ISSN 2044-3145

# Continuous Mortality Investigation

## Critical Illness Committee

## WORKING PAPER 58

# Supplementary analyses to CMI critical illness diagnosis rates for accelerated business, 2003-2006

December 2011

## EXECUTIVE SUMMARY

This paper completes the further work identified in Working Paper 50, which presented the "AC04 Series" of claim diagnosis rates for accelerated critical illness insurance, on a 'lives' basis, using data for claims settled in the period 2003 to 2006. Specifically, it describes the supplementary analyses designed to aid understanding of the AC04 Series rates. The Committee intends to propose adoption of these rates by the Actuarial Profession early in 2012. Prior to this, further feedback is invited by 29th February 2012.

Before considering the supplementary analyses, section 2 re-states the main assumptions underlying the AC04 Series rates and illustrates the sensitivity of the rates to the claim development distribution (CDD). This is a key component of the methodology used to derive the AC04 Series rates yet generally there are only small variations in the rates resulting from using the alternative CDDs; the one exception is the rates at duration 0. The Committee has therefore concluded that the approach and assumptions underlying the CDD used to derive the AC04 Series rates are unlikely to have had a material distorting effect on the resulting tables.

The methodology underlying the derivation of the AC04 Series rates is not based on a formal statistical model. The Committee has therefore developed an approach for deriving approximate standard errors to help actuaries to understand and allow for uncertainty associated with the rates. The results indicate that the AC04 Series rates rarely sit outside the approximate confidence intervals and, where they do, this often arises from the application of a consistent selection pattern, by age, and from smoothing. The results also provide support for the existence of a select effect by duration.

Section 3 reports on the experience of subsets of the data to examine whether they exhibit different underlying claims experience and hence whether the characteristics used to define these subsets could be regarded as risk factors not allowed for explicitly in the AC04 Series rates. Two types of analysis were undertaken: a series of one-way analyses and a multivariate analysis, using a generalised linear model. The conclusions drawn from these analyses are:

- There was no evidence of any material distortion by age and duration in the AC04 Series rates for any of the factors considered. Indeed, the GLM model demonstrated that age, sex and smoker status are all well-represented by the AC04 Series rates.
- There are significant variations by office; the Committee's interpretation is that the overall experience of the "worst" large office may be around 20% heavier than that of the "best" office.
- The claims experience of policies with the lowest sums assured (up to £40,000) is up to 10% lower than the experience of larger policies.
- Whole of life business appears to exhibit heavier experience than term assurances or endowments.
- Claims experience appears to be reducing by commencement year, except for direct sales business, where more recent business appears heavier.

The two types of analysis produced divergent results for sales channel; however the Committee tentatively concluded that the experience of IFA business is lighter than that sold through direct sales or bancassurance channels.

The AC04 Series rates apply only to accelerated critical illness business; section 4 concludes the paper and examines the experience of stand-alone business. This indicates that the overall experience appears somewhat heavier than the corresponding accelerated business, although the overall shape of the AC04 Series rates is broadly appropriate.

# Continuous Mortality Investigation

# Critical Illness Committee

# WORKING PAPER 58

# Supplementary analyses to CMI critical illness diagnosis rates for accelerated business, 2003-2006

## CONTENTS

# Continuous Mortality Investigation

# Critical Illness Committee

# WORKING PAPER 58

# Supplementary analyses to CMI critical illness diagnosis rates for accelerated business, 2003-2006

## 1. INTRODUCTION

1.1 This paper follows on from and complements CMI Working Paper 50 which presented all-causes claim diagnosis rates for accelerated critical illness insurance, on a 'lives' basis, using data for claims settled in the period 2003 to 2006. It completes the further work identified in Working Paper 50 by providing supplementary analyses designed to aid understanding of the AC04 Series rates published in that paper in January 2011.

1.2 The first stage of this further work was the presentation in CMI Working Paper 52 (published in June 2011) of cause-specific rates derived for the main causes of claim using a subset of the data used to produce the all-causes rates in Working Paper 50.

1.3 In this paper we look in more detail at subsets of the 2003 to 2006 data and examine the extent to which underlying features within these subsets may have influenced the all-causes rates. The paper also includes sensitivity analyses and an analysis of approximate standard errors around the crude all-causes diagnosis rates on which the AC04 Series rates are based. These are intended to provide an indication of the relative levels of uncertainty associated with the AC04 Series rates at different ages, durations and between gender/smoker datasets.

1.4 The AC04 Series rates represent the principal end-product of a programme of work carried out by the CMI Critical Illness Committee to develop tables of critical illness diagnosis rates based on recent UK insured lives experience, together with sufficient supporting information to enable appropriate practical use by actuaries involved with this business. This work began with CMI Working Paper 33 which set out a methodology for deriving "adjusted" results from data relating to claims settled during the period 1999 to 2004 by enabling consistent comparison of actual and expected claims. This methodology was then extended and applied to the 1999 to 2004 dataset to produce diagnosis rates, as documented in CMI Working Paper 43. Draft rates for the 2003-2006 dataset were then produced, in a paper released only to firms that financially support the CMI in August 2010.

1.5 This paper completes this programme of work by providing the remaining supplementary analyses outlined as "further work" in Working Paper 50. The Committee regards these analyses together with the information provided in the prior working papers as important background material for actuaries using the AC04 Series rates.

1.6 The assumptions underlying the methodology are a particularly important part of this background information. These were first described in Working Paper 33 and are revisited in section 2 and Appendix A to this paper. These assumptions include off rates used to estimate exposure for years prior to the investigation period and parameters used to define the claim development distribution (CDD). The sensitivity of the assumptions regarding off rates was tested and reported in Working Paper 33. This has not been repeated in this paper as any such sensitivity will be much lower for the 2003 to 2006 data and hence the AC04 Series rates. The CDD however remains a key feature of the methodology and the sensitivity to this is re-examined in section 2 in relation to the AC04 Series rates.

1.7 At each stage in this process the Committee has sought feedback on the evolving methodology and has made additional information and data available to enable actuaries to comment on the approach being taken and the emerging results. This feedback has been useful in guiding the direction and prioritisation of subsequent work. For example, the approximate standard errors presented in section 2 are included in response to feedback that, since the underlying methodology is not based on a formal statistical model, it may be difficult for actuaries to understand and allow for uncertainty associated with the AC04 Series rates. Earlier feedback highlighted the possibility that underlying market changes during the period from which the claims data arose could have distorted the results and the analyses set out in section 3 have been designed to explore this possibility in more detail.

1.8 The majority of data submitted to the CMI Critical Illness investigation relates to accelerated, rather than stand-alone, business, reflecting the relative level of sales. The Committee did not consider the volumes of stand-alone data sufficiently credible to allow tables to be produced from this data only and the AC04 Series rates only cover accelerated business. However, the Committee is conscious that some practitioners will be setting bases for stand-alone critical illness, as appreciable volumes of the product are still sold and existing business needs to be managed. The Committee was therefore keen to illustrate the experience of the stand-alone data it has collected against rates that are reasonably consistent with the AC04 Series rates. This analysis is contained in section 4.

1.9 The Committee intends to propose adoption of the AC04 Series rates by the Actuarial Profession early in 2012. Prior to this we invite members of the Profession to provide any further feedback they feel may be helpful. In particular we would welcome, by 29th February 2012, any comments which members believe should be considered before or during the process of seeking adoption by the Profession.

1.10 This paper complies with the material requirements of the principles in the Board for Actuarial Standard's generic TASs. In particular, TAS D and TAS M have been met insofar as their principles are applicable.

## 2. ASSUMPTIONS AND SENSITIVITIES IN THE AC04 SERIES RATES

### Introduction

2.1 In this section we summarise the assumptions underlying the AC04 Series claim diagnosis rates and demonstrate the sensitivity of these rates to key assumptions. In addition, approximate confidence intervals around the rates are shown, to illustrate the relative levels of uncertainty in the rates.

2.2 Note that this section is concerned only with the rates at ages 25 to 65, derived in section 6 of CMI Working Paper 50, where we have credible volumes of data. The AC04 Series rates were extended to younger and older ages, at which there were minimal data, as described in section 7 of Working Paper 50. The Committee adopted a pragmatic means of extending the age range of the rates and these rates are highly uncertain.

### A brief summary of the methodology underlying the AC04 Series rates

2.3 The Committee felt it would be helpful to readers to first provide a brief summary of the methodology underlying the AC04 Series diagnosis rates. More detail is, of course, included in the earlier working papers.

2.4 The first stage of the methodology used to analyse the data was to generate "adjusted results" which compare actual settled claims with expected settled claims. The approach can be summarised as follows:

- The exposure during the investigation period is estimated using a census approach, based on the start- and end-year in force data.
- Prior years' in force data (and hence exposure) is then estimated. This estimation process is reasonably robust as we have the commencement dates for all policies in force at the start of the investigation period, hence the unknown element relates only to policies that have ceased before the period. These are estimated using 'off rates'.
- The expected diagnosed claims in each year (at each age and duration) are then estimated using an initial set of claim rates; for this we used CIBT02.
- A claim development distribution (CDD) is then applied to the expected diagnosed claims, to estimate the expected settled claims in each year (by age and duration at settlement).
- These expected settled claims (which are dependent on the selected base table and CDD) are then compared to the actual settled claims in the investigation period. These are termed "adjusted results"'.

This stage of the methodology is described in more detail in CMI Working Paper 33, which included adjusted results for 1999-2002.

2.5 CMI Working Paper 43 introduced a further stage, of equating the expected settled claims to the actual settled claims to generate a set of diagnosis claim rates. These diagnosis rates were based on claims settled in 1999-2004 and are referred to as the "WP43 rates". The rate-fitting was done using an iterative approach to solving for the diagnosis rates, rather than a more conventional statistical model. In particular, Working Paper 43 highlighted the subjective approach the Committee adopted to balancing smoothness of rates with goodness of fit to the data. The work was then "repeated", in Working Paper 50, on the larger, more recent, 2003-2006 dataset.

**Assumptions underlying the AC04 Series rates**

2.6 A substantial number of assumptions underlie the AC04 Series claim diagnosis rates. It is important to recognise that there is some uncertainty associated with each of these, and hence a considerable degree of uncertainty surrounds the rates. These assumptions were required to produce the "adjusted results" that the Committee has issued and a full list of these assumptions is set out in section 10 of Working Paper 33. The list is repeated in Appendix A to this paper, with updated commentary, where appropriate.

2.7 No additional assumptions were required to produce the AC04 Series rates however a considerable degree of judgement has been exercised, for example in deciding on the trade-off between smoothing and goodness of fit, noted above. Consequently – and as previously stated – although the Committee considers the AC04 Series rates to be a reasonable estimate of the true underlying rates, it is by no means the only set of rates that could have been derived and other approaches may be equally valid. To this end, the Committee has made available to member offices spreadsheets containing summarised data that allow practitioners to experiment with alternative approaches to deriving the rates, subject to the limitation that the CDD cannot be varied.

2.8 The assumptions underlying the analysis vary considerably in significance. For example, some assumptions arise from the limitations inherent in collecting census data or relate to the time-intervals applied in the methodology. The novel assumptions within the methodology relate to the CDD and the use of off rates, to estimate exposure prior to the investigation period. The Committee has previously carried out sensitivity tests in respect of these assumptions which have been reported as follows:

- In section 10 of Working Paper 33, the Committee illustrated the sensitivity of the adjusted results to the CDD and to the off rates used to estimate exposure from years prior to 1999.
- In section 8 of Working Paper 43, the Committee illustrated the sensitivity of the WP43 rates to the CDD.

2.9 A similar illustration of the sensitivity of the AC04 Series rates to the CDD is included in this section, again for male non-smokers only.

2.10 The Committee has not illustrated the sensitivity of the AC04 Series rates to the off rates in this paper as the analysis in Working Paper 33 demonstrated that the adjusted results are relatively insensitive to off rates. In addition, in comparison with the earlier work, the AC04 Series rates rely less on the use of off rates because the proportion of the exposure giving rise to claims settled in 2003-2006 which is known, rather than estimated, is much higher. Note that off rates are only required to derive exposure for years prior to an office's first data submission; for many offices this was 1999, so for these offices much of the prior year exposure required for the AC04 Series rates is known, whereas our earlier work used 1999 as the first year of settled claims in the investigation period.

**Sensitivity to the claim development distribution**

2.11 In Working Papers 33 and 43, the Committee illustrated the sensitivity of the adjusted results and the WP43 rates to alternative CDDs which were denoted the 'short', 'mid-short', 'mid-long' and 'long' distributions. The Committee has applied the same approach to derive analogous distributions based on claims settled in 2003-2006.

2.12 The fitting of the Burr model to the 2003-2006 data is described in section 5 of Working Paper 50. The distribution using the best fit assumptions is the 'central' distribution, which underpins the AC04 Series diagnosis rates. The parameter values for this distribution are shown in Table 2.1, together with 95% confidence intervals around each parameter. The alternative distributions are derived as follows:

- The 'short' distribution uses the higher parameter values for alpha and gamma and the lower parameter value for lambda;
- The 'long' distribution uses the lower values for alpha and gamma and the higher value for lambda;
- The 'mid-short' distribution uses the higher parameter values for all three parameters; and
- The 'mid-long' distribution uses the lower parameter values for all three parameters.

Figures 2.1 and 2.2 illustrate these distributions.

Table 2.1. Parameter values for the best fit Burr model of the claim development distributions for claims settled in 2003-2006 and for 95% confidence intervals around the parameter values

| **Burr model of 2003-2006 claim development distribution** | | | |
|---|---|---|---|
| | **$\hat{e} - 1.96\sigma$** | **$\hat{e}$** | **$\hat{e} + 1.96\sigma$** |
| **$\alpha$** | 0.7676 | 0.8408 | 0.9139 |
| **$\lambda$** | 11,596 | 15,281 | 18,966 |
| **$\gamma$** | 2.0269 | 2.0967 | 2.1665 |

2.13 Note that although the 'short' and 'long' distributions are derived using the 95% confidence intervals for the parameter values, they carry no exact probabilistic interpretation in relation to the CDD itself. As the 'short' and 'long' are relatively extreme scenarios, the Committee derived intermediate distributions (the 'mid-short' and 'mid-long'); these also carry no probabilistic interpretation but the Committee considers them a more reasonable range of variation to use for illustrating the sensitivity of the AC04 Series rates. These are therefore used below.

Figure 2.1. Cumulative distribution function for the central Burr model of the CDD for claims settled in 2003-2006, together with the four alternative distributions

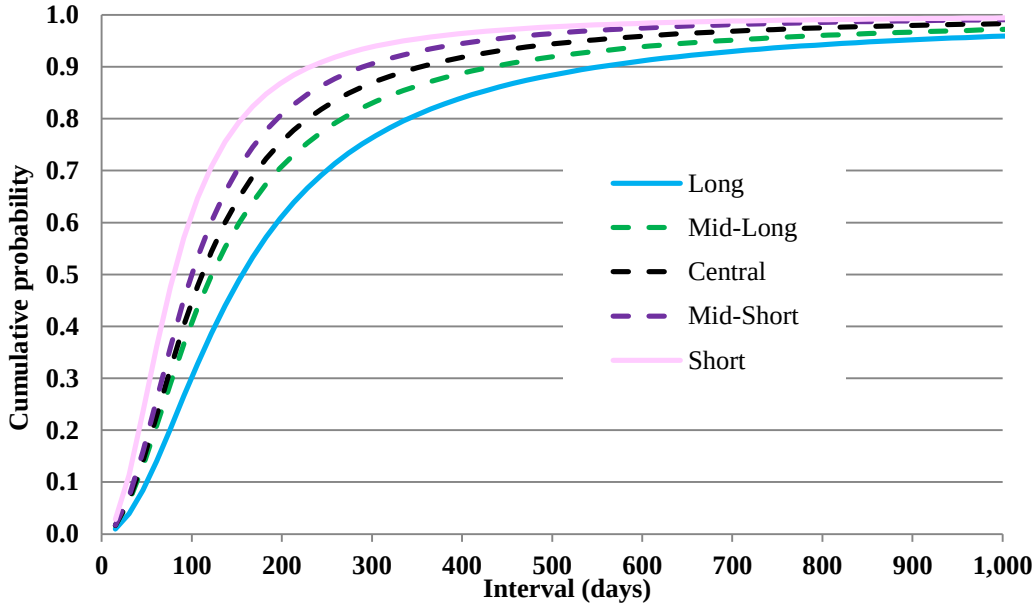
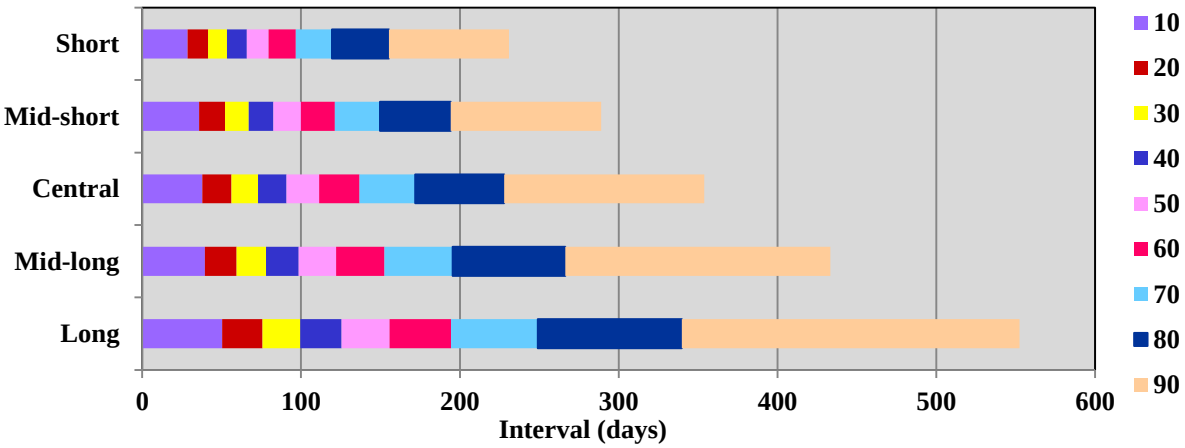


Figure 2.2. Cumulative time-intervals from diagnosis to settlement for each decile of claims to be settled using the central Burr model of the CDD, together with the four alternative distributions




2.14 Table 2.2 shows the values of 100 x actual settled claims/expected settled claims using the mid-short CDD for male non-smokers; the overall A/E value of 99% compares to 100% using the central CDD (as shown in Table B1 of Working Paper 50, reproduced as Table 2.3 below for ease of comparison).

2.15 The impact of using a shorter CDD is that the claims settled in 2003-2006 will relate to slightly later diagnosis dates than when using the central CDD, as the application of a diagnosis rate to exposure will generate a settled claim slightly earlier than when using the central CDD. In general, because of increasing volumes of business, this has the impact of increasing the number of expected settled claims in the investigation period and hence of reducing the 100A/E values. The result is similar to, but less marked than, that seen with the WP43 rates which were based on an earlier period of more significant business growth. In particular, it will be observed from comparing Table 2.2 with Table 2.3 that, in some cells, the 100A/E values now increase slightly, indicating reduced volumes of expected settled claims in those cells.

2.16 At an all-durations level, the reduction in 100A/E values is reasonably uniform across the ages, if slightly less at older ages; however the impact by duration is again more significant.

Table 2.2: Values of 100A/E using the mid-short CDD and the AC04 Series rates; male non-smokers

| **Age last at** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| **settlement** | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 77 | 91 | 120 | 90 | 88 | 211 | **97** |
| **26-30** | 91 | 101 | 94 | 78 | 97 | 143 | **98** |
| **31-35** | 103 | 90 | 85 | 122 | 106 | 96 | **99** |
| **36-40** | 91 | 108 | 100 | 104 | 93 | 94 | **99** |
| **41-45** | 86 | 89 | 102 | 107 | 100 | 101 | **99** |
| **46-50** | 86 | 89 | 94 | 95 | 94 | 110 | **99** |
| **51-55** | 97 | 90 | 86 | 108 | 102 | 104 | **100** |
| **56-60** | 107 | 109 | 97 | 102 | 107 | 97 | **100** |
| **61-65** | 116 | 112 | 105 | 115 | 117 | 96 | **103** |
| **66-70** | 0 | 49 | 114 | 132 | 80 | 81 | **86** |
| **ALL** | **93** | **96** | **95** | **105** | **100** | **101** | **99** |

Table 2.3: Values of 100A/E using the central CDD and the AC04 Series rates; male non-smokers

| Age last at | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **20-25** | 82 | 93 | 120 | 90 | 87 | 210 | **99** |
| **26-30** | 97 | 103 | 94 | 78 | 96 | 142 | **99** |
| **31-35** | 109 | 92 | 86 | 122 | 106 | 96 | **100** |
| **36-40** | 97 | 111 | 101 | 104 | 93 | 94 | **100** |
| **41-45** | 92 | 91 | 103 | 107 | 100 | 101 | **100** |
| **46-50** | 92 | 92 | 95 | 95 | 94 | 110 | **100** |
| **51-55** | 104 | 93 | 87 | 109 | 102 | 104 | **101** |
| **56-60** | 114 | 111 | 98 | 102 | 107 | 97 | **101** |
| **61-65** | 123 | 114 | 105 | 115 | 117 | 96 | **103** |
| **66-70** | 0 | 50 | 114 | 132 | 79 | 80 | **86** |
| **ALL** | **98** | **98** | **96** | **105** | **100** | **101** | **100** |

2.17 Revised rates using the mid-short CDD can be produced by reducing the AC04 Series diagnosis rates at duration 0 by 7%; the resulting fit to settled claims is shown in Table 2.4. As will be familiar from the description of the fitting procedure used to derive the rates (for example, in section 6 of Working Paper 50), this also affects the A/E values at durations 1 and 2, increasing them to 98% and 96% respectively. Some further refinement of these rates could be undertaken – in particular the rates at durations 1 and 2 could be reduced by 3-4%, and those at latter durations increased – but the degree of fit of these rates is comparable to that achieved for the AC04 Series rates, as shown in Table 2.3.

Table 2.4: Values of 100A/E using the mid-short CDD and the AC04 Series rates, but reduced by 7% at duration 0 (male non-smokers)

| Age last at | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **20-25** | 83 | 93 | 120 | 90 | 88 | 211 | **99** |
| **26-30** | 98 | 103 | 94 | 78 | 97 | 143 | **100** |
| **31-35** | 110 | 92 | 85 | 122 | 106 | 96 | **100** |
| **36-40** | 98 | 110 | 100 | 104 | 93 | 94 | **100** |
| **41-45** | 93 | 91 | 102 | 107 | 100 | 101 | **100** |
| **46-50** | 93 | 91 | 94 | 95 | 94 | 110 | **99** |
| **51-55** | 105 | 92 | 86 | 108 | 102 | 104 | **100** |
| **56-60** | 115 | 111 | 97 | 102 | 107 | 97 | **101** |
| **61-65** | 125 | 113 | 105 | 115 | 117 | 96 | **103** |
| **66-70** | 0 | 50 | 114 | 132 | 80 | 81 | **86** |
| **ALL** | **100** | **98** | **96** | **105** | **100** | **101** | **100** |

2.18 Table 2.5 shows the 100A/E values using the AC04 Series rates and the mid-long CDD. As one might expect, and as with the WP43 rates, the results are close to a mirror-image of those using the mid-short CDD: the overall A/E value is now 101%, again with a more significant impact by duration than by age.

Table 2.5: Values of 100A/E using the mid-long CDD and the AC04 Series rates (male non-smokers)

| **Age last at** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| **settlement** | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 87 | 96 | 122 | 90 | 87 | 209 | **102** |
| **26-30** | 103 | 106 | 95 | 78 | 96 | 140 | **101** |
| **31-35** | 116 | 95 | 87 | 123 | 106 | 95 | **101** |
| **36-40** | 103 | 114 | 102 | 105 | 93 | 94 | **101** |
| **41-45** | 98 | 94 | 104 | 108 | 100 | 101 | **101** |
| **46-50** | 97 | 95 | 97 | 96 | 94 | 110 | **101** |
| **51-55** | 110 | 96 | 88 | 110 | 102 | 104 | **102** |
| **56-60** | 121 | 115 | 99 | 103 | 107 | 96 | **101** |
| **61-65** | 131 | 118 | 107 | 115 | 117 | 95 | **103** |
| **66-70** | 0 | 51 | 116 | 132 | 79 | 79 | **85** |
| **ALL** | **105** | **101** | **97** | **105** | **100** | **101** | **101** |

2.19 Revised rates using the mid-long CDD can be produced by increasing the AC04 Series rates at duration 0 by 5%; the resulting fit is shown in Table 2.6. Again, this also affects the A/E value at duration 1, reducing it to 100%, and the degree of fit of these rates is again comparable to that achieved for the AC04 Series rates.

Table 2.6: Values of 100A/E using the mid-long CDD and the AC04 Series rates, but increased by 5% at duration 0 (male non-smokers)

| **Age last at** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| **settlement** | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 83 | 94 | 121 | 90 | 87 | 209 | **100** |
| **26-30** | 98 | 104 | 95 | 78 | 96 | 140 | **100** |
| **31-35** | 110 | 94 | 86 | 123 | 106 | 95 | **100** |
| **36-40** | 98 | 112 | 102 | 105 | 93 | 94 | **101** |
| **41-45** | 93 | 93 | 104 | 108 | 100 | 101 | **100** |
| **46-50** | 93 | 93 | 96 | 96 | 94 | 110 | **100** |
| **51-55** | 105 | 94 | 88 | 110 | 102 | 104 | **101** |
| **56-60** | 115 | 113 | 99 | 103 | 107 | 96 | **101** |
| **61-65** | 125 | 116 | 106 | 115 | 117 | 95 | **103** |
| **66-70** | 0 | 51 | 115 | 132 | 79 | 79 | **85** |
| **ALL** | **100** | **100** | **97** | **105** | **100** | **101** | **101** |

## Uncertainty around the rates

2.20 One drawback of the methodology we have used to derive diagnosis rates is the lack of standard errors. These can be used for demonstrating levels of uncertainty and would have been easily obtainable from a formal statistical model. Feedback to Working Paper 50 suggested that the absence of standard errors was a significant omission.

2.21 Accordingly, the Committee sought to develop an approach for deriving approximate standard errors which allow us to:

- Demonstrate the relative levels of uncertainty around the AC04 Series rates at different ages, between durations and between gender/smoker datasets; and
- Examine additional evidence for the existence of a select effect.

2.22 We make the assumption that claim diagnoses follow a Poisson distribution. Taking $N$ as the number of claim diagnoses and $Exp$ as the exposure at a given age and duration, we have:

$$Crude\ rate = \frac{N}{Exp}$$

$$Variance = \frac{N}{Exp^2}$$

and hence: $$Standard\ error = \sqrt{\frac{N}{Exp^2}}$$

leading to approximate confidence intervals of:

$$\frac{N}{Exp} \pm 1.96 \sqrt{\frac{N}{Exp^2}}$$

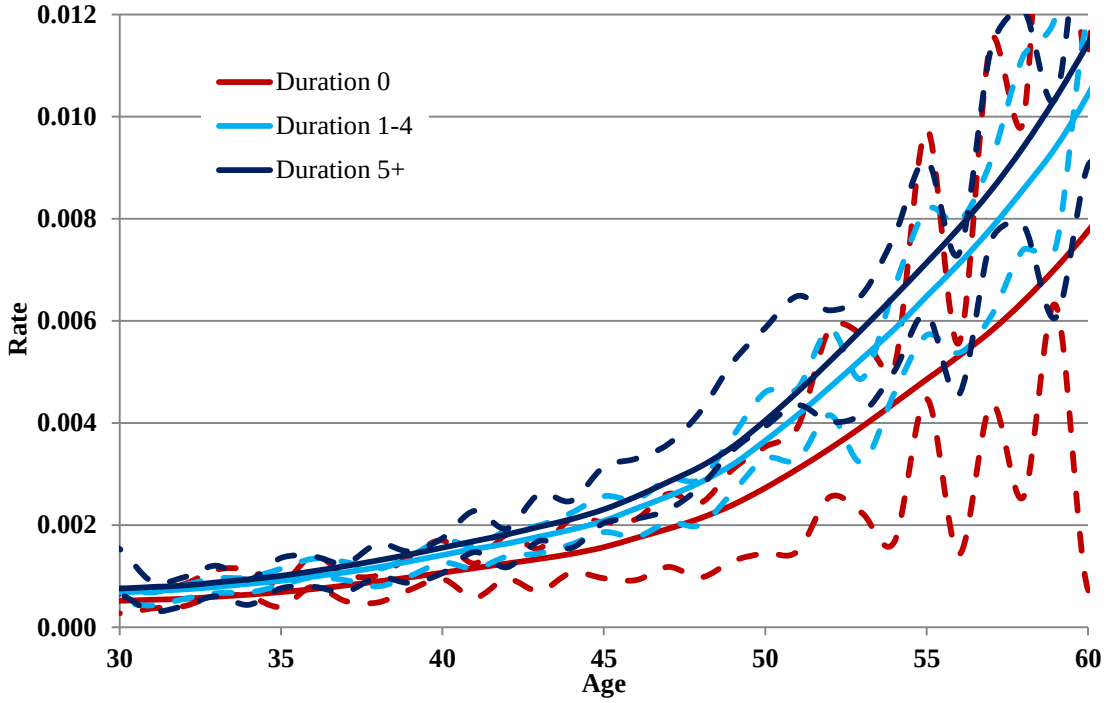
2.23 Note that:

- Claims are allocated by age and duration based on the actual date of diagnosis, where this is known. Where this is unknown, we use a point estimate and assume that this occurs 111 days (the median of the central CDD) before the date of settlement. In the small number of cases where neither date of diagnosis nor date of settlement is known, we assume diagnosis occurs 111 days before 1 July of the settlement year, which is known for all claims. In both cases, the date of diagnosis is taken as the date of commencement, if later.
- The exposure that corresponds to the expected settled claims in 2003-2006 has been calculated by dividing the expected diagnosed claims (at each age/duration at diagnosis) by the relevant claim rate from the AC04 Series tables. This is a subset of the total exposure calculated under the Working Paper 33 methodology, much of which would give rise to diagnoses that are settled before (or after) the investigation period.

2.24 The approximate confidence intervals only reflect the volumes of claims and exposure. They do not reflect the uncertainty associated with the assumptions (listed in Appendix A) and, in particular, the increased uncertainty that arises at duration 0 where there is greater sensitivity to the choice of CDD, as discussed above.

2.25 The values of the approximate confidence intervals, derived as outlined above, are contained in Appendix B, together with the AC04 Series rates. Figure 2.3 below illustrates the rates and the approximate confidence intervals for male non-smokers. It is difficult to discern the key features from Figure 2.3 and an alternative presentation is used in the remainder of this section.

Figure 2.3. AC04 Series rates and approximate confidence intervals by age for male non-smokers




*Relative levels of uncertainty*

2.26 The presentation used in the remainder of this section illustrates the approximate confidence intervals in terms of values of actual diagnosed claims/expected diagnosed claims ("A/E"), where the approximate confidence intervals are defined as:

$$crude\ A/E \ \pm \ 1.96\ \frac{\sqrt{A}}{E}$$

2.27 Figures 2.4 to 2.6 show 100A/E values for the AC04 Series rates for male non-smokers, together with approximate confidence intervals around the crude A/Es for duration 0, durations 1-4 combined and durations 5+. In each case the 'expected' is based on AC04 (Ultimate). This is chosen as the comparison basis so that the A/Es are comparable between durations and hence we can re-examine the evidence for a selection effect. A corollary is that the duration 5+ A/Es are centred on 100 whereas those at duration 0 and at durations 1-4 are centred on lower values.

2.28 The volatility of the crude rates is carried through into the approximate confidence intervals and their width reflects the volume of exposure. Consequently, for each chart, it is apparent that the "funnel of doubt" around the rates is narrower and less volatile between ages 40 and 50 than at younger and older ages. The approximate confidence intervals are generally narrower for durations 1-4 combined and particularly wide for younger ages at durations 5+ and for older ages at duration 0.

2.29 The AC04 Series rates were derived using a consistent selection pattern by age (for each gender/smoker dataset) which, in conjunction with the degree of smoothing applied, therefore results in the consistent A/E by age shown by the near-flat solid lines of Figures 2.4 to 2.6. It is encouraging that the AC04 Series rates rarely sit outside of the approximate confidence intervals despite these constraints and adjustments; where they do, this often arises from the application of the consistent selection pattern by age and the smoothing. For example, the rate at age 36 for duration 0 is below the lower bound,

however the rate at durations 5+ at that age is reasonably central between the upper and lower bounds.

Figure 2.4. 100xactual diagnosed claims/expected diagnosed claims (where expected are based on ACMNL04 Ultimate) and approximate confidence intervals, male non-smokers, duration 0

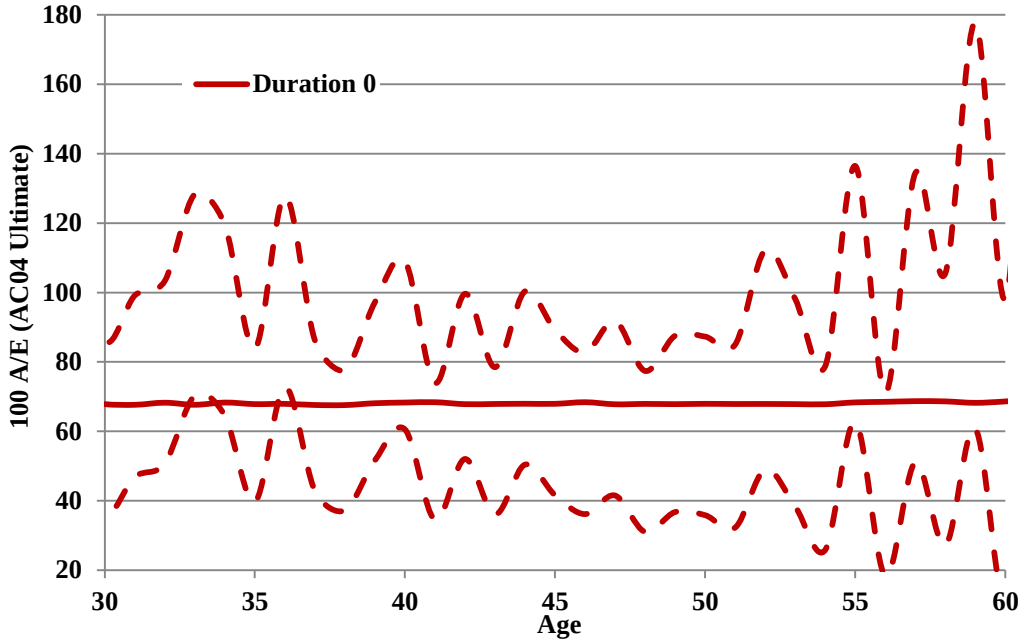



Figure 2.5. 100xactual diagnosed claims/expected diagnosed claims (where expected are based on ACMNL04 Ultimate) and approximate confidence intervals, male non-smokers, durations 1-4

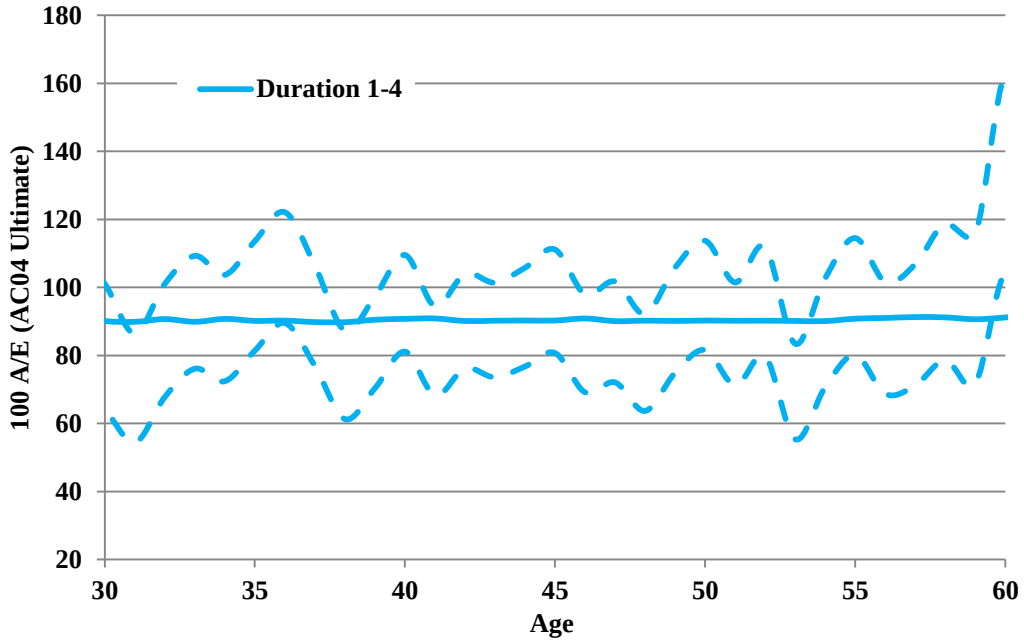
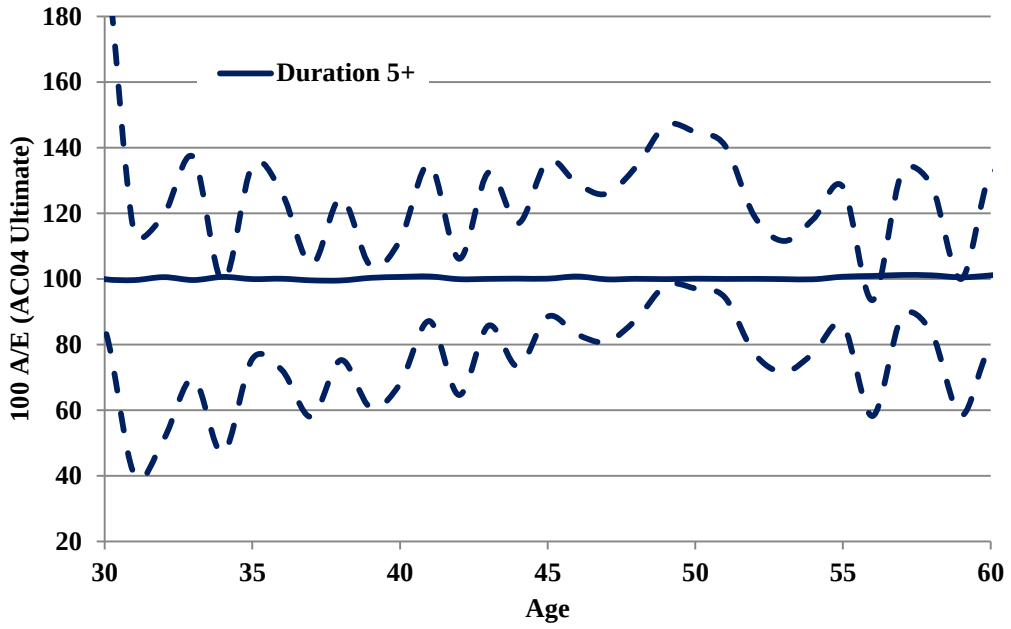
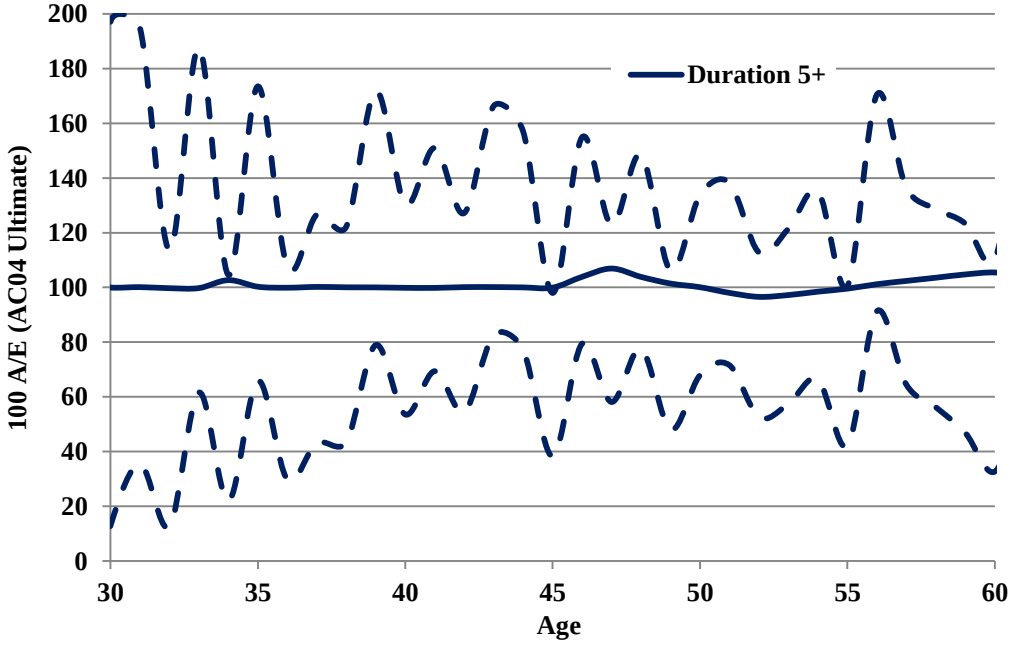


Figure 2.6. 100xactual diagnosed claims/expected diagnosed claims (where expected are based on ACMNL04 Ultimate) and approximate confidence intervals, male non-smokers, durations 5+




2.30 Figure 2.7 shows A/E values for the AC04 fitted rates for male smokers, together with approximate confidence intervals around the crude A/Es, where the 'expected' is based on ACMSL04 (Ultimate). Note that this shows the experience for durations 5+ for comparability with Figure 2.6 (even though the ultimate male smoker rates combine durations 3+). The wider and more volatile intervals compared with those for male non-smokers in Figure 2.6 are clear to see. (Note that the vertical scales of Figures 2.6 and 2.7 differ.)

