

Continuous Mortality Investigation

Mortality Committee

Working Paper 12

**The Graduation of the CMI 1999-2002 Mortality Experience:
Feedback on Working Paper 8 and Proposed Assured Lives
Graduations**

April 2005

CMI Mortality Graduation Working Party
Working Paper 12
The Graduation of the CMI 1999-2002 Mortality Experience:
Feedback on Working Paper 8 and Proposed Assured Lives Graduations

Contents

Introduction	Page 3
Changes to Working Paper 8	Page 4
Labels for tables	Page 4
Feedback from the profession	Page 5
1. General comments	Page 5
2. The Assured Lives investigations	Page 5
3. The Annuitant and Pensioner investigations	Page 6
Assured Lives – proposed graduations	Page 8
1. Overview	Page 8
2. Ultimate durations	Page 8
3. Select durations	Page 16
4. Comparison with 1999-2002 experience	Page 40
5. Comparison with “92” Series tables	Page 50
6. Comparison of select and ultimate rates	Page 51
References	Page 57
Appendix	Page 58

The Graduation of the CMI 1999-2002 Mortality Experience: Feedback on Working Paper 8 and Proposed Assured Lives Graduations

Introduction

In 2003 the Mortality Committee set up a Working Party to carry out the graduation of a new set of standard mortality tables, to be based on the 1999-2002 experience. The members of the Mortality Graduation Working Party (“MGWP”) are Angus Macdonald (Chairman), John Ellam, Adrian Gallop, Simon Spencer, Joanne Wells, David Wilkie and Richard Willets.

The first task of the MGWP was to decide which tables should be graduated, given the available data. Initial findings and proposals were made through the publication of Working Paper 8. The Working Paper was first published in draft form on the CMI section of the Actuarial Profession’s website in May 2004. This was replaced in August 2004 with a final version, as agreed by the Mortality Committee. The final version contained a number of minor edits, but was substantively the same as the draft version.

On 4 June 2004 the CMI hosted a seminar at Staple Inn to discuss both Working Paper 8 and Working Paper 3 (produced by the Mortality Projections Working Party (“MPWP”) on the issue of projections). The seminar was an opportunity to invite comment from the profession on the proposals made in Working Paper 8. Written responses were also welcomed.

The purpose of this Working Paper is to set out the final decisions of the MGWP regarding the assured lives investigations, and to propose a new set of standard mortality tables. The annuitant and pensioner graduations will be published at a later date in conjunction with the MPWP’s work on projections. This is expected to be towards the middle of 2005.

The tables set out in this Working Paper should be treated as **proposals**. They are not standard tables of mortality unless and until officially endorsed by the Actuarial Profession. Any comments on this Working Paper are of course very welcome, and should be addressed by 31 May 2005 to:

Simon Spencer
The CMI
Cheapside House
138 Cheapside
London EC2V 6BW

Email: newtables@cmib.org.uk

Changes to Working Paper 8

Working Paper 8 was originally published in draft form in May 2004. The final version, as agreed by the Mortality Sub-Committee and published in August 2004, is largely unchanged from the draft version. However, a number of mainly presentational edits have been made, and these are documented below.

- An Appendix describing the statistical tests has been added.
- A references section has been added.
- A note on the joint life first death investigations has been added to aid understanding of the nature of the underlying data.
- Graphs showing crude values of μ have been amended to remove the high and low gates in the case of Amounts for the annuitant and pensioner investigations.
- The probability values, $p(+)$ and $p(\text{runs})$, in the tables comparing investigations have been amended to reflect the description given in the Appendix. Previously, ‘significant’ probabilities were those that approached 0 or 1, depending on the tail under consideration. This has now been changed so that ‘significant’ probabilities are those that approach 0 from either a positive or negative direction, depending on the tail under consideration.
- Some further corrections have been made to the tables comparing investigations in the pensioners section. These relate to the underlying choice of durations and ages to be grouped for the purposes of carrying out the statistical tests.
- The appearance of some graphs has been changed to improve presentational consistency.
- A few minor typographical corrections and amendments to aid clarity have been made.

Labels for tables

The previous two sets of standard tables were denoted the “92” Series (based on the 1991-1994 experience) and the “80” Series (based on the 1979-1982 experience). In keeping with this convention, we expect that the new tables, being based on the 1999-2002 experience, will be denoted the “00” Series. This is not set in stone, however, and may yet change. For the purposes of this Working Paper, though, we will assume that this will be the case, and that the naming convention of individual tables remains unchanged – thus, for example, the equivalent of AM80 and AM92 would be called AM00. We have provisionally labelled new tables in a way that follows the previous naming convention, although again these may be subject to change when the final tables are published.

Feedback from the profession

1. General comments

The main source of feedback on Working Paper 8 was the seminar held at Staple Inn on 4 June 2004. This was an open meeting, and the attendance of around sixty people ensured an interesting and useful discussion. A varied cross-section of speakers raised comments, suggestions and questions. The general impression of the Working Party was that the participants were broadly supportive of the proposals set out in Working Paper 8, and this was affirmed after subsequently studying the transcript of the meeting. (The recording of the meeting was solely for the benefit of the two Working Parties; the transcript will not be published.)

Written feedback was also encouraged. However, only one such response was received – and that was effectively a short addendum to a detailed response on Working Paper 3. We believe that respondents are far more likely to have made the effort to correspond if they had particular issues, concerns or disagreements, and so we can only take the lack of response as implicit support for our proposals.

Nevertheless, a number of comments were made at the seminar, and these have been taken into account by the MGWP. More specific comments are set out below.

2. The Assured Lives investigations

Summary of proposed standard tables

Table	Investigation	Sex	Lives / Amounts	Select Period
AM00	Assured Lives – combined	Male	Lives	2
AMS00	Assured Lives – smokers	Male	Lives	2
AMN00	Assured Lives – non-smokers	Male	Lives	2
AF00	Assured Lives – combined	Female	Lives	2
AFS00	Assured Lives – smokers	Female	Lives	2
AFN00	Assured Lives – non-smokers	Female	Lives	2
TM00	Temporary Assured Lives – combined	Male	Lives	5
TMS00	Temporary Assured Lives – smokers	Male	Lives	5
TMN00	Temporary Assured Lives – non-smokers	Male	Lives	5
TF00	Temporary Assured Lives – combined	Female	Lives	5
TFS00	Temporary Assured Lives – smokers	Female	Lives	5
TFN00	Temporary Assured Lives – non-smokers	Female	Lives	5

Working Paper 8 set out in detail the data available to the MGWP. We suggested that, as in previous graduations, it would be appropriate to produce tables based on the main Permanent Assurance and Temporary Assurance investigations. We also considered whether any of the other assured lives experience should be graduated.

These experiences are:

- Linked Assurances
- Joint-Life First-Death Assurances
- Guaranteed Acceptance Assurances
- Pensions Temporary Assurances
- Minimum Evidence Assurances
- Minimum Evidence Joint-Life First-Death Assurances

For some sections of the data, low volumes effectively made the decision for us. In other cases, we felt that the practical use of further tables would be limited, and none of the feedback suggested otherwise. We therefore decided that the time, effort and cost involved in producing tables other than for the two main investigations would not be justified.

Smokers and non-smokers

All previous standard tables have combined smokers and non-smokers. We stated in Working Paper 8 that separate tables for smokers and non-smokers were being considered. This received overwhelming support at the seminar. We have therefore decided that such tables should be produced as part of this graduation.

Select and ultimate durations

In Working Paper 8 we showed that there was some evidence that the Permanent Assurances experience exhibited a two-year select period, while a five-year select period appeared more appropriate for the Temporary Assurances experience. Further, the ultimate experiences of the two investigations appeared to be very similar and we suggested that it might be possible to produce a single, combined ultimate table. This proposal received a positive reaction at the seminar. We have therefore decided that a combined Permanent and Temporary Assurance ultimate table should be produced, comprising data at durations two and over for Permanent Assurances and at durations five and over for Temporary Assurances.

3. The Annuitant and Pensioner investigations

Detailed feedback and proposed graduations for the annuitant and pensioner investigations will be published later in 2005, once the work on projections is complete. At this stage, we expect the following tables to be produced:

Summary of proposed annuitant tables

Table	Investigation	Sex	Lives / Amounts	Select Period
IML00	Immediate Annuitants	Male	Lives	1
IMA00	Immediate Annuitants	Male	Amounts	1
IFL00	Immediate Annuitants	Female	Lives	1
IFA00	Immediate Annuitants	Female	Amounts	1
RMD00	Retirement Annuitants, Deferred	Male	Lives	0
RMV00	Retirement Annuitants, Vested	Male	Lives	0
RMC00	Retirement Annuitants, Combined	Male	Lives	0
RFD00	Retirement Annuitants, Deferred	Female	Lives	0
RFV00	Retirement Annuitants, Vested	Female	Lives	0
RFC00	Retirement Annuitants, Combined	Female	Lives	0
PPMD00	Personal Pensioners, Deferred	Male	Lives	0
PPMV00	Personal Pensioners, Vested	Male	Lives	0
PPMC00	Personal Pensioners, Combined	Male	Lives	0
PPFD00	Personal Pensioners, Deferred	Female	Lives	0
PPFV00	Personal Pensioners, Vested	Female	Lives	0
PPFC00	Personal Pensioners, Combined	Female	Lives	0

Summary of proposed pensioner tables

Table	Investigation	Sex	Lives / Amounts	Select Period
PML00	Pensioners, Normal/Late Retirements	Male	Lives	0
PEML00	Pensioners, Early Retirements	Male	Lives	0
PCML00	Pensioners, Combined	Male	Lives	0
PMA00	Pensioners, Normal/Late Retirements	Male	Amounts	0
PEMA00	Pensioners, Early Retirements	Male	Amounts	0
PCMA00	Pensioners, Combined	Male	Amounts	0
PFL00	Pensioners, Normal/Late Retirements	Female	Lives	0
PEFL00	Pensioners, Early Retirements	Female	Lives	0
PCFL00	Pensioners, Combined	Female	Lives	0
PFA00	Pensioners, Normal/Late Retirements	Female	Amounts	0
PEFA00	Pensioners, Early Retirements	Female	Amounts	0
PCFA00	Pensioners, Combined	Female	Amounts	0
WL00	Widows	Female	Lives	0
WA00	Widows	Female	Amounts	0

Assured Lives - proposed graduations

1. Overview

Extensive descriptions of the data were provided in Working Paper 8 and will not be reproduced here.

As with the “80” and “92” Series graduations, the intention of the MGWP was to use the graduation methodology developed by Forfar, McCutcheon and Wilkie (1988) as the preferred approach. This involves using a central exposed to risk, fitting a formula of the $\mu_x = GM(r,s)$ class and in the first place choosing parameters by maximum likelihood, taking account also of the usual diagnostic tests (numbers of positive and negative deviations, runs, Kolmogorov-Smirnov, serial correlations and χ^2).

It was, however, necessary to make some adjustments in order that the resulting mortality rates remained sensible in terms of the relationships between different sections (for example smokers and non-smokers), and at the extremes of age where there was very little data. Also, low data volumes at the select durations dictated a different approach.

2. Ultimate durations

Working Paper 8 revealed a similarity in the experience of Permanent Assurances at durations 2 and over and Temporary Assurances at durations 5 and over. It has therefore been decided to amalgamate these experiences. This resulted in six separate graduations of ultimate rates:

- Males, Combined
- Males, Smokers
- Males, Non-smokers
- Females, Combined
- Females, Smokers
- Females, Non-smokers.

In all cases, different orders of $GM(r,s)$ were considered. For example, $GM(2,3)$ would be parameterised as:

$$a_1 + a_2t + \exp\{b_1 + b_2t + b_3(2t^2 - 1)\}$$

where $t = (x - 70)/50$.

This age scaling, and the form of the polynomial, arise from the use of Chebycheff polynomials in the fitting process. See Forfar, McCutcheon and Wilkie (1988) for further details on this process.

The fitted parameters are summarized in the table below.

Table 1. Graduations for the 1999-2002 assured lives ultimate experience:
Permanent Assurances (dur 2+) and Temporary Assurances (dur 5+) combined.

Males

Section	Combined	Non-smoker	Smoker
GM formula	GM(1,3)	GM(1,3)	GM(1,3)
Age range fitted	20-90	20-90	20-90
Optimised parameters			
100^*a_1	0.044726	0.034421	0.067019
b_1	-4.594470	-4.259447	-4.492762
b_2	5.890200	6.275162	5.578582
b_3	-0.575750	-0.033485	-1.023187
Selected μ_x			
μ_{20}	0.000463	0.000370	0.000685
μ_{50}	0.001865	0.001519	0.003079
μ_{70}	0.018423	0.014955	0.031800
μ_{100}	0.407367	0.616057	0.424205
μ_{119}	1.911732	6.420092	1.033289

Females

Section	Combined	Non-smoker	Smoker
GM formula	GM(1,2)	GM(1,2)	GM(1,3)
Age range fitted	20-90	20-90	20-90
Optimised parameters			
100^*a_1	0.014423	0.022054	0.023434
b_1	-4.389068	-4.621657	-4.435892
b_2	5.584346	5.850592	5.487066
b_3			-0.736004
Selected μ_x			
μ_{20}	0.000191	0.000249	0.000258
μ_{50}	0.001474	0.001168	0.002410
μ_{70}	0.012557	0.010057	0.024961
μ_{100}	0.354144	0.329351	0.391812
μ_{119}	2.955417	3.040420	1.301998

The following figures illustrate how the graduations compare with the data. A log scale is used on the y -axis. The “gates” are $2\frac{1}{2}\%$ and $97\frac{1}{2}\%$ lower and upper confidence limits of the crude values of μ_x .

