premium payments, even if they do not make a claim. This is reinforced by many elderly people's desire to leave an inheritance for their children. Conventional pre-funded products do not yet meet those needs, although some unit-linked products may.
- 3.50 At the same time there is a requirement for certainty that claims will be paid and that premiums will not rise, for affordability and for ease of understanding in product designs. No current product yet meets all of those needs.
- 3.51 In addition, purchasers of LTC insurance are concerned that it meets all of their needs whenever they require care. These might cover more than simple financial needs and include other forms of assistance. While some LTC insurance policies partly meet this requirement, there is scope for further developments.
- 3.52 It may be that the perfect product design is not possible; only time will tell. However we expect more and more innovative products will arise which attempt to meet these needs as more companies enter into the market.

4 Product Features

- 4.1 The majority of LTC insurance products share similar product features. This section describes these features, discusses the rationale behind them and sets out our understanding of current market practice.

Claims Criteria

- 4.2 The need for long-term care is difficult to measure objectively, will vary from person to person and by individual circumstances and may be assessed differently by each individual outside observer. However, insurance companies need quantifiable, objective and consistent claims criteria if they are to price and control LTC insurance policies.
- 4.3 A range of instruments have been developed to assess levels of disability, such as :
- The Index of Independence in Activities of Daily Living (Katz & Stroud, 1963).
 - Royal College of Nurses Assessment Tool (Smith & Nephew, 1997).
 - The Barthel Index (Mahoney & Barthel, 1965).
 - The Crichton Royal Behaviour Rating Scale (Wilkin & Jolly, 1979).
 - The Clifton Assessment Procedures for the Elderly (Pattie & Gilleard, 1979).
 - The General Health Questionnaire (Goldberg, 1972).
 - The Geriatric Mental Health State Schedule (Copeland, Kelleher & Keller et al, 1976).
- 4.4 The most promising approach so far for insurance purposes has been to use a combination of activities of daily living (ADLs) and cognitive impairment tests. These fulfil the insurers requirements for objectivity whilst also being good proxies of the need for care.

Definition of ADLs

- 4.5 ADLs were originally developed by Dr. Sidney Katz and colleagues at the Benjamin Rose Hospital in Cleveland, Ohio in the US as a clinical tool to assess disability. As such, they form a natural starting point for assessing the need for care, indeed, they are used in this manner by doctors and in Local Authority assessments. They have been adapted slightly for different purposes and there are several versions in current use. The Association of British Insurers (ABI) has developed a benchmark set of ADLs for use in LTC insurance policies and these are defined in Appendix 1.
- 4.6 The ADLs on the benchmark list are :
- Washing
 - Dressing
 - Feeding
 - Toileting
 - Mobility
 - Transferring.

- 4.7 A typical claims criteria would be failing 2 or 3 out of these 6 ADLs, or failing a cognitive impairment test.

ABI Benchmark Definitions of ADLs

- 4.8 The benchmark definitions of ADLs describe the circumstances that will give rise to a claim under a pre-funded LTC insurance product. These criteria are only benchmarks and some individual offices use different ADLs or different definitions of a particular ADL.
- 4.9 As products were developed before this benchmark was established, various definitions do exist in the market. However, new products tend to adopt the ABI definition and so this variation is likely to reduce over time.
- 4.10 ADLs are typically failed in a given order, which is set out below:
- Washing
 - Dressing
 - Mobility
 - Toileting
 - Feeding
 - Transferring.

They also tend to be recovered in the reverse order, closely paralleling childhood development.

- 4.11 This order of failure makes the choice of ADLs used an important one. Early products often used only 5 ADLs, but which 5 varied from product to product. It would be considerably easier to fail 2 out of the first 5 on the list, for example, than 2 out of the last 5.
- 4.12 Even now, this sort of difference can manifest itself in the precise wording of ADL definitions.
- 4.13 In insurance policy wordings it is common to specify the circumstances of ADL failure. In particular, ADLs must continue to be failed even if assistive devices (such as stair rails) are being used.

Cognitive or Mental Impairment

- 4.14 The other element of most claims criteria is a cognitive impairment test. Typically this would require the claimant to be suffering from a deterioration or loss of mental capacity which :
- results from an identifiable organic cause, and
 - is evidenced by a deterioration in the insured's ability to think, perceive, reason and remember and
 - results in a need for continual care or supervision.

- 4.15 Mental/cognitive impairments will be determined using clinical evidence and recognised tests of mental capacity, such as Mini Mental Tests. These are set out in Appendix 2.

Discussion of ADLs

- 4.16 While ADLs are clearly more subjective than the claim criteria for life insurance, they are more objective than that used for PHI, where the definition of disability is usually related to occupation and can be very subjective. However companies are continually searching for a more objective claims criteria to use.

- 4.17 An alternative to ADLs is the Royal Commission of Nurses (RCN) Assessment Tool. This focuses on the level and type of registered nursing input. Their emphasis is on ability as opposed to dependency

- 4.18 In the assessment there are 3 essential care components considered :

- maximisation of life potential
- prevention and relief of distress
- maintenance of health status.

- 4.19 There are 5 stages in the process. The first 4 stages are used to determine a score relating to the level of intervention by a registered nurse.

Stage 1 – assessment of the health status

Stage 2 – stability and predictability matrix, which operates as a trigger for potential registered nursing input

Stage 3 – determine levels of registered nursing input

Stage 4 – predicting the number of registered nursing hours required

Stage 5 – encouragement of nurses to collect evidence to support the decisions they have made.

- 4.20 While this has some potential, given one of its outputs is a predicted level of care required, we are not aware of any product available or being developed which takes this approach.

Other Factors in Claims Assessment

- 4.21 In many policies a claim is a two-step process. Once ADLs and cognitive impairment tests have been used to admit a claim, an assessment needs to be made of the appropriate care package. The factors involved in this assessment will include :
- living conditions, i.e., one or two storey house
 - living alone or with a spouse or roommate
 - financial affairs
 - social environment, i.e., proximity of family and friends
 - proximity to amenities
 - availability of public transportation.

Benefit Levels

- 4.22 Generally LTC insurance products provide a benefit towards care costs, up to a fixed maximum amount for each week of care needed. Typically, these benefits are defined as a percentage of the annual sum assured under the policy, with the amount payable frequently depending on the number of ADLs failed.
- 4.23 The most basic design would provide up to 100% of the sum assured on failure of 3 out of 6 ADLs or of a cognitive level. This level was chosen as it is the point at which residential care is typically required. However, there is not normally a need to actually be in care for benefits to be paid. Most policies will provide benefits towards homecare as well as residential care.
- 4.24 More generous policy designs will, in addition, pay up to 50% of the sum assured on the failure of 2 ADLs. This level of failure is assumed to approximate the point at which homecare is needed.
- 4.25 The rationale for a lower payment is typically that a lower level of disability will require less expensive care, and that such a limit will make the product more affordable. However, for those policyholders without escalating benefits, or those purchasing LTC insurance to top up other funds, this argument may not hold true. There are now designs that provide 100% of benefit on the failure of 2 ADLs, addressing this need.
- 4.26 At least one policy also provides a small benefit on failure of one ADL, to meet the extra incidental costs arising at this level.

Maximum Benefit Levels and Payment Periods

- 4.27 All policies in the UK have some form of maximum benefit ceiling. Most policies have an annual sum assured, as discussed above. The maximum sum assured that will be accepted is usually capped, although this cap is set at a level which care costs are unlikely to exceed. A typical level today is £36,000 per annum.

- 4.28 Most policies allow payments to be made until the claimant dies or recovers, but some policies provide for limited payment periods of between 3 and 5 years. This is mainly in an attempt to control costs although it also limits the offices exposure to longevity risk.
- 4.29 We are not convinced that such limits are appropriate. For a claimant there is the possibility that care will be interrupted at a stage when they are very infirm, and this must remove much of the peace of mind element provided by the insurance. From the offices point of view, such limits are unlikely to produce significant cost savings, as the expected lengths of claim are low anyway. It would also be difficult from a marketing and public relations point of view to cease benefits at such a critical time.
- 4.30 A minority of policies have a maximum lifetime benefit level. This, again, provides some protection to the office and also gives the policyholder an incentive to control their spending on care. However, again we believe that such a limit must reduce the perceived value of the insurance.

Benefit Escalation

- 4.31 Benefit escalation offers inflation protection. It can be argued that a policy offering level benefits does not provide adequate protection, as the benefits will not be paid until sometime into the future, at which time the initial level benefit will no longer be adequate.
- 4.32 Currently there are three forms of escalation offered :
- a fixed percentage, with 5% per annum being most common
 - RPI linked, usually with a cap of 10-15%
 - NAEI linked, again with a cap of 10-15%.
- 4.33 The latter can be deemed to be the most appropriate because the bulk of LTC costs are identified as wage related, and hence RPI escalation is likely to fall behind. However, few policies actually offer this, due to the difficulty of finding a suitable matched investment. A good alternative would be a proxy such as RPI + 2%, but again this does not seem to be widely offered.

Premiums

- 4.34 For prefunded products, regular premium and single premium versions are available; whereas immediate care plans are only offered on a single premium basis. In practice policyholders often buy both regular and single premium policies.
- 4.35 This may be due to their financial situation. Most retired people have some savings, perhaps from a lump sum taken at retirement. However, this may not be enough to purchase a single premium policy of sufficient size or they may wish to retain some of it to meet other, unforeseen needs. Hence they meet the remainder of their insurance premiums from income.

- 4.36 Alternatively, the single premium policy may be used to cover the initial care needs and additional regular premium policies used to meet extra needs as circumstances change. Regardless, some thought should be given in designing policies as to how these two types of premium can work together.
- 4.37 Premiums vary by age, state of health, type and level of benefit and are generally higher for females.

Premium Rate Guarantees

- 4.38 Premiums are generally reviewable, although limited guarantees are now being offered. Single premium products tend to offer more comprehensive guarantees.
- 4.39 The guarantees that are offered vary with typical offerings being as follows :
- a guarantee of 5 to 10 years, then annually thereafter
 - a guarantee from a specific age, such as 65 or 70.
- 4.40 A full rate guarantee for life is attractive to the elderly consumer, as they do not want to be faced with rate increases when they can least afford it. As most pensioner's incomes are fixed (at least in real terms), an unforeseen premium increase may make the policy unaffordable when it is most required. This may remove the peace of mind a LTC insurance policy should offer.
- 4.41 From an insurance company's point of view premium rate guarantees should not be offered without careful consideration. While much work has been done to develop pricing bases and product designs for LTC insurance policies in the UK, there is almost no real insured experience. It is quite possible that actual claims experience could substantially exceed that incorporated in the original pricing.
- 4.42 It is a brave office that guarantees such premium rates. The costs of doing so should be substantial, given the valuation margins taking such a stance will require. It is not an approach we would recommend at this stage of the market's development.
- 4.43 Even from the policyholder's point of view, guarantees may not always be in their favour, because as insurance companies develop more experience, premium rates may fall.
- 4.44 Having said that, one must question whether even reviewable products are truly reviewable. It would be difficult to review a single premium policy other than by reducing benefits and even increasing regular premiums may be difficult in the face of possible negative market perceptions and the risk of potential selective lapsation.
- 4.45 Offices writing LTC insurance may need to accept limited implicit guarantees, but we urge them not to make them explicit.

Premium Escalation

- 4.46 In the same way as benefits escalate, regular premiums may also escalate. It is normal for regular premiums to escalate in line with benefits, and this provides a measure of protection to the office against unexpected future changes in benefit level.
- 4.47 Against this, the incomes of elderly people are often fixed or, at best, keep pace with the RPI. Hence, escalating premiums may make it difficult for policyholders to meet the cost of LTC insurance at the point it becomes most valuable.
- 4.48 This suggests that some limit on premium increases may be appropriate, either on an annual basis, a total upper limit, or an age beyond which they are fixed. It is certainly important to make sure that the potential for increases is clearly explained as part of the sales process.
- 4.49 These comments are doubly true of any company which prices increases as an additional policy, issued on the terms in force at that time. This can lead to much higher increases than the policyholder expects due to the effects of advancing age on premium rates.

Premium Waiver

- 4.50 Waiver of premium applies to all regular premium plans. As its name suggests this feature waives premium payments which fall due whilst the benefit is being paid. Due to the difficulties in meeting regular premiums (financial & otherwise) which will arise during care we suggest this should be a standard feature on all plans.

Care or Cash Benefits

- 4.51 For reasons of taxation, LTC insurance policies in the UK historically met no more than the actual costs of care, regardless of the sum assured, and paid this amount directly to care providers. This allowed payments to be free of tax.
- 4.52 In April 1996, LTC insurance benefits became tax free regardless of whether they were paid to the care provider or directly to the policyholder. Prior to that time, LTC insurance benefits were taxed as income if they were paid directly to the policyholder.
- 4.53 As a result of this change in taxation, companies began to provide products that offered cash payments directly to the claimant. Often, these payments were made regardless of whether they were in receipt of care or not. The claimant still had to satisfy the claims criteria, that is ADL failure or a significant cognitive impairment, but effectively a gatekeeper had been removed.
- 4.54 Companies can now take three stances. They can continue to restrict benefits to actual care costs and pay them to recognised providers only. They can retain the cost related approach, but pay benefits to the policyholder or their family, or they can pay the full sum assured directly to the policyholder or their family.

- 4.55 The first approach allows the insurer close control over the use to which benefit payments are made, potentially giving it more scope to negotiate on costs and to ensure that adequate care is being provided. It can be argued that this approach leads to the greatest added value for the policyholder.
- 4.56 It should also give lower incentives for fraudulent claims, as the claimant does not benefit financially from a claim. As the insurer may pay less than the full sum assured this should also control costs.
- 4.57 On the other hand, policyholders like to receive cash, particularly as it allows them to be cared for by relatives informally and yet recompense them for their time. It also provides them with “choice”.
- 4.58 The second approach addresses this point, although in such a case it may be difficult to be clear what the cost of care should be assessed as. However, it introduces the possibility of direct financial gain and hence of anti-selective claims.
- 4.59 Such an approach is likely to increase the cost of claims. Perhaps more importantly it may change the nature of the relationship between the insurer and the claimant from one of help and support to one where more emphasis is put on controlling costs.
- 4.60 In this sense the final approach is least attractive. Payments unrelated to actual care costs provide the greatest potential financial gain to claimants and also remove any advantages the insurer may have gained from cost control.
- 4.61 Set against this, the approach is easiest to administer and has an undeniable attractiveness to policyholders.
- 4.62 In our view, LTC insurance policies exist primarily to help meet care needs and this makes the first approach most appropriate, perhaps modified to allow payments to informal carers. However, the market appears to be moving closer to the final approach. This can lead to a significant difference in claims costs and should be priced appropriately.

Deferred Periods

- 4.63 All LTC insurance policies in the UK have a deferred period. This is the period during which a claimant must continuously fail the claims criteria before payments commence.
- 4.64 In the UK most policies have relatively long deferred periods. The most common deferred period is 3 months, which serves to eliminate ADL failure due to acute conditions, which LTC insurance is not really intended to cover. They also give claims departments time to assess claims thoroughly. Longer deferred periods such as 12, 24 or 36 months are now becoming available. These are used either as a means of containing costs or to allow the benefit to take effect after other funds have been exhausted.
- 4.65 Shorter deferred periods, such as those common in the US can lead to a number of complications. Acute conditions, such as broken bones, can lead to ADL failure in the

elderly for short periods of time. Without a deferred period payments will be required in these cases even though care will be provided by the NHS or private medical insurance.

- 4.66 Such claims will be much more numerous than the long-term care claims and this will increase the volume and total cost of assessments required. In addition, while longer term claims are unlikely to end in recovery, short-term claims will, and hence, will require a more pro-active claims management approach.
- 4.67 Because of this, we would recommend that a minimum deferred period of 2 or 3 months continues to be used.

Assistive Devices

- 4.68 Assistive devices are aids provided for use in the policyholders home, which stave off ADL failure and limit the need for care, maximising the policyholder's capacity to function independently. Examples include but are not limited to stair lifts, grab handles and emergency alarm installation.
- 4.69 When an assistive device benefit should be paid is a matter for judgement by the claims assessor. In theory, they need to weigh up the cost of the assistive device against the likely savings that will accrue from delaying the entry to care. Hence such a benefit could be provided at any time.
- 4.70 In practice, such benefits are usually provided when a claim is made and it is clear that ADLs will not be failed with the device, but will without it. In such a case any deferred period is likely to be waived.
- 4.71 A limit is usually placed on the total cost of assistance devices, of 3 to 6 months equivalent benefits.
- 4.72 In theory, one could argue that the cost of offering such a benefit is offset by the savings in claims cost and hence is cost neutral. However, before drawing such a conclusion one should consider which devices are actually being offered and model their cost against the potential cost savings. In particular, for longer deferred period policies the cost of the assistive device can become a significant proportion of total benefits paid and should be costed separately.

Surrender Values

- 4.73 Most insurance products, particularly those requiring a large single premium, will provide a surrender value. However, this is not the case with conventional pre-funded LTC insurance in the UK.
- 4.74 The main technical reason for this is that LTC insurance business is typically written in the PHI fund, which attracts substantial tax advantages. However, products written in this fund cannot provide surrender values.

- 4.75 In addition, offices typically make a profit on lapsation, so offering a surrender value (or indeed a full paid-up value) would increase the cost of products. This will only affect the premiums for regular premium products as, naturally, it is unlikely that single premium products will suffer lapses.
- 4.76 Research has shown that the lack of a surrender value is one of the main factors which dissuade people from purchasing LTC insurance. It is a key advantage of the unit-linked off-shore products, for which these limitations do not apply.

Death Benefits

- 4.77 For much the same reasons that most LTC insurance policies do not provide surrender values, they also do not provide death benefits. Single premium policies are often sold with a 5 year reducing term assurance as a low-cost way to partially address this need.
- 4.78 One unit-linked product available in the UK is written in such a way as to allow the policy to be assigned so that on death it passes to a named survivor, who can surrender it, effectively receiving a death benefit.
- 4.79 While this approach appears to be acceptable to the regulatory authorities in this instance, it offers a potential route to use LTC insurance as a very efficient investment vehicle. Should any company succumb to this temptation we feel this loophole would very quickly be closed.

Paid Up Values

- 4.80 The most common approach on lapse is for a policy to be made paid-up, and for the benefits to be reduced accordingly. It is important to give some thought to what form these reduced benefits take.
- 4.81 While the natural thought is to simply reduce the sum assured, this may not be appropriate. A small benefit may not be of any real use if care is required, and may actually affect the claimants eligibility for State benefits. It will almost certainly be set against any such benefits and used to reduce their level.
- 4.82 A better approach may be to leave the benefit level unchanged, but to reduce the payment period. Alternatively, both benefit level and payment period could be left unchanged but the period of cover reduced from total lifetime to a limited term.

Joint Policies

- 4.83 While the majority of LTC insurance purchasers are single, a significant number of policies are sold to couples. Presently they are just sold two standard policies, perhaps with a small discount. However, there may be scope to design joint life policies more closely matched to their needs.

- 4.84 Such a policy would probably assume that the first member of the couple would be largely cared for at home by the healthy spouse. Benefits would be limited to assistive devices and respite care, until residential care was required.
- 4.85 On the healthy member of the couple falling ill, or on the death of one member, cover would revert to that normally found under a single life policy.
- 4.86 While it appears that such a policy would both better meet the needs of a couple and be cheaper than two single life policies, it is not clear if circumstances exist in which it might be inappropriate. As yet, no such policies exist.

Spouses Discounts

- 4.87 It is common to offer a small discount, typically 5-10% of combined premiums, to joint purchasers. The reasoning behind this discount is two-fold. First, the sales costs are lower in the case of a joint sale. Second, it is assumed that in the early stages of disability the spouse will provide informal care. This is assumed to defer the time at which a "full" claim will be made and to reduce the amount of formal care required.
- 4.88 While it is relatively easy to calculate the reduction in sales costs, the extent to which such informal care reduces actual care costs must as yet be a matter of conjecture.

Guaranteed Insurability Option

- 4.89 Perhaps regrettably, most people do not regard LTC as a priority. Product design today is very much geared to opening up the market, hence the emphasis on riders and packaging.
- 4.90 A guaranteed insurability option is one such rider. It allows policyholders to purchase basic coverage and for this to be increased, without additional underwriting, at some point in the future. The option could be exercised at retirement when the need for LTC is more relevant.
- 4.91 Thus, the guaranteed insurability option allows for premiums to be collected today, in response to today's demands, whilst positioning the insurer to receive premiums in the future geared to the demand that will inevitably occur at that time.
- 4.92 From a marketing perspective, understanding what customers want to buy today and supplying it, but at the same time recognising what the future needs and supplying that, is a key ingredient for success in the LTC insurance market.

Respite Care

- 4.93 This feature provides a break for the informal care givers. It enables an unpaid relative or friend providing the care in the claimant's own home to take a break. As the vast majority of care is provided informally, this is a very important option. It is usually limited to a fixed number of weeks per annum.

Issue Ages

- 4.94 The minimum issue age for current products ranges from age 18 to age 60, with the most common being age 20. The corresponding maximum age figures are ages 75 to 95, with age 80 being the most common.

Other Ancillary Benefits

- 4.95 Benefits are also available to assist the policy holder at time of claim. Such benefits include, but are not limited to telephone helplines and access to care consultants and counsellors.
- 4.96 Such care counsellors help to arrange a suitable care package and advise on the complexities of State benefits and other care-related issues. This can be of great help for policyholders and their relatives and is a valuable addition to an LTC insurance policy.
- 4.97 However, it does require a significant investment from the insurance company. Providing poor advice is worse than no advice at all, and could lead to potential damage to the company's reputation.

5 Pricing

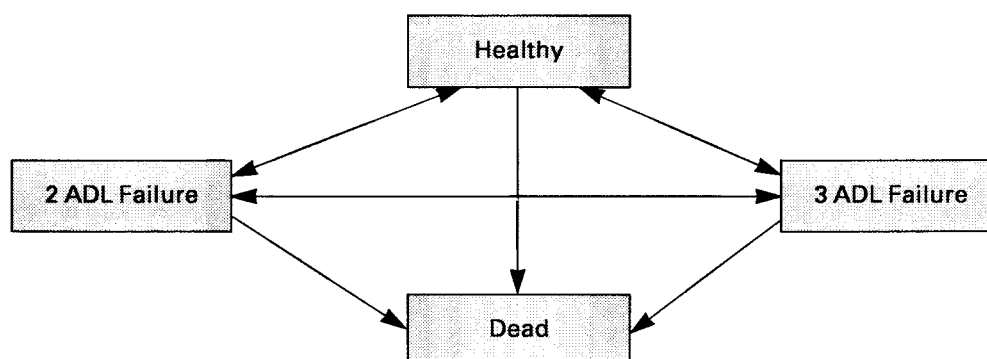
- 5.1 To calculate a set of premium rates for a LTC insurance product it requires a pricing methodology, along with a set of assumptions to incorporate into this methodology. In this section we consider the methodologies available, the assumptions required and the data available to allow these assumptions to be set.
- 5.2 Our focus is on pre-funded business, be it conventional or unit linked, rather than on immediate care annuities. While there are a number of specific methodological issues, and of course all of the assumptions are important, we believe it is the basic risk rates that are the most fundamental element. We therefore concentrate most heavily on these.
- 5.3 In our view the data available is too scant for anyone to be dogmatic about what is a correct pricing basis. We do not therefore attempt to provide such a thing, but instead provide some guidance as to the range we would expect such a basis to fall within.
- 5.4 Perhaps the most important conclusion to be drawn from this section is that we are dealing with a great many unknowns in pricing LTC insurance. Data is scarce, does not relate directly to the task at hand, and is usually not in the most useful format.
- 5.5 While everyone involved in this area naturally attempts to minimise the uncertainties that arise, it is more than possible that some of the elements in any basis will be incorrect, perhaps by a significant margin. In our view this calls for conservatism in both pricing approaches and product design.

Methodology

- 5.6 There are a number of different methodologies that can be applied to pricing LTC insurance in general, and specific product designs in particular. These vary in their theoretical correctness, in their complexity of use and in the number of assumptions they require. The two main approaches that we consider are the:
- Multi-state modelling approach
 - Inception/annuity approach
- 5.7 We initially consider these approaches generically, but with the pricing of pre-funded products to the forefront of our minds. We then look at the pricing of specific products.
- 5.8 It is our view that practicality should win out over theoretical correctness if this leads to easier and more understandable calculation procedures without unduly compromising the accuracy of results. We believe that this is the case with the inception/annuity approach and LTC insurance, especially given the relative uncertainty and paucity of data available. Hence we favour this approach and our discussion of the data available will reflect this.

Multi-State Modelling

- 5.9 A number of papers have been written on the subject of Multi-State modelling in relation to LTC insurance, and it is not our intention to repeat the technical details here. Briefly, Multi-State modelling requires us to postulate a number of states and the transition intensities between these states. This is demonstrated diagrammatically below.



- 5.10 By examining the proportion of lives in each state as the policy evolves over time it is possible to calculate expected premium inflow and claims outgo, and hence to price a LTC insurance (or most other insurance) policy.
- 5.11 In practice, further states would be required to capture the full complexity of long-term care claims. At the very least it would be necessary to allow for cognitive impairment and for durational effects.
- 5.12 Such an approach has two important advantages:
- It is, given a suitably specified model, an accurate representation of the true process of insurance. In particular it can account correctly for the effect of lives that recover and return to the population exposed to risk, and for the cumulative selection that a portfolio may suffer.
 - Developing and testing a Multi-State model can give a high level of understanding of the product, and particularly the possible (and sometimes counter-intuitive) outcomes that can occur over time and in particular scenarios.
- 5.13 The second of these points in particular make Multi-State modelling an excellent research tool. Set against these advantages are a number of disadvantages, which we believe make it less suitable as a day-to-day pricing methodology for LTC insurance.
- Multi-State models can be complex to construct, difficult to maintain and take a considerable amount of computing power.