Figure 2.7. 100xactual diagnosed claims/expected diagnosed claims (where expected are based on ACMSL04 Ultimate) and approximate confidence intervals, male smokers, durations 5+

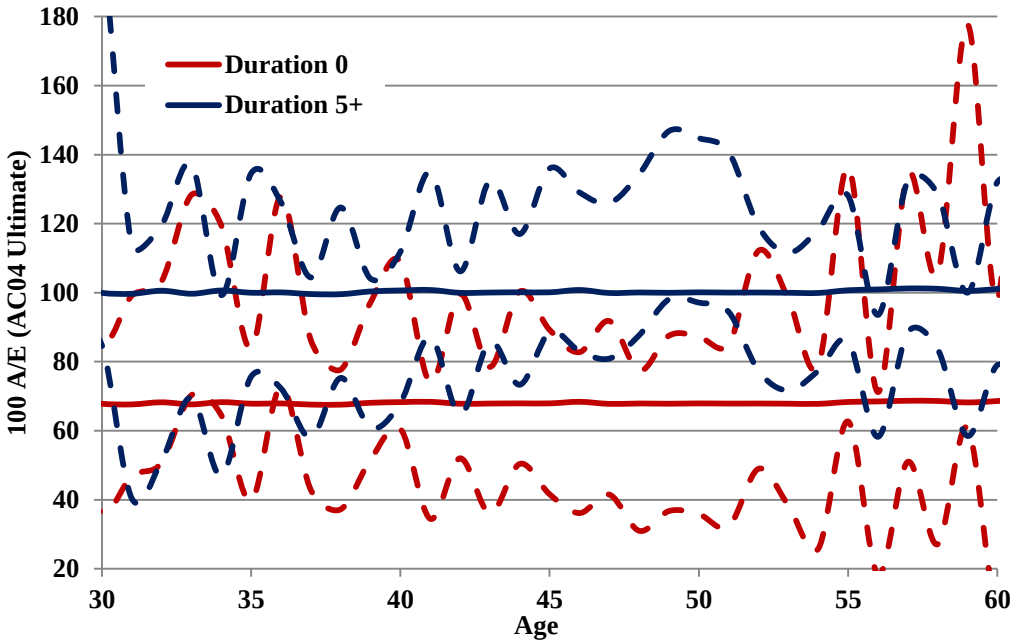


2.31 The corresponding figures for females are not shown but, as one would expect, the intervals for female non-smokers are of broadly similar width to those for male non-smokers whilst those for female smokers are even wider than those for male smokers, reflecting the low volume of data.

*Evidence for select effect*

2.32 Comparing the approximate confidence intervals of different durations offers an alternative perspective on the evidence in the data of a select effect. For male non-smokers, we have considered durations 0 and 5+ only in Figure 2.8.

Figure 2.8. 100xactual diagnosed claims/expected diagnosed claims (where expected are based on ACMNL04 Ultimate) and approximate confidence intervals, male non-smokers, durations 0 and 5+ only




2.33 The two intervals overlap to a large extent at younger ages, and at older ages, implying that the evidence for select rates at these ages is limited. In contrast, there is clear evidence for the crude rates for duration 0 and durations 5+ being significantly different between ages 43 and 54 which lends support to the Committee's decision to derive separate sets of rates for these durations.

## 3. THE EXPERIENCE OF SUBSETS OF THE DATA

### Introduction

3.1 The AC04 Series diagnosis rates for accelerated critical illness insurance presented in CMI Working Paper 50 were derived from the combined data of all offices that submitted data to the CMI relating to claims settled in the years 2003 to 2006.

3.2 Although the rates were based on claims settled between 2003 and 2006, the underlying policies relate to a longer period, starting significantly earlier, as illustrated in Figure 2.2 of Working Paper 50. As discussed in section 2 of that paper, the market has changed in many ways, including distribution, underwriting and product design, over the period giving rise to these settled claims. This may mean that the mix of business at short durations and young ages differs from that at the ultimate durations and older ages, in terms of socio-economic profile, reason for purchase and sales process, for example. These changes could clearly influence the AC04 Series rates, not only in terms of their overall level but also the shape by both age and duration.

3.3 This section therefore illustrates the experience for various subsets of the overall dataset to investigate the impact of these changes and, hopefully, to aid understanding of the rates and how they might be used. The experience of various subsets is first considered individually; however, the Committee was conscious of the potential correlation between the factors in these one-way analyses and therefore also undertook an initial multivariate analysis which is described later in the section.

### One-way analyses: the approach adopted

3.4 The experience of a number of subsets of the dataset is first presented using "one-way" analyses. These subsets relate to product type, sum assured, sales channel, year of commencement and individual office. The analyses are restricted to the larger subsets, with some residual business ignored, to avoid reducing the credibility of individual subsets too far. The results are described in the following parts of this section.

3.5 As noted above, the maturity of the business differs between the subsets reflecting changes in the critical illness market. In order to illustrate these differences, we have therefore included charts illustrating the profile by age and duration of the different subsets; in each case these show the exposure that gives rise to the expected settled claims in 2003-2006 (calculated as set out in 2.23).

3.6 The approach adopted for each of the one-way analyses is identical:

- The dataset has been segregated by a number of distinct factors. In some cases there is a residual subset that has not been analysed separately.
- The experience is presented in terms of values of 100xactual settled claims/ expected settled claims, where:
  - The actual settled claims (ASC) are categorised by age last birthday at settlement and by curtate duration at settlement.
  - The expected settled claims (ESC) are similarly categorised and are calculated as follows:
    i. The exposure is estimated using the methodology set out in section 7 of CMI Working Paper 33;

ii. The exposure is multiplied by the relevant AC04 Series rate to calculate the expected diagnosed claims; and
iii. A Burr model of the claim development distribution (CDD) is applied to the expected diagnosed claims to obtain the expected settled claims.

- As discussed in section 2, the Committee considers the analyses to be relatively insensitive to the off rates that are assumed in calculating exposure and the same off rates are used to estimate prior years' exposure for each subset in the analyses in this section.
- The Committee did however assess whether the CDDs differed between the subsets. Where the differences were deemed immaterial, the central CDD, derived in section 5 of Working Paper 50 was used for each subset. However where the variation appeared more significant, a specific CDD was derived using the claims data for that subset.

**Experience by product type**

3.7 Working Paper 50 described how CMI data reflect the broad trends seen in the critical illness market over time. Until the late 1990's most critical illness cover was sold attached to mortgage endowment or whole of life (WoL) products which contained a savings element. As endowment sales faltered at the turn of the millennium, pure protection term assurance business increased rapidly and quickly became the majority of new sales.

3.8 Overall, the exposure giving rise to claims settled in 2003-2006 is clearly dominated by term assurance as is shown in Figures 3.1 to 3.3 (note that the vertical scales differ between these three charts). However, at durations 5+, around 66% of the exposure is represented by the older product types of whole of life and endowments, whereas these products contribute less than 5% of the exposure at any of the shorter durations. Note that a small amount of unclassified business is excluded, approximately 1%.

Figure 3.1: Absolute life years exposure by age and duration for all term assurances

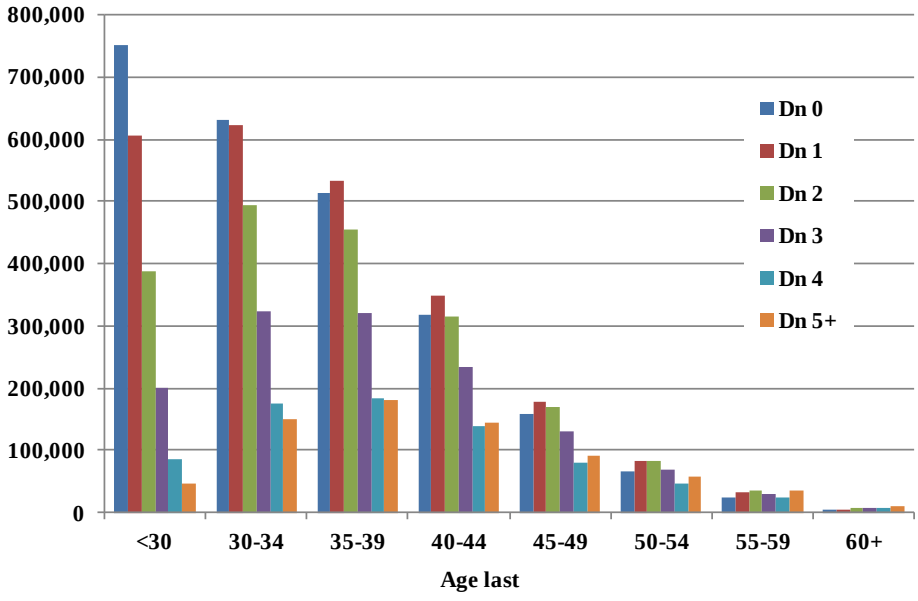


Figure 3.2: Absolute life years exposure by age and duration for endowments

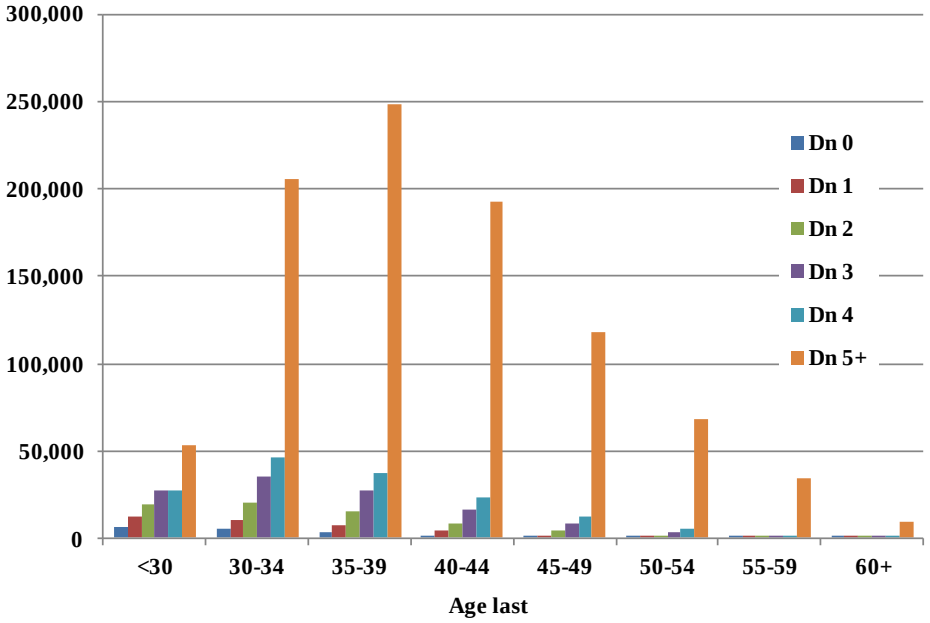
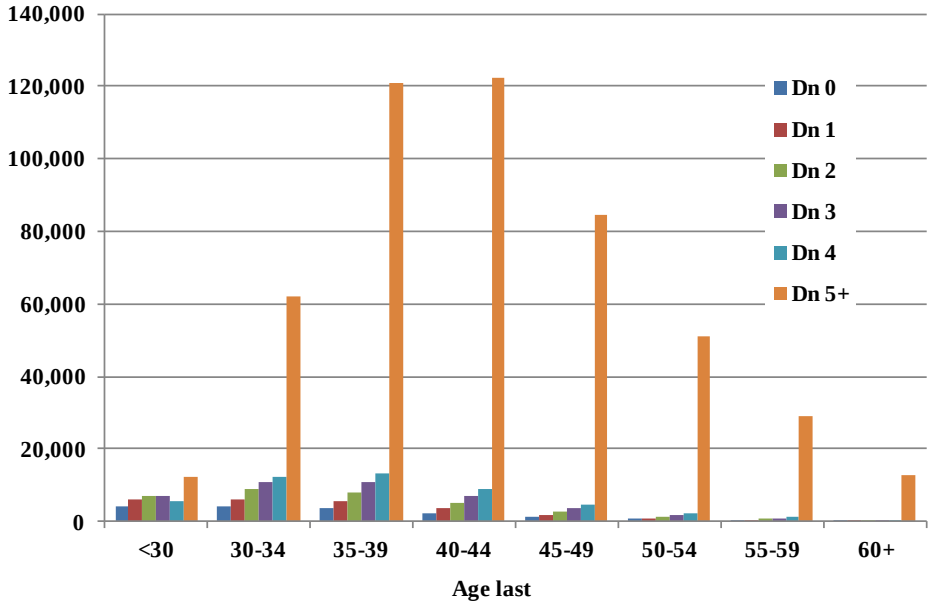



Figure 3.3: Absolute life years exposure by age and duration for whole of life policies

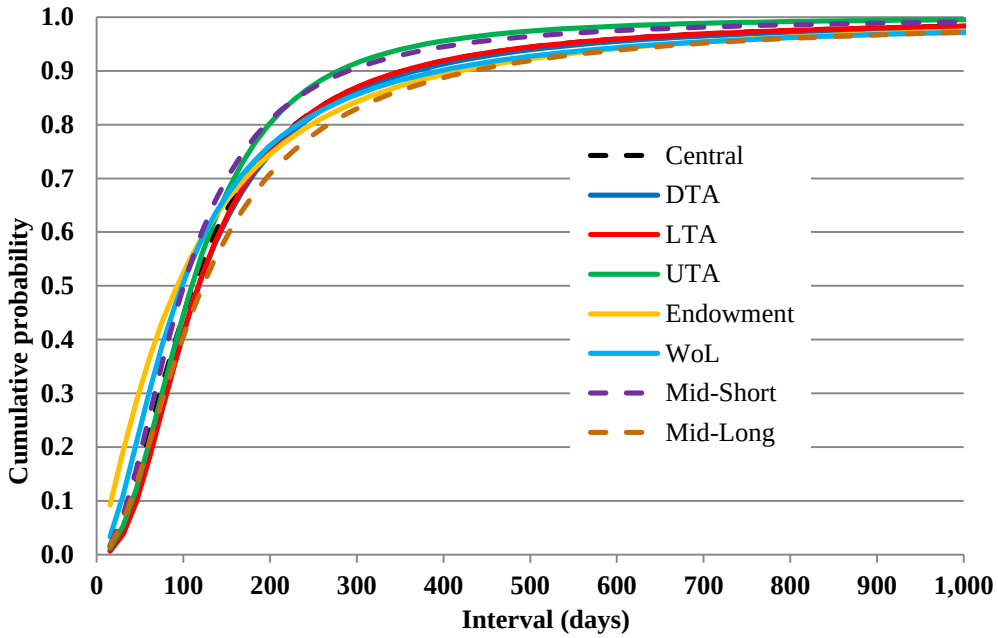



3.9 Note that as previously described in Working Paper 50, it has been possible to additionally split the majority of the term assurance business into level term (LTA) and decreasing term (DTA), leaving the remainder – approximately a quarter of the exposure – still unclassified (UTA). The breakdown of exposure for these sub-categories is shown in Appendix C.

3.10 Figure 3.4 shows the CDDs for each product type, as well as those for the central, mid-short and mid-long distributions (discussed in section 2). The CDDs are similar but with claims under endowment and whole of life policies exhibiting a slightly shorter development pattern than the central or term assurance CDDs. The Committee

considered these differences small and decided to use the central CDD for all the subsets.

Figure 3.4: Claim development distributions, by product type




3.11 Table 3.1 summarises the results by product type. More detailed results, and the numbers of actual settled claims, are contained in Appendix C. The expected claims in Table 3.1, and in all other corresponding tables in this section, are calculated using the AC04 Series rates.

Table 3.1: All-durations, all-ages 100xactual settled claims/expected settled claims, by product type

| **Product Type** | **MNS** | **MS** | **FNS** | **FS** | **Total** |
|---|---|---|---|---|---|
| *Decreasing TA* | *101%* | *106%* | *102%* | *104%* | *103%* |
| *Level TA* | *105%* | *95%* | *103%* | *107%* | *103%* |
| *Unclassified TA* | *86%* | *93%* | *93%* | *87%* | *90%* |
| **All Term Assurances** | 98% | 101% | 100% | 101% | 99% |
| **Endowment** | 101% | 96% | 92% | 100% | 97% |
| **Whole of Life** | 111% | 115% | 115% | 99% | 112% |

3.12 The following features are noted:

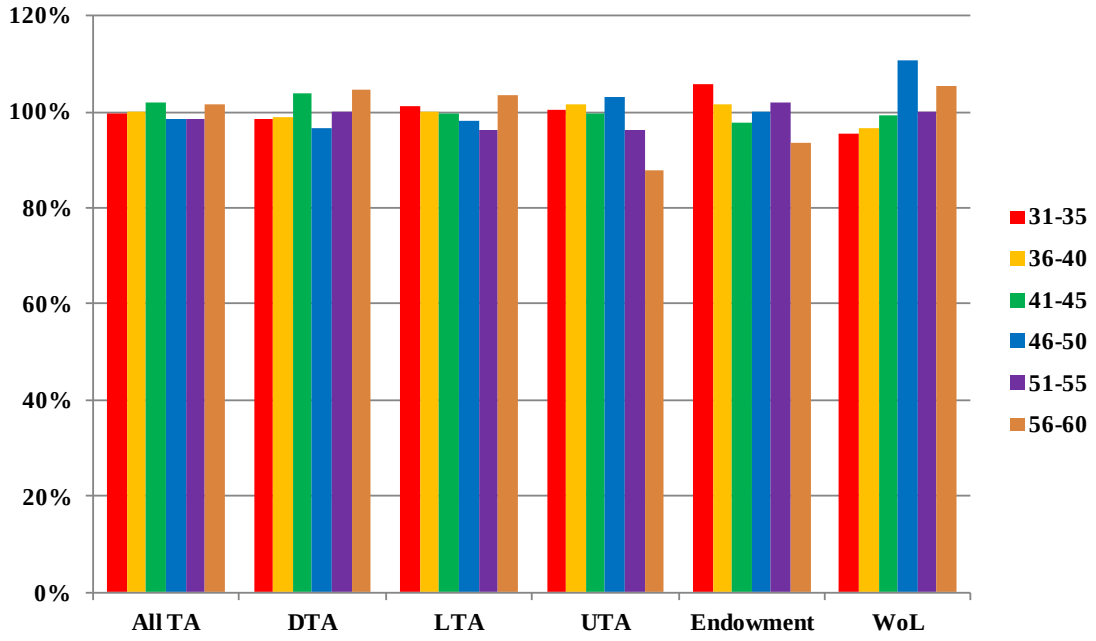
- Overall term assurance experience is close to the AC04 Series tables with the experience lightest for the unclassified term business. The Committee noted that the unclassified business was not office-specific, with a number of offices contributing level, decreasing and unclassified term assurance business. The experience of decreasing and level term business is similar.
- Experience for endowment business is lighter than the AC04 Series tables, particularly for female non-smokers.
- Experience is heaviest for whole of life business for all males and female non-smokers.

3.13 Note that the exposure for the product type with the heaviest experience, whole of life policies, is concentrated at the ultimate durations and that the average duration of whole of life business within the 5+ category may be longer than other products. This illustrates the different mix of business at short durations (and young ages) from that at the ultimate durations (and older ages) that gives rise to a possible distortion implicit within the AC04 Series tables.

3.14 Figure 3.5 shows the experience by age (last, at settlement) across all four gender/smoker datasets combined for all-durations for each product type. This comparison shows the experience in 5-year age bands for ages 31 to 60 only, due to the limited volumes of data outside of this range. Note that the experience is shown relative to the all-ages/all-durations experience for that product type.

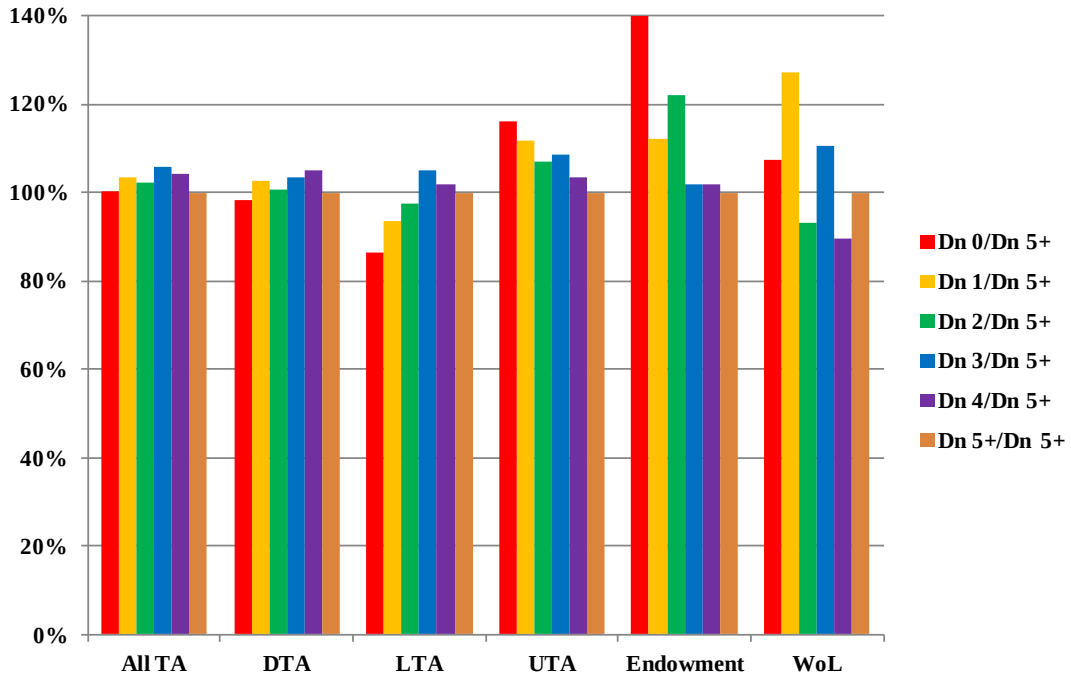
3.15 Most of the 100A/E values vary between 95% and 105% of the all-ages experience for that product type. If the shape of the AC04 Series rates by age were exactly appropriate for each product, this graph would show values of 100% in each case. No product precisely fits this pattern, however the range of variation is fairly narrow.

Figure 3.5: All-durations 100xactual settled claims/expected settled claims by age band (relative to the all-ages 100A/E), by product type




3.16 Figure 3.6 shows the experience by duration (at settlement) across all four gender/smoker datasets for all-ages combined for each product type, relative to the experience at durations 5+ for that product type. There is greater variation in individual cells than in Figure 3.5; in particular, the value at duration 0 for endowments is "off the scale" with actual claims around 490% of the expected, however there is little exposure in this cell (and only 23 settled claims).

Figure 3.6: All-ages 100xactual settled claims/expected settled claims by duration (relative to the 100A/E at durations 5+), by product type




## Experience by sum assured

3.17 Within mortality analyses it has long been considered that differentials exist by size of insured benefit, with the claims experience thought to be lighter for higher sums assured. This has been attributed to:

- A link to socio-economic group, and
- Increased underwriting of higher sums assured.

3.18 The Committee was keen to explore whether such a feature exists within critical illness experience and felt that showing the results of this analysis would be useful to practitioners in consideration of pricing and reserving.

3.19 The extent of any analysis that can be undertaken is restricted by the data provided. Ideally an analysis by benefit amount would consider the original sum assured, however the data requested for the CMI Critical Illness investigation for this period only shows the current sum assured. It is worth noting that original sum assured has been requested in Per Policy data (as well as current sum assured) to allow more meaningful analysis in the future.

3.20 In addition, from the data available, the CMI is not able to identify policies where adjustments such as alterations or options to amend the sum assured and top-up policies may have taken place with an impact upon a sum assured banded analysis.

3.21 The product type (in particular whether the sum assured is due to remain level, decrease or increase) is the primary reason for the sum assured on an individual policy to change over time. As noted above, there is a significant volume of exposure within the 2003-2006 dataset where it is not possible to determine the sum assured pattern using the product type.

3.22 The Committee considered undertaking an analysis based only on level term assurance policies in order to reduce the impact of the sum assured changing over time; however doing so would have reduced the exposure by over 75%, which was felt to be too significant for the subsets by sum assured band to have credibility.Seeking consistent treatment of policies between calendar years and between exposure and claims would have been labour-intensive and still not entirely accurate. The Committee therefore opted for a simple approach based on three sum assured groupings:

- Band 1: £0 - £40,000;
- Band 2: £40,001 - £80,000; and
- Band 3: £80,001+.

The Committee recognises this simple approach means that the analysis can only be regarded as indicative.

3.23 These groupings were selected after considering the results of initial analysis at a more granular level and allowing for practical considerations. As an example, the Committee felt it important that a band did not start from a common sum assured such as £100,000 in case the allocation of these policies between bands distorted the results.

3.24 The chosen bands split the data into relatively equal proportions – approximately 30%/40%/30%.

3.25 A census-style approach has been taken considering the sum assured at the start and end of the calendar year. As an example, the exposure for a life with a sum assured of £41,000 at the start of the year and £35,000 at the end of the year would be calculated as half a year of exposure in Band 2 and half a year in Band 1. This approach is not consistent with the allocation of exposure between ages and durations where a daily exposure is calculated.

3.26 It is worth noting that much of the exposure is likely to have come from early durations of long term decreasing sum assured business where the 'current' sum assured is unlikely to have decreased significantly from the original sum assured. As an example, the sum assured on a 25-year decreasing term assurance product would have decreased by 6% after 5 years (based on a 10% interest rate); so this may not be a material source of distortion.No allowance has been made in the results for the 'inflationary' effects of time upon the average sum assured. Table 3.2 shows the average claim sum assured for the level term assurances split by year of commencement. It shows a significant increase in the claim amounts with time.

Table 3.2: Average claim sum assured for Level Term Assurances, split by commencement year

| **Comm Year** | **≤1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Average Sum Assured** | £43,813 | £46,876 | £49,171 | £52,163 | £61,186 | £68,375 | £66,711 | £67,489 | £72,162 | £79,740 |

3.27 As well as the genuine inflationary effect demonstrated in Table 3.2, the underlying data will reflect any difference in sum assured as a result of changes in the mix of business sold (noted in 3.7) and the relative levels of cover associated with each. This is an unavoidable feature of any one-way analysis. In order to provide additional insight the average sum assured by product type is shown in Table 3.3.

Table 3.3: Average claim sum assured by product type

| | **Average sum assured** |
|---|---|
| *Decreasing TA* | 56,453 |
| *Level TA* | 66,436 |
| *Unclassified TA* | 69,170 |
| **All Term Assurances** | 61,915 |
| **Endowment** | 38,163 |
| **Whole of life** | 60,062 |

3.28 Note that claims have been allocated to the bands based on the actual claim payment notified to the CMI. The data does not allow the Committee to identify:

- Proportional claims as a result of non-disclosure, or
- Partial benefit payments.

3.29 The inflationary effects over time can also be seen in Figures 3.7 to 3.9 which show the exposure by age and duration for each sum assured band. The amount of exposure at older ages and longer durations reduces as the sum assured increases.

Figure 3.7: Absolute life years exposure by age and duration for sum assured band 1 (£0 - £40,000)

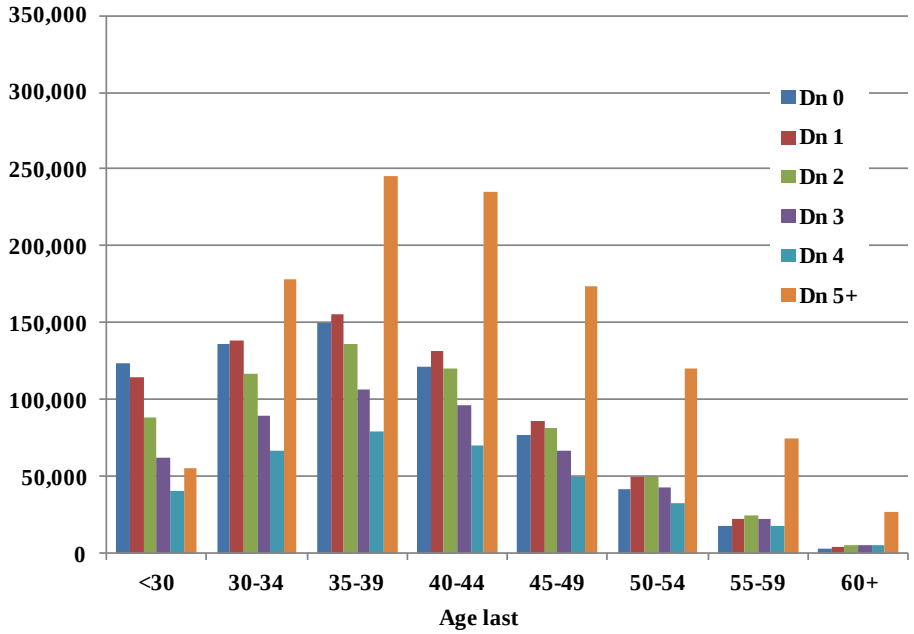


Figure 3.8: Absolute life years exposure by age and duration for sum assured band 2 (£40,001 - £80,000)

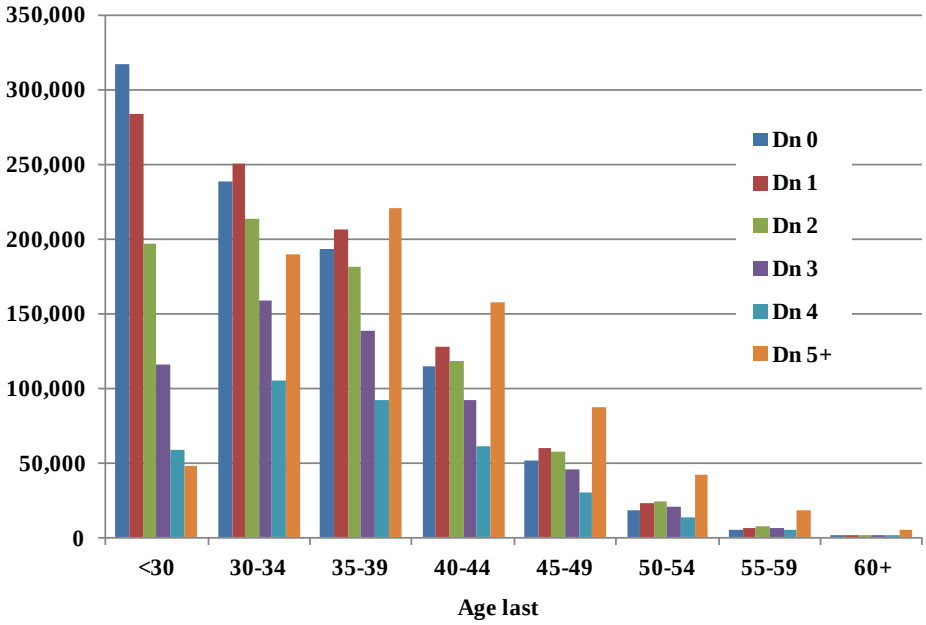
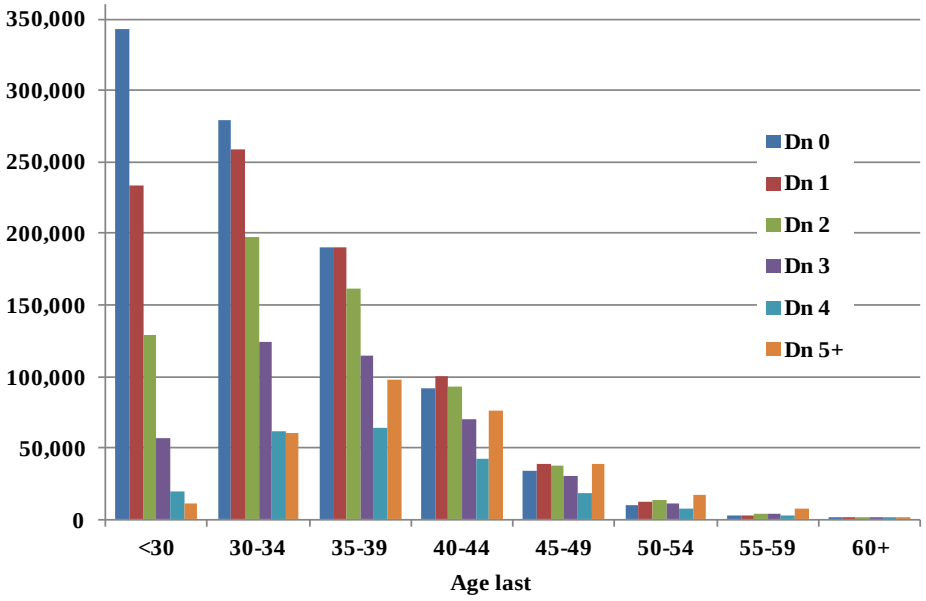
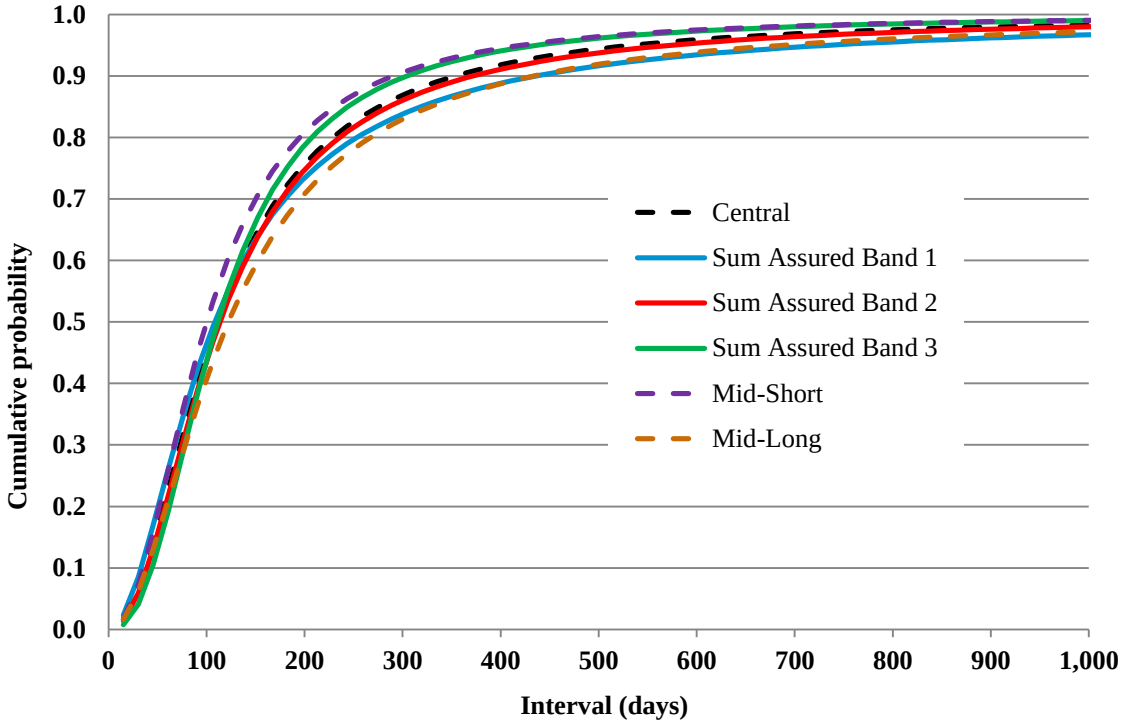



Figure 3.9: Absolute life years exposure by age and duration for sum assured band 3 (£80,001+)




3.30 Figure 3.10 shows the CDDs for each sum assured band. The CDD for the larger sums assured (Band 3) is the shortest and that for the smallest sums assured (Band 1) is the longest. However, the Committee considered these differences small and decided to use the central CDD for all three bands.

Figure 3.10: Cumulative claim development distributions, by sum assured band




3.31 Table 3.4 summarises the results by sum assured band. More detailed results, and the numbers of actual settled claims, are contained in Appendix D.

Table 3.4: All-durations, all-ages 100xactual settled claims/expected settled claims, by sum assured band.

| Sum Assured Band | MNS | MS | FNS | FS | All |
|---|---|---|---|---|---|
| £0 - £40,000 | 96% | 98% | 95% | 99% | 96% |
| £40,001 - £80,000 | 105% | 105% | 103% | 101% | 104% |
| £80,001+ | 101% | 104% | 103% | 104% | 102% |

3.32 The significant features from the table above are summarised below:

- Smallest sums assured have the lightest experience in all cases, with the impact larger for non-smokers than for smokers.
- The middle sum assured band has the heaviest experience for males and the largest band has the heaviest experience for females.
- Experience for all three bands is within 5% of the overall experience for each of the four datasets.

3.33 Figures 3.11 and 3.12 show the relative 100A/E results within each band by age and duration.

3.34 There is little consistent variation within any of the bands by age, suggesting that the shape of the AC04 Series rates is reasonable regardless of the level of sum assured. However Figure 3.12 suggests that a slightly deeper selection pattern than those in the AC04 Series rates might be justified for Band 2.