Figure 1. Crude Mu, gates and graduated Mu for Males, Combined: GM(1,3) ML

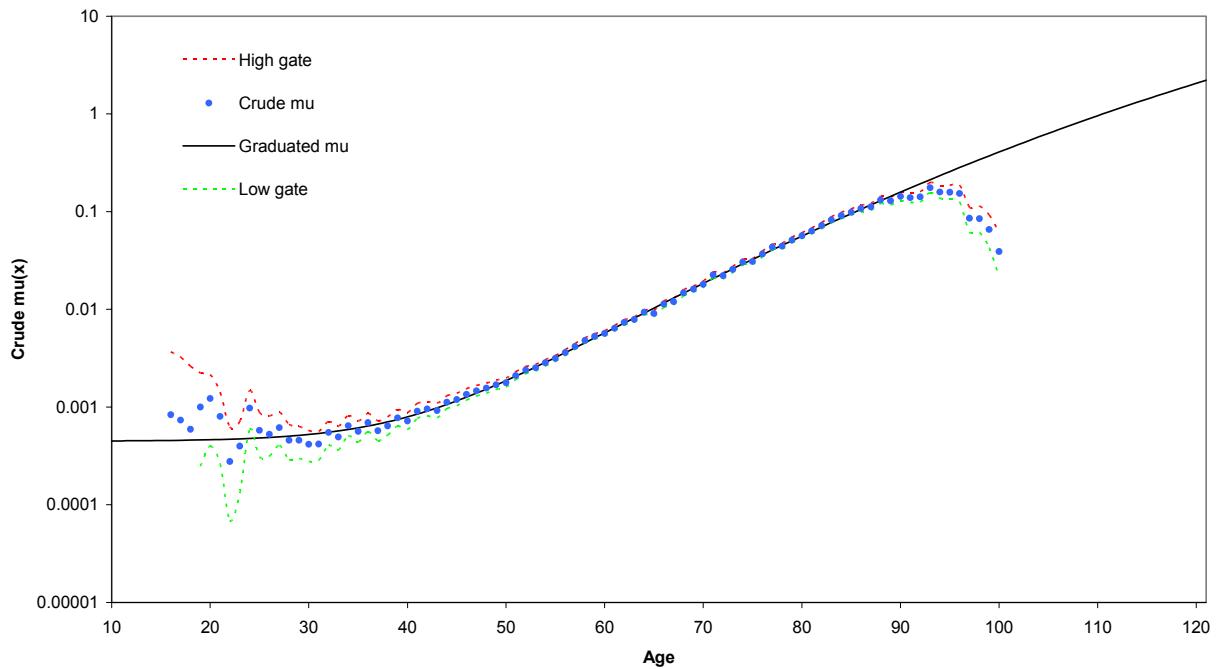


Figure 2. Crude Mu, gates and graduated Mu for Males, Smokers: GM(1,3) ML

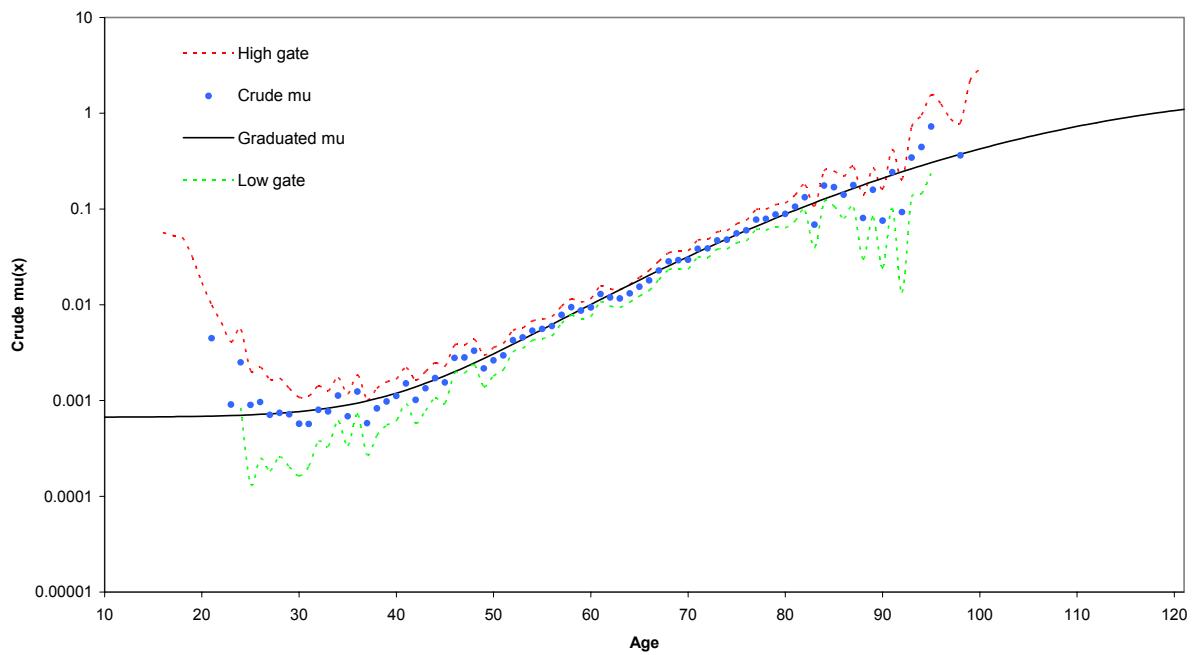


Figure 3. Crude Mu, gates and graduated Mu for Males, Non-smokers: GM(1,3) ML

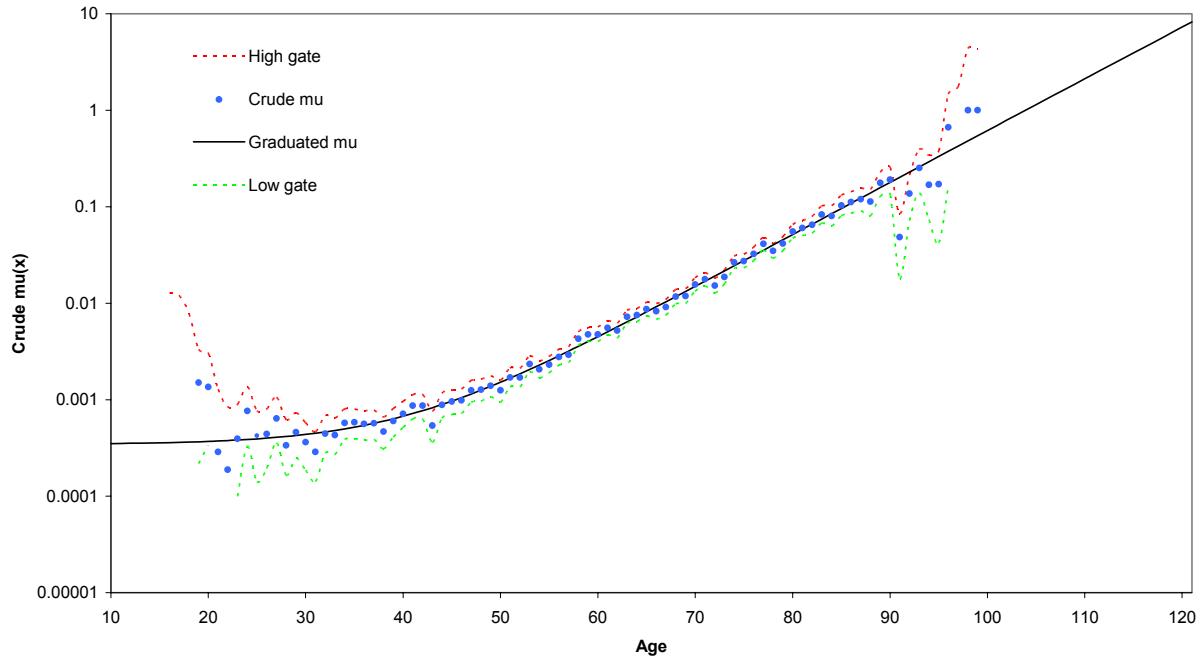


Figure 4. Crude Mu, gates and graduated Mu for Females, Combined: GM(1,2) ML

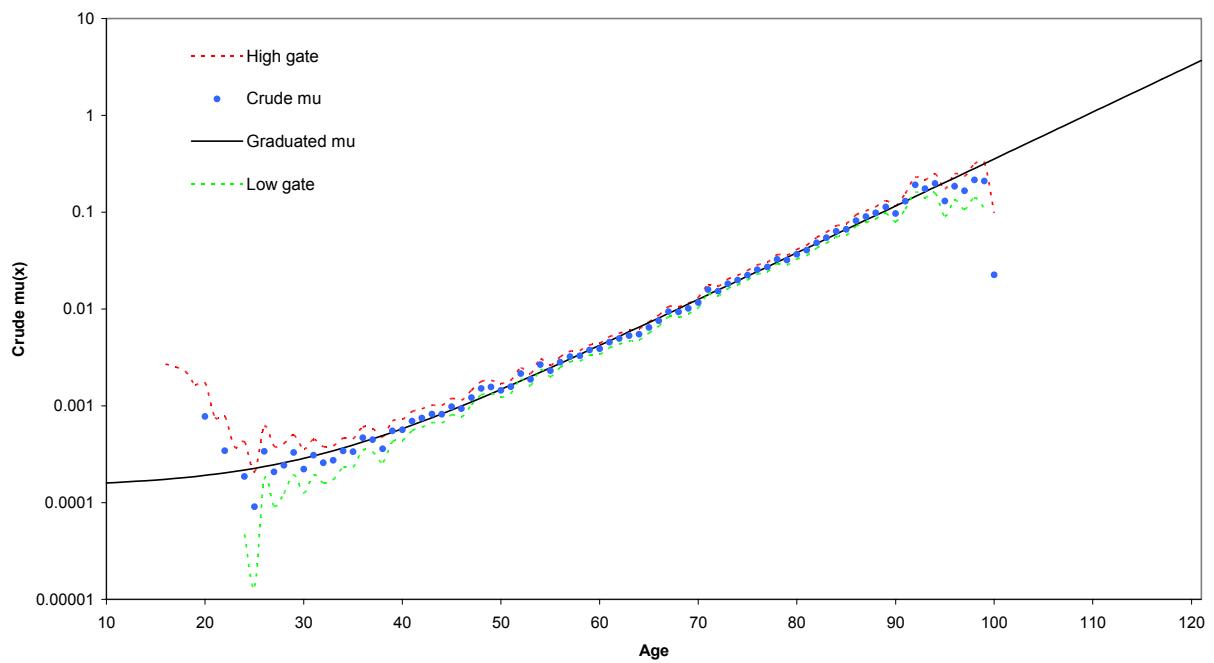


Figure 5. Crude Mu, gates and graduated Mu for Females, Smokers: GM(1,3) ML

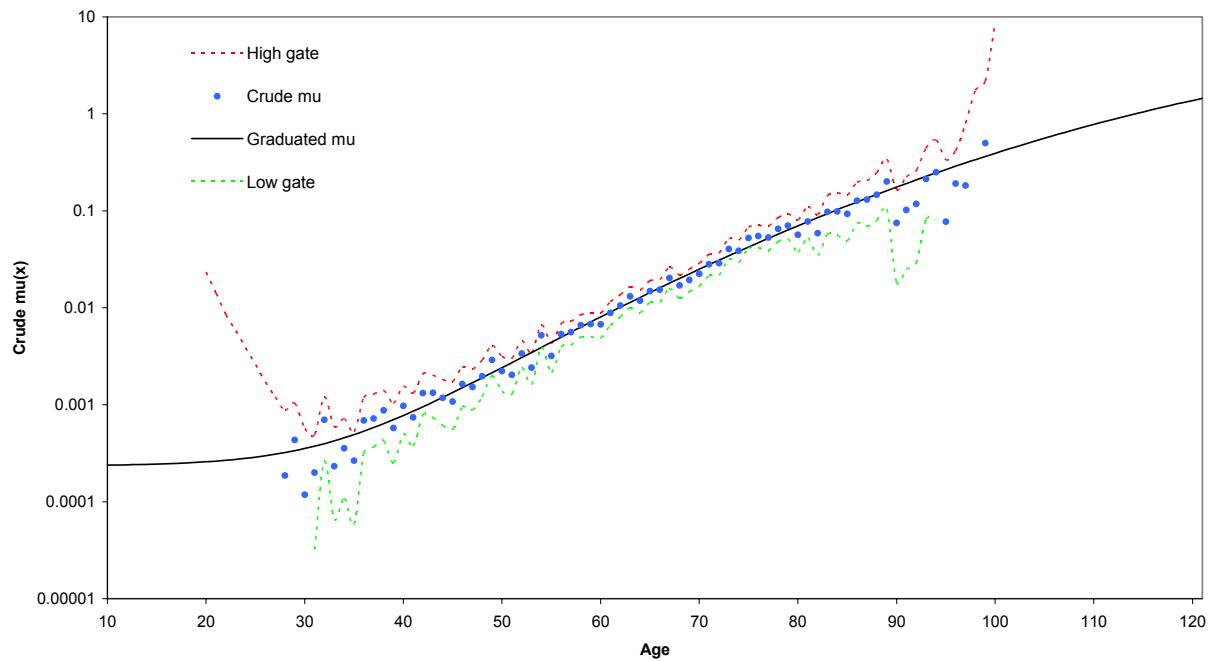
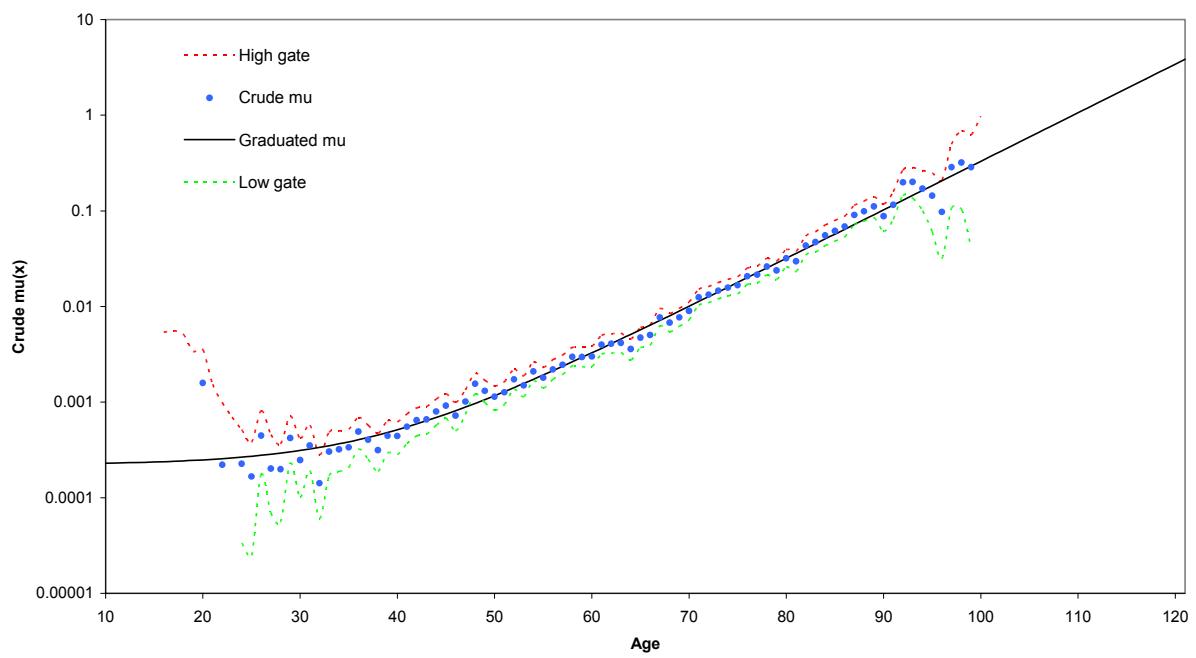


Figure 6. Crude Mu, gates and graduated Mu for Females, Non-smokers: GM(1,2) ML



From the above graphs, it can be seen that over the majority of the age range there is very little doubt as to the graduated values. However, at the lower and upper extremes of age a number of undesirable features emerge. These are more obvious when the graduated formulae are graphed together.

Figure 7. Chart of Unadjusted Mu for Males

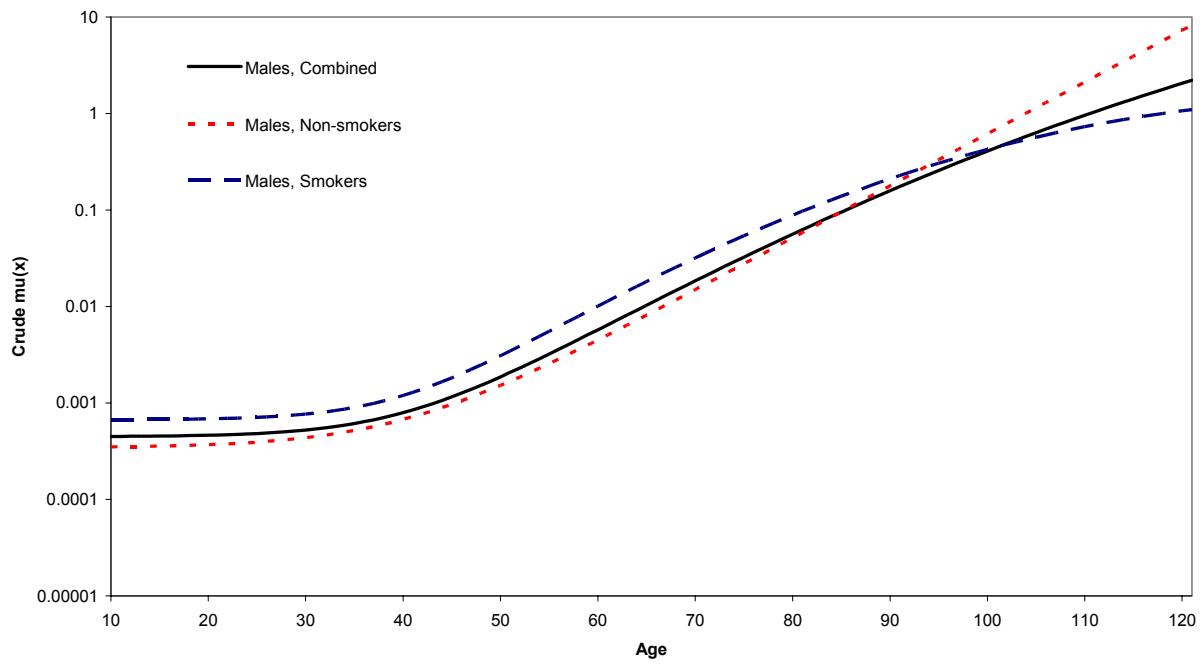
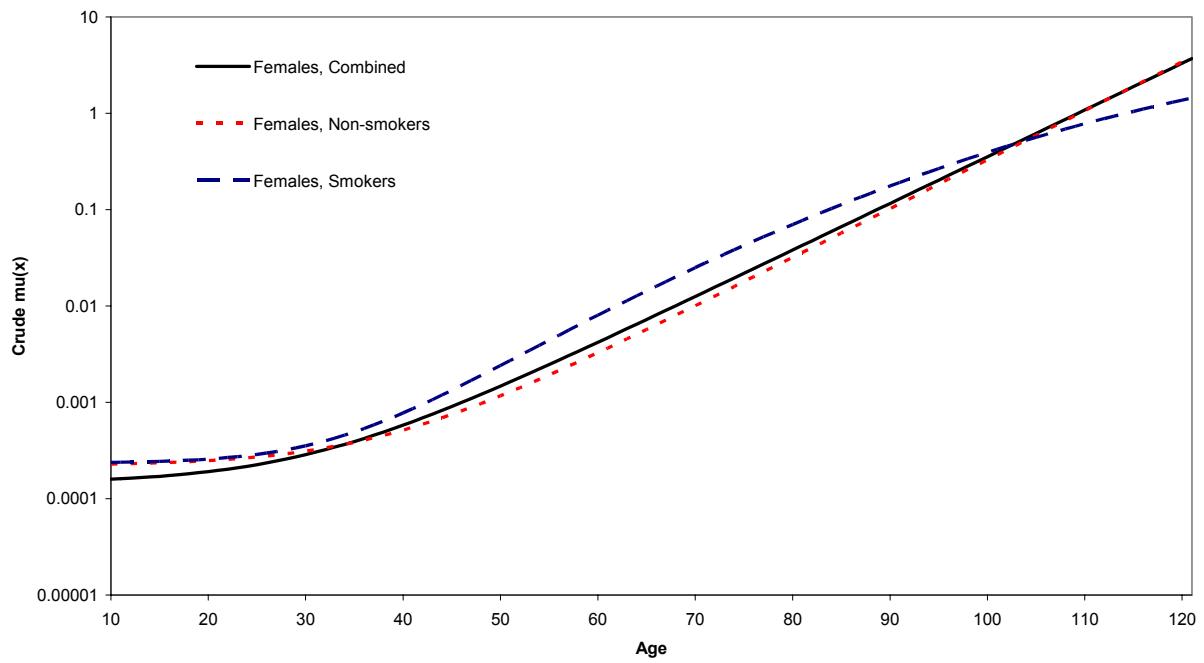


Figure 8. Chart of Unadjusted Mu for Females



The two main problems are: (a) the erratic nature of the (extrapolated) values at the very old ages (i.e. 100+), and (b) the crossing over of the combined, non-smoker and smoker sections at the young and old ages.

The Working Party therefore feels that adjustments should be made to “correct” these spurious anomalies.

Old age mortality rates

The Working Party has no credible data at the oldest ages, and so whatever mortality rates are published will necessarily be subjective. One option might be to stop the mortality tables at an age supported by the data (say 90). This, however, would not be particularly helpful to practitioners. We have therefore decided to “blend” the graduated formulae into a reasonable upper limit, which we believe will provide a sensible and consistent end to the tables. The process we have used is summarised below.

Action	Assumption
1. Choose an age, ω , at which, arbitrarily, $q_{\omega-1} = 1$	$\omega = 121$, i.e. $q_{120} = 1$
2. Fix a value of $\mu_{\omega-1}$	$\mu_{120} = 1.0$
3. Choose a lower age, y , from which the blending will begin	$y = 100$

Values of μ are calculated according to the GM graduation formulae up to μ_{100} . μ_{120} is set to equal 1. Values of μ between 100 and 120 are then derived by interpolation between the two, using the formula:

$$\mu_x = \frac{(120-x)^{1.25}}{(120-100)^{1.25}} \times \mu_{100} + \left(1 - \frac{(120-x)^{1.25}}{(120-100)^{1.25}}\right) \times \mu_{120}$$

The power factor in the weights affects the speed (or “curvature”) at which the rates blend into the target value. A value of 1 would simply be linear interpolation, i.e. a straight line. The value of 1.25 chosen leads to a slowing of the rate of increase of mortality rates by age. This feature would accord with views expressed at the Society of Actuaries International Symposium: Living to 100 and Beyond held in January 2005 (see for example *Ending the Mortality Table* by E C Hustead).

Relationships between combined, non-smokers and smokers

The following constraints have been made to ensure consistency between the smoker statuses:

$\mu_x[\text{smoker}]$ constrained to be not less than $\mu_x[\text{combined}]$

$\mu_x[\text{non-smoker}]$ constrained to be not more than $\mu_x[\text{combined}]$

The resulting values of μ , following the adjustments described above, are shown in the charts below.

Figure 9. Chart of Adjusted Mu for Males

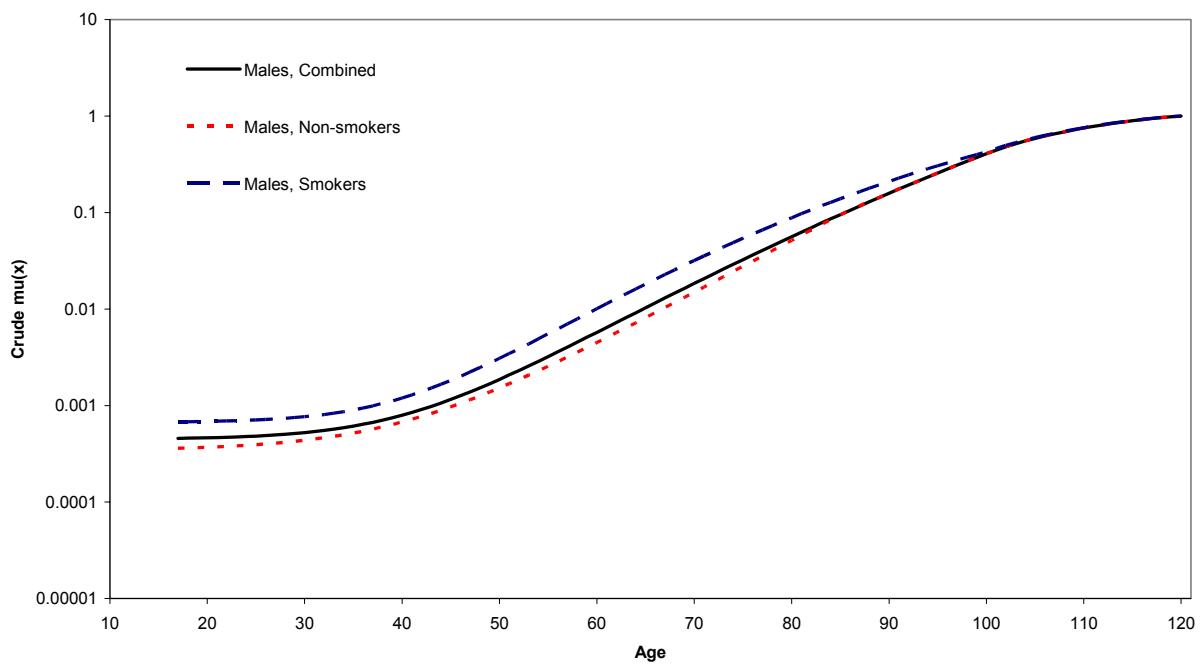
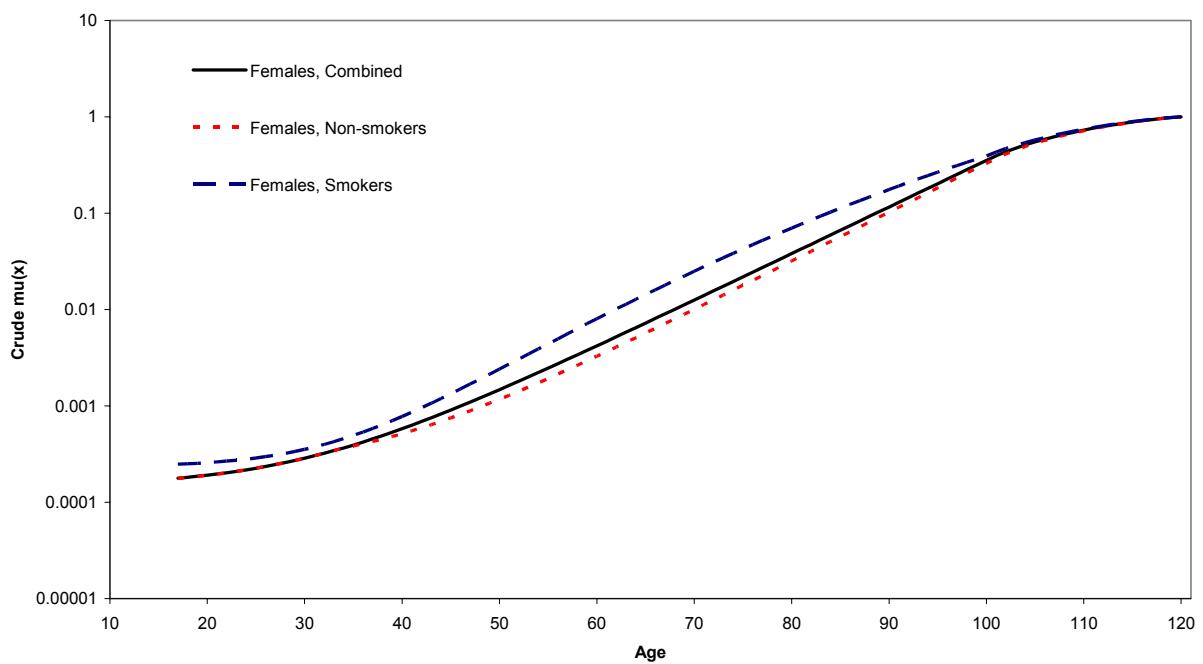


Figure 10. Chart of Adjusted Mu for Females



Values of q_x have been calculated using the formula:

$$q_x = 1 - \exp \left\{ - \int_0^1 \mu_{x+t} dt \right\}$$

where the integral has been evaluated using a Simpson's rule approximation. A full listing of the proposed values of q_x is given in the Appendix.

3. Select durations

A significant problem for the Working Party has been a shortage of data at early durations, which has compromised the effectiveness of the method used for graduating the ultimate rates. As with the problem of producing mortality rates at the oldest ages, one option would have been to produce tables with no select rates. Again, this was not considered to be helpful to practitioners, who would expect select rates in assured lives tables, and so an alternative approach was developed.