- They require a large number of assumptions - transition probabilities are required into each state - and many of these assumptions are either unknown or poorly specified at the present time.
 - The most commonly used Multi-State models - Markov processes - do not deal well with durational variation in transition rates, which are common in long-term care. To do so either requires a great many individual states or a semi-Markov model. These are mathematically far more intractable than the simpler Markov models.
- 5.14 We believe that these disadvantages weigh against the use of Multi-State models in a product development and pricing environment, although they may be the most suitable approach for more theoretical work.
- 5.15 In particular, it is a common assumption that once a long-term care claim has occurred the claimant does not recover, but proceeds through various stages of ADL failure until death. This simplifying assumption (the justification for which is discussed later) reduces the multi-state approach to a multiple-decrement table approach, which is the underpinning of the methodology discussed next.

Inception/Annuity Approach

- 5.16 This is an approach that is commonly used in practice for pricing disability business and is being increasingly adopted to price LTC insurance. In essence an annuity factor is calculated that reflects the present value of a claim which commences at a given age, and this is used to capitalise the value of a claim should it occur. Inception rates are applied to these capitalised values to calculate the expected claims costs for use in profit testing.
- 5.17 This approach has some major advantages for pricing LTC insurance:
- It is very easy to apply within the traditional profit testing framework adopted by most offices for pricing other lines of business
 - It requires far fewer explicit assumptions to be made than the Multi-State model approach
 - It deals well with select inception and recovery rates.
- 5.18 Theoretically the inception/annuity approach is incorrect, as it does not allow for policyholders to return to the exposed-to-risk population should they recover.
- 5.19 However, we do not believe that this is an issue for the type of policies written in the UK, which typically have long deferred periods. In our view, recoveries after such a deferred period has expired are rare in practice, so this simplification is unlikely to have any real impact.

Issues in Pricing Pre-funded Products

- 5.20 For a product which pays a fixed benefit while a policyholder is failing ADLs, and where the level of the benefit does not depend upon the severity of ADL failure, LTC insurance introduces no new issues beyond those common from PHI business. The value of an annuity given that claims payment is just about to commence (i.e., the deferred period has expired) is:

$$a_{x,d} = \sum_{t=0}^{\infty} v^t \cdot {}_t p_{x,d}$$

where t is the period since the deferred period expired, d is the deferred period, x is the age at which the annuity payment starts and ${}_t p_{x,d}$ is the probability of someone aged x at the end of a deferred period surviving for time t .

- 5.21 Risk rates, for use in profit testing would be calculated as:

$$rr_{x,d} = i_x \cdot d p_{x,0} \cdot v^d \cdot a_{x+d,d}$$

where i_x is the probability of failing the claims criteria at age x , at the start of the deferred period.

- 5.22 If the benefit paid varies with the severity of ADL failure, then in theory the formulae becomes more complex, in that we should allow for the transition probabilities between the different states.
- 5.23 Often an approximate approach is used based on the premise that a policy which pays, for example, pays 50% of benefits on 2 ADL failure and 100% of benefits on 3 ADL failure can be thought of as two separate policies. The first pays 50% while 2 or more ADLs are being failed, the second pays 50% when 3 or more ADLs are being failed. On this basis the risk rate for such a policy would be the average for the two policies mentioned above.
- 5.24 We have not found the inaccuracy introduced by this method to be significant.

Issues in Pricing Unit-linked Policies

- 5.25 For a unit linked policy where the fund merely meets the risk charges and will not be used to meet the actual costs of care, pricing is relatively straightforward. Risk charges calculated as above are simply deducted in the normal way.
- 5.26 For policies where the fund meets the initial costs of care, with insurance only picking up the balance, the approach is slightly more complex. In essence the deferred period varies with the fund size and so the risk charges will vary month by month.

- 5.27 If the fund value at the start of the month is F , and the monthly sum assured S , then the deferred period to be used in pricing becomes (approximately):

$$DP = \frac{F}{S} + d$$

where d is the specified deferred period in the underlying contract.

- 5.28 The fund can be defined as the actual value of the units or just the increase in value over their purchase price, depending on the details of the policy design.
- 5.29 In practice, the fund will grow due to investment income over the period of a claim and this will increase the deferred period. Equally the full sum assured may not be claimed, which would again increase the actual deferred period.
- 5.30 These adjustments are not made in practice and this gives an implicit margin to the office, which only meets claims once the fund is exhausted.
- 5.31 Typically, a maximum deferred period of five years is used in calculating risk rates, to ensure that they do not become too small and to prevent the policy effectively becoming an excess of loss insurance.

Issues in Pricing Immediate Care Annuities

- 5.32 There is far more judgement in pricing immediate care annuities than in pricing other LTC insurance products. Once it has been decided that a policy should be offered (as opposed to declined or a standard annuity offered), the normal approach is for an underwriter to estimate the expected remaining lifetime of the proposer, and for the annuity rate to be calculated based upon this.
- 5.33 The underwriter may make this assessment based upon tabulated rates or upon medical advice. Some of the tables presented later in this section could be appropriate for this use. A standard mortality table would then be adjusted to give a similar expected remaining lifetime then used in pricing.
- 5.34 Two further modifications may be made to this approach. It has been suggested that medical and underwriting estimates of life expectancy reflect the median rather than mean value, and this can be incorporated into the calculation of an appropriate table.
- 5.35 Additionally, because of the uncertainty in these estimates, a margin may deliberately be built into the calculation. For example, rates may be calculated on the 90th percentile upper confidence interval of expected lifetime, rather than the mean value.

Data Sources

- 5.36 Ideally LTC insurance should be priced based upon a data source that provides reliable, up to date experience, using the same claim definition as will be used in the products being priced and based upon the same population. That is, a study of UK insured long-term care experience is required.
- 5.37 Unfortunately at present such a source is not available, and is unlikely to be so for some time to come. This means that we need to turn to other data sources. Fortunately, there are many of these, although the relevance of some of them is questionable. Below we describe the main sources of information that can be used for pricing LTC insurance in the UK. The contents of these studies are considered later in this section.

Insured Data

- 5.38 At present the only significant insured data is presented in a study from the US: The Society of Actuaries Long-Term Care Experience Committee Intercompany Study (the Intercompany study). This examined over 800,000 exposure records and 13,000 claims from policies in force between 1984 and 1991. It has the major advantage of being based on insured lives. However it has a number of disadvantages:
- It is based upon US, rather than UK lives
 - It is not homogenous, including a number of policies with early forms of product design, which may be unrepresentative of current policies
 - The experience is not yet mature enough to give any sensible indication of mortality/recovery rates.
- 5.39 While these are clearly defects, it does give some insight into inception rates and early recovery experience. It also gives data on issues such as the select effect, lapses and mortality in deferment. However, sometimes this seems to confuse rather than clarify the situation.
- 5.40 This study has been repeated, although the results have not yet been published. While this study is not a sufficient source of data to be used to price LTC insurance on its own at present, it may well become one of the most important sources in the future.

Population Data

- 5.41 The lack of appropriate insured data means that we have to look elsewhere, at data which is mainly population based. While this is not ideal, a variety of population data sources are available and serve to round out our pricing assumptions.

US Population Data

- 5.42 In the US there are at least two more large studies which are worth considering. The 1985 National Nursing Home Survey (NNHS) provides inception rates, prevalence rates and length of stay data. Unfortunately for UK purposes, apart from being US data, it also looks at stays in nursing homes, rather than being based upon ADL failure.

- 5.43 This makes it potentially unsuitable for a number of reasons. Because it looks at nursing home stays only, it cannot be used for the pricing of homecare, which is an important part of most long-term care policies in the UK. There is also no reason to believe that nursing home admissions will bear any particular relation to ADL failure. Worse still, stays in nursing homes are affected by the supply of homes and by the availability of funds to pay for them, while ADL failure is not.
- 5.44 This means that the NNHS is not a particularly reliable data source for pricing LTC insurance as we define it, even though it was used for some early pricing in the US, and also in Germany. It is recommended as a standard valuation table in the US, with the comment that it is expected to be more prudent than actual experience. We do not yet have reliable enough insured experience to test this hypothesis.
- 5.45 The other main US study is the National Long Term Care Survey (NLTCs). This is a longitudinal study which has been repeated 3 times so far. It looks at a large sample of the US population, and reports on ADL failure. This is close to what we want for pricing LTC insurance. It also provides data in a format that allows the calculation of transition rates, making it an attractive starting point for those using the Multi-State modelling approach to pricing.
- 5.46 In the US particularly, this is a useful source of pricing information. While it should also be useful in the UK, it still has the problem that it represents a different country's population experience. In particular, the sample set is drawn from Medicare records. It is not clear that this population will be a good match for typical LTC insurance purchasers.
- 5.47 Manton and his colleagues at Duke University have carried out a number of analyses of this data set, and their papers are a good first source for those interested in this data.

UK Population Data

- 5.48 For basic pricing data, the most useful UK study to date is the OPCS survey, "The prevalence of disability in adults", published in 1985 (OPCS study). This study looked at some 100,000 people in the UK, both in nursing homes and in their own homes. Apart from the advantage of being a UK study, it also asked questions relating to ADL failure, which makes it particularly suitable for LTC insurance pricing.
- 5.49 Unfortunately the results of these questions were not published in a particularly useful format, but we understand that a number of reinsurers in the UK have obtained the original data, and so data based on the underlying ADL definitions is now available (albeit indirectly) within the insurance industry.
- 5.50 While only considering lengths of stay, another useful UK source is the series of discussion papers from the Personal Social Services Research Unit (PSSRU) at the University of Kent on nursing home stays in the Canterbury area.

Other Population Data

- 5.51 A study from Holland : “The prevalence of functional disability in the elderly 1989/90” (Dutch study) looks at age-adjusted ADL failure by a number of specific factors, and so is useful in suggesting adjustments that should be made to the underlying population data.
- 5.52 Meanwhile, the Canadian paper :”Survival Patterns of Nursing Home Admissions and their Policy Implications” (Shapiro and Tate), which considers survival patterns of nursing home residents in Manitoba, rounds out the data on survival in care.
- 5.53 While there are undoubtedly many more sources, these together provide a good starting point for setting a LTC insurance pricing basis. The key figures from these sources are discussed in this section and reproduced in the appendices.
- 5.54 One particular source which may be worthwhile is the Medical Research Council Study of Cognitive Function and Ageing: MRC-CFAS. We have not yet studied this source in detail but early indications are that it could be potentially valuable.

Pricing Assumptions

- 5.55 To price pre-funded LTC insurance the following assumptions are required:
- Claim termination rates
 - Claim inception rates
 - Mortality in deferment
 - Lapse rates
 - Average claim size
 - Economic assumptions
 - Trends
- 5.56 In addition there are a host of minor assumptions that must be made, depending upon the exact design of the product. To price immediate care annuities only the claim termination rates and economic assumptions are relevant.
- 5.57 There is no one data source from which we can derive all of these assumptions. Instead they must be pieced together from various sources. The majority of this section is dedicated to showing how this can be done.
- 5.58 Before looking at these individual sources it is worth looking at the prevalence rate data available. Although prevalence rates are not a required assumption, much useful data comes in this form and, as we show below, it is possible to derive some of the main assumptions that we do require from such data.
- 5.59 This type of data is also useful in considering some of the modifications which should be made to the basic rates we derive. With the exception of the Intercompany study all of the data sources we consider are from population studies, and it is unlikely that these

reflect the typical LTC insurance purchaser. Prevalence rate studies which consider the level of ADL failure by factors such as socio-economic class can assist in modifying these rates.

Prevalence Rates

- 5.60 The only major UK study (OPCS) gives prevalence rate data. As this is a natural starting point for pricing UK LTC insurance policies, we start by considering this data. The US NNHS also gives prevalence rates and in this section these are compared to the OPCS data.
- 5.61 The OPCS study did not publish the prevalence of ADL failure or cognitive impairment, but rather scored the severity of disability on a scale of one to ten, with ten being the most severely disabled. We believe that the more severe categories (7-10 and above) are of interest in pricing LTC insurance. The NNHS study looked at whether people were resident in a nursing home. The table below compares the results of these two studies at the age groups most relevant for long-term care. Fuller tables are given in the appendices.

Prevalence Rates per thousand of the population

	OPCS Severity Levels			NNHS
Age Group	7-10	8-10	9-10	
Male				
50-59	19	12	6	3
60-69	39	26	15	6
70-79	71	48	25	24
80+	246	178	112	93
Female				
50-59	24	15	8	2
60-69	44	28	16	8
70-79	99	63	37	30
80+	298	209	142	162

- 5.62 The table shows a number of interesting features. Both the male and female prevalence rates from the OPCS data increase at around 8% per year of age, although this falls off at the older ages. This is similar to the growth in mortality rates.
- 5.63 For both sexes around twice as many people have a severity score between 7-10 as do between 9-10. Female prevalence rates are higher than those for males, although the gap is much smaller than seen in mortality or PHI business.

- 5.64 While these figures are interesting in themselves, most policies in the UK use an ADL and cognitive impairment based claims criteria and it is necessary to consider how these relate to the OPCS severity categories. While we have analysed the underlying data, it is not possible to publish it for reasons both of copyright and commercial sensitivity. However, we have compared the prevalence rates calculated on a basis close to the ABI's suggested ADL definitions including cognitive impairment to those given above.
- 5.65 The results suggest that a criteria of failing two out of six benchmark ADLs or a cognitive impairment test would give prevalence rates close to the 7-10 severity level. The more stringent 3 out of 6 ADLs or cognitive impairment test gives results that fall between the 8-10 and 9-10 level. The relativities by age and sex remain broadly unchanged.
- 5.66 While superficially comparable to the OPCS rates, the NNHS data does have some differences. The NNHS rates increase more steeply with age and the female rates are considerably heavier than the male rates at the highest ages. Before adopting one or the other of these data sources as part of a pricing basis, it is necessary to understand these differences. It is our belief that these discrepancies arise from looking at nursing home admissions rather than ADL failure or a similar proxy, as opposed to reflecting differences between the countries.
- 5.67 It seems possible to us that younger age groups mentioned will be more likely to be cared for at home while disabled than older people, if only because their carers will also be younger. As women are typically younger than their spouses and tend to suffer disabling illness at an older age, we believe that women are more likely to be able to care for their spouses at home than men are. This, along with the larger percentage of women in residential homes, for social reasons, may explain the discrepancies between the two data sources.
- 5.68 As LTC insurance payments will be made based on ADL or cognitive failure regardless of whether a claimant is in a nursing home or in their own home, and given the discrepancy between the two data sources considered, we believe that the OPCS data is more suitable for pricing LTC policies than the NNHS data. Having said that, the similarities of the NNHS rates to OPCS categories 9-10 is encouraging.
- 5.69 Another worthwhile comparison is between the NLTCs data from the US and the OPCS data. In the table below we compare the prevalence rates of those in institutions or failing at least one out of six ADLs or cognitive impairment from the NLTCs source to what we believe is an equivalent severity level from the OPCS data, for both sexes combined.

	NLTCS (1994)	OPCS (6-10)
Age Group		
60-69		57
65-74	84	
70-79		125
75-84	214	
80+		354
85+	327	

- 5.70 While the age groups do not tie up precisely, the fit is quite good. This suggests to us that there may be more difference because of definitions of disability than because of countries, and that this study may well be useful in the UK.

Conversion Between Prevalence Rates and Inception/Termination Rates

- 5.71 While much of the data which is available gives prevalence rates, it is inception and termination rates which are required for pricing. This is not such a problem as it first seems, as it is possible to derive the latter from the former. Various formulae can be constructed to do this. One such set is given in Appendix 3.
- 5.72 For this derivation to work we must make a number of assumptions, as listed below:
- The population is approximately stationary
 - An assumption as to the level of aggregate population mortality
 - The assumption that claims end in death, not recovery
 - An assumption about any one of the inception rates into care, the termination rate from care or the level of mortality experienced by lives not in care.

These assumptions are discussed below.

- 5.73 In reality the population is not stationary and this strictly invalidates the method. However, this has relatively little effect if the claims termination rates are high and the expected lengths of stay low. As we will see later this is true for long-term care claims.
- 5.74 As the prevalence rates most likely to be used in the UK (OPCS) are from a population study which took place in the early 80's, it is appropriate to use a population mortality table compiled at this time in the calculation. For this ELT14 is appropriate and we recommend that this is used.
- 5.75 It is important to note that the assumption about terminations ending in death does not lead to a margin in the rates we calculate. We do not ignore recoveries; rather we re-classify recoveries as deaths to allow the methodology to work.

- 5.76 If this approach is adopted, we believe the easiest assumption to fix is mortality in claim or mortality prior to ADL failure. There are a number of studies, both in the UK and abroad that provide an indication of the level these should be set at.
- 5.77 It is clearly possible to derive a great many sets of inception and termination rates, depending upon the other assumptions made for the calculation of age-specific risks rates. Fortunately, the key assumption is the level of the prevalence rates, the final split of the prevalence rates not being too important. If too high a level of inception rates is assumed, there will be too many claims. However, the mortality derived for those claims will also be too high. The final risk rates will remain almost unchanged.

Graduation

- 5.78 Before inception and termination rates can be derived by this method, the prevalence data will need to be smoothed or graduated. As the OPCS data groups all data from age 85 together this can lead to a wide range of results depending upon the method adopted.
- 5.79 Fitting an exponential curve to the data can lead to very high estimates of the prevalence rates at the highest ages. Indeed it may lead to rates over 100%, which is clearly unreasonable. However, it seems equally unreasonable to assume that prevalence rates do not increase beyond age 85.
- 5.80 We have found that a suitable approach is to fit a logistic curve, of the form.

$$\frac{Z_x}{1-Z_x} = e^{a+bx}$$

where Z_x is the prevalence rate at age x .

- 5.81 Such a curve can be fitted (in logs) by ordinary least squares regression. It naturally limits the upper values of Z_x to one, and gives the sort of s-shaped curve typically seen in the prevalence rate studies. We have found that a higher order equation in x may be required to capture the shape of the data for females correctly.
- 5.82 There is also a question over the average age in each group. In most age groups it is acceptable to use the mid-point, but for the last age group we should look at the population as a whole. ELT14 suggests an average age of 86 for men and 88 for women. This difference may explain some, but not all, of the higher female prevalence rates from the OPCS data.
- 5.83 Appendices 4 and 5 give information on the prevalence of disability and the number of disabled people in the population from the OPCS study. Appendix 6 gives a number of tables from the NNHS, including prevalence rates.
- 5.84 We have produced an example graduation of the OPCS data, and these rates are given in Appendix 7. However, we should stress this is for example purposes only, and is not intended to be our recommended graduation.

Population Adjustments

- 5.85 The data given so far is from population studies. However the purchasers of LTC insurance are unlikely to be typical members of the population. We therefore need to consider how these rates should be adjusted before they can be used to price products. Similar adjustments can be applied to the assumptions considered later.

Insured vs General Population

- 5.86 In all other areas of insurance, the insured population has different mortality and morbidity to the general population. Part of this is due to underwriting, part due to socio-economic factors and part due to the definition of claim.
- 5.87 We would expect LTC insurance purchasers to be predominantly AB's. In mortality studies, the mortality of the insured public is about 70% of the population generally. This reflects the lower incidence of stroke, cardio-vascular disease and cancer cases. As these conditions account for about half of LTC insurance claims, it seems that some, but perhaps smaller, adjustment should be made to allow for this.
- 5.88 Data from the Dutch study on the functionality of the elderly supports this finding. The following table shows the (age and sex adjusted) prevalence of ADL failure in the non-institutionalised population by various socio-economic class indicators. The number and definition of ADLs is different from those we generally use. However it is the relativities which are important.

Prevalence of ADL failure

Schooling	%
Basic	5.9
To 16	3.7
To 18	4.6
University	3.7
Income (Guilders)	
18,000 or less	7.0
18,000-22,000	6.4
22,000-28,000	4.6
36,000-45,000	4.8
45,000 plus	5.0
Job Status	
Very low	5.0
Low	6.3
Average	4.7
High	6.6
Very high	5.5
Medical Cover	
Sickfund (state)	6.9
Private	3.1

- 5.89 Overall this analysis shows that the prevalence of disability falls as the indicators of socio-economic class rise. Most interesting is the medical cover data. In Holland most people are covered by the country-wide sickfund. However certain professions and those earning above 40,000 guilders are insured privately.
- 5.90 This split seems a good proxy for the typical LTC insurance purchaser. It shows prevalence rates of 45% of the rest of the population. This is obviously not directly applicable to general population data, which is a mixture of all classes and is not seen to such an extent in the other indicators. However, it does indicate that some reduction is reasonable. Given the level of uncertainty about data we would tend to be cautious and restrict any reduction to the order of 20%.

Conditions Not Covered

- 5.91 Apart from the difference in socio-economic class, there are some conditions that just would not be covered by insurance; they would be underwritten out at the proposal stage. An analysis based on NNHS data showed that this was worth about a 6% reduction in rates.
- 5.92 A study we conducted based on the OPCS data gave similar results. Appendix 8 gives a list of those conditions in the data which we would expect to be underwritten out at the proposal stage.

Setting the Pricing Assumptions

- 5.93 For UK purposes we would suggest deriving all assumptions possible from the OPCS data, as it is UK based and appears to be a good proxy for the claims criteria used. It is our view that other data sources are best used to set the assumptions required for to this derivation to take place, to fill in missing assumptions and to validate the results. This section considers these assumptions.

Claim Termination Rates

- 5.94 Termination rates are required to price all LTC insurance policies, from stand alone pre-funded policies to immediate care annuities. They are also an obvious assumption to fix to derive incidence rates from prevalence rate data. Unfortunately they are also one of the most complex assumptions to consider.
- 5.95 Terminations of claim can arise from two principle sources, recovery or death. The rates themselves can vary by age, sex, duration and a host of other factors. In addition, the information available from studies comes in a variety of forms. In this section we consider all of these facets.
- 5.96 We first look at average lengths of stay and then at aggregate termination rates. Finally, we split the termination rates between recovery and mortality in claim.

Length of Stay

- 5.97 Perhaps the most basic data available is how long a claim lasts, which should roughly approximate LTC insurance annuity factors. There are many studies which consider lengths of stay.
- 5.98 One potential problem is that many studies consider all stays, rather than just completed stays. Hence a nursing home occupant who had been in residence for one year at the time of a study would have a recorded length of stay of just one year, despite the fact that he or she may continue for many more years. This can lead to underestimates of lengths of stay. The studies considered here all report completed lengths of stay and so should not be subject to this distortion.
- 5.99 The NNHS gives graduated length of stay data on a number of bases. Reproduced below is data on the benefit period concept, which pulls together all parts of a stay in care, even if they are in different homes. This is most appropriate for LTC insurance policies as a claim would continue regardless of a change in the nursing home occupied. This data is for stays in nursing homes regardless of ADL status. The stays are in days.

Average nursing home lengths of stay (NNHS, in days)

Age	60	70	80	90
Male	767	535	265	369
Female	975	697	630	556

- 5.100 The average lengths of stay from this data source are short, under two years in most cases. It can be seen that these fall with age and that females spend longer in care than males.
- 5.101 It is our belief that this study underestimates the expected length of claim under a LTC insurance policy. This is because it (by definition) does not include care delivered at home.
- 5.102 Shapiro and Tate analyse the lengths of stay in nursing homes in Manitoba by age, sex and severity of disability at admission. Their findings are set out below.

Average nursing home lengths of stay (Shapiro and Tate, in years)

Age			
Male	Care Level 1	Care Level 2	Care Levels 3-4
<65	14.8	8.2	7.4
65-74	7.2	5.4	3.8
75-84	6.2	3.8	2.7
85+	4.5	3.0	1.8
Female			
<65	16.5	10.3	10.3
65-74	14.7	8.0	5.8
75-84	9.3	6.1	4.4
85+	6.3	4.5	3.0

- 5.103 It is clear that length of stay reduces with increased severity of disablement. Care levels 3-4 would most closely equate to failure of 3 or more ADLs. At the ages we are interested in (ie, post 75), stays average 2-2.5 years for men and 3-4 years for women. This variation by sex is consistent with that given by the NNHS.
- 5.104 Booth et al conducted a 12 month study of 6,099 care home residents in the UK. All subjects were classified individually on four separate scales of personal functioning; self care, continence, social integration and mental orientation. The highest mortality was among doubly incontinent residents, 47% of whom died. The respective mortality rates of subjects classified as independent, moderately dependent and severely dependent were 15%, 22% and 42%. Tentative conclusions as to life expectancy can be drawn as follows :

Life expectancy and 1-year survival probabilities (Booth et al)

	%Survival at 1 Year	Implied Life Expectancy (yrs)
Age 75		
Independent	89	7.1
Moderately dependent	85	4.6
Severely dependent	65	1.6
Age 85		
Independent	85	4.6
Moderately dependent	78	3.1
Severely dependent	58	1.3
Age 95		
Independent	74	2.8
Moderately dependent	66	2.1
Severely dependent	51	1.3
All Ages		
Independent	85	6.5
Moderately dependent	78	3.7
Severely dependent	58	1.3

- 5.105 This study again gives similar results to that by Shapiro and Tate and captures the effect of age and disability level. While these studies are only of limited use for pricing pre-funded products, they should form a good base for estimating immediate care annuity rates.
- 5.106 The PSSRU analysed completed stays in months, as shown in the table below. It is clear that nursing homes, which care for more severely disabled people have shorter stays than residential care homes.

Type of Home	Length of Stay (Months)
Local Authority Residential	46
Private Residential	29
Voluntary Residential	56
Private Nursing	17
Voluntary Nursing	17

- 5.107 The population studies are all broadly consistent, indicating that nursing home stays under LTC insurance policies are likely to be relatively short. Where a breakdown is available by sex, it seems that females are expected to stay roughly 50% longer than males. The difference between residential and nursing home stays and stay lengths by disability show the importance of considering all disability (including homecare) and not just nursing home stays.
- 5.108 The fact that these studies do not allow for homecare and that LTC insurance purchasers may be healthier on average than other members of the population suggest that these figures should be used as a lower limit on the length of stay only.
- 5.109 The Intercompany study also has some information on lengths of stay. For those claims which closed during the investigation the average length of stay was only 231 days, which is much lower than any of the population studies.
- 5.110 However, this figure should be treated with caution. By definition only the shorter claims were captured in this period, and open claims had an average duration of 564 days. In addition, a number of claims closed due to the expiry of coverage or unspecified causes. All in all, little can be drawn from this experience, although future studies may be more forthcoming.

Continuance and Termination Rates

- 5.111 For pricing purposes more useful information is to be drawn from those studies which consider continuance rates or termination rates, even if there is no split between recovery and death.
- 5.112 The NNHS study looked at continuance by age and sex. Figures are given in the table below.