Figure 3.11: All-durations 100xactual settled claims/expected settled claims by age band (relative to the all-ages 100A/E), by sum assured

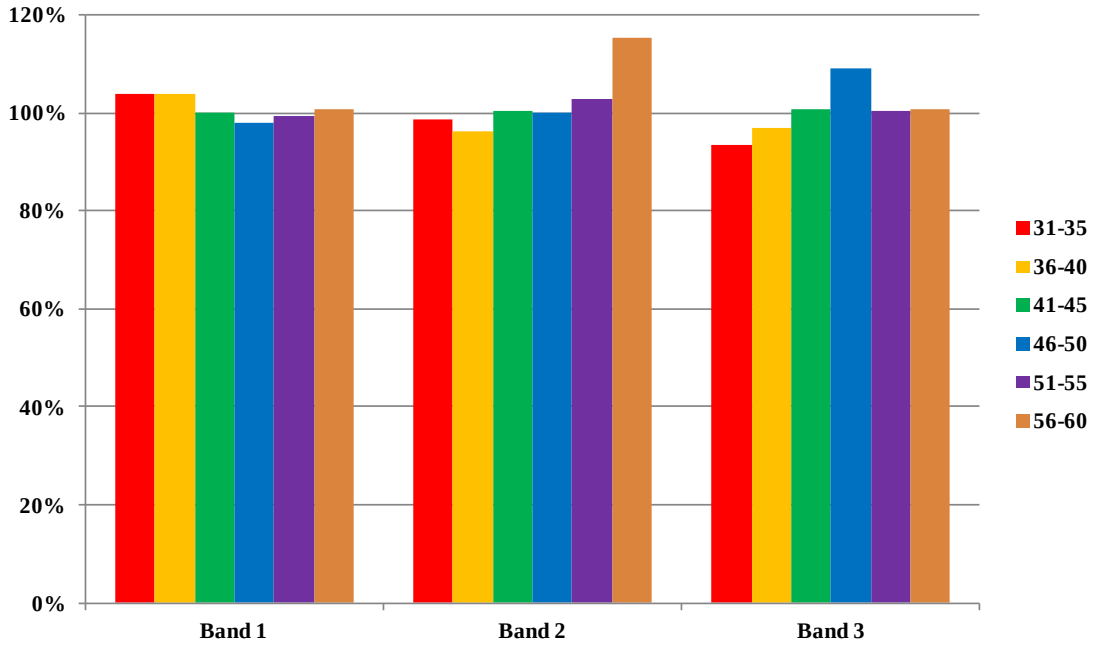
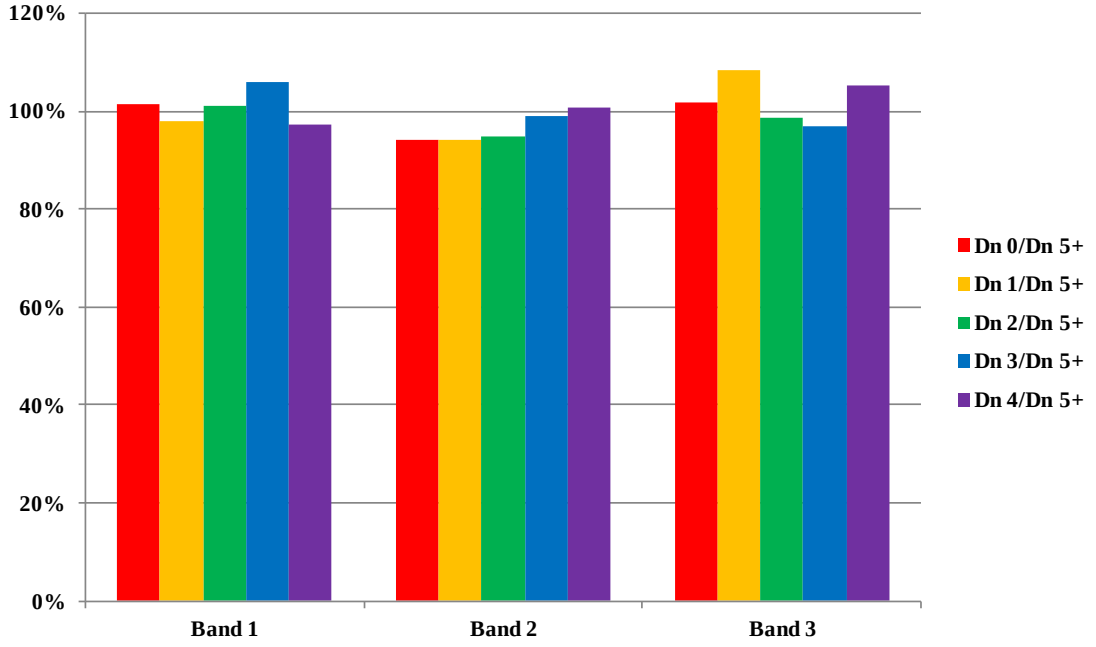



Figure 3.12: All-ages 100xactual settled claims/expected settled claims by duration (relative to the 100A/E at durations 5+), by sum assured




## Experience by sales channel

3.35 Figures 3.13 to 3.15 show the absolute exposures by age and duration for the sales channels considered. (Note that the vertical scales differ between these charts.) It is clear that the largest sales channel is the IFA sourced business, with around 44% of the exposure. This is followed by bancassurer (29%) and direct sales (15%). The remaining exposure is made up of other (11%) and unknown (1%) which are not considered in the one-way analysis.

3.36 t is clear from these figures that direct sales has proportionally more exposure at older ages and at longer durations relative to IFA and bancassurer.

Figure 3.13: Absolute life years exposure by age and duration for policies sold through IFAs

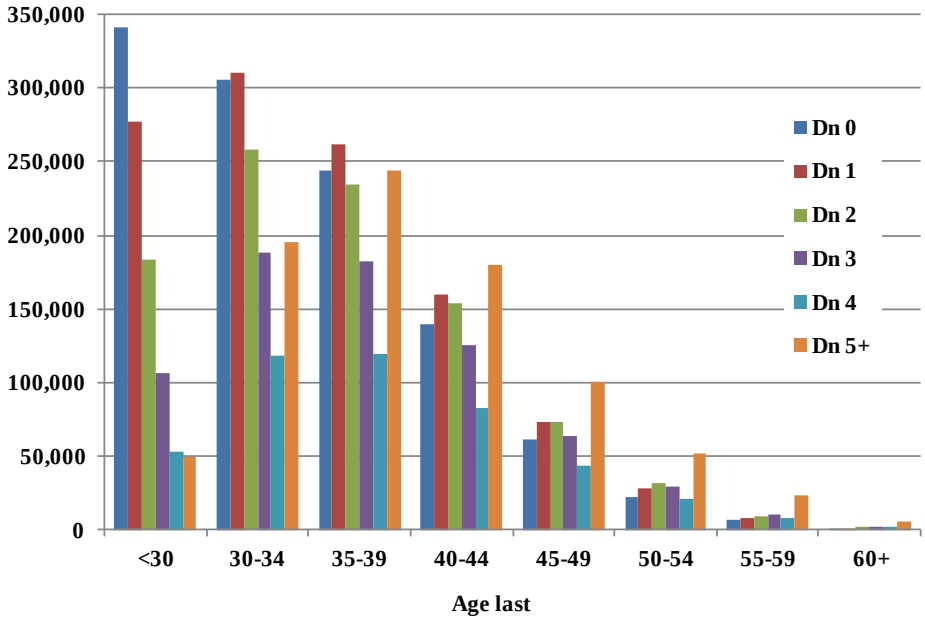



Figure 3.14: Absolute life years exposure by age and duration for policies sold through Bancassurer

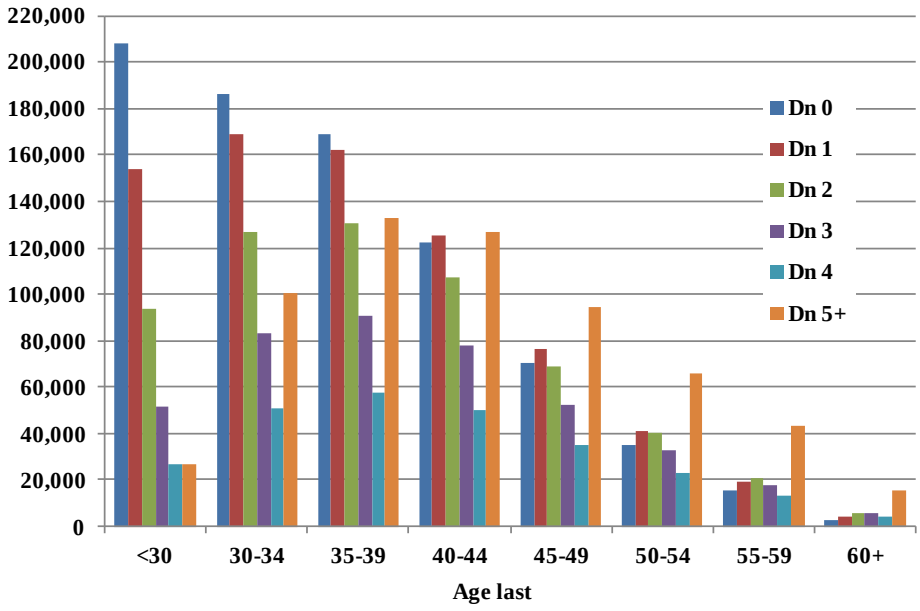
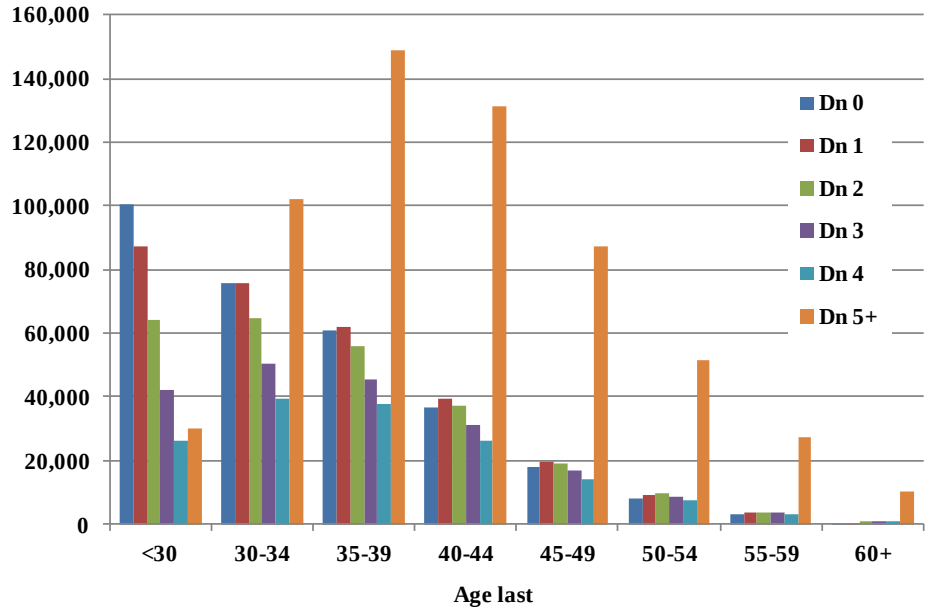
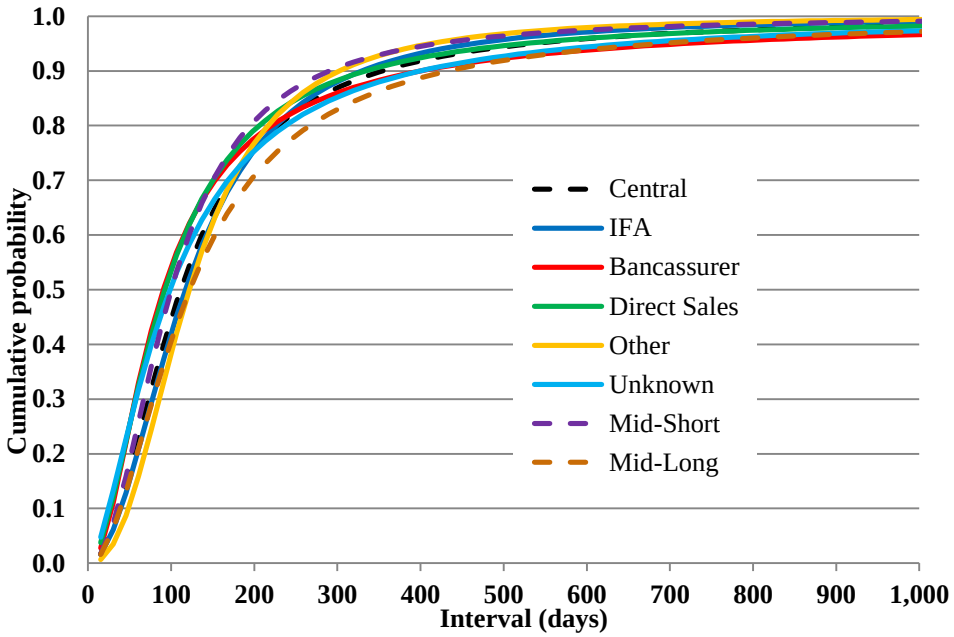


Figure 3.15: Absolute life years exposure by age and duration for policies sold through Direct Sales




3.37 Figure 3.16 shows the CDDs by sales channel. The CDDs are very similar, with the IFA CDD in particular being very close to the central CDD. The direct sales and bancassurer CDDs are identical for the first 4 months, with a slightly shorter development than the central CDD in the first 6 months. Given the similarity in CDDs, the Committee decided to use the central CDD for each channel.

Figure 3.16: Claim development distributions, by sales channel




3.38 Table 3.5 provides an overall summary of the results by sales channel. More detailed results, and the numbers of actual settled claims, are contained in Appendix E.

Table 3.5: All-durations, all-ages 100xactual settled claims/expected settled claims, by sales channel

| Sales Channel | MNS | MS | FNS | FS | Total |
|---|---|---|---|---|---|
| Bancassurer | 101% | 106% | 104% | 111% | 104% |
| Direct Sales | 107% | 107% | 99% | 105% | 104% |
| IFA | 99% | 97% | 98% | 90% | 97% |

3.39 The following features are noted:

- Experience is clearly lightest for IFA-sourced business across all four subsets, with the impact appearing to be larger for smokers than non-smokers.
- Experience is heaviest for direct sales for males and bancassurer for females.
- Heavy experience is particularly notable at short durations for direct sales, especially at duration 0, for all four subsets.

3.40 The exposure for the sales channels exhibiting heavier experience, bancassurer and direct sales, is more prevalent at the ultimate durations; this is another example of a possible distortion implicit within the AC04 Series tables, as noted for product type in 3.13.

3.41 Given that IFA business has a higher average sum assured than the other sales channels the lighter experience appears inconsistent with the preceding analysis by sum assured, which indicates that the experience is lightest for the business with the smallest sums assured. The Committee therefore considered the experience by both sum assured band and sales channel and the following features were noted:

- The lightest experience across all four gender/smoker subsets is for the IFA channel at the smallest sum assured band.
- Experience is generally heavier for the IFA channel as sum assured increases.

3.42 It should be noted, however, that the experience may also be influenced strongly by other factors such as office, where certain offices are concentrated on certain sales channels, or product type, which may also have some correlation with sales channel.

3.43 Figures 3.17 and 3.18 show the relative 100A/E results by age and duration for each sales channel. There are no clear patterns by age, suggesting that the shape of the AC04 Series rates is broadly appropriate. In contrast, Figure 3.18 suggests that slightly deeper selection patterns than those in the AC04 Series rates might be justified for bancassurer and IFA business. It also suggests that little selection exists for direct sales business; however this channel has fewer claims at short durations.

Figure 3.17: All-durations 100xactual settled claims/expected settled claims by age band (relative to the all-ages 100A/E), by sales channel

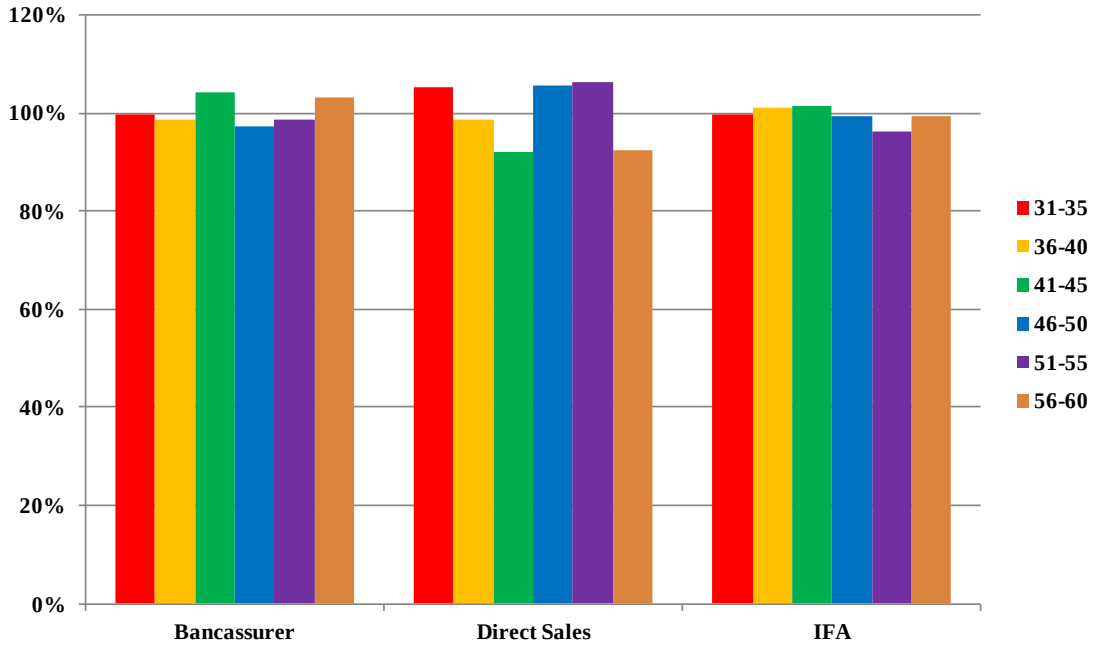
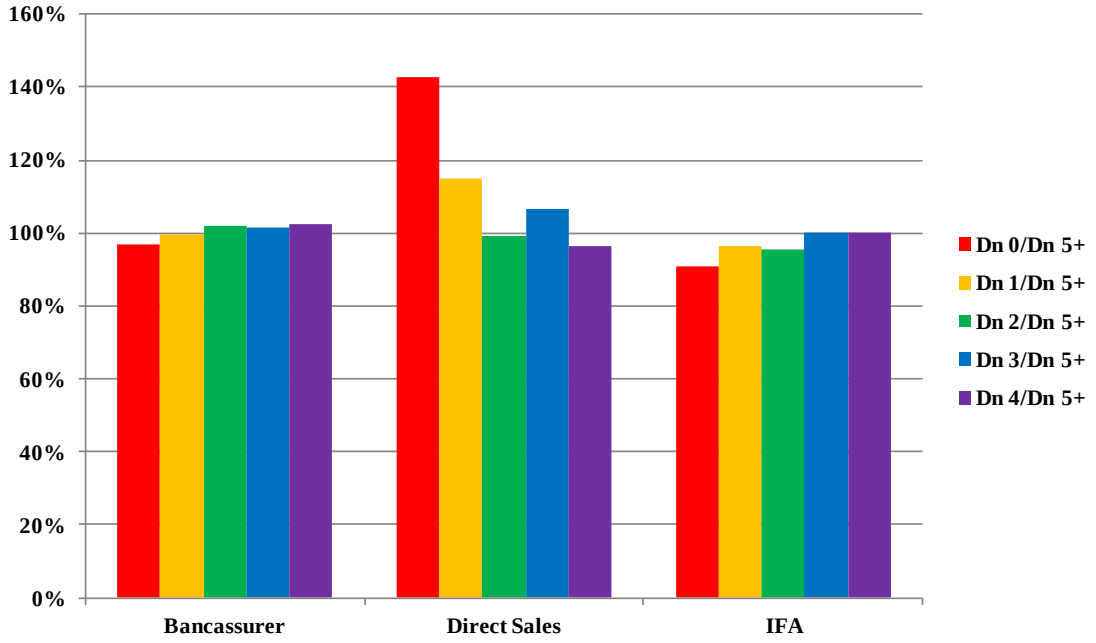



Figure 3.18: All-ages 100xactual settled claims/expected settled claims by duration (relative to the 100A/E at durations 5+), by sales channel




## Experience by year of commencement

3.44 The critical illness market in the UK grew rapidly over the 1990's. It is perceived that expertise increased during this period, with one of the anticipated consequences being improved risk selection at underwriting stage. Feedback to Working Paper 43 suggested that a significant change in underwriting standards around 2000 had materially affected claims experience. The Committee was therefore keen to examine this effect.

3.45 Note that the CMI did not collect information on rated cases for the period underlying this dataset so changes in underwriting standards which affect the ratings applied to cases would not impact on the dataset. Furthermore, the approach adopted in the other one-way analyses – of separating the dataset into distinct subsets – provides limited insight on this issue, as will be seen. To fully assess the impact of changes in underwriting, it would be preferable to analyse a dataset with a longer time series.

3.46 Notwithstanding this weakness, we illustrate below the claims experience for two tranches of policies – those commencing prior to 2000 and those commencing on, or after, 1/1/2000. The pre-2000 business contains nearly 6,000 claims in total, whilst the post-1999 business contains nearly 14,000. The split of exposure by age and duration for these tranches are shown in Figure 3.19 and Figure 3.20, respectively. (Note that, again, the vertical scales differ between these charts.)

Figure 3.19: Absolute life years exposure by age and duration for policies commencing Pre-2000

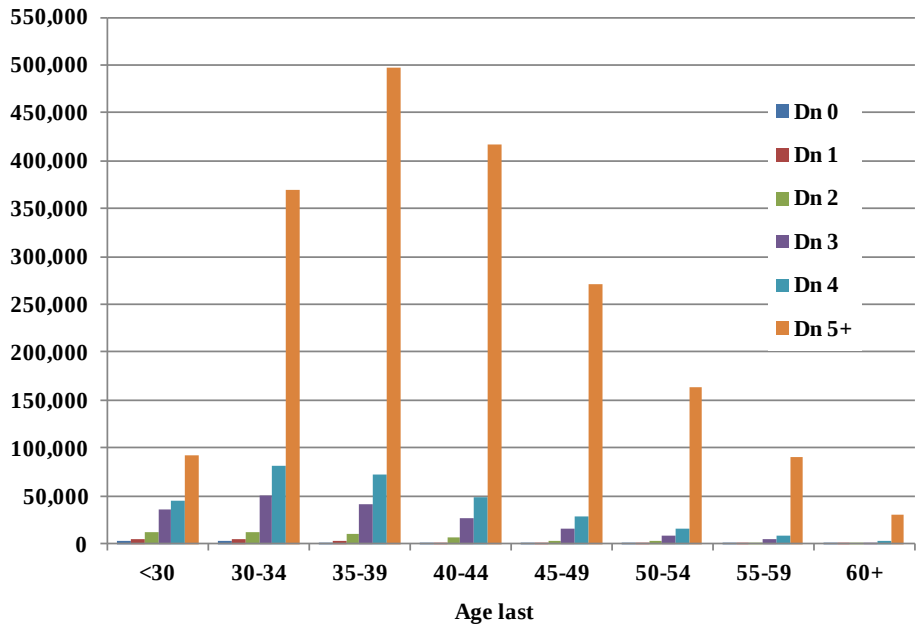
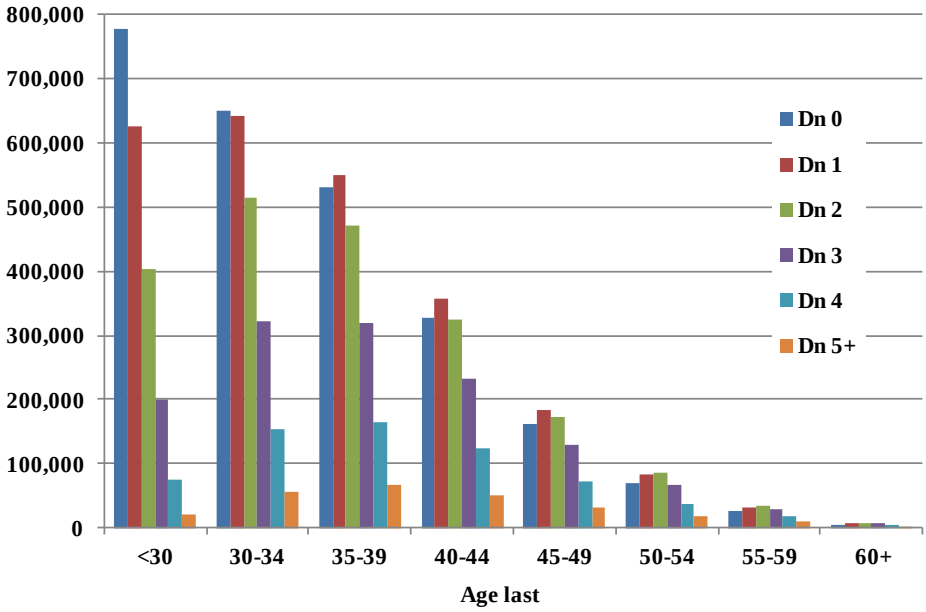


Figure 3.20: Absolute life years exposure by age and duration for policies commencing Post-1999



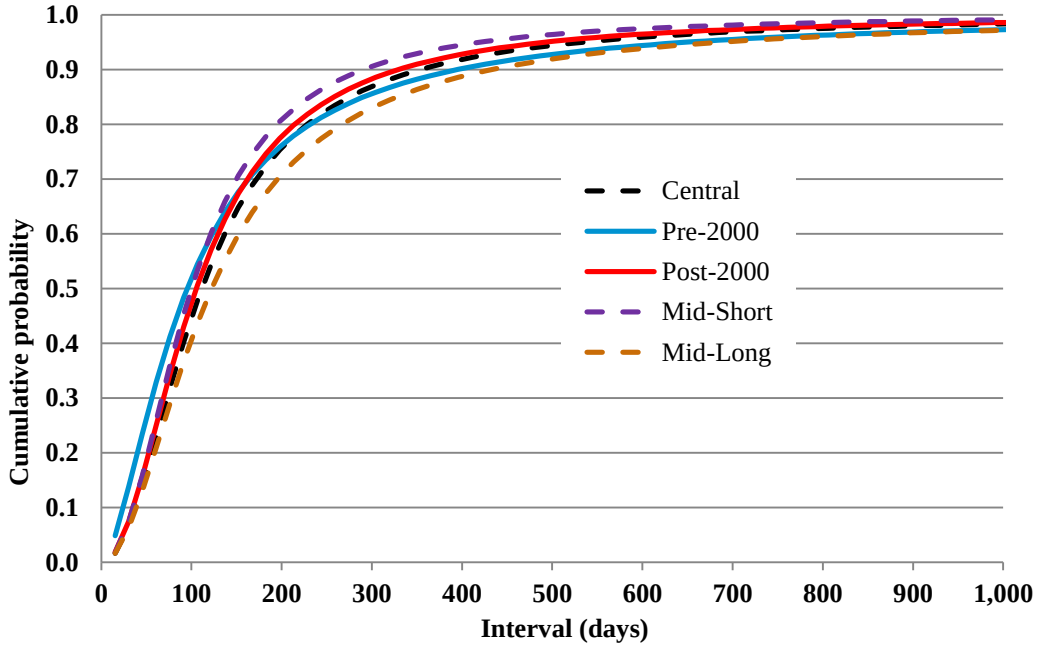

3.47 The most obvious feature in looking at the exposure is that there is very little exposure at durations 0-4 for business written prior to 2000. This is unsurprising because we are considering claims settled in the period 2003-2006. Similarly the post-1999 exposure is limited at durations 5+ and most significant at durations 0, 1 and 2.

3.48 Another noticeable, but expected feature, is that the pre-2000 business has an older profile of age attained, with proportionately less exposure for the under 30's and significantly more for the over 50's.

3.49 Consideration of the analysis and results highlights a potential issue in the construction of a table of decrement rates – the shape by age and duration can be skewed by the different business mix. Older ages and longer durations are necessarily more heavily weighted towards business commencing longer ago. The result is that the select shape derived is influenced by the changing mix over time, discussed in 3.2.

3.50 The Committee calculated the CDDs for both tranches and considered the differences to be such that little distortion would be introduced by using the central CDD for each. The individual CDDs are shown in Figure 3.21.

Figure 3.21: Claim development distributions, by year of commencement




3.51 Table 3.6 summarises the results by year of commencement. More detailed results, and the numbers of actual settled claims, are contained in Appendix F.

Table 3.6: All-durations, all-ages 100xactual settled claims/expected settled claims, by year of commencement

| Year of Commencement | MNS | MS | FNS | FS | Total |
|---|---|---|---|---|---|
| Pre-2000 | 101% | 99% | 99% | 99% | 100% |
| Post-1999 | 99% | 101% | 100% | 101% | 100% |

3.52 Table 3.6 appears to indicate that experience does not differ significantly based on underwriting year and the experience for any given dataset is consistently within 1.5% of the overall experience. However these results do not demonstrate that experience has not changed; instead they reflect that the AC04 Series tables have been derived to fit both the shorter durations, which are only present in the post-1999 dataset, and the longer durations, which are dominated by the pre-2000 dataset.

3.53 Figures 3.22 and 3.23 show the relative 100A/E results by age band and duration at settlement. There is no obvious difference in shape by age or by duration when looking at tranches from the different periods but, again, this is an expected outcome of the method of fitting the rates.

Figure 3.22: All-durations 100xactual settled claims/expected settled claims by age band (relative to the all-ages 100A/E), by year of commencement

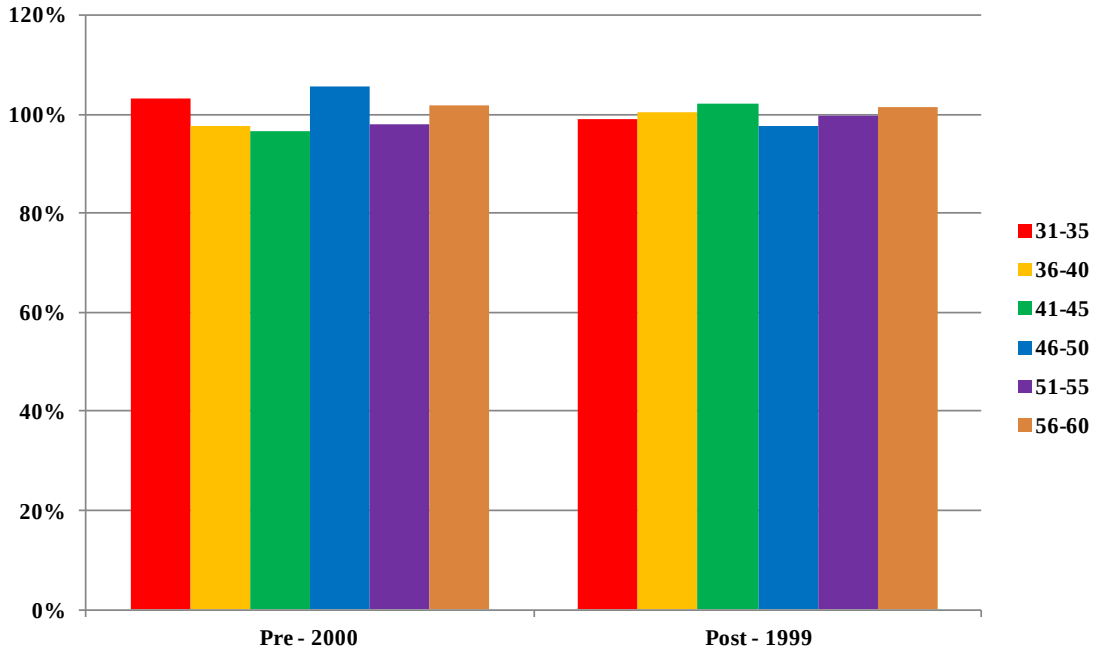
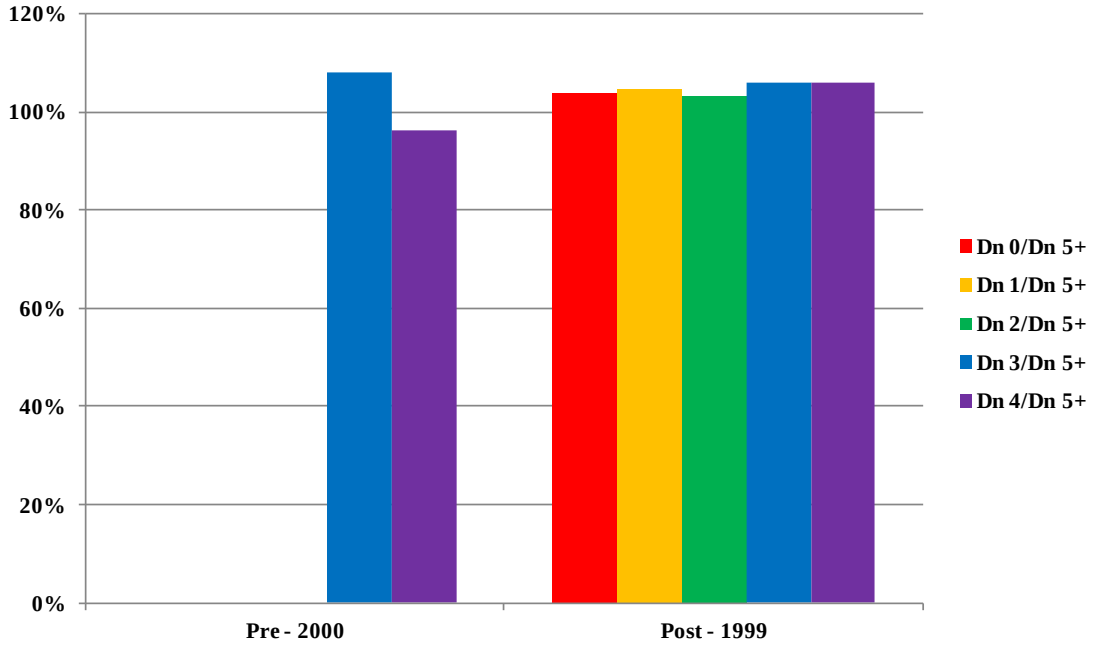



Figure 3.23: All-ages 100xactual settled claims/expected settled claims by duration (relative to the 100A/E at durations 5+), by year of commencement




## Experience by office

3.54 The Committee considered that there might be significant variations in experience between offices and the Secretariat undertook an analysis on an anonymous basis. Fewer detailed figures are included in this section, compared with the preceding one-way analyses, to safeguard the confidentiality of individual data contributors. Any office wishing to receive its own results from this analysis should e-mail the Secretariat at mailto:ci@cmib.org.uk.

3.55 The experience was investigated for the eight largest offices, ranked according to the number of settled claims in the 2003-2006 dataset. In aggregate, these offices account for 90% of the total claims advised to the CMI for that period. For the purposes of this analysis, these eight offices are labelled A to H.

3.56 The maturity of the business of these offices varies considerably. Two relatively extreme examples are shown in Figures 3.24 and 3.25. Note that to protect confidentiality, the offices are not identified within the range A to H and these figures show relative exposure for each office (whereas the corresponding figures in the preceding one-way analyses used absolute exposure).

Figure 3.24: Relative exposure by age and duration for an office with a mature portfolio

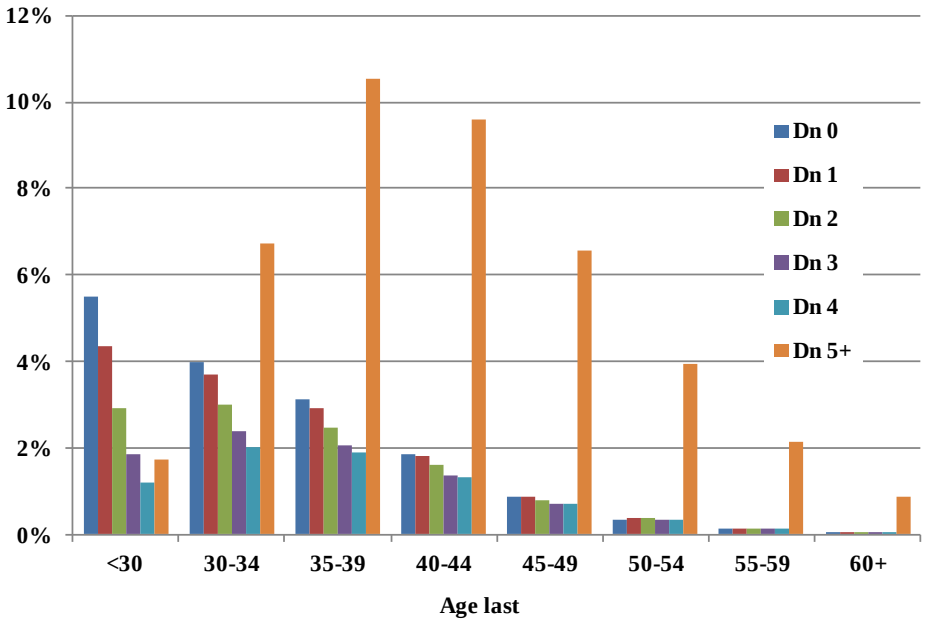
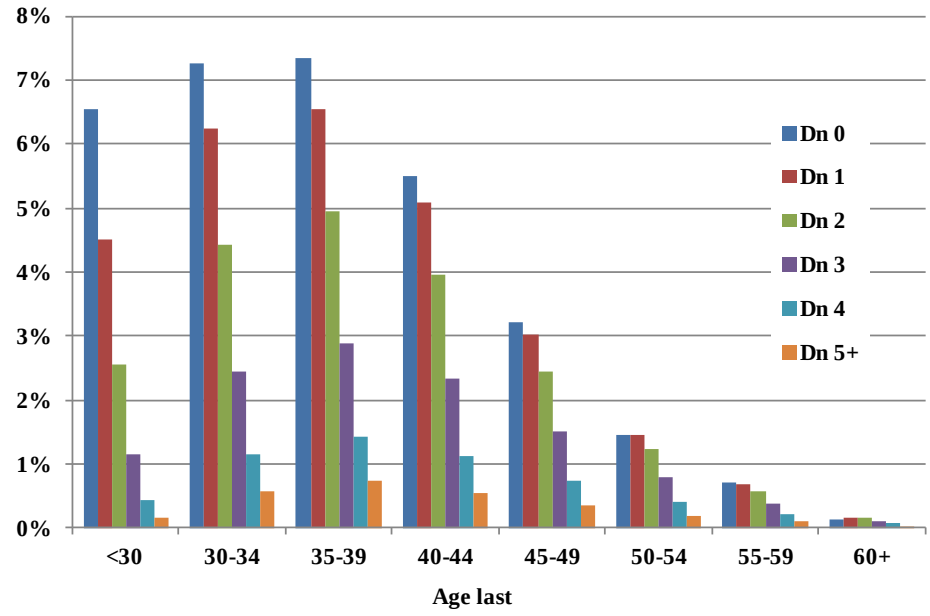



Figure 3.25: Relative exposure by age and duration for an office with an immature portfolio

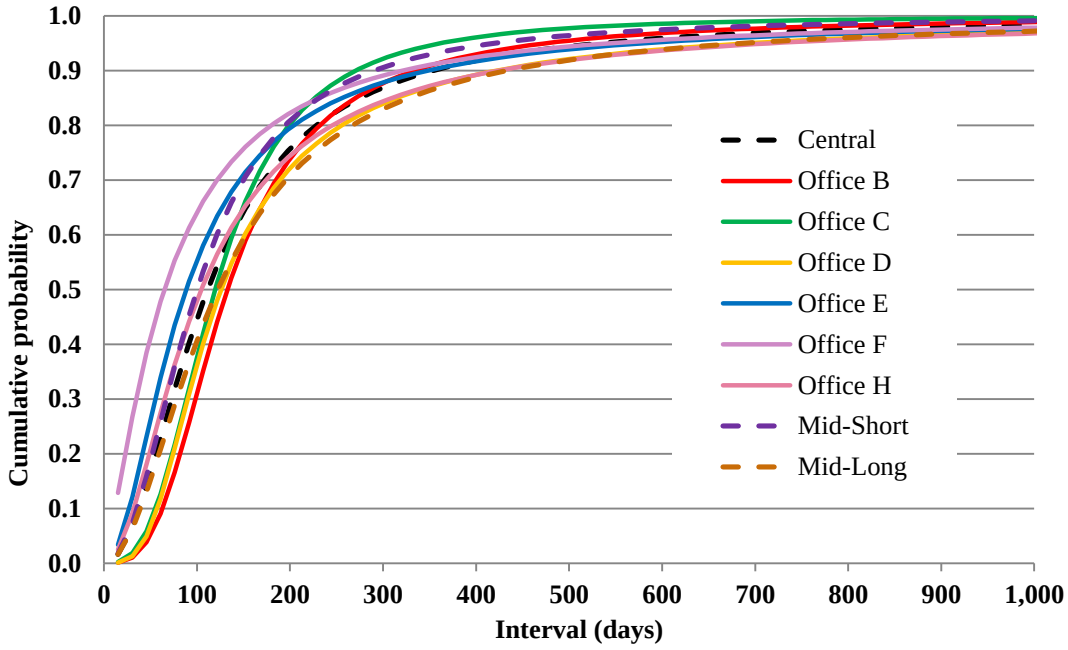


3.57 The Burr model was fitted to the claims data for each office and the office-specific CDDs are shown in Figure 3.26. These indicate significant variation between offices, in some cases lying outside the mid-short and mid-long distributions. The Committee considered that this was more likely to reflect a genuine source of variation, compared to the other one-way analyses in this section, as it may reflect:

- Different practices with regard to defining the date of diagnosis (note that this data precedes the guidelines developed in conjunction with the Health Claims Forum, to standardise recording practices); and/or
- Different policyholder behaviour with regard to notifying offices of claims.

3.58 Separate CDDs were therefore used for most offices. Two of the eight offices (A and G) were not thought to have provided both date of diagnosis/death and date of settlement for sufficient claims to generate a credible CDD; hence the central CDD was used in the calculation of the expected settled claims for these offices.