In Working Paper 8 it was shown that, broadly, the available data were consistent with a two-year select period for the Permanent Assurances and a five-year select period for the Temporary Assurances, and we have decided to adopt these select periods. Scanty data at early durations, however, meant that separate graduations of data at individual select durations was impossible. Expressing the crude rates at select durations as a proportion of the graduated ultimate rates at the same ages revealed great variability but, on a broad enough scale, justified graduating the data at select durations as functions of the graduated ultimate rates. This approach also ensured that the graduated rates at select durations behaved consistently as functions of age and duration.

After much experimentation, we assumed that the mortality rate $q(x, t)$ at age x and duration t could be expressed as a function of the graduated ultimate rate at age x , $q(x)$, as follows:

$$q(x, t) = q(x) \times f(x, t)$$

The function $f(x, t)$ was subject to smoothing by rolling averages. As a first stage, an unsmoothed function, $uf(x, t)$, was first derived, where $uf(x, t)$ was a fourth-order polynomial in x plus a term in t which ensured that the graduated rates at different select durations are parallel:

$$uf(x, t) = [a_0 + a_1x + a_2x^2 + a_3x^3 + a_4x^4] + b(t)$$

The polynomial was assumed to apply to ages of x in the range $30 \leq x \leq 80$, while for ages $x < 30$ we assume that $uf(x, t) = uf(30, t)$, and for ages $x > 80$ we assume that $uf(x, t) = uf(80, t)$. The smoothed $f(x, t)$ was then calculated as

$$f(x, t) = [uf(x-2, t) + 2 \times uf(x-1, t) + 3 \times uf(x, t) + 2 \times uf(x+1, t) + uf(x+2, t)] \div 9$$

The following constraints were applied:

$uf(x, t) \leq 1.0$; $uf(x, 0) \geq 0.2$ (we assume that select rates cannot exceed ultimate rates and, arbitrarily, that select duration 0 rates cannot fall below 20% of ultimate rates)

$uf(x, 2) = 1.0$ for Permanent Assurances

$uf(x, 5) = 1.0$ for Temporary Assurances

$a_0 = 0$; $a_1 = 0$; $b(0) = 0$

$b(i) \geq b(i-1)$

$b(i) - b(i-1) \geq b(i+1) - b(i)$

Parameters a_2 , a_3 , a_4 and $b(t)$ were then found which maximised the function:

$$\sum_x \sum_t (E_{x,t} \times \log(f(x,t) \times q_x) + (E_{x,t} - A_{x,t}) \times \log(1 - f(x,t) \times q_x))^{(1)}$$

where E and A are the 1999-2002 exposures and actual deaths respectively for the relevant ages and durations, and q is the graduated ultimate mortality rate.

Separate functions were fitted for the following investigations:-

- Males, Permanent Assurances
- Males, Temporary Assurances
- Females, Permanent Assurances
- Females, Temporary Assurances

For the female Temporary Assurances there are virtually no deaths after about age 70. This caused the factors derived above to fall very rapidly at these ages (since the 100A/E is generally zero). We have therefore assumed that the factors at ages above 70 are equal to those at age 70 for this section of the data, in order to avoid the undesirable feature of the select rates decreasing as age increases (i.e. where $f(x, t)$ falls by more than $q(x)$ increases).

In the series of charts below we show the “before” and “after” positions for the combined experiences. The left panels show actual experience at durations 0 to 4 as a proportion of the graduated ultimate rates with 9-year rolling averages used to iron out the largest fluctuations. Even with this averaging the volatility in the proportions is very apparent, and is clearly unsuitable for use in a standard table. The right panels show the results of applying the approach described above.

Figure 11. Permanent Assurances, Males, Combined

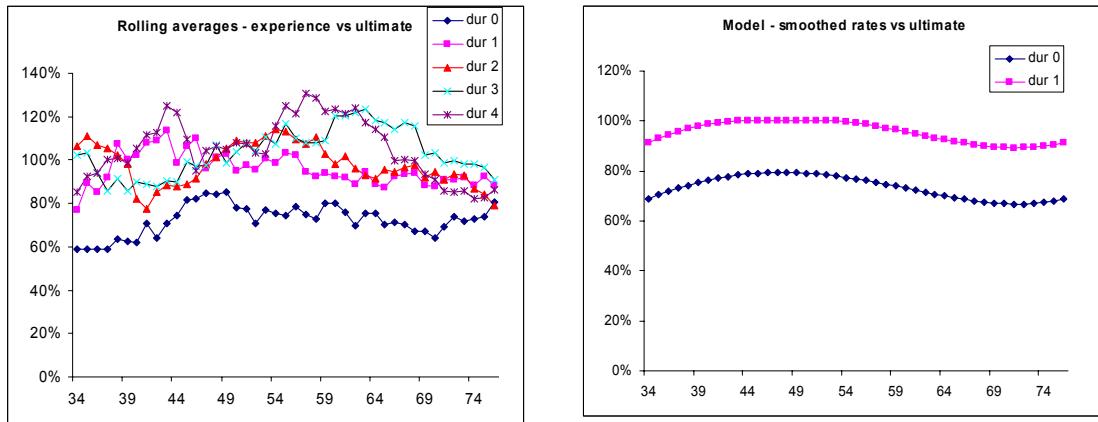


Figure 12. Permanent Assurances, Females, Combined

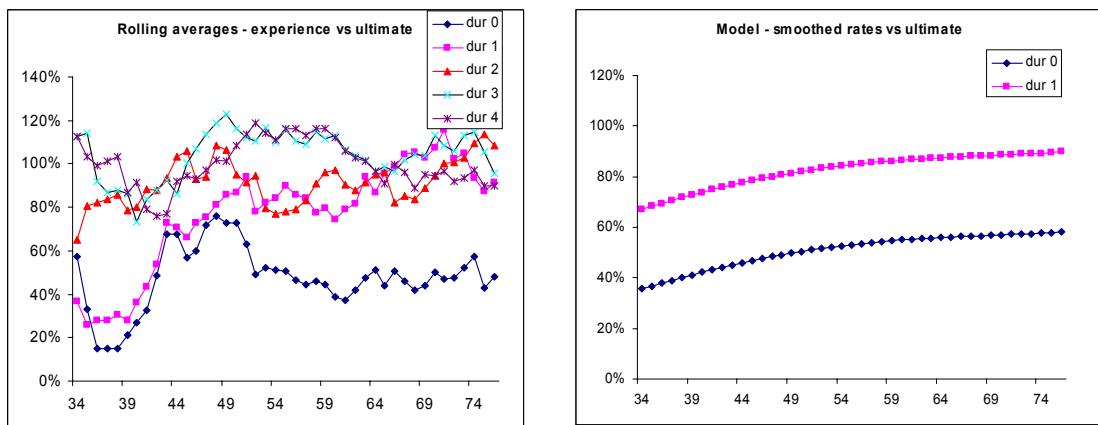


Figure 13. Temporary Assurances, Males, Combined

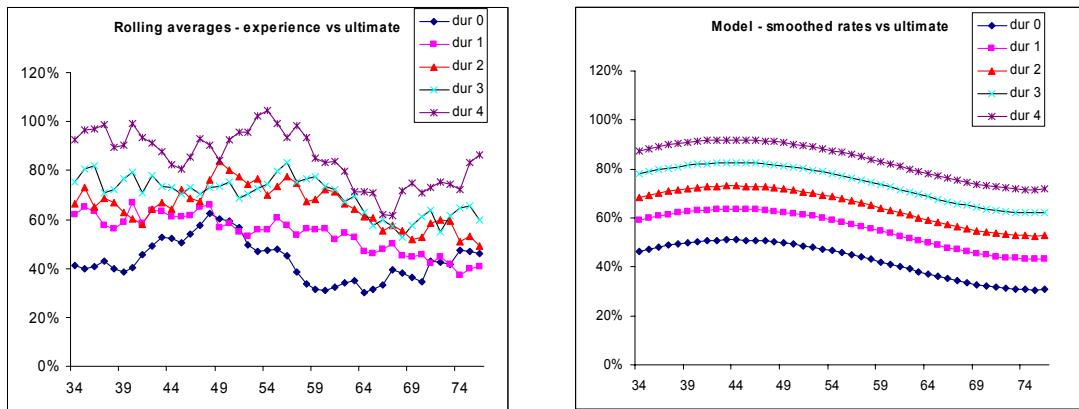
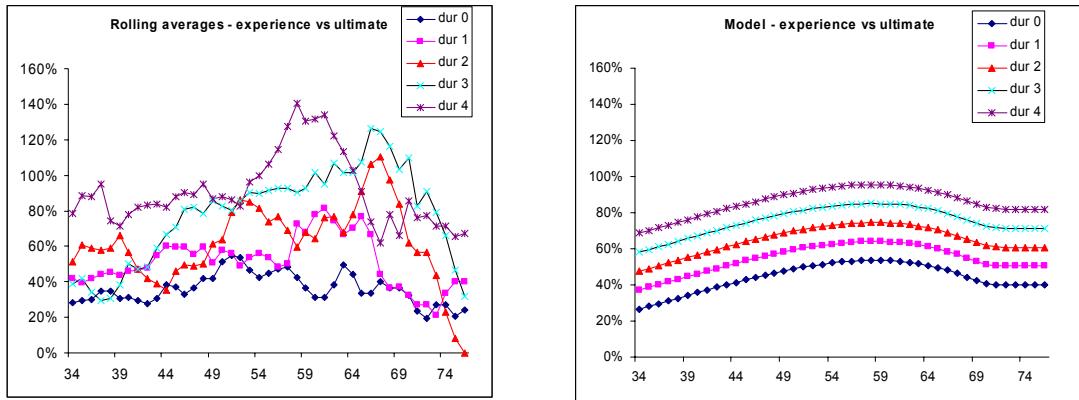


Figure 14. Temporary Assurances, Females, Combined



For non-smokers and smokers a simple adjustment factor was applied to the combined $f(x, t)$. The adjustment was again found by maximising formula (1), given the combined a and b parameters. The resulting mortality rates were further constrained to be not greater/lower (as appropriate) than the relevant combined select rates.

The parameters fitted for the various investigations were as follows:-

Parameter	Males		Females	
	Permanent Assurances	Temporary Assurances	Permanent Assurances	Temporary Assurances
100,000 a_0	0.0000	0.0000	0.0000	0.0000
100,000 a_1	0.0000	0.0000	0.0000	0.0000
100,000 a_2	159.0392	113.5889	64.1485	13.2721
100,000 a_3	-3.7226	-2.7468	-1.2016	0.6237
100,000 a_4	0.0235	0.0174	0.0064	-0.0100
$b(0)$	0.0000	0.0000	0.0000	0.0000
$b(1)$	0.2253	0.1258	0.3158	0.1050
$b(2)$	-	0.2203	-	0.2101
$b(3)$	-	0.3148	-	0.3151
$b(4)$	-	0.4093	-	0.4202
Non-smoker adj	0.9980	1.0368	1.0501	1.0116
Smoker adj	1.1720	1.1108	1.3157	0.9976

Select rates have been assumed to end at age $90+t$, as was the case in the "92" Series tables. The final proposed rates are presented in the tables in the Appendix.

At this stage, select values of μ have not been calculated. It is proposed that these will be produced as part of the final publication of these tables using the methodology set out in *C.M.I.R. 10*, 31-34.

In the following charts we show how the final graduated select values of q (as we do not yet have values of μ) compare with the crude values of μ and their associated upper and lower "gates". The scantiness of the data leads to the very large "confidence intervals".

Figure 15. Crude Mu, gates and graduated q for Permanent Assurances, Males, Combined, Duration 0

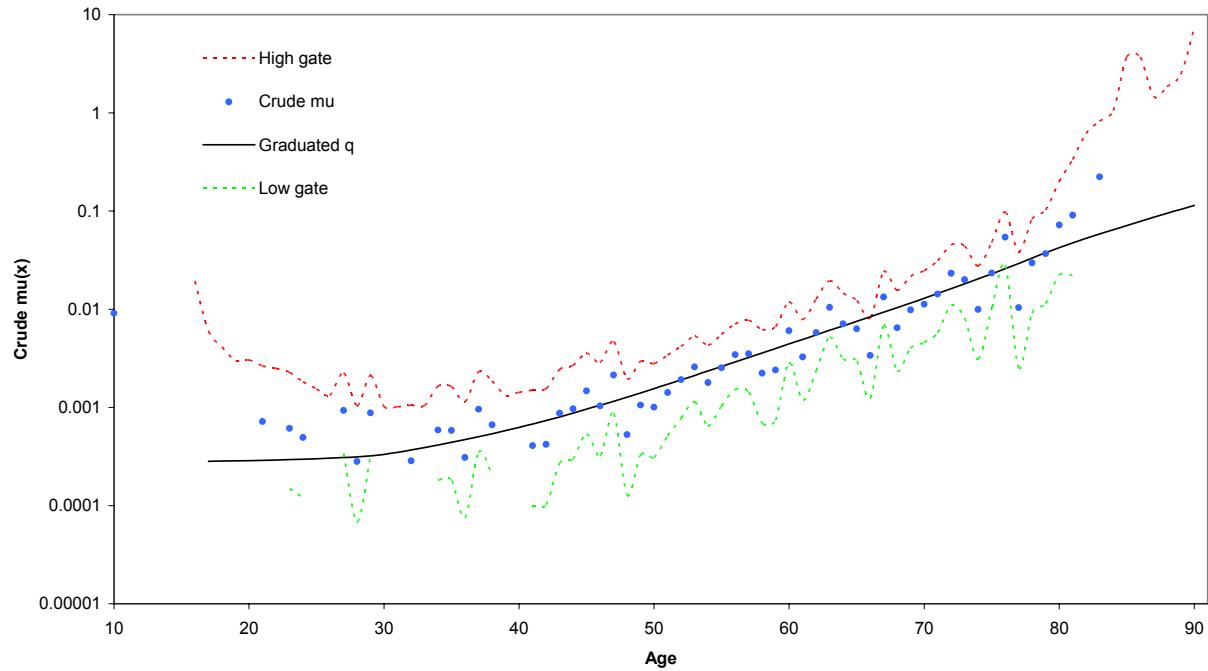


Figure 16. Crude Mu, gates and graduated q for Permanent Assurances, Males, Combined, Duration 1

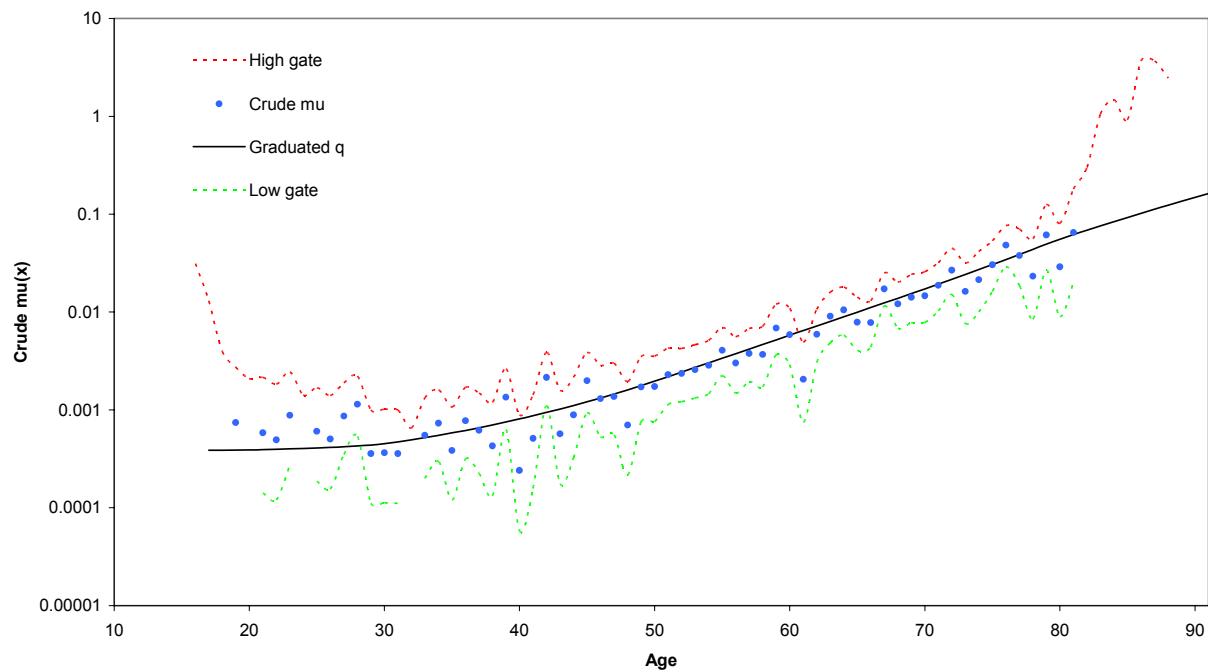


Figure 17. Crude Mu, gates and graduated q for Permanent Assurances Males, Smokers, Duration 0

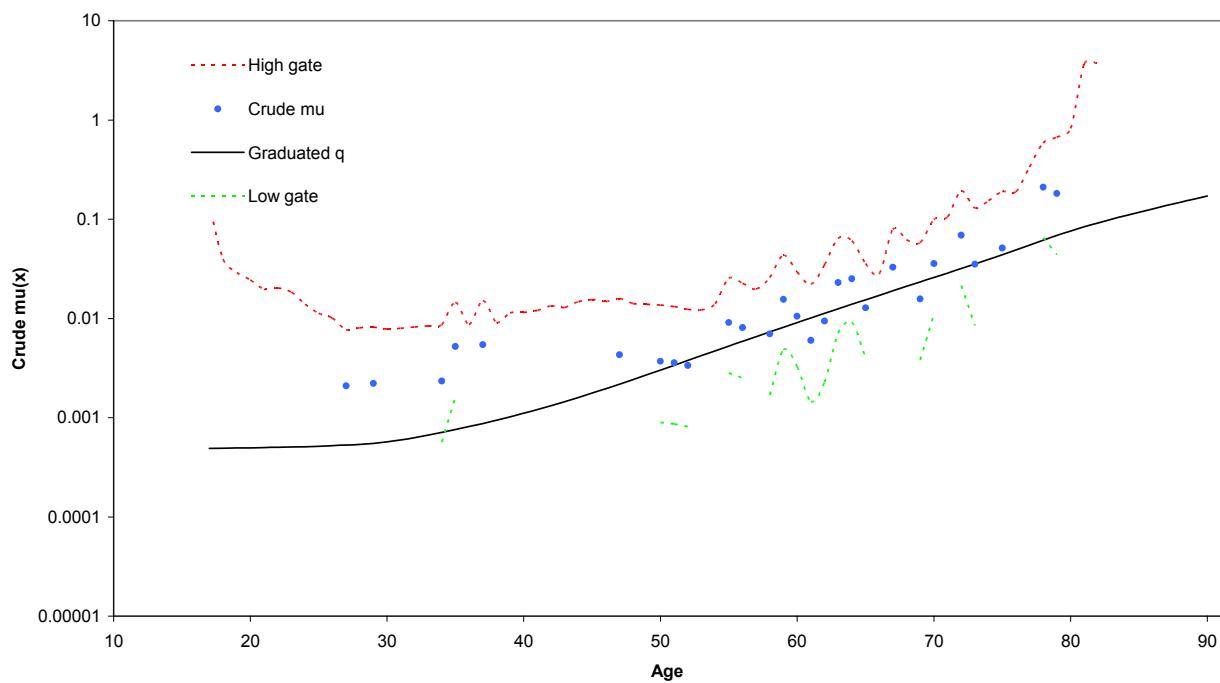


Figure 18. Crude Mu, gates and graduated q for Permanent Assurance, Males, Smokers, Duration 1

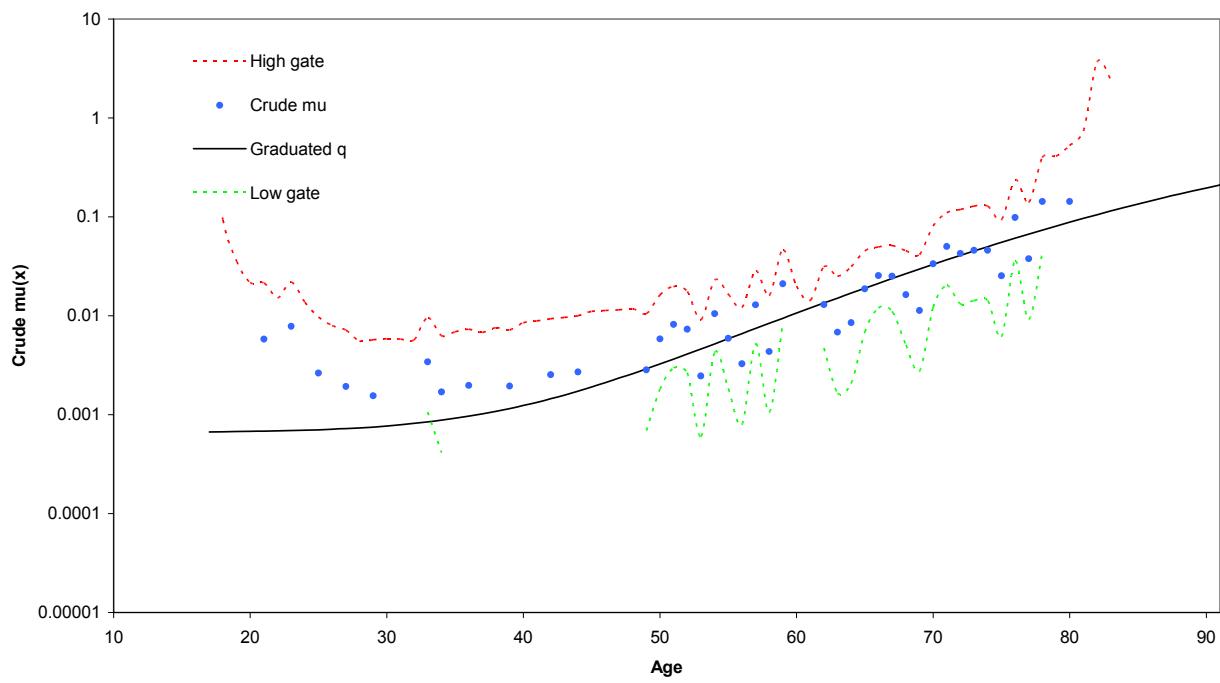


Figure 19. Crude Mu, gates and graduated q for Permanent Assurances, Males, Non-smokers, Duration 0