Continuance of nursing home stays (NNHS)

	Age at Entry			
	Male		Female	
	65-74	75-84	65-74	75-84
Days from Admission				
0	100%	100%	100%	100%
90	56	50	57	60
182	42	36	45	47
365	32	26	38	37
730	21	15	27	27
1095	16	7	19	20
1460	11	4	14	14
1825	8	3	11	9

- 5.113 It is clear that females recover or die more slowly than males and that terminations

reduce with age, although the effect is not that significant for women. It is also clear that most stays are short, with well under half of nursing home stays lasting more than one year and less than 10% lasting 5 years.

- 5.114 There is a clear durational effect. Approximately 50% of claimants stop claiming in the first 90 days. Only 25% of the remaining claims terminate in the next 90 days, and it takes a further 180 days for the next 25% to go. This effect seems to wear off after the first year.
- 5.115 This is not unexpected, and mirrors the pattern seen in PHI claims. Some causes of claim will naturally lead to recovery, for example, broken limbs. Others will lead to rapid deaths, such as late stage cancers. On the other hand, some claimant will not recover and will experience relatively normal mortality. An obvious example is Alzheimers disease. As the mix of claimants in the population changes with increasing claim duration the rate of claims termination will fall. This can have important consequences for product design and for reserving.
- 5.116 The Intercompany study gives a similar analysis, and while we have already expressed our reservations over this source, it may still give some indication of early recovery patterns. Sample tables are in Appendix 9.

Continuance of LTC claims (Intercompany study)

Days from Admission	Deferred Period		
	0 Day	15-30 Days	60-90 Days
0	100%	100%	100%
90	56	62	92
182	50	49	83
365	38	37	65
730	29	25	51
1,095	22	18	40

- 5.117 It is clear that the deferred period is a key factor, and that once again there is a durational effect. However, little more can be drawn from this data.

Recovery/Mortality Rates

- 5.118 The only data source that gives rates split between recovery and mortality in claim is Manton et al's analysis of the NLTCs data. This ignores the durational effect, but does give transition probability between ADL statuses, between the years 1982, 1984 and 1989.
- 5.119 Approximating one year transition rates by simple division gives the following sample rates, for the 75-84 age group. The full tables are given in Appendix 10.

Transition rates from ADL failure (Manton et al/NLTCS)

From To	3-4 ADL failure	5-6 ADL failure	Institutionalised
<3 ADL failure	6.3%	4.0%	1.8%
Dead	11.7	16.7	15.1
Total	18.0	20.7	16.9

- 5.120 It is clear that recovery is far less likely than death, and that the chance of recovery falls with increasing disability. However, the probability of a stay terminating is remarkably consistent at around 20% per annum.
- 5.121 This broadly supports the hypothesis that claims will end in death not recovery. This seems particularly likely for those policies with longer deferred periods, where termination rates are lower in any case.
- 5.122 Based on this analysis claims termination rates will be significantly higher than normal mortality rates. Depending on age and sex the ultimate rates seem likely to be between 20 and 30% per annum. There also seems to be a strong durational effect, at least initially.
- 5.123 This durational effect is a complication if rates are derived from prevalence data, as this technique does not allow for this aspect of the data. While this does not invalidate such an approach, it is important that consistent assumptions are used in calculating any subsequent risk rates.
- 5.124 We have derived a set of sample mortality and inception rates from the graduated OPCS prevalence rates, and those are given in Appendix 11. At the ages concerned these are consistent with the data given in this section.

Claim Inception Rates

- 5.125 There are three potentially useful sources of data on claim inception rates. Both the NLTCS and NNHS provide population rates, while the Intercompany study gives insured data. This study comes into its own here, as it gives data by deferred period, sex, issue year and duration.
- 5.126 Sample inception rates from the NNHS study are given below, per 1000 lives.

Inception rates (NNHS study, per 1000 lives)

Age	Male	Female
50	1.4	0.7
60	2.8	2.0
70	8.5	11.5
80	43.9	51.6
90	143.8	155.2

- 5.127 These are population rather than insured rates. Unlike mortality rates, the male and female inception rates are very similar at all ages. Indeed up to age 80 the male rates are actually lower than the female rates. Like mortality rates they increase at approximately 10% per annum, although this rate of increase falls off at the older ages.
- 5.128 The US Intercompany study looks at insured data and an extract of this is reproduced in the following table.

Inception rates (Intercompany study, per 1000 lives)

Age Group	0	15-30	50-150
60-64	1.8	0.7	0.7
65-69	4.5	1.7	1.0
70-74	11.0	4.5	2.5
75-79	27.1	10.7	6.7
80-84	51.3	26.8	12.4
85+	98.6	55.2	16.1

- 5.129 The table shows rates for males and females combined. Like the population studies, insured experience shows little difference by sex and it seems that differentiating inception rates in this way may not be necessary when pricing LTC insurance.
- 5.130 The zero day inception rates from this study (ie, no deferred period) can be compared to the population rates and we shall consider these first. The insured rates appear to be of a similar level to the population rates at younger ages but below them at higher ages, where the difference is around 20%. This is consistent with our comments in the section on prevalence rates.
- 5.131 In the UK there is no zero day business currently being written and so it is more useful to look at data on longer deferred periods. These are shown in the final two columns of the table, with the 50-150 day period being most appropriate for UK business.
- 5.132 These rates are much lower than the zero day or population data suggests, being only one quarter of the zero day level at most ages. Part of this difference will be due to deaths and recoveries by claimants during the deferred period, but this suggests an exceptionally high level of terminations initially. This supports the strong durational effect discussed earlier.
- 5.133 The table below shows the transitions to 3 or more ADL failure or institutionalisation from non-disabled, Instrumental ADL failure and failure of 1 to 2 ADLs. This data is from the NLTCs data as analysed by Manton. It shows transitions between various states of disability, and is not directly comparable to other sources. See Appendix 12 for the full table.

Transition rates to ADL failure (Manton et al/NLTCS, per 1000 lives)

	From		
	Non-disabled	IADL	1-2 ADL
65-74	7	26	109
75-84	18	59	115
85+	50	111	144

- 5.134 It is interesting to see how the transition probabilities increase with higher states of disability. This supports the theory that people tend to progress through these states rather than jump directly from being well to severe disablement. It also suggests that a good indicator of ADL failure at a sufficient level to lead to a claim is failure of a lower number of ADLs or of IADLs. This has obvious implications for underwriting LTC insurance.
- 5.135 The other interesting point that comes out of this table is how the sensitivity of the inception rate to age changes with the level of disability. Transitions from a non-disabled state to 3 or more ADL failure increase steeply with age, while transitions from a low ADL failure are almost independent of age.
- 5.136 While discussing basic inception rates it is worth warning against an approach that has been used in the UK in the past on PHI products. This has been to use inception rates from one study and to use mortality and recovery data from elsewhere. This is very dangerous, as inception and recovery rates are closely linked. For example an easy to fail claims definition will give high inception rates, but also high recoveries. Adopting a termination table with a different claims definition will give risk rates that may well be incorrect.
- 5.137 This had been a problem for PHI writers before CMIR12 was produced, as they often used UK inceptions and US terminations. We hope that the provision of inception data from the Intercompany study without useful termination data from the same source will not lead to the same problem in LTC insurance.

Selection

- 5.138 We have already noted the reverse selection in terminations and mortality in claim. This is often ignored in pricing and aggregate rates are used instead, which seems to have little impact on the longer deferred period products sold today. There also seems to be a select effect on inceptions, but it is not clear exactly what it is.
- 5.139 The following table shows inceptions by policy duration, and is again from the US Intercompany study.

Duration (Years)	Incidence Rate (%/a)
1	5.3
2	7.2
3	8.8
4-5	11.8
6-10	21.7

5.140 This suggests a pronounced select effect, as we would expect given the high level of underwriting associated with this product, but the level is not yet clear.

5.141 Unfortunately the data is distorted by changes in policy design, by changing mix of policy design, and by the different average ages in each cohort. We believe this overstates the effect. In the US, it is common to assume an initial select discount of 50%, and we do not believe any further amount is justified.

Anti-selection

5.142 We also need to consider the possible effects of anti-selection. There is no evidence yet that there is any significant level of anti-selection, and given the underwriting process it is hoped that most cases would be picked up at this stage. However it is again prudent to allow some margin for this.

Mortality in Deferment

5.143 One important assumption that should not be overlooked is the rate of mortality in deferment. We would expect this to be light compared with typical insured mortality.

5.144 The reason for this is that many of the causes of death among the elderly are not sudden, but occur after a period of illness. Such illnesses may give rise to a long-term care claim, and hence increase the rate of mortality in claim rather than deferment. Relatively few deaths will occur before a claim, particularly at the higher ages, where deaths from accident and acute episodes make up a smaller proportion of total deaths.

5.145 This is important because the typical product designs seen today do not include a payment on death, and so high mortality in deferment will lead to a lower premium. The Intercompany study is the only real source of such data and gives the following mortality in deferment.

Mortality in deferment (Intercompany study)

Duration (years)	50-59	60-69	70-79
1	0.4%	0.6%	1.2%
2	0.5	0.9	2.0
3	0.5	1.3	2.6
4	0.7	1.6	3.1
Total	0.4	0.9	1.9

5.146 These rates are lower than typical insured mortality experience. As we would expect, underwriting has led to a select period, although given the low overall level of mortality, this may not be significant.

5.147 In deriving our example inception and termination rates (as shown in appendix) we used population mortality in deferment of 75-80% of ELT 14.

Lapses

- 5.148 There is little experience on lapse rates available outside of the US. However, in most current products (without surrender values) a lapse will lead to a profit and so it is important not to overstate lapse rates.
- 5.149 The Intercompany study (again the only real source) shows the lapse experience below.

Lapse rates (Intercompany study)

Duration	Female	Male
1	17.8%	16.8%
2	13.3	12.3
3	12.8	11.9
4	14.4	13.7
Total	15.4	14.5

- 5.150 These are lower than typical experience on other products in the US. A wide range is reported for LTC insurance products with some offices experience being below 10%.
- 5.151 Even these figures are probably too high for use in the UK. Policy design has varied during the period of this study in the US, while premium rates have fallen. Hence there may have been a number of lapses and re-entries. Experience also shows lower lapses on products with longer deferred periods.
- 5.152 For single premium policies, which do not have surrender values, any level of lapse would be surprising. We do not have any information on the persistency of regular premium policyholders in the UK. However, we would be surprised to see experience above 10% per annum.
- 5.153 It is also worth considering the profile of lapses. Most purchasers of LTC insurance will have incomes that do not increase in real terms, and may even decrease. Given this any financial pressures may fall later in the life of the policy, and we would not be surprised if an atypical pattern of lapse rates that increased with duration occurred with long-term care insurance.

Average Claim Size

- 5.154 An assumption is required as to the average claim size as a proportion of the sum assured when calculating premium rates. If the benefit paid is simply a cash sum equivalent to the sum assured then this is straightforward.
- 5.155 If the claim paid can be less than the sum assured, then it is considerably more complex. The higher the sum assured the more likely a claim will fall below this level, and so theoretically a larger discount could be incorporated.
- 5.156 Over time inflation in care costs may reduce this effect, and so any discount should also fall over time. This should happen more quickly on a policy with no benefit escalation than on one with escalation close to NAE.

- 5.157 In practice, it is common to simply base charges on the sum assured rather than attempting to estimate the actual claim cost. This builds an implicit margin into the pricing basis. Given the number of unknown factors in pricing LTC insurance, we do not believe any additional complexity is justified at the current time.

Economic Assumptions

- 5.158 While the demographic assumptions are obviously a very important aspect of LTC insurance pricing, there are a number of economic assumptions which must also be addressed. These are considered below.

Interest Rates

- 5.159 The rate of investment return assumed will of course depend on the underlying investments made. These in turn will depend upon the product design and upon current economic conditions.
- 5.160 For most conventional products the insurer accepts all investment risk. The prospective duration of the policy suggests interest rates in line with medium term Government stocks. For single premium products there will be significant reinvestment required and this exposes the insurer to falls in investment rates over time. Hence a more prudent assumption may be required.
- 5.161 Matching requirements may also effect the interest rate assumed. The majority of policies contain a provision for escalation of benefits both in deferment and in payment. Explicitly or implicitly, a greater part of this escalation will be in line with care costs, which may exhibit different rates of increase to the RPI. It is not clear that a suitable matching investment exists and this needs to be taken into account when setting the investment rate.
- 5.162 Unit linked products have reviewable risk rates and this will allow the investment return assumed to more closely reflect the then current conditions.

Escalation Rates

- 5.163 The majority of LTC insurance policies feature some form of escalation provision, both for premiums and for benefits.
- 5.164 Escalation of benefit amounts is almost a pre-requisite if the policy is to provide a worthwhile contribution to care costs, as a claim will on average not be expected until sometime into the lifetime of the policy.
- 5.165 Escalation in premium rates is a mechanism that to some extent protects the insurer from unforeseen increases in costs, but it must be remembered that the incomes of policyholders are likely to be fixed to a large extent and that large increases may render the policies unaffordable at precisely the time they are required.

- 5.166 The most appropriate rate of escalation in benefits would be one that matches the average increase in care costs. Unfortunately, no such index exists, so such a provision is unlikely. A suitable proxy might be the increase in the NAE index, as the majority of care costs are labour related. However, no asset exists to match such an index and this makes it a poor device. A proxy such as RPI + 2% might again be a more suitable approach.
- 5.167 Regardless of the terms set out in this policy, attention must be given to an appropriate pricing assumption. If the payments are in cash and have no regard to the cost of care, then the escalation in outgo will be equal to the policy conditions.
- 5.168 However, if the sum assured is just an upper limit, claims payments may escalate at a higher rate until this limit is needed, as set out in the section on the average claim size.
- 5.169 The actual assumption appropriate is therefore a trade-off between the policy design, the level of cover and the assumed proportion of the sum assured that will initially be paid. This is a complex arrangement that has no simple solution.

Required Return

- 5.170 The required rate of return an insurer will require is of course its own decision. However, given the relative uncertainty of this product, we would expect it to be above that required for other lines of business.

Trends

- 5.171 There is little point in analysing and setting rates based upon current data, if trends are expected to lead to less favourable morbidity experience in the future. The expected trends in morbidity and mortality are two of the key factors to consider in designing and pricing risk products, even if they are not taken into account explicitly.
- 5.172 A good example is mortality business. We expect experience to improve, and even though we don't always price for this explicitly, it affects our views on, for example, guaranteed rates. PHI does not appear to have such an improving trend and one of the problems in that area is that pricing and product design have not seemed to recognise this in the past.
- 5.173 The trends in LTC morbidity are uncertain. Looking at disability generally seems to suggest that the trend is level, or worsening. For example, the proportion of people reporting some form of limiting long term illness in the General Household Survey has increased over time.
- 5.174 However, looking at trends in the proportion of the population suffering substantial disability, e.g. 3 ADL failure, suggests trends are either level or improving.
- 5.175 The Intercompany study shows inception rates falling at nearly all ages, deferred periods and policy durations from 1986 to 1991, while comparison of the 1982 and 1994 NLTCs prevalence rates shows falls at all ages, as shown in the following table.

Change in the prevalence of disability (NLTCS, both sexes)

Prevalence of ADL failure or institutionalisation			
Age	1982	1994	Difference
65-74	9.8%	8.4%	-1.5%
75-84	24.7	21.4	-3.5
85+	57.3	52.7	-4.7

- 5.176 The difference between these sources may be because the lower levels of disability are generally self-reported and subject to changes in what society sees as acceptable, while ADL studies tend to be more objective.
- 5.177 This is encouraging, but not conclusive. It may mean that we do not need to price worsening experience into our best estimate pricing bases for non-guaranteed business. However, we still need to be aware of the possibility in setting valuation margins and deciding on what are sensible product designs.

Risk Rates

- 5.178 As an example, we include a sample set of risk rates in Appendix 13. These are based on the OPCS data, a zero day deferred period and 7.5% interest. They have no escalation and do not contain loadings for expenses or adjustments for insured lives. However they give a ballpark figure as to the rates required for LTC insurance.

6 Valuation and Other Issues

6.1 As for all insurance products, there is a direct link between the price charged for cover, the design of the product and the valuation and taxation regime in place. This section considers:

- The class of business that long-term care falls into
- The taxation of long-term care
- Valuation margins and approaches
- Solvency margins.

Class of Business

6.2 A number of unit-linked long-term care products are written off-shore and for those the question of which fund the business falls in is not relevant. For others, this question has a significant impact on the pricing, taxation and product design.

6.3 Most on-shore long-term care products are written as class IV business. This gives a significant taxation advantage compared to writing the policy as class I/III business.

To be eligible for this status, a policy must :

- Provide benefits whose level depends upon the health of the policyholder
- Not provide a death benefit
- Not provide a surrender benefit.

6.4 Unit-linked products, which do provide surrender and death benefits are class III business. The investment funds which build up will therefore be subject to taxation. However, the risk premiums can be reinsured into the class IV fund, giving them the same benefits as conventional products.

6.5 While there are advantages of writing long-term care as class IV business, there are also limitations, these limitations can cause problems for product design, particularly the lack of surrender values or death benefits.

6.6 This has led to some innovative attempts to circumvent this restriction while still retaining the advantages of the PHI fund. It remains to be seen how successful these will be.

6.7 Immediate care annuities fall into Class I.

Taxation

6.8 LTC insurance policies written as class IV business are tax efficient. Taxation is on a profits basis and this gives rise to gross roll-up of investment savings. Profits to the insurer after investment earnings and claims payments are taxed at the appropriate rate.

- 6.9 Following the change to the taxation of individual PHI business announced in 1995 (effective April 1996), all benefits to policyholders are free of tax, whether paid as cash or in kind.
- 6.10 Immediate care annuities suffer tax on payment of all but the capital content of the annuity. This must be calculated on the prescribed IMSO tables, which will overstate the life expectancy for this business.

Valuation Margins and Approaches

- 6.11 LTC insurance is a new product, for which experience is as yet uncertain. This causes some difficulties for valuations.
- 6.12 In the early years, a number of companies took a retrospective approach and set the valuation of liabilities as rolled up premiums. For the very small books that initially existed, this was a reasonable approach, but it becomes less so as policies mature and portfolios grow. Almost all companies now appear to use prospective approaches.
- 6.13 As in all long term business it is necessary to hold policy reserves for inforce business and these should be on a prudent basis. The lack of surrender values means that some thought should be given to what is a prudent assumption. Most policies will lead to a loss on early lapse (due to initial expenses and commission) with profits on later lapses.
- 6.14 It is also necessary to hold reserves for claims in payment. While on average we would expect claims to last for a relatively short period of time, perhaps 2 to 4 years, this will vary from case to case. The reverse selection effect may require larger annuity values to be used for established claims. The cause for claim will also be important to note. For example, claims resulting from Alzheimers disease could potentially last for many years.
- 6.15 There is a wide range of possible approaches to margins in valuation assumptions. At one extreme it can be argued that pricing bases already contain substantial margins over best estimates and so relatively small margins are required.
- 6.16 However, at the other extreme, experience is largely unknown and this argues for prudent margins generally. We would expect margins in the order of 30% over best estimates.
- 6.17 The existence of substantial guarantees in many cases strengthens the arguments for significant margins, although the need for these margins with non-guaranteed products should not be under-estimated.
- 6.18 Even for products without guarantees, it will take a number of years before experience develops to a credible enough level on which to base changes to the pricing basis. In addition, marketing pressures may make it difficult to increase rates for in-force business.
- 6.19 This suggests that in practice even non-guaranteed business may actually include substantial implicit guarantees, and that rate reviews should only be relied upon if experience is catastrophically higher than expected. We suggest that the valuation basis for these products needs to reflect this risk.

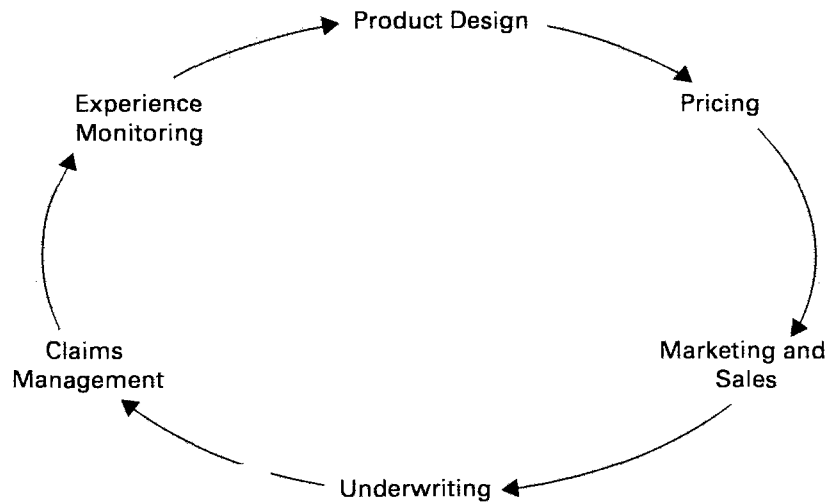
- 6.20 LTC insurance policies may suffer constraints due to matching requirements. RPI is an allowed link, matchable with index linked gilts. NAEI is not an approved link, although offered by some companies.

Solvency Margins

- 6.21 As class IV business, the only solvency margin requirement at present is the EC requirement of 4% of mathematical reserves. This is also true for immediate care annuities written in class I.
- 6.22 For a line of business subject to such uncertainty in results we believe this to be inadequate. This is likely to be increased in the ongoing review of EC solvency margins.
- 6.23 At present, many insurers reinsure substantial portions of the business and so are subject to the limit on the credit that can be taken for reinsurance. These limits act to strengthen the overall reserves and solvency margins held.

7 Efficient Risk Management and the Control Cycle

- 7.1 The control cycle is a very simple concept and is vital for the sound risk management of any product line. It involves all disciplines working together in harmony to achieve a common goal. Each discipline must ensure that their standards are consistent with each other, and that their knowledge is fed back into the cycle.



- 7.2 Product design and pricing have been covered elsewhere in this paper, so this section will focus on the remaining areas of efficient risk management, namely marketing, underwriting, claims management and the monitoring of results.

Marketing and Sales

- 7.3 The distribution of LTC insurance is one of the current barriers to sales. LTC is a specialised sale due to the characteristics of the potential client.
- 7.4 The bulk of LTC sales have been (and probably always will be) to the elderly. Selling to the elderly requires careful consideration. The elderly are not a homogeneous group. The individual will vary depending on age, sex, social background, marital status, etc.
- 7.5 The traditional methods of selling and distribution may not be successful. The elderly tend to be more conservative and cautious, particularly in financial matters. There is potential sales resistance due to the fact that the product can be perceived as complex and expensive, as the premium as a percentage of income can be quite large. The salesperson must also be aware that it is a time-consuming sale and could take up to two or three interviews to complete.
- 7.6 Marketing material needs to have a strong educational message for potential customers, emphasising the importance of LTC funding and how LTC insurance widens the range of choices available. LTC insurance is just one solution to a number of financial issues

that need to be addressed. The salesperson may need to offer information on a wide range of specialised issues, including:

- safeguarding and maximising future income
- inheritance tax
- release of equity from property to provide additional capital.

7.7 Apart from the educational message, the sales material and process should also take into account the following desires of the elderly :

- to maintain a degree of independence and dignity
- to 'enhance' their lifestyle
- to remain in their own home for as long as possible
- to provide comfort, security and 'peace of mind'.

7.8 It is usually beneficial to include a family member in the process. They can assist in the decision-making process and they could also help to fund the premium. Family members can also have considerable initial suspicion of the LTC concept, and involving them at an early stage may allay these fears.

7.9 The above techniques and messages are suitable for the elderly, but there are different considerations when dealing with the younger market, who are looking for more flexible products to deal with their changing needs throughout their life.

7.10 The younger age groups are looking for products featuring LTC insurance as part of a package of benefits, as a rider or as an option to be taken up later, as opposed to stand alone LTC insurance.

Underwriting

7.11 A "standard" LTC risk is not equivalent to a "standard" life risk. The underwriter must determine the probability of an elderly person becoming disabled and remaining in this state, rather than just surviving. They need to be able to access age-specific disease processes where unfortunately the claims experience is limited.

7.12 It is not straight-forward to assess the extra risk in the elderly. The underwriter must be able to distinguish between the "normal" signs of growing old and pathological conditions. Few elderly people will have an entirely 'clean' medical history.

7.13 There are numerous conditions which can affect the independence and quality of life of an elderly person. The principles are summarised in the "Giants of Geriatrics", a term coined by Professor Bernard Isaacs in 1975. They include :

- Immobility
- Instability
- Incontinence
- Intellectual impairment.

7.14 The underwriting of LTC insurance involves the assessment and interaction of multiple risk factors which include :

- Functional status
 - Instrumental Activities of Daily Living (IADLs)
 - Activities of Daily Living (ADLs)
- Health/Medical status
 - self-perception of poor health
 - medication
 - family history
- Social/demographic factors
- Cognitive factors.

7.15 As LTC insurance evolves, the underwriting will as well. It is important that the experience of claims management is fed back to underwriters to allow them to assess their performance. It is also important that actuaries and underwriters make sure that a standard life in underwriting terms is equivalent to the standard the actuary is pricing for.

Claims Management

7.16 The profitability of LTC insurance relies heavily upon effective claims management. One must also remember that the typical LTC claimant will be frail and elderly and hence will require sensitivity and different skills to those required for traditional life insurance claims.

7.17 The handling of LTC insurance claims could have an enormous impact on the clients' perceptions of the insurance company. The insurer must ensure that there is no post claims underwriting and that the process is as smooth and efficient as possible. Effective policy design, policy wording and underwriting procedures should ensure that this does happen.

7.18 The primary objectives of an LTC insurance policy and the corresponding claims procedures should be :

- to identify valid claims
- to pay claims as and when real care needs arise, so that payments under the policy coincide with the need for care
- to pay the claims that the policy was designed to cover and therefore implicit in the pricing basis.

Again it is important that the claims manager and the pricing actuary have the same perception of what is a valid claim.