Figure 3.26: Claim development distributions, by office




3.59 Table 3.7 provides a summary of the office-specific results.

Table 3.7: All-durations, all-ages 100xactual settled claims/expected settled claims, by office

| Office | MNS | MSm | FNS | FSm | ALL | All using Central CDD |
|---|---|---|---|---|---|---|
| A | 112% | 109% | 102% | 114% | **108%** | *(108)%* |
| B | 94% | 96% | 94% | 92% | **94%** | *94%* |
| C | 93% | 91% | 95% | 89% | **93%** | *94%* |
| D | 93% | 104% | 96% | 87% | **96%** | *94%* |
| E | 101% | 93% | 101% | 93% | **99%** | *99%* |
| F | 102% | 115% | 111% | 115% | **109%** | *(109)%* |
| G | 95% | 92% | 101% | 78% | **95%** | *95%* |
| H | 114% | 111% | 113% | 125% | **114%** | *113%* |

3.60 Table 3.7 illustrates the following features:

- Experience by office varies significantly with the "worst" being 14% heavier overall than the AC04 Series rates and the "best" around 7% lighter than average.
- Offices A, F and H have heavier than average experience. This occurs consistently across the four gender/smoker subsets.
- Most of the other offices have generally lighter experience, although office E has (slightly) heavier non-smoker experience, but lighter smoker experience, so that its overall experience is close to that in the AC04 Series rates.

3.61 As noted earlier, the experience uses an office-specific CDD, where possible. The final column of Table 3.7 shows the all-ages, all-durations experience for the four gender/smoker datasets combined using the central CDD. These results are necessarily identical for offices A and F (as no office-specific CDD was used) but it will be noted that these results are little different from the experience based on office-specific CDDs for the other six offices. This again demonstrates the relative lack of sensitivity of the all-durations results to the choice of CDD, discussed in section 2.

3.62 Charts showing the experience for the individual offices by age and by duration, corresponding to those included for the other one-way analyses, are not shown; however the analysis can be summarised as follows:

- The 100A/E values by age band vary between 82% and 112% of the all-ages experience for that office. The shape of the AC04 Series rates by age appears broadly appropriate for most offices, with only one office exhibiting a shape that differs consistently from the AC04 Series rates, with higher experience at younger ages and relatively low experience at the older ages, however the range of variation is not that great (falling from 105% of the all-ages experience at ages 31-35 to 93% at ages 56-60).
- By duration, the 100A/E values vary between 80% and 125% of the durations 5+ experience for that office. The durational pattern in the AC04 Series rates appears broadly appropriate for most offices; however two offices appear to have steeper selection than the AC04 Series rates and one office appears to exhibit less selection, with particularly heavy experience at duration 0.

3.63 The inclusion of this analysis by office is intended to illustrate the range of experience that exists between offices, relative to the AC04 Series tables. Overall, it appears that the experience of individual (large) offices lies inside a range from 90% to 120%. The analysis by duration and age band demonstrates that for most offices there is no clear evidence to suggest that the shape of the AC04 Series rates is not reasonable.

**A multivariate analysis of subsets**

3.64 The preceding one-way analyses illustrate the experience for various subsets of the overall dataset; however there is clearly considerable correlation between some of the factors considered. For example, if an office that only sold whole of life policies with relatively low sums assured via direct sales in the years prior to 2000 has unusual experience, this would then be represented in only one of each group of subsets considered earlier. Each of these analyses could then exhibit a feature arising solely from the experience of that office.

3.65 The Committee was therefore keen also to carry out a multivariate analysis, using a generalised linear model (GLM). More details of this analysis are contained in Appendix G. The Committee is conscious that this work has not been undertaken in great depth and therefore these results should be regarded as preliminary and the conclusions as tentative.

3.66 Note that the detailed exposure calculations required for the GLM analysis were undertaken before the further work to classify the data by product type (referred to in 3.9, above). Consequently, the factors considered in this analysis are sum assured, sales channel, year of commencement and office, in addition to the four main factors (age, gender, smoker status and duration) incorporated in the AC04 Series rates. In addition, a number of differences apply between the groupings used in the GLM and those used in the one-way analyses – these are detailed in Appendix G.

3.67 The expected diagnosed claims were incorporated as an "offset" term in the model, allowing the GLM to only model the additional effects on top of those already incorporated in the AC04 Series rates, thereby measuring the significance of the other factors. It is encouraging to note that age, sex and smoker status, together with all their interactions with other factors, showed little or no statistical significance. This lack of variation for these key factors suggests that they are well-represented in the AC04 Series rates.

3.68 Duration showed some statistical significance; however the interpretation is complicated by the durations used in the GLM (0, 1, 2, 3, 4, 5+) differing from those underlying the AC04 Series rates, where the durational groupings vary between the gender/smoker datasets, for example 0, 1-4 and 5+ for male non-smokers. Duration 1 exhibited the greatest significance in the GLM analysis, with experience around 10% heavier than implied by the AC04 Series rates. Had this been incorporated in the tables, it would have resulted in rates at duration 1 exceeding those at duration 2, thereby breaking one of the constraints adopted by the Committee in the derivation of the tables (see paragraph 6.6 of WP50), that "In general, rates cannot reduce with duration". The Committee is therefore confident that the GLM analysis does not indicate any weakness in the AC04 Series rates by duration.

3.69 All the other principal factors (sales channel, sum assured, year of commencement and office) demonstrated statistical significance. The only significant interaction was that between sales channel and year of commencement; this appears to indicate deteriorating experience, by year of commencement, for direct sales business.

3.70 Other results from the GLM analysis include:

- Direct sales and IFA business both show significantly heavier experience than bancassurer, at +15% and +19%, respectively;
- The two higher sum assured bands both show experience around 10% heavier than the lowest band;
- Overall, experience appears to have improved by year of commencement, with the exception of direct sales business, noted above; and
- The range of variation in experience of large offices (the eight considered in the one-way analysis) is around 40%; smaller offices exhibit even greater variation.

These results are considered further, below, in conjunction with the results of the one-way analyses.

**Interpreting the results of the different analyses**

3.71 The one-way analyses and the GLM analysis are both intended to illustrate the experience for various subsets of the overall dataset that underlies the AC04 Series rates and thereby, hopefully, aid understanding of the rates and how they might be used. The two types of analysis use different approaches and consequently, do not necessarily produce consistent answers.

3.72 In addition, the absence of product type from the GLM analysis may have distorted these results, as the one-way analysis suggests that whole of life business shows markedly heavier experience from term assurance and endowment business.

3.73 One noteworthy feature of both analyses is the indication that claims experience is lightest for the smallest sum assured band (£0 - £40,000). The GLM analysis indicates that the other bands have experience around 10% greater, with the one-way analysis indicating slightly lower differentials. This is perhaps counter-intuitive as greater attention may be given to larger policies during underwriting and at claims stage. It is important to note the simplistic nature of the allocation of exposure and claims to sum assured bands, however as more policies are likely to have decreasing benefits than increasing, then the expected distortion would be for experience in the lowest sum assured band to appear heavier than the "true" level.

3.74 As noted earlier, the one-way analysis was unlikely to generate meaningful results by year of commencement given that the tranches used are being compared with different segments of the AC04 Series tables. The GLM analysis suggested that, in general, more recent business has lighter claims experience than older business, as might be expected if there has been a general improvement in underwriting standards; however this result only has statistical significance when an interaction with sales channel is included, as the experience of direct sales business appears to be heavier for more recent business.

3.75 Both analyses indicate significant variation between offices. Restricting the comparison to the larger offices, the GLM analysis suggests that the office with the heaviest experience is around 140% of the office with the lightest experience. This margin is notably higher than is demonstrated in the one-way analysis, where the differential is around 20%.

3.76 The area where the two analyses produce the greatest inconsistency is with regard to sales channel. Overall, the one-way analysis suggests that IFA business has the lightest experience, with both bancassurer and direct sales business around 7% heavier. However the GLM analysis suggests that IFA business has the heaviest experience, slightly higher than direct sales but nearly 20% higher than bancassurer business.

3.77 The Committee suspected that this apparent contradiction arose from some of the variation between sales channels detected in the one-way analysis being assigned to variation by office in the GLM analysis, and further investigations were undertaken to examine this.

3.78 Firstly, the GLM was re-run excluding office; this produced results consistent with the one-way analysis. This is, perhaps, unsurprising given the few remaining significant factors.

3.79 Secondly, the Secretariat considered the results, by sales channel, of the larger offices. This showed that there are only a small number of "cells" where a single office has submitted data for multiple channels. In this respect, the CMI dataset may not be representative of the market, perhaps because an "office" (in CMI terms) does not necessarily equate to a life company or because a life company that writes business through several channels may only submit data to the CMI for one of them. This analysis showed that offices writing IFA business do generally have lighter experience than those writing bancassurer business; again this confirms the findings of the one-way analysis.

3.80 Although these investigations cannot be regarded as conclusive, they suggest that the results by sales channel from the GLM are misleading, because the GLM infers that bancassurer is lighter than IFA from a relatively small volume of data submitted by offices that write through both channels. In fact, as the one-way analyses show, overall, the experience of IFA business is lighter, but the GLM attributes this to "office" and not to "sales channel".

3.81 Two additional inferences drawn by the Committee from these investigations are that:

i. If the GLM has attributed a genuine difference between sales channels to offices, it is likely to increase the range of variation of results between offices. Investigation by the Secretariat suggests the range of 20%, from the one-way analysis, may be a more reliable indicator of variation. This is of similar magnitude to that reported for large offices for Life Office Mortality in CMIR20, but considerably lower than the variation for Income Protection reported in CMIR22

ii. The lack of data in the "intersection" between office and sales channel could be exacerbated by including product type in the GLM if there are instances of offices submitting a single product type through a single sales channel (as noted in 3.64). Furthermore product type may be correlated with year of commencement; for example the general switch within the market from mortgage endowments to mortgage term assurances. Consequently, the Committee does not consider that the inclusion of product type in a GLM analysis would necessarily produce valuable results.

3.82 It is important to reiterate that the Committee considers the results of the GLM to be indicative and hence the overall conclusions can only be regarded as tentative.

## 4. STAND-ALONE CRITICAL ILLNESS INSURANCE

### Introduction

4.1 The majority of data submitted to the CMI Critical Illness investigation relates to accelerated, rather than stand-alone, cover. This is to be expected given the relative level of sales, and the Committee's work to date has therefore concentrated on this dataset. In particular, the AC04 Series diagnosis rates considered in the remainder of this paper relate only to accelerated business.

4.2 The Committee did not consider the volumes of stand-alone data sufficiently credible to allow tables to be produced from this data only. However, the Committee was conscious that some practitioners will be setting bases for stand-alone critical illness, as appreciable volumes of the product are still sold and existing business needs to be managed. The Committee was therefore keen to illustrate the experience of the stand-alone data it has collected against rates that are reasonably consistent with the AC04 Series rates. This section describes the derivation of these rates, illustrates the experience of stand-alone business against these rates and highlights areas for further consideration by practitioners.

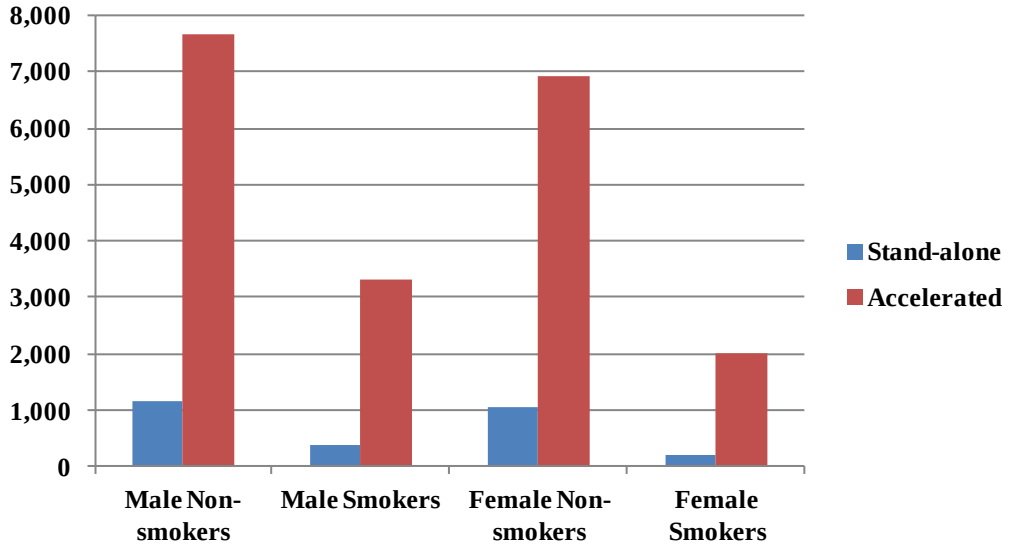
4.3 The rates derived below are not intended to represent a "formal table" but to provide a basis for assessing stand-alone experience. In particular, the Committee opted to impute stand-alone rates from the AC04 Series rates for ultimate durations and for a limited age range.

4.4 Note that for the purposes of this section, "stand-alone" refers to a benefit paid on diagnosis of a specified critical illness that would not be payable on earlier death. It includes both policies sold as stand-alone cover and the segment of benefit that arises under some policies where the critical illness benefit exceeds the death benefit.

### Volume of stand-alone data

4.5 The volume of stand-alone data is shown in Figure 4.1, in comparison with accelerated data. Whilst there are appreciable numbers of non-smoker claims, the smoker subsets have only 350 and 181 actual settled claims for males and females, respectively. Even with over 1,000 claims in the male non-smoker dataset, actual settled claims only exceed 200 in one quinquennial age band (46-50). The credibility of any split of results is thus limited and should be borne in mind when considering the results of this analysis.

Figure 4.1: Number of actual settled claims in 2003-2006 by gender and smoker status for stand-alone business and for accelerated business

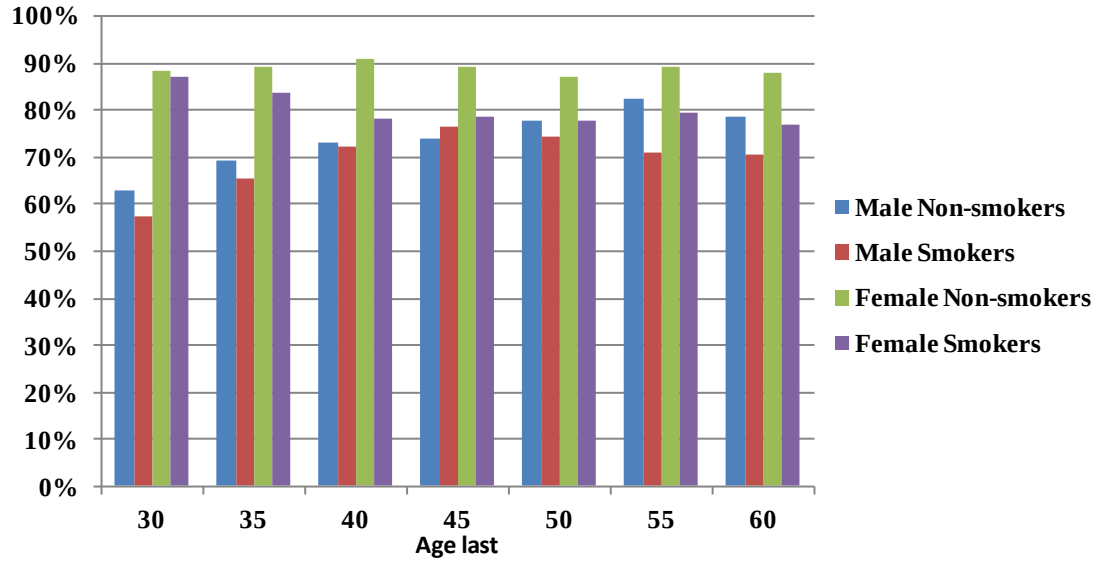



## Derivation of imputed stand-alone rates

4.6 The stand-alone rates by gender and smoker status were imputed by subtracting the death-only rates (derived in CMI Working Paper 52) from the all-causes rates (derived in CMI Working Paper 50). As noted earlier, rates were only derived at ultimate durations. The cause-specific rates in Working Paper 52 were deemed credible for a limited age range between 30 and 60 and the analysis below has also been limited to this age range. The derivation of rates is shown in Appendix H.

4.7 Figure 4.2 shows the imputed stand-alone rates in comparison with the corresponding AC04 Series rates for quinquennial ages.

Figure 4.2: Imputed stand-alone rates as a percentage of the corresponding AC04 Series rates by age



4.8 The imputed stand-alone rates for females appear to be a reasonably consistent percentage by age of the AC04 Series rates of between 75% and 90%; in contrast, male rates are much lower at younger ages and show a generally increasing trend with age.

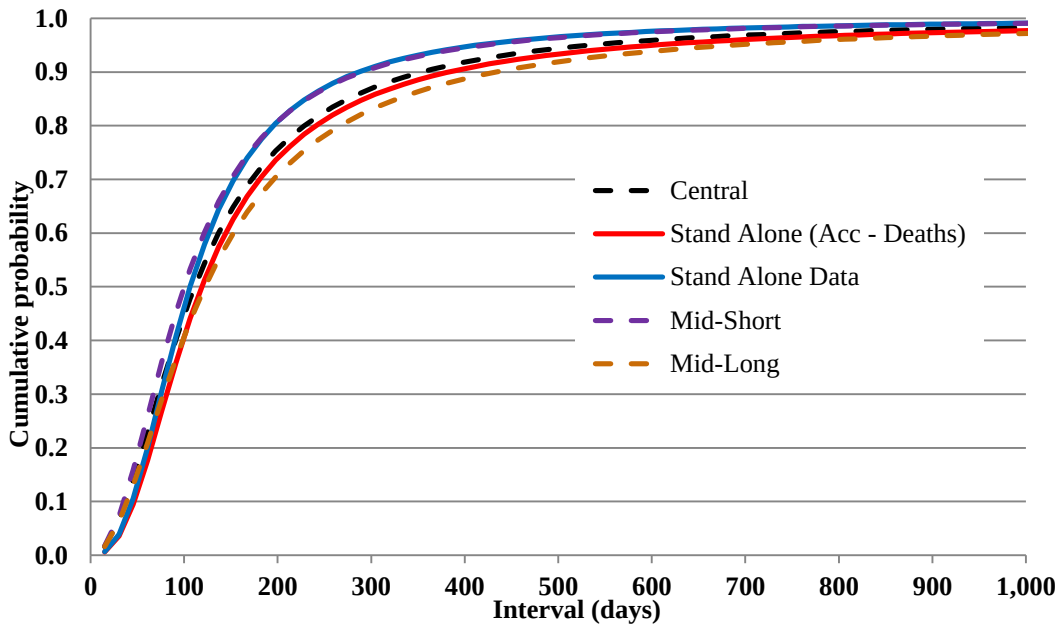
4.9 Whilst the aim is to provide a relevant basis on which to assess stand-alone experience, these rates are not intended to represent an industry standard table as they have been derived from accelerated experience. There are a number of further issues with these imputed rates that warrant consideration before moving on to examine how 2003-2006 All Office stand-alone experience compares to these rates:

- The death-only rates are based on a restricted dataset, as a number of offices do not provide cause of claim information; whereas the all-causes rates are based on the full dataset;
- In accelerated data, some death claims may be recorded as critical illnesses and vice versa, depending on each office's approach and survival periods, leading to potential inaccuracy in the death-only rates; and
- The imputed rates will clearly not reflect any differences in office mix, anti-selection, underwriting practices, non-disclosure, distribution or socio-economic profile that may exist between the lives applying for, and the companies selling, stand-alone cover as opposed to accelerated cover.

**The claim development distribution (CDD)**

4.10 A further stage of adjustment is required before analysing experience against this table of diagnosis rates. As CMI data is collected based on year of settlement, whereas the imputed rates produce expected diagnosed claims, a CDD has to be used to produce expected settled claims. Figure 4.3 shows CDDs derived in two ways – based on the accelerated business (but excluding deaths) and from the claims on stand-alone business.

Figure 4.3: Comparison of the CDD derived from stand-alone data with the CDD derived from accelerated data



4.11 One might expect longer claim delays for stand-alone cover compared to accelerated cover, where the relatively simple death claims will reduce the average delay. In fact, the stand-alone data produced a slightly shorter CDD than the central CDD, derived from accelerated data for all-causes in Working Paper 50. The Committee chose to use the CDD derived from the accelerated data, rather than that based on the smaller volume of stand-alone data but both approaches produce distributions which lie within the range of sensitivities discussed in section 2 and so the choice of approach to deriving a CDD was concluded to have no material impact on the results produced.

**Comparison of 2003-2006 stand-alone experience to imputed rates**

4.12 High level results are shown in Table 4.1 with more detailed results for each gender/smoker dataset, including numbers of actual settled claims, in Appendix I.

Table 4.1: All-durations, all-ages 100xactual settled claims/expected settled claims, for stand-alone business (Expected based on imputed rates)

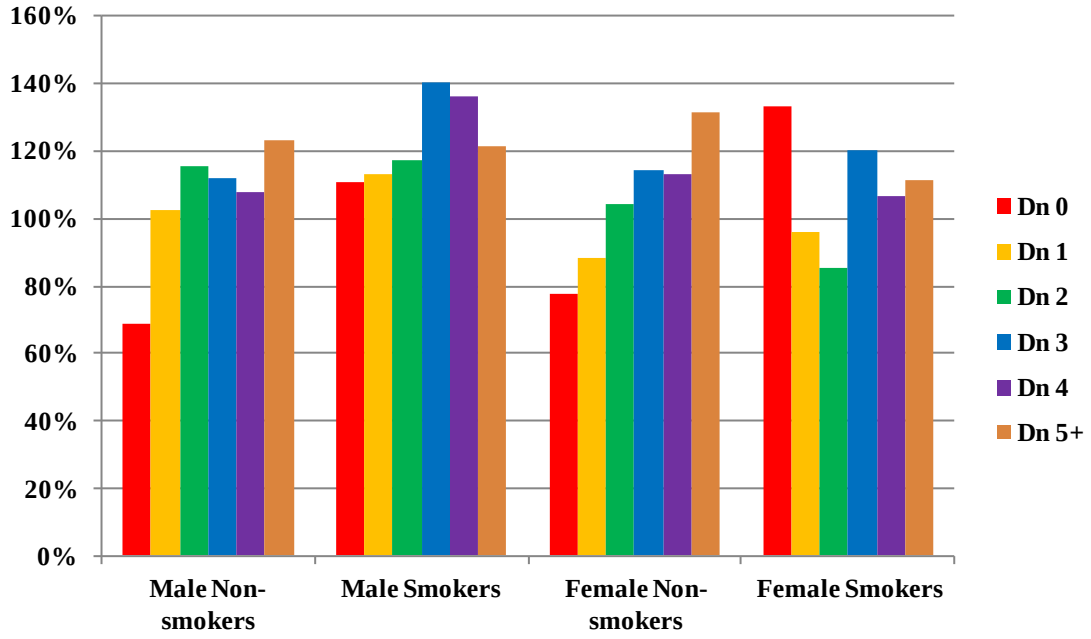
| MNS | MS | FNS | FS | Total |
|---|---|---|---|---|
| 112% | 123% | 112% | 107% | **113%** |

4.13 Figure 4.4 compares the experience of stand-alone business by duration with the imputed rates. It shows ultimate experience to be heavier than the imputed rates for each gender/smoker dataset, though it should be noted that the volume of claims within each subset is very limited. The following additional points are of note:

- There is a distinct select effect for both male and female non-smokers;
- Male smoker experience is broadly flat by duration; and

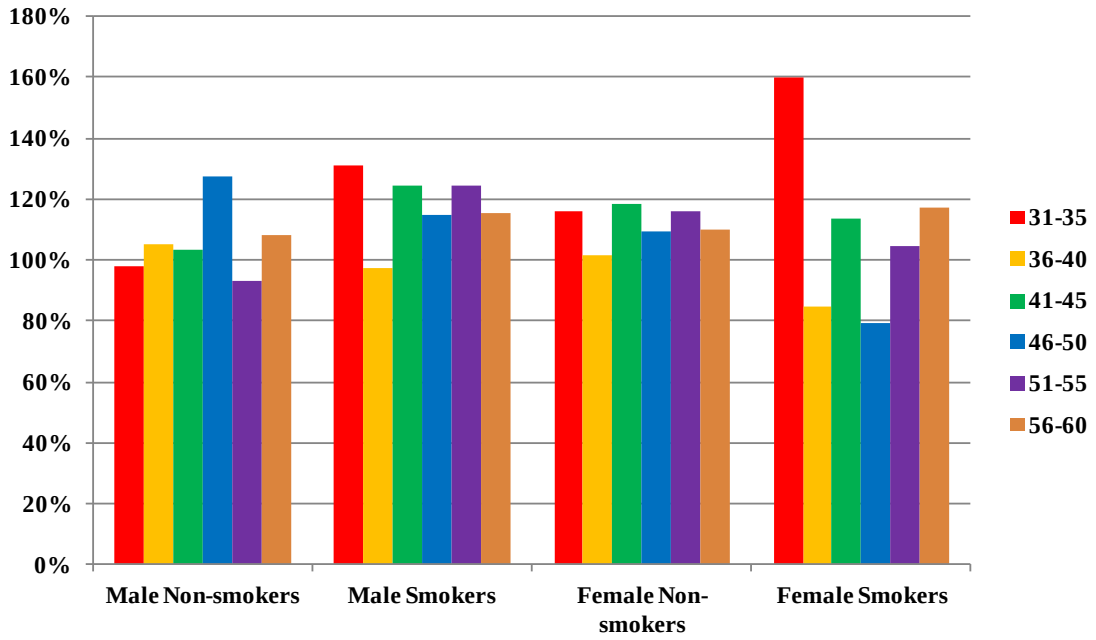
There is some evidence of possible anti-selection on female smokers; however this is based on limited data.

Figure 4.4: All-ages 100xactual settled claims/expected settled claims by duration for stand-alone business (Expected based on imputed rates)



4.14 Figure 4.5 shows the experience of stand-alone business by age band. This suggests that the shape of the imputed rates by age looks broadly appropriate. Again the female smoker experience is erratic, but this is based on few claims.

Figure 4.5: All-durations 100xactual settled claims/expected settled claims by age for stand-alone business (Expected based on imputed rates)




## Summary

4.15 A set of ultimate diagnosis rates for stand-alone critical illness has been imputed by subtracting the death-only rates from the all-causes rates, by gender and smoker status. The All Office experience for stand-alone critical illness business has been analysed against these rates by comparing actual settled claims against expected settled claims. This analysis showed:

- The overall experience of stand-alone business to be markedly higher than that expected using the imputed rates;
- The imputed rates broadly fit experience by age; and
- Select effects in the non-smoker groups but possible anti-selection in female smokers (although the volume of data is limited).

4.16 The imputed rates described above are not intended to represent an industry "standard table" but to provide a basis for assessing stand-alone experience that is reasonably consistent with the AC04 Series rates for accelerated business.

## 5. SUMMARY

5.1 The AC04 Series rates set out in CMI Working Paper 50 represent the principal end-product of a programme of work carried out by the CMI Critical Illness Committee to develop tables of critical illness diagnosis rates based on recent UK insured lives experience, together with sufficient supporting information to enable appropriate practical use by actuaries involved with this business.

5.2 The AC04 Series rates vary considerably, in shape and level, from the tables based on population data, such as CIBT02, that were previously in common use by actuaries.

5.3 This paper completes this programme of work by providing the remaining supplementary analyses outlined as "further work" in Working Paper 50. The Committee regards these analyses together with the information provided in the prior working papers as important background material for actuaries using the AC04 Series rates.

**Assumptions and sensitivities**

5.4 The first part of section 2 re-states the main assumptions underlying the AC04 Series rates and the comments relating to these which were set out in earlier working papers. A full summary of these assumptions is provided in Appendix A. The novel assumptions within the methodology relate to the claim development distribution (CDD) and the use of off rates to estimate exposure prior to the investigation period.

5.5 The sensitivity of the AC04 Series rates to the off rates is not re-examined in this paper. The analysis in CMI Working Paper 33 demonstrated that the adjusted results are relatively insensitive to off rates. In addition, in comparison with the earlier work, the AC04 Series rates rely less on the use of off rates because the proportion of the exposure giving rise to claims settled in 2003-2006 which is known, rather than estimated, is much higher.

5.6 The CDD is a key component of the Committee's methodology. The sensitivity to alternative CDDs was examined in Working Papers 33 and 43 in relation to the 1999-2004 data using 'short', 'mid-short', 'mid-long' and 'long' CDDs. A similar approach is used in section 2 using analogous distributions based on claims settled in 2003-2006. As with the previous analyses, there are generally only small variations in the rates resulting from using the alternative CDDs; the one exception being the rates at duration 0. The Committee has therefore concluded that the approach and assumptions underlying the CDD used to derive the AC04 Series rates are unlikely to have had a material distorting effect on the resulting tables.

5.7 The Committee acknowledges that, since the methodology underlying the derivation of the AC04 Series rates is not based on a formal statistical model, it may be difficult for actuaries to understand and allow for uncertainty associated with these rates. We have therefore developed an approach for deriving approximate standard errors which is also described in section 2. The results indicate that the AC04 Series rates rarely sit outside the approximate confidence intervals and, where they do, this often arises from the application of a consistent selection pattern, by age, and from smoothing. These

approximate standard errors also provide support for the existence of a select effect by duration.

**Analysis of subsets of the data**

5.8 The analyses in section 3 are intended to help actuaries understand the extent to which the changes in the UK critical illness market, discussed in Working Paper 50, could have influenced the shape of the AC04 Series rates, by age and duration. It seeks to examine whether these subsets exhibit different underlying claims experience and hence whether the characteristics used to define these subsets could be regarded as risk factors not allowed for explicitly in the AC04 Series rates.

5.9 Two types of analysis were undertaken. First, the following subsets are considered separately in a series of one-way analyses: sum assured band, product type, sales channel, year of commencement and office. Given the considerable correlation between some of the factors considered in the one-way analyses, the Committee also undertook a multivariate analysis, using a generalised linear model.

5.10 Neither of the analyses suggested that there is likely to be material distortion by age and duration in the AC04 Series rates for any of the factors considered. Indeed, the GLM model demonstrated that age, sex and smoker status, together with their related interactions, all showed little or no statistical significance, suggesting that these key factors are well-represented by the AC04 Series rates. Duration showed some statistical significance; however this may result from the grouping of duration used in the modelling being different from that built into the AC04 Series rates.

5.11 The two types of analysis produced divergent results for sales channel. Overall, the one-way analysis indicated that business originating from IFAs exhibited lighter overall experience than that sold through the bancassurer or direct sales channels whereas the GLM analysis shows that IFA business has the heaviest experience and bancassurer business the lightest. Further investigation suggested this apparent contradiction may have arisen because there is a relatively low volume of business where a single office has submitted data for multiple channels. As a result, some of the variation between sales channels detected in the one-way analysis may be assigned to variation by office in the GLM analysis. The Committee's tentative conclusion is that the one-way analysis is likely to provide the more reliable indicator of experience by sales channel.

5.12 A consistent finding from both types of analysis was with regard to sum assured, where the claims experience on policies with the lowest sums assured (up to £40,000) appears to be up to 10% lighter than the experience of larger policies. This is perhaps counter-intuitive as greater attention may be given to larger policies during underwriting and at claims stage; however the simplistic nature of the analysis should be noted.

5.13 Both types of analysis found significant variation by office – the one-way analysis indicated that overall experience for the "worst" large office is over 20% heavier than that for the "best" office whilst the GLM analysis suggested the differential to be even greater, after taking account of other variables. From the additional investigation (referred to in 5.11), the Committee again drew the tentative conclusion that the range of variation from the one-way analysis is likely to be the more reliable indicator.

5.14 There were two areas which were, effectively, only considered by one of the analyses:

- Product type was excluded from the scope of the GLM analysis for practical reasons. The one-way analysis suggested that whole of life business exhibits heavier experience, whereas term assurances and endowments are closer to the experience implied by the AC04 Series rates; and
- Year of commencement for which the one-way analysis did not generate meaningful results but the GLM analysis suggested that, in general, more recent business has lighter claims experience than older business, as might be expected if there has been a general improvement in underwriting standards. However the experience of business sold through direct sales appears to be heavier for more recent business.

**Stand-alone critical illness**

5.15 The focus of the Committee's work has been on accelerated business, which represents the largest proportion of the data. The volume of stand-alone data submitted to the investigation is not sufficiently credible to allow rates to be produced solely from these data. However the Committee was keen to report on the experience of stand-alone business against rates that are consistent with the AC04 Series rates.

5.16 Section 4 describes the derivation of a set of rates, imputed from the accelerated business, as the all-causes rates minus the death-only rates. This has been done for ultimate rates only (i.e. durations 5+) and for a limited age range. We then examine how the experience for stand-alone business compares with these imputed rates. This indicates that the overall experience of stand-alone business is markedly heavier than that expected using the imputed rates; however, the overall shape by age and duration appears broadly appropriate.. It is noted that the volumes of reported claims for stand-alone business within the sub-groups are very limited so it is difficult to draw firm conclusions.

**Next steps**

5.17 This paper completes the further work designed to aid understanding of the AC04 Series rates and the Committee intends to propose adoption of these rates by the Actuarial Profession early in 2012. Prior to this, we invite members of the Profession to provide any further feedback they feel may be helpful. In particular we would welcome, by 29th February 2012, any comments which members believe should be considered before or during the process of seeking adoption by the Profession.

5.18 The AC04 Series rates will be used for comparing actual experience in the Committee's ongoing Critical Illness Investigation reporting in future. We also hope that this benchmark of diagnosed claim rates derived from insured experience together with the supplementary analyses described in this paper and in Working Paper 52 will provide a sound basis for assessing emerging trends and interpreting key features which may be relevant to the pricing and reserving of critical illness business.

5.19 The Committee will continue to consider approaches for deriving tables of diagnosed claim rates using experience relating to claims settled in years 2007 and beyond. We anticipate that the proportion of reported claims for which date of diagnosis is available will continue to increase. This may enable a more direct derivation of sets of diagnosed claim rates and hence the development of a different methodology from that underlying

"adjusted results" and the AC04 Series tables. In particular the Committee intends to continue to explore the development of a formal statistical model as the basis for future tables, as the need to adjust the underlying experience data for missing information reduces.

5.20 The recent focus of our work has been on the production of the AC04 Series rates and the supporting analyses and a key priority for the Committee is to update the data collection and analysis, commencing with release of 2007 All Office results to members.

5.21 Almost all of the data underlying these analyses was received by the CMI in census format, with no information on exits (other than claims) during the year. A small proportion of the data was received in the new "Per Policy" format, and converted to census form by the CMI Secretariat. The Committee hopes that the volume of Per Policy data will increase, allowing additional analyses in future.

5.22 The Committee welcomes all feedback on its work and will be particularly interested in views regarding the future work that will be of most value to practitioners. Please e-mail feedback to ci@cmib.org.uk.

**REFERENCES**

CMI Report No. 20 : Inter-office comparisons (2001)

CMI Report No. 22 : Sickness Experience 1999-2002 for Individual Income Protection Policies (2005)

CMI Working Paper 33 : A new methodology for analysing CMI critical illness experience (July 2009)

CMI Working Paper 43 : CMI critical illness diagnosis rates for accelerated business, 1999-2004 (February 2010)

CMI Working Paper 50 : CMI critical illness diagnosis rates for accelerated business, 2003-2006 (January 2011)

CMI Working Paper 52 : Cause-specific CMI critical illness diagnosis rates for accelerated business, 2003-2006 (June 2011)

(All of the above are available from http://www.actuaries.org.uk/research-and-resources/pages/continuous-mortality-investigation-working-papers)

Draft CMI critical illness diagnosis rates for accelerated business, 2003-2006 (August 2010). This paper was released only to firms that financially support the CMI.

Board for Actuarial Standards: Technical Actuarial Standard D: Data (November 2009)

Board for Actuarial Standards: Technical Actuarial Standard M: Modelling (April 2010)

(These documents can be found at: http://www.frc.org.uk/bas/standards/tas.cfm)

Health Claims Forum : Recording of 'Date of Claim' for Critical Illness claims (November 2006) [see http://www.actuaries.org.uk/research-and-resources/pages/critical-illness-faqs]

The CIBT02 tables are developed in:

Critical Illness Trends Research Group : "Exploring the Critical Path" presented to the Staple Inn Actuarial Society on 6 December 2006. Available from:

http://www.sias.org.uk/siaspapers/search/view_paper?id=CITrends

**Appendix A: Summary of assumptions underlying "adjusted results"**

A.1 The full list of assumption underlying the "adjusted results" that the Committee has issued were set out in section 10 of CMI Working Paper 33. The list of assumptions is repeated below, with updated commentary where appropriate:

*EXPOSURE DURING THE INVESTIGATION PERIOD*

a) Dates of exit are unknown for all records and hence are estimated to calculate the exposure during the investigation period.
b) Exposure during the investigation period makes no allowance for policies entering and exiting within a calendar year (nor is exposure reduced for policies exiting and being reinstated within a year).
c) Exposure does not stop at the date of diagnosis.
d) The implementation of the methodology is not exact; in particular we have used time, age and duration in months. Note these timing assumptions differ from those listed in Working Paper 33 and were adopted in Working Paper 43 (which illustrated the impact of the change). The use of months (rather than, say, days) avoids excessive run times.

*EXPOSURE PRIOR TO THE INVESTIGATION PERIOD*

e) We have used a simple structure of off rates to estimate past exposure, even though these almost certainly vary by product type, by duration and by office. Specifically, we have used the off rates set out in Table 8.2 of Working Paper 33, which vary only by calendar year, and with a single assumption of 9% pa applied to 1998 & prior. Note that no assumptions were required for subsequent years as there are no "new" offices after 2003.
f) Off rates are applied to an earlier period than the data from which they are estimated; in particular we have no data for 1998 and prior years, yet are making an assumption regarding off rates during those years.

*EXPECTED DIAGNOSED CLAIMS*

g) [This assumption in Working Paper 33 read "Our interpretation of CIBT93 needs to be noted." This related to the age definition assumed to apply to CIBT93, which was used to calculate expected claims in the "Adjusted Results". This assumption is no longer relevant. CIBT02 was used as the starting-point for fitting the AC04 Series rates but the final rates are not dependent on it.]
h) We have assumed that diagnoses occur on the 15$^{th}$ of the calendar month, on the monthly anniversary of the birthday and at the mid-point of duration in months. (This differs from Working Paper 33, as a consequence of the change to d), above.)

*ESTIMATING THE CLAIM DEVELOPMENT DISTRIBUTION*

i) The date of diagnosis is not well-defined for many CI events. This leads to uncertainty over the timing of the event we are seeking to measure.
j) We have used a single claim development distribution, even though it might vary with a number of factors.
k) This claim development distribution is based on around 64% of the claims on full acceleration business submitted to the CMI. (NB This is a significant increase on the proportion underlying the earlier work.) In particular a number of offices have not submitted any claims that were included in the subset of the data used for modelling, so we are using the average claim development distribution for these offices without being able to gauge its appropriateness.

l) The claim development distribution derived from 2003-2006 claims data is assumed to apply throughout the period under investigation.
m) We have made decisions (some of them arbitrary) as to which claims to include in the dataset for modelling the claim development distribution, for example excluding claims with equal dates of diagnosis and settlement.
n) No allowance was made for any change over time in the proportion of claims with the relevant dates of claim (whereas arbitrary decisions were applied in our earlier work, where the increase in the proportion was more significant).
o) We have assumed that a Burr model reasonably represents the claim development distribution.
p) We have also assumed that it is reasonable to truncate the fitted Burr distribution to achieve a finite distribution.

*GENERAL*

q) We assume the data fields used are accurate. In some cases we have sought to correct for instances where data values are highly unlikely to be accurate, but there are probably other instances that have gone undetected.