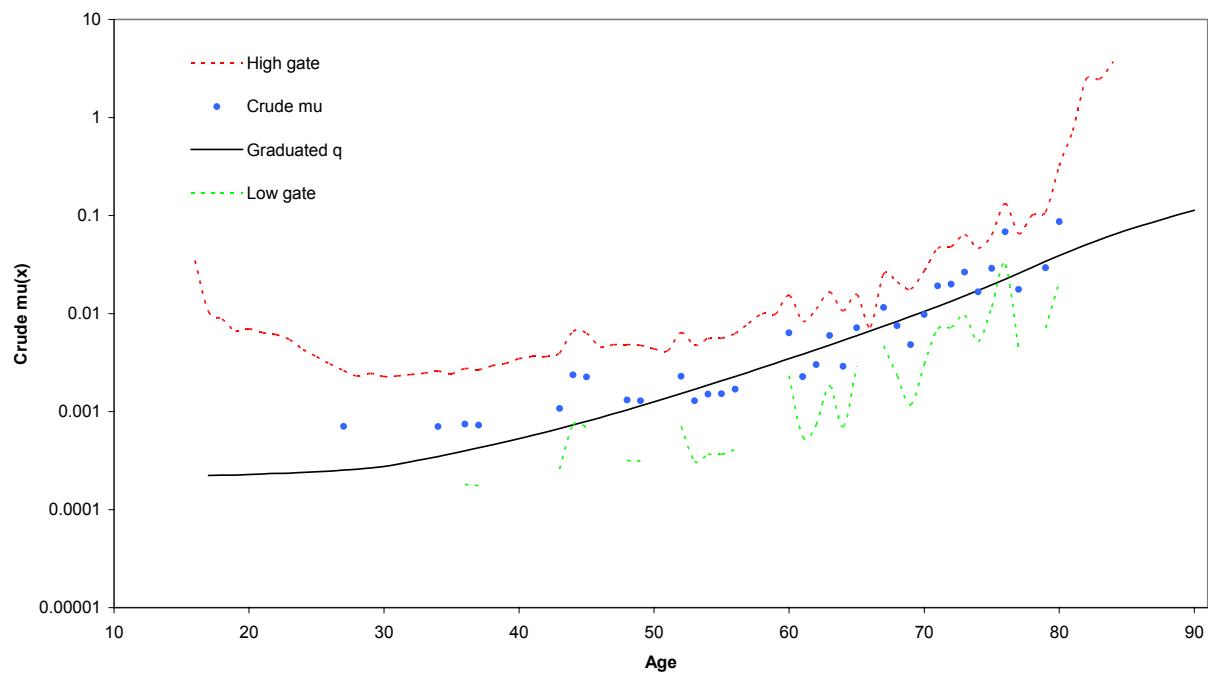


Figure 20. Crude Mu, gates and graduated q for Permanent Assurances, Males, Non-smokers, Duration 1

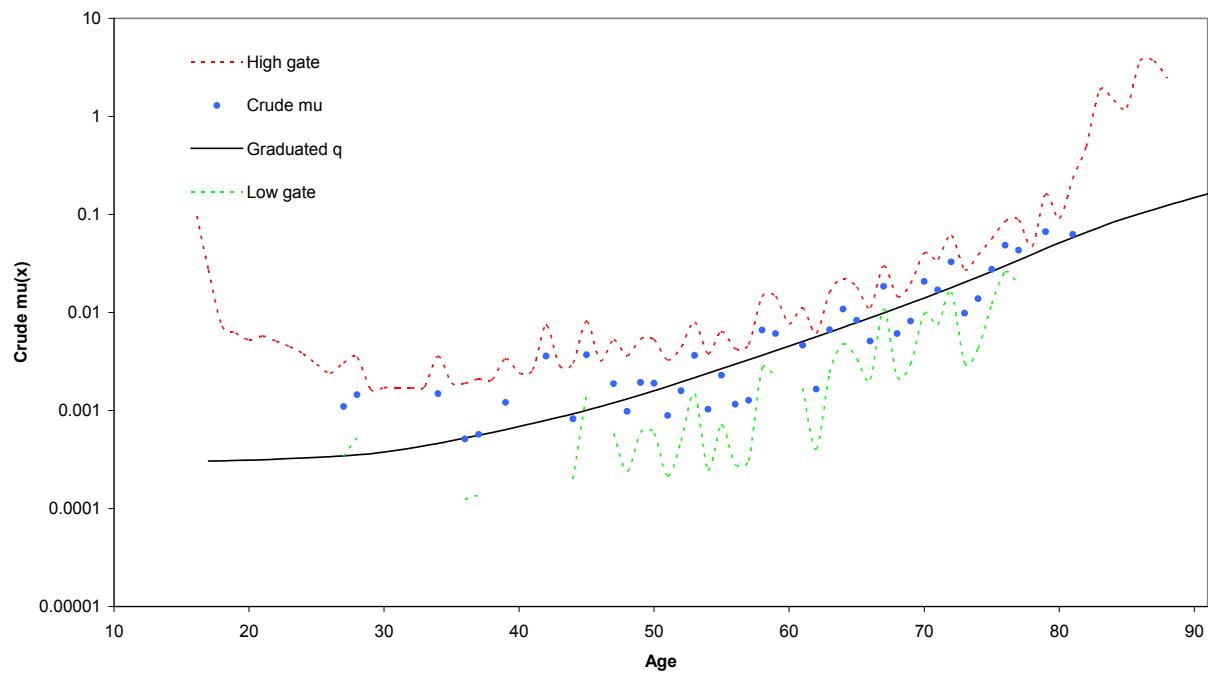


Figure 21. Crude Mu, gates and graduated q for Permanent Assurances, Females, Combined, Duration 0

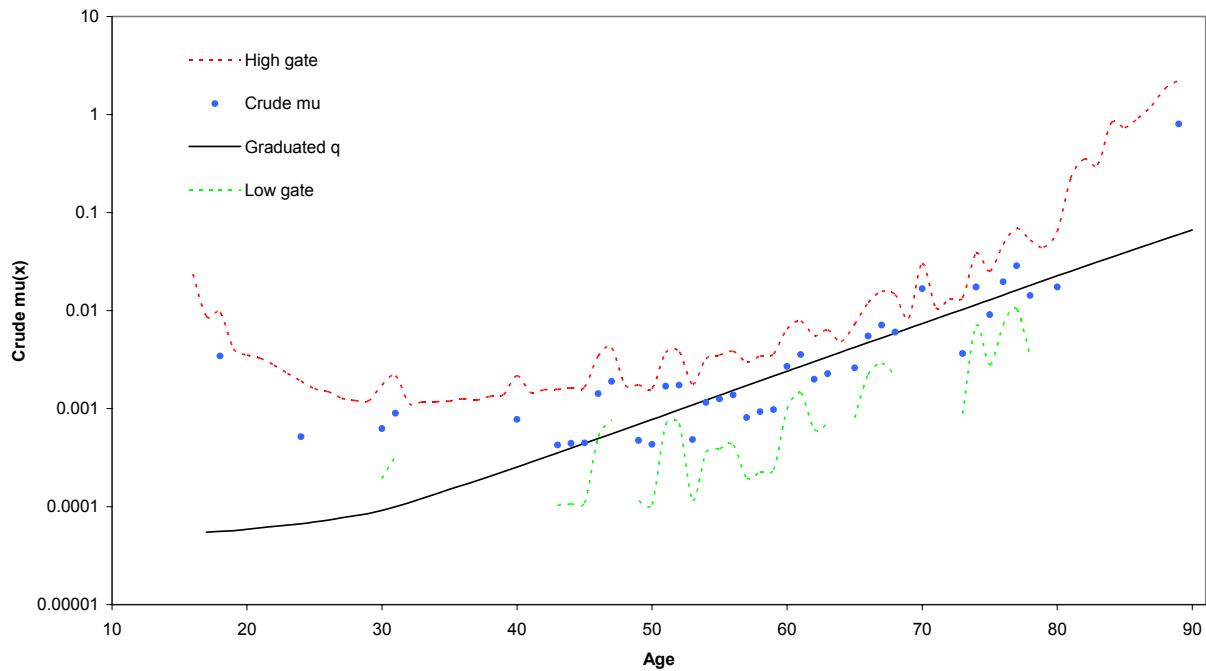


Figure 22. Crude Mu, gates and graduated q for Permanent Assurances, Females, Combined, Duration 1

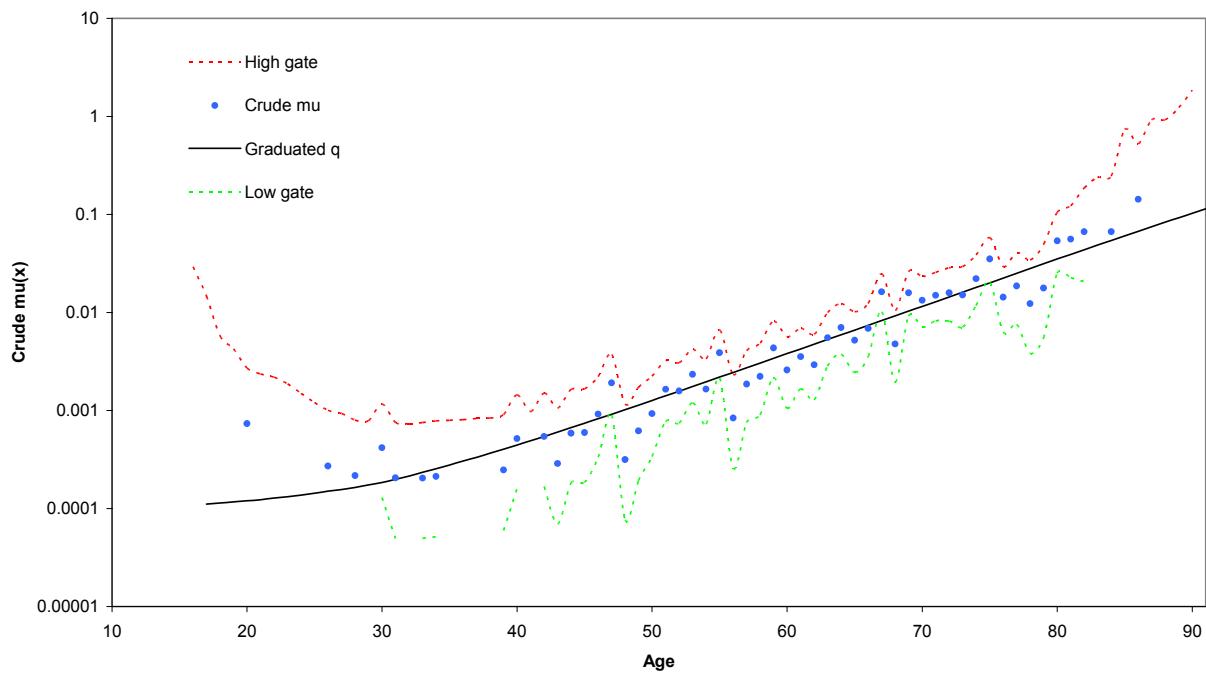


Figure 23. Crude Mu, gates and graduated q for Permanent Assurances, Females, Smokers, Duration 0

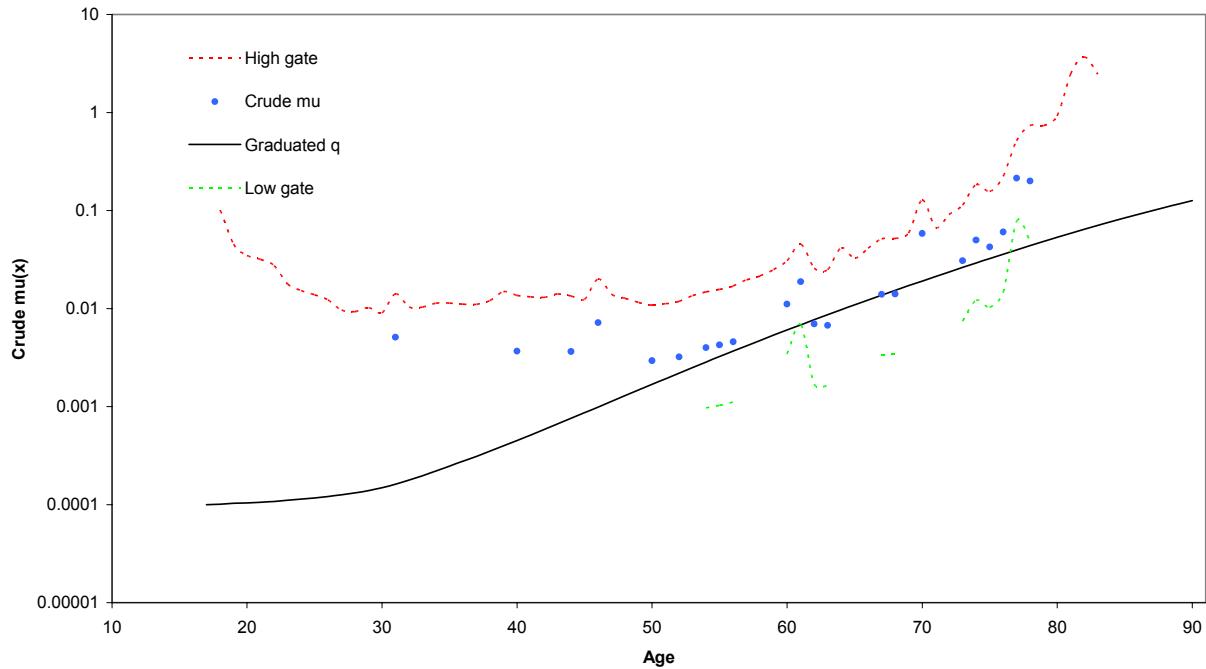


Figure 24. Crude Mu, gates and graduated q for Permanent Assurances, Females, Smokers, Duration 1

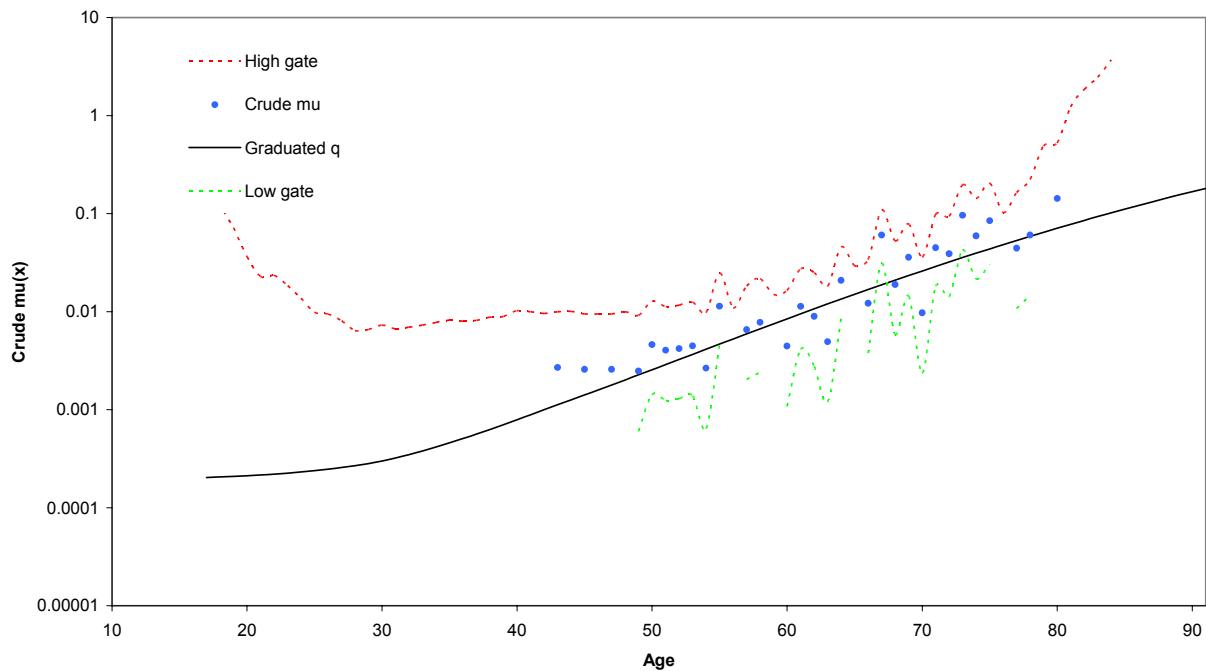


Figure 25. Crude Mu, gates and graduated q for Permanent Assurances, Females, Non-smokers, Duration 0

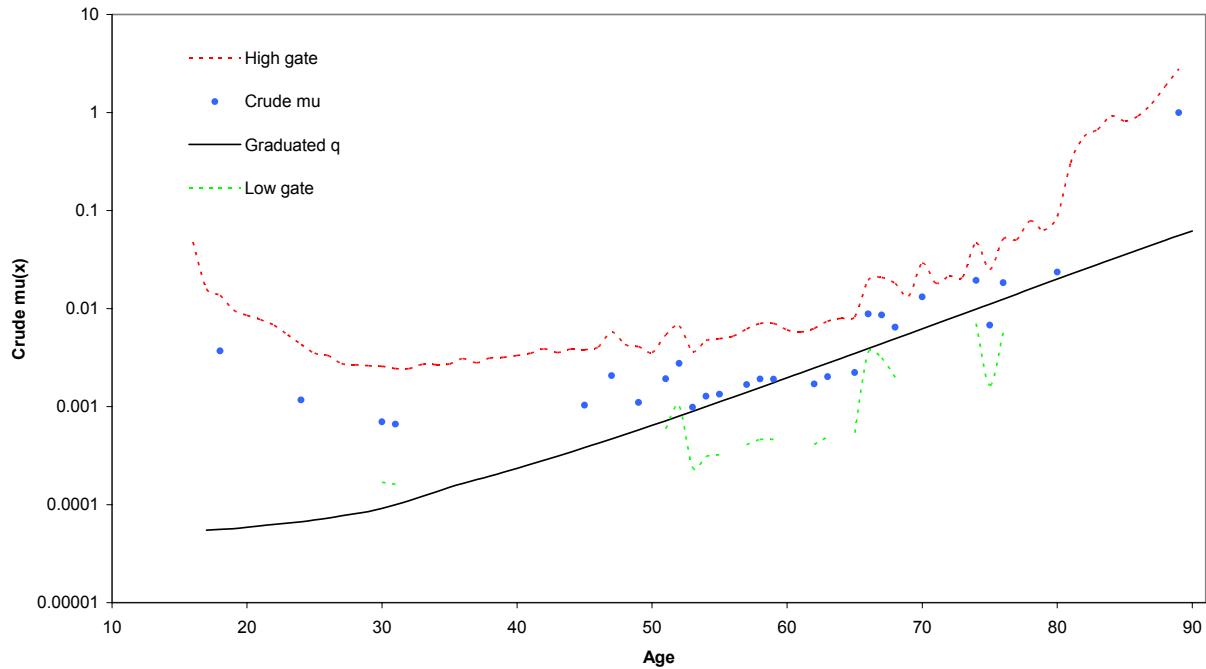


Figure 26. Crude Mu, gates and graduated q for Permanent Assurances, Females, Non-smokers, Duration 1

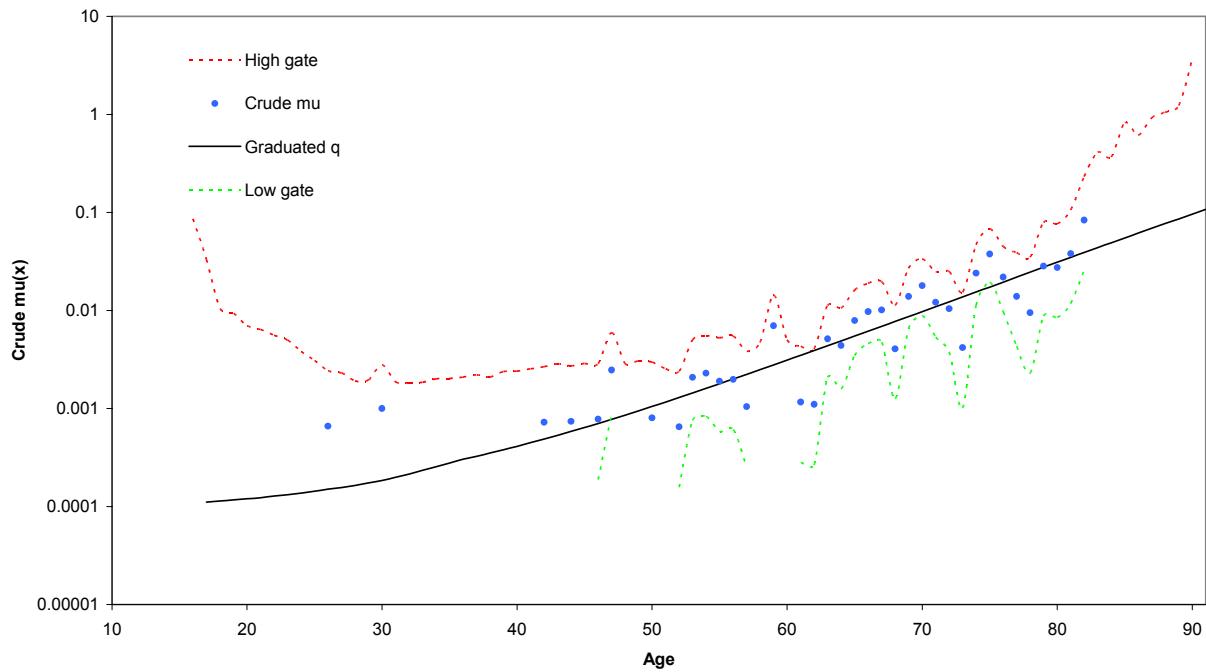


Figure 27. Crude Mu, gates and graduated q for Temporary Assurances, Males, Combined, Duration 0