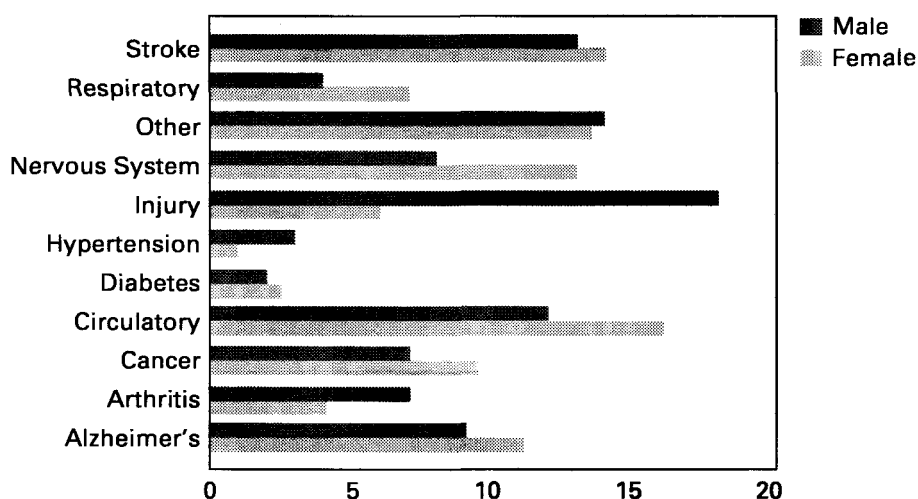
7.19 These goals will be achieved with the product development specialist, the pricing actuary, the underwriter and the claims manager all working together from the start of the product development process through the handling of new business to the admission and management of claims.

7.20 The claims assessment process will involve the collection of evidence, examples of which are set out below :

- Evidence from GP - to confirm the medical history and obtain basic details of the claimant's current state
- Physical and cognitive assessment - carried out at claimant's own home or nursing home for those already needing care. Occupational therapists are well placed to carry out this assessment and to make recommendations for special equipment as appropriate. Physical assessment is done using ADLs. A Mini-Mental State Examination is commonly used to assess the degree of cognitive impairment.
- Further evidence from a geriatrician.
- A report including the treatment plan from the supervising nurse if the claimant is already in a nursing home.
- Invoices from the nursing home or care agency (for home care) if the policy requires payment direct to the care provider and the benefit entitlement is limited to the actual cost of care received.

7.21 Statistics are limited in the UK regarding the main causes of claim due to the immaturity of the market. The US market is much more developed and such statistics have been collected and published by the Society of Actuaries in the US.

Cause of Claim : Diagnosis comparison by sex



Source : Society of Actuaries Intercompany Study (1984-91)

- 7.22 The higher level of respiratory disease in men may reflect occupational risks. The higher level of injury in women is believed to reflect greater incidence of fractures due to osteoporosis. The higher level of arthritis may reflect the fact that women live longer and are therefore more likely to suffer joint degeneration.
- 7.23 It is also important to note that a number of claims are made following a traumatic event such as a fall or a bereavement or in anticipation of a slow recovery from an operation. Many of these claims are withdrawn within the deferred period as the claimant adjusts and begins to regain strength and confidence.
- 7.24 The age profile of existing LTC claimants is also captured in the Intercompany study, as set out below:

Distribution of claims by age group	
Society of Actuaries LTC Study (1984-91)	
Up to age 64	1.4%
Ages 65-74	29.8
Ages 75-79	32.5
Ages 80-84	31.6
Ages 85+	4.8

- 7.25 The average age of the LTC claimant is 77, which is consistent with what we would expect.
- 7.26 LTC claims handling in the UK is virtually untested but experience in dealing with income protection should stand the claims assessor in good stead. Undoubtedly there will be claims which, for various reasons, will prove difficult to evaluate. However, with sound product features, carefully designed and worded forms and careful information gathering, it should be possible to assess the majority of claims speedily and without undue difficulty.
- 7.27 There will initially be occasions when strictly a claim could be declined because the policy conditions have not been fully met. It will be the role of the claims assessor in these cases to exercise a measure of reasonableness while at the same time maintaining firm control of the claim.
- 7.28 LTC insurance claims handling practice will undoubtedly evolve and offices should be prepared to modify their procedures in the light of experience. But regardless of the nature of that evolution, there will continue to be a need for the right combination of practicality, firmness, flexibility and sensitivity.

Experience Monitoring

- 7.29 Although experience monitoring is the final stage of the control cycle it is vital for the success of any product line. Without comparing actual results to those expected at the original or most recent pricing stage, it is possible to be lulled into a false sense of security.

7.30 The key pricing assumptions that need to be monitored are :

- Morbidity - inceptions and terminations separately, incorporating all of the appropriate/relevant risk factors
- Lapses - especially for products which offer surrender or paid up values
- Expenses - especially with respect to claims expenses
- Exposure to particular risk factors.

7.31 For this monitoring to be effective, it must be done on a timely and regular basis. At a minimum it should be done annually, but early warning measures and procedures need to be in place, to ensure that all disciplines are communicating and are aware of what is developing, so appropriate action can be taken before it is too late.

7.32 Systems and data requirements must be assessed and factored into the development process. LTC insurance is in its' infancy and we have an ideal opportunity to ensure that all requirements for experience monitoring are put into place. The industry can learn some valuable lessons from PHI, where such monitoring procedures were eventually put into place but not before suffering severe financial consequences.

APPENDIX 1

Association of British Insurers

Benchmark Definitions of Activities of Daily Living for Long Term Care Insurance

1 Introduction

Long Term Care insurance is designed to provide protection against the need for care services in older age. The risk of needing care is growing as the UK's population ages, and research undertaken by numerous independent bodies highlights the very real funding problems which Government will have to address over the next four decades.

The "Commission on Social Justice" report in October 1994 refers to Long Term Care as a bigger challenge than that for the funding of pensions.

Means testing already exists to determine what, if any, assistance people will receive if they have to enter a nursing or residential home. Local authorities are currently wrestling with the management of limited budgets within which to meet their new responsibilities under Community Care legislation. These responsibilities include both Nursing Home and domiciliary care settings.

It is against this background that a number of UK Insurers have developed and launched Long Term Care insurance plans, which allow people to plan ahead for the extra help they may need in later life.

In recognition of the potential importance of this new class of insurance the Association of British Insurers have established a Long Term Care Committee to consider the interests of both current practitioners and prospective new entrants to the market.

One of the principal objectives of the Committee is to encourage best practice amongst members offering Long Term Care products and to ensure that the adoption of high standards will generate public confidence in the concept of Long Term Care insurance.

As part of this process, a working party has developed benchmark definitions of those policy provisions which describe the circumstances that will give rise to a claim under a pre-funded Long Term Care contract.

The benchmark definitions set criteria from which offices have the flexibility to develop and underwrite their own products, and set premiums accordingly.

On-going reviews of the ABI benchmark definitions will take place to ensure they reflect developments in the assessment process of the need for care.

2 Claims Assessment

Benefit will be payable while either :-

- the insured is unable to perform “x” of the following activities of daily living* (even using special equipment devices or modified clothing if appropriate) and as a result needs the constant assistance by another person on every occasion; or
- the insured is suffering from mental impairment.

Examples of the definitions for activities of daily living and mental impairment are noted in the next section.

*Note that individual offices have the ability to choose how their list of activities of daily living is comprised and the number “x” that must be failed to qualify for benefit.

3 Definition of Terms

(a) Activities of Daily Living

Washing

The ability to wash in the bath or shower (including getting into and out of the bath or shower) or wash by other means,

Dressing

The ability to put on, take off, secure and unfasten all garments and, as appropriate, any braces, artificial limbs or other surgical appliances.

Feeding

The ability to feed one’s self once food has been prepared and made available.

Toileting

The ability to use the lavatory or manage bowel and bladder function through the use of protective undergarments or surgical appliances if appropriate.

Mobility

The ability to move indoors from room to room on level surfaces.

Transferring

The ability to move from a bed to an upright chair or wheelchair and vice versa.

(b) Mental Impairment

Mental impairment means the deterioration in or loss of mental capacity which results in a need for continual care or supervision and :-

- results from an organic cause and
- is shown by a deterioration in the insured's short and long term memory, knowing who and where they are, the identity of others, an awareness of time and the ability to solve simple problems and make rational decisions.

APPENDIX 2 : Sample Mental Status Questionnaires

Mental Status Questionnaire (MSQ)

1. What is this place?
2. Where is this place located?
3. What day in the month is it today?
4. What day of the week is it?
5. What year is it?
6. How old are you?
7. When is your birthday?
8. In what year were you born?
9. What is the name of the Prime Minister?
10. Who was the Prime Minister before this one?

MSQ Scoring Scheme

- | | | |
|---------------|---|----------------------------|
| 0 - 2 errors | = | none or minimal impairment |
| 3 - 8 errors | = | moderate impairment |
| 9 - 10 errors | = | severe impairment |

Short Portable Mental Status Questionnaire (SPMSQ)

1. What is the date today (month/day/year)?
2. What day of the week is it?
3. What is the name of this place?
4. What is your telephone number? (If no telephone, what is your street address)?
5. How old are you?
6. When were you born (month/day/year)?
7. Who is the current Prime Minister of the United Kingdom?
8. Who was the Prime Minister just before him?
9. What was your mother's maiden name?
10. Subtract 3 from 20 and keep subtracting it from each new number you get, all the way down.

SPMSQ Scoring Scheme

- | | | |
|---------------|---|---------------------|
| 0 - 2 errors | = | intact |
| 3 - 4 errors | = | mild impairment |
| 5 - 7 errors | = | moderate impairment |
| 8 - 10 errors | = | severe impairment |

APPENDIX 3 :

Derivation of Inception and Termination Rates from Prevalence Data

$$I_x^T = I_{x-1}^T \cdot (1 - q_{x-1}^T)$$

$$I_x^D = Z_x \cdot I_x^A$$

$$I_x^H = I_x^T - I_x^D$$

$$q_x^D = \frac{I_x^T \cdot q_x^T - I_x^H \cdot q_x^H}{I_x^D}$$

$$i_x = \frac{I_{x+1}^D - I_x^D \cdot (1 - q_x^D)}{I_x^H \cdot (1 - q_x^H) \cdot (1 - \frac{q_x^D}{2})}$$

where I_x^T = Total number of lives aged x

I_x^D = Number of disabled lives aged x

I_x^H = Number of 'healthy' lives aged x

q_x^T = Aggregate mortality rate for lives aged x

q_x^D = Mortality rate for disabled lives aged x

q_x^H = Mortality rate for 'healthy' lives aged x

Z_x = Proportion of total lives aged x who are disabled

i_x = Inception rate from 'healthy' to disabled for lives aged x.

APPENDIX 4 :

Estimates of prevalence of disability among adults by age and severity category for men and women (cumulative rate per thousand population)

Severity Category	Men				Women			
	Age Group				Age Group			
	16-59	60-74	75 & Over	Total	16-59	60-74	75 & Over	Total

In private households (cumulative rate per thousand)

10	1	3	10	2	1	2	20	3
9 - 10	2	14	48	7	4	14	61	11
8 - 10	5	27	86	13	7	27	105	20
7 - 10	8	42	128	21	12	45	171	34
6 - 10	13	57	167	29	18	68	238	49
5 - 10	19	82	226	41	26	100.0	314	68
4 - 10	25	112.0	287	54	35	130.0	376	86
3 - 10	32	149.0	349	69	43	166.0	442	105.0
2 - 10	40	202.0	425.0	88	50	208.0	510	125.0
1 - 10	54	278.0	521.0	117.0	63	258	586	151.0

Total population including establishments (cumulative rate per thousand)

10	1	5	21	3	1	4	45	6
9 - 10	3	17	64	9	4	18	102	17
8 - 10	6	31	107.0	16	8	31	154	28
7 - 10	10	46	150.0	24	13	50	224	42
6 - 10	14	62	191.0	32	19	73	293	58
5 - 10	20	87	250.0	45	28	106.0	369	78
4 - 10	27	117	309.0	58	36	136.0	431	97
3 - 10	34	155	369.0	73	44	172.0	495	115.0
2 - 10	41	207	442.0	92	51	213.0	561	135.0
1 - 10	56	283	533.0	121.0	64	264.0	631	161.0

Source : The prevalence of disability in adults, OPCS.

APPENDIX 5 :

Estimated numbers of disabled people in Great Britain 1985 ('000s) by age, sex and severity of disability

Age Group	Severity										
	NONE	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
MEN											
0-4	1737.0	7.0	3.0	6.0	7.0	3.0	7.0	5.0	3.0	2.0	1.0
5-9	1604.0	7.0	4.0	10.0	7.0	9.0	7.0	10.0	7.0	7.0	8.0
10-15	2259.0	3.0	5.0	14.0	10.0	13.0	11.0	15.0	10.0	7.0	10.0
16-19	1790.0	8.0	2.0	2.0	3.0	5.0	4.0	3.0	2.0	2.0	3.0
20-29	4235.0	24.0	15.0	14.0	16.0	13.0	13.0	9.0	8.0	5.0	7.0
30-39	3717.0	42.0	16.0	22.0	20.0	18.0	13.0	11.0	10.0	4.0	5.0
40-49	3015.0	57.0	30.0	25.0	25.0	21.0	18.0	15.0	11.0	6.0	4.0
50-59	2577.0	100.0	58.0	53.0	41.0	40.0	25.0	21.0	18.0	12.0	6.0
60-69	1956.0	173.0	116.0	81.0	69.0	58.0	32.0	32.0	30.0	27.0	11.0
70-79	1020.0	152.0	117.0	86.0	71.0	60.0	46.0	38.0	38.0	29.0	13.0
80+	137.0	55.0	39.0	37.0	38.0	41.0	29.0	34.0	33.0	38.0	18.0
WOMEN											
0-4	1664.0	8.0	2.0	4.0	3.0	4.0	3.0	2.0	2.0	1.0	1.0
5-9	1543.0	5.0	2.0	6.0	6.0	5.0	3.0	7.0	4.0	3.0	6.0
10-15	2168.0	2.0	3.0	9.0	9.0	10.0	6.0	7.0	4.0	6.0	8.0
16-19	1696.0	7.0	2.0	3.0	4.0	7.0	5.0	3.0	3.0	4.0	2.0
20-29	4102.0	21.0	13.0	14.0	21.0	18.0	18.0	11.0	10.0	8.0	6.0
30-39	3660.0	36.0	15.0	23.0	27.0	24.0	18.0	15.0	12.0	7.0	4.0
40-49	2958.0	50.0	28.0	27.0	34.0	30.0	25.0	20.0	15.0	9.0	3.0
50-59	2604.0	87.0	54.0	57.0	55.0	55.0	36.0	28.0	22.0	19.0	5.0
60-69	2266.0	138.0	111.0	94.0	86.0	90.0	55.0	49.0	34.0	37.0	11.0
70-79	1427.0	161.0	151.0	132.0	116.0	122.0	112.0	86.0	66.0	57.0	34.0
80-89	364.0	86.0	72.0	80.0	79.0	106.0	96.0	111.0	84.0	100.0	79.0

Source : Martin et al (1988), Bone and Meltzer (1989), in Bebbington (1989).

APPENDIX 6: 1985 National Nursing Home Survey

- Table 1** – Male admissions, admission rates and average length-of-stay (graduated)
- Table 2** – Female admissions, admission rates and average length-of-stay (graduated)
- Table 3** – Total admissions, admission rates and average length-of-stay (graduated)
- Table 4** – Nursing home residents and prevalence rates as of October 11 1985 by age and sex
- Table 6** – Proportion of admissions still resident at the end of the period shown; all stays; stay concept; unadjusted 1985 NNHS experience
- Table 7** – Proportion of admissions still resident at the end of the period shown; all stays; benefit period concept; unadjusted 1985 NNHS experience
- Table 8** – Proportion of admissions still resident at the end of the period shown; insurable stays; benefit period concept; unadjusted 1985 NNHS experience.

TABLE 1
MALE ADMISSIONS, ADMISSION RATES, AND AVERAGE LENGTH-OF-STAY (GRADUATED)
FROM THE 1985 NNHS

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
< 30 ...	11,828	.01%	417	9,968	.01%	941	6,116	.01%	825
30 ...	1,215	.06	419	977	.05	947	273	.01	830
31 ...	1,215	.06	419	946	.04	945	234	.01	828
32 ...	1,164	.06	419	864	.04	942	198	.01	825
33 ...	1,085	.05	418	751	.04	939	172	.01	822
34 ...	1,004	.05	418	639	.03	934	162	.01	818
35 ...	951	.05	417	564	.03	928	172	.01	813
36 ...	964	.05	416	562	.03	920	208	.01	807
37 ...	1,042	.06	414	632	.03	912	269	.01	800
38 ...	1,150	.06	412	752	.04	902	351	.02	793
39 ...	995	.07	410	708	.05	892	358	.02	785
40 ...	1,134	.08	408	879	.06	880	490	.03	776
41 ...	1,302	.09	405	1,091	.07	869	684	.05	767
42 ...	1,512	.10	402	1,352	.09	856	947	.06	757
43 ...	1,555	.12	399	1,460	.11	844	1,115	.08	748
44 ...	1,686	.13	396	1,633	.13	832	1,322	.10	738
45 ...	1,835	.15	393	1,800	.15	821	1,512	.12	729
46 ...	1,976	.16	389	1,933	.16	812	1,657	.14	720
47 ...	2,018	.17	386	1,935	.16	804	1,677	.14	712
48 ...	1,961	.17	384	1,811	.16	798	1,579	.14	705
49 ...	1,938	.17	381	1,693	.15	793	1,483	.13	699
50 ...	1,923	.17	379	1,565	.14	791	1,384	.13	693
51 ...	1,898	.18	378	1,433	.13	790	1,288	.12	689
52 ...	1,982	.19	377	1,402	.13	790	1,287	.12	685
53 ...	2,174	.20	376	1,477	.14	791	1,382	.13	681
54 ...	2,438	.22	376	1,638	.15	792	1,551	.14	678
55 ...	2,727	.24	376	1,852	.17	793	1,754	.16	674
56 ...	3,018	.27	377	2,092	.19	792	1,964	.18	670
57 ...	3,352	.30	378	2,371	.21	790	2,191	.20	666
58 ...	3,580	.33	379	2,569	.24	785	2,328	.22	660
59 ...	3,837	.36	380	2,773	.26	777	2,464	.23	653
60 ...	4,166	.39	382	3,008	.28	767	2,628	.24	644
61 ...	4,349	.42	383	3,117	.30	753	2,691	.26	634
62 ...	4,488	.44	385	3,176	.31	735	2,726	.27	622
63 ...	4,787	.47	386	3,330	.33	715	2,860	.28	608
64 ...	4,910	.50	386	3,351	.34	692	2,896	.30	593
65 ...	5,024	.55	386	3,364	.37	667	2,941	.32	577
66 ...	5,378	.62	385	3,543	.41	641	3,151	.36	561
67 ...	6,056	.72	382	3,953	.47	614	3,590	.43	543
68 ...	6,762	.86	379	4,412	.56	587	4,096	.52	525
69 ...	7,738	1.05	373	5,088	.69	561	4,816	.65	507

TABLE 1—Continued

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
70....	9,014	1.28%	367	6,011	.85%	535	5,776	.82%	489
71....	10,422	1.57	358	7,074	1.06	510	6,868	1.03	471
72....	11,864	1.90	348	8,198	1.31	486	8,010	1.28	453
73....	13,250	2.28	338	9,301	1.60	463	9,120	1.57	436
74....	14,502	2.71	326	10,309	1.92	441	10,126	1.89	419
75....	15,570	3.17	315	11,171	2.27	422	10,978	2.24	404
76....	16,370	3.67	304	11,820	2.65	405	11,611	2.60	390
77....	16,927	4.20	295	12,273	3.04	390	12,044	2.99	378
78....	17,238	4.76	287	12,537	3.46	379	12,285	3.39	369
79....	17,135	5.36	282	12,501	3.91	370	12,227	3.82	361
80....	17,019	6.00	278	12,465	4.39	365	12,164	4.29	356
81....	16,491	6.69	277	12,138	4.93	362	11,814	4.80	353
82....	16,019	7.46	278	11,862	5.53	361	11,512	5.36	352
83....	15,364	8.33	280	11,452	6.21	361	11,079	6.00	352
84....	14,777	9.31	284	11,087	6.99	363	10,688	6.73	353
85....	14,030	10.44	288	10,585	7.88	365	10,170	7.57	355
86....	13,154	11.74	292	9,966	8.90	368	9,543	8.52	356
87....	12,050	13.23	296	9,150	10.05	370	8,737	9.60	358
88....	10,888	14.93	299	8,271	11.34	371	7,880	10.81	358
89....	9,660	16.86	302	7,327	12.79	371	6,970	12.16	357
90....	8,981	19.01	303	6,791	14.38	369	6,457	13.67	355
91....	7,908	21.41	303	5,955	16.12	366	5,663	15.33	352
92....	6,947	24.07	301	5,206	18.03	361	4,957	17.17	346
93....	5,724	26.98	298	4,267	20.11	354	4,070	19.19	339
94....	4,450	30.17	294	3,299	22.37	345	3,155	21.39	331
95....	3,589	33.64	289	2,648	24.82	335	2,539	23.80	321
96....	2,863	37.38	282	2,103	27.46	323	2,022	26.41	309
97....	2,190	41.41	274	1,602	30.30	310	1,546	29.23	296
98....	1,502	45.72	266	1,096	33.34	295	1,060	32.27	281
99....	1,192	50.32	256	866	36.59	279	841	35.52	265
100....	577	55.20	246	419	40.04	261	408	38.99	249
101....	363	60.36	235	263	43.70	243	256	42.67	230
102....	224	65.81	223	162	47.56	223	158	46.57	211
103....	134	71.54	210	97	51.63	202	95	50.69	191
104....	80	77.55	196	58	55.90	180	57	55.02	169
105....	46	83.16	182	33	60.38	156	33	59.57	150
106....	25	87.37	167	19	65.06	150	19	64.34	150
107....	14	90.53	151	10	69.95	150	10	69.32	150
108....	7	92.90	150	5	75.04	150	5	74.52	150
109....	4	94.67	150	3	80.34	150	3	79.93	150
110....	2	96.00	150	2	85.25	150	2	84.95	150
30-64..	77,333	0.07	388	58,136	0.06	800	46,255	0.04	678
65-84..	252,919	2.44	313	180,557	1.74	427	174,897	1.69	404
85+...	106,603	16.44	294	80,203	12.37	359	76,657	11.82	346
Total ..	448,682	0.38%	324	328,865	0.28%	492	303,925	0.26%	440

TABLE 2
FEMALE ADMISSIONS, ADMISSION RATES, AND AVERAGE LENGTH-OF-STAY (GRADUATED)
FROM THE 1985 NNHS

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
<30 ...	4,245	.00%	438	3,912	.00%	908	1,868	.00%	1,096
30 ...	352	.02	431	357	.02	898	104	.00	1,098
31 ...	377	.02	429	359	.02	899	125	.01	1,101
32 ...	407	.02	427	350	.02	901	148	.01	1,105
33 ...	441	.02	425	334	.02	904	170	.01	1,109
34 ...	473	.02	423	313	.02	908	189	.01	1,114
35 ...	499	.03	421	295	.02	914	207	.01	1,120
36 ...	528	.03	420	295	.02	920	233	.01	1,125
37 ...	552	.03	418	312	.02	927	267	.01	1,132
38 ...	556	.03	417	340	.02	936	306	.02	1,138
39 ...	439	.03	416	296	.02	945	274	.02	1,144
40 ...	457	.03	416	336	.02	956	313	.02	1,150
41 ...	494	.03	416	379	.03	967	352	.02	1,156
42 ...	554	.04	418	423	.03	979	389	.03	1,162
43 ...	573	.04	420	418	.03	991	378	.03	1,166
44 ...	641	.05	423	440	.03	1,004	390	.03	1,170
45 ...	735	.06	427	477	.04	1,017	414	.03	1,172
46 ...	849	.07	433	530	.04	1,029	451	.04	1,172
47 ...	941	.08	439	579	.05	1,040	487	.04	1,171
48 ...	992	.09	447	616	.05	1,051	515	.04	1,167
49 ...	1,054	.09	455	676	.06	1,059	564	.05	1,162
50 ...	1,104	.10	464	743	.07	1,066	618	.05	1,153
51 ...	1,132	.10	474	804	.07	1,071	665	.06	1,143
52 ...	1,207	.11	484	901	.08	1,074	740	.07	1,129
53 ...	1,323	.12	493	1,025	.09	1,073	838	.07	1,113
54 ...	1,462	.13	503	1,157	.10	1,070	941	.08	1,094
55 ...	1,611	.14	511	1,279	.11	1,063	1,039	.09	1,073
56 ...	1,810	.15	518	1,421	.12	1,053	1,158	.10	1,049
57 ...	2,081	.18	523	1,597	.13	1,039	1,313	.11	1,024
58 ...	2,374	.20	526	1,773	.15	1,021	1,484	.13	996
59 ...	2,773	.24	526	2,020	.17	1,000	1,736	.15	966
60 ...	3,344	.28	525	2,394	.20	975	2,124	.18	936
61 ...	3,966	.34	521	2,825	.24	947	2,579	.22	904
62 ...	4,713	.41	514	3,379	.30	917	3,142	.27	872
63 ...	5,745	.50	507	4,179	.36	885	3,912	.34	839
64 ...	6,684	.60	498	4,949	.45	853	4,628	.42	808
65 ...	7,629	.72	488	5,751	.54	821	5,351	.51	778
66 ...	8,773	.86	478	6,712	.66	790	6,214	.61	750
67 ...	10,119	1.01	469	7,821	.78	762	7,222	.72	725
68 ...	11,220	1.16	461	8,708	.90	737	8,051	.83	703
69 ...	12,276	1.32	455	9,509	1.02	715	8,830	.95	684