## Appendix B: Approximate confidence intervals for the AC04 Series rates

Table B1: Approximate confidence intervals for the AC04 Series rates for male non-smokers

| Age Exact | Duration 0 | | | Durations 1-4 | | | Durations 5+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lower | AC04 | Upper | Lower | AC04 | Upper | Lower | AC04 | Upper |
| 30 | 0.0003 | 0.00052 | 0.0007 | 0.0005 | 0.00069 | 0.0008 | 0.0006 | 0.00076 | 0.0015 |
| 31 | 0.0004 | 0.00054 | 0.0008 | 0.0004 | 0.00071 | 0.0007 | 0.0003 | 0.00079 | 0.0009 |
| 32 | 0.0004 | 0.00056 | 0.0008 | 0.0006 | 0.00074 | 0.0008 | 0.0004 | 0.00082 | 0.0010 |
| 33 | 0.0006 | 0.00060 | 0.0011 | 0.0007 | 0.00079 | 0.0010 | 0.0006 | 0.00088 | 0.0012 |
| 34 | 0.0006 | 0.00064 | 0.0011 | 0.0007 | 0.00085 | 0.0010 | 0.0004 | 0.00094 | 0.0009 |
| 35 | 0.0004 | 0.00069 | 0.0008 | 0.0008 | 0.00091 | 0.0011 | 0.0008 | 0.00101 | 0.0014 |
| 36 | 0.0008 | 0.00075 | 0.0014 | 0.0010 | 0.00099 | 0.0013 | 0.0008 | 0.00110 | 0.0014 |
| 37 | 0.0005 | 0.00082 | 0.0010 | 0.0009 | 0.00108 | 0.0013 | 0.0007 | 0.00120 | 0.0013 |
| 38 | 0.0005 | 0.00090 | 0.0010 | 0.0008 | 0.00118 | 0.0011 | 0.0010 | 0.00131 | 0.0016 |
| 39 | 0.0007 | 0.00098 | 0.0014 | 0.0010 | 0.00128 | 0.0014 | 0.0009 | 0.00143 | 0.0015 |
| 40 | 0.0009 | 0.00107 | 0.0017 | 0.0013 | 0.00139 | 0.0017 | 0.0011 | 0.00156 | 0.0017 |
| 41 | 0.0006 | 0.00116 | 0.0012 | 0.0012 | 0.00151 | 0.0016 | 0.0015 | 0.00169 | 0.0023 |
| 42 | 0.0009 | 0.00125 | 0.0018 | 0.0014 | 0.00164 | 0.0019 | 0.0012 | 0.00182 | 0.0019 |
| 43 | 0.0007 | 0.00134 | 0.0015 | 0.0014 | 0.00177 | 0.0020 | 0.0017 | 0.00197 | 0.0026 |
| 44 | 0.0011 | 0.00144 | 0.0021 | 0.0016 | 0.00191 | 0.0022 | 0.0016 | 0.00212 | 0.0025 |
| 45 | 0.0010 | 0.00157 | 0.0021 | 0.0019 | 0.00209 | 0.0026 | 0.0020 | 0.00231 | 0.0031 |
| 46 | 0.0009 | 0.00175 | 0.0021 | 0.0018 | 0.00231 | 0.0025 | 0.0021 | 0.00256 | 0.0033 |
| 47 | 0.0012 | 0.00193 | 0.0026 | 0.0021 | 0.00257 | 0.0029 | 0.0023 | 0.00285 | 0.0036 |
| 48 | 0.0010 | 0.00214 | 0.0024 | 0.0020 | 0.00286 | 0.0029 | 0.0028 | 0.00315 | 0.0042 |
| 49 | 0.0013 | 0.00240 | 0.0031 | 0.0027 | 0.00319 | 0.0037 | 0.0035 | 0.00354 | 0.0052 |
| 50 | 0.0015 | 0.00273 | 0.0035 | 0.0033 | 0.00366 | 0.0046 | 0.0039 | 0.00405 | 0.0059 |
| 51 | 0.0015 | 0.00310 | 0.0039 | 0.0033 | 0.00416 | 0.0047 | 0.0044 | 0.00461 | 0.0065 |
| 52 | 0.0026 | 0.00350 | 0.0058 | 0.0042 | 0.00470 | 0.0058 | 0.0040 | 0.00521 | 0.0062 |
| 53 | 0.0022 | 0.00393 | 0.0057 | 0.0032 | 0.00526 | 0.0049 | 0.0042 | 0.00584 | 0.0065 |
| 54 | 0.0017 | 0.00439 | 0.0051 | 0.0046 | 0.00584 | 0.0067 | 0.0050 | 0.00648 | 0.0077 |
| 55 | 0.0045 | 0.00486 | 0.0097 | 0.0057 | 0.00644 | 0.0082 | 0.0061 | 0.00714 | 0.0091 |
| 56 | 0.0014 | 0.00531 | 0.0056 | 0.0054 | 0.00706 | 0.0079 | 0.0046 | 0.00782 | 0.0073 |
| 57 | 0.0044 | 0.00581 | 0.0115 | 0.0061 | 0.00771 | 0.0091 | 0.0076 | 0.00856 | 0.0113 |
| 58 | 0.0026 | 0.00639 | 0.0099 | 0.0074 | 0.00848 | 0.0112 | 0.0079 | 0.00941 | 0.0121 |
| 59 | 0.0063 | 0.00704 | 0.0184 | 0.0074 | 0.00935 | 0.0120 | 0.0061 | 0.01037 | 0.0104 |
| 60 | 0.0007 | 0.00776 | 0.0112 | 0.0119 | 0.01031 | 0.0186 | 0.0090 | 0.01144 | 0.0151 |

Table B2: Approximate confidence intervals for the AC04 Series rates for male smokers

| Age Exact | Duration 0 | | | Durations 1-2 | | | Durations 3+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lower | AC04 | Upper | Lower | AC04 | Upper | Lower | AC04 | Upper |
| 30 | 0.0005 | 0.00078 | 0.0015 | 0.0006 | 0.00087 | 0.0014 | 0.0004 | 0.00094 | 0.0013 |
| 31 | 0.0003 | 0.00086 | 0.0010 | 0.0006 | 0.00096 | 0.0014 | 0.0010 | 0.00104 | 0.0021 |
| 32 | 0.0003 | 0.00095 | 0.0011 | 0.0007 | 0.00107 | 0.0015 | 0.0006 | 0.00116 | 0.0014 |
| 33 | 0.0008 | 0.00106 | 0.0019 | 0.0007 | 0.00118 | 0.0014 | 0.0008 | 0.00128 | 0.0017 |
| 34 | 0.0005 | 0.00115 | 0.0014 | 0.0009 | 0.00129 | 0.0017 | 0.0006 | 0.00139 | 0.0014 |
| 35 | 0.0009 | 0.00124 | 0.0021 | 0.0009 | 0.00139 | 0.0018 | 0.0011 | 0.00150 | 0.0021 |
| 36 | 0.0004 | 0.00134 | 0.0014 | 0.0009 | 0.00150 | 0.0017 | 0.0010 | 0.00162 | 0.0020 |
| 37 | 0.0013 | 0.00143 | 0.0029 | 0.0011 | 0.00160 | 0.0021 | 0.0014 | 0.00173 | 0.0025 |
| 38 | 0.0006 | 0.00157 | 0.0019 | 0.0013 | 0.00176 | 0.0024 | 0.0012 | 0.00190 | 0.0023 |
| 39 | 0.0008 | 0.00176 | 0.0022 | 0.0014 | 0.00197 | 0.0025 | 0.0020 | 0.00213 | 0.0034 |
| 40 | 0.0015 | 0.00198 | 0.0035 | 0.0016 | 0.00222 | 0.0030 | 0.0016 | 0.00240 | 0.0028 |
| 41 | 0.0012 | 0.00225 | 0.0032 | 0.0018 | 0.00252 | 0.0033 | 0.0019 | 0.00273 | 0.0034 |
| 42 | 0.0018 | 0.00255 | 0.0044 | 0.0015 | 0.00285 | 0.0031 | 0.0024 | 0.00308 | 0.0041 |
| 43 | 0.0021 | 0.00290 | 0.0050 | 0.0025 | 0.00324 | 0.0045 | 0.0026 | 0.00350 | 0.0044 |
| 44 | 0.0015 | 0.00328 | 0.0045 | 0.0026 | 0.00366 | 0.0048 | 0.0034 | 0.00396 | 0.0057 |
| 45 | 0.0026 | 0.00380 | 0.0065 | 0.0023 | 0.00425 | 0.0045 | 0.0024 | 0.00460 | 0.0044 |
| 46 | 0.0017 | 0.00449 | 0.0055 | 0.0025 | 0.00502 | 0.0051 | 0.0050 | 0.00543 | 0.0080 |
| 47 | 0.0027 | 0.00521 | 0.0076 | 0.0049 | 0.00583 | 0.0086 | 0.0053 | 0.00630 | 0.0086 |
| 48 | 0.0040 | 0.00594 | 0.0101 | 0.0056 | 0.00664 | 0.0099 | 0.0072 | 0.00718 | 0.0111 |
| 49 | 0.0036 | 0.00667 | 0.0101 | 0.0069 | 0.00747 | 0.0120 | 0.0051 | 0.00807 | 0.0087 |
| 50 | 0.0012 | 0.00742 | 0.0064 | 0.0051 | 0.00830 | 0.0099 | 0.0062 | 0.00897 | 0.0104 |
| 51 | 0.0032 | 0.00817 | 0.0114 | 0.0060 | 0.00914 | 0.0116 | 0.0081 | 0.00988 | 0.0131 |
| 52 | 0.0039 | 0.00893 | 0.0142 | 0.0054 | 0.00999 | 0.0115 | 0.0085 | 0.01080 | 0.0139 |
| 53 | 0.0041 | 0.00970 | 0.0161 | 0.0082 | 0.01085 | 0.0163 | 0.0084 | 0.01173 | 0.0142 |
| 54 | 0.0048 | 0.01048 | 0.0188 | 0.0072 | 0.01172 | 0.0158 | 0.0093 | 0.01267 | 0.0158 |
| 55 | 0.0001 | 0.01136 | 0.0096 | 0.0074 | 0.01271 | 0.0170 | 0.0075 | 0.01373 | 0.0140 |
| 56 | 0.0057 | 0.01236 | 0.0244 | 0.0113 | 0.01383 | 0.0235 | 0.0160 | 0.01495 | 0.0254 |
| 57 | 0.0013 | 0.01342 | 0.0192 | 0.0113 | 0.01501 | 0.0255 | 0.0123 | 0.01622 | 0.0215 |
| 58 | 0.0019 | 0.01456 | 0.0290 | 0.0077 | 0.01629 | 0.0225 | 0.0128 | 0.01761 | 0.0233 |
| 59 | -0.0016 | 0.01577 | 0.0266 | 0.0081 | 0.01764 | 0.0274 | 0.0099 | 0.01907 | 0.0212 |
| 60 | -0.0057 | 0.01714 | 0.0176 | 0.0111 | 0.01916 | 0.0375 | 0.0071 | 0.02071 | 0.0192 |

Table B3: Approximate confidence intervals for the AC04 Series rates for female non-smokers

| Age last | Duration 0 | | | Durations 1-4 | | | Durations 5+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lower | AC04 | Upper | Lower | AC04 | Upper | Lower | AC04 | Upper |
| **30** | 0.0004 | 0.00052 | 0.0008 | 0.0006 | 0.00077 | 0.0009 | 0.0005 | 0.00079 | 0.0011 |
| **31** | 0.0005 | 0.00058 | 0.0009 | 0.0007 | 0.00085 | 0.0010 | 0.0007 | 0.00087 | 0.0013 |
| **32** | 0.0003 | 0.00064 | 0.0007 | 0.0007 | 0.00093 | 0.0010 | 0.0008 | 0.00095 | 0.0014 |
| **33** | 0.0005 | 0.00070 | 0.0010 | 0.0008 | 0.00102 | 0.0011 | 0.0008 | 0.00104 | 0.0014 |
| **34** | 0.0006 | 0.00076 | 0.0012 | 0.0010 | 0.00111 | 0.0014 | 0.0008 | 0.00113 | 0.0015 |
| **35** | 0.0008 | 0.00082 | 0.0014 | 0.0010 | 0.00120 | 0.0013 | 0.0012 | 0.00122 | 0.0019 |
| **36** | 0.0005 | 0.00088 | 0.0010 | 0.0010 | 0.00129 | 0.0014 | 0.0010 | 0.00132 | 0.0017 |
| **37** | 0.0008 | 0.00094 | 0.0014 | 0.0012 | 0.00139 | 0.0017 | 0.0011 | 0.00142 | 0.0018 |
| **38** | 0.0007 | 0.00101 | 0.0013 | 0.0012 | 0.00149 | 0.0016 | 0.0011 | 0.00152 | 0.0018 |
| **39** | 0.0007 | 0.00108 | 0.0013 | 0.0012 | 0.00159 | 0.0016 | 0.0016 | 0.00163 | 0.0024 |
| **40** | 0.0008 | 0.00116 | 0.0015 | 0.0016 | 0.00170 | 0.0021 | 0.0013 | 0.00175 | 0.0021 |
| **41** | 0.0012 | 0.00126 | 0.0021 | 0.0017 | 0.00183 | 0.0022 | 0.0017 | 0.00192 | 0.0027 |
| **42** | 0.0012 | 0.00137 | 0.0023 | 0.0015 | 0.00198 | 0.0020 | 0.0015 | 0.00209 | 0.0024 |
| **43** | 0.0013 | 0.00149 | 0.0025 | 0.0016 | 0.00215 | 0.0023 | 0.0013 | 0.00226 | 0.0022 |
| **44** | 0.0010 | 0.00160 | 0.0022 | 0.0020 | 0.00234 | 0.0028 | 0.0017 | 0.00244 | 0.0027 |
| **45** | 0.0012 | 0.00171 | 0.0025 | 0.0025 | 0.00254 | 0.0034 | 0.0023 | 0.00262 | 0.0035 |
| **46** | 0.0017 | 0.00184 | 0.0034 | 0.0017 | 0.00274 | 0.0025 | 0.0023 | 0.00281 | 0.0037 |
| **47** | 0.0011 | 0.00199 | 0.0027 | 0.0022 | 0.00296 | 0.0031 | 0.0026 | 0.00301 | 0.0041 |
| **48** | 0.0014 | 0.00217 | 0.0032 | 0.0024 | 0.00319 | 0.0035 | 0.0027 | 0.00326 | 0.0043 |
| **49** | 0.0016 | 0.00235 | 0.0038 | 0.0026 | 0.00346 | 0.0038 | 0.0022 | 0.00355 | 0.0037 |
| **50** | 0.0021 | 0.00254 | 0.0048 | 0.0030 | 0.00374 | 0.0045 | 0.0031 | 0.00385 | 0.0051 |
| **51** | 0.0029 | 0.00278 | 0.0063 | 0.0043 | 0.00406 | 0.0061 | 0.0031 | 0.00419 | 0.0051 |
| **52** | 0.0008 | 0.00302 | 0.0033 | 0.0036 | 0.00441 | 0.0054 | 0.0027 | 0.00456 | 0.0048 |
| **53** | 0.0030 | 0.00327 | 0.0075 | 0.0039 | 0.00479 | 0.0059 | 0.0030 | 0.00494 | 0.0053 |
| **54** | 0.0018 | 0.00354 | 0.0061 | 0.0042 | 0.00520 | 0.0065 | 0.0030 | 0.00535 | 0.0055 |
| **55** | 0.0018 | 0.00382 | 0.0066 | 0.0038 | 0.00560 | 0.0063 | 0.0035 | 0.00577 | 0.0064 |
| **56** | 0.0014 | 0.00409 | 0.0067 | 0.0034 | 0.00602 | 0.0061 | 0.0045 | 0.00619 | 0.0079 |
| **57** | 0.0043 | 0.00439 | 0.0139 | 0.0055 | 0.00646 | 0.0092 | 0.0049 | 0.00663 | 0.0088 |
| **58** | 0.0001 | 0.00469 | 0.0069 | 0.0035 | 0.00691 | 0.0071 | 0.0051 | 0.00710 | 0.0097 |
| **59** | -0.0010 | 0.00506 | 0.0061 | 0.0039 | 0.00744 | 0.0086 | 0.0051 | 0.00765 | 0.0105 |
| **60** | 0.0013 | 0.00544 | 0.0203 | 0.0041 | 0.00801 | 0.0103 | 0.0053 | 0.00824 | 0.0121 |

Table B4: Approximate confidence intervals for the AC04 Series rates for female smokers

| Age last | Duration 0 | | | Duration 1 | | | Durations 2+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Lower | AC04 | Upper | Lower | AC04 | Upper | Lower | AC04 | Upper |
| **30** | 0.0002 | 0.00067 | 0.0010 | 0.0003 | 0.00077 | 0.0013 | 0.0006 | 0.00077 | 0.0014 |
| **31** | 0.0001 | 0.00072 | 0.0010 | 0.0002 | 0.00085 | 0.0010 | 0.0006 | 0.00085 | 0.0014 |
| **32** | 0.0007 | 0.00078 | 0.0020 | 0.0003 | 0.00093 | 0.0013 | 0.0006 | 0.00093 | 0.0014 |
| **33** | 0.0003 | 0.00085 | 0.0014 | 0.0006 | 0.00102 | 0.0018 | 0.0005 | 0.00102 | 0.0012 |
| **34** | 0.0001 | 0.00092 | 0.0008 | 0.0007 | 0.00111 | 0.0020 | 0.0006 | 0.00111 | 0.0014 |
| **35** | 0.0004 | 0.00102 | 0.0016 | 0.0005 | 0.00120 | 0.0017 | 0.0008 | 0.00120 | 0.0017 |
| **36** | 0.0004 | 0.00112 | 0.0016 | 0.0008 | 0.00129 | 0.0023 | 0.0013 | 0.00129 | 0.0023 |
| **37** | 0.0005 | 0.00129 | 0.0019 | 0.0009 | 0.00144 | 0.0026 | 0.0012 | 0.00144 | 0.0022 |
| **38** | 0.0011 | 0.00146 | 0.0030 | 0.0004 | 0.00165 | 0.0017 | 0.0014 | 0.00165 | 0.0025 |
| **39** | 0.0010 | 0.00165 | 0.0029 | 0.0014 | 0.00187 | 0.0036 | 0.0012 | 0.00187 | 0.0023 |
| **40** | 0.0004 | 0.00187 | 0.0020 | 0.0008 | 0.00211 | 0.0027 | 0.0015 | 0.00211 | 0.0027 |
| **41** | 0.0025 | 0.00209 | 0.0057 | 0.0011 | 0.00236 | 0.0034 | 0.0015 | 0.00236 | 0.0028 |
| **42** | 0.0006 | 0.00231 | 0.0028 | 0.0013 | 0.00262 | 0.0039 | 0.0024 | 0.00262 | 0.0041 |
| **43** | 0.0018 | 0.00255 | 0.0052 | 0.0025 | 0.00289 | 0.0060 | 0.0023 | 0.00289 | 0.0040 |
| **44** | 0.0008 | 0.00283 | 0.0037 | 0.0017 | 0.00321 | 0.0051 | 0.0023 | 0.00321 | 0.0042 |
| **45** | 0.0015 | 0.00317 | 0.0054 | 0.0017 | 0.00359 | 0.0054 | 0.0028 | 0.00359 | 0.0049 |
| **46** | 0.0015 | 0.00353 | 0.0058 | 0.0007 | 0.00399 | 0.0040 | 0.0026 | 0.00399 | 0.0048 |
| **47** | 0.0020 | 0.00390 | 0.0073 | 0.0042 | 0.00440 | 0.0104 | 0.0049 | 0.00440 | 0.0079 |
| **48** | 0.0008 | 0.00428 | 0.0055 | 0.0018 | 0.00482 | 0.0071 | 0.0039 | 0.00482 | 0.0069 |
| **49** | 0.0017 | 0.00466 | 0.0080 | 0.0021 | 0.00526 | 0.0081 | 0.0043 | 0.00526 | 0.0076 |
| **50** | 0.0008 | 0.00504 | 0.0070 | 0.0007 | 0.00571 | 0.0059 | 0.0054 | 0.00571 | 0.0093 |
| **51** | 0.0005 | 0.00544 | 0.0074 | 0.0034 | 0.00617 | 0.0121 | 0.0051 | 0.00617 | 0.0092 |
| **52** | 0.0018 | 0.00587 | 0.0121 | 0.0001 | 0.00665 | 0.0061 | 0.0066 | 0.00665 | 0.0115 |
| **53** | 0.0040 | 0.00632 | 0.0190 | 0.0017 | 0.00716 | 0.0116 | 0.0053 | 0.00716 | 0.0102 |
| **54** | -0.0006 | 0.00679 | 0.0096 | -0.0005 | 0.00769 | 0.0079 | 0.0043 | 0.00769 | 0.0091 |
| **55** | 0.0045 | 0.00738 | 0.0246 | -0.0006 | 0.00837 | 0.0089 | 0.0040 | 0.00837 | 0.0092 |
| **56** | -0.0018 | 0.00807 | 0.0109 | 0.0042 | 0.00914 | 0.0234 | 0.0076 | 0.00914 | 0.0151 |
| **57** | -0.0025 | 0.00881 | 0.0155 | 0.0071 | 0.00998 | 0.0338 | 0.0096 | 0.00998 | 0.0189 |
| **58** | -0.0044 | 0.00947 | 0.0137 | 0.0021 | 0.01073 | 0.0320 | 0.0065 | 0.01073 | 0.0157 |
| **59** | -0.0057 | 0.01004 | 0.0352 | -0.0047 | 0.01137 | 0.0146 | 0.0093 | 0.01137 | 0.0222 |
| **60** | -0.0118 | 0.01062 | 0.0363 | -0.0067 | 0.01203 | 0.0412 | 0.0031 | 0.01203 | 0.0146 |

## Appendix C: Detailed results by product type

Note that the vertical scales differ between the charts in this Appendix:

Figure C1: Absolute life years exposure by age and duration for decreasing term assurances

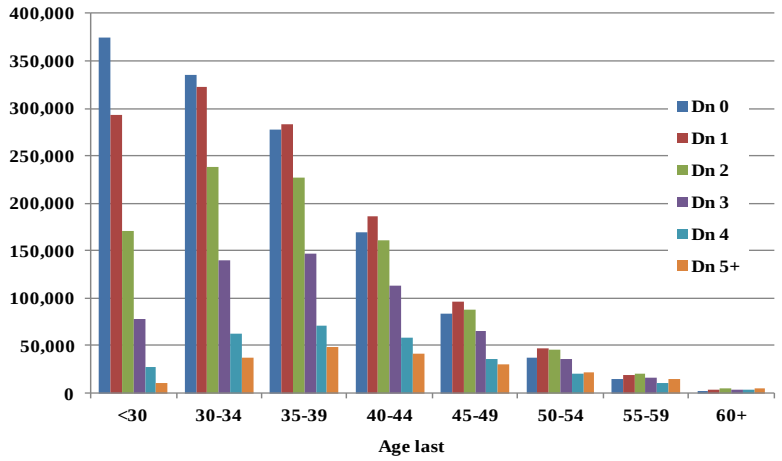



Figure C2: Absolute life years exposure by age and duration for level term assurances

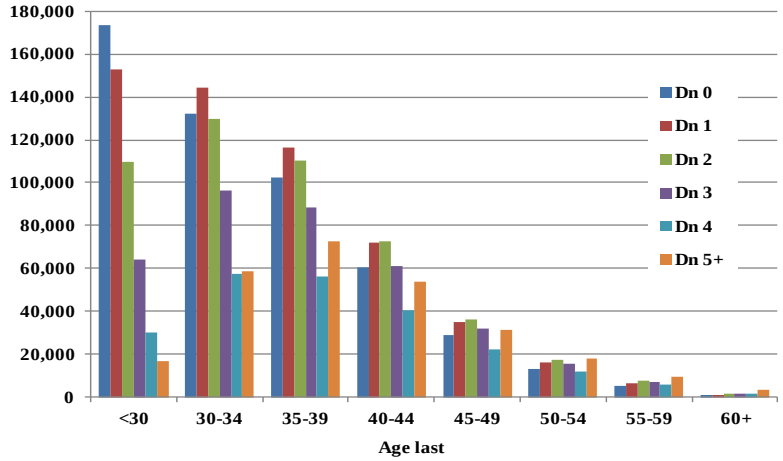



Figure C3: Absolute life years exposure by age and duration for unclassified term assurances

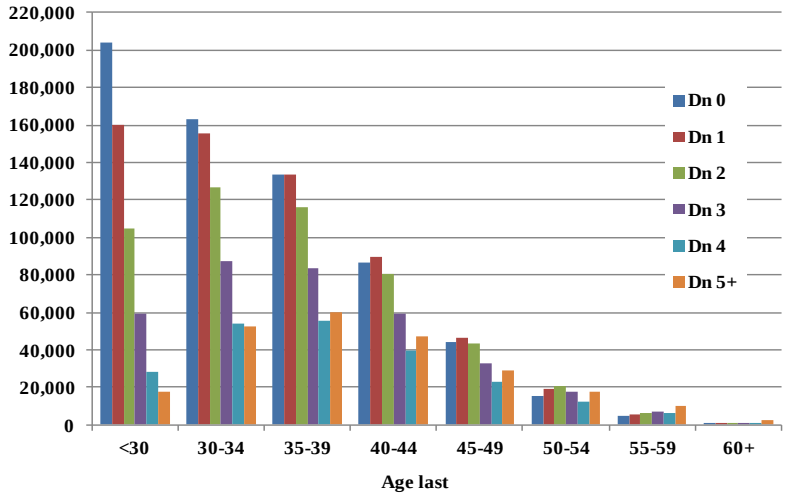


Table C1: Values of 100ASC/ESC for **All Term Assurances** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 75 | 92 | 123 | 84 | 111 | 164 | **96** |
| **26-30** | 97 | 103 | 95 | 79 | 90 | 127 | **96** |
| **31-35** | 105 | 95 | 84 | 124 | 104 | 97 | **100** |
| **36-40** | 92 | 110 | 101 | 105 | 97 | 90 | **101** |
| **41-45** | 92 | 92 | 103 | 108 | 103 | 83 | **98** |
| **46-50** | 87 | 91 | 95 | 94 | 95 | 111 | **96** |
| **51-55** | 98 | 93 | 83 | 106 | 103 | 91 | **95** |
| **56-60** | 109 | 111 | 98 | 105 | 104 | 90 | **100** |
| **61-65** | 133 | 121 | 101 | 113 | 123 | 94 | **107** |
| **66-70** | 0 | 0 | 54 | 148 | 90 | 96 | **95** |
| **ALL** | **95** | **99** | **95** | **105** | **101** | **94** | **98** |

Table C2: Values of 100ASC/ESC for **Decreasing Term Assurances** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 83 | 75 | 100 | 56 | 0 | 0 | **79** |
| **26-30** | 96 | 126 | 101 | 78 | 101 | 189 | **107** |
| **31-35** | 121 | 105 | 93 | 117 | 80 | 118 | **105** |
| **36-40** | 93 | 111 | 92 | 98 | 111 | 104 | **101** |
| **41-45** | 89 | 97 | 106 | 119 | 108 | 94 | **104** |
| **46-50** | 94 | 85 | 95 | 99 | 98 | 95 | **94** |
| **51-55** | 97 | 94 | 87 | 119 | 108 | 94 | **100** |
| **56-60** | 99 | 102 | 107 | 108 | 110 | 108 | **107** |
| **61-65** | 153 | 118 | 108 | 119 | 119 | 90 | **108** |
| **66-70** | 0 | 0 | 50 | 115 | 79 | 90 | **85** |
| **ALL** | **98** | **101** | **97** | **108** | **104** | **100** | **101** |

Table C3: Values of 100ASC/ESC for **Level Term Assurances** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 82 | 118 | 164 | 144 | 129 | 183 | **128** |
| **26-30** | 86 | 77 | 95 | 93 | 112 | 128 | **92** |
| **31-35** | 39 | 73 | 100 | 146 | 130 | 114 | **104** |
| **36-40** | 110 | 122 | 106 | 128 | 96 | 110 | **113** |
| **41-45** | 97 | 104 | 113 | 105 | 106 | 69 | **98** |
| **46-50** | 98 | 98 | 105 | 87 | 104 | 128 | **105** |
| **51-55** | 82 | 77 | 87 | 102 | 120 | 94 | **95** |
| **56-60** | 129 | 143 | 96 | 128 | 102 | 102 | **112** |
| **61-65** | 247 | 186 | 90 | 112 | 150 | 112 | **124** |
| **66-70** | 0 | 0 | 0 | 200 | 50 | 70 | **78** |
| **ALL** | **90** | **101** | **103** | **114** | **110** | **102** | **105** |

Table C4: Values of 100ASC/ESC for **Unclassified Term Assurances** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 57 | 92 | 106 | 29 | 164 | 212 | **84** |
| **26-30** | 110 | 83 | 86 | 65 | 53 | 82 | **82** |
| **31-35** | 127 | 94 | 50 | 110 | 105 | 62 | **87** |
| **36-40** | 76 | 98 | 113 | 92 | 78 | 54 | **88** |
| **41-45** | 94 | 72 | 87 | 92 | 92 | 90 | **87** |
| **46-50** | 68 | 99 | 88 | 93 | 82 | 108 | **92** |
| **51-55** | 116 | 107 | 68 | 83 | 76 | 85 | **85** |
| **56-60** | 114 | 96 | 73 | 67 | 93 | 56 | **73** |
| **61-65** | 0 | 55 | 92 | 96 | 94 | 78 | **80** |
| **66-70** | 0 | 0 | 104 | 184 | 225 | 195 | **157** |
| **ALL** | **93** | **91** | **84** | **89** | **86** | **79** | **86** |

Table C5: Values of 100ASC/ESC for **Endowment** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 134 | 196 | 0 | 212 | **121** |
| **26-30** | 0 | 80 | 112 | 56 | 102 | 126 | **107** |
| **31-35** | 1119 | 59 | 153 | 71 | 115 | 94 | **99** |
| **36-40** | 0 | 115 | 122 | 87 | 68 | 98 | **95** |
| **41-45** | 666 | 66 | 80 | 111 | 88 | 108 | **106** |
| **46-50** | 538 | 98 | 38 | 65 | 83 | 105 | **102** |
| **51-55** | 1181 | 182 | 263 | 212 | 132 | 107 | **112** |
| **56-60** | 0 | 0 | 209 | 61 | 131 | 95 | **96** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 87 | **85** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 47 | **47** |
| **ALL** | **465** | **83** | **121** | **94** | **95** | **101** | **101** |

Table C6: Values of 100ASC/ESC for **Whole of Life** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 320 | 0 | 0 | 0 | 364 | **139** |
| **26-30** | 0 | 0 | 0 | 134 | 209 | 246 | **166** |
| **31-35** | 0 | 0 | 137 | 192 | 133 | 88 | **100** |
| **36-40** | 361 | 116 | 68 | 140 | 34 | 96 | **95** |
| **41-45** | 0 | 192 | 208 | 69 | 51 | 117 | **115** |
| **46-50** | 200 | 69 | 124 | 147 | 87 | 115 | **115** |
| **51-55** | 232 | 239 | 217 | 151 | 90 | 119 | **121** |
| **56-60** | 0 | 0 | 62 | 86 | 157 | 108 | **107** |
| **61-65** | 0 | 0 | 260 | 208 | 0 | 105 | **105** |
| **66-70** | 0 | 285 | 231 | 0 | 0 | 84 | **85** |
| **ALL** | **117** | **109** | **134** | **128** | **83** | **111** | **111** |

Table C7: Values of 100ASC/ESC for **All Term Assurances** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 61 | 217 | 86 | 84 | 159 | 0 | **129** |
| **26-30** | 111 | 103 | 117 | 73 | 31 | 94 | **98** |
| **31-35** | 85 | 103 | 92 | 109 | 98 | 95 | **98** |
| **36-40** | 102 | 96 | 92 | 117 | 105 | 91 | **100** |
| **41-45** | 116 | 95 | 108 | 96 | 92 | 101 | **101** |
| **46-50** | 109 | 92 | 105 | 126 | 103 | 88 | **104** |
| **51-55** | 87 | 96 | 94 | 100 | 113 | 78 | **95** |
| **56-60** | 94 | 86 | 129 | 108 | 100 | 104 | **106** |
| **61-65** | 49 | 30 | 145 | 91 | 69 | 132 | **104** |
| **66-70** | 0 | 0 | 0 | 128 | 0 | 32 | **38** |
| **ALL** | **100** | **98** | **103** | **107** | **98** | **94** | **101** |

Table C8: Values of 100ASC/ESC for **Decreasing Term Assurances** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 23 | 247 | 65 | 97 | 373 | 0 | **131** |
| **26-30** | 119 | 110 | 81 | 56 | 28 | 134 | **94** |
| **31-35** | 97 | 93 | 91 | 105 | 89 | 103 | **95** |
| **36-40** | 102 | 112 | 87 | 145 | 108 | 81 | **108** |
| **41-45** | 117 | 98 | 119 | 122 | 96 | 118 | **112** |
| **46-50** | 139 | 97 | 112 | 113 | 109 | 92 | **109** |
| **51-55** | 97 | 102 | 108 | 104 | 110 | 96 | **104** |
| **56-60** | 83 | 90 | 135 | 105 | 118 | 101 | **109** |
| **61-65** | 0 | 41 | 136 | 104 | 91 | 129 | **107** |
| **66-70** | 0 | 0 | 0 | 187 | 0 | 42 | **55** |
| **ALL** | **106** | **102** | **107** | **114** | **103** | **101** | **106** |

Table C9: Values of 100ASC/ESC for **Level Term Assurances** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 43 | 145 | 82 | 75 | 0 | 0 | **87** |
| **26-30** | 91 | 102 | 170 | 66 | 32 | 54 | **102** |
| **31-35** | 34 | 88 | 109 | 83 | 152 | 77 | **92** |
| **36-40** | 56 | 56 | 105 | 75 | 115 | 85 | **83** |
| **41-45** | 116 | 89 | 135 | 58 | 108 | 114 | **102** |
| **46-50** | 44 | 42 | 77 | 156 | 96 | 93 | **90** |
| **51-55** | 102 | 76 | 79 | 113 | 138 | 48 | **88** |
| **56-60** | 75 | 84 | 158 | 157 | 94 | 127 | **123** |
| **61-65** | 0 | 0 | 295 | 49 | 42 | 141 | **115** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **69** | **76** | **115** | **98** | **109** | **92** | **95** |

Table C10: Values of 100ASC/ESC for **Unclassified Term Assurances** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 129 | 237 | 114 | 83 | 244 | 0 | **163** |
| **26-30** | 109 | 89 | 133 | 110 | 34 | 100 | **102** |
| **31-35** | 93 | 142 | 77 | 145 | 57 | 106 | **108** |
| **36-40** | 134 | 88 | 91 | 93 | 90 | 109 | **99** |
| **41-45** | 116 | 92 | 60 | 65 | 66 | 66 | **76** |
| **46-50** | 83 | 110 | 105 | 136 | 94 | 77 | **104** |
| **51-55** | 47 | 92 | 65 | 79 | 104 | 73 | **79** |
| **56-60** | 160 | 72 | 76 | 70 | 51 | 93 | **80** |
| **61-65** | 205 | 0 | 0 | 65 | 0 | 134 | **76** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **105** | **106** | **83** | **99** | **78** | **86** | **93** |

Table C11: Values of 100ASC/ESC for **Endowment** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 846 | 0 | 0 | **228** |
| **26-30** | 1697 | 0 | 98 | 149 | 40 | 147 | **131** |
| **31-35** | 0 | 0 | 241 | 115 | 202 | 87 | **111** |
| **36-40** | 0 | 0 | 163 | 77 | 65 | 86 | **84** |
| **41-45** | 499 | 106 | 130 | 77 | 60 | 91 | **89** |
| **46-50** | 703 | 122 | 95 | 158 | 178 | 92 | **104** |
| **51-55** | 1542 | 0 | 186 | 32 | 86 | 103 | **101** |
| **56-60** | 0 | 0 | 0 | 122 | 134 | 81 | **83** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 76 | **74** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 89 | **87** |
| **ALL** | **492** | **42** | **147** | **110** | **112** | **91** | **96** |

Table C12: Values of 100ASC/ESC for **Whole of Life** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 1231 | 0 | 0 | **265** |
| **26-30** | 0 | 0 | 259 | 0 | 237 | 0 | **76** |
| **31-35** | 0 | 0 | 108 | 78 | 208 | 144 | **132** |
| **36-40** | 367 | 0 | 0 | 63 | 96 | 136 | **121** |
| **41-45** | 0 | 156 | 0 | 69 | 160 | 133 | **127** |
| **46-50** | 0 | 141 | 0 | 60 | 49 | 114 | **105** |
| **51-55** | 0 | 166 | 118 | 94 | 156 | 101 | **104** |
| **56-60** | 0 | 0 | 0 | 136 | 0 | 141 | **132** |
| **61-65** | 0 | 0 | 384 | 0 | 0 | 95 | **94** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 101 | **93** |
| **ALL** | **61** | **71** | **63** | **80** | **113** | **120** | **115** |

Table C13: Values of 100ASC/ESC for **All Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 119 | 98 | 104 | 114 | 170 | 0 | **108** |
| **26-30** | 81 | 101 | 97 | 99 | 120 | 119 | **100** |
| **31-35** | 94 | 100 | 98 | 105 | 104 | 107 | **101** |
| **36-40** | 83 | 102 | 97 | 104 | 85 | 102 | **97** |
| **41-45** | 111 | 105 | 97 | 106 | 116 | 96 | **104** |
| **46-50** | 100 | 90 | 105 | 76 | 99 | 107 | **95** |
| **51-55** | 109 | 123 | 106 | 104 | 94 | 86 | **103** |
| **56-60** | 116 | 110 | 96 | 72 | 89 | 107 | **96** |
| **61-65** | 167 | 50 | 100 | 71 | 76 | 79 | **80** |
| **66-70** | 0 | 0 | 62 | 89 | 90 | 116 | **91** |
| **ALL** | **97** | **102** | **99** | **97** | **100** | **100** | **100** |

Table C14: Values of 100ASC/ESC for **Decreasing Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 108 | 92 | 123 | 132 | 142 | 0 | **108** |
| **26-30** | 73 | 121 | 90 | 103 | 80 | 134 | **100** |
| **31-35** | 85 | 112 | 108 | 102 | 121 | 82 | **105** |
| **36-40** | 68 | 107 | 93 | 106 | 97 | 100 | **97** |
| **41-45** | 115 | 108 | 100 | 100 | 139 | 86 | **107** |
| **46-50** | 114 | 86 | 107 | 74 | 107 | 107 | **96** |
| **51-55** | 120 | 137 | 111 | 94 | 84 | 85 | **105** |
| **56-60** | 131 | 115 | 99 | 74 | 107 | 122 | **104** |
| **61-65** | 261 | 19 | 110 | 81 | 93 | 57 | **80** |
| **66-70** | 0 | 0 | 108 | 0 | 150 | 103 | **88** |
| **ALL** | **96** | **109** | **102** | **94** | **109** | **96** | **102** |

Table C15: Values of 100ASC/ESC for **Level Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 79 | 91 | 56 | 128 | 231 | 0 | **91** |
| **26-30** | 97 | 78 | 119 | 118 | 147 | 85 | **106** |
| **31-35** | 73 | 109 | 89 | 125 | 96 | 140 | **108** |
| **36-40** | 106 | 103 | 95 | 102 | 76 | 118 | **100** |
| **41-45** | 139 | 112 | 84 | 121 | 95 | 113 | **107** |
| **46-50** | 72 | 113 | 99 | 90 | 111 | 114 | **103** |
| **51-55** | 128 | 78 | 87 | 111 | 126 | 103 | **103** |
| **56-60** | 99 | 72 | 106 | 62 | 79 | 88 | **83** |
| **61-65** | 0 | 134 | 158 | 100 | 65 | 131 | **115** |
| **66-70** | 0 | 0 | 0 | 161 | 0 | 66 | **60** |
| **ALL** | **100** | **100** | **94** | **109** | **100** | **113** | **103** |

Table C16: Values of 100ASC/ESC for **Unclassified Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 169 | 115 | 120 | 78 | 127 | 0 | **121** |
| **26-30** | 85 | 81 | 90 | 73 | 140 | 141 | **94** |
| **31-35** | 127 | 69 | 88 | 88 | 90 | 90 | **88** |
| **36-40** | 97 | 93 | 104 | 101 | 77 | 86 | **94** |
| **41-45** | 83 | 95 | 104 | 105 | 99 | 87 | **97** |
| **46-50** | 92 | 81 | 103 | 67 | 71 | 98 | **86** |
| **51-55** | 69 | 123 | 109 | 118 | 84 | 71 | **97** |
| **56-60** | 88 | 131 | 76 | 77 | 58 | 99 | **88** |
| **61-65** | 0 | 72 | 0 | 0 | 40 | 69 | **40** |
| **66-70** | 0 | 0 | 0 | 359 | 0 | 277 | **159** |
| **ALL** | **99** | **90** | **99** | **92** | **86** | **90** | **93** |