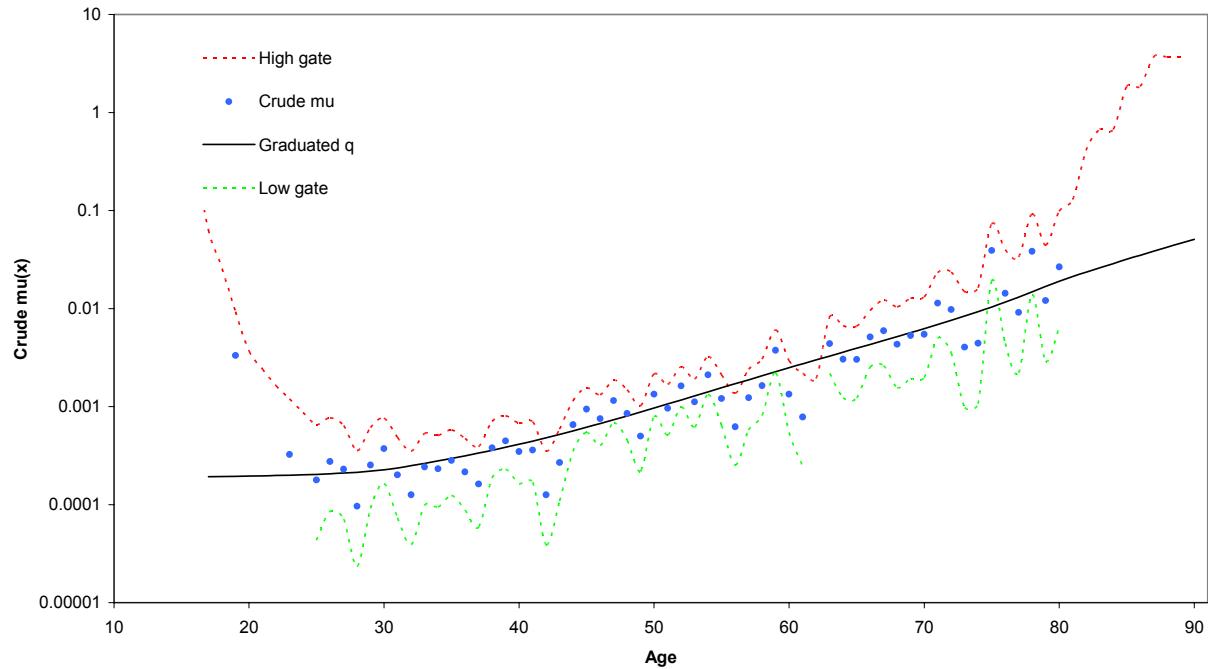


Figure 28. Crude Mu, gates and graduated q for Temporary Assurances, Males, Combined, Duration 1

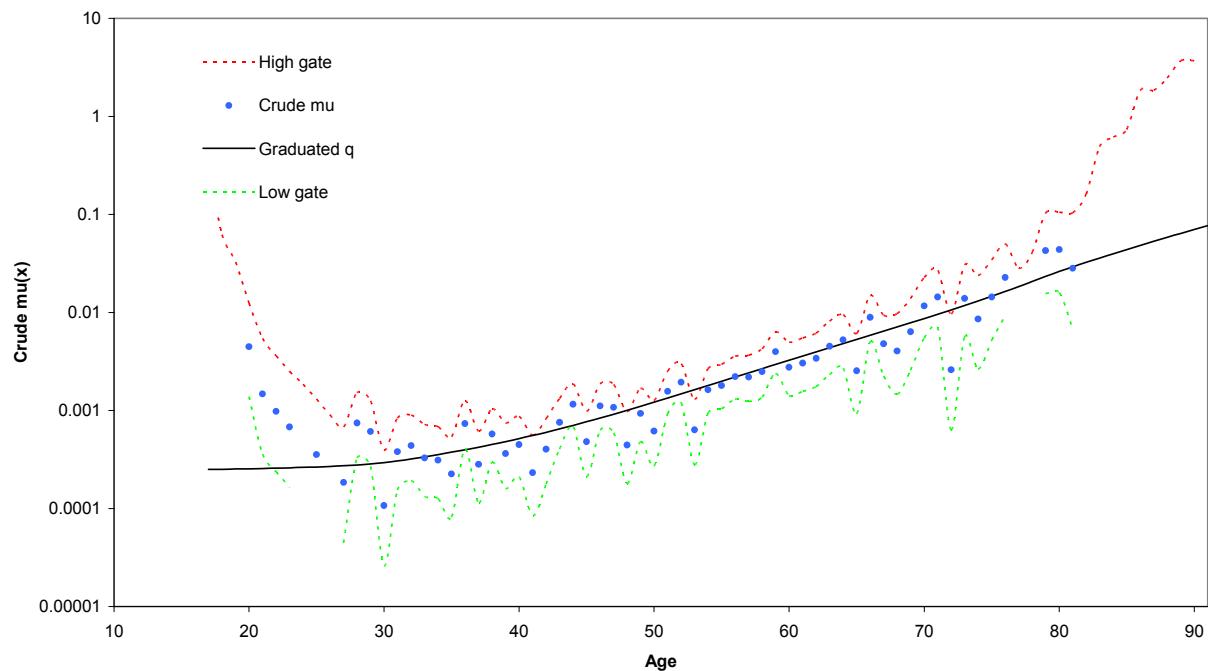


Figure 29. Crude Mu, gates and graduated q for Temporary Assurances, Males, Combined, Duration 2

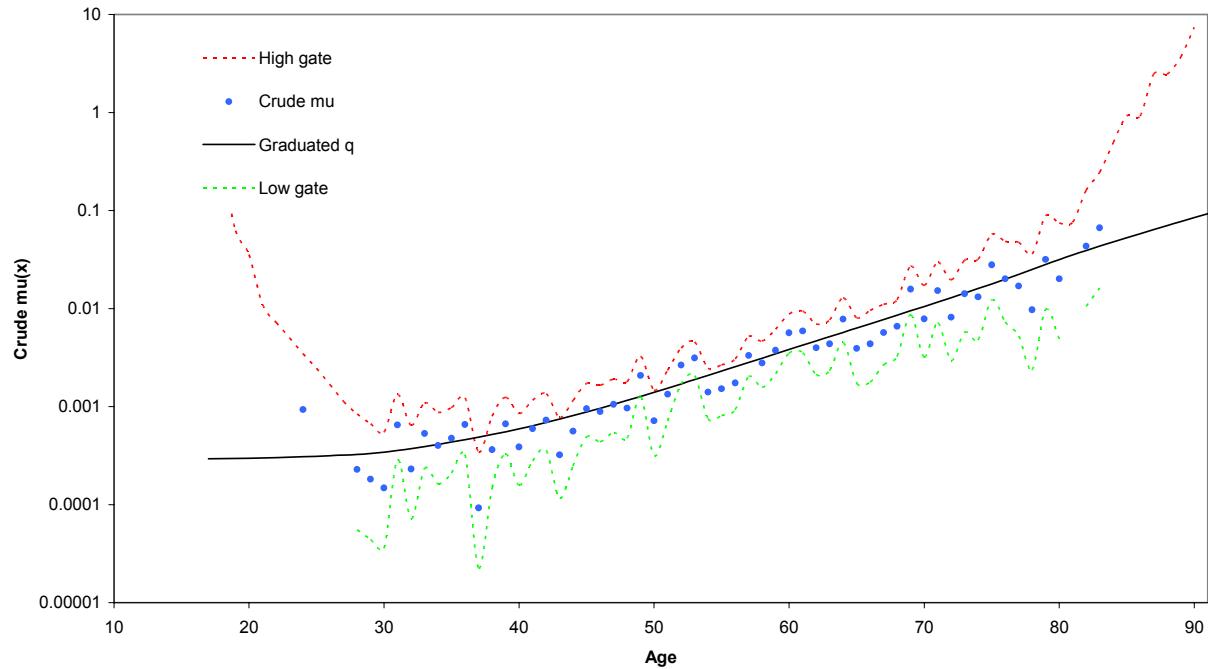


Figure 30. Crude Mu, gates and graduated q for Temporary Assurances, Males, Combined, Duration 3

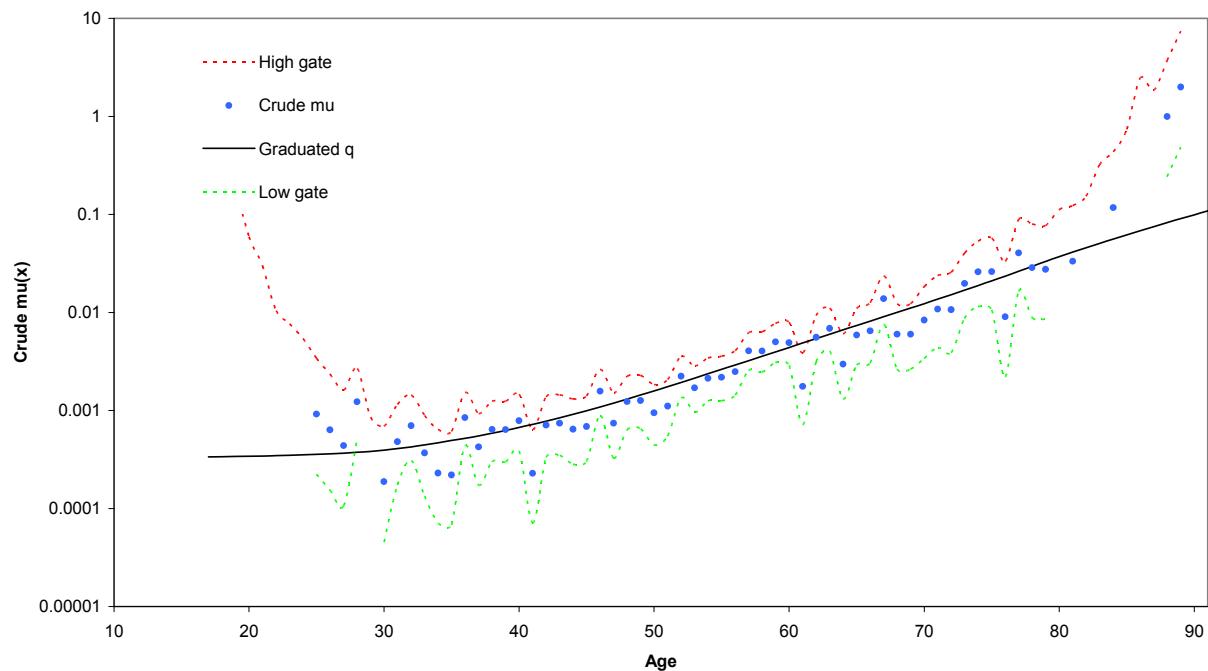


Figure 31. Crude Mu, gates and graduated q for Temporary Assurances, Males, Combined, Duration 4

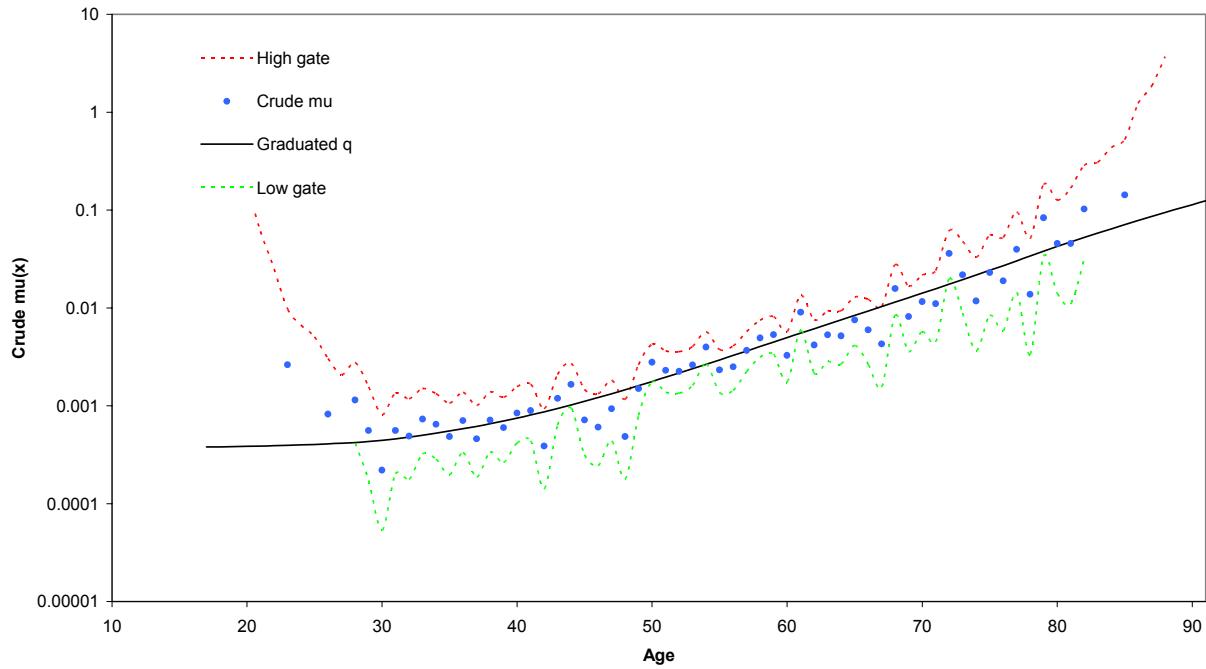


Figure 32. Crude Mu, gates and graduated q for Temporary Assurances, Males, Smokers, Duration 0

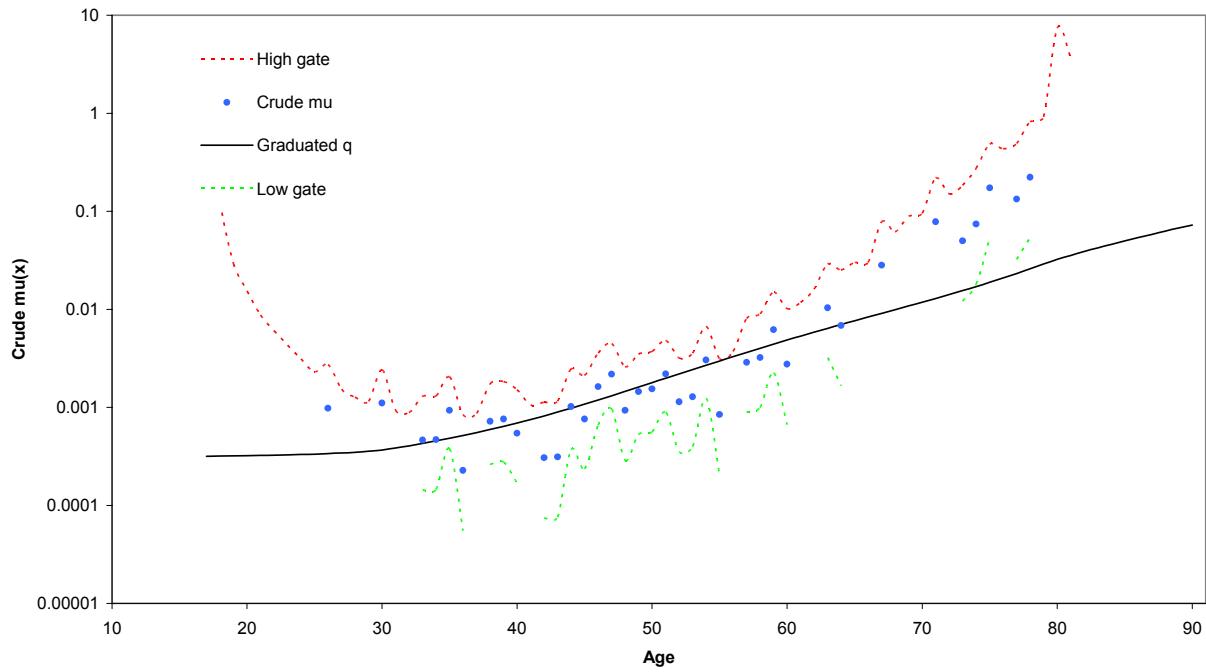


Figure 33. Crude Mu, gates and graduated q for Temporary Assurances, Males, Smokers, Duration 1

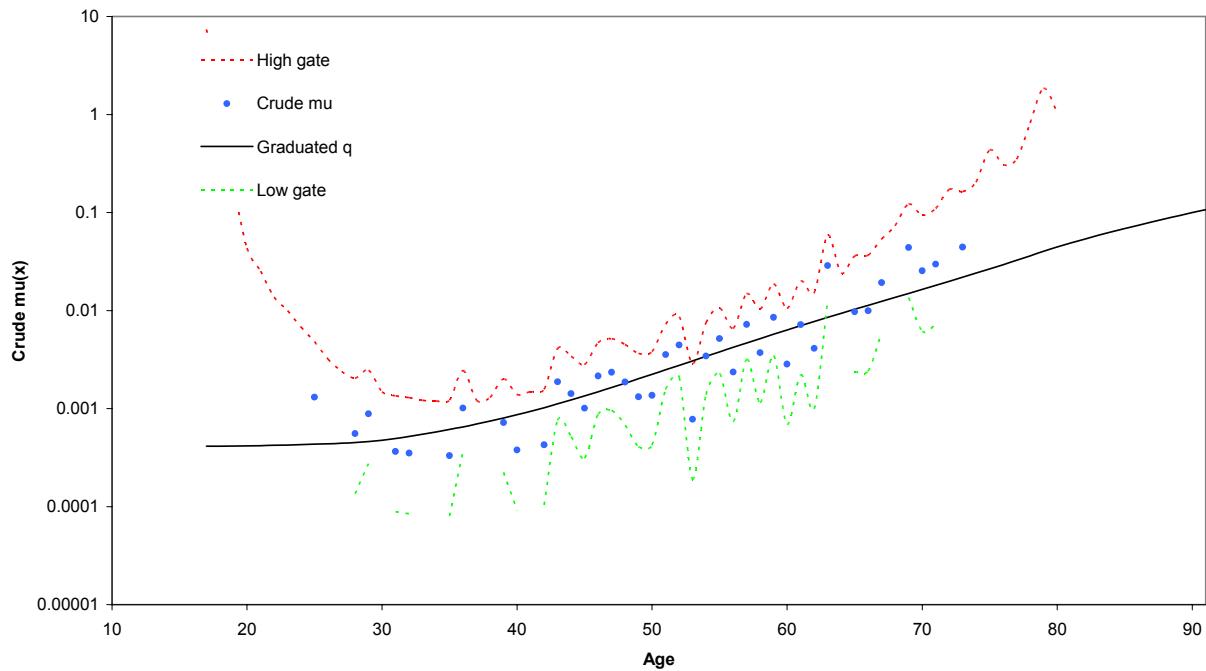


Figure 34. Crude Mu, gates and graduated q for Temporary Assurances, Males, Smokers, Duration 2

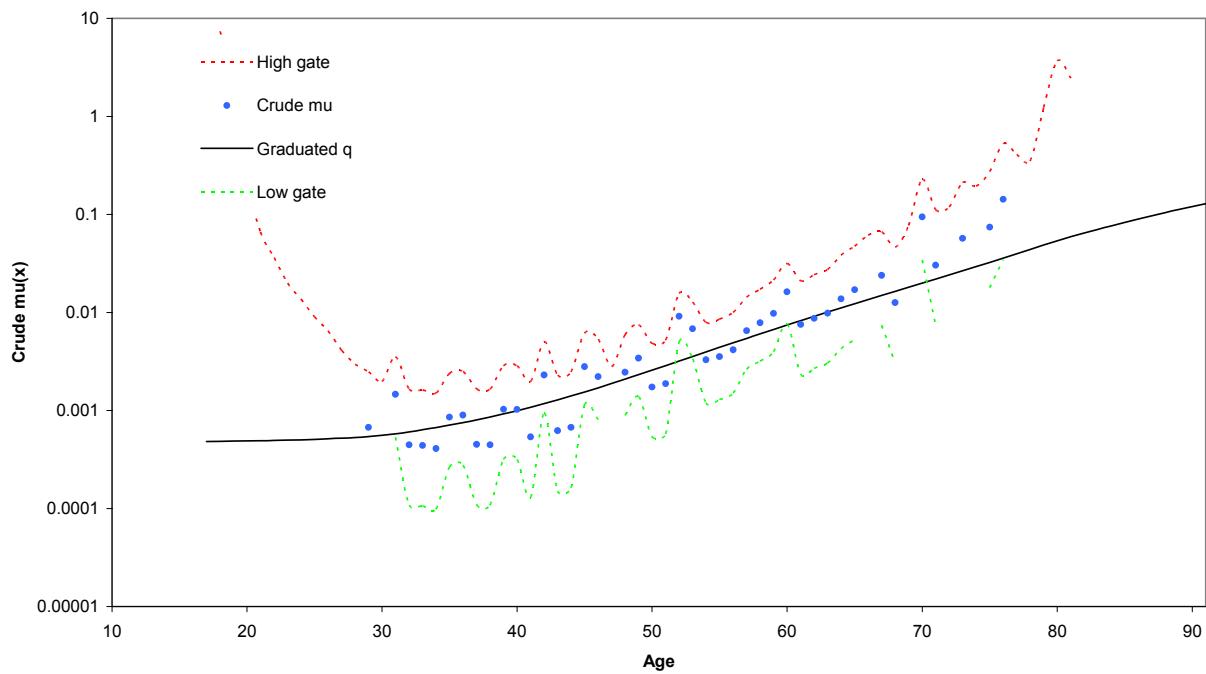


Figure 35. Crude Mu, gates and graduated q for Temporary Assurances, Males, Smokers, Duration 3