TABLE 2—Continued

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
70....	13,506	1.49%	449	10,391	1.15%	697	9,713	1.07%	669
71....	14,740	1.68	446	11,232	1.28	683	10,583	1.21	656
72....	16,049	1.90	444	12,108	1.44	671	11,498	1.36	646
73....	17,559	2.18	443	13,139	1.63	662	12,557	1.56	639
74....	19,368	2.53	442	14,420	1.89	655	13,839	1.81	633
75....	21,518	2.98	443	15,985	2.22	650	15,374	2.13	628
76....	24,030	3.54	444	17,842	2.63	646	17,173	2.53	624
77....	26,694	4.22	445	19,819	3.14	642	19,082	3.02	621
78....	29,561	5.02	446	21,935	3.73	638	21,124	3.59	618
79....	31,812	5.95	448	23,568	4.41	634	22,701	4.24	615
80....	34,404	6.99	448	25,418	5.16	630	24,487	4.97	612
81....	35,974	8.15	449	26,465	6.00	625	25,497	5.78	609
82....	37,573	9.44	450	27,472	6.90	618	26,466	6.65	604
83....	38,480	10.85	450	27,905	7.87	611	26,879	7.58	599
84....	38,730	12.38	451	27,801	8.89	603	26,772	8.56	594
85....	38,376	14.03	451	27,228	9.95	594	26,206	9.58	588
86....	37,311	15.77	451	26,145	11.05	585	25,143	10.63	583
87....	34,848	17.60	451	24,112	12.18	577	23,161	11.70	577
88....	32,949	19.46	450	22,523	13.30	569	21,601	12.76	571
89....	28,655	21.34	449	19,369	14.42	562	18,539	13.80	566
90....	25,385	23.19	447	16,987	15.52	556	16,224	14.82	561
91....	21,858	24.99	444	14,501	16.58	550	13,817	15.80	556
92....	19,036	26.72	440	12,536	17.60	544	11,919	16.73	550
93....	15,223	28.36	436	9,964	18.57	539	9,455	17.62	544
94....	11,532	29.91	430	7,513	19.49	534	7,117	18.46	538
95....	8,567	31.36	424	5,562	20.36	528	5,263	19.26	532
96....	6,342	32.70	417	4,110	21.19	523	3,885	20.03	525
97....	4,498	33.94	409	2,913	21.99	518	2,753	20.78	518
98....	3,079	35.08	401	1,998	22.76	513	1,888	21.51	510
99....	1,968	36.12	393	1,281	23.51	508	1,211	22.24	503
100....	1,212	37.08	385	793	24.27	503	751	22.97	496
101....	823	37.96	377	543	25.03	498	515	23.73	488
102....	547	38.77	369	364	25.81	494	346	24.52	481
103....	356	39.50	361	239	26.61	489	228	25.34	473
104....	225	40.18	353	154	27.43	485	147	26.20	466
105....	139	40.79	344	97	28.29	480	93	27.10	458
106....	84	41.34	336	60	29.17	476	57	28.05	450
107....	49	41.83	328	36	30.09	472	34	29.04	443
108....	28	42.26	320	21	31.04	467	20	30.07	435
109....	16	42.62	311	12	32.01	463	12	31.15	427
110....	8	42.93	303	6	33.02	459	6	32.27	419
30-64..	53,243	0.03	491	38,574	0.02	966	33,194	0.02	976
65-84..	450,017	3.14	450	334,000	2.33	651	319,412	2.23	630
85+...	293,114	20.14	444	199,065	13.68	563	190,390	13.08	564
Total ..	800,618	0.66%	450	575,552	0.48%	643	544,865	0.45%	630

TABLE 3

TOTAL ADMISSIONS, ADMISSION RATES, AND AVERAGE LENGTH-OF-STAY (GRADUATED)
FROM THE 1985 NNHS

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
<30 ...	15,923	.01%	418	13,725	.01%	886	7,922	.01%	907
30 ...	1,591	.04	418	1,380	.03	885	376	.01	910
31 ...	1,638	.04	418	1,377	.03	884	364	.01	909
32 ...	1,610	.04	418	1,278	.03	882	355	.01	907
33 ...	1,542	.04	417	1,115	.03	881	354	.01	905
34 ...	1,472	.04	417	943	.02	879	365	.01	903
35 ...	1,438	.04	417	824	.02	877	398	.01	899
36 ...	1,489	.04	416	819	.02	875	464	.01	895
37 ...	1,609	.04	416	922	.02	872	559	.01	891
38 ...	1,731	.05	415	1,089	.03	870	663	.02	886
39 ...	1,445	.05	415	1,006	.03	867	610	.02	881
40 ...	1,570	.05	415	1,197	.04	865	748	.03	875
41 ...	1,729	.06	415	1,419	.05	864	953	.03	869
42 ...	1,967	.07	415	1,701	.06	862	1,250	.04	863
43 ...	2,053	.08	415	1,829	.07	862	1,450	.05	857
44 ...	2,309	.09	416	2,077	.08	862	1,732	.07	851
45 ...	2,627	.11	417	2,350	.10	863	2,012	.08	846
46 ...	2,940	.12	418	2,585	.11	865	2,236	.09	841
47 ...	3,081	.13	420	2,635	.11	868	2,281	.10	836
48 ...	3,032	.13	422	2,499	.11	872	2,156	.09	833
49 ...	3,013	.13	425	2,380	.11	877	2,044	.09	830
50 ...	2,995	.13	428	2,262	.10	883	1,944	.09	827
51 ...	2,968	.14	431	2,156	.10	889	1,868	.09	825
52 ...	3,115	.14	435	2,208	.10	895	1,937	.09	823
53 ...	3,427	.15	438	2,414	.11	900	2,145	.10	821
54 ...	3,847	.17	442	2,734	.12	904	2,451	.11	819
55 ...	4,308	.19	445	3,111	.14	907	2,794	.12	815
56 ...	4,828	.21	448	3,537	.16	906	3,158	.14	810
57 ...	5,450	.24	450	4,021	.17	903	3,552	.15	804
58 ...	5,977	.26	451	4,401	.19	896	3,848	.17	795
59 ...	6,634	.30	452	4,837	.22	885	4,211	.19	784
60 ...	7,536	.33	451	5,426	.24	869	4,746	.21	771
61 ...	8,345	.38	450	5,943	.27	850	5,263	.24	755
62 ...	9,225	.43	448	6,534	.30	827	5,871	.27	737
63 ...	10,539	.49	445	7,471	.34	801	6,784	.31	718
64 ...	11,588	.56	441	8,269	.40	773	7,543	.36	697
65 ...	12,650	.64	438	9,112	.46	744	8,314	.42	676
66 ...	14,176	.75	434	10,300	.55	716	9,400	.50	656
67 ...	16,248	.88	430	11,875	.64	690	10,873	.59	636
68 ...	18,074	1.03	426	13,232	.76	665	12,207	.70	619
69 ...	20,097	1.21	422	14,684	.88	644	13,689	.82	603

TABLE 3—Continued

Age	All Stays Stay Concept			All Stays Benefit Period Concept			Insurable Stays Benefit Period Concept		
	Admissions		Average Length of Stay	Admissions		Average Length of Stay	Admissions		Average Length of Stay
	Number	Rate		Number	Rate		Number	Rate	
70....	22,542	1.40%	418	16,413	1.02%	625	15,478	.96%	590
71....	25,084	1.63	414	18,219	1.18	609	17,370	1.13	577
72....	27,734	1.89	411	20,139	1.37	596	19,370	1.32	567
73....	30,578	2.21	406	22,247	1.61	583	21,525	1.55	557
74....	33,657	2.59	402	24,573	1.89	573	23,843	1.83	549
75....	36,955	3.05	398	27,084	2.23	564	26,293	2.17	542
76....	40,391	3.59	395	29,689	2.64	556	28,802	2.56	535
77....	43,745	4.22	392	32,204	3.11	549	31,209	3.01	530
78....	47,029	4.95	390	34,632	3.64	544	33,529	3.53	526
79....	49,226	5.76	388	36,233	4.24	539	35,054	4.10	522
80....	51,669	6.66	388	38,001	4.90	536	36,745	4.74	520
81....	52,616	7.65	389	38,654	5.62	533	37,358	5.43	518
82....	53,617	8.75	392	39,311	6.42	530	37,973	6.20	517
83....	53,750	9.97	394	39,275	7.28	527	37,913	7.03	515
84....	53,371	11.32	398	38,801	8.23	524	37,421	7.93	514
85....	52,261	12.81	401	37,741	9.25	521	36,353	8.91	513
86....	50,343	14.44	405	36,069	10.35	518	34,685	9.95	512
87....	46,838	16.20	408	33,269	11.51	515	31,928	11.04	510
88....	43,750	18.06	410	30,801	12.72	511	29,491	12.18	508
89....	38,318	20.00	411	26,743	13.96	508	25,542	13.33	506
90....	34,445	21.98	410	23,843	15.21	504	22,718	14.50	502
91....	29,837	23.98	408	20,498	16.48	500	19,492	15.67	498
92....	26,023	25.99	405	17,758	17.74	495	16,862	16.84	493
93....	20,965	28.00	400	14,225	19.00	489	13,496	18.02	487
94....	15,982	29.99	394	10,795	20.25	483	10,240	19.21	480
95....	12,138	31.95	387	8,173	21.51	476	7,757	20.42	472
96....	9,169	33.90	380	6,164	22.79	468	5,857	21.65	463
97....	6,639	35.82	372	4,463	24.08	460	4,249	22.92	454
98....	4,549	37.71	364	3,064	25.40	452	2,923	24.23	445
99....	3,094	39.59	356	2,091	26.75	444	2,001	25.59	435
100....	1,788	41.44	349	1,215	28.16	436	1,166	27.02	425
101....	1,199	43.29	341	821	29.63	427	790	28.53	415
102....	790	45.13	333	545	31.17	419	527	30.11	406
103....	511	46.97	326	357	32.77	411	346	31.79	396
104....	325	48.81	319	229	34.45	403	223	33.56	386
105....	202	50.66	312	144	36.21	394	141	35.42	377
106....	122	52.50	305	89	38.04	386	87	37.37	367
107....	72	54.35	299	53	39.96	378	52	39.42	357
108....	42	56.20	293	31	41.95	370	31	41.56	348
109....	24	58.06	287	18	44.02	362	18	43.80	338
110....	13	59.92	281	10	46.17	354	10	46.14	328
30-64..	130,666	0.13	437	96,753	0.10	861	79,482	0.08	792
65-84..	703,210	2.85	400	514,678	2.08	567	494,368	2.00	544
85 + ...	399,440	18.99	403	279,207	13.27	504	266,985	12.69	499
Total ..	1,249,239	0.53%	405	904,364	0.38%	583	848,757	0.36%	556

TABLE 4

NURSING HOME RESIDENTS AND PREVALENCE RATES AS OF OCTOBER 11, 1985 FROM THE 1985 NNHS BY AGE AND SEX

Age	Male				Female				Total			
	Ungraduated		Graduated		Ungraduated		Graduated		Ungraduated		Graduated	
	Residents	Rate	Rate	Residents	Residents	Rate	Rate	Residents	Residents	Rate	Rate	Residents
<30....	7,128	.01%	.01%	8,325	3,580	.01%	.01%	3,964	10,708	.01%	.01%	12,289
30....	1,173	.05	.05	1,156	739	.03	.03	540	1,912	.04	.04	1,696
31....	1,826	.08	.06	1,218	1,013	.05	.03	590	2,839	.07	.04	1,808
32....	1,854	.09	.06	1,256	352	.02	.03	641	2,206	.05	.05	1,897
33....	1,777	.09	.06	1,274	658	.03	.04	696	2,435	.06	.05	1,970
34....	2,057	.10	.06	1,275	1,059	.05	.04	758	3,116	.08	.05	2,033
35....	698	.04	.07	1,255	554	.03	.04	818	1,252	.03	.05	2,074
36....	293	.02	.07	1,257	929	.05	.05	901	1,222	.03	.06	2,159
37....	0	.00	.07	1,266	1,300	.07	.05	996	1,300	.04	.06	2,263
38....	882	.04	.07	1,353	437	.02	.06	1,159	1,319	.03	.06	2,513
39....	1,895	.12	.07	1,124	1,738	.11	.07	1,054	3,633	.11	.07	2,178
40....	3,762	.26	.07	1,045	761	.05	.07	1,062	4,523	.15	.07	2,107
41....	1,624	.11	.07	1,079	1,399	.09	.08	1,174	3,023	.10	.08	2,253
42....	0	.00	.08	1,162	1,142	.07	.09	1,329	1,142	.04	.08	2,491
43....	473	.03	.08	1,135	292	.02	.09	1,338	765	.03	.09	2,473
44....	494	.04	.09	1,125	1,804	.14	.10	1,327	2,298	.09	.09	2,452
45....	1,386	.11	.09	1,179	1,009	.08	.11	1,347	2,395	.10	.10	2,526
46....	1,541	.13	.11	1,293	1,371	.11	.11	1,396	2,912	.12	.11	2,689
47....	874	.07	.12	1,444	2,703	.22	.12	1,446	3,577	.15	.12	2,890
48....	1,447	.13	.14	1,579	2,167	.19	.12	1,455	3,614	.16	.13	3,034
49....	934	.08	.16	1,754	1,200	.10	.13	1,491	2,134	.09	.14	3,244
50....	3,134	.28	.18	1,971	2,138	.19	.14	1,556	5,272	.23	.16	3,528
51....	2,097	.19	.20	2,145	977	.09	.15	1,607	3,074	.14	.17	3,752
52....	1,115	.10	.22	2,340	2,042	.19	.16	1,718	3,157	.15	.19	4,057
53....	2,694	.25	.24	2,601	1,231	.11	.17	1,926	3,925	.18	.21	4,526
54....	2,539	.23	.26	2,893	2,902	.25	.19	2,219	5,441	.24	.23	5,112
55....	5,175	.46	.28	3,158	1,756	.15	.22	2,553	6,931	.30	.25	5,711
56....	3,940	.35	.30	3,359	2,900	.25	.25	2,945	6,840	.30	.28	6,305
57....	5,294	.47	.32	3,587	2,303	.19	.29	3,455	7,597	.33	.31	7,042
58....	1,691	.15	.34	3,732	2,607	.22	.34	3,985	4,298	.19	.34	7,717
59....	4,311	.40	.36	3,867	5,848	.50	.39	4,545	10,159	.45	.37	8,412

TABLE 4—Continued

Age	Male			Female			Total		
	Ungraduated		Graduated	Ungraduated		Graduated	Ungraduated		Graduated
	Residents	Rate	Rate	Residents	Rate	Rate	Residents	Rate	Rate
60....	3,089	.29%	.39%	4,141	2,932	.44%	5,258	6,021	.42%
61....	3,042	.29	.41	4,404	6,707	.50	5,946	9,749	.43
62....	4,743	.46	.45	4,612	6,495	.56	6,515	11,238	.52
63....	6,796	.66	.49	5,050	6,082	.63	7,286	12,878	.59
64....	6,234	.62	.55	5,463	10,339	.91	7,927	16,573	.78
65....	4,775	.51	.61	5,738	9,390	.87	8,350	14,165	.70
66....	4,066	.46	.69	6,066	10,065	.97	8,827	14,131	.74
67....	8,623	1.01	.78	6,670	8,824	.86	9,600	17,447	.93
68....	6,899	.85	.89	7,211	9,012	.91	10,368	15,911	.88
69....	6,527	.86	1.02	7,750	14,607	1.54	11,174	21,134	1.24
70....	9,407	1.31	1.17	8,453	10,783	1.17	12,352	20,190	1.23
71....	7,723	1.13	1.35	9,240	18,572	2.06	13,865	26,295	1.66
72....	9,883	1.53	1.56	10,034	17,475	2.01	15,649	27,358	1.81
73....	14,109	2.34	1.80	10,805	17,314	2.07	17,721	31,423	2.18
74....	9,055	1.62	2.07	11,529	15,730	1.97	20,111	24,785	1.83
75....	13,383	2.61	2.38	12,222	25,128	3.31	22,852	38,511	3.03
76....	13,534	2.88	2.74	12,856	27,270	3.79	25,928	40,804	3.43
77....	16,070	3.77	3.15	13,413	26,271	3.88	29,232	42,341	3.84
78....	13,459	3.51	3.62	13,893	32,224	5.08	32,730	45,683	4.49
79....	13,461	3.92	4.15	14,259	36,039	6.10	36,265	49,500	5.30
80....	16,145	5.29	4.76	14,539	41,043	7.51	39,679	57,188	6.71
81....	15,667	5.84	5.45	14,623	41,674	8.30	42,784	57,341	7.45
82....	14,102	6.02	6.23	14,601	46,651	10.18	45,564	60,753	8.77
83....	12,387	6.08	7.10	14,461	45,121	10.82	47,953	57,508	9.27
84....	13,588	7.68	8.08	14,296	48,736	12.94	49,702	62,324	11.26
85....	14,165	9.35	9.16	13,888	45,675	13.55	50,697	59,840	12.24
86....	9,603	7.50	10.36	13,273	42,947	14.37	50,775	52,550	12.31
87....	9,974	9.34	11.67	12,452	51,918	19.91	49,682	61,892	16.84
88....	11,254	13.03	13.08	11,299	45,475	20.22	47,663	56,729	18.22
89....	9,055	13.11	14.61	10,086	50,804	26.62	44,650	59,859	23.03
									21.06

TABLE 4—Continued

Age	Male						Female						Total					
	Ungraduated			Graduated			Ungraduated			Graduated			Ungraduated			Graduated		
	Residents	Rate		Residents	Rate		Residents	Rate		Residents	Rate		Residents	Rate		Residents	Rate	
90	10,277	17.68%		9,441	16.24%		41,008	25.29%		41,595	25.65%		51,285	23.28%		51,036	23.17%	
91	9,648	20.19		8,588	17.97		44,358	32.60		37,991	27.92		54,006	29.37		46,579	25.33	
92	8,862	23.38		7,505	19.80		34,092	30.70		33,523	30.19		42,954	28.84		41,027	27.54	
93	9,201	31.98		6,246	21.71		27,306	31.09		28,493	32.44		36,507	31.31		34,740	29.80	
94	3,381	16.38		4,894	23.72		24,655	36.38		23,492	34.66		28,036	31.71		28,386	32.11	
95	6,014	39.41		3,938	25.80		22,066	43.62		18,633	36.84		28,080	42.65		22,571	34.28	
96	3,572	31.92		3,130	27.97		15,957	42.43		14,650	38.95		19,529	40.02		17,779	36.43	
97	2,299	28.24		2,460	30.22		10,321	38.58		10,966	40.99		12,620	36.17		13,426	38.48	
98	992	18.45		1,749	32.54		6,466	35.35		7,859	42.96		7,458	31.51		9,609	40.60	
99	811	19.91		1,423	34.93		4,932	35.06		6,309	44.85		5,743	31.66		7,732	42.63	
100	1,481	65.21		849	37.41		5,951	63.23		4,391	46.66		7,432	63.61		5,241	44.86	
101	190	12.28		618	39.95		3,198	47.95		3,226	48.37		3,388	41.24		3,844	46.78	
102	261	25.17		441	42.57		1,167	25.18		2,317	49.99		1,428	25.18		2,758	48.64	
103	0	.00		308	45.27		1,922	60.84		1,628	51.52		1,922	50.07		1,935	50.41	
104	384	86.88		212	48.03		566	26.86		1,116	52.96		950	37.27		1,328	52.11	
105	297	106.07		142	50.87		476	34.67		746	54.30		773	46.76		888	53.72	
106	0	.00		93	53.79		262	29.94		486	55.55		262	25.00		579	55.26	
107	0	.00		60	56.77		259	47.79		307	56.70		259	39.97		368	56.71	
108	0	.00		37	59.83		0	.00		189	57.76		0	.00		226	58.09	
109	0	.00		23	62.97		0	.00		113	58.72		0	.00		137	59.40	
110	0	.00		13	66.17		0	.00		65	59.59		0	.00		78	60.61	
30-64 ..	80,884	0.16		78,550	0.16		79,886	0.16		80,962	0.16		160,770	0.16		159,512	0.16	
65-84 ..	222,863	2.07		222,659	2.07		501,929	3.32		500,705	3.32		724,792	2.80		723,364	2.80	
85+ ...	111,721	14.22		113,171	14.40		481,781	23.45		481,560	23.44		593,502	20.90		594,731	20.94	
Total ...	422,596	0.35%		422,705	0.35%		1,067,176	0.87%		1,067,191	0.87%		1,489,772	0.62%		1,489,896	0.62%	

TABLE 6

PROPORTION OF ADMISSIONS STILL RESIDENT AT THE END OF THE PERIOD SHOWN;
ALL STAYS; STAY CONCEPT; UNADJUSTED 1985 NNHS EXPERIENCE

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
Males							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8747	.8420	.9054	.8635	.8491	.8577	.8721
20.....	.7800	.7441	.7996	.7840	.7298	.7359	.7698
30.....	.7243	.6748	.7315	.6971	.6298	.6622	.7036
60.....	.5620	.4720	.5818	.5540	.4724	.5337	.4936
90.....	.4545	.3612	.4744	.4545	.3747	.4420	.3719
121.....	.3805	.2964	.3955	.3832	.3107	.3748	.2963
151.....	.3278	.2563	.3362	.3306	.2666	.3241	.2463
182.....	.2888	.2306	.2908	.2908	.2349	.2848	.2114
212.....	.2588	.2133	.2555	.2601	.2109	.2536	.1856
243.....	.2348	.2012	.2276	.2358	.1920	.2284	.1657
273.....	.2147	.1921	.2053	.2162	.1765	.2075	.1496
304.....	.1973	.1847	.1872	.2001	.1632	.1899	.1361
334.....	.1818	.1780	.1723	.1866	.1515	.1748	.1248
365.....	.1680	.1716	.1597	.1750	.1410	.1618	.1151
547.....	.1084	.1292	.1096	.1279	.0938	.1091	.0814
730.....	.0715	.0909	.0825	.0986	.0633	.0794	.0648
912.....	.0500	.0659	.0695	.0764	.0402	.0560	.0446
1095.....	.0429	.0471	.0601	.0576	.0261	.0364	.0227
1277.....	.0416	.0353	.0480	.0438	.0193	.0242	.0105
1460.....	.0408	.0254	.0338	.0361	.0152	.0168	.0065
1642.....	.0366	.0173	.0238	.0319	.0118	.0107	.0058
1825.....	.0334	.0119	.0192	.0242	.0093	.0068	.0057
2190.....	.0220	.0092	.0106	.0072	.0033	.0018	.0009
2555.....	.0135	.0077	.0066	.0025	.0009	.0003	.0003
2920.....	.0081	.0067	.0044	.0009	.0002	.0000	.0002
3285.....	.0049	.0061	.0030	.0004	.0000	.0000	.0001
3650.....	.0031	.0056	.0021	.0002	.0000	.0000	.0001
4015.....	.0021	.0051	.0013	.0001	.0000	.0000	.0001
4380.....	.0016	.0042	.0008	.0001	.0000	.0000	.0001
4745.....	.0014	.0030	.0004	.0000	.0000	.0000	.0000
5110.....	.0012	.0018	.0002	.0000	.0000	.0000	.0000
5475.....	.0011	.0008	.0001	.0000	.0000	.0000	.0000
5840.....	.0010	.0004	.0000	.0000	.0000	.0000	.0000
6205.....	.0009	.0002	.0000	.0000	.0000	.0000	.0000
6570.....	.0008	.0001	.0000	.0000	.0000	.0000	.0000
6935.....	.0007	.0000	.0000	.0000	.0000	.0000	.0000
7300.....	.0006	.0000	.0000	.0000	.0000	.0000	.0000
7665.....	.0006	.0000	.0000	.0000	.0000	.0000	.0000
8030.....	.0005	.0000	.0000	.0000	.0000	.0000	.0000
8395.....	.0005	.0000	.0000	.0000	.0000	.0000	.0000
8760.....	.0004	.0000	.0000	.0000	.0000	.0000	.0000
9125.....	.0004	.0000	.0000	.0000	.0000	.0000	.0000

TABLE 6--Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
Females							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8648	.9363	.9095	.8995	.8900	.8798	.8926
20.....	.8048	.8426	.8192	.7864	.7839	.7854	.8349
30.....	.7434	.7491	.7363	.6958	.7064	.7212	.7813
60.....	.6521	.5378	.5872	.5430	.5684	.5902	.6266
90.....	.5747	.4149	.4917	.4486	.4761	.5021	.5226
121.....	.5083	.3386	.4282	.3878	.4122	.4407	.4500
151.....	.4509	.2884	.3846	.3471	.3664	.3966	.3975
182.....	.4008	.2536	.3535	.3188	.3325	.3638	.3580
212.....	.3570	.2283	.3303	.2984	.3065	.3385	.3272
243.....	.3188	.2089	.3120	.2828	.2858	.3181	.3023
273.....	.2855	.1933	.2967	.2699	.2688	.3010	.2814
304.....	.2566	.1800	.2829	.2584	.2543	.2861	.2632
334.....	.2317	.1682	.2700	.2476	.2415	.2726	.2469
365.....	.2104	.1572	.2575	.2369	.2301	.2601	.2322
547.....	.1378	.1031	.1899	.1707	.1772	.1965	.1648
730.....	.1008	.0759	.1437	.1209	.1409	.1461	.1133
912.....	.0693	.0666	.1082	.0908	.1124	.1082	.0681
1095.....	.0538	.0607	.0823	.0699	.0863	.0820	.0438
1277.....	.0481	.0556	.0709	.0569	.0651	.0628	.0344
1460.....	.0394	.0473	.0679	.0487	.0501	.0459	.0284
1642.....	.0225	.0295	.0625	.0412	.0380	.0319	.0226
1825.....	.0128	.0145	.0521	.0307	.0260	.0236	.0159
2190.....	.0094	.0094	.0340	.0142	.0133	.0079	.0097
2555.....	.0075	.0067	.0204	.0073	.0055	.0025	.0016
2920.....	.0064	.0051	.0117	.0040	.0019	.0007	.0000
3285.....	.0057	.0042	.0066	.0023	.0006	.0001	.0000
3650.....	.0052	.0036	.0039	.0013	.0002	.0000	.0000
4015.....	.0046	.0032	.0024	.0007	.0001	.0000	.0000
4380.....	.0037	.0030	.0017	.0004	.0000	.0000	.0000
4745.....	.0025	.0028	.0013	.0002	.0000	.0000	.0000
5110.....	.0014	.0027	.0011	.0001	.0000	.0000	.0000
5475.....	.0005	.0026	.0009	.0000	.0000	.0000	.0000
5840.....	.0002	.0025	.0008	.0000	.0000	.0000	.0000
6205.....	.0001	.0024	.0007	.0000	.0000	.0000	.0000
6570.....	.0000	.0023	.0006	.0000	.0000	.0000	.0000
6935.....	.0000	.0023	.0005	.0000	.0000	.0000	.0000
7300.....	.0000	.0022	.0005	.0000	.0000	.0000	.0000
7665.....	.0000	.0021	.0004	.0000	.0000	.0000	.0000
8030.....	.0000	.0021	.0004	.0000	.0000	.0000	.0000
8395.....	.0000	.0020	.0003	.0000	.0000	.0000	.0000
8760.....	.0000	.0019	.0003	.0000	.0000	.0000	.0000
9125.....	.0000	.0019	.0002	.0000	.0000	.0000	.0000