Table C17: Values of 100ASC/ESC for **Endowment** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 137 | 87 | 95 | 0 | **65** |
| **26-30** | 0 | 84 | 76 | 128 | 107 | 115 | **111** |
| **31-35** | 507 | 200 | 106 | 88 | 82 | 101 | **101** |
| **36-40** | 271 | 156 | 127 | 105 | 87 | 102 | **103** |
| **41-45** | 351 | 132 | 80 | 12 | 70 | 90 | **86** |
| **46-50** | 0 | 0 | 0 | 147 | 71 | 89 | **88** |
| **51-55** | 0 | 0 | 198 | 33 | 166 | 76 | **80** |
| **56-60** | 4495 | 0 | 0 | 233 | 241 | 74 | **81** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 84 | **83** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 78 | **77** |
| **ALL** | **313** | **121** | **95** | **88** | **93** | **91** | **92** |

Table C18: Values of 100ASC/ESC for **Whole of Life** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 383 | 0 | 0 | 0 | 0 | **62** |
| **26-30** | 432 | 258 | 0 | 0 | 0 | 95 | **73** |
| **31-35** | 212 | 196 | 73 | 127 | 162 | 100 | **111** |
| **36-40** | 0 | 212 | 60 | 163 | 153 | 113 | **117** |
| **41-45** | 189 | 290 | 131 | 112 | 67 | 106 | **108** |
| **46-50** | 0 | 278 | 197 | 226 | 176 | 130 | **138** |
| **51-55** | 0 | 95 | 53 | 152 | 151 | 102 | **104** |
| **56-60** | 456 | 142 | 86 | 187 | 0 | 141 | **138** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 90 | **83** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 48 | **44** |
| **ALL** | **131** | **216** | **88** | **137** | **115** | **113** | **115** |

Table C19: Values of 100ASC/ESC for **All Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 65 | 83 | 201 | 56 | 78 | 0 | **102** |
| **26-30** | 77 | 128 | 113 | 127 | 146 | 74 | **114** |
| **31-35** | 87 | 96 | 92 | 82 | 102 | 71 | **90** |
| **36-40** | 80 | 110 | 96 | 98 | 117 | 104 | **101** |
| **41-45** | 123 | 95 | 103 | 85 | 123 | 108 | **103** |
| **46-50** | 95 | 90 | 107 | 100 | 103 | 101 | **100** |
| **51-55** | 123 | 81 | 108 | 118 | 77 | 108 | **102** |
| **56-60** | 98 | 122 | 108 | 115 | 108 | 91 | **106** |
| **61-65** | 0 | 0 | 28 | 153 | 71 | 100 | **83** |
| **66-70** | 0 | 0 | 0 | 247 | 0 | 0 | **41** |
| **ALL** | **95** | **99** | **104** | **100** | **107** | **98** | **101** |

Table C20: Values of 100ASC/ESC for **Decreasing Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 79 | 58 | 212 | 76 | 0 | 0 | **100** |
| **26-30** | 50 | 124 | 124 | 146 | 87 | 138 | **112** |
| **31-35** | 81 | 80 | 84 | 91 | 109 | 97 | **86** |
| **36-40** | 123 | 118 | 97 | 95 | 121 | 142 | **111** |
| **41-45** | 110 | 109 | 118 | 82 | 115 | 129 | **108** |
| **46-50** | 87 | 91 | 110 | 103 | 109 | 129 | **104** |
| **51-55** | 114 | 75 | 120 | 126 | 84 | 104 | **105** |
| **56-60** | 146 | 98 | 94 | 136 | 124 | 114 | **116** |
| **61-65** | 0 | 0 | 0 | 130 | 70 | 70 | **62** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **98** | **98** | **107** | **104** | **107** | **116** | **104** |

Table C21: Values of 100ASC/ESC for **Level Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 120 | 125 | 167 | 105 | 0 | 0 | **122** |
| **26-30** | 135 | 116 | 89 | 82 | 232 | 59 | **113** |
| **31-35** | 82 | 151 | 139 | 103 | 55 | 56 | **109** |
| **36-40** | 0 | 83 | 113 | 161 | 101 | 105 | **103** |
| **41-45** | 121 | 59 | 83 | 117 | 151 | 100 | **101** |
| **46-50** | 106 | 92 | 123 | 75 | 101 | 73 | **94** |
| **51-55** | 238 | 153 | 81 | 98 | 138 | 155 | **132** |
| **56-60** | 0 | 190 | 194 | 91 | 70 | 45 | **102** |
| **61-65** | 0 | 0 | 180 | 128 | 0 | 137 | **103** |
| **66-70** | 0 | 0 | 0 | 1084 | 0 | 0 | **207** |
| **ALL** | **95** | **108** | **113** | **111** | **113** | **93** | **107** |

Table C22: Values of 100ASC/ESC for **Unclassified Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 93 | 212 | 0 | 193 | 0 | **91** |
| **26-30** | 88 | 147 | 116 | 141 | 141 | 44 | **121** |
| **31-35** | 104 | 92 | 66 | 44 | 136 | 62 | **80** |
| **36-40** | 24 | 105 | 79 | 50 | 125 | 63 | **76** |
| **41-45** | 159 | 83 | 75 | 67 | 118 | 87 | **92** |
| **46-50** | 111 | 86 | 83 | 109 | 91 | 80 | **92** |
| **51-55** | 70 | 50 | 87 | 106 | 14 | 81 | **71** |
| **56-60** | 0 | 165 | 87 | 55 | 86 | 66 | **78** |
| **61-65** | 0 | 0 | 0 | 287 | 159 | 167 | **154** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **87** | **96** | **85** | **80** | **101** | **76** | **87** |

Table C23: Values of 100ASC/ESC for **Endowment** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 414 | 0 | 0 | 0 | **67** |
| **26-30** | 0 | 287 | 121 | 125 | 143 | 78 | **106** |
| **31-35** | 830 | 184 | 148 | 72 | 74 | 111 | **109** |
| **36-40** | 708 | 156 | 0 | 114 | 115 | 114 | **112** |
| **41-45** | 0 | 455 | 182 | 114 | 54 | 88 | **93** |
| **46-50** | 3015 | 0 | 81 | 130 | 86 | 88 | **92** |
| **51-55** | 0 | 0 | 180 | 132 | 99 | 91 | **93** |
| **56-60** | 13395 | 4081 | 0 | 0 | 178 | 95 | **103** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 112 | **109** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 270 | **266** |
| **ALL** | **827** | **242** | **118** | **106** | **91** | **96** | **100** |

Table C24: Values of 100ASC/ESC for **Whole of Life** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **26-30** | 0 | 0 | 571 | 226 | 0 | 0 | **112** |
| **31-35** | 0 | 0 | 0 | 339 | 195 | 32 | **75** |
| **36-40** | 0 | 190 | 224 | 0 | 0 | 107 | **99** |
| **41-45** | 520 | 0 | 0 | 0 | 129 | 86 | **84** |
| **46-50** | 626 | 0 | 0 | 223 | 0 | 154 | **145** |
| **51-55** | 0 | 342 | 183 | 128 | 221 | 81 | **94** |
| **56-60** | 0 | 464 | 0 | 0 | 165 | 101 | **102** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 46 | **42** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 110 | **85** |
| **ALL** | **185** | **110** | **109** | **112** | **93** | **97** | **99** |

Table C25: Actual Settled Claims for **All Term Assurances** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 22 | 37 | 32 | 10 | 5 | 3 | **109** |
| **26-30** | 60 | 116 | 94 | 48 | 27 | 25 | **370** |
| **31-35** | 90 | 162 | 144 | 156 | 78 | 74 | **704** |
| **36-40** | 94 | 234 | 226 | 184 | 108 | 115 | **961** |
| **41-45** | 87 | 190 | 238 | 208 | 130 | 124 | **977** |
| **46-50** | 64 | 154 | 187 | 160 | 110 | 164 | **839** |
| **51-55** | 54 | 125 | 140 | 168 | 121 | 156 | **764** |
| **56-60** | 36 | 94 | 112 | 119 | 96 | 150 | **607** |
| **61-65** | 8 | 24 | 33 | 42 | 42 | 72 | **221** |
| **66-70** | 0 | 0 | 2 | 9 | 6 | 16 | **33** |
| **ALL** | **515** | **1,136** | **1,208** | **1,104** | **723** | **899** | **5,585** |

Table C26: Actual Settled Claims for **Decreasing Term Assurances** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 11 | 13 | 10 | 2 | 0 | 0 | **36** |
| **26-30** | 30 | 71 | 47 | 20 | 11 | 10 | **189** |
| **31-35** | 54 | 92 | 77 | 65 | 23 | 24 | **335** |
| **36-40** | 50 | 123 | 102 | 79 | 50 | 36 | **440** |
| **41-45** | 43 | 104 | 123 | 108 | 58 | 41 | **477** |
| **46-50** | 35 | 74 | 94 | 81 | 50 | 46 | **380** |
| **51-55** | 29 | 70 | 78 | 94 | 58 | 59 | **388** |
| **56-60** | 18 | 50 | 69 | 65 | 49 | 71 | **322** |
| **61-65** | 5 | 14 | 21 | 25 | 21 | 32 | **118** |
| **66-70** | 0 | 0 | 1 | 4 | 3 | 8 | **16** |
| **ALL** | **275** | **611** | **622** | **543** | **323** | **327** | **2,701** |

Table C27: Actual Settled Claims for **Level Term Assurances** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 6 | 13 | 14 | 7 | 3 | 2 | **45** |
| **26-30** | 12 | 21 | 25 | 17 | 11 | 9 | **95** |
| **31-35** | 7 | 29 | 45 | 55 | 32 | 34 | **202** |
| **36-40** | 23 | 58 | 58 | 63 | 33 | 56 | **291** |
| **41-45** | 18 | 46 | 61 | 54 | 40 | 38 | **257** |
| **46-50** | 14 | 34 | 46 | 37 | 34 | 66 | **231** |
| **51-55** | 10 | 23 | 34 | 40 | 39 | 52 | **198** |
| **56-60** | 10 | 29 | 27 | 38 | 26 | 50 | **180** |
| **61-65** | 3 | 8 | 7 | 11 | 15 | 27 | **71** |
| **66-70** | 0 | 0 | 0 | 3 | 1 | 4 | **8** |
| **ALL** | **103** | **261** | **317** | **325** | **234** | **338** | **1,578** |

Table C28: Actual Settled Claims for **Unclassified Term Assurances** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 11 | 8 | 1 | 2 | 1 | **28** |
| **26-30** | 18 | 24 | 22 | 11 | 5 | 6 | **86** |
| **31-35** | 29 | 41 | 22 | 36 | 23 | 16 | **167** |
| **36-40** | 21 | 53 | 66 | 42 | 25 | 23 | **230** |
| **41-45** | 26 | 40 | 54 | 46 | 32 | 45 | **243** |
| **46-50** | 15 | 46 | 47 | 42 | 26 | 52 | **228** |
| **51-55** | 15 | 32 | 28 | 34 | 24 | 45 | **178** |
| **56-60** | 8 | 15 | 16 | 16 | 21 | 29 | **105** |
| **61-65** | 0 | 2 | 5 | 6 | 6 | 13 | **32** |
| **66-70** | 0 | 0 | 1 | 2 | 2 | 4 | **9** |
| **ALL** | **137** | **264** | **269** | **236** | **166** | **234** | **1,306** |

Table C29: Actual Settled Claims for **Endowment** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 1 | 2 | 0 | 2 | **5** |
| **26-30** | 0 | 1 | 3 | 3 | 7 | 25 | **39** |
| **31-35** | 4 | 1 | 6 | 6 | 15 | 81 | **113** |
| **36-40** | 0 | 2 | 5 | 8 | 10 | 138 | **163** |
| **41-45** | 2 | 1 | 3 | 9 | 12 | 174 | **201** |
| **46-50** | 1 | 1 | 1 | 4 | 9 | 165 | **181** |
| **51-55** | 1 | 1 | 4 | 9 | 11 | 173 | **199** |
| **56-60** | 0 | 0 | 1 | 1 | 5 | 130 | **137** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 45 | **45** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 5 | **5** |
| **ALL** | **8** | **7** | **24** | **42** | **69** | **938** | **1,088** |

Table C30: Actual Settled Claims for **Whole of Life** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 1 | 0 | 0 | 0 | 2 | **3** |
| **26-30** | 0 | 0 | 0 | 2 | 3 | 11 | **16** |
| **31-35** | 0 | 0 | 3 | 6 | 5 | 23 | **37** |
| **36-40** | 2 | 2 | 2 | 6 | 2 | 70 | **84** |
| **41-45** | 0 | 3 | 6 | 3 | 3 | 130 | **145** |
| **46-50** | 1 | 1 | 3 | 5 | 4 | 144 | **158** |
| **51-55** | 1 | 3 | 5 | 5 | 4 | 167 | **185** |
| **56-60** | 0 | 0 | 1 | 2 | 5 | 147 | **155** |
| **61-65** | 0 | 0 | 2 | 2 | 0 | 74 | **78** |
| **66-70** | 0 | 1 | 1 | 0 | 0 | 20 | **22** |
| **ALL** | **4** | **11** | **23** | **31** | **26** | **788** | **883** |

Table C31: Actual Settled Claims for **All Term Assurances** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 6 | 29 | 7 | 3 | 2 | 0 | **47** |
| **26-30** | 29 | 44 | 40 | 15 | 3 | 5 | **136** |
| **31-35** | 41 | 89 | 72 | 61 | 31 | 24 | **318** |
| **36-40** | 55 | 98 | 91 | 91 | 50 | 39 | **424** |
| **41-45** | 58 | 94 | 112 | 84 | 52 | 55 | **455** |
| **46-50** | 50 | 88 | 109 | 116 | 65 | 59 | **487** |
| **51-55** | 26 | 65 | 77 | 79 | 66 | 57 | **370** |
| **56-60** | 14 | 31 | 60 | 52 | 39 | 64 | **260** |
| **61-65** | 1 | 2 | 16 | 12 | 9 | 35 | **75** |
| **66-70** | 0 | 0 | 0 | 2 | 0 | 1 | **3** |
| **ALL** | **280** | **540** | **584** | **515** | **317** | **339** | **2,575** |

Table C.32: Actual Settled Claims for **Decreasing Term Assurances** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 1 | 14 | 2 | 1 | 1 | 0 | **19** |
| **26-30** | 17 | 25 | 14 | 5 | 1 | 2 | **64** |
| **31-35** | 27 | 46 | 39 | 29 | 12 | 8 | **161** |
| **36-40** | 32 | 67 | 50 | 61 | 25 | 12 | **247** |
| **41-45** | 33 | 57 | 73 | 61 | 29 | 25 | **278** |
| **46-50** | 36 | 54 | 68 | 60 | 38 | 27 | **283** |
| **51-55** | 18 | 44 | 55 | 49 | 36 | 34 | **236** |
| **56-60** | 8 | 22 | 42 | 33 | 28 | 34 | **167** |
| **61-65** | 0 | 2 | 11 | 10 | 8 | 22 | **53** |
| **66-70** | 0 | 0 | 0 | 2 | 0 | 1 | **3** |
| **ALL** | **172** | **331** | **354** | **311** | **178** | **165** | **1,511** |

Table C33: Actual Settled Claims for **Level Term Assurances** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 1 | 5 | 2 | 1 | 0 | 0 | **9** |
| **26-30** | 5 | 10 | 15 | 4 | 1 | 1 | **36** |
| **31-35** | 3 | 15 | 19 | 12 | 14 | 7 | **70** |
| **36-40** | 5 | 10 | 20 | 13 | 14 | 12 | **74** |
| **41-45** | 9 | 14 | 24 | 10 | 14 | 19 | **90** |
| **46-50** | 3 | 6 | 13 | 26 | 13 | 17 | **78** |
| **51-55** | 5 | 8 | 10 | 15 | 15 | 8 | **61** |
| **56-60** | 2 | 5 | 12 | 13 | 7 | 16 | **55** |
| **61-65** | 0 | 0 | 5 | 1 | 1 | 7 | **14** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **33** | **73** | **120** | **95** | **79** | **87** | **487** |

Table C34: Actual Settled Claims for **Unclassified Term Assurances** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 4 | 10 | 3 | 1 | 1 | 0 | **19** |
| **26-30** | 7 | 9 | 11 | 6 | 1 | 2 | **36** |
| **31-35** | 11 | 28 | 14 | 20 | 5 | 9 | **87** |
| **36-40** | 18 | 21 | 21 | 17 | 11 | 15 | **103** |
| **41-45** | 16 | 23 | 15 | 13 | 9 | 11 | **87** |
| **46-50** | 11 | 28 | 28 | 30 | 14 | 15 | **126** |
| **51-55** | 3 | 13 | 12 | 15 | 15 | 15 | **73** |
| **56-60** | 4 | 4 | 6 | 6 | 4 | 14 | **38** |
| **61-65** | 1 | 0 | 0 | 1 | 0 | 6 | **8** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **75** | **136** | **110** | **109** | **60** | **87** | **577** |

Table C35: Actual Settled Claims for **Endowment** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 3 | 0 | 0 | **3** |
| **26-30** | 2 | 0 | 1 | 3 | 1 | 9 | **16** |
| **31-35** | 0 | 0 | 5 | 5 | 13 | 28 | **51** |
| **36-40** | 0 | 0 | 4 | 4 | 5 | 46 | **59** |
| **41-45** | 1 | 1 | 3 | 4 | 5 | 64 | **78** |
| **46-50** | 1 | 1 | 2 | 8 | 15 | 77 | **104** |
| **51-55** | 1 | 0 | 2 | 1 | 5 | 84 | **93** |
| **56-60** | 0 | 0 | 0 | 1 | 3 | 48 | **52** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 15 | **15** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 2 | **2** |
| **ALL** | **5** | **2** | **17** | **29** | **47** | **373** | **473** |

Table C36: Actual Settled Claims for **Whole of Life** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **26-30** | 0 | 0 | 1 | 0 | 1 | 0 | **2** |
| **31-35** | 0 | 0 | 1 | 1 | 3 | 11 | **16** |
| **36-40** | 1 | 0 | 0 | 1 | 2 | 27 | **31** |
| **41-45** | 0 | 1 | 0 | 1 | 3 | 38 | **43** |
| **46-50** | 0 | 1 | 0 | 1 | 1 | 43 | **46** |
| **51-55** | 0 | 1 | 1 | 1 | 2 | 38 | **43** |
| **56-60** | 0 | 0 | 0 | 1 | 0 | 43 | **44** |
| **61-65** | 0 | 0 | 1 | 0 | 0 | 14 | **15** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 3 | **3** |
| **ALL** | **1** | **3** | **4** | **7** | **12** | **217** | **244** |

Table C37: Actual Settled Claims for **All Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 27 | 36 | 27 | 14 | 8 | 0 | **112** |
| **26-30** | 47 | 118 | 107 | 71 | 45 | 31 | **419** |
| **31-35** | 90 | 210 | 216 | 173 | 104 | 104 | **897** |
| **36-40** | 88 | 247 | 256 | 217 | 113 | 146 | **1,067** |
| **41-45** | 98 | 220 | 235 | 214 | 154 | 147 | **1,068** |
| **46-50** | 62 | 136 | 188 | 119 | 107 | 144 | **756** |
| **51-55** | 41 | 119 | 131 | 119 | 80 | 105 | **595** |
| **56-60** | 19 | 50 | 60 | 45 | 45 | 94 | **313** |
| **61-65** | 4 | 4 | 13 | 10 | 10 | 21 | **62** |
| **66-70** | 0 | 0 | 1 | 2 | 2 | 6 | **11** |
| **ALL** | **476** | **1,140** | **1,234** | **984** | **668** | **798** | **5,300** |

Table C38: Actual Settled Claims for **Decreasing Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 12 | 16 | 14 | 6 | 2 | 0 | **50** |
| **26-30** | 22 | 73 | 48 | 32 | 11 | 9 | **195** |
| **31-35** | 43 | 123 | 118 | 77 | 48 | 21 | **430** |
| **36-40** | 38 | 136 | 125 | 105 | 54 | 40 | **498** |
| **41-45** | 54 | 121 | 125 | 99 | 83 | 41 | **523** |
| **46-50** | 38 | 72 | 104 | 60 | 55 | 51 | **380** |
| **51-55** | 26 | 79 | 79 | 58 | 35 | 41 | **318** |
| **56-60** | 13 | 33 | 38 | 27 | 29 | 49 | **189** |
| **61-65** | 4 | 1 | 9 | 7 | 7 | 8 | **36** |
| **66-70** | 0 | 0 | 1 | 0 | 2 | 3 | **6** |
| **ALL** | **250** | **654** | **661** | **471** | **326** | **263** | **2,625** |

Table C39: Actual Settled Claims for **Level Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 4 | 8 | 4 | 5 | 4 | 0 | **25** |
| **26-30** | 12 | 21 | 34 | 25 | 18 | 8 | **118** |
| **31-35** | 14 | 50 | 48 | 58 | 30 | 53 | **253** |
| **36-40** | 22 | 53 | 59 | 57 | 30 | 65 | **286** |
| **41-45** | 23 | 47 | 45 | 62 | 36 | 63 | **276** |
| **46-50** | 8 | 32 | 37 | 33 | 32 | 52 | **194** |
| **51-55** | 9 | 14 | 21 | 27 | 26 | 38 | **135** |
| **56-60** | 3 | 6 | 13 | 8 | 9 | 20 | **59** |
| **61-65** | 0 | 2 | 4 | 3 | 2 | 9 | **20** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 1 | **2** |
| **ALL** | **95** | **233** | **265** | **279** | **187** | **309** | **1,368** |

Table C40: Actual Settled Claims for **Unclassified Term Assurances** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 11 | 12 | 9 | 3 | 2 | 0 | **37** |
| **26-30** | 13 | 24 | 25 | 14 | 16 | 14 | **106** |
| **31-35** | 33 | 37 | 50 | 38 | 26 | 30 | **214** |
| **36-40** | 28 | 58 | 72 | 55 | 29 | 41 | **283** |
| **41-45** | 21 | 52 | 65 | 53 | 35 | 43 | **269** |
| **46-50** | 16 | 32 | 47 | 26 | 20 | 41 | **182** |
| **51-55** | 6 | 26 | 31 | 34 | 19 | 26 | **142** |
| **56-60** | 3 | 11 | 9 | 10 | 7 | 25 | **65** |
| **61-65** | 0 | 1 | 0 | 0 | 1 | 4 | **6** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 2 | **3** |
| **ALL** | **131** | **253** | **308** | **234** | **155** | **226** | **1,307** |

Table C41: Actual Settled Claims for **Endowment** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 1 | 1 | 1 | 0 | **3** |
| **26-30** | 0 | 1 | 2 | 7 | 8 | 29 | **47** |
| **31-35** | 2 | 4 | 5 | 9 | 13 | 108 | **141** |
| **36-40** | 1 | 3 | 6 | 11 | 15 | 166 | **202** |
| **41-45** | 1 | 2 | 3 | 1 | 10 | 154 | **171** |
| **46-50** | 0 | 0 | 0 | 8 | 7 | 128 | **143** |
| **51-55** | 0 | 0 | 2 | 1 | 10 | 91 | **104** |
| **56-60** | 1 | 0 | 0 | 2 | 5 | 55 | **63** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 18 | **18** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 3 | **3** |
| **ALL** | **5** | **10** | **19** | **40** | **69** | **752** | **895** |

Table C42: Actual Settled Claims for **Whole of Life** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 1 | 0 | 0 | 0 | 0 | **1** |
| **26-30** | 1 | 2 | 0 | 0 | 0 | 5 | **8** |
| **31-35** | 1 | 3 | 2 | 5 | 8 | 36 | **55** |
| **36-40** | 0 | 4 | 2 | 8 | 10 | 94 | **118** |
| **41-45** | 1 | 5 | 4 | 5 | 4 | 115 | **134** |
| **46-50** | 0 | 4 | 5 | 8 | 8 | 128 | **153** |
| **51-55** | 0 | 1 | 1 | 4 | 5 | 85 | **96** |
| **56-60** | 1 | 1 | 1 | 3 | 0 | 83 | **89** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 24 | **24** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 5 | **5** |
| **ALL** | **4** | **21** | **15** | **33** | **35** | **575** | **683** |

Table C43: Actual Settled Claims for **All Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 9 | 15 | 2 | 1 | 0 | **32** |
| **26-30** | 14 | 40 | 32 | 23 | 13 | 4 | **126** |
| **31-35** | 24 | 50 | 47 | 30 | 21 | 12 | **184** |
| **36-40** | 27 | 70 | 65 | 51 | 36 | 28 | **277** |
| **41-45** | 41 | 63 | 76 | 52 | 47 | 39 | **318** |
| **46-50** | 25 | 48 | 67 | 55 | 38 | 41 | **274** |
| **51-55** | 18 | 27 | 46 | 48 | 23 | 41 | **203** |
| **56-60** | 6 | 18 | 23 | 25 | 19 | 26 | **117** |
| **61-65** | 0 | 0 | 1 | 7 | 3 | 9 | **20** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **ALL** | **160** | **325** | **372** | **294** | **201** | **200** | **1,552** |

Table C44: Actual Settled Claims for **Decreasing Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 3 | 3 | 7 | 1 | 0 | 0 | **14** |
| **26-30** | 5 | 21 | 18 | 12 | 3 | 2 | **61** |
| **31-35** | 13 | 24 | 24 | 17 | 10 | 5 | **93** |
| **36-40** | 25 | 46 | 39 | 28 | 19 | 14 | **171** |
| **41-45** | 22 | 45 | 54 | 30 | 24 | 19 | **194** |
| **46-50** | 14 | 31 | 44 | 35 | 23 | 24 | **171** |
| **51-55** | 11 | 17 | 34 | 33 | 15 | 20 | **130** |
| **56-60** | 6 | 10 | 14 | 20 | 14 | 19 | **83** |
| **61-65** | 0 | 0 | 0 | 4 | 2 | 4 | **10** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **99** | **197** | **234** | **180** | **110** | **107** | **927** |

Table C45: Actual Settled Claims for **Level Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 2 | 3 | 3 | 1 | 0 | 0 | **9** |
| **26-30** | 5 | 8 | 6 | 4 | 6 | 1 | **30** |
| **31-35** | 4 | 15 | 15 | 9 | 3 | 3 | **49** |
| **36-40** | 0 | 9 | 14 | 17 | 7 | 8 | **55** |
| **41-45** | 6 | 6 | 10 | 13 | 12 | 10 | **57** |
| **46-50** | 4 | 7 | 12 | 7 | 7 | 7 | **44** |
| **51-55** | 5 | 7 | 5 | 6 | 7 | 12 | **42** |
| **56-60** | 0 | 4 | 6 | 3 | 2 | 2 | **17** |
| **61-65** | 0 | 0 | 1 | 1 | 0 | 2 | **4** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **ALL** | **26** | **59** | **72** | **62** | **44** | **45** | **308** |

Table C46: Actual Settled Claims for **Unclassified Term Assurances** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 3 | 5 | 0 | 1 | 0 | **9** |
| **26-30** | 4 | 11 | 8 | 7 | 4 | 1 | **35** |
| **31-35** | 7 | 11 | 8 | 4 | 8 | 4 | **42** |
| **36-40** | 2 | 15 | 12 | 6 | 10 | 6 | **51** |
| **41-45** | 13 | 12 | 12 | 9 | 11 | 10 | **67** |
| **46-50** | 7 | 10 | 11 | 13 | 8 | 10 | **59** |
| **51-55** | 2 | 3 | 7 | 9 | 1 | 9 | **31** |
| **56-60** | 0 | 4 | 3 | 2 | 3 | 5 | **17** |
| **61-65** | 0 | 0 | 0 | 2 | 1 | 3 | **6** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **35** | **69** | **66** | **52** | **47** | **48** | **317** |

Table C47: Actual Settled Claims for **Endowment** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 1 | 0 | 0 | 0 | **1** |
| **26-30** | 0 | 1 | 1 | 2 | 3 | 5 | **12** |
| **31-35** | 1 | 1 | 2 | 2 | 3 | 26 | **35** |
| **36-40** | 1 | 1 | 0 | 4 | 6 | 45 | **57** |
| **41-45** | 0 | 3 | 3 | 4 | 3 | 43 | **56** |
| **46-50** | 2 | 0 | 1 | 4 | 4 | 44 | **55** |
| **51-55** | 0 | 0 | 1 | 2 | 3 | 40 | **46** |
| **56-60** | 1 | 1 | 0 | 0 | 2 | 26 | **30** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 8 | **8** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 2 | **2** |
| **ALL** | **5** | **7** | **9** | **18** | **24** | **239** | **302** |

Table C48: Actual Settled Claims for **Whole of Life** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **26-30** | 0 | 0 | 2 | 1 | 0 | 0 | **3** |
| **31-35** | 0 | 0 | 0 | 3 | 2 | 2 | **7** |
| **36-40** | 0 | 1 | 2 | 0 | 0 | 15 | **18** |
| **41-45** | 1 | 0 | 0 | 0 | 2 | 17 | **20** |
| **46-50** | 1 | 0 | 0 | 2 | 0 | 32 | **35** |
| **51-55** | 0 | 1 | 1 | 1 | 2 | 15 | **20** |
| **56-60** | 0 | 1 | 0 | 0 | 1 | 14 | **16** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 3 | **3** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| **ALL** | **2** | **3** | **5** | **7** | **7** | **99** | **123** |

## Appendix D: Detailed results by sum assured band

Table D1: Values of 100ASC/ESC for **sum assured band 1 (£0 - £40,000)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 79 | 85 | 106 | 108 | 73 | 222 | **101** |
| **26-30** | 72 | 98 | 75 | 78 | 105 | 150 | **100** |
| **31-35** | 80 | 90 | 87 | 120 | 99 | 101 | **98** |
| **36-40** | 115 | 108 | 107 | 112 | 76 | 110 | **106** |
| **41-45** | 90 | 102 | 91 | 102 | 80 | 96 | **95** |
| **46-50** | 81 | 79 | 95 | 103 | 100 | 102 | **97** |
| **51-55** | 85 | 98 | 96 | 87 | 93 | 96 | **94** |
| **56-60** | 100 | 73 | 90 | 102 | 92 | 90 | **90** |
| **61-65** | 103 | 108 | 109 | 105 | 106 | 88 | **96** |
| **66-70** | 0 | 64 | 88 | 93 | 49 | 85 | **81** |
| **ALL** | **90** | **93** | **95** | **101** | **91** | **97** | **96** |

Table D2: Values of 100ASC/ESC for **sum assured band 2 (£40,001 - £80,000)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 85 | 83 | 107 | 110 | 44 | 95 | **91** |
| **26-30** | 106 | 103 | 106 | 88 | 81 | 134 | **102** |
| **31-35** | 104 | 88 | 98 | 127 | 115 | 99 | **104** |
| **36-40** | 93 | 108 | 97 | 91 | 104 | 91 | **97** |
| **41-45** | 90 | 82 | 114 | 114 | 104 | 111 | **105** |
| **46-50** | 88 | 109 | 91 | 92 | 76 | 107 | **98** |
| **51-55** | 91 | 85 | 72 | 144 | 114 | 131 | **114** |
| **56-60** | 128 | 228 | 124 | 122 | 141 | 109 | **129** |
| **61-65** | 358 | 103 | 97 | 168 | 94 | 110 | **117** |
| **66-70** | 0 | 0 | 176 | 487 | 219 | 61 | **111** |
| **ALL** | **97** | **102** | **100** | **112** | **104** | **109** | **105** |

Table D3: Values of 100ASC/ESC for **sum assured band 3 (£80,001+)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 80 | 111 | 162 | 0 | 268 | 422 | **109** |
| **26-30** | 97 | 105 | 89 | 63 | 121 | 143 | **96** |
| **31-35** | 124 | 97 | 74 | 119 | 99 | 74 | **97** |
| **36-40** | 90 | 114 | 100 | 111 | 93 | 68 | **98** |
| **41-45** | 97 | 90 | 103 | 105 | 119 | 95 | **100** |
| **46-50** | 115 | 89 | 100 | 89 | 105 | 138 | **108** |
| **51-55** | 182 | 91 | 85 | 114 | 108 | 90 | **101** |
| **56-60** | 166 | 113 | 95 | 72 | 116 | 120 | **109** |
| **61-65** | 0 | 172 | 88 | 98 | 223 | 137 | **137** |
| **66-70** | 0 | 0 | 246 | 0 | 184 | 71 | **84** |
| **ALL** | **107** | **101** | **94** | **101** | **110** | **101** | **101** |

Table D4: Values of 100ASC/ESC for **sum assured band 1 (£0 - £40,000)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 54 | 250 | 74 | 228 | 112 | 0 | **148** |
| **26-30** | 97 | 34 | 75 | 81 | 46 | 141 | **77** |
| **31-35** | 117 | 104 | 100 | 131 | 141 | 96 | **111** |
| **36-40** | 96 | 90 | 86 | 101 | 94 | 76 | **88** |
| **41-45** | 105 | 84 | 80 | 90 | 92 | 93 | **90** |
| **46-50** | 106 | 102 | 89 | 120 | 93 | 94 | **99** |
| **51-55** | 101 | 97 | 104 | 98 | 110 | 93 | **99** |
| **56-60** | 117 | 91 | 129 | 106 | 91 | 107 | **107** |
| **61-65** | 53 | 32 | 149 | 85 | 78 | 100 | **95** |
| **66-70** | 0 | 0 | 0 | 71 | 0 | 78 | **59** |
| **ALL** | **104** | **93** | **98** | **105** | **97** | **95** | **98** |

Table D5: Values of 100ASC/ESC for **sum assured band 2 (£40,001 - £80,000)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 40 | 180 | 45 | 110 | 165 | 0 | **104** |
| **26-30** | 100 | 117 | 106 | 71 | 0 | 96 | **93** |
| **31-35** | 98 | 97 | 114 | 98 | 116 | 108 | **105** |
| **36-40** | 122 | 91 | 97 | 121 | 134 | 120 | **111** |
| **41-45** | 142 | 104 | 121 | 80 | 97 | 105 | **106** |
| **46-50** | 138 | 83 | 132 | 143 | 131 | 91 | **115** |
| **51-55** | 51 | 84 | 61 | 102 | 105 | 94 | **87** |
| **56-60** | 0 | 60 | 142 | 118 | 148 | 75 | **99** |
| **61-65** | 0 | 0 | 94 | 123 | 56 | 148 | **107** |
| **66-70** | 0 | 0 | 0 | 483 | 0 | 0 | **84** |
| **ALL** | **109** | **98** | **108** | **107** | **111** | **102** | **105** |

Table D6: Values of 100ASC/ESC for **sum assured band 3 (£80,001+)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 89 | 239 | 206 | 222 | 0 | 0 | **171** |
| **26-30** | 136 | 121 | 163 | 88 | 141 | 0 | **129** |
| **31-35** | 45 | 117 | 70 | 100 | 94 | 63 | **85** |
| **36-40** | 90 | 116 | 91 | 120 | 61 | 99 | **100** |
| **41-45** | 110 | 105 | 143 | 126 | 71 | 137 | **119** |
| **46-50** | 97 | 65 | 103 | 114 | 144 | 116 | **105** |
| **51-55** | 43 | 136 | 100 | 71 | 126 | 85 | **96** |
| **56-60** | 0 | 49 | 105 | 95 | 76 | 79 | **79** |
| **61-65** | 0 | 0 | 257 | 0 | 0 | 190 | **105** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **86** | **112** | **107** | **109** | **93** | **104** | **104** |

Table D7: Values of 100ASC/ESC for **sum assured band 1 (£0 - £40,000)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 161 | 49 | 17 | 48 | 41 | 0 | **51** |
| **26-30** | 65 | 122 | 112 | 104 | 130 | 130 | **115** |
| **31-35** | 100 | 78 | 106 | 112 | 105 | 102 | **100** |
| **36-40** | 85 | 94 | 90 | 126 | 91 | 102 | **100** |
| **41-45** | 114 | 101 | 95 | 107 | 89 | 95 | **98** |
| **46-50** | 77 | 81 | 99 | 78 | 80 | 94 | **88** |
| **51-55** | 103 | 122 | 98 | 99 | 94 | 86 | **96** |
| **56-60** | 108 | 98 | 93 | 83 | 80 | 104 | **97** |
| **61-65** | 185 | 14 | 96 | 64 | 67 | 80 | **76** |
| **66-70** | 0 | 0 | 56 | 42 | 83 | 67 | **63** |
| **ALL** | **97** | **95** | **96** | **98** | **89** | **95** | **95** |

Table D8: Values of 100ASC/ESC for **sum assured band 2 (£40,001 - £80,000)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 144 | 77 | 122 | 127 | 211 | 0 | **113** |
| **26-30** | 91 | 96 | 75 | 81 | 122 | 102 | **91** |
| **31-35** | 88 | 103 | 101 | 111 | 97 | 109 | **104** |
| **36-40** | 77 | 104 | 98 | 106 | 93 | 102 | **100** |
| **41-45** | 89 | 96 | 92 | 110 | 128 | 105 | **103** |
| **46-50** | 149 | 84 | 111 | 92 | 107 | 112 | **106** |
| **51-55** | 123 | 125 | 107 | 119 | 119 | 85 | **105** |
| **56-60** | 232 | 155 | 83 | 39 | 133 | 127 | **114** |
| **61-65** | 414 | 225 | 128 | 55 | 55 | 122 | **118** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 92 | **73** |
| **ALL** | **102** | **100** | **98** | **102** | **110** | **105** | **103** |

Table D9: Values of 100ASC/ESC for **sum assured band 3 (£80,001+)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 92 | 154 | 136 | 153 | 267 | 0 | **132** |
| **26-30** | 83 | 98 | 110 | 122 | 78 | 134 | **102** |
| **31-35** | 102 | 111 | 89 | 91 | 118 | 88 | **99** |
| **36-40** | 95 | 112 | 99 | 83 | 77 | 113 | **98** |
| **41-45** | 132 | 132 | 107 | 84 | 113 | 81 | **104** |
| **46-50** | 101 | 130 | 108 | 69 | 141 | 147 | **118** |
| **51-55** | 127 | 126 | 134 | 78 | 97 | 104 | **108** |
| **56-60** | 97 | 166 | 140 | 131 | 112 | 53 | **101** |
| **61-65** | 0 | 232 | 0 | 132 | 133 | 34 | **71** |
| **66-70** | 0 | 0 | 0 | 1449 | 0 | 107 | **174** |
| **ALL** | **101** | **117** | **102** | **89** | **105** | **103** | **103** |

Table D10: Values of 100ASC/ESC for **sum assured band 1 (£0 - £40,000)** for female smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 113 | 87 | 130 | 0 | 0 | **74** |
| **26-30** | 118 | 104 | 173 | 137 | 124 | 74 | **122** |
| **31-35** | 100 | 81 | 114 | 66 | 126 | 81 | **92** |
| **36-40** | 87 | 106 | 98 | 99 | 102 | 104 | **101** |
| **41-45** | 125 | 103 | 109 | 91 | 123 | 92 | **103** |
| **46-50** | 86 | 96 | 88 | 108 | 93 | 100 | **97** |
| **51-55** | 101 | 79 | 105 | 124 | 85 | 86 | **95** |
| **56-60** | 126 | 114 | 106 | 112 | 118 | 101 | **108** |
| **61-65** | 0 | 0 | 30 | 137 | 48 | 96 | **82** |
| **66-70** | 0 | 0 | 0 | 184 | 0 | 75 | **69** |
| **ALL** | **100** | **96** | **103** | **106** | **102** | **94** | **99** |

Table D11: Values of 100ASC/ESC for **sum assured band 2 (£40,001 - £80,000)** for female smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 107 | 71 | 299 | 0 | 135 | 0 | **128** |
| **26-30** | 77 | 161 | 95 | 113 | 144 | 75 | **115** |
| **31-35** | 61 | 113 | 89 | 93 | 81 | 91 | **91** |
| **36-40** | 76 | 85 | 79 | 94 | 115 | 121 | **95** |
| **41-45** | 130 | 83 | 98 | 96 | 111 | 108 | **102** |
| **46-50** | 124 | 60 | 136 | 68 | 99 | 121 | **102** |
| **51-55** | 156 | 103 | 116 | 64 | 53 | 150 | **110** |
| **56-60** | 0 | 303 | 119 | 75 | 92 | 35 | **91** |
| **61-65** | 0 | 0 | 0 | 263 | 284 | 0 | **70** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 680 | **637** |
| **ALL** | **93** | **101** | **105** | **88** | **103** | **109** | **101** |