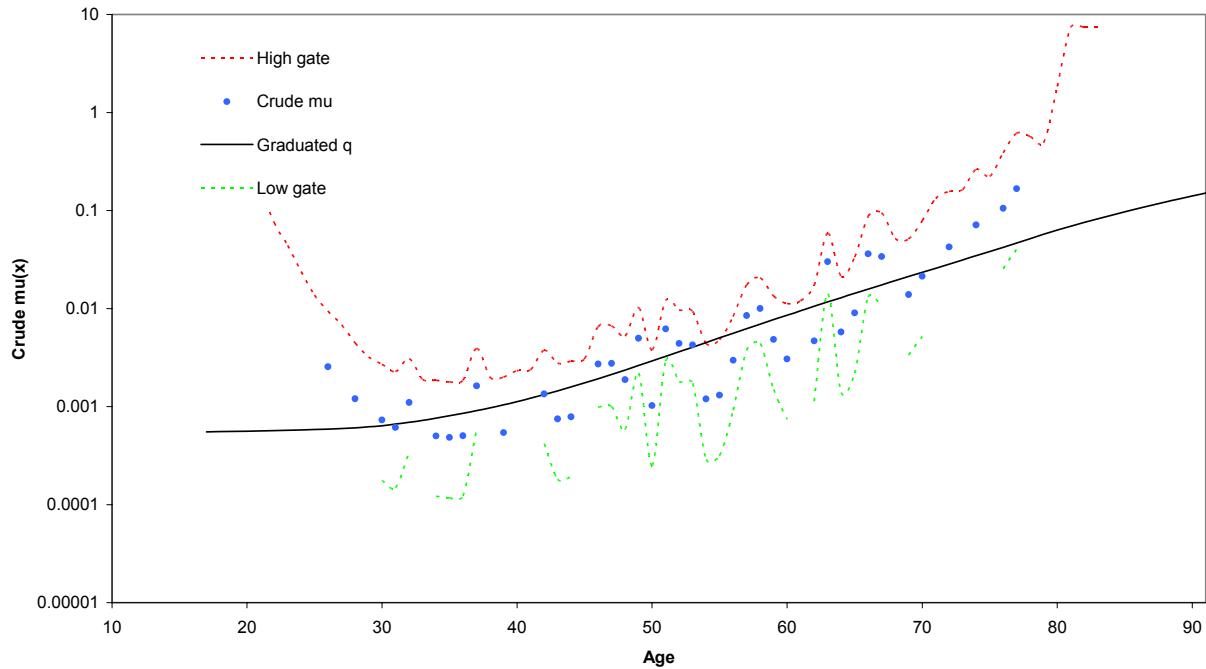


Figure 36. Crude Mu, gates and graduated q for Temporary Assurances, Males, Smokers, Duration 4

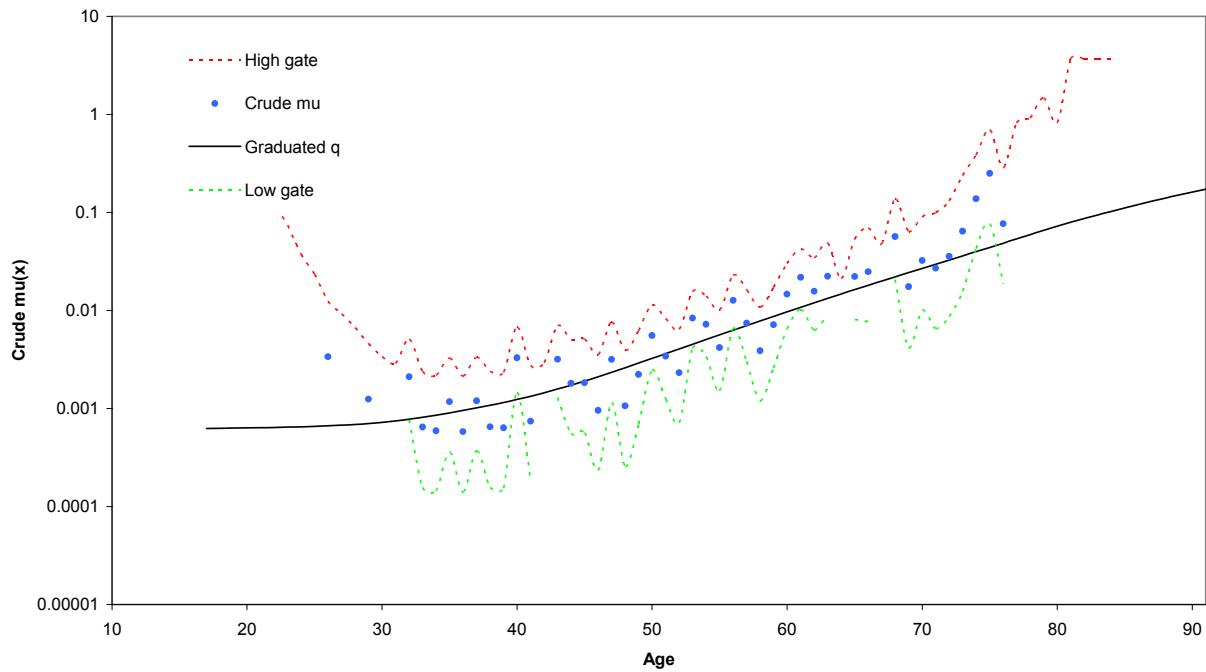


Figure 37. Crude Mu, gates and graduated q for Temporary Assurances, Males, Non-smokers, Duration 0

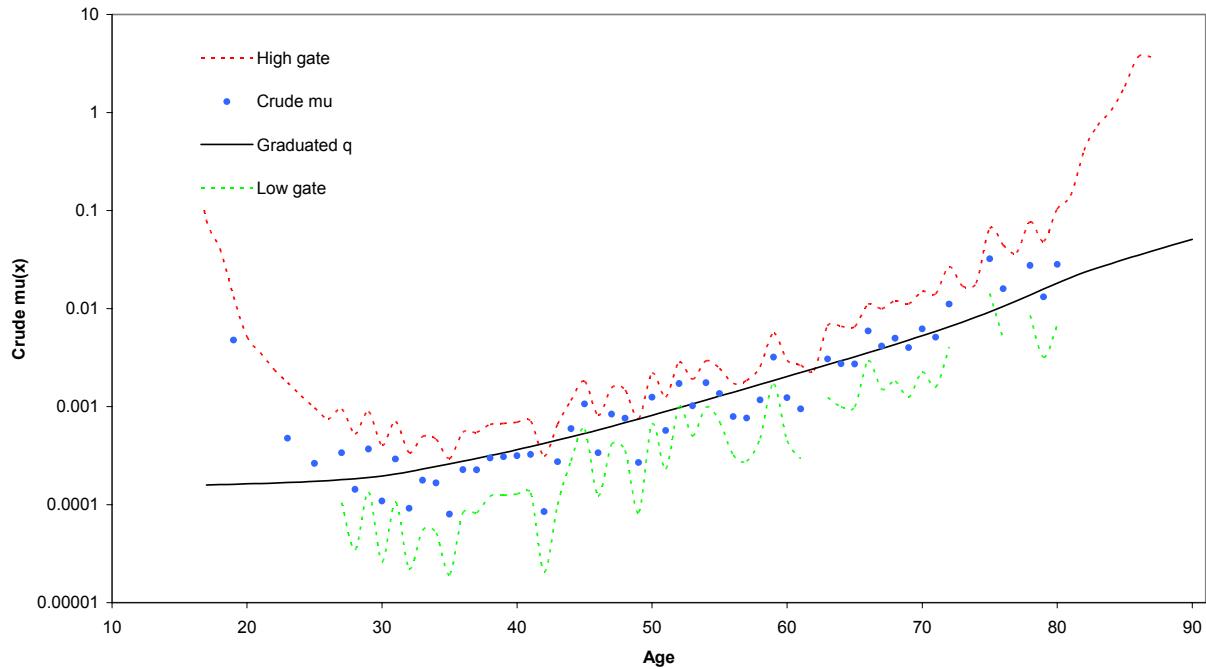


Figure 38. Crude Mu, gates and graduated q for Temporary Assurances, Males, Non-smokers, Duration 1

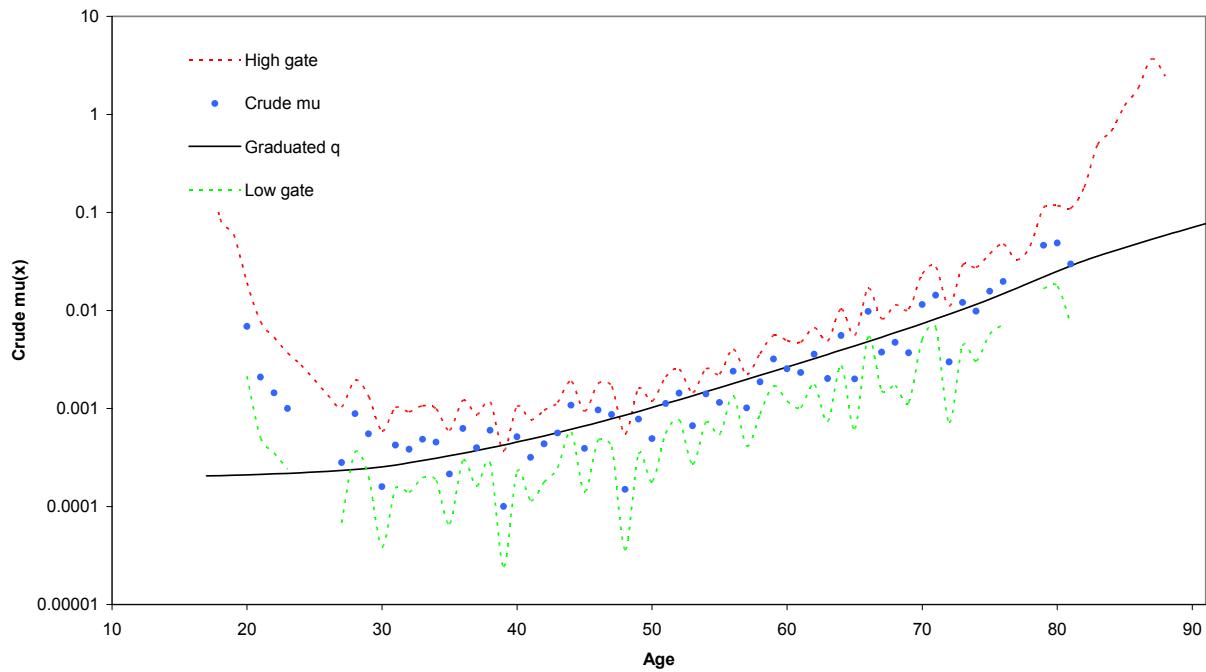


Figure 39. Crude Mu, gates and graduated q for Temporary Assurances, Males, Non-smokers, Duration 2

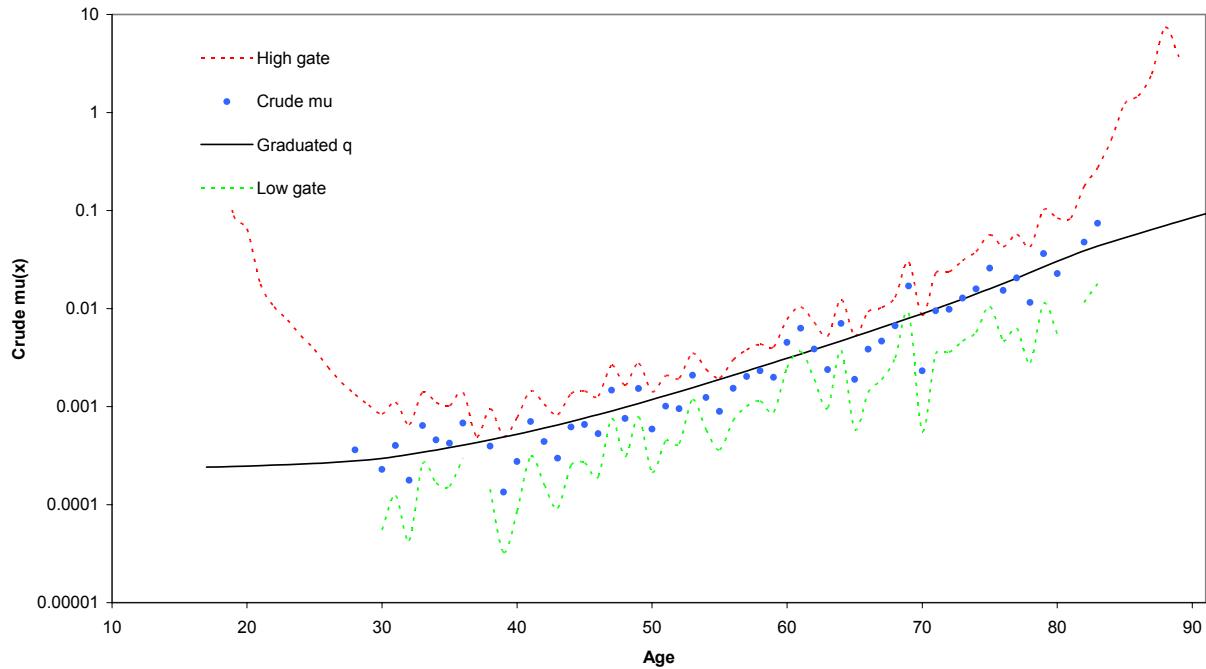


Figure 40. Crude Mu, gates and graduated q for Temporary Assurances, Males, Non-smokers, Duration 3

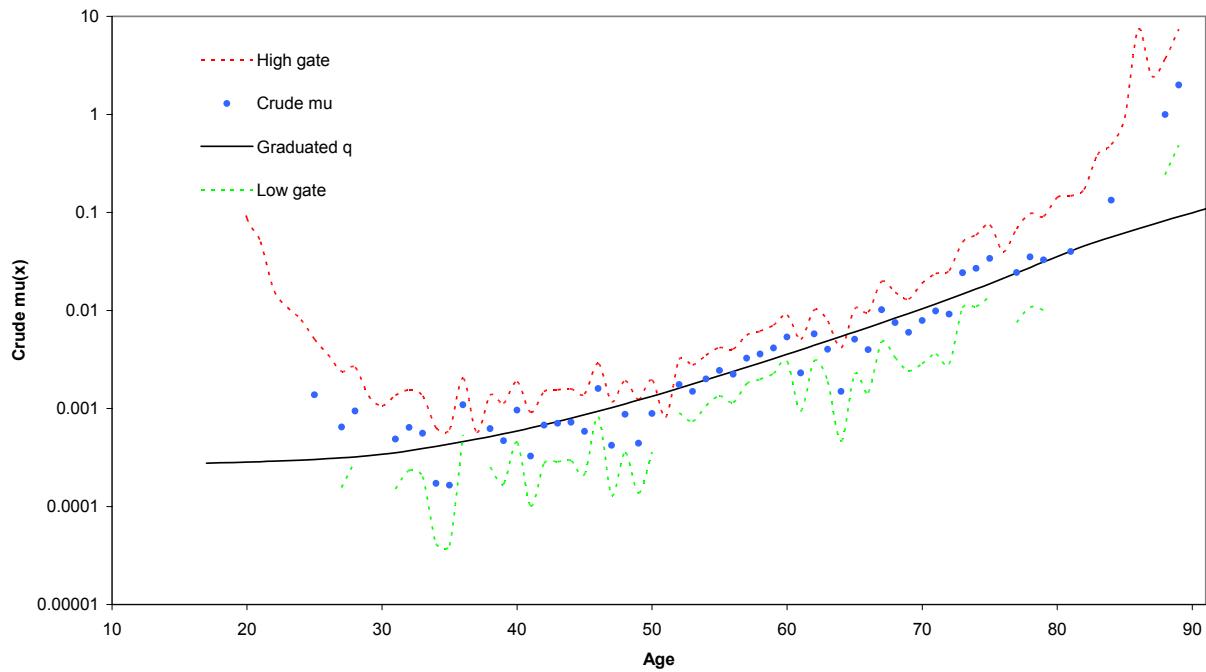


Figure 41. Crude Mu, gates and graduated q for Temporary Assurances, Males, Non-smokers, Duration 4

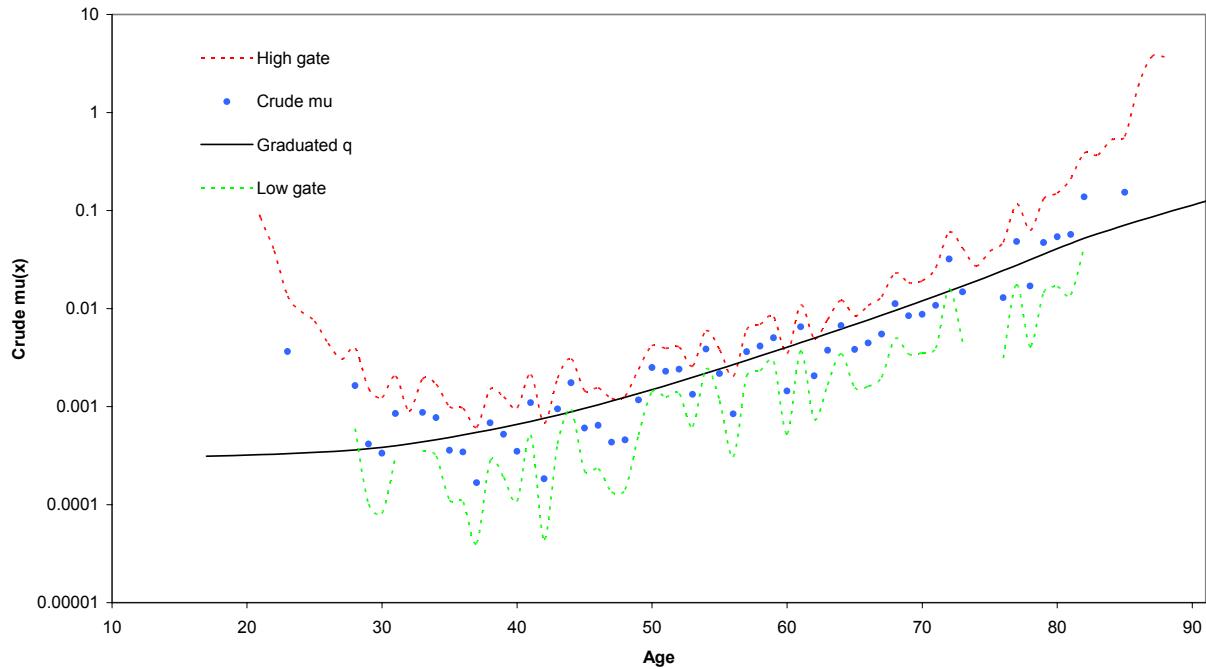


Figure 42. Crude Mu, gates and graduated q for Temporary Assurances, Females, Combined, Duration 0