TABLE 6—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
Total							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8715	.8830	.9072	.8849	.8763	.8741	.8868
20.....	.7888	.7873	.8084	.7854	.7658	.7722	.8164
30.....	.7315	.7143	.7336	.6963	.6807	.7055	.7593
60.....	.5939	.5046	.5833	.5472	.5366	.5750	.5913
90.....	.4958	.3874	.4815	.4509	.4424	.4860	.4822
121.....	.4236	.3173	.4102	.3862	.3782	.4232	.4082
151.....	.3688	.2730	.3585	.3411	.3328	.3774	.3557
182.....	.3260	.2437	.3200	.3085	.2994	.3429	.3170
212.....	.2915	.2234	.2902	.2840	.2739	.3159	.2873
243.....	.2629	.2086	.2665	.2649	.2537	.2941	.2636
273.....	.2386	.1971	.2471	.2493	.2370	.2759	.2438
304.....	.2175	.1876	.2307	.2358	.2228	.2601	.2267
334.....	.1990	.1790	.2164	.2238	.2102	.2460	.2118
365.....	.1827	.1708	.2036	.2126	.1989	.2332	.1984
547.....	.1188	.1231	.1450	.1545	.1469	.1722	.1408
730.....	.0817	.0895	.1094	.1132	.1119	.1275	.0998
912.....	.0566	.0714	.0865	.0861	.0850	.0934	.0618
1095.....	.0461	.0569	.0695	.0658	.0633	.0687	.0388
1277.....	.0426	.0464	.0578	.0523	.0476	.0513	.0289
1460.....	.0373	.0360	.0491	.0442	.0368	.0372	.0237
1642.....	.0270	.0235	.0414	.0380	.0281	.0254	.0194
1825.....	.0203	.0143	.0344	.0285	.0200	.0183	.0139
2190.....	.0141	.0106	.0205	.0113	.0096	.0059	.0070
2555.....	.0103	.0085	.0125	.0052	.0037	.0018	.0014
2920.....	.0079	.0071	.0078	.0026	.0012	.0005	.0001
3285.....	.0062	.0062	.0049	.0014	.0003	.0001	.0000
3650.....	.0050	.0055	.0031	.0008	.0001	.0000	.0000
4015.....	.0040	.0049	.0020	.0004	.0000	.0000	.0000
4380.....	.0032	.0044	.0013	.0002	.0000	.0000	.0000
4745.....	.0025	.0039	.0008	.0001	.0000	.0000	.0000
5110.....	.0019	.0034	.0005	.0001	.0000	.0000	.0000
5475.....	.0013	.0029	.0003	.0000	.0000	.0000	.0000
5840.....	.0010	.0024	.0002	.0000	.0000	.0000	.0000
6205.....	.0007	.0020	.0001	.0000	.0000	.0000	.0000
6570.....	.0005	.0017	.0001	.0000	.0000	.0000	.0000
6935.....	.0003	.0014	.0001	.0000	.0000	.0000	.0000
7300.....	.0002	.0012	.0000	.0000	.0000	.0000	.0000
7665.....	.0002	.0010	.0000	.0000	.0000	.0000	.0000
8030.....	.0001	.0009	.0000	.0000	.0000	.0000	.0000
8395.....	.0001	.0007	.0000	.0000	.0000	.0000	.0000
8760.....	.0001	.0006	.0000	.0000	.0000	.0000	.0000
9125.....	.0000	.0005	.0000	.0000	.0000	.0000	.0000

TABLE 7

PROPORTION OF ADMISSIONS STILL RESIDENT AT THE END OF THE PERIOD SHOWN;
ALL STAYS; BENEFIT PERIOD CONCEPT; UNADJUSTED 1985 NNHS EXPERIENCE

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
Males							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.9146	.9218	.9466	.8974	.8844	.8854	.9238
20.....	.8641	.8612	.8670	.8404	.7942	.7816	.8136
30.....	.8251	.8523	.8168	.7709	.7145	.7139	.7694
60.....	.7275	.6959	.7044	.6472	.5842	.6152	.5863
90.....	.6499	.5949	.6252	.5600	.4967	.5395	.4650
121.....	.5878	.5276	.5680	.4973	.4360	.4806	.3816
151.....	.5381	.4816	.5256	.4514	.3924	.4339	.3224
182.....	.4981	.4495	.4930	.4174	.3600	.3966	.2791
212.....	.4659	.4263	.4672	.3918	.3350	.3662	.2467
243.....	.4397	.4088	.4458	.3721	.3149	.3414	.2219
273.....	.4182	.3949	.4274	.3565	.2981	.3208	.2024
304.....	.4001	.3830	.4109	.3436	.2834	.3035	.1869
334.....	.3845	.3721	.3956	.3324	.2702	.2890	.1745
365.....	.3707	.3613	.3808	.3221	.2580	.2764	.1643
547.....	.2981	.2868	.2978	.2629	.1958	.2214	.1333
730.....	.2338	.2179	.2450	.2116	.1461	.1718	.1200
912.....	.2009	.1889	.2309	.1830	.1032	.1198	.0854
1095.....	.1934	.1698	.2253	.1595	.0719	.0801	.0419
1277.....	.1921	.1429	.2018	.1311	.0541	.0567	.0239
1460.....	.1918	.1254	.1720	.1088	.0426	.0420	.0200
1642.....	.1910	.1214	.1562	.0975	.0329	.0298	.0194
1825.....	.1907	.0929	.1420	.0820	.0258	.0227	.0178
2190.....	.1420	.0820	.1117	.0369	.0167	.0107	.0027
2555.....	.1124	.0716	.0869	.0170	.0101	.0007	.0010
2920.....	.0926	.0617	.0666	.0081	.0057	.0000	.0005
3285.....	.0780	.0521	.0503	.0040	.0031	.0000	.0003
3650.....	.0660	.0431	.0374	.0021	.0017	.0000	.0002
4015.....	.0551	.0346	.0273	.0011	.0009	.0000	.0002
4380.....	.0447	.0269	.0194	.0006	.0005	.0000	.0002
4745.....	.0346	.0202	.0135	.0004	.0003	.0000	.0001
5110.....	.0249	.0145	.0091	.0002	.0002	.0000	.0001
5475.....	.0163	.0099	.0060	.0002	.0001	.0000	.0001
5840.....	.0107	.0068	.0039	.0001	.0001	.0000	.0000
6205.....	.0070	.0046	.0026	.0001	.0001	.0000	.0000
6570.....	.0046	.0032	.0017	.0000	.0000	.0000	.0000
6935.....	.0030	.0022	.0011	.0000	.0000	.0000	.0000
7300.....	.0020	.0015	.0007	.0000	.0000	.0000	.0000
7665.....	.0013	.0010	.0005	.0000	.0000	.0000	.0000
8030.....	.0008	.0007	.0003	.0000	.0000	.0000	.0000
8395.....	.0006	.0005	.0002	.0000	.0000	.0000	.0000
8760.....	.0004	.0003	.0001	.0000	.0000	.0000	.0000
9125.....	.0002	.0002	.0001	.0000	.0000	.0000	.0000

TABLE 7—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
Females							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.9225	.9776	.9246	.9211	.9315	.9159	.9134
20.....	.8562	.8999	.8441	.8346	.8551	.8418	.8658
30.....	.8226	.8390	.8047	.7697	.7824	.7896	.8149
60.....	.7892	.6791	.6854	.6482	.6742	.6727	.7360
90.....	.7509	.5800	.6040	.5669	.5973	.5925	.6664
121.....	.7100	.5165	.5474	.5113	.5414	.5362	.6055
151.....	.6686	.4746	.5077	.4727	.4999	.4959	.5524
182.....	.6284	.4460	.4795	.4454	.4685	.4665	.5065
212.....	.5907	.4256	.4592	.4258	.4441	.4443	.4669
243.....	.5563	.4100	.4441	.4113	.4245	.4269	.4327
273.....	.5258	.3970	.4324	.4000	.4084	.4127	.4030
304.....	.4992	.3850	.4226	.3908	.3945	.4004	.3769
334.....	.4765	.3731	.4138	.3826	.3823	.3892	.3539
365.....	.4574	.3609	.4053	.3750	.3712	.3785	.3333
547.....	.3950	.2838	.3528	.3247	.3163	.3160	.2468
730.....	.3325	.2392	.3129	.2651	.2720	.2570	.1917
912.....	.2450	.2248	.2736	.2176	.2345	.2104	.1485
1095.....	.1943	.2216	.2375	.1860	.1998	.1745	.1185
1277.....	.1819	.2122	.2199	.1609	.1682	.1404	.0954
1460.....	.1731	.1967	.2103	.1393	.1399	.1072	.0797
1642.....	.1441	.1807	.1953	.1239	.1145	.0820	.0713
1825.....	.1127	.1569	.1851	.1149	.0916	.0681	.0573
2190.....	.0990	.1271	.1486	.0789	.0559	.0377	.0443
2555.....	.0900	.1033	.1155	.0541	.0323	.0154	.0248
2920.....	.0839	.0846	.0881	.0370	.0180	.0046	.0069
3285.....	.0786	.0703	.0667	.0255	.0099	.0010	.0000
3650.....	.0702	.0596	.0509	.0176	.0054	.0002	.0000
4015.....	.0571	.0519	.0398	.0123	.0030	.0000	.0000
4380.....	.0401	.0467	.0322	.0087	.0018	.0000	.0000
4745.....	.0224	.0431	.0274	.0062	.0011	.0000	.0000
5110.....	.0084	.0407	.0243	.0046	.0007	.0000	.0000
5475.....	.0014	.0390	.0223	.0034	.0005	.0000	.0000
5840.....	.0002	.0373	.0204	.0025	.0004	.0000	.0000
6205.....	.0000	.0357	.0187	.0019	.0003	.0000	.0000
6570.....	.0000	.0342	.0171	.0014	.0002	.0000	.0000
6935.....	.0000	.0328	.0157	.0010	.0001	.0000	.0000
7300.....	.0000	.0314	.0143	.0008	.0001	.0000	.0000
7665.....	.0000	.0300	.0131	.0006	.0001	.0000	.0000
8030.....	.0000	.0288	.0120	.0004	.0001	.0000	.0000
8395.....	.0000	.0276	.0110	.0003	.0000	.0000	.0000
8760.....	.0000	.0264	.0101	.0002	.0000	.0000	.0000
9125.....	.0000	.0253	.0092	.0002	.0000	.0000	.0000

TABLE 7—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
Total							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.9170	.9444	.9364	.9115	.9149	.9072	.9164
20.....	.8623	.8772	.8564	.8369	.8337	.8245	.8510
30.....	.8337	.8512	.8121	.7704	.7585	.7678	.8052
60.....	.7590	.6929	.6962	.6480	.6433	.6557	.7003
90.....	.6945	.5922	.6159	.5645	.5628	.5769	.6160
121.....	.6389	.5262	.5591	.5063	.5052	.5201	.5477
151.....	.5912	.4817	.5182	.4650	.4629	.4784	.4919
182.....	.5505	.4509	.4880	.4352	.4311	.4470	.4461
212.....	.5159	.4287	.4652	.4134	.4064	.4228	.4081
243.....	.4865	.4119	.4472	.3969	.3867	.4035	.3764
273.....	.4615	.3983	.4323	.3840	.3702	.3876	.3495
304.....	.4402	.3863	.4192	.3733	.3561	.3740	.3264
334.....	.4218	.3749	.4071	.3640	.3435	.3619	.3063
365.....	.4058	.3635	.3954	.3552	.3320	.3507	.2887
547.....	.3346	.2886	.3258	.3006	.2739	.2905	.2174
730.....	.2679	.2310	.2774	.2437	.2268	.2341	.1728
912.....	.2123	.2079	.2497	.2039	.1867	.1851	.1313
1095.....	.1861	.1925	.2272	.1756	.1526	.1468	.0979
1277.....	.1802	.1694	.2063	.1493	.1257	.1153	.0771
1460.....	.1744	.1518	.1870	.1274	.1035	.0878	.0660
1642.....	.1564	.1449	.1722	.1137	.0836	.0663	.0605
1825.....	.1360	.1145	.1613	.1017	.0665	.0543	.0487
2190.....	.1110	.0976	.1284	.0615	.0411	.0292	.0281
2555.....	.0953	.0825	.0997	.0379	.0240	.0110	.0136
2920.....	.0841	.0693	.0761	.0239	.0134	.0029	.0047
3285.....	.0742	.0579	.0575	.0153	.0074	.0005	.0008
3650.....	.0642	.0483	.0434	.0100	.0040	.0001	.0000
4015.....	.0529	.0404	.0330	.0067	.0022	.0000	.0000
4380.....	.0404	.0339	.0255	.0045	.0013	.0000	.0000
4745.....	.0276	.0286	.0202	.0031	.0008	.0000	.0000
5110.....	.0160	.0244	.0165	.0022	.0005	.0000	.0000
5475.....	.0073	.0212	.0140	.0015	.0004	.0000	.0000
5840.....	.0033	.0183	.0119	.0011	.0003	.0000	.0000
6205.....	.0015	.0159	.0101	.0008	.0002	.0000	.0000
6570.....	.0007	.0137	.0085	.0006	.0001	.0000	.0000
6935.....	.0003	.0119	.0073	.0004	.0001	.0000	.0000
7300.....	.0001	.0103	.0062	.0003	.0001	.0000	.0000
7665.....	.0001	.0089	.0052	.0002	.0000	.0000	.0000
8030.....	.0000	.0077	.0044	.0001	.0000	.0000	.0000
8395.....	.0000	.0067	.0038	.0001	.0000	.0000	.0000
8760.....	.0000	.0058	.0032	.0001	.0000	.0000	.0000
9125.....	.0000	.0050	.0027	.0000	.0000	.0000	.0000

TABLE 8

PROPORTION OF ADMISSIONS STILL RESIDENT AT THE END OF THE PERIOD SHOWN;
INSURABLE STAYS; BENEFIT PERIOD CONCEPT; UNADJUSTED 1985 NNHS EXPERIENCE

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95+
Males							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8595	.9029	.9410	.8935	.8826	.8839	.9294
20.....	.8332	.8281	.8530	.8356	.7927	.7792	.8401
30.....	.8016	.8172	.7976	.7616	.7121	.7154	.7939
60.....	.6772	.6794	.6750	.6324	.5840	.6110	.6039
90.....	.5862	.5907	.5897	.5427	.4973	.5322	.4756
121.....	.5188	.5324	.5286	.4790	.4367	.4717	.3861
151.....	.4684	.4932	.4834	.4329	.3929	.4245	.3217
182.....	.4304	.4662	.4488	.3992	.3602	.3871	.2743
212.....	.4014	.4471	.4213	.3740	.3349	.3571	.2386
243.....	.3790	.4327	.3986	.3549	.3145	.3326	.2111
273.....	.3610	.4210	.3790	.3399	.2973	.3124	.1897
304.....	.3461	.4102	.3616	.3277	.2824	.2956	.1728
334.....	.3331	.3995	.3455	.3171	.2689	.2814	.1592
365.....	.3210	.3880	.3303	.3074	.2565	.2692	.1484
547.....	.2549	.2944	.2480	.2502	.1930	.2162	.1169
730.....	.2077	.2067	.1988	.1985	.1420	.1679	.1057
912.....	.1884	.1725	.1864	.1690	.0991	.1159	.0754
1095.....	.1844	.1533	.1779	.1446	.0682	.0758	.0368
1277.....	.1837	.1303	.1492	.1153	.0507	.0522	.0209
1460.....	.1834	.1182	.1225	.0926	.0393	.0379	.0176
1642.....	.1827	.1153	.1147	.0811	.0296	.0266	.0170
1825.....	.1824	.0799	.1134	.0674	.0234	.0203	.0155
2190.....	.1397	.0679	.0846	.0298	.0148	.0074	.0024
2555.....	.1071	.0563	.0639	.0134	.0088	.0000	.0009
2920.....	.0818	.0455	.0486	.0062	.0049	.0000	.0004
3285.....	.0620	.0358	.0367	.0030	.0027	.0000	.0003
3650.....	.0463	.0276	.0274	.0015	.0014	.0000	.0002
4015.....	.0340	.0207	.0199	.0008	.0007	.0000	.0002
4380.....	.0245	.0151	.0140	.0004	.0004	.0000	.0001
4745.....	.0171	.0109	.0093	.0002	.0002	.0000	.0001
5110.....	.0116	.0076	.0058	.0002	.0001	.0000	.0001
5475.....	.0076	.0052	.0033	.0001	.0001	.0000	.0001
5840.....	.0049	.0036	.0019	.0001	.0000	.0000	.0000
6205.....	.0032	.0025	.0011	.0000	.0000	.0000	.0000
6570.....	.0021	.0017	.0006	.0000	.0000	.0000	.0000
6935.....	.0014	.0012	.0004	.0000	.0000	.0000	.0000
7300.....	.0009	.0008	.0002	.0000	.0000	.0000	.0000
7665.....	.0006	.0006	.0001	.0000	.0000	.0000	.0000
8030.....	.0004	.0004	.0001	.0000	.0000	.0000	.0000
8395.....	.0003	.0003	.0000	.0000	.0000	.0000	.0000
8760.....	.0002	.0002	.0000	.0000	.0000	.0000	.0000
9125.....	.0001	.0001	.0000	.0000	.0000	.0000	.0000

TABLE 8—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
Females							
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8884	.9727	.9229	.9266	.9322	.9139	.9092
20.....	.7935	.9126	.8401	.8390	.8531	.8403	.8592
30.....	.7458	.8514	.8044	.7706	.7794	.7881	.8059
60.....	.7222	.6854	.6771	.6436	.6687	.6705	.7285
90.....	.7012	.5839	.5924	.5592	.5903	.5900	.6592
121.....	.6820	.5202	.5350	.5019	.5336	.5335	.5979
151.....	.6644	.4799	.4958	.4624	.4918	.4932	.5444
182.....	.6478	.4546	.4688	.4346	.4602	.4637	.4982
212.....	.6319	.4366	.4497	.4148	.4358	.4415	.4585
243.....	.6164	.4236	.4360	.4002	.4163	.4241	.4243
273.....	.6011	.4141	.4260	.3891	.4002	.4098	.3948
304.....	.5859	.4072	.4177	.3800	.3864	.3975	.3690
334.....	.5707	.4021	.4099	.3721	.3743	.3862	.3462
365.....	.5558	.3972	.4019	.3647	.3633	.3755	.3258
547.....	.4962	.3306	.3419	.3156	.3087	.3135	.2391
730.....	.4775	.2638	.2925	.2550	.2641	.2566	.1869
912.....	.4012	.2383	.2524	.2049	.2266	.2122	.1485
1095.....	.3028	.2334	.2190	.1728	.1916	.1778	.1197
1277.....	.2681	.2198	.2037	.1502	.1603	.1446	.0960
1460.....	.2508	.1961	.1975	.1316	.1331	.1104	.0799
1642.....	.2018	.1880	.1932	.1175	.1089	.0835	.0717
1825.....	.1503	.1866	.1921	.1087	.0876	.0696	.0575
2190.....	.1307	.1636	.1343	.0739	.0525	.0399	.0445
2555.....	.1127	.1384	.0964	.0497	.0298	.0176	.0249
2920.....	.0954	.1145	.0712	.0334	.0163	.0060	.0069
3285.....	.0788	.0939	.0540	.0225	.0087	.0016	.0000
3650.....	.0628	.0776	.0421	.0154	.0047	.0003	.0000
4015.....	.0479	.0655	.0339	.0108	.0026	.0001	.0000
4380.....	.0346	.0575	.0281	.0077	.0015	.0000	.0000
4745.....	.0233	.0521	.0241	.0057	.0009	.0000	.0000
5110.....	.0144	.0485	.0215	.0044	.0006	.0000	.0000
5475.....	.0080	.0460	.0197	.0036	.0005	.0000	.0000
5840.....	.0045	.0436	.0181	.0029	.0003	.0000	.0000
6205.....	.0025	.0413	.0166	.0023	.0003	.0000	.0000
6570.....	.0014	.0392	.0152	.0019	.0002	.0000	.0000
6935.....	.0008	.0371	.0139	.0015	.0001	.0000	.0000
7300.....	.0004	.0352	.0128	.0012	.0001	.0000	.0000
7665.....	.0002	.0334	.0117	.0010	.0001	.0000	.0000
8030.....	.0001	.0316	.0107	.0008	.0001	.0000	.0000
8395.....	.0001	.0300	.0099	.0006	.0000	.0000	.0000
8760.....	.0000	.0284	.0090	.0005	.0000	.0000	.0000
9125.....	.0000	.0269	.0083	.0004	.0000	.0000	.0000

TABLE 8—Continued

Days from Admission	Age at Admission						
	<45	45-54	55-64	65-74	75-84	85-94	95 +
	Total						
0.....	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
10.....	.8719	.9323	.9326	.9133	.9146	.9054	.9150
20.....	.8178	.8639	.8471	.8376	.8317	.8228	.8538
30.....	.7881	.8366	.8010	.7674	.7556	.7673	.8056
60.....	.7057	.6872	.6760	.6393	.6392	.6531	.6998
90.....	.6424	.5929	.5911	.5529	.5581	.5731	.6137
121.....	.5935	.5319	.5322	.4933	.5000	.5159	.5435
151.....	.5553	.4918	.4905	.4513	.4575	.4740	.4860
182.....	.5253	.4650	.4602	.4213	.4256	.4425	.4388
212.....	.5012	.4460	.4376	.3995	.4008	.4184	.3997
243.....	.4816	.4324	.4200	.3832	.3810	.3992	.3673
273.....	.4649	.4225	.4055	.3705	.3646	.3834	.3399
304.....	.4500	.4138	.3928	.3602	.3504	.3699	.3166
334.....	.4362	.4052	.3808	.3512	.3379	.3579	.2963
365.....	.4229	.3957	.3689	.3428	.3264	.3467	.2786
547.....	.3533	.3113	.2943	.2896	.2681	.2874	.2074
730.....	.3085	.2327	.2421	.2321	.2205	.2327	.1658
912.....	.2683	.2016	.2161	.1905	.1803	.1850	.1284
1095.....	.2337	.1848	.1951	.1616	.1459	.1474	.0964
1277.....	.2219	.1618	.1736	.1366	.1193	.1163	.0756
1460.....	.2104	.1459	.1571	.1164	.0979	.0882	.0646
1642.....	.1798	.1417	.1516	.1034	.0787	.0659	.0593
1825.....	.1476	.1058	.1506	.0921	.0631	.0541	.0477
2190.....	.1204	.0912	.1094	.0549	.0382	.0294	.0275
2555.....	.0975	.0762	.0805	.0331	.0219	.0117	.0133
2920.....	.0781	.0622	.0601	.0204	.0120	.0033	.0046
3285.....	.0615	.0498	.0453	.0128	.0065	.0007	.0008
3650.....	.0473	.0395	.0346	.0082	.0035	.0001	.0000
4015.....	.0353	.0314	.0267	.0054	.0019	.0000	.0000
4380.....	.0255	.0251	.0208	.0037	.0011	.0000	.0000
4745.....	.0177	.0204	.0164	.0026	.0007	.0000	.0000
5110.....	.0117	.0171	.0130	.0019	.0004	.0000	.0000
5475.....	.0073	.0147	.0105	.0014	.0003	.0000	.0000
5840.....	.0045	.0127	.0084	.0010	.0002	.0000	.0000
6205.....	.0028	.0109	.0067	.0008	.0002	.0000	.0000
6570.....	.0018	.0094	.0054	.0006	.0001	.0000	.0000
6935.....	.0011	.0081	.0043	.0004	.0001	.0000	.0000
7300.....	.0007	.0070	.0035	.0003	.0001	.0000	.0000
7665.....	.0004	.0061	.0028	.0002	.0000	.0000	.0000
8030.....	.0003	.0052	.0022	.0002	.0000	.0000	.0000
8395.....	.0002	.0045	.0018	.0001	.0000	.0000	.0000
8760.....	.0001	.0039	.0014	.0001	.0000	.0000	.0000
9125.....	.0001	.0034	.0012	.0001	.0000	.0000	.0000

Appendix 7

Graduation of OPCS data Prevalence rates per 1000

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
20	5.7	7.2	4.0	5.2
21	5.8	7.3	4.0	5.2
22	5.8	7.4	4.0	5.2
23	5.9	7.5	4.0	5.2
24	6.0	7.7	4.1	5.2
25	6.1	7.8	4.1	5.3
26	6.2	8.0	4.2	5.3
27	6.3	8.2	4.2	5.4
28	6.5	8.4	4.3	5.4
29	6.7	8.6	4.4	5.5
30	6.9	8.9	4.5	5.6
31	7.1	9.1	4.6	5.7
32	7.3	9.4	4.7	5.8
33	7.5	9.7	4.8	6.0
34	7.8	10.0	4.9	6.1
35	8.0	10.3	5.1	6.3
36	8.3	10.6	5.2	6.4
37	8.6	11.0	5.4	6.6
38	8.9	11.4	5.5	6.8
39	9.3	11.8	5.7	7.1
40	9.7	12.3	5.9	7.3
41	10.0	12.7	6.2	7.6
42	10.5	13.2	6.4	7.8
43	10.9	13.7	6.6	8.1
44	11.4	14.3	6.9	8.5
45	11.9	14.9	7.2	8.8
46	12.4	15.5	7.5	9.2
47	13.0	16.2	7.9	9.6
48	13.6	17.0	8.2	10.0
49	14.2	17.7	8.6	10.5
50	14.9	18.6	9.1	11.0
51	15.6	19.5	9.5	11.6
52	16.4	20.4	10.0	12.2
53	17.2	21.5	10.6	12.8
54	18.1	22.6	11.2	13.5
55	19.1	23.8	11.8	14.3
56	20.1	25.1	12.5	15.1
57	21.2	26.5	13.3	16.1
58	22.4	28.0	14.1	17.0
59	23.7	29.7	15.0	18.1
60	25.2	31.5	16.0	19.3
61	26.7	33.5	17.1	20.6
62	28.4	35.7	18.3	22.1