Table D12: Values of 100ASC/ESC for **sum assured band 3 (£80,001+)** for female smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 74 | 102 | 195 | 0 | 0 | 0 | **101** |
| **26-30** | 58 | 96 | 107 | 147 | 155 | 0 | **99** |
| **31-35** | 148 | 83 | 65 | 103 | 96 | 83 | **93** |
| **36-40** | 70 | 170 | 116 | 94 | 130 | 99 | **118** |
| **41-45** | 158 | 127 | 92 | 24 | 94 | 50 | **85** |
| **46-50** | 243 | 96 | 145 | 159 | 138 | 99 | **137** |
| **51-55** | 304 | 63 | 140 | 195 | 141 | 68 | **130** |
| **56-60** | 0 | 255 | 0 | 141 | 0 | 0 | **57** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **115** | **115** | **102** | **99** | **114** | **74** | **104** |

Table D13: Actual Settled Claims for **sum assured band 1 (£0 - £40,000)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 3 | 6 | 7 | 5 | 2 | 4 | **27** |
| **26-30** | 6 | 16 | 12 | 10 | 10 | 28 | **82** |
| **31-35** | 13 | 30 | 30 | 34 | 22 | 72 | **201** |
| **36-40** | 30 | 59 | 62 | 55 | 29 | 152 | **387** |
| **41-45** | 29 | 71 | 70 | 68 | 41 | 189 | **468** |
| **46-50** | 26 | 57 | 79 | 75 | 57 | 237 | **531** |
| **51-55** | 27 | 73 | 88 | 75 | 65 | 282 | **610** |
| **56-60** | 23 | 42 | 68 | 76 | 59 | 276 | **544** |
| **61-65** | 5 | 17 | 28 | 30 | 28 | 133 | **241** |
| **66-70** | 0 | 1 | 3 | 5 | 3 | 33 | **45** |
| **ALL** | **162** | **372** | **447** | **433** | **316** | **1,406** | **3,136** |

Table D14: Actual Settled Claims for **sum assured band 2 (£40,001 - £80,000)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 11 | 17 | 15 | 7 | 1 | 1 | **52** |
| **26-30** | 23 | 47 | 48 | 29 | 16 | 27 | **190** |
| **31-35** | 31 | 56 | 67 | 71 | 46 | 85 | **356** |
| **36-40** | 34 | 85 | 83 | 65 | 53 | 124 | **444** |
| **41-45** | 30 | 61 | 97 | 83 | 54 | 161 | **486** |
| **46-50** | 22 | 63 | 62 | 55 | 33 | 141 | **376** |
| **51-55** | 14 | 33 | 36 | 71 | 43 | 161 | **358** |
| **56-60** | 9 | 43 | 33 | 34 | 33 | 101 | **253** |
| **61-65** | 3 | 3 | 5 | 11 | 6 | 37 | **65** |
| **66-70** | 0 | 0 | 1 | 4 | 2 | 5 | **12** |
| **ALL** | **177** | **408** | **447** | **430** | **287** | **843** | **2,592** |

Table D15: Actual Settled Claims for **sum assured band 3 (£80,001+)** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 11 | 16 | 11 | 0 | 2 | 2 | **42** |
| **26-30** | 33 | 57 | 37 | 14 | 11 | 8 | **160** |
| **31-35** | 53 | 77 | 56 | 64 | 30 | 25 | **305** |
| **36-40** | 39 | 99 | 90 | 78 | 41 | 49 | **396** |
| **41-45** | 31 | 63 | 81 | 70 | 52 | 80 | **377** |
| **46-50** | 22 | 40 | 54 | 43 | 35 | 100 | **294** |
| **51-55** | 18 | 23 | 29 | 39 | 28 | 57 | **194** |
| **56-60** | 7 | 13 | 16 | 13 | 17 | 53 | **119** |
| **61-65** | 0 | 4 | 3 | 4 | 9 | 23 | **43** |
| **66-70** | 0 | 0 | 1 | 0 | 1 | 3 | **5** |
| **ALL** | **214** | **392** | **378** | **325** | **226** | **400** | **1,935** |

Table D16: Actual Settled Claims for **sum assured band 1 (£0 - £40,000)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 1 | 8 | 2 | 4 | 1 | 0 | **16** |
| **26-30** | 5 | 3 | 6 | 5 | 2 | 9 | **30** |
| **31-35** | 15 | 24 | 22 | 23 | 18 | 29 | **131** |
| **36-40** | 19 | 33 | 31 | 31 | 21 | 45 | **180** |
| **41-45** | 26 | 40 | 40 | 39 | 30 | 85 | **260** |
| **46-50** | 30 | 58 | 55 | 69 | 42 | 123 | **377** |
| **51-55** | 23 | 48 | 61 | 56 | 50 | 140 | **378** |
| **56-60** | 15 | 27 | 49 | 42 | 31 | 140 | **304** |
| **61-65** | 1 | 2 | 15 | 10 | 9 | 56 | **93** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 6 | **7** |
| **ALL** | **135** | **243** | **281** | **280** | **204** | **633** | **1,776** |

Table D17: Actual Settled Claims for **sum assured band 2 (£40,001 - £80,000)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 2 | 13 | 2 | 2 | 1 | 0 | **20** |
| **26-30** | 11 | 23 | 18 | 8 | 0 | 5 | **65** |
| **31-35** | 19 | 35 | 39 | 26 | 20 | 30 | **169** |
| **36-40** | 25 | 36 | 39 | 40 | 30 | 51 | **221** |
| **41-45** | 24 | 36 | 45 | 26 | 22 | 48 | **201** |
| **46-50** | 18 | 23 | 41 | 40 | 26 | 40 | **188** |
| **51-55** | 3 | 12 | 11 | 19 | 15 | 31 | **91** |
| **56-60** | 0 | 3 | 10 | 9 | 9 | 12 | **43** |
| **61-65** | 0 | 0 | 1 | 2 | 1 | 6 | **10** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **ALL** | **102** | **181** | **206** | **173** | **124** | **223** | **1,009** |

Table D18: Actual Settled Claims for **sum assured band 3 (£80,001+)** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 3 | 8 | 3 | 1 | 0 | 0 | **15** |
| **26-30** | 15 | 19 | 18 | 5 | 3 | 0 | **60** |
| **31-35** | 8 | 35 | 18 | 18 | 9 | 5 | **93** |
| **36-40** | 14 | 33 | 25 | 26 | 8 | 16 | **122** |
| **41-45** | 11 | 21 | 31 | 24 | 9 | 24 | **120** |
| **46-50** | 6 | 9 | 16 | 16 | 14 | 18 | **79** |
| **51-55** | 1 | 8 | 8 | 6 | 8 | 9 | **40** |
| **56-60** | 0 | 1 | 3 | 3 | 2 | 4 | **13** |
| **61-65** | 0 | 0 | 1 | 0 | 0 | 2 | **3** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **58** | **134** | **123** | **99** | **53** | **78** | **545** |

Table D19: Actual Settled Claims for **sum assured band 1 (£0 - £40,000)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 3 | 1 | 2 | 1 | 0 | **12** |
| **26-30** | 6 | 24 | 22 | 16 | 15 | 31 | **114** |
| **31-35** | 21 | 36 | 53 | 46 | 33 | 97 | **286** |
| **36-40** | 27 | 68 | 72 | 84 | 46 | 174 | **471** |
| **41-45** | 41 | 84 | 91 | 88 | 56 | 212 | **572** |
| **46-50** | 25 | 63 | 91 | 64 | 51 | 215 | **509** |
| **51-55** | 26 | 78 | 79 | 75 | 57 | 198 | **513** |
| **56-60** | 14 | 35 | 45 | 40 | 33 | 183 | **350** |
| **61-65** | 4 | 1 | 11 | 8 | 8 | 51 | **83** |
| **66-70** | 0 | 0 | 1 | 1 | 2 | 11 | **15** |
| **ALL** | **169** | **392** | **466** | **424** | **302** | **1,172** | **2,925** |

Table D20: Actual Settled Claims for **sum assured band 2 (£40,001 - £80,000)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 14 | 14 | 17 | 9 | 6 | 0 | **60** |
| **26-30** | 19 | 45 | 37 | 30 | 29 | 27 | **187** |
| **31-35** | 31 | 84 | 91 | 82 | 51 | 116 | **455** |
| **36-40** | 31 | 97 | 102 | 92 | 57 | 154 | **533** |
| **41-45** | 29 | 74 | 83 | 86 | 71 | 153 | **496** |
| **46-50** | 31 | 43 | 68 | 50 | 42 | 124 | **358** |
| **51-55** | 12 | 32 | 36 | 38 | 29 | 63 | **210** |
| **56-60** | 7 | 13 | 10 | 5 | 14 | 47 | **96** |
| **61-65** | 1 | 2 | 2 | 1 | 1 | 11 | **18** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 2 | **2** |
| **ALL** | **175** | **404** | **446** | **393** | **300** | **697** | **2,415** |

Table D21: Actual Settled Claims for **sum assured band 3 (£80,001+)** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 10 | 21 | 10 | 4 | 2 | 0 | **47** |
| **26-30** | 25 | 53 | 50 | 32 | 9 | 9 | **178** |
| **31-35** | 44 | 98 | 79 | 59 | 44 | 35 | **359** |
| **36-40** | 36 | 94 | 90 | 61 | 35 | 80 | **396** |
| **41-45** | 31 | 72 | 68 | 46 | 41 | 54 | **312** |
| **46-50** | 11 | 35 | 36 | 21 | 29 | 62 | **194** |
| **51-55** | 5 | 13 | 19 | 11 | 10 | 24 | **82** |
| **56-60** | 1 | 5 | 6 | 6 | 4 | 6 | **28** |
| **61-65** | 0 | 1 | 0 | 1 | 1 | 1 | **4** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 1 | **2** |
| **ALL** | **163** | **392** | **358** | **242** | **175** | **272** | **1,602** |

Table D22: Actual Settled Claims for **sum assured band 1 (£0 - £40,000)** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 3 | 2 | 2 | 0 | 0 | **7** |
| **26-30** | 5 | 8 | 13 | 8 | 5 | 5 | **44** |
| **31-35** | 9 | 14 | 20 | 9 | 12 | 19 | **83** |
| **36-40** | 13 | 30 | 30 | 25 | 18 | 48 | **164** |
| **41-45** | 24 | 39 | 47 | 34 | 33 | 65 | **242** |
| **46-50** | 16 | 36 | 39 | 44 | 28 | 86 | **249** |
| **51-55** | 12 | 21 | 36 | 42 | 23 | 74 | **208** |
| **56-60** | 7 | 15 | 20 | 22 | 20 | 64 | **148** |
| **61-65** | 0 | 0 | 1 | 6 | 2 | 20 | **29** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 2 | **3** |
| **ALL** | **86** | **166** | **208** | **193** | **141** | **383** | **1,177** |

Table D23: Actual Settled Claims for **sum assured band 2 (£40,001 - £80,000)** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 4 | 4 | 12 | 0 | 1 | 0 | **21** |
| **26-30** | 6 | 23 | 13 | 11 | 8 | 4 | **65** |
| **31-35** | 7 | 25 | 20 | 16 | 9 | 17 | **94** |
| **36-40** | 10 | 21 | 21 | 20 | 16 | 33 | **121** |
| **41-45** | 14 | 18 | 24 | 20 | 15 | 30 | **121** |
| **46-50** | 8 | 8 | 22 | 10 | 10 | 27 | **85** |
| **51-55** | 4 | 6 | 9 | 5 | 3 | 20 | **47** |
| **56-60** | 0 | 5 | 3 | 2 | 2 | 2 | **14** |
| **61-65** | 0 | 0 | 0 | 1 | 1 | 0 | **2** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| **ALL** | **53** | **110** | **124** | **85** | **65** | **134** | **571** |

Table D24: Actual Settled Claims for **sum assured band 3 (£80,001+)** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 2 | 3 | 3 | 0 | 0 | 0 | **8** |
| **26-30** | 4 | 10 | 9 | 7 | 3 | 0 | **33** |
| **31-35** | 12 | 12 | 9 | 10 | 5 | 4 | **52** |
| **36-40** | 5 | 22 | 16 | 10 | 8 | 8 | **69** |
| **41-45** | 7 | 11 | 9 | 2 | 5 | 4 | **38** |
| **46-50** | 5 | 4 | 7 | 7 | 4 | 5 | **32** |
| **51-55** | 2 | 1 | 3 | 4 | 2 | 2 | **14** |
| **56-60** | 0 | 1 | 0 | 1 | 0 | 0 | **2** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **37** | **64** | **56** | **41** | **27** | **23** | **248** |

## Appendix E: Detailed results by sales channel

Table E1: Values of 100ASC/ESC for **bancassurer** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 49 | 88 | 103 | 119 | 198 | 182 | **89** |
| **26-30** | 105 | 130 | 76 | 89 | 67 | 108 | **100** |
| **31-35** | 80 | 100 | 107 | 137 | 124 | 86 | **104** |
| **36-40** | 96 | 108 | 112 | 79 | 92 | 99 | **99** |
| **41-45** | 95 | 79 | 120 | 122 | 98 | 108 | **105** |
| **46-50** | 88 | 83 | 100 | 89 | 96 | 105 | **96** |
| **51-55** | 107 | 78 | 92 | 118 | 110 | 93 | **98** |
| **56-60** | 105 | 113 | 108 | 102 | 112 | 100 | **105** |
| **61-65** | 172 | 117 | 99 | 126 | 122 | 97 | **107** |
| **66-70** | 0 | 128 | 39 | 128 | 90 | 78 | **85** |
| **ALL** | **95** | **95** | **104** | **107** | **105** | **99** | **101** |

Table E2: Values of 100ASC/ESC for **direct sales** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 122 | 91 | 161 | 161 | 90 | 245 | **134** |
| **26-30** | 150 | 135 | 44 | 80 | 74 | 189 | **111** |
| **31-35** | 131 | 80 | 95 | 132 | 102 | 110 | **107** |
| **36-40** | 110 | 126 | 94 | 86 | 66 | 95 | **96** |
| **41-45** | 122 | 107 | 102 | 98 | 59 | 98 | **97** |
| **46-50** | 154 | 78 | 91 | 109 | 122 | 121 | **115** |
| **51-55** | 182 | 127 | 141 | 165 | 120 | 118 | **127** |
| **56-60** | 161 | 109 | 66 | 104 | 79 | 94 | **94** |
| **61-65** | 0 | 201 | 158 | 116 | 61 | 112 | **113** |
| **66-70** | 0 | 0 | 147 | 217 | 0 | 76 | **78** |
| **ALL** | **136** | **108** | **98** | **114** | **87** | **108** | **107** |

Table E3: Values of 100ASC/ESC for **IFA** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 64 | 100 | 111 | 59 | 51 | 198 | **89** |
| **26-30** | 92 | 85 | 104 | 81 | 123 | 128 | **98** |
| **31-35** | 124 | 100 | 65 | 123 | 98 | 88 | **96** |
| **36-40** | 91 | 105 | 100 | 121 | 96 | 96 | **102** |
| **41-45** | 79 | 99 | 98 | 104 | 122 | 107 | **103** |
| **46-50** | 72 | 102 | 100 | 91 | 86 | 106 | **97** |
| **51-55** | 78 | 96 | 69 | 92 | 100 | 111 | **96** |
| **56-60** | 100 | 121 | 85 | 101 | 111 | 94 | **99** |
| **61-65** | 59 | 49 | 103 | 87 | 124 | 91 | **92** |
| **66-70** | 0 | 0 | 274 | 83 | 93 | 112 | **113** |
| **ALL** | **90** | **100** | **91** | **104** | **103** | **102** | **99** |

Table E4: Values of 100ASC/ESC for **bancassurer** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 240 | 131 | 0 | 0 | 0 | **114** |
| **26-30** | 118 | 123 | 166 | 58 | 0 | 98 | **111** |
| **31-35** | 97 | 89 | 114 | 90 | 105 | 116 | **101** |
| **36-40** | 82 | 103 | 101 | 116 | 79 | 115 | **102** |
| **41-45** | 125 | 108 | 131 | 105 | 107 | 107 | **113** |
| **46-50** | 119 | 104 | 102 | 126 | 94 | 99 | **106** |
| **51-55** | 88 | 97 | 103 | 105 | 104 | 91 | **98** |
| **56-60** | 69 | 89 | 132 | 132 | 103 | 121 | **116** |
| **61-65** | 0 | 19 | 146 | 105 | 78 | 103 | **97** |
| **66-70** | 0 | 0 | 0 | 157 | 0 | 69 | **63** |
| **ALL** | **98** | **101** | **116** | **113** | **95** | **105** | **106** |

Table E5: Values of 100ASC/ESC for **direct sales** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 192 | 62 | 300 | 188 | 0 | **131** |
| **26-30** | 188 | 130 | 169 | 203 | 84 | 127 | **152** |
| **31-35** | 122 | 140 | 63 | 89 | 179 | 100 | **110** |
| **36-40** | 129 | 107 | 123 | 111 | 111 | 108 | **113** |
| **41-45** | 181 | 125 | 99 | 59 | 92 | 109 | **107** |
| **46-50** | 100 | 93 | 111 | 136 | 155 | 112 | **117** |
| **51-55** | 63 | 76 | 89 | 64 | 69 | 101 | **89** |
| **56-60** | 139 | 32 | 119 | 48 | 47 | 86 | **80** |
| **61-65** | 494 | 0 | 253 | 0 | 0 | 116 | **108** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 93 | **82** |
| **ALL** | **129** | **110** | **106** | **99** | **110** | **105** | **107** |

Table E6: Values of 100ASC/ESC for **IFA** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 109 | 226 | 79 | 231 | 157 | 0 | **157** |
| **26-30** | 99 | 85 | 92 | 57 | 35 | 110 | **83** |
| **31-35** | 75 | 116 | 109 | 128 | 120 | 87 | **107** |
| **36-40** | 123 | 95 | 80 | 117 | 112 | 82 | **98** |
| **41-45** | 113 | 79 | 83 | 87 | 77 | 92 | **87** |
| **46-50** | 106 | 85 | 109 | 129 | 110 | 81 | **101** |
| **51-55** | 112 | 110 | 88 | 83 | 114 | 90 | **96** |
| **56-60** | 128 | 81 | 121 | 60 | 121 | 86 | **93** |
| **61-65** | 0 | 93 | 128 | 52 | 90 | 116 | **101** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **105** | **98** | **94** | **104** | **103** | **87** | **97** |

Table E7: Values of 100ASC/ESC for **bancassurer** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 187 | 52 | 49 | 142 | 173 | 0 | **97** |
| **26-30** | 98 | 120 | 111 | 91 | 116 | 109 | **109** |
| **31-35** | 110 | 129 | 97 | 92 | 117 | 105 | **108** |
| **36-40** | 77 | 98 | 87 | 115 | 97 | 126 | **103** |
| **41-45** | 120 | 108 | 97 | 116 | 134 | 98 | **108** |
| **46-50** | 114 | 94 | 99 | 82 | 103 | 107 | **99** |
| **51-55** | 117 | 149 | 111 | 95 | 117 | 96 | **110** |
| **56-60** | 116 | 97 | 103 | 81 | 94 | 117 | **104** |
| **61-65** | 58 | 17 | 104 | 66 | 91 | 88 | **81** |
| **66-70** | 0 | 0 | 88 | 60 | 116 | 75 | **78** |
| **ALL** | **108** | **109** | **98** | **97** | **111** | **106** | **104** |

Table E8: Values of 100ASC/ESC for **direct sales** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 158 | 90 | 128 | 34 | 119 | 0 | **98** |
| **26-30** | 130 | 92 | 78 | 56 | 53 | 93 | **83** |
| **31-35** | 218 | 106 | 105 | 104 | 108 | 94 | **110** |
| **36-40** | 126 | 133 | 103 | 94 | 105 | 97 | **104** |
| **41-45** | 133 | 134 | 72 | 80 | 87 | 76 | **86** |
| **46-50** | 162 | 137 | 106 | 111 | 98 | 96 | **105** |
| **51-55** | 63 | 104 | 87 | 121 | 122 | 102 | **103** |
| **56-60** | 194 | 195 | 104 | 114 | 72 | 92 | **102** |
| **61-65** | 302 | 0 | 117 | 110 | 54 | 85 | **85** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 66 | **55** |
| **ALL** | **150** | **121** | **95** | **95** | **96** | **91** | **99** |

Table E9: Values of 100ASC/ESC for **IFA** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 93 | 136 | 100 | 124 | 124 | 0 | **112** |
| **26-30** | 65 | 88 | 95 | 117 | 132 | 138 | **102** |
| **31-35** | 63 | 84 | 98 | 107 | 106 | 104 | **96** |
| **36-40** | 85 | 98 | 100 | 103 | 76 | 106 | **98** |
| **41-45** | 94 | 104 | 102 | 101 | 103 | 105 | **103** |
| **46-50** | 85 | 79 | 103 | 73 | 84 | 116 | **95** |
| **51-55** | 118 | 103 | 109 | 111 | 76 | 71 | **91** |
| **56-60** | 133 | 110 | 84 | 60 | 108 | 106 | **98** |
| **61-65** | 433 | 141 | 48 | 43 | 0 | 79 | **75** |
| **66-70** | 0 | 0 | 0 | 245 | 0 | 98 | **85** |
| **ALL** | **83** | **94** | **100** | **99** | **93** | **103** | **98** |

Table E10: Values of 100ASC/ESC for **bancassurer** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 50 | 119 | 66 | 0 | 0 | 0 | **70** |
| **26-30** | 139 | 176 | 196 | 185 | 126 | 142 | **168** |
| **31-35** | 58 | 87 | 104 | 65 | 145 | 90 | **89** |
| **36-40** | 97 | 147 | 101 | 93 | 111 | 119 | **113** |
| **41-45** | 103 | 110 | 135 | 95 | 127 | 104 | **112** |
| **46-50** | 90 | 96 | 115 | 87 | 107 | 141 | **111** |
| **51-55** | 106 | 103 | 125 | 143 | 107 | 98 | **112** |
| **56-60** | 120 | 111 | 78 | 123 | 131 | 110 | **110** |
| **61-65** | 0 | 0 | 38 | 116 | 62 | 110 | **87** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 67 | **37** |
| **ALL** | **95** | **113** | **115** | **106** | **115** | **113** | **111** |

Table E11: Values of 100ASC/ESC for **direct sales** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 162 | 168 | 141 | 114 | 214 | 0 | **149** |
| **26-30** | 121 | 95 | 149 | 195 | 139 | 0 | **114** |
| **31-35** | 215 | 133 | 115 | 125 | 92 | 74 | **114** |
| **36-40** | 43 | 71 | 132 | 39 | 132 | 131 | **104** |
| **41-45** | 242 | 140 | 110 | 124 | 96 | 82 | **111** |
| **46-50** | 198 | 131 | 60 | 162 | 73 | 81 | **99** |
| **51-55** | 114 | 53 | 76 | 147 | 143 | 86 | **96** |
| **56-60** | 151 | 303 | 86 | 212 | 89 | 90 | **116** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 33 | **25** |
| **66-70** | 0 | 0 | 0 | 957 | 0 | 244 | **261** |
| **ALL** | **159** | **118** | **104** | **129** | **106** | **87** | **105** |

Table E12: Values of 100ASC/ESC for **IFA** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 30 | 43 | 334 | 0 | 0 | 0 | **99** |
| **26-30** | 58 | 100 | 79 | 83 | 183 | 84 | **92** |
| **31-35** | 109 | 84 | 82 | 85 | 107 | 88 | **90** |
| **36-40** | 89 | 95 | 79 | 91 | 122 | 83 | **91** |
| **41-45** | 106 | 78 | 92 | 51 | 107 | 92 | **85** |
| **46-50** | 108 | 68 | 110 | 103 | 103 | 82 | **93** |
| **51-55** | 103 | 74 | 90 | 86 | 18 | 118 | **87** |
| **56-60** | 85 | 172 | 112 | 36 | 98 | 76 | **86** |
| **61-65** | 0 | 0 | 0 | 398 | 148 | 95 | **126** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **92** | **84** | **95** | **80** | **102** | **90** | **90** |

Table E13: Actual Settled Claims for **bancassurer** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 4 | 9 | 6 | 3 | 2 | 1 | **25** |
| **26-30** | 19 | 40 | 19 | 14 | 6 | 12 | **110** |
| **31-35** | 21 | 49 | 49 | 45 | 26 | 39 | **229** |
| **36-40** | 33 | 73 | 74 | 40 | 31 | 84 | **335** |
| **41-45** | 35 | 60 | 96 | 78 | 43 | 128 | **440** |
| **46-50** | 29 | 61 | 82 | 61 | 46 | 147 | **426** |
| **51-55** | 31 | 54 | 77 | 90 | 63 | 166 | **481** |
| **56-60** | 21 | 60 | 76 | 69 | 62 | 196 | **484** |
| **61-65** | 7 | 17 | 24 | 35 | 31 | 97 | **211** |
| **66-70** | 0 | 1 | 1 | 6 | 5 | 16 | **29** |
| **ALL** | **200** | **424** | **504** | **441** | **315** | **886** | **2,770** |

Table E14: Actual Settled Claims for **direct sales** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 6 | 9 | 6 | 2 | 4 | **32** |
| **26-30** | 11 | 19 | 6 | 8 | 5 | 20 | **69** |
| **31-35** | 13 | 16 | 20 | 23 | 14 | 48 | **134** |
| **36-40** | 13 | 30 | 24 | 19 | 12 | 83 | **181** |
| **41-45** | 13 | 24 | 26 | 22 | 11 | 111 | **207** |
| **46-50** | 13 | 14 | 19 | 20 | 19 | 146 | **231** |
| **51-55** | 12 | 19 | 26 | 28 | 18 | 155 | **258** |
| **56-60** | 6 | 10 | 8 | 12 | 8 | 111 | **155** |
| **61-65** | 0 | 4 | 5 | 4 | 2 | 62 | **77** |
| **66-70** | 0 | 0 | 1 | 2 | 0 | 16 | **19** |
| **ALL** | **86** | **142** | **144** | **144** | **91** | **756** | **1,363** |

Table E15: Actual Settled Claims for **IFA** for male non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 8 | 17 | 12 | 3 | 1 | 2 | **43** |
| **26-30** | 26 | 44 | 48 | 25 | 22 | 25 | **190** |
| **31-35** | 51 | 83 | 56 | 84 | 46 | 77 | **397** |
| **36-40** | 44 | 109 | 113 | 115 | 65 | 144 | **590** |
| **41-45** | 33 | 94 | 109 | 103 | 88 | 178 | **605** |
| **46-50** | 21 | 71 | 85 | 73 | 52 | 158 | **460** |
| **51-55** | 14 | 44 | 43 | 60 | 53 | 160 | **374** |
| **56-60** | 9 | 26 | 26 | 35 | 35 | 105 | **236** |
| **61-65** | 1 | 2 | 6 | 6 | 9 | 34 | **58** |
| **66-70** | 0 | 0 | 3 | 1 | 1 | 9 | **14** |
| **ALL** | **207** | **490** | **501** | **505** | **372** | **892** | **2,967** |

Table E16: Actual Settled Claims for **bancassurer** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 7 | 2 | 0 | 0 | 0 | **9** |
| **26-30** | 9 | 14 | 14 | 3 | 0 | 3 | **43** |
| **31-35** | 15 | 23 | 25 | 14 | 10 | 19 | **106** |
| **36-40** | 16 | 36 | 33 | 29 | 13 | 37 | **164** |
| **41-45** | 27 | 44 | 54 | 36 | 25 | 52 | **238** |
| **46-50** | 28 | 48 | 50 | 54 | 30 | 73 | **283** |
| **51-55** | 16 | 38 | 47 | 46 | 35 | 84 | **266** |
| **56-60** | 7 | 22 | 42 | 43 | 27 | 101 | **242** |
| **61-65** | 0 | 1 | 13 | 11 | 8 | 37 | **70** |
| **66-70** | 0 | 0 | 0 | 2 | 0 | 3 | **5** |
| **ALL** | **118** | **233** | **280** | **238** | **148** | **409** | **1,426** |

Table E17: Actual Settled Claims for **direct sales** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 0 | 4 | 1 | 3 | 1 | 0 | **9** |
| **26-30** | 6 | 7 | 8 | 7 | 2 | 4 | **34** |
| **31-35** | 7 | 14 | 6 | 7 | 11 | 16 | **61** |
| **36-40** | 8 | 12 | 14 | 11 | 9 | 32 | **86** |
| **41-45** | 10 | 13 | 11 | 6 | 8 | 44 | **92** |
| **46-50** | 5 | 9 | 12 | 15 | 15 | 54 | **110** |
| **51-55** | 2 | 5 | 7 | 5 | 5 | 45 | **69** |
| **56-60** | 2 | 1 | 5 | 2 | 2 | 28 | **40** |
| **61-65** | 1 | 0 | 2 | 0 | 0 | 16 | **19** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 3 | **3** |
| **ALL** | **41** | **65** | **66** | **56** | **53** | **242** | **523** |

Table E18: Actual Settled Claims for **IFA** for male smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 14 | 3 | 4 | 1 | 0 | **27** |
| **26-30** | 12 | 17 | 15 | 6 | 2 | 6 | **58** |
| **31-35** | 17 | 48 | 42 | 38 | 23 | 25 | **193** |
| **36-40** | 30 | 45 | 38 | 47 | 31 | 39 | **230** |
| **41-45** | 23 | 33 | 38 | 36 | 23 | 51 | **204** |
| **46-50** | 17 | 30 | 44 | 49 | 31 | 46 | **217** |
| **51-55** | 9 | 22 | 23 | 23 | 25 | 43 | **145** |
| **56-60** | 4 | 6 | 12 | 7 | 13 | 24 | **66** |
| **61-65** | 0 | 1 | 2 | 1 | 2 | 10 | **16** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **117** | **216** | **217** | **211** | **151** | **244** | **1,156** |

Table E19: Actual Settled Claims for **bancassurer** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 12 | 5 | 3 | 4 | 2 | 0 | **26** |
| **26-30** | 16 | 37 | 30 | 16 | 12 | 15 | **126** |
| **31-35** | 31 | 74 | 54 | 37 | 30 | 57 | **283** |
| **36-40** | 27 | 73 | 66 | 66 | 36 | 113 | **381** |
| **41-45** | 42 | 84 | 81 | 77 | 60 | 117 | **461** |
| **46-50** | 32 | 62 | 74 | 51 | 45 | 129 | **393** |
| **51-55** | 23 | 74 | 68 | 51 | 47 | 115 | **378** |
| **56-60** | 12 | 28 | 40 | 30 | 28 | 115 | **253** |
| **61-65** | 1 | 1 | 10 | 7 | 9 | 32 | **60** |
| **66-70** | 0 | 0 | 1 | 1 | 2 | 5 | **9** |
| **ALL** | **196** | **438** | **427** | **340** | **271** | **698** | **2,370** |

Table E20: Actual Settled Claims for **direct sales** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 5 | 5 | 6 | 1 | 2 | 0 | **19** |
| **26-30** | 9 | 13 | 11 | 6 | 4 | 12 | **55** |
| **31-35** | 25 | 26 | 28 | 23 | 19 | 52 | **173** |
| **36-40** | 16 | 37 | 32 | 25 | 23 | 98 | **231** |
| **41-45** | 14 | 32 | 20 | 20 | 18 | 91 | **195** |
| **46-50** | 12 | 24 | 22 | 21 | 16 | 105 | **200** |
| **51-55** | 3 | 12 | 13 | 17 | 15 | 95 | **155** |
| **56-60** | 4 | 11 | 8 | 9 | 5 | 57 | **94** |
| **61-65** | 1 | 0 | 2 | 2 | 1 | 20 | **26** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 6 | **6** |
| **ALL** | **89** | **160** | **142** | **124** | **103** | **536** | **1,154** |

Table E21: Actual Settled Claims for **IFA** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 9 | 21 | 11 | 7 | 3 | 0 | **51** |
| **26-30** | 18 | 49 | 51 | 44 | 30 | 36 | **228** |
| **31-35** | 30 | 89 | 113 | 99 | 68 | 119 | **518** |
| **36-40** | 43 | 116 | 136 | 119 | 63 | 183 | **660** |
| **41-45** | 36 | 97 | 116 | 104 | 78 | 177 | **608** |
| **46-50** | 20 | 47 | 77 | 52 | 46 | 148 | **390** |
| **51-55** | 14 | 32 | 46 | 50 | 28 | 67 | **237** |
| **56-60** | 5 | 11 | 12 | 10 | 17 | 54 | **109** |
| **61-65** | 2 | 2 | 1 | 1 | 0 | 10 | **16** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 3 | **4** |
| **ALL** | **177** | **464** | **563** | **487** | **333** | **797** | **2,821** |

Table E22: Actual Settled Claims for **bancassurer** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 1 | 3 | 1 | 0 | 0 | 0 | **5** |
| **26-30** | 7 | 14 | 13 | 8 | 3 | 4 | **49** |
| **31-35** | 5 | 13 | 14 | 6 | 8 | 9 | **55** |
| **36-40** | 12 | 32 | 22 | 15 | 11 | 23 | **115** |
| **41-45** | 15 | 30 | 39 | 22 | 19 | 32 | **157** |
| **46-50** | 12 | 25 | 34 | 22 | 18 | 56 | **167** |
| **51-55** | 9 | 19 | 28 | 30 | 17 | 41 | **144** |
| **56-60** | 5 | 11 | 11 | 17 | 15 | 39 | **98** |
| **61-65** | 0 | 0 | 1 | 4 | 2 | 14 | **21** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 1 | **1** |
| **ALL** | **66** | **147** | **163** | **124** | **93** | **219** | **812** |

Table E23: Actual Settled Claims for **direct sales** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 2 | 3 | 2 | 1 | 1 | 0 | **9** |
| **26-30** | 3 | 4 | 6 | 6 | 3 | 0 | **22** |
| **31-35** | 8 | 9 | 8 | 7 | 4 | 9 | **45** |
| **36-40** | 2 | 6 | 12 | 3 | 8 | 30 | **61** |
| **41-45** | 11 | 12 | 11 | 11 | 7 | 25 | **77** |
| **46-50** | 7 | 9 | 5 | 13 | 5 | 26 | **65** |
| **51-55** | 2 | 2 | 4 | 8 | 7 | 23 | **46** |
| **56-60** | 1 | 5 | 2 | 5 | 2 | 15 | **30** |
| **61-65** | 0 | 0 | 0 | 0 | 0 | 2 | **2** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 2 | **3** |
| **ALL** | **36** | **50** | **50** | **55** | **37** | **132** | **360** |

Table E24: Actual Settled Claims for **IFA** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 1 | 2 | 11 | 0 | 0 | 0 | **14** |
| **26-30** | 5 | 15 | 11 | 8 | 10 | 5 | **54** |
| **31-35** | 14 | 21 | 21 | 17 | 14 | 19 | **106** |
| **36-40** | 13 | 27 | 25 | 24 | 22 | 28 | **139** |
| **41-45** | 13 | 20 | 28 | 14 | 21 | 35 | **131** |
| **46-50** | 9 | 12 | 24 | 22 | 17 | 28 | **112** |
| **51-55** | 4 | 7 | 12 | 12 | 2 | 32 | **69** |
| **56-60** | 1 | 5 | 5 | 2 | 5 | 11 | **29** |
| **61-65** | 0 | 0 | 0 | 3 | 1 | 3 | **7** |
| **66-70** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **ALL** | **60** | **109** | **137** | **102** | **92** | **161** | **661** |

## Appendix F: Detailed results by year of commencement

Table F1: Values of 100ASC/ESC for policies **commencing pre-2000** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 119 | 0 | 215 | **125** |
| **26-30** | | | | 94 | 122 | 143 | **133** |
| **31-35** | | | | 90 | 112 | 96 | **98** |
| **36-40** | | | | 57 | 83 | 98 | **95** |
| **41-45** | | | | 119 | 61 | 102 | **100** |
| **46-50** | | | | 89 | 99 | 109 | **108** |
| **51-55** | | | | 194 | 85 | 103 | **104** |
| **56-60** | | | | 139 | 109 | 98 | **100** |
| **61-65** | | | | 77 | 84 | 97 | **96** |
| **66-70** | | | | 0 | 99 | 83 | **82** |
| **ALL** | | | | **110** | **91** | **102** | **101** |

Table F2: Values of 100ASC/ESC for policies **commencing post-1999** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 82 | 93 | 120 | 88 | 112 | 204 | **98** |
| **26-30** | 97 | 103 | 94 | 77 | 86 | 139 | **95** |
| **31-35** | 109 | 92 | 86 | 125 | 104 | 93 | **100** |
| **36-40** | 97 | 111 | 101 | 107 | 95 | 77 | **102** |
| **41-45** | 92 | 91 | 103 | 107 | 109 | 94 | **100** |
| **46-50** | 92 | 92 | 95 | 96 | 93 | 115 | **95** |
| **51-55** | 104 | 93 | 87 | 103 | 106 | 112 | **98** |
| **56-60** | 114 | 111 | 98 | 100 | 107 | 84 | **102** |
| **61-65** | 123 | 114 | 105 | 118 | 126 | 90 | **112** |
| **66-70** | 0 | 50 | 114 | 144 | 72 | 49 | **93** |
| **ALL** | **98** | **98** | **96** | **104** | **102** | **97** | **99** |

Table F3: Values of 100ASC/ESC for policies **commencing pre-2000** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 409 | 0 | 0 | **107** |
| **26-30** | | | | 60 | 60 | 119 | **98** |
| **31-35** | | | | 187 | 153 | 99 | **112** |
| **36-40** | | | | 70 | 61 | 95 | **91** |
| **41-45** | | | | 44 | 88 | 105 | **102** |
| **46-50** | | | | 130 | 178 | 95 | **103** |
| **51-55** | | | | 96 | 80 | 93 | **92** |
| **56-60** | | | | 190 | 108 | 104 | **106** |
| **61-65** | | | | 0 | 34 | 101 | **96** |
| **66-70** | | | | 0 | 0 | 80 | **74** |
| **ALL** | | | | **109** | **105** | **98** | **99** |

Table F4: Values of 100ASC/ESC for policies **commencing post-1999** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 59 | 211 | 82 | 159 | 159 | 0 | **132** |
| **26-30** | 114 | 102 | 117 | 79 | 32 | 90 | **100** |
| **31-35** | 84 | 106 | 96 | 103 | 108 | 89 | **99** |
| **36-40** | 104 | 97 | 91 | 116 | 112 | 95 | **102** |
| **41-45** | 118 | 95 | 107 | 96 | 91 | 83 | **100** |
| **46-50** | 114 | 91 | 103 | 125 | 93 | 95 | **105** |
| **51-55** | 87 | 98 | 94 | 96 | 119 | 95 | **99** |
| **56-60** | 98 | 84 | 129 | 102 | 96 | 96 | **103** |
| **61-65** | 46 | 29 | 148 | 92 | 81 | 127 | **97** |
| **66-70** | 0 | 0 | 0 | 134 | 0 | 0 | **38** |
| **ALL** | **101** | **99** | **103** | **106** | **99** | **93** | **101** |

Table F5: Values of 100ASC/ESC for policies **commencing pre-2000** for female non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 103 | 132 | 0 | **67** |
| **26-30** | | | | 70 | 123 | 118 | **115** |
| **31-35** | | | | 83 | 121 | 105 | **106** |
| **36-40** | | | | 75 | 62 | 105 | **101** |
| **41-45** | | | | 98 | 87 | 94 | **94** |
| **46-50** | | | | 135 | 90 | 103 | **103** |
| **51-55** | | | | 166 | 122 | 90 | **94** |
| **56-60** | | | | 52 | 75 | 107 | **104** |
| **61-65** | | | | 97 | 62 | 85 | **84** |
| **66-70** | | | | 0 | 143 | 73 | **75** |
| **ALL** | | | | **99** | **95** | **100** | **99** |

Table F6: Values of 100ASC/ESC for policies **commencing post-1999** for female non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 123 | 100 | 103 | 109 | 154 | 0 | **108** |
| **26-30** | 83 | 101 | 95 | 101 | 110 | 114 | **98** |
| **31-35** | 96 | 101 | 97 | 105 | 101 | 93 | **100** |
| **36-40** | 86 | 104 | 96 | 106 | 94 | 98 | **99** |
| **41-45** | 110 | 107 | 97 | 102 | 114 | 105 | **104** |
| **46-50** | 105 | 90 | 105 | 78 | 101 | 115 | **96** |
| **51-55** | 111 | 123 | 104 | 97 | 95 | 67 | **102** |
| **56-60** | 130 | 113 | 94 | 79 | 97 | 95 | **97** |
| **61-65** | 197 | 47 | 95 | 64 | 71 | 73 | **77** |
| **66-70** | 0 | 0 | 51 | 82 | 51 | 63 | **55** |
| **ALL** | **100** | **103** | **98** | **97** | **101** | **97** | **100** |