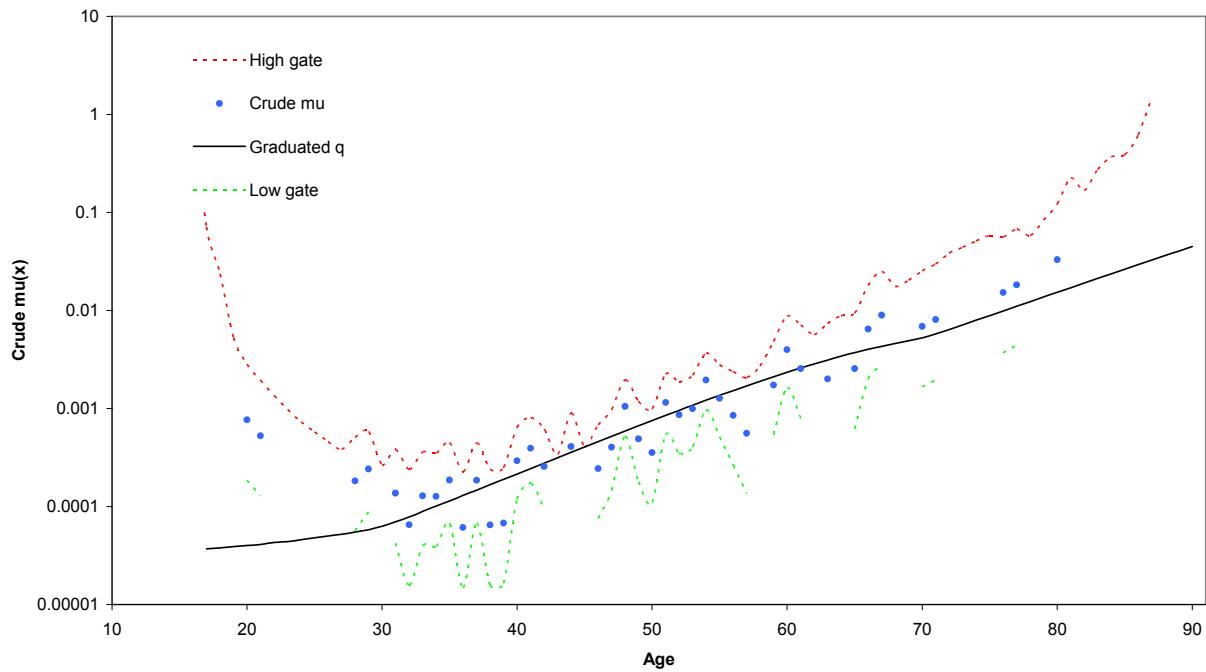


Figure 43. Crude Mu, gates and graduated q for Temporary Assurances, Females, Combined, Duration 1

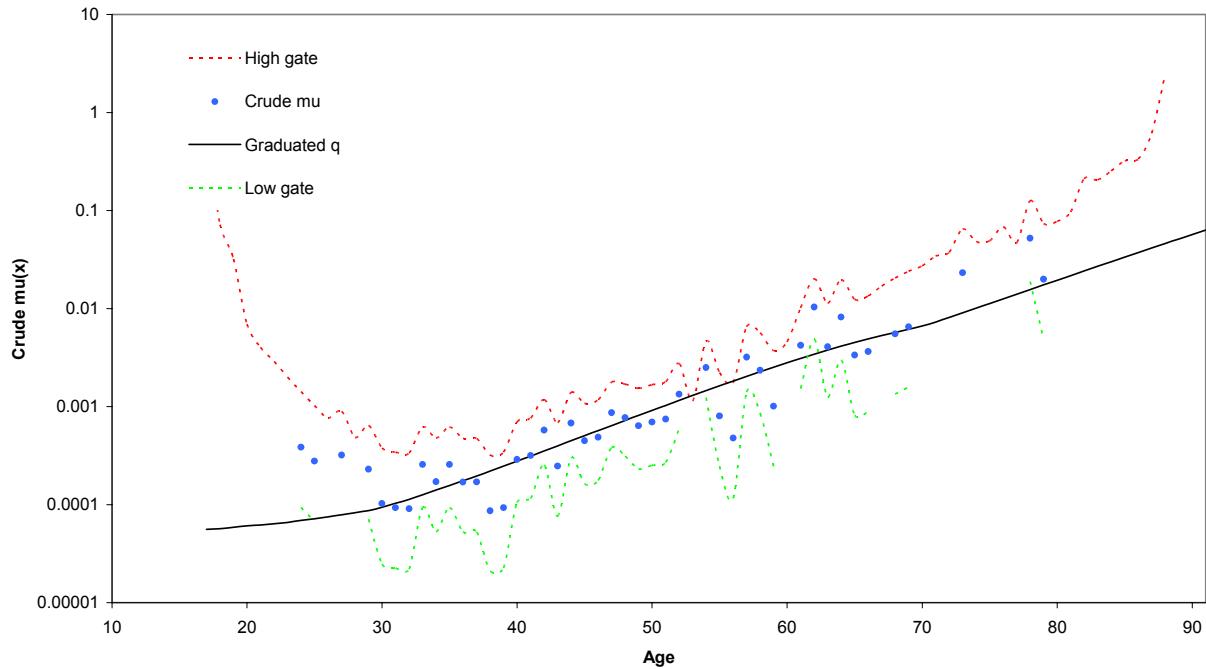


Figure 44. Crude Mu, gates and graduated q for Temporary Assurances, Females, Combined, Duration 2

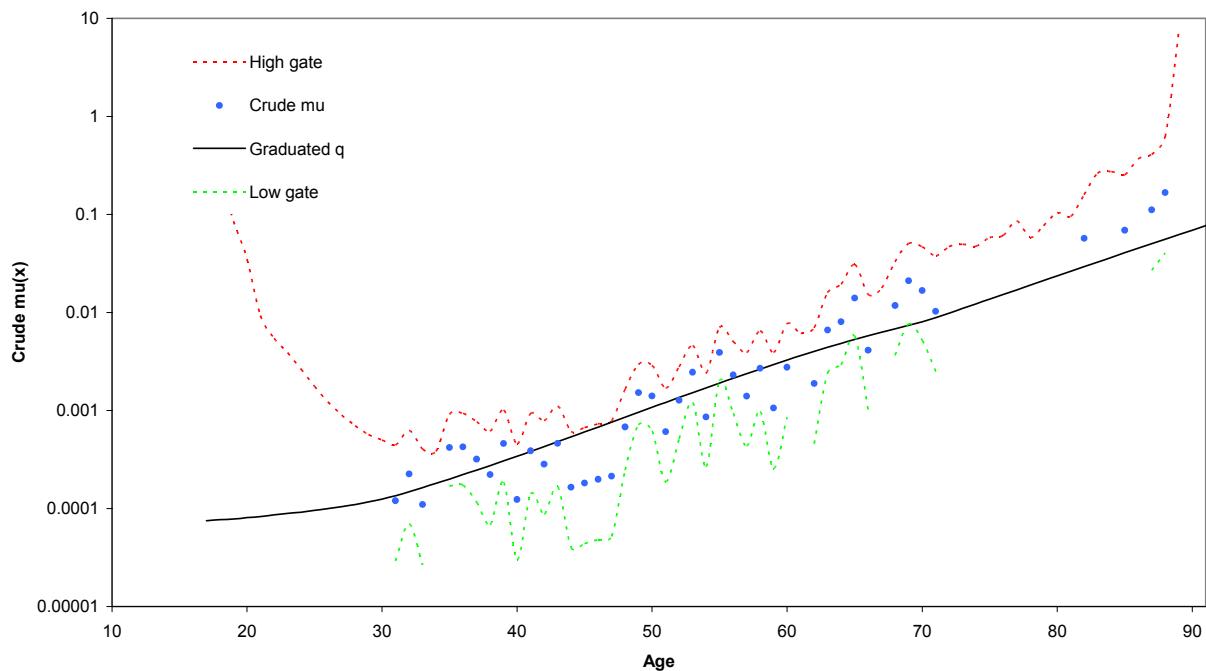


Figure 45. Crude Mu, gates and graduated q for Temporary Assurances, Females, Combined, Duration 3

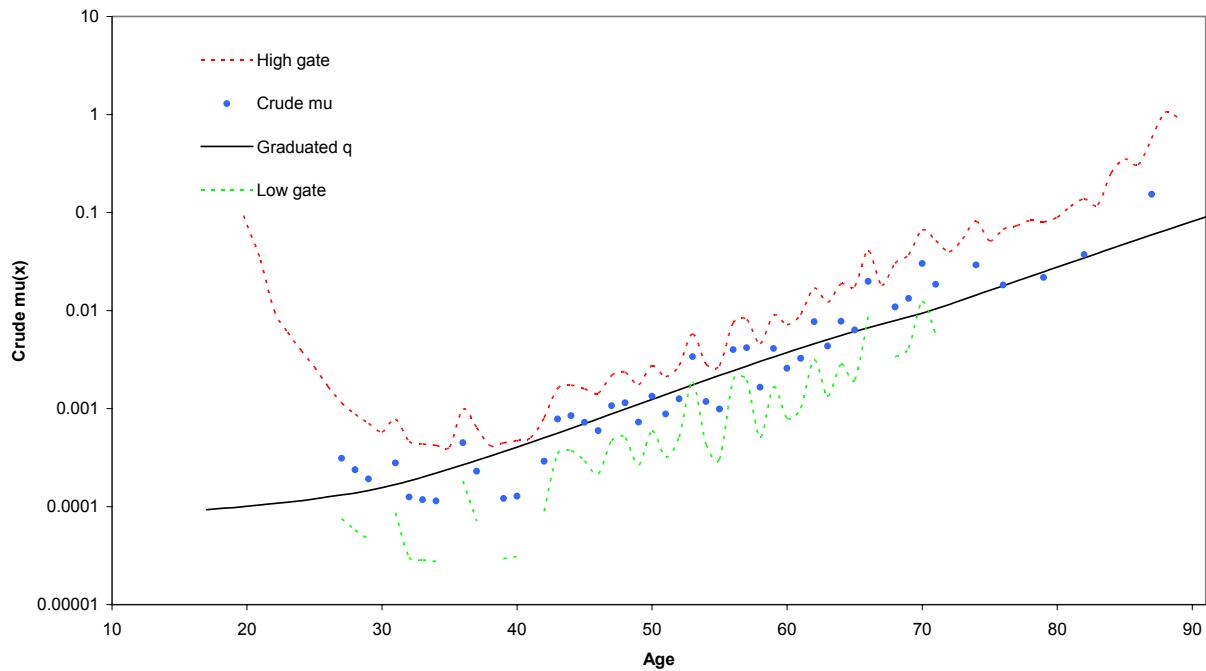


Figure 46. Crude Mu, gates and graduated q for Temporary Assurnaces, Females, Combined, Duration 4

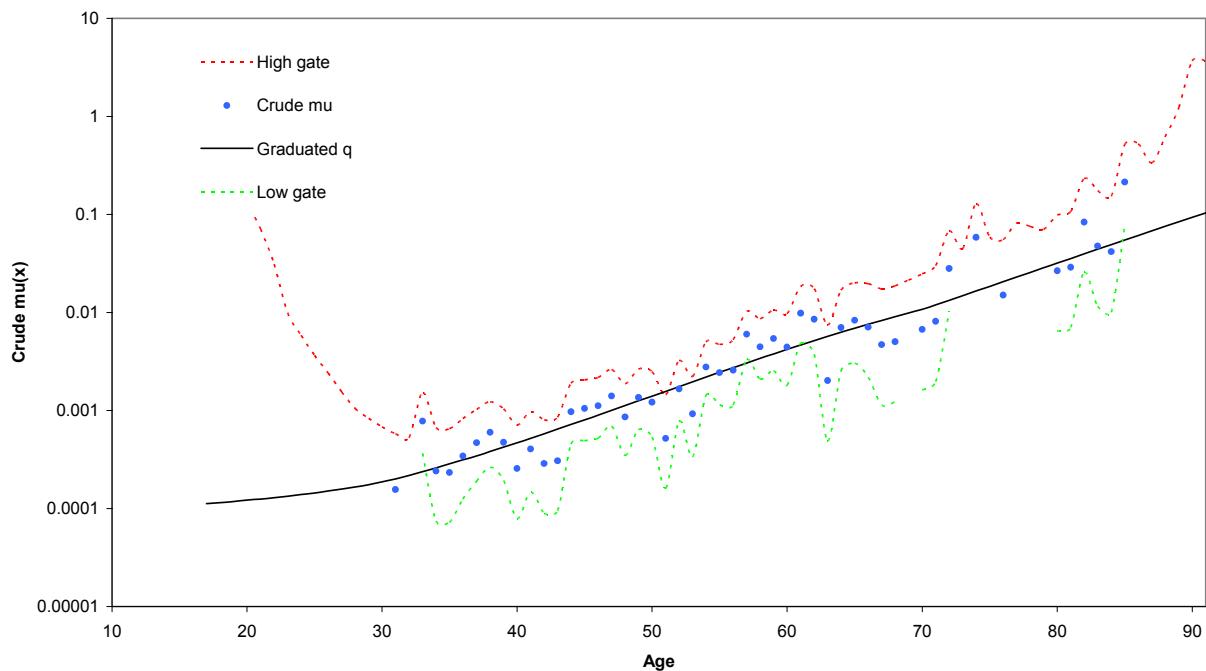


Figure 47. Crude Mu, gates and graduated q for Temporary Assurances, Females, Smokers, Duration 0

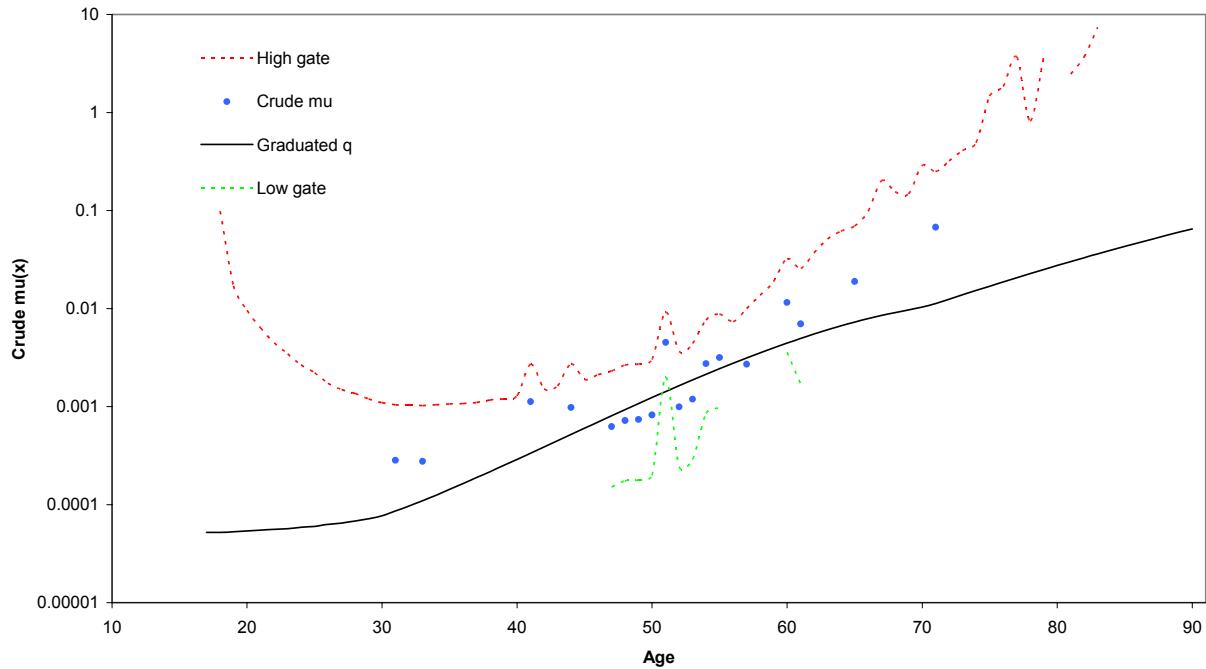


Figure 48. Crude Mu, gates and graduated q for Temporary Assurances, Females, Smokers, Duration 1

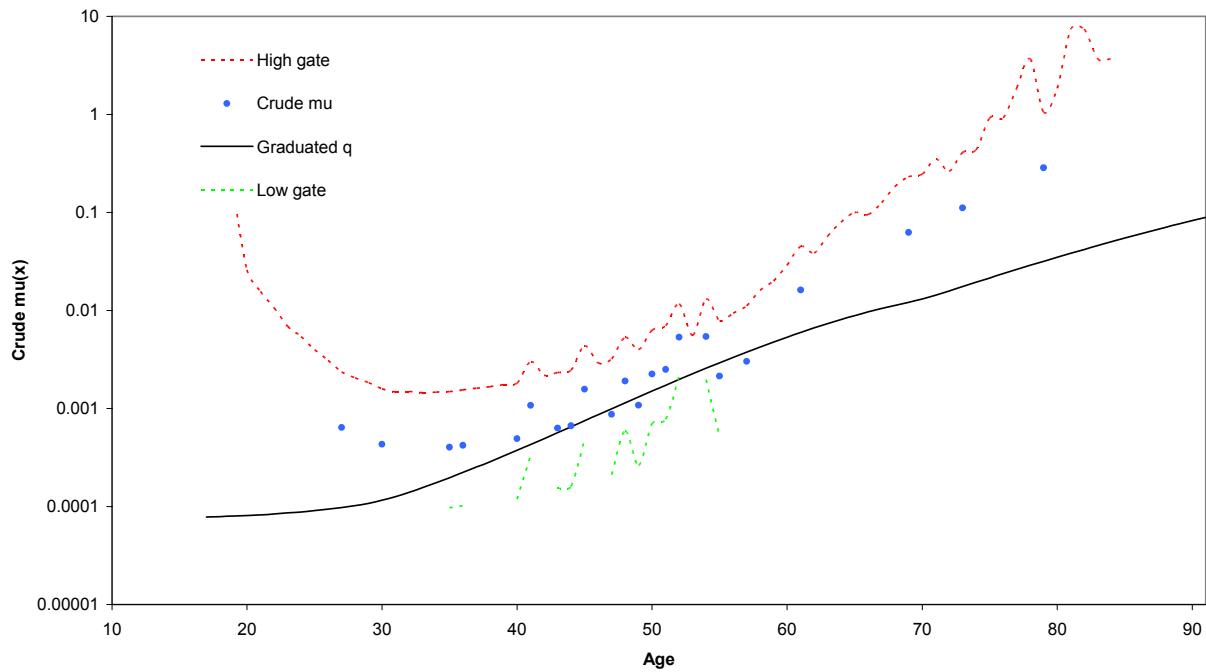


Figure 49. Crude Mu, gates and graduated q for Temporary Assurances, Females, Smokers, Duration 2

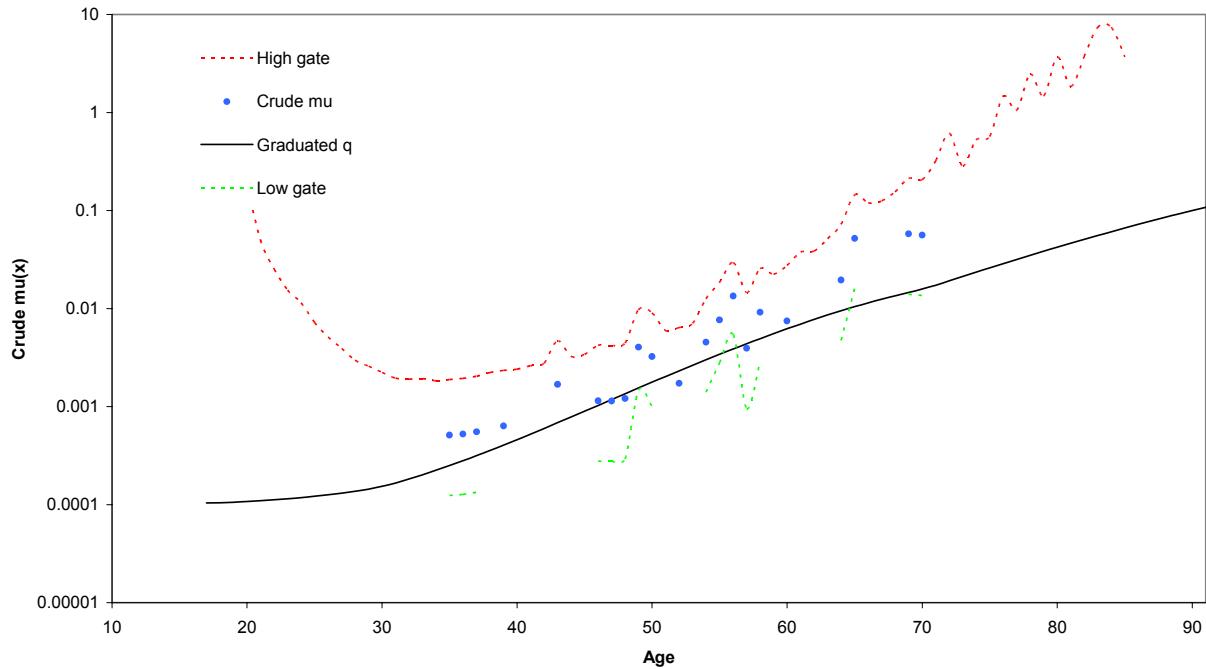


Figure 50. Crude Mu, gates and graduated q for Temporary Assurances, Females, Smokers, Duration 3