Prevalence rates per 1000 *(continued)*

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
63	30.3	38.1	19.7	23.7
64	32.3	40.8	21.2	25.4
65	34.6	43.8	22.8	27.4
66	37.1	47.0	24.6	29.6
67	39.8	50.6	26.6	32.0
68	42.9	54.7	28.9	34.7
69	46.4	59.2	31.4	37.7
70	50.2	64.2	34.3	41.1
71	54.6	69.9	37.5	44.9
72	59.4	76.2	41.1	49.2
73	65.0	83.4	45.1	54.1
74	71.2	91.5	49.7	59.6
75	78.3	100.7	55.0	65.9
76	86.4	111.1	60.9	73.0
77	95.7	122.9	67.7	81.2
78	106.3	136.3	75.4	90.5
79	118.5	151.5	84.3	101.2
80	132.5	168.8	94.4	113.4
81	148.6	188.4	106.1	127.5
82	167.2	210.7	119.5	143.5
83	188.5	235.9	134.8	162.0
84	212.9	264.2	152.4	183.1
85	240.8	295.9	172.5	207.2
86	272.6	331.1	195.6	234.6
87	308.5	369.9	221.8	265.5
88	348.6	412.1	251.5	300.3
89	393.0	457.4	284.9	338.9
90	441.4	505.3	322.1	381.4
91	493.1	555.0	363.2	427.5
92	547.2	605.5	407.9	476.7
93	602.6	655.8	455.8	528.1
94	657.7	704.6	506.2	580.8
95	711.0	750.7	558.3	633.6
96	761.1	793.3	610.9	685.1
97	806.6	831.6	662.6	734.1
98	846.7	865.2	712.4	779.5
99	881.0	893.8	758.9	820.3
100	909.5	917.8	801.4	856.2
101	932.5	937.4	839.1	886.8
102	950.6	953.0	871.8	912.4
103	964.5	965.3	899.4	933.3
104	975.0	974.7	922.3	950.0
105	982.6	981.9	940.9	963.0
106	988.2	987.2	955.7	973.1
107	992.1	991.1	967.2	980.7
108	994.8	993.8	976.0	986.3
109	996.6	995.8	982.7	990.4

APPENDIX 8 : Conditions in OPCS Data Likely to be Underwritten Out

Fairly likely to underwrite out

ankylosing
multiple sclerosis
para/quad/spinal injury
motor neurone disease
hydrocephalus
microcephalus cerebral atrophy
myasthesia gravis
TB
allergy resulting in complaint of lung/breathing
mentally handicapped
phobias
schizophrenia
congenital conditions
significant medical history



Very likely to underwrite out

muscular dystrophy
cerebral palsy
polio
spina bifida
haemophilia
cystic fibrosis
retinitis pigmentosa
congenital blindness
severely mentally handicapped
autistic/autism
mental and physically handicapped
absence of loss of extremities
deformity of extremities

APPENDIX 9:

Society of Actuaries Long Term Care Committee 1984 - 1991 Intercompany Experience Study

Appendix D - 3

Incidence Rates by Attained Age, Elimination Period, and Sex

Attained Age Group	Elimination Period Category												
	All Elimination Periods			0 Days			15 - 30 Days			60 - 150 Days			
	Exposure	Claims	Incidence Rate/100	Exposure	Claims	Incidence Rate/100	Exposure	Claims	Incidence Rate/100	Exposure	Claims	Incidence Rate/100	
Less than 60	All	195,165	62	0.032	16,733	14	0.084	38,677	6	0.016	139,755	42	0.030
	Female	118,494	35	0.030	11,811	7	0.059	26,594	5	0.019	80,089	23	0.029
	Male	71,055	23	0.032	4,922	7	0.142	12,011	1	0.008	54,122	15	0.028
	Unknown	5,816	4	0.071	0	0	N/A	72	0	0.000	5,544	4	0.072
60 - 64	All	270,005	240	0.089	54,404	95	0.175	87,680	59	0.067	127,921	86	0.067
	Female	173,396	148	0.085	36,867	67	0.182	58,046	31	0.053	78,483	50	0.064
	Male	95,635	90	0.094	17,535	28	0.160	29,536	28	0.095	48,564	34	0.070
	Unknown	874	2	0.205	2	0	0.000	98	0	0.000	874	2	0.229
65 - 69	All	549,513	1,163	0.212	141,599	631	0.446	192,173	325	0.169	215,741	207	0.096
	Female	336,503	747	0.222	87,975	404	0.459	119,420	217	0.182	129,108	126	0.096
	Male	212,152	410	0.193	53,624	227	0.423	72,665	108	0.149	85,863	75	0.087
	Unknown	858	6	0.699	0	0	N/A	88	0	0.000	770	6	0.779
70 - 74	All	502,884	2,725	0.542	130,715	1,438	1.100	180,583	808	0.447	191,586	479	0.250
	Female	303,571	1,657	0.546	79,107	836	1.057	111,081	513	0.462	113,383	308	0.272
	Male	198,971	1,063	0.534	51,606	602	1.167	69,479	294	0.423	77,886	167	0.214
	Unknown	342	5	1.462	2	0	0.000	23	1	4.348	317	4	1.282
75 - 79	All	322,897	4,260	1.319	78,521	2,128	2.710	117,378	1,281	1.074	126,998	871	0.686
	Female	204,555	2,654	1.297	50,073	1,313	2.622	75,689	773	1.021	78,793	568	0.721
	Male	118,188	1,600	1.354	28,448	815	2.865	41,676	486	1.186	48,084	289	0.622
	Unknown	154	6	3.896	0	0	N/A	13	2	15.365	141	4	2.837
Ages 80+	All	154,230	4,546	2.948	41,174	2,328	5.654	48,242	1,389	2.879	64,814	829	1.279
	Female	103,437	3,070	2.968	28,529	1,558	5.461	32,086	946	2.948	42,822	566	1.322
	Male	50,745	1,476	2.909	12,645	770	6.089	16,155	443	2.742	21,945	283	1.198
	Unknown	48	0	0.000	0	0	N/A	1	0	0.000	47	0	0.000
All Ages	All	1,994,894	12,996	0.652	463,146	6,634	1.432	664,733	3,848	0.579	868,815	2,514	0.290
	Female	1,239,956	8,311	0.670	294,362	4,185	1.422	422,916	2,485	0.588	522,878	1,641	0.314
	Male	746,746	4,682	0.624	168,780	2,449	1.451	241,522	1,360	0.563	336,444	853	0.254
	Unknown	7,992	23	0.288	4	0	0.000	295	3	1.017	7,693	20	0.260

Society of Actuaries Long Term Care Committee
1984 – 1992 Intercompany Experience Study
Appendix D-7
Percent Persisting at Least n Days by Elimination Period Category
All Benefit Periods

Days	0 Day Elimination Period					15–30 Days Elimination Period					60–150 Days Elimination Period				
	Number of Claims Open	Number Closed	Beginning Exposure	Terminating on Day n	Percent Persisting n Days	Number of Claims Open	Number Closed	Beginning Exposure	Terminating on Day n	Percent Persisting n Days	Number of Claims Open	Number Closed	Beginning Exposure	Terminating on Day n	Percent Persisting n Days
1	1,355	5,279	6,634	15	99.77%	630	3,217	3,847	7	99.82%	972	1,538	2,510	5	99.80%
2	1,355	5,264	6,619	24	99.41	630	3,210	3,840	15	99.43	972	1,533	2,505	3	99.68
3	1,355	5,240	6,595	32	98.93	630	3,195	3,825	18	98.96	972	1,530	2,502	3	99.56
4	1,355	5,208	6,563	70	97.87	630	3,177	3,807	21	98.41	972	1,527	2,499	3	99.44
5	1,355	5,138	6,493	61	96.96	630	3,156	3,786	19	97.92	972	1,524	2,495	4	99.28
6	1,355	5,077	6,432	68	95.93	630	3,137	3,767	15	97.53	971	1,520	2,491	1	99.24
7	1,355	5,009	6,364	91	94.56	630	3,122	3,752	15	97.14	971	1,519	2,489	3	99.12
8	1,355	4,918	6,273	97	93.10	630	3,107	3,737	12	96.83	970	1,516	2,486	2	99.04
9	1,355	4,821	6,176	80	91.89	630	3,095	3,725	20	96.31	970	1,514	2,484	1	99.00
10	1,355	4,741	6,096	80	90.68	630	3,075	3,705	19	95.81	970	1,513	2,483	2	98.92
11	1,355	4,661	6,016	72	89.60	630	3,056	3,686	18	95.40	970	1,511	2,481	4	98.76
12	1,355	4,589	5,944	59	88.71	630	3,040	3,670	10	95.14	970	1,507	2,477	3	98.64
13	1,355	4,530	5,885	75	87.58	630	3,030	3,660	20	94.62	970	1,504	2,473	3	98.53
14	1,355	4,455	5,809	70	86.52	630	3,010	3,640	18	94.20	969	1,501	2,470	2	98.45
15	1,354	4,385	5,739	73	85.42	630	2,994	3,624	16	93.79	969	1,499	2,468	2	98.37
16	1,354	4,312	5,665	57	84.56	630	2,978	3,608	12	93.48	969	1,497	2,466	6	98.13
17	1,353	4,255	5,608	73	83.46	630	2,966	3,596	22	92.90	969	1,491	2,460	3	98.01
18	1,353	4,182	5,534	45	82.78	630	2,944	3,574	11	92.62	969	1,488	2,457	2	97.93
19	1,352	4,137	5,489	58	81.91	630	2,933	3,563	21	92.07	969	1,486	2,455	3	97.81
20	1,352	4,079	5,431	286	80.94	630	2,912	3,542	103	91.86	969	1,483	2,452	10	97.73
25	1,350	3,793	5,143	207	76.92	630	2,809	3,439	146	88.46	967	1,473	2,440	8	97.25
30	1,345	3,586	4,931	194	73.75	629	2,663	3,292	137	84.51	967	1,465	2,431	13	96.83
35	1,343	3,392	4,735	166	70.95	629	2,528	3,155	115	81.38	963	1,452	2,415	5	96.57
40	1,342	3,228	4,568	141	68.53	629	2,411	3,040	118	78.50	963	1,447	2,410	14	96.25
45	1,339	3,085	4,422	123	66.40	629	2,293	2,922	70	75.51	962	1,433	2,395	16	95.73
50	1,335	2,962	4,297	104	64.63	628	2,223	2,851	82	73.90	962	1,417	2,379	6	95.09
55	1,333	2,858	4,191	81	63.25	628	2,141	2,769	78	71.58	962	1,411	2,373	11	94.89
60	1,329	2,777	4,106	99	61.90	628	2,063	2,691	79	69.58	962	1,400	2,362	13	94.45
65	1,327	2,678	4,004	74	60.40	627	1,984	2,611	57	67.52	962	1,387	2,349	9	93.97
70	1,320	2,604	3,923	62	59.49	625	1,927	2,551	58	66.04	961	1,378	2,339	7	93.57
75	1,316	2,542	3,858	63	58.53	621	1,869	2,490	42	64.78	961	1,371	2,332	12	93.33
80	1,308	2,478	3,786	54	57.51	621	1,827	2,448	41	63.61	961	1,359	2,319	10	92.73
85	1,308	2,425	3,731	56	56.63	618	1,786	2,404	44	62.60	958	1,349	2,307	9	92.41
90	1,300	2,369	3,668	52	55.91	616	1,742	2,358	38	61.47	958	1,340	2,294	10	92.05
95	1,295	2,317	3,612	39	55.15	615	1,704	2,319	44	60.38	953	1,330	2,282	9	91.69

Society of Actuaries Long Term Care Committee
1984 – 1992 Intercompany Experience Study
Appendix D – 7
Percent Persisting at Least n Days by Elimination Period Category
All Benefit Periods

Days	0 Day Elimination Period				15--30 Days Elimination Period				60--150 Days Elimination Period			
	Number of Claims Open	Number Closed	Beginning Exposure	Percent Persisting n Days	Number of Claims Open	Number Closed	Beginning Exposure	Percent Persisting n Days	Number of Claims Open	Number Closed	Beginning Exposure	Percent Persisting n Days
100	1,294	2,278	3,572	54.52	614	1,660	2,274	40	950	1,321	2,270	91.24
105	1,290	2,229	3,519	31	613	1,620	2,231	19	947	1,304	2,251	90.44
110	1,287	2,198	3,484	53.31	611	1,601	2,212	23	943	1,286	2,229	89.75
115	1,277	2,166	3,440	52.86	611	1,578	2,189	27	940	1,260	2,200	88.74
120	1,269	2,138	3,406	37	609	1,551	2,158	33	940	1,239	2,178	87.77
125	1,266	2,101	3,364	21	607	1,518	2,125	28	929	1,219	2,146	87.12
130	1,259	2,080	3,337	27	604	1,490	2,094	33	925	1,203	2,128	86.51
135	1,252	2,053	3,305	16	600	1,457	2,057	18	923	1,186	2,109	85.82
140	1,241	2,037	3,277	24	598	1,439	2,037	28	923	1,172	2,093	85.13
145	1,234	2,013	3,243	20	598	1,411	2,007	25	918	1,151	2,068	84.23
150	1,222	1,993	3,214	138	595	1,386	1,981	113	914	1,135	2,049	83.62
160	1,168	1,955	3,019	152	564	1,273	1,837	91	883	1,055	1,938	80.38
210	1,099	1,703	2,799	115	538	1,182	1,714	80	832	992	1,822	77.70
240	1,029	1,588	2,615	90	510	1,102	1,610	78	799	922	1,721	74.78
270	972	1,498	2,469	77	475	1,024	1,499	57	760	856	1,614	71.88
300	916	1,421	2,335	79	434	967	1,400	66	725	805	1,530	69.52
330	854	1,342	2,196	79	406	901	1,308	49	681	754	1,434	67.24
360	816	1,263	2,079	56	381	852	1,230	41	644	711	1,355	65.20
390	660	590	1,239	31	343	487	829	30	595	461	1,056	63.28
420	621	549	1,169	25	319	457	775	25	561	439	994	62.08
450	591	524	1,114	27	298	432	729	26	537	417	954	60.67
480	558	497	1,052	29	279	408	685	22	511	396	907	59.32
510	526	468	993	22	265	384	649	18	475	382	856	56.38
540	499	446	945	23	253	366	619	20	461	357	818	54.59
570	468	423	891	22	238	346	583	19	444	350	794	56.10
600	451	401	851	11	225	327	551	19	426	334	760	54.95
630	421	390	808	16	211	308	519	12	407	314	719	53.58
660	392	374	764	14	194	296	490	14	387	299	686	52.42
690	362	360	722	11	180	282	462	16	359	285	642	51.33
720	337	349	685	20	167	266	432	15	333	271	604	50.20
750	289	233	522	11	156	229	385	16	298	228	546	49.18
780	276	222	497	6	143	213	356	11	296	218	513	48.24
810	256	214	470	5	135	202	337	10	278	202	480	46.62
840	240	209	448	9	121	192	313	9	262	190	451	45.33
870	220	200	419	9	112	183	295	9	250	178	428	44.31

**Society of Actuaries Long Term Care Committee
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Appendix D – 7 Percent Persisting at Least n Days by Elimination Period Category All Benefit Periods																
0 Day Elimination Period					15 – 30 Days Elimination Period					60 – 150 Days Elimination Period						
Days	Number of Claims		Beginning Exposure	Number Terminating on Day n	Percent Persisting n Days	Number of Claims		Beginning Exposure	Number Terminating on Day n	Percent Persisting n Days	Number of Claims		Beginning Exposure	Number Terminating on Day n	Percent Persisting n Days	
	Open	Closed				Open	Closed				Open	Closed				
900	209	191	399	10	25.35	102	174	276	13	20.19	225	169	393	6	43.35	
930	195	181	376	6	24.63	94	161	255	6	19.30	210	163	373	5	42.87	
960	173	175	347	9	24.23	83	155	238	1	18.90	189	158	345	6	42.08	
990	162	166	328	10	23.66	79	154	233	7	18.74	176	152	327	5	41.21	
1020	150	156	306	6	22.84	71	147	217	5	18.24	160	147	307	5	40.58	
1050	137	150	286	11	22.46	61	142	202	11	17.72	146	142	288	4	39.88	
1080	127	139	265	5	21.58	54	131	184	5	16.64	128	138	264	3	39.45	
1110	107	73	180	8	21.02	40	67	107	1	16.30	63	39	102	1	39.00	
1140	107	65	172	1	20.20	38	66	103	2	16.15	61	38	99	1	38.61	
1170	97	64	161	4	20.07	35	64	99	2	15.83	57	37	94	2	38.21	
1200	89	60	149	5	19.56	30	62	92	4	15.50	55	35	90	1	37.39	
1230	81	55	136	4	18.88	27	58	85	2	14.82	51	34	85	1	36.95	
1260	68	51	118	6	18.31	25	56	80	3	14.47	47	33	80	3	36.51	
1290	65	45	110	4	17.37	23	53	76	2	13.92	41	30	71	1	35.03	
1320	60	41	101	2	16.73	22	51	73	3	13.37	38	29	65	1	34.53	
1350	52	39	89	3	16.38	20	48	68	1	13.00	34	28	62	1	34.00	
1380	45	36	81	2	15.80	19	47	66	2	12.80	32	27	59	3	33.43	
1410	39	34	73	1	15.39	18	45	63	2	12.41	29	24	53	1	31.66	
1440	25	13	38	2	15.18	16	9	25	0	12.02	23	11	34	0	31.01	
1470	23	11	34	0	14.36	18	9	24	1	12.02	20	11	31	0	31.01	
1500	21	11	32	0	14.38	14	8	22	0	11.52	19	11	30	0	31.01	
1530	18	11	29	1	14.38	14	8	22	0	11.52	18	11	28	0	31.01	
1560	17	10	27	0	13.85	11	8	19	0	11.52	13	11	24	0	31.01	
1590	15	10	25	0	13.85	11	8	19	1	11.52	13	11	24	1	31.01	
1620	14	10	24	0	13.85	10	7	17	1	10.88	12	10	22	1	29.67	
1650	10	10	20	0	13.85	8	6	14	1	10.15	11	9	20	0	28.25	
1680	7	10	16	0	13.85	7	5	12	0	9.37	9	9	18	0	28.25	
1710	5	10	15	0	13.85	6	5	11	0	9.37	5	9	14	0	28.25	
1740	5	10	15	0	13.85	4	5	9	1	9.37	3	9	12	0	28.25	
1770	4	10	14	0	13.85	1	4	5	0	7.81	1	9	10	0	28.25	
1800	2	10	12	0	13.85	1	4	5	1	7.81	1	9	10	0	28.25	
1825	1	10	0	0	0.00	1	3	3	3	0.00	1	9	9	9	0.00	

APPENDIX 10 :

Age - Specific Two Year Changes in Functional Status in the US Elderly Population (% Distribution) : Estimates from the 1982, 1984 and 1989 NLTCs

Disability Level	Non-Disabled		IADLs Only		1-2 ADLs		3-4 ADLs		5-6 ADLs		Institutional		Dead	
Age*	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89
Non-Disabled														
65-74	89.7	91.2	2.6	1.7	2.1	1.5	0.8	0.5	0.7	0.6	0.5	0.3	3.7	4.3
Mortality Adjusted	93.1	95.2	2.7	1.7	2.2	1.6	0.8	0.6	0.7	0.6	0.5	0.3		
75-84	80.9	85.0	4.4	2.9	4.1	2.5	1.5	1.0	1.2	0.9	1.7	1.7	6.3	6.2
Mortality Adjusted	86.3	90.5	4.7	3.1	4.4	2.6	1.6	1.0	1.2	0.9	1.8	1.8		
85+	60.5	67.5	6.9	3.9	9.9	6.9	2.9	2.6	2.6	2.3	6.2	5.0	11.0	11.8
Mortality Adjusted	68.1	76.6	7.7	4.4	11.2	7.8	3.2	2.9	2.9	2.6	6.9	5.7		
IADLs Only 65-74	25.0	13.6	36.3	42.4	17.5	26.3	4.4	0.0	4.7	3.6	3.1	1.6	9.0	12.5
Mortality Adjusted	27.5	15.6	39.9	48.5	19.2	30.0	4.8	0.0	5.1	4.1	3.5	1.9		
75-84	15.8	8.8	30.3	44.1	21.5	16.3	5.7	4.0	5.1	3.3	7.6	4.5	14.2	19.0
Mortality Adjusted	18.4	10.8	35.2	54.5	25.0	20.1	6.6	5.0	6.0	4.0	8.8	5.6		
85+	2.9	1.9	24.4	37.8	21.2	18.1	7.1	6.6	8.1	7.4	13.6	8.2	22.8	20.1
Mortality Adjusted	3.7	2.3	31.6	47.4	27.5	22.6	9.2	8.3	10.5	9.2	17.5	10.3		
1-2 ADLs														
65-74	18.2	8.9	14.4	7.9	33.3	49.8	10.1	16.1	5.1	0.6	4.4	5.0	14.5	11.8
Mortality Adjusted	21.3	10.1	16.9	9.0	38.9	56.4	11.8	18.3	6.0	0.6	5.1	5.7		
75-84	10.2	3.2	12.9	5.0	30.0	51.9	10.1	13.0	5.8	5.2	7.3	4.8	23.8	16.9
Mortality Adjusted	13.4	3.8	16.9	6.0	39.3	62.5	13.3	15.7	7.6	6.3	9.5	5.8		
85+	1.8	1.7	9.5	5.2	27.9	39.3	13.7	11.3	10.6	3.9	14.1	13.5	22.5	25.2
Mortality Adjusted	2.4	2.2	12.2	6.9	36.0	52.6	17.7	15.1	13.7	5.2	18.1	18.0		
3-4 ADLs														
65-74	6.3	0.0	5.0	2.3	28.4	21.1	20.6	42.6	15.5	20.0	3.2	1.1	21.1	12.9
Mortality Adjusted	8.0	0.0	6.3	2.6	36.0	24.2	26.1	48.9	19.6	22.9	4.1	1.3		
75-84	3.1	0.7	4.0	1.0	16.1	10.9	19.8	46.2	16.9	9.4	8.8	8.4	31.3	23.4
Mortality Adjusted	4.4	1.0	5.9	1.3	23.5	14.3	28.8	60.3	24.6	12.2	12.8	10.9		
85+	1.3	0.0	3.1	0.8	9.9	5.5	16.6	42.7	22.8	9.4	14.6	14.0	31.7	27.6
Mortality Adjusted	1.9	0.0	4.5	1.1	14.5	7.6	24.3	59.0	33.4	12.9	21.4	19.4		
5-6 ADLs														
65-74	1.3	2.1	6.5	1.0	12.5	6.1	9.5	9.9	33.5	44.0	6.5	7.3	30.3	29.6
Mortality Adjusted	1.9	3.0	9.3	1.4	18.0	8.7	13.6	14.1	48.1	62.6	9.3	10.4		
75-84	1.5	0.0	4.4	3.0	7.6	5.0	10.2	7.1	34.5	44.8	8.9	6.7	32.8	33.4
Mortality Adjusted	2.3	0.0	6.6	4.5	11.3	7.5	15.2	10.7	51.4	67.3	13.3	10.1		
85+	0.4	0.5	1.6	0.0	6.0	5	8.4	3.5	28.5	37.0	11.7	8.6	43.5	48.9
Mortality Adjusted	0.6	0.9	2.8	0.0	10.7	3.0	14.9	6.9	50.3	72.4	20.7	16.8		
Institutional 65-74	4.1	0.0	2.6	1.5	2.7	0.2	2.6	0.8	2.1	0.7	64.2	78.6	21.8	18.1
Mortality Adjusted	5.2	0.0	3.3	1.8	3.4	0.2	3.4	1.0	2.7	0.9	82.1	96.1		
75-84	1.4	0.3	2.0	0.0	2.8	3.2	1.6	0.0	1.0	0.7	58.0	65.5	33.4	30.2
Mortality Adjusted	2.1	0.5	2.9	0.0	4.2	4.6	2.4	0.0	1.5	1.0	87.0	94.0		
85+	0.2	0.3	0.5	0.9	0.6	0.0	1.5	0.6	1.6	0.8	52.9	51.4	42.7	46.1
Mortality Adjusted	0.4	0.5	0.8	1.6	1.1	0.0	2.7	1.1	2.8	1.4	92.2	95.3		

*Age at end of interval; age at start of intervals is two years younger.