Table F7: Values of 100ASC/ESC for policies **commencing pre-2000** for female smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 0 | 0 | 0 | **0** |
| **26-30** | | | | 73 | 168 | 82 | **99** |
| **31-35** | | | | 170 | 172 | 84 | **100** |
| **36-40** | | | | 103 | 79 | 106 | **103** |
| **41-45** | | | | 93 | 81 | 89 | **88** |
| **46-50** | | | | 143 | 91 | 112 | **112** |
| **51-55** | | | | 254 | 79 | 93 | **96** |
| **56-60** | | | | 0 | 186 | 96 | **100** |
| **61-65** | | | | 0 | 103 | 89 | **89** |
| **66-70** | | | | 0 | 0 | 124 | **114** |
| **ALL** | | | | **127** | **108** | **97** | **99** |

Table F8: Values of 100ASC/ESC for policies **commencing post-1999** for female smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 74 | 89 | 216 | 53 | 78 | 0 | **111** |
| **26-30** | 79 | 127 | 118 | 132 | 129 | 31 | **115** |
| **31-35** | 98 | 95 | 91 | 81 | 80 | 89 | **90** |
| **36-40** | 80 | 110 | 95 | 96 | 119 | 127 | **101** |
| **41-45** | 131 | 100 | 103 | 84 | 124 | 115 | **105** |
| **46-50** | 107 | 87 | 104 | 100 | 99 | 62 | **96** |
| **51-55** | 119 | 82 | 109 | 108 | 83 | 102 | **100** |
| **56-60** | 111 | 138 | 104 | 116 | 91 | 79 | **108** |
| **61-65** | 0 | 0 | 27 | 152 | 55 | 75 | **69** |
| **66-70** | 0 | 0 | 0 | 195 | 0 | 0 | **52** |
| **ALL** | **101** | **101** | **103** | **98** | **102** | **93** | **101** |

Table F9: Actual Settled Claims for **policies commencing pre-2000** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 1 | 0 | 4 | **5** |
| **26-30** | | | | 5 | 13 | 48 | **66** |
| **31-35** | | | | 8 | 25 | 149 | **182** |
| **36-40** | | | | 6 | 23 | 281 | **310** |
| **41-45** | | | | 12 | 17 | 368 | **397** |
| **46-50** | | | | 8 | 25 | 408 | **441** |
| **51-55** | | | | 20 | 24 | 429 | **473** |
| **56-60** | | | | 10 | 24 | 384 | **418** |
| **61-65** | | | | 2 | 7 | 173 | **182** |
| **66-70** | | | | 0 | 2 | 39 | **41** |
| **ALL** | | | | **72** | **160** | **2,283** | **2,515** |

Table F10: Actual Settled Claims for **policies commencing post-1999** for male non-smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 25 | 39 | 33 | 11 | 5 | 3 | **116** |
| **26-30** | 62 | 120 | 97 | 48 | 24 | 15 | **366** |
| **31-35** | 97 | 163 | 153 | 161 | 73 | 33 | **680** |
| **36-40** | 103 | 243 | 235 | 192 | 100 | 44 | **917** |
| **41-45** | 90 | 195 | 248 | 209 | 130 | 62 | **934** |
| **46-50** | 70 | 160 | 195 | 165 | 100 | 70 | **760** |
| **51-55** | 59 | 129 | 153 | 165 | 112 | 71 | **689** |
| **56-60** | 39 | 98 | 117 | 113 | 85 | 46 | **498** |
| **61-65** | 8 | 24 | 36 | 43 | 36 | 20 | **167** |
| **66-70** | 0 | 1 | 5 | 9 | 4 | 2 | **21** |
| **ALL** | **553** | **1,172** | **1,272** | **1,116** | **669** | **366** | **5,148** |

Table F11: Actual Settled Claims for **policies commencing pre-2000** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 1 | 0 | 0 | **1** |
| **26-30** | | | | 1 | 2 | 11 | **14** |
| **31-35** | | | | 7 | 14 | 52 | **73** |
| **36-40** | | | | 3 | 7 | 91 | **101** |
| **41-45** | | | | 2 | 11 | 134 | **147** |
| **46-50** | | | | 7 | 26 | 152 | **185** |
| **51-55** | | | | 5 | 11 | 153 | **169** |
| **56-60** | | | | 6 | 10 | 136 | **152** |
| **61-65** | | | | 0 | 1 | 54 | **55** |
| **66-70** | | | | 0 | 0 | 6 | **6** |
| **ALL** | | | | **32** | **82** | **789** | **903** |

Table F12: Actual Settled Claims for **policies commencing post-1999** for male smokers

| **Age last at settlement** | **Curtate duration at settlement** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 6 | 29 | 7 | 6 | 2 | 0 | **50** |
| **26-30** | 31 | 45 | 42 | 17 | 3 | 3 | **141** |
| **31-35** | 42 | 94 | 79 | 60 | 33 | 12 | **320** |
| **36-40** | 58 | 102 | 95 | 94 | 52 | 21 | **422** |
| **41-45** | 61 | 97 | 116 | 87 | 50 | 23 | **434** |
| **46-50** | 54 | 90 | 112 | 118 | 56 | 29 | **459** |
| **51-55** | 27 | 68 | 80 | 76 | 62 | 27 | **340** |
| **56-60** | 15 | 31 | 62 | 48 | 32 | 20 | **208** |
| **61-65** | 1 | 2 | 17 | 12 | 9 | 10 | **51** |
| **66-70** | 0 | 0 | 0 | 2 | 0 | 0 | **2** |
| **ALL** | **295** | **558** | **610** | **520** | **299** | **145** | **2,427** |

Table F13: Actual Settled Claims for **policies commencing pre-2000** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 1 | 2 | 0 | **3** |
| **26-30** | | | | 4 | 15 | 51 | **70** |
| **31-35** | | | | 9 | 33 | 205 | **247** |
| **36-40** | | | | 9 | 20 | 345 | **374** |
| **41-45** | | | | 10 | 25 | 348 | **383** |
| **46-50** | | | | 12 | 22 | 338 | **372** |
| **51-55** | | | | 13 | 26 | 256 | **295** |
| **56-60** | | | | 2 | 9 | 209 | **220** |
| **61-65** | | | | 1 | 2 | 57 | **60** |
| **66-70** | | | | 0 | 1 | 13 | **14** |
| **ALL** | | | | **61** | **155** | **1,822** | **2,038** |

Table F14: Actual Settled Claims for **policies commencing post-1999** for female non-smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 29 | 38 | 28 | 14 | 7 | 0 | **116** |
| **26-30** | 50 | 122 | 109 | 74 | 38 | 16 | **409** |
| **31-35** | 96 | 218 | 223 | 178 | 95 | 43 | **853** |
| **36-40** | 94 | 259 | 264 | 228 | 118 | 63 | **1,026** |
| **41-45** | 101 | 230 | 242 | 210 | 143 | 71 | **997** |
| **46-50** | 67 | 141 | 195 | 123 | 100 | 63 | **689** |
| **51-55** | 43 | 123 | 134 | 111 | 70 | 29 | **510** |
| **56-60** | 22 | 53 | 61 | 49 | 42 | 27 | **254** |
| **61-65** | 5 | 4 | 13 | 9 | 8 | 6 | **45** |
| **66-70** | 0 | 0 | 1 | 2 | 1 | 1 | **5** |
| **ALL** | **507** | **1,188** | **1,270** | **998** | **622** | **319** | **4,904** |

Table F15: Actual Settled Claims for **policies commencing pre-2000** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | | | | 0 | 0 | 0 | **0** |
| **26-30** | | | | 1 | 5 | 8 | **14** |
| **31-35** | | | | 4 | 10 | 32 | **46** |
| **36-40** | | | | 3 | 6 | 71 | **80** |
| **41-45** | | | | 3 | 7 | 78 | **88** |
| **46-50** | | | | 5 | 8 | 107 | **120** |
| **51-55** | | | | 7 | 6 | 81 | **94** |
| **56-60** | | | | 0 | 8 | 58 | **66** |
| **61-65** | | | | 0 | 1 | 18 | **19** |
| **66-70** | | | | 0 | 0 | 3 | **3** |
| **ALL** | | | | **23** | **51** | **456** | **530** |

Table F16: Actual Settled Claims for **policies commencing post-1999** for female smokers

| Age last at settlement | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | **5+** | **ALL** |
| **20-25** | 6 | 10 | 17 | 2 | 1 | 0 | **36** |
| **26-30** | 15 | 41 | 35 | 25 | 11 | 1 | **128** |
| **31-35** | 28 | 51 | 49 | 31 | 16 | 8 | **183** |
| **36-40** | 28 | 73 | 67 | 52 | 36 | 18 | **274** |
| **41-45** | 45 | 68 | 80 | 53 | 46 | 21 | **313** |
| **46-50** | 29 | 48 | 68 | 56 | 34 | 11 | **246** |
| **51-55** | 18 | 28 | 48 | 44 | 22 | 15 | **175** |
| **56-60** | 7 | 21 | 23 | 25 | 14 | 8 | **98** |
| **61-65** | 0 | 0 | 1 | 7 | 2 | 2 | **12** |
| **66-70** | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| **ALL** | **176** | **340** | **388** | **296** | **182** | **84** | **1,466** |

## Appendix G: Application of a generalised linear model to the experience

G.1 This appendix describes the application of a generalised linear model to the experience, as introduced in section 3 of this paper.

G.2 The approach adopted was to use the statistics program 'R' to fit a generalised linear model (GLM), modelling actual claims as a Poisson process dependent on the various factors under consideration. All except age were treated as categorical variables and were grouped as follows:

- Sex – male, female
- Smoker Status – non-smoker, smoker
- Duration – 0, 1, 2, 3, 4, 5+
- Sales Channel – bancassurer, direct sales, IFA, other, unknown
- Sum Assured Band – 0-£40,000, £40,001-£80,000, £80,001+
- Year of Commencement – pre-1997, 1997-1999, 2000-2002, 2003-2006
- Office – 15 offices

G.3 As noted in section 3, product type was not included in the GLM analysis. In addition, the following differences apply between the groupings used in the GLM and one-way analyses:

- Duration, where the one-way analyses implicitly used the (different) groupings applied for each of the four gender/smoker status subsets;
- "Other" and "unknown" are included as distinct sales channels here, whereas they were excluded from the one-way analysis;
- Year of commencement; here we have used four periods, rather than the two used in the one-way analysis; and
- All offices were initially included in the analysis, not just the eight larger offices considered in the one-way analysis.

G.4 The Committee modelled the actual settled claims in 2003-2006, based on their age and duration at date of diagnosis (denoted as ADC, below) – with missing dates of diagnosis estimated using the approach used in the derivation of standard errors (see 2.23) – and assumed these follow a Poisson process. The GLM is therefore of the form:

$$ADC \sim EDC \times \exp(\boldsymbol{\beta X})$$

where $\boldsymbol{X}$ is the vector of covariates and $\boldsymbol{\beta}$ is a vector of (unknown) parameters.

G.5 Incorporating the expected diagnosed claims (EDC) as an "offset" term in the model allows the GLM itself to only model the additional effects on top of those already incorporated in the AC04 Series rates, thereby measuring the significance of the other factors.

G.6 The inclusion of interaction terms in the model allows consideration of, for example, the impact of smoker status varying with age beyond the extent that this is already incorporated in the AC04 Series rates. However, in order not to make the model overly complex, these were restricted to the following two-way interactions:

- Age*Sex
- Age*Smoker Status
- Age*Duration
- Sex*Smoker Status

- Sex*Duration
- Smoker Status*Duration
- Sales Channel*Sum Assured Band
- Sales Channel*Year of Commencement
- Sum Assured Band*Year of Commencement

G.7 Each level of each categorical factor was incorporated separately into the model, with one level from each factor being incorporated into the "base case". The base case is a male, non-smoker, duration 0, …, etc; the GLM then models the effect of being a female, being a smoker, etc, on top of this.

G.8 R's StepAIC function was used to add the interaction terms to the main factors (where significant) and to remove the insignificant factors. This uses the Akaike Information Criterion to measure the relative goodness of fit of the alternative models.

G.9 Table G1 shows the results of the initial model fitted to the experience. The results are shown for each factor and for each interaction. The final column indicates the significance of each variable based on their p-values, where:

*** indicates a p-value between 0 and 0.001;
** indicates a p-value between 0.001 and 0.01; and
* indicates a p-value between 0.01 and 0.05.

Thus, any variable shown with stars is significant at a 95% confidence level.

Table G1. Results of the full GLM model with no factors or interactions excluded

| | **Degrees of freedom** | **Deviance** | **Residual degrees of freedom** | **Residual deviance** | **P(>\|Chi\|)** | |
|---|---|---|---|---|---|---|
| NULL | | | 231398 | 49235 | | |
| Age | 1 | 1.92 | 231397 | 49233 | 0.165861 | |
| Sex | 1 | 0.198 | 231396 | 49232 | 0.656103 | |
| Smoker | 1 | 0.265 | 231395 | 49232 | 0.606513 | |
| Duration | 5 | 19.708 | 231390 | 49213 | 0.001418 | ** |
| Sales | 4 | 51.527 | 231386 | 49161 | 1.73E-10 | *** |
| SABand | 2 | 28.865 | 231384 | 49132 | 5.40E-07 | *** |
| YoC | 3 | 8.788 | 231381 | 49123 | 0.032245 | * |
| Office | 14 | 148.258 | 231367 | 48975 | < 2.2 x10^-16 | *** |
| Age:Sex | 1 | 1.611 | 231366 | 48973 | 0.204283 | |
| Age:Smoker | 1 | 0.201 | 231365 | 48973 | 0.654077 | |
| Age:Duration | 5 | 5.446 | 231360 | 48968 | 0.363955 | |
| Sex:Smoker | 1 | 0.001 | 231359 | 48968 | 0.969909 | |
| Sex:Duration | 5 | 8.03 | 231354 | 48960 | 0.154583 | |
| Smoker:Duration | 5 | 7.737 | 231349 | 48952 | 0.171325 | |
| Sales:YoC | 12 | 41.162 | 231337 | 48911 | 4.60E-05 | *** |
| Sales:SABand | 8 | 7.766 | 231329 | 48903 | 0.456682 | |
| SABand:YoC | 6 | 4.915 | 231323 | 48898 | 0.554752 | |

G.10 These results demonstrate that age, sex and smoker status, together with their related interactions, all show little or no statistical significance. The lack of variation for these key factors suggests that they are well-represented in the AC04 Series rates. Duration did show statistical significance; however although the AC04 Series rates vary by

duration, the groupings differ between the gender/smoker datasets and from those used in the modelling. Duration 1 exhibited the greatest significance in the GLM analysis, with experience around 10% heavier than implied by the AC04 Series rates. Had this been incorporated in the tables, it would have resulted in rates at duration 1 exceeding those at duration 2, thereby breaking one of the constraints adopted by the Committee in the derivation of the tables (see paragraph 6.6 of Working Paper 50), that "In general, rates cannot reduce with duration". The Committee is therefore confident that the GLM analysis does not indicate any weakness in the AC04 Series rates by duration.

G.11 The other factors that demonstrated statistical significance were sales channel, sum assured, year of commencement and office, plus the interaction between sales channel and year of commencement. The significance of this interaction appears to indicate deteriorating experience, by year of commencement, for direct sales business.

G.12 Removing the insignificant factors, regrouping the data and refitting a GLM gave an optimum fit and also helped overcome a problem with over-dispersion. An assumption of using a GLM with a Poisson link function, as we have done, is that the dispersion parameter equals 1. However, including all the factors meant that around 20,000 actual claims were spread across around 230,000 combinations of factors; consequently the dispersion parameter was around 0.2. The refitted model, with insignificant factors removed, has a dispersion parameter of 0.9, a much more satisfactory result.

G.13 The results of re-fitting the model are set out in Table G2. Note that the base model from which the significance of other factors is determined is: duration 0, sales channel = bancassurer, sum assured band = £0-£40,000, year of commencement = pre-1997 and office = 1. Note also that the designation of the offices in this model does not correspond with that used in the one-way analysis is section 3.

G.14 Taking the exponential of the coefficients measures their difference from the base case. For example, direct sales appears to have experience around 98% ( = exp(-0.01929)) of bancassurance.

Table G2. Results of the restricted GLM model, after insignificant factors/interactions were excluded

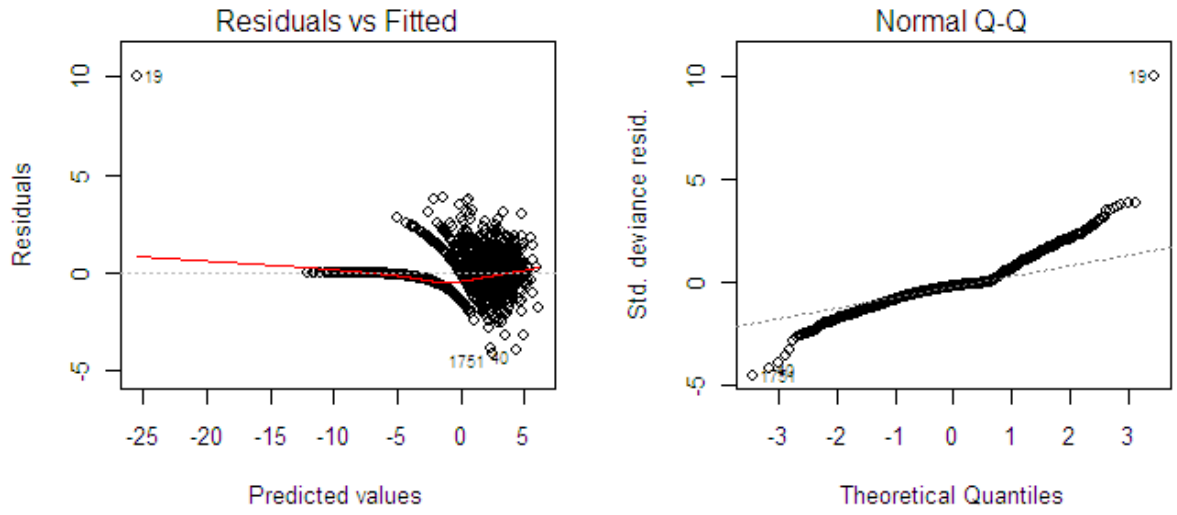
| Coefficient | Estimate | Std. Error | z value | Pr(>\|z\|) | |
|---|---|---|---|---|---|
| (Intercept) | 0.02225 | 0.0804 | 0.277 | 0.781996 | |
| Duration 1 | 0.10062 | 0.02569 | 3.917 | 8.95E-05 | *** |
| Duration 2 | 0.02509 | 0.02429 | 1.033 | 0.301551 | |
| Duration 3 | 0.07263 | 0.0265 | 2.741 | 0.006125 | ** |
| Duration 4 | 0.01352 | 0.03138 | 0.431 | 0.666567 | |
| Durations 5+ | -0.0186 | 0.03523 | -0.528 | 0.597555 | |
| Sales1 (Direct Sales) | -0.01929 | 0.07678 | -0.251 | 0.80165 | |
| Sales2 (IFA) | 0.09044 | 0.06955 | 1.3 | 0.193474 | |
| Sales3 (Other) | -0.25463 | 0.13258 | -1.921 | 0.054782 | |
| Sales4 (Unknown) | -0.14902 | 0.18339 | -0.813 | 0.416467 | |
| SABand1 (£40,001-£80,000) | 0.09535 | 0.01664 | 5.729 | 1.01E-08 | *** |
| SABand2 (£80,001+) | 0.08835 | 0.01946 | 4.541 | 5.60E-06 | *** |
| YoC1 (1997-1999) | -0.11463 | 0.04645 | -2.468 | 0.013599 | * |
| YoC2 (2000-2002) | -0.13223 | 0.04909 | -2.694 | 0.00707 | ** |
| YoC3 (2003-2006) | -0.16363 | 0.05605 | -2.919 | 0.003506 | ** |
| Office1 | -0.11664 | L | | | * |
| Office2 | 0.15777 | L | | | * |
| Office3 | -0.01425 | L | | | |
| Office4 | -0.12303 | L | | | |
| Office5 | -0.19288 | L | | | *** |
| Office6 | 0.12373 | L | | | |
| Office7 | -0.14576 | L | | | *** |
| Office8 | -0.11009 | L | | | * |
| Office9 | -0.09214 | L | | | |
| Office10 | 0.05773 | S | | | |
| Office11 | -0.38557 | S | | | ** |
| Office12 | -0.63035 | S | | | *** |
| Office13 | -0.20435 | L | | | *** |
| Office14 | -0.10009 | S | | | |
| Sales1:YoC1 | 0.09094 | 0.0685 | 1.328 | 0.184317 | |
| Sales2:YoC1 | 0.06037 | 0.06603 | 0.914 | 0.360548 | |
| Sales3:YoC1 | 0.10085 | 0.17105 | 0.59 | 0.555471 | |
| Sales4:YoC1 | -0.09843 | 0.35842 | -0.275 | 0.783606 | |
| Sales1:YoC2 | 0.16629 | 0.06245 | 2.663 | 0.007751 | ** |
| Sales2:YoC2 | 0.09203 | 0.06239 | 1.475 | 0.140167 | |
| Sales3:YoC2 | 0.32296 | 0.13383 | 2.413 | 0.015809 | * |
| Sales4:YoC2 | -1.03224 | 0.60138 | -1.716 | 0.08608 | |
| Sales1:YoC3 | 0.2367 | 0.0694 | 3.411 | 0.000648 | *** |
| Sales2:YoC3 | 0.03407 | 0.06893 | 0.494 | 0.621069 | |
| Sales3:YoC3 | 0.36474 | 0.13878 | 2.628 | 0.008586 | ** |
| Sales4:YoC3 | 1.06767 | 0.33103 | 3.225 | 0.001258 | ** |

G.15 Note that the statistics for individual offices have not been included in Table G2 (and Table G3). Instead, offices with a standard error greater than 0.1 are shown as "S" (small) and those with a standard error below than 0.1 are shown as "L" (large). Figures G1 and G2 provide an indication of the goodness of fit of the re-fitted model. Figure G1 plots residuals versus fitted values. If the model is good, we would expect there to be no pattern evident in this chart – i.e. the plot should be random. Although it is not very

clear, there appear to be some patterns in the bottom left; however the Committee has not sought to improve this fit beyond the optimum solution found by R.

G.16 Figure G2 is a Normal quantile-quantile plot. For a good model, we would expect this to be a diagonal straight line. Again, the fit is not perfect but the Committee has not sought to improve it.

Figures G1 and G2. Illustrations of the goodness-of-fit of the restricted GLM model




G.17 The results for sales channel and year of commencement from the refitted model are not easy to interpret because of the additional interaction term between these factors. The Committee therefore chose to drop the interaction term and re-run the model. The full results are set out in Table G3 and the range of experience for each factor is shown in Table G4. The findings are summarised in 3.70.

Table G3. Results of the restricted GLM model, after insignificant factors and all interactions were excluded

| Coefficient | Estimate | Std. Error | z value | Pr(>\|z\|) | |
|---|---|---|---|---|---|
| (Intercept) | -0.0902 | 0.06659 | -1.355 | 0.17544 | |
| Duration 1 | 0.10176 | 0.02568 | 3.962 | 7.43E-05 | *** |
| Duration 2 | 0.0241 | 0.02429 | 0.992 | 0.32107 | |
| Duration 3 | 0.07122 | 0.02649 | 2.689 | 0.00718 | ** |
| Duration 4 | 0.01159 | 0.03137 | 0.369 | 0.71176 | |
| Durations 5+ | -0.0225 | 0.03521 | -0.639 | 0.52294 | |
| Sales1 (Direct Sales) | 0.14367 | 0.05282 | 2.72 | 0.00653 | ** |
| Sales2 (IFA) | 0.17563 | 0.03624 | 4.846 | 1.26E-06 | *** |
| Sales3 (Other) | 0.05723 | 0.04028 | 1.421 | 0.15535 | |
| Sales4 (Unknown) | -0.0339 | 0.14477 | -0.234 | 0.81469 | |
| SABand1 (£40,001-£80,000) | 0.09619 | 0.01663 | 5.784 | 7.31E-09 | *** |
| SABand2 (£80,001+) | 0.0885 | 0.01944 | 4.552 | 5.32E-06 | *** |
| YoC1 (1997-1999) | -0.0569 | 0.02853 | -1.993 | 0.04626 | * |
| YoC2 (2000-2002) | -0.04 | 0.03683 | -1.086 | 0.2775 | |
| YoC3 (2003-2006) | -0.0743 | 0.04184 | -1.775 | 0.07582 | |
| Office1 | -0.0922 | L | | | |
| Office2 | 0.19731 | L | | | *** |
| Office3 | 0.0651 | L | | | |
| Office4 | -0.0732 | L | | | |
| Office5 | -0.1735 | L | | | *** |
| Office6 | 0.14415 | L | | | * |
| Office7 | -0.129 | L | | | ** |
| Office8 | -0.0953 | L | | | |
| Office9 | -0.0486 | L | | | |
| Office10 | 0.05854 | S | | | |
| Office11 | -0.4142 | S | | | ** |
| Office12 | -0.6061 | S | | | *** |
| Office13 | -0.196 | L | | | *** |
| Office14 | -0.0995 | S | | | |

Table G4: Highest and lowest values for each factor, as a % of the base factor

| Factor | Minimum value and level | | Maximum value and level | |
|---|---|---|---|---|
| Duration | 98% | Duration 5+ | 111% | Duration 1 |
| Sales channel | 97% | Unknown | 119% | IFA |
| Sum assured | 100% | Band 1 | 110% | Band 2 |
| Year of commencement | 93% | 2003-2006 | 100% | Pre-1997 |
| Office | 55% | | 122% | |

## Appendix H: Derivation of stand-alone rates

H.1 The stand-alone rates by gender and smoker status were imputed by subtracting the death-only rates (derived in CMI Working Paper 52) from the all-causes rates (derived in CMI Working Paper 50) at ultimate durations only and for a limited age range. Rates for ages 30 to 60 inclusive are shown below.

H.2 Note that rates at ages below 30 at diagnosis were required to generate the expected settled claims at ages 30 and over; some adjustments were required at younger ages, similar to those applied in the all-causes rates, to ensure that non-smoker rates at younger ages were not higher than the smoker rates. The death-only rates that do not equal those shown in CMI Working Paper 52 are shown in italics below.

Table H1: Derivation of rates for stand-alone business for males

| Age Exact | Male non-smokers | | | Male smokers | | |
|---|---|---|---|---|---|---|
| | Accelerated | Death-only | Imputed stand-alone | Accelerated | Death-only | Imputed stand-alone |
| **30** | 0.00076 | *0.00028* | **0.00048** | 0.00094 | *0.00040* | **0.00054** |
| **31** | 0.00079 | *0.00028* | **0.00051** | 0.00104 | 0.00046 | **0.00058** |
| **32** | 0.00082 | 0.00028 | **0.00054** | 0.00116 | 0.00047 | **0.00069** |
| **33** | 0.00088 | 0.00028 | **0.00060** | 0.00128 | 0.00048 | **0.00080** |
| **34** | 0.00094 | 0.00029 | **0.00065** | 0.00139 | 0.00050 | **0.00089** |
| **35** | 0.00101 | 0.00031 | **0.00070** | 0.00150 | 0.00052 | **0.00098** |
| **36** | 0.00110 | 0.00033 | **0.00077** | 0.00162 | 0.00054 | **0.00108** |
| **37** | 0.00120 | 0.00036 | **0.00084** | 0.00173 | 0.00057 | **0.00116** |
| **38** | 0.00131 | 0.00038 | **0.00093** | 0.00190 | 0.00059 | **0.00131** |
| **39** | 0.00143 | 0.00040 | **0.00103** | 0.00213 | 0.00063 | **0.00150** |
| **40** | 0.00156 | 0.00042 | **0.00114** | 0.00240 | 0.00066 | **0.00174** |
| **41** | 0.00169 | 0.00045 | **0.00124** | 0.00273 | 0.00070 | **0.00203** |
| **42** | 0.00182 | 0.00047 | **0.00135** | 0.00308 | 0.00074 | **0.00234** |
| **43** | 0.00197 | 0.00050 | **0.00147** | 0.00350 | 0.00082 | **0.00268** |
| **44** | 0.00212 | 0.00055 | **0.00157** | 0.00396 | 0.00092 | **0.00304** |
| **45** | 0.00231 | 0.00060 | **0.00171** | 0.00460 | 0.00107 | **0.00353** |
| **46** | 0.00256 | 0.00067 | **0.00189** | 0.00543 | 0.00125 | **0.00418** |
| **47** | 0.00285 | 0.00074 | **0.00211** | 0.00630 | 0.00149 | **0.00481** |
| **48** | 0.00315 | 0.00080 | **0.00235** | 0.00718 | 0.00174 | **0.00544** |
| **49** | 0.00354 | 0.00085 | **0.00269** | 0.00807 | 0.00201 | **0.00606** |
| **50** | 0.00405 | 0.00090 | **0.00315** | 0.00897 | 0.00228 | **0.00669** |
| **51** | 0.00461 | 0.00098 | **0.00363** | 0.00988 | 0.00255 | **0.00733** |
| **52** | 0.00521 | 0.00107 | **0.00414** | 0.01080 | 0.00283 | **0.00797** |
| **53** | 0.00584 | 0.00112 | **0.00472** | 0.01173 | 0.00315 | **0.00858** |
| **54** | 0.00648 | 0.00118 | **0.00530** | 0.01267 | 0.00352 | **0.00915** |
| **55** | 0.00714 | 0.00126 | **0.00588** | 0.01373 | 0.00395 | **0.00978** |
| **56** | 0.00782 | 0.00148 | **0.00634** | 0.01495 | 0.00428 | **0.01067** |
| **57** | 0.00856 | 0.00168 | **0.00688** | 0.01622 | 0.00467 | **0.01155** |
| **58** | 0.00941 | 0.00191 | **0.00750** | 0.01761 | 0.00511 | **0.01250** |
| **59** | 0.01037 | 0.00217 | **0.00820** | 0.01907 | 0.00561 | **0.01346** |
| **60** | 0.01144 | 0.00246 | **0.00898** | 0.02071 | 0.00613 | **0.01458** |

Table H2: Derivation of rates for stand-alone business for females

| Age Exact | Female non-smokers | | | Female smokers | | |
|---|---|---|---|---|---|---|
| | Accelerated | Death-only | Imputed stand-alone | Accelerated | Death-only | Imputed stand-alone |
| **30** | 0.00079 | 0.00009 | **0.00070** | 0.00086 | 0.00011 | **0.00075** |
| **31** | 0.00087 | 0.00010 | **0.00077** | 0.00092 | 0.00012 | **0.00080** |
| **32** | 0.00095 | 0.00011 | **0.00084** | 0.00100 | 0.00013 | **0.00087** |
| **33** | 0.00104 | 0.00011 | **0.00093** | 0.00108 | 0.00015 | **0.00093** |
| **34** | 0.00113 | 0.00012 | **0.00101** | 0.00118 | 0.00018 | **0.00100** |
| **35** | 0.00122 | 0.00013 | **0.00109** | 0.00130 | 0.00021 | **0.00109** |
| **36** | 0.00132 | 0.00014 | **0.00118** | 0.00144 | 0.00027 | **0.00117** |
| **37** | 0.00142 | 0.00014 | **0.00128** | 0.00164 | 0.00033 | **0.00131** |
| **38** | 0.00152 | 0.00015 | **0.00137** | 0.00186 | 0.00040 | **0.00146** |
| **39** | 0.00163 | 0.00015 | **0.00148** | 0.00211 | 0.00046 | **0.00165** |
| **40** | 0.00175 | 0.00016 | **0.00159** | 0.00238 | 0.00052 | **0.00186** |
| **41** | 0.00192 | 0.00017 | **0.00175** | 0.00266 | 0.00057 | **0.00209** |
| **42** | 0.00209 | 0.00019 | **0.00190** | 0.00295 | 0.00064 | **0.00231** |
| **43** | 0.00226 | 0.00021 | **0.00205** | 0.00326 | 0.00070 | **0.00256** |
| **44** | 0.00244 | 0.00024 | **0.00220** | 0.00362 | 0.00078 | **0.00284** |
| **45** | 0.00262 | 0.00028 | **0.00234** | 0.00405 | 0.00086 | **0.00319** |
| **46** | 0.00281 | 0.00033 | **0.00248** | 0.00450 | 0.00095 | **0.00355** |
| **47** | 0.00301 | 0.00038 | **0.00263** | 0.00497 | 0.00108 | **0.00389** |
| **48** | 0.00326 | 0.00043 | **0.00283** | 0.00545 | 0.00123 | **0.00422** |
| **49** | 0.00355 | 0.00046 | **0.00309** | 0.00594 | 0.00136 | **0.00458** |
| **50** | 0.00385 | 0.00049 | **0.00336** | 0.00644 | 0.00144 | **0.00500** |
| **51** | 0.00419 | 0.00051 | **0.00368** | 0.00694 | 0.00153 | **0.00541** |
| **52** | 0.00456 | 0.00052 | **0.00404** | 0.00745 | 0.00161 | **0.00584** |
| **53** | 0.00494 | 0.00055 | **0.00439** | 0.00801 | 0.00173 | **0.00628** |
| **54** | 0.00535 | 0.00058 | **0.00477** | 0.00867 | 0.00182 | **0.00685** |
| **55** | 0.00577 | 0.00062 | **0.00515** | 0.00943 | 0.00195 | **0.00748** |
| **56** | 0.00619 | 0.00066 | **0.00553** | 0.01031 | 0.00208 | **0.00823** |
| **57** | 0.00663 | 0.00072 | **0.00591** | 0.01125 | 0.00228 | **0.00897** |
| **58** | 0.00710 | 0.00080 | **0.00630** | 0.01210 | 0.00251 | **0.00959** |
| **59** | 0.00765 | 0.00089 | **0.00676** | 0.01282 | 0.00280 | **0.01002** |
| **60** | 0.00824 | 0.00100 | **0.00724** | 0.01357 | 0.00314 | **0.01043** |

## Appendix I: Detailed results for stand-alone business

I.1 This Appendix contains detailed results for the experience of stand-alone business compared to the imputed rates set out in Appendix H. Due to the low data volumes, the results are limited to ages 31-60 at settlement (note that the "TOTAL" rows cover this age range only.)

### Male non-smokers

Table I1: Actual Settled Claims 2003-2006 for stand-alone business for male non-smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| 31-35 | 3 | 10 | 20 | 14 | 14 | 16 | **77** |
| 36-40 | 9 | 22 | 25 | 25 | 20 | 47 | **148** |
| 41-45 | 4 | 29 | 26 | 28 | 24 | 79 | **190** |
| 46-50 | 11 | 24 | 37 | 27 | 28 | 117 | **244** |
| 51-55 | 6 | 21 | 23 | 28 | 24 | 92 | **194** |
| 56-60 | 4 | 16 | 21 | 21 | 16 | 105 | **183** |
| **TOTAL** | **37** | **122** | **152** | **143** | **126** | **456** | **1,036** |

Table I2: 100xASC/ESC for stand-alone business for male non-smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| 31-35 | 39 | 70 | 135 | 107 | 136 | 86 | **98** |
| 36-40 | 85 | 107 | 111 | 116 | 107 | 101 | **105** |
| 41-45 | 33 | 121 | 96 | 107 | 102 | 111 | **103** |
| 46-50 | 94 | 103 | 142 | 106 | 123 | 143 | **128** |
| 51-55 | 57 | 95 | 86 | 106 | 98 | 94 | **93** |
| 56-60 | 56 | 103 | 109 | 104 | 84 | 119 | **108** |
| **TOTAL** | **62** | **102** | **111** | **107** | **106** | **113** | **107** |

### Male smokers

Table I3: Actual Settled Claims 2003-2006 for stand-alone business for male smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| 31-35 | 3 | 10 | 6 | 4 | 4 | 6 | **33** |
| 36-40 | 4 | 6 | 5 | 10 | 4 | 12 | **41** |
| 41-45 | 7 | 12 | 11 | 11 | 8 | 25 | **74** |
| 46-50 | 9 | 7 | 18 | 13 | 9 | 24 | **80** |
| 51-55 | 2 | 8 | 10 | 15 | 15 | 27 | **77** |
| 56-60 | 3 | 6 | 6 | 7 | 4 | 19 | **45** |
| **TOTAL** | **28** | **49** | **56** | **60** | **44** | **113** | **350** |

Table I4: 100xASC/ESC for stand-alone business for male smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| 31-35 | 107 | 194 | 119 | 98 | 134 | 117 | **131** |
| 36-40 | 99 | 79 | 67 | 155 | 78 | 105 | **97** |
| 41-45 | 132 | 122 | 110 | 126 | 116 | 134 | **124** |
| 46-50 | 151 | 61 | 156 | 131 | 116 | 104 | **115** |
| 51-55 | 46 | 88 | 102 | 170 | 205 | 120 | **125** |
| 56-60 | 126 | 113 | 100 | 130 | 88 | 124 | **116** |
| **TOTAL** | **113** | **101** | **112** | **138** | **127** | **118** | **118** |

## Female non-smokers

Table I5: Actual Settled Claims 2003-2006 for stand-alone business for female non-smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **31-35** | 10 | 15 | 23 | 22 | 24 | 39 | **133** |
| **36-40** | 6 | 21 | 27 | 34 | 25 | 70 | **183** |
| **41-45** | 13 | 35 | 32 | 31 | 31 | 95 | **237** |
| **46-50** | 10 | 17 | 30 | 31 | 23 | 68 | **179** |
| **51-55** | 3 | 10 | 18 | 19 | 19 | 81 | **150** |
| **56-60** | 3 | 8 | 12 | 10 | 12 | 44 | **89** |
| **TOTAL** | **45** | **106** | **142** | **147** | **134** | **397** | **971** |

Table I6: 100xASC/ESC for stand-alone business for female non-smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **31-35** | 96 | 74 | 107 | 113 | 155 | 141 | **116** |
| **36-40** | 45 | 79 | 91 | 119 | 100 | 121 | **101** |
| **41-45** | 96 | 130 | 105 | 103 | 116 | 132 | **119** |
| **46-50** | 94 | 81 | 123 | 130 | 110 | 109 | **109** |
| **51-55** | 42 | 64 | 99 | 106 | 115 | 150 | **116** |
| **56-60** | 77 | 94 | 113 | 91 | 120 | 119 | **110** |
| **TOTAL** | **76** | **89** | **105** | **112** | **117** | **128** | **112** |

## Female smokers

Table I7: Actual Settled Claims 2003-2006 for stand-alone business for female smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **31-35** | 3 | 7 | 4 | 7 | 2 | 10 | **33** |
| **36-40** | 4 | 5 | 2 | 3 | 3 | 8 | **25** |
| **41-45** | 3 | 6 | 6 | 7 | 5 | 14 | **41** |
| **46-50** | 4 | 3 | 1 | 7 | 4 | 11 | **30** |
| **51-55** | 3 | 4 | 7 | 2 | 5 | 10 | **31** |
| **56-60** | 3 | 3 | 3 | 4 | 3 | 5 | **21** |
| **TOTAL** | **20** | **28** | **23** | **30** | **22** | **58** | **181** |

Table I8: 100xASC/ESC for stand-alone business for female smokers

| Age last | Curtate duration at settlement | | | | | | |
|---|---|---|---|---|---|---|---|
| at settlement | 0 | 1 | 2 | 3 | 4 | 5+ | ALL |
| **31-35** | 137 | 170 | 98 | 208 | 80 | 228 | **160** |
| **36-40** | 141 | 95 | 38 | 66 | 84 | 99 | **85** |
| **41-45** | 95 | 102 | 98 | 129 | 116 | 126 | **114** |
| **46-50** | 126 | 50 | 17 | 132 | 92 | 85 | **79** |
| **51-55** | 140 | 91 | 149 | 48 | 144 | 94 | **105** |
| **56-60** | 270 | 127 | 109 | 154 | 141 | 72 | **117** |
| **TOTAL** | **137** | **100** | **80** | **118** | **108** | **107** | **106** |