**Age - Specific Five Year Changes in Functional Status in the US Elderly Population (% Distribution) :
Estimates from the 1982, 1984 and 1989 NLTCS**

Disability Level	Non-Disabled		IADLs Only		1-2 ADLs		3-4 ADLs		5-6 ADLs		Institutional		Dead	
Age*	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89	1982-84	84-89
Non-Disabled														
65-74	76.8	80.2	4.1	2.5	4.0	2.9	1.6	1.3	1.6	1.1	1.3	1.0	10.7	11.0
Mortality Adjusted	85.9	90.1	4.6	2.8	4.5	3.3	1.7	1.5	1.8	1.3	1.5	1.1		
75-84	60.7	67.1	5.7	4.1	6.2	4.6	2.5	2.5	2.3	1.7	3.8	3.4	18.9	17.2
Mortality Adjusted	74.8	81.0	7.0	4.9	7.6	5.5	3.1	2.5	2.9	2.0	4.7	4.1		
85+	29.1	37.8	6.3	4.3	10.0	7.9	4.5	4.2	5.1	3.4	10.9	8.4	34.2	33.9
Mortality Adjusted	44.3	57.2	9.6	6.5	15.1	12.0	6.8	6.4	7.7	5.1	16.6	12.8		
IADLs Only														
65-74	37.4	22.8	12.7	15.8	12.6	22.0	4.6	4.9	4.8	3.1	4.7	4.3	23.2	27.2
Mortality Adjusted	48.6	31.4	16.5	21.7	16.4	30.2	6.0	6.7	6.3	4.2	6.1	5.9		
75-84	20.5	12.3	9.7	14.5	12.1	15.1	5.2	6.3	5.4	4.3	9.4	6.9	37.7	40.5
Mortality Adjusted	32.9	20.8	15.6	24.4	19.5	25.4	8.3	10.6	8.7	7.2	15.1	11.6		
85+	2.7	2.3	5.6	10.2	9.4	11.7	5.6	7.2	7.5	6.1	14.8	11.5	54.4	51.2
Mortality Adjusted	6.0	4.7	12.4	20.8	20.5	23.9	12.4	14.7	16.4	12.4	32.4	23.5		
1-2 ADLs														
65-74	29.1	14.7	9.8	7.4	13.9	25.0	5.6	13.6	5.4	5.0	5.5	7.3	30.7	27.0
Mortality Adjusted	42.0	20.2	14.1	10.1	20.1	34.3	8.0	18.7	7.8	6.9	8.0	10.0		
75-84	14.4	5.3	7.3	4.7	11.0	23.2	5.3	12.2	5.6	6.4	8.8	8.0	47.7	40.3
Mortality Adjusted	27.6	9.0	13.9	7.9	21.0	38.8	10.1	20.4	10.7	10.7	16.8	13.4		
85+	2.0	1.9	4.3	3.5	8.6	11.7	6.0	8.3	8.4	4.2	15.0	13.6	55.8	56.8
Mortality Adjusted	4.6	4.3	9.6	8.1	19.4	27.2	13.5	19.1	19.1	9.8	33.8	31.5		
3-4 ADLs														
65-74	16.4	1.5	7.9	4.2	14.6	20.1	6.7	19.9	8.0	15.4	5.4	5.0	41.0	33.9
Mortality Adjusted	27.7	2.3	13.4	6.3	24.8	30.3	11.4	30.1	13.6	23.4	9.2	7.6		
75-84	6.6	1.7	4.7	1.9	8.4	10.8	5.5	17.4	7.9	8.2	9.4	10.6	57.5	49.5
Mortality Adjusted	15.4	3.3	11.1	3.7	19.8	21.4	13.0	34.4	18.5	16.3	22.1	21.0		
85+	1.3	0.3	2.3	1.0	5.2	4.0	4.7	13.3	8.4	6.5	13.2	13.5	64.9	61.5
Mortality Adjusted	3.8	0.7	6.5	2.6	14.8	10.3	13.3	34.5	23.9	16.8	37.7	35.1		
5-6 ADLs														
65-74	8.6	3.8	6.5	1.9	10.9	8.2	5.6	8.9	9.5	15.6	7.1	9.6	51.7	52.0
Mortality Adjusted	17.9	7.9	13.5	4.0	22.6	17.1	11.5	18.5	19.7	32.5	14.7	20.0		
75-84	4.5	0.4	4.1	2.6	6.9	6.3	5.2	6.6	9.8	15.1	9.5	8.4	59.9	60.7
Mortality Adjusted	11.2	0.9	10.3	6.7	17.2	15.9	13.0	16.8	24.6	38.4	23.8	21.4		
85+	0.7	0.5	1.5	0.2	3.8	1.1	3.7	2.5	7.4	9.0	10.6	7.3	72.5	79.4
Mortality Adjusted	2.3	2.5	5.6	0.7	13.7	5.5	13.2	12.2	26.7	43.5	38.5	35.6		
Institutional 65-74	9.0	0.0	3.4	1.9	4.4	1.1	2.7	1.2	2.8	1.2	33.7	55.4	44.1	39.3
Mortality Adjusted	16.0	0.0	6.1	3.1	7.8	1.9	4.9	2.0	60.3	91.2				
75-84	3.0	0.7	2.2	0.0	3.1	3.6	1.7	0.6	1.5	0.9	26.4	35.6	62.2	58.7
Mortality Adjusted	8.0	1.6	5.7	0.0	8.2	8.8	4.4	1.3	4.0	2.3	69.8	86.0		
85+	0.3	0.4	0.5	0.7	0.9	0.0	1.2	0.6	1.6	0.7	21.1	19.5	64.5	78.2
Mortality Adjusted	1.3	1.6	1.8	3.1	3.4	0.0	4.5	2.6	6.3	3.3	82.7	89.4		

*Age at end of interval;age at start of interval is five years younger.

Appendix 11:

Inception rates per 1000 (from graduated OPCS data)

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
20	0.2	0.2	0.1	0.0
21	0.2	0.2	0.1	0.1
22	0.2	0.2	0.2	0.1
23	0.3	0.2	0.2	0.1
24	0.3	0.3	0.2	0.1
25	0.3	0.3	0.2	0.1
26	0.3	0.3	0.2	0.1
27	0.3	0.3	0.2	0.2
28	0.3	0.3	0.2	0.2
29	0.4	0.4	0.2	0.2
30	0.4	0.4	0.2	0.2
31	0.4	0.4	0.2	0.2
32	0.4	0.4	0.3	0.3
33	0.5	0.5	0.3	0.3
34	0.5	0.5	0.3	0.3
35	0.5	0.6	0.3	0.3
36	0.6	0.6	0.4	0.4
37	0.6	0.6	0.4	0.4
38	0.7	0.7	0.4	0.4
39	0.7	0.7	0.5	0.5
40	0.8	0.8	0.5	0.5
41	0.8	0.9	0.6	0.6
42	0.9	0.9	0.6	0.6
43	1.0	1.0	0.7	0.7
44	1.1	1.1	0.8	0.8
45	1.2	1.2	0.8	0.8
46	1.4	1.3	0.9	0.9
47	1.5	1.5	1.1	1.0
48	1.7	1.6	1.2	1.1
49	1.9	1.7	1.3	1.2
50	2.1	1.9	1.5	1.4
51	2.3	2.1	1.6	1.5
52	2.5	2.3	1.8	1.7
53	2.8	2.5	2.1	1.8
54	3.1	2.7	2.3	2.0
55	3.5	3.0	2.5	2.2
56	3.8	3.3	2.8	2.4
57	4.3	3.6	3.2	2.6
58	4.7	3.9	3.5	2.9
59	5.2	4.3	3.9	3.2
60	5.8	4.7	4.3	3.5
61	6.3	5.2	4.8	3.8
62	7.0	5.7	5.2	4.2
63	7.7	6.3	5.8	4.6

Inception rates per1000 (continued)

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
64	8.5	6.9	6.4	5.1
65	9.4	7.6	7.1	5.6
66	10.4	8.4	7.8	6.2
67	11.6	9.3	8.7	6.9
68	12.8	10.3	9.6	7.6
69	14.2	11.5	10.7	8.5
70	15.8	12.8	11.9	9.5
71	17.6	14.4	13.2	10.7
72	19.5	16.2	14.7	12.0
73	21.8	18.2	16.3	13.5
74	24.2	20.6	18.1	15.2
75	27.0	23.2	20.2	17.2
76	30.2	26.3	22.5	19.4
77	33.7	29.8	25.0	22.0
78	37.7	33.9	27.9	25.0
79	42.1	38.5	31.0	28.4
80	47.2	43.9	34.6	32.4
81	52.9	50.1	38.6	37.0
82	59.3	57.3	43.2	42.4
83	66.7	65.5	48.2	48.5
84	75.0	74.9	53.9	55.6
85	84.3	85.4	60.4	63.7
86	94.9	97.2	67.5	72.8
87	106.7	110.1	75.5	82.9
88	119.8	124.2	84.5	94.2
89	134.2	139.4	94.3	106.6
90	149.9	155.5	105.2	120.2
91	166.9	172.4	117.1	134.7
92	184.8	189.8	130.0	150.3
93	203.5	207.6	143.8	166.5
94	222.9	225.4	158.6	183.4
95	242.6	243.0	174.2	200.5
96	262.6	260.2	190.5	217.7
97	282.6	277.3	207.4	235.0
98	302.5	294.3	224.7	252.3
99	322.3	311.6	242.2	269.9
100	342.0	329.5	259.7	287.8
101	361.6	348.2	277.2	306.1
102	381.2	368.0	294.6	324.9
103	400.8	389.2	311.8	344.6
104	420.6	412.0	328.7	365.1
105	440.4	436.4	345.4	386.6
106	460.0	462.4	361.6	408.9
107	479.3	489.6	377.2	431.8
108	497.6	517.0	391.9	454.6
109	515.9	543.1	406.4	476.0

Mortality rates per 1000 (from graduated OPCS data)

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
20	33.2	12.4	35.6	13.6
21	30.9	12.6	33.3	14.1
22	29.2	12.4	31.6	14.1
23	28.1	12.5	30.7	14.5
24	27.7	12.7	30.5	14.8
25	27.2	12.7	30.2	15.1
26	27.1	13.1	30.2	15.8
27	26.8	13.4	30.1	16.4
28	26.5	13.7	30.0	16.9
29	26.5	14.3	30.2	17.8
30	26.4	15.1	30.3	19.0
31	26.5	15.8	30.7	20.1
32	26.6	16.5	31.0	21.1
33	27.2	17.3	31.9	22.3
34	27.9	18.3	33.0	23.8
35	29.1	19.5	34.5	25.5
36	30.6	20.6	36.5	27.1
37	32.2	21.8	38.6	28.8
38	34.3	23.4	41.3	30.9
39	36.9	25.0	44.6	33.2
40	39.6	26.9	48.1	35.8
41	42.7	28.8	52.0	38.4
42	46.0	30.9	56.2	41.3
43	49.8	33.3	60.9	44.6
44	53.9	35.7	66.1	47.8
45	58.6	38.4	71.9	51.4
46	63.7	41.2	78.1	55.2
47	69.0	44.3	84.6	59.2
48	74.8	47.3	91.7	63.1
49	81.2	50.5	99.3	67.3
50	87.6	53.7	107.0	71.5
51	94.5	57.0	115.2	75.7
52	101.6	60.4	123.4	80.0
53	108.9	63.7	131.9	84.2
54	116.4	67.1	140.3	88.3
55	124.0	70.3	148.8	92.2
56	131.6	73.5	157.2	96.1
57	139.2	76.6	165.4	99.7
58	146.7	79.7	173.3	103.3
59	154.1	82.6	181.0	106.6
60	161.3	85.6	188.2	109.9
61	168.1	88.4	194.9	113.0
62	174.8	91.1	201.3	115.9
63	181.3	93.8	207.4	118.7
64	187.8	96.3	213.4	121.3
65	194.2	98.8	219.1	123.8
66	200.6	101.3	224.8	126.3

Mortality rates per 1000 *(continued)*

Age	Male 2/6	Male 3/6	Female 2/6	Female 3/6
67	206.9	104.0	230.4	129.0
68	213.1	106.9	235.7	131.9
69	219.1	110.0	240.9	135.0
70	224.9	113.4	245.8	138.4
71	230.4	117.0	250.4	142.0
72	235.6	120.8	254.7	145.8
73	240.4	124.7	258.7	149.7
74	244.8	128.8	262.2	153.6
75	248.7	132.9	265.4	157.6
76	252.1	137.0	268.2	161.6
77	255.1	141.2	270.6	165.5
78	257.6	145.7	272.8	169.7
79	259.8	150.5	274.7	174.1
80	261.7	155.8	276.4	179.0
81	263.4	161.5	278.0	184.3
82	265.1	167.9	279.6	190.1
83	266.8	174.8	281.3	196.6
84	268.6	182.3	283.2	203.4
85	270.5	190.1	285.3	210.5
86	272.6	198.1	287.4	217.5
87	275.0	206.0	289.8	224.4
88	277.7	214.0	292.4	231.2
89	280.8	221.9	295.3	237.9
90	284.4	229.9	298.6	244.6
91	288.5	237.9	302.2	251.2
92	293.2	245.9	306.3	257.9
93	298.5	253.9	311.0	264.5
94	305.1	261.9	316.7	271.2
95	313.3	269.8	324.1	278.0
96	323.4	278.0	333.4	284.9
97	335.8	287.1	344.9	293.1
98	350.7	298.3	358.9	303.4
99	368.2	312.3	375.6	316.6
100	388.5	329.7	395.0	333.4
101	411.4	351.1	417.2	354.2
102	436.9	376.9	441.9	379.5
103	464.8	407.1	469.1	409.3
104	494.7	441.7	498.4	443.4
105	526.0	480.0	529.1	481.5
106	558.0	521.3	560.5	522.5
107	589.7	564.0	591.7	565.0
108	619.6	606.1	621.2	606.9
109	650.3	644.5	651.6	645.1

APPENDIX 12 :

Reductions in prevalence of ADL limitations

Age	1982 Rates	1994 Rates	Difference
Non-disabled			
65-74	85.9%	88.5%	2.6%
75-84	68.1%	73.1%	5.0%
>85	34.8%	40.2%	5.4%
Only IADLs			
65-74	4.3%	3.1%	-1.2%
75-84	7.2%	5.5%	-1.7%
>85	7.9%	7.2%	-0.7%
ADL or Institutional			
65-74	9.8%	8.4%	-1.5%
75-84	24.7%	21.4%	-3.5%
>85	57.3%	52.7%	-4.7%

Source : Proceedings of the National Academy of Sciences, March 1997.

Appendix 13

Sample risk rates based on OPCS data

Males

2 Adl failure

Age Next	Inception	Annuity	Risk rate
21	0.23	9.52	2.21
22	0.24	9.51	2.28
23	0.25	9.49	2.37
24	0.26	9.44	2.49
25	0.28	9.39	2.63
26	0.30	9.33	2.77
27	0.31	9.25	2.91
28	0.33	9.17	3.05
29	0.35	9.07	3.19
30	0.37	8.97	3.33
31	0.39	8.85	3.48
32	0.42	8.72	3.63
33	0.44	8.58	3.79
34	0.47	8.42	3.97
35	0.50	8.26	4.17
36	0.54	8.08	4.38
37	0.58	7.90	4.62
38	0.63	7.71	4.87
39	0.69	7.52	5.16
40	0.75	7.32	5.47
41	0.81	7.12	5.80
42	0.89	6.92	6.16
43	0.97	6.72	6.54
44	1.07	6.52	6.97
45	1.18	6.31	7.43
46	1.30	6.11	7.95
47	1.44	5.92	8.50
48	1.59	5.73	9.10
49	1.76	5.54	9.76
50	1.96	5.36	10.48
51	2.17	5.18	11.26
52	2.41	5.02	12.10
53	2.68	4.86	13.01
54	2.97	4.71	14.00
55	3.30	4.57	15.06
56	3.66	4.44	16.22
57	4.05	4.31	17.46
58	4.48	4.19	18.81
59	4.96	4.09	20.26
60	5.48	3.98	21.84
61	6.05	3.89	23.54

Sample risk rates based on OPCS data *(continued)*

Age Next	Inception	Annuity	Risk rate
62	6.67	3.80	25.38
63	7.36	3.72	27.39
64	8.13	3.64	29.59
65	8.98	3.57	32.01
66	9.93	3.50	34.70
67	10.99	3.43	37.69
68	12.18	3.37	41.02
69	13.51	3.31	44.74
70	15.00	3.26	48.89
71	16.68	3.21	53.54
72	18.55	3.17	58.76
73	20.65	3.13	64.62
74	23.01	3.09	71.19
75	25.65	3.06	78.59
76	28.61	3.04	86.92
77	31.93	3.02	96.29
78	35.68	2.99	106.85
79	39.89	2.98	118.74
80	44.65	2.96	132.13
81	50.02	2.94	147.20
82	56.11	2.93	164.17
83	63.00	2.91	183.24
84	70.82	2.89	204.63
85	79.65	2.87	228.51
86	89.61	2.85	255.02
87	100.76	2.82	284.23
88	113.21	2.79	316.12
89	126.97	2.76	350.55
90	142.06	2.73	387.17
91	158.39	2.69	425.43
92	175.83	2.64	464.49
93	194.16	2.59	503.30
94	213.20	2.54	540.72
95	232.76	2.47	575.62
96	252.62	2.40	606.99
97	272.60	2.33	634.03
98	292.56	2.24	656.27
99	312.41	2.16	673.63
100	332.13	2.07	686.34
101	351.76	1.98	694.91
102	371.35	1.89	700.05
103	390.99	1.80	702.54
104	410.70	1.71	703.21
105	430.47	1.63	702.87
106	450.20	1.56	702.34
107	469.65	1.50	702.48
108	488.45	1.44	704.33
109	506.79	1.40	710.35

Males
3 Adl failure

Age Next	Inception	Annuity	Risk rate
21	0.15	9.19	1.34
22	0.15	9.18	1.36
23	0.15	9.14	1.40
24	0.16	9.08	1.46
25	0.17	9.02	1.53
26	0.18	8.94	1.61
27	0.19	8.85	1.69
28	0.20	8.76	1.77
29	0.21	8.65	1.85
30	0.23	8.53	1.93
31	0.24	8.40	2.02
32	0.25	8.26	2.11
33	0.27	8.11	2.20
34	0.29	7.94	2.31
35	0.31	7.77	2.44
36	0.34	7.59	2.58
37	0.37	7.39	2.73
38	0.40	7.20	2.90
39	0.44	7.00	3.09
40	0.49	6.79	3.30
41	0.54	6.59	3.53
42	0.59	6.38	3.77
43	0.65	6.18	4.04
44	0.72	5.98	4.33
45	0.80	5.78	4.65
46	0.90	5.58	5.00
47	1.00	5.39	5.38
48	1.12	5.20	5.80
49	1.25	5.02	6.26
50	1.39	4.85	6.76
51	1.56	4.69	7.31
52	1.74	4.54	7.90
53	1.94	4.39	8.54
54	2.17	4.26	9.23
55	2.42	4.13	9.99
56	2.69	4.02	10.81
57	3.00	3.91	11.70
58	3.33	3.81	12.67
59	3.69	3.72	13.72
60	4.09	3.64	14.87
61	4.52	3.56	16.10
62	5.00	3.49	17.45
63	5.52	3.42	18.92
64	6.10	3.36	20.53
65	6.75	3.31	22.31
66	7.47	3.25	24.28

(continued)

Age Next	Inception	Annuity	Risk rate
67	8.27	3.20	26.47
68	9.17	3.15	28.91
69	10.17	3.11	31.62
70	11.28	3.07	34.65
71	12.53	3.03	38.03
72	13.93	3.00	41.81
73	15.48	2.97	46.03
74	17.22	2.95	50.74
75	19.15	2.92	56.01
76	21.32	2.90	61.90
77	23.73	2.89	68.47
78	26.43	2.87	75.83
79	29.45	2.85	84.05
80	32.84	2.84	93.22
81	36.63	2.82	103.46
82	40.90	2.81	114.88
83	45.69	2.79	127.62
84	51.09	2.78	141.81
85	57.15	2.76	157.57
86	63.95	2.74	175.01
87	71.54	2.71	194.21
88	80.00	2.69	215.25
89	89.39	2.66	238.13
90	99.76	2.63	262.82
91	111.15	2.60	289.13
92	123.54	2.56	316.76
93	136.89	2.52	345.22
94	151.18	2.47	373.94
95	166.36	2.42	402.25
96	182.33	2.36	429.39
97	198.95	2.28	454.60
98	216.05	2.21	477.20
99	233.44	2.13	496.66
100	250.96	2.04	512.70
101	268.48	1.96	525.28
102	285.91	1.87	534.62
103	303.19	1.78	541.11
104	320.25	1.70	545.31
105	337.05	1.63	547.87
106	353.50	1.55	549.50
107	369.42	1.49	550.99
108	384.58	1.44	553.28
109	399.16	1.40	558.41

Females
2 Adl failure

Age Next	Inception	Annuity	Risk rate
21	0.20	10.94	2.13
22	0.21	10.87	2.30
23	0.23	10.79	2.46
24	0.25	10.70	2.63
25	0.26	10.61	2.80
26	0.28	10.51	2.97
27	0.30	10.40	3.16
28	0.32	10.29	3.34
29	0.35	10.17	3.53
30	0.37	10.05	3.75
31	0.40	9.92	3.98
32	0.43	9.79	4.20
33	0.46	9.65	4.43
34	0.49	9.50	4.69
35	0.53	9.36	4.96
36	0.57	9.21	5.25
37	0.61	9.05	5.54
38	0.66	8.89	5.87
39	0.71	8.73	6.22
40	0.77	8.57	6.61
41	0.84	8.40	7.02
42	0.91	8.24	7.46
43	0.99	8.07	7.95
44	1.07	7.91	8.48
45	1.17	7.75	9.05
46	1.27	7.59	9.68
47	1.39	7.43	10.36
48	1.52	7.28	11.09
49	1.67	7.13	11.89
50	1.82	6.99	12.75
51	2.00	6.85	13.68
52	2.19	6.72	14.69
53	2.39	6.60	15.79
54	2.62	6.47	16.97
55	2.87	6.36	18.25
56	3.14	6.25	19.63
57	3.44	6.14	21.13
58	3.77	6.04	22.76
59	4.12	5.95	24.53
60	4.52	5.85	26.47
61	4.96	5.76	28.59
62	5.44	5.68	30.90
63	5.98	5.59	33.44
64	6.58	5.50	36.21

(continued)

Age Next	Inception	Annuity	Risk rate
65	7.24	5.42	39.26
66	7.99	5.33	42.62
67	8.84	5.25	46.35
68	9.80	5.16	50.54
69	10.90	5.07	55.25
70	12.17	4.98	60.54
71	13.62	4.88	66.51
72	15.28	4.79	73.23
73	17.19	4.70	80.80
74	19.38	4.61	89.31
75	21.89	4.52	98.87
76	24.77	4.42	109.58
77	28.06	4.33	121.56
78	31.84	4.24	134.98
79	36.20	4.14	150.03
80	41.23	4.05	166.90
81	47.04	3.95	185.80
82	53.73	3.85	206.93
83	61.42	3.75	230.49
84	70.22	3.66	256.65
85	80.17	3.56	285.42
86	91.31	3.47	316.74
87	103.65	3.38	350.44
88	117.16	3.30	386.26
89	131.78	3.22	423.83
90	147.43	3.14	462.64
91	163.94	3.06	502.04
92	181.11	2.99	541.26
93	198.72	2.92	579.42
94	216.51	2.84	615.56
95	234.20	2.77	648.61
96	251.61	2.69	677.52
97	268.74	2.61	701.54
98	285.78	2.52	720.30
99	302.96	2.42	733.77
100	320.55	2.32	742.25
101	338.84	2.20	746.36
102	358.10	2.09	746.98
103	378.61	1.97	745.14
104	400.61	1.85	742.00
105	424.22	1.74	738.73
106	449.44	1.64	736.53
107	476.01	1.55	736.71
108	503.30	1.47	740.88
109	530.06	1.42	751.49

Females
3 Adl failure

Age Next	Inception	Annuity	Risk rate
21	0.05	10.52	0.56
22	0.07	10.42	0.72
23	0.08	10.32	0.87
24	0.10	10.21	1.02
25	0.12	10.10	1.16
26	0.13	9.98	1.31
27	0.15	9.85	1.46
28	0.16	9.72	1.60
29	0.18	9.58	1.75
30	0.20	9.44	1.91
31	0.22	9.29	2.08
32	0.25	9.14	2.24
33	0.27	8.98	2.41
34	0.29	8.82	2.59
35	0.32	8.65	2.78
36	0.35	8.49	2.98
37	0.38	8.32	3.19
38	0.42	8.15	3.41
39	0.46	7.97	3.65
40	0.50	7.80	3.92
41	0.55	7.62	4.20
42	0.60	7.45	4.50
43	0.66	7.27	4.83
44	0.73	7.11	5.19
45	0.80	6.94	5.57
46	0.88	6.78	5.99
47	0.97	6.62	6.45
48	1.07	6.47	6.94
49	1.18	6.32	7.47
50	1.30	6.18	8.05
51	1.43	6.05	8.67
52	1.58	5.93	9.35
53	1.74	5.81	10.09
54	1.91	5.70	10.88
55	2.10	5.60	11.74
56	2.30	5.50	12.67
57	2.53	5.41	13.67
58	2.78	5.32	14.77
59	3.05	5.24	15.96
60	3.34	5.16	17.26
61	3.67	5.09	18.69
62	4.03	5.02	20.25
63	4.44	4.95	21.96
64	4.88	4.88	23.84
65	5.37	4.82	25.89

(continued)

Age Next	Inception	Annuity	Risk rate
66	5.93	4.75	28.16
67	6.55	4.68	30.69
68	7.27	4.61	33.52
69	8.08	4.54	36.71
70	9.02	4.47	40.30
71	10.09	4.40	44.36
72	11.32	4.32	48.93
73	12.72	4.25	54.11
74	14.34	4.18	59.94
75	16.18	4.11	66.51
76	18.30	4.04	73.89
77	20.71	3.97	82.18
78	23.49	3.90	91.51
79	26.70	3.82	102.04
80	30.42	3.75	113.92
81	34.72	3.67	127.34
82	39.69	3.59	142.49
83	45.45	3.51	159.60
84	52.08	3.43	178.85
85	59.65	3.36	200.38
86	68.23	3.29	224.27
87	77.85	3.22	250.54
88	88.58	3.15	279.19
89	100.42	3.09	310.14
90	113.39	3.03	343.18
91	127.44	2.97	378.00
92	142.50	2.91	414.11
93	158.40	2.85	450.81
94	174.96	2.78	487.25
95	191.94	2.72	522.32
96	209.09	2.65	554.82
97	226.32	2.58	583.64
98	243.65	2.50	607.96
99	261.12	2.40	627.24
100	278.84	2.30	641.34
101	296.91	2.19	650.46
102	315.49	2.08	655.22
103	334.74	1.96	656.50
104	354.82	1.85	655.37
105	375.82	1.74	653.02
106	397.73	1.64	650.68
107	420.36	1.55	649.69
108	443.19	1.47	651.71
109	465.31	1.42	659.12

Glossary

ABI	–	Association of British Insurers
ADLs	–	Activities of Daily Living
GHS	–	General Household Survey
IADLs	–	Instrumental Activities of Daily Living
IOA	–	Institute of Actuaries
IPPR	–	Institute of Public Policy Research
LTC	–	Long Term Care
LTCI	–	Long Term Care Insurance
MIRAS	–	Mortgage Interest Relief at Source
NAEI	–	National Average Earnings Index
NLTCS	–	National Long Term Care Survey
NNHS	–	National Nursing Home Survey
OPCS	–	Office of Population Census Survey
PHI	–	Permanent Health Insurance
PSSRU	–	Personal Social Services Research Unit
RCN	–	Royal College of Nursing
RPI	–	Retail Price Index

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