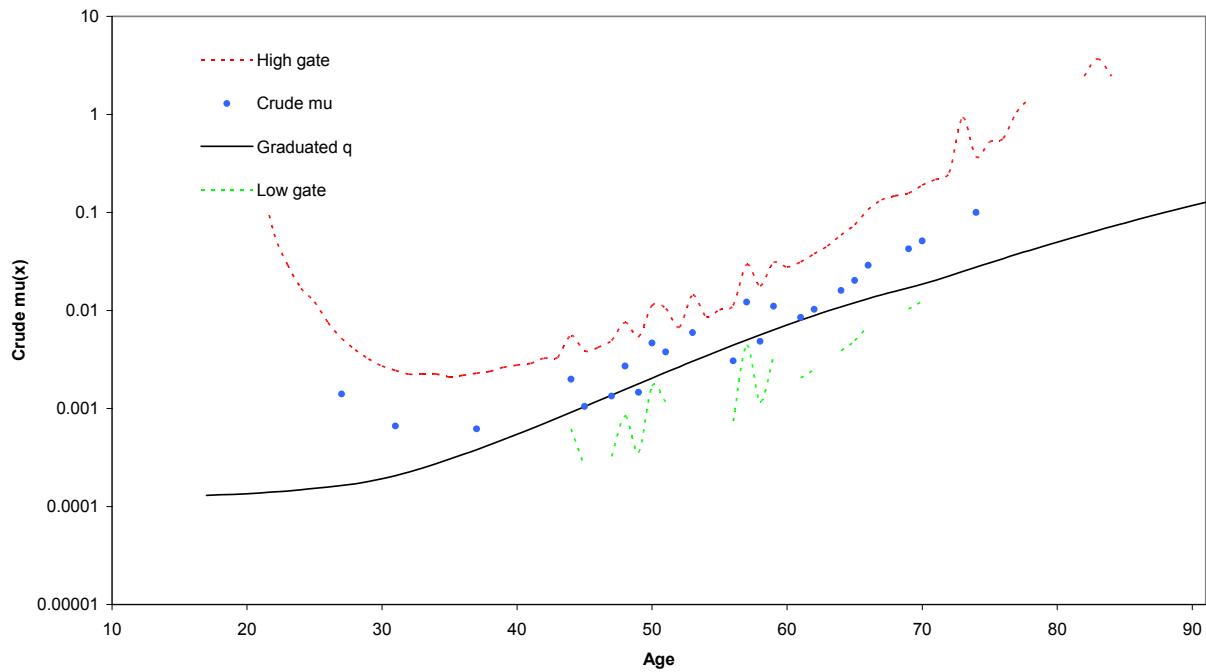


Figure 51. Crude Mu, gates and graduated q for Temporary Assurances, Females, Smokers, Duration 4

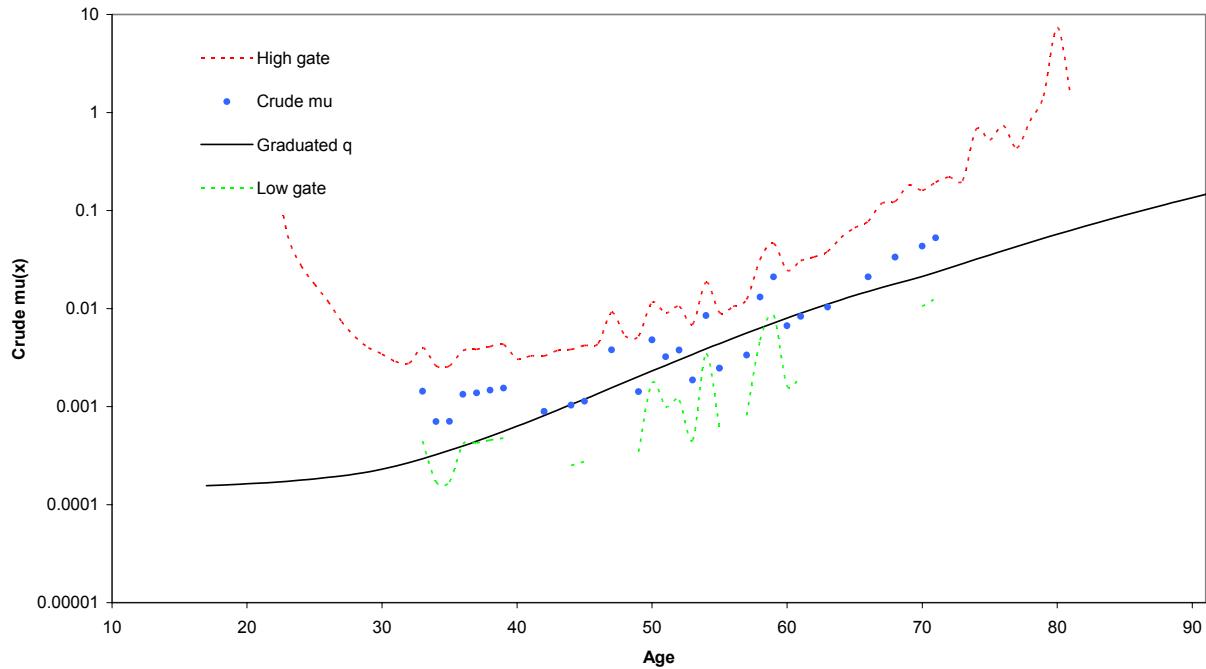


Figure 52. Crude Mu, gates and graduated q for Temporary Assurances, Females, Non-smokers, Duration 0

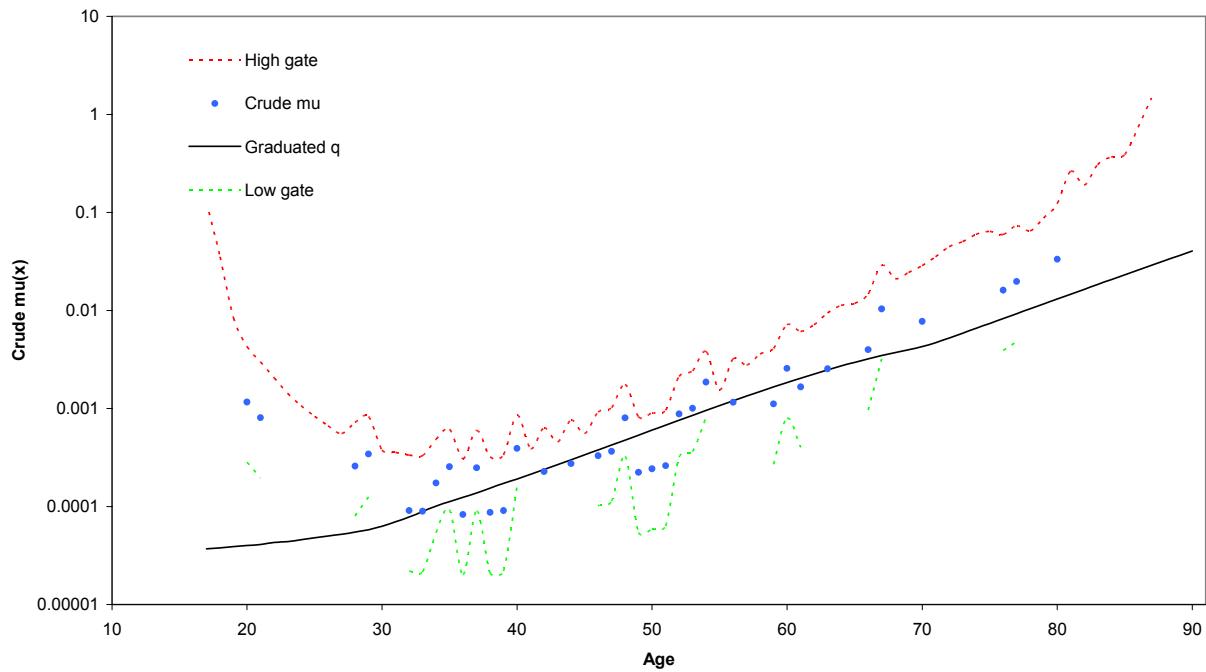


Figure 53. Crude Mu, gates and graduated q for Temporary Assurances, Females, Non-smokers, Duration 1

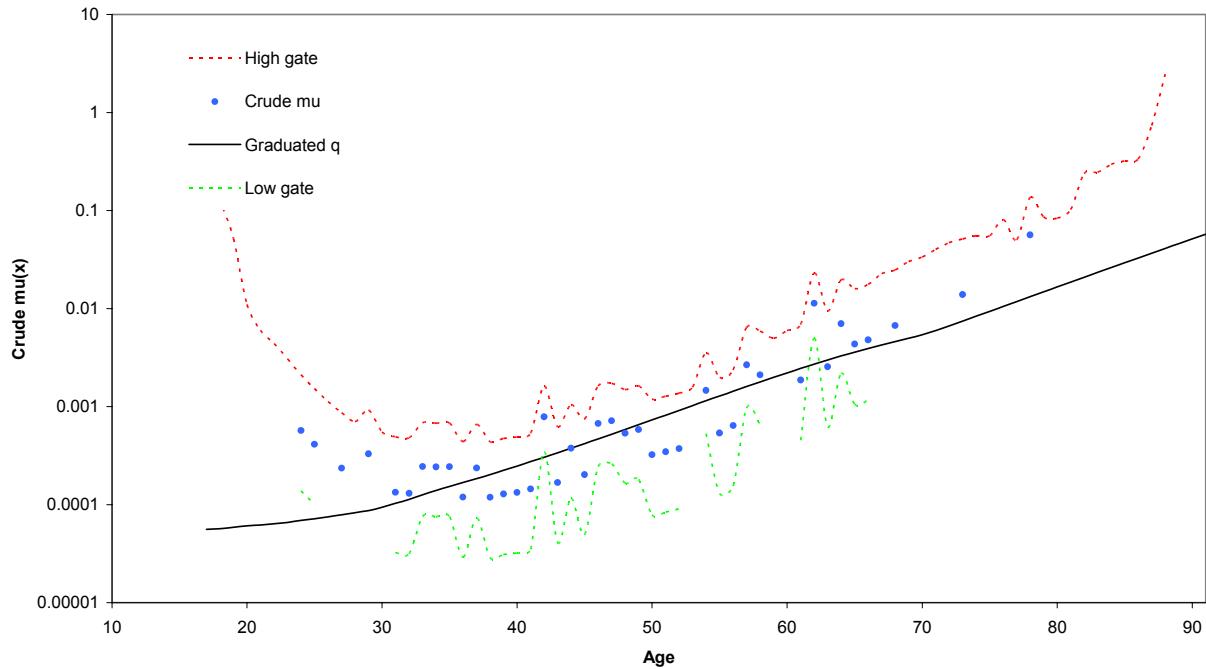


Figure 54. Crude Mu, gates and graduated q for Temporary Assurances, Females, Non-smokers, Duration 2

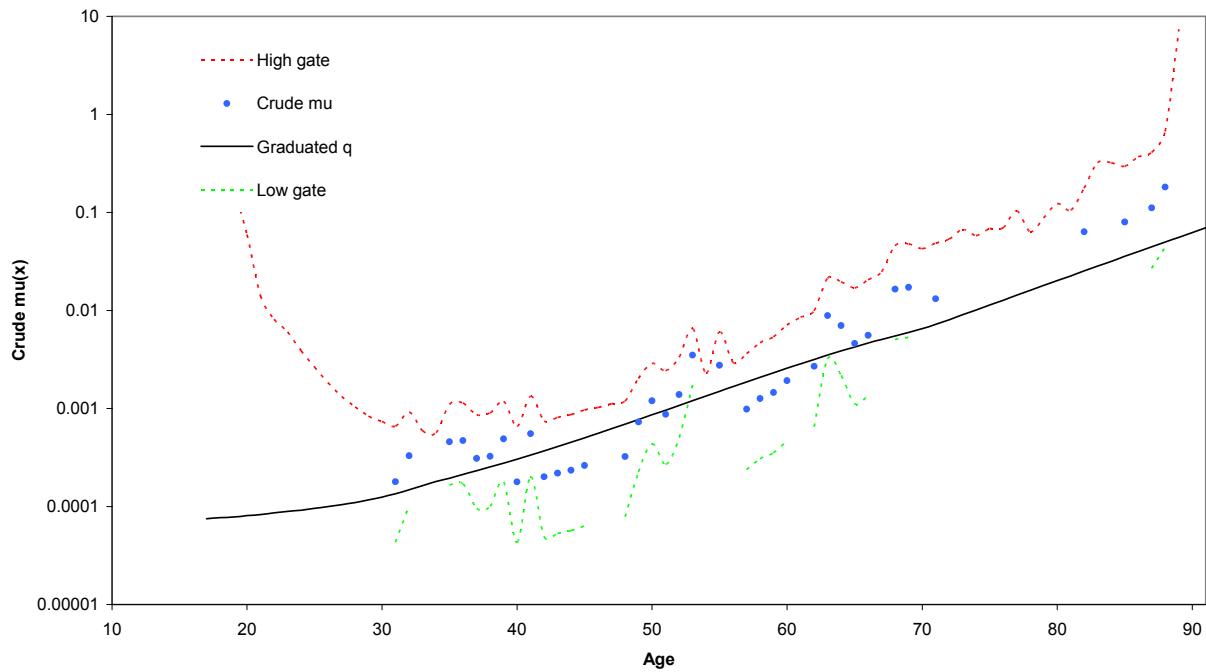


Figure 55. Crude Mu, gates and graduated q for Temporary Assurances, Females, Non-smokers, Duration 3

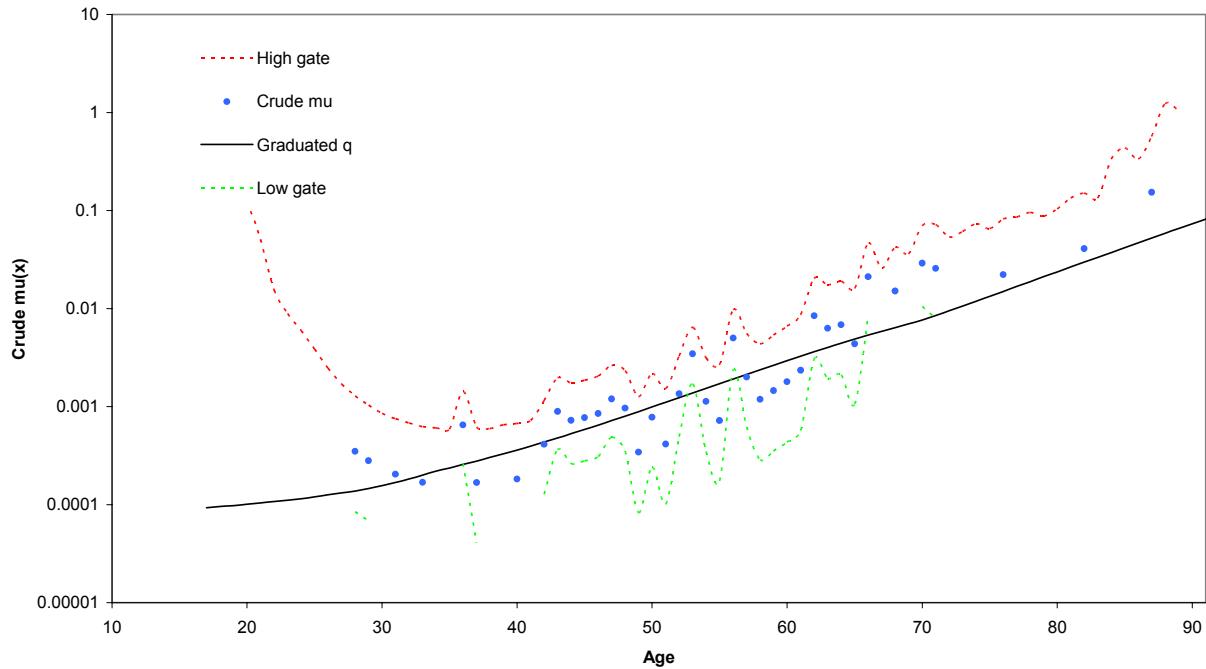
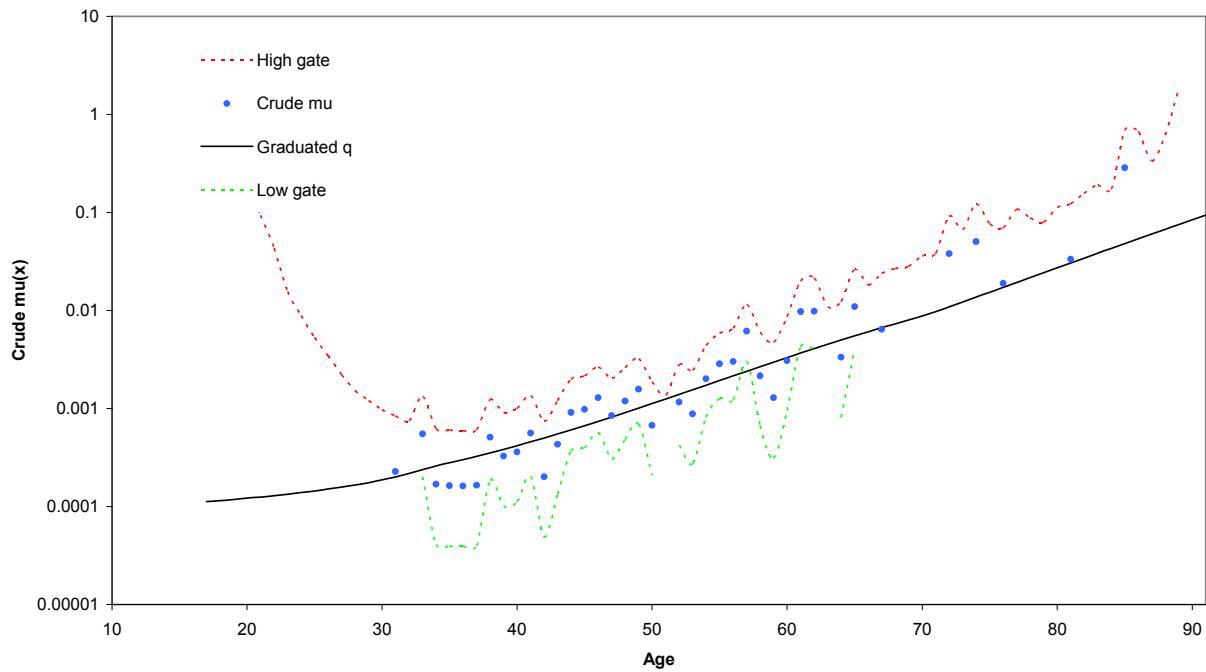


Figure 56. Crude Mu, gates and graduated q for Temporary Assurances, Females, Non-smokers, Duration 4



4. Comparison with 1999-2002 experience

The “acid test” for the new tables will be the results of an analysis of the 1999-2002 experience using the new tables as the comparison basis. These are presented below.

Permanent Assurances

Table 2. Males, Combined, comparison basis AM00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	3	117	6	127	51	135
26-30	7	137	16	152	125	92
31-35	5	75	11	79	297	96
36-40	6	78	16	101	528	97
41-45	9	104	21	122	947	105
46-50	11	93	20	88	1,838	101
51-55	19	101	41	108	4,084	100
56-60	19	106	37	100	5,915	103
61-65	25	108	38	87	6,270	97
66-70	22	85	64	101	4,060	98
71-75	21	106	42	98	4,638	100
76-80	15	129	31	105	5,028	101
81-85	2	147	2	58	4,198	104
86-90	-	-	-	-	3,013	97
21-90	164	101	345	101	40,992	100

Table 3. Males, Non-smokers, comparison basis AMN00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	-	-	-	-	19	125
26-30	1	54	5	146	52	103
31-35	1	41	3	68	106	98
36-40	2	73	4	80	163	100
41-45	5	165	10	189	206	103
46-50	2	50	7	104	271	100
51-55	5	81	10	92	432	92
56-60	4	66	9	82	634	108
61-65	9	96	16	102	704	101
66-70	9	78	29	109	686	97
71-75	15	152	21	107	839	96
76-80	9	154	17	107	813	101
81-85	-	-	1	51	508	104
86-90	-	-	-	-	256	107
21-90	62	96	132	103	5,689	100

Table 4. Males, Smokers, comparison basis AMS00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	-	-	4	444	9	221
26-30	2	170	2	94	18	102
31-35	3	214	3	120	46	106
36-40	2	120	2	76	58	84
41-45	-	-	2	69	90	94
46-50	2	67	3	72	178	110
51-55	4	74	13	155	341	102
56-60	7	113	10	106	521	105
61-65	9	117	8	63	515	90
66-70	6	77	17	96	465	99
71-75	4	88	11	101	485	103
76-80	3	107	7	117	326	107
81-85	-	-	-	-	154	108
86-90	-	-	-	-	55	77
21-90	42	95	82	101	3,261	100

Table 5. Females, Combined, comparison basis AF00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	1	190	-	-	8	59
26-30	2	174	4	115	62	109
31-35	3	161	3	55	127	90
36-40	2	73	3	40	242	91
41-45	3	76	7	69	459	107
46-50	9	140	15	96	825	114
51-55	13	127	35	129	1,395	107
56-60	8	75	21	78	1,593	100
61-65	10	70	34	94	1,459	91
66-70	19	127	50	129	1,466	93
71-75	7	54	45	129	1,695	103
76-80	8	103	19	79	1,703	101
81-85	-	-	7	121	1,319	101
86-90	2	333	1	65	1,045	105
21-90	87	97	244	102	13,398	100

Table 6. Females, Non-smokers, comparison basis AFN00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	1	435	-	-	5	70
26-30	1	192	3	209	34	126
31-35	1	121	-	-	61	100
36-40	-	-	-	-	82	82
41-45	1	67	2	58	150	112
46-50	3	128	5	97	237	120
51-55	8	204	9	97	377	109
56-60	3	68	8	82	433	101
61-65	3	44	14	88	418	89
66-70	13	166	27	148	473	88
71-75	4	56	23	128	579	102
76-80	3	63	12	87	527	98
81-85	-	-	4	107	375	102
86-90	2	380	-	-	336	114
21-90	43	101	107	102	4,087	100

Table 7. Females, Smokers, comparison basis AFS00 sel

Age group	Duration 0		Duration 1		Durations 2+	
	Deaths	100A/E	Deaths	100A/E	Deaths	100A/E
21-25	-	-	-	-	-	-
26-30	-	-	-	-	5	74
31-35	2	603	-	-	11	64
36-40	1	202	-	-	43	137
41-45	1	112	2	99	54	103
46-50	3	161	4	104	113	113
51-55	3	92	11	149	205	96
56-60	3	74	5	58	310	101
61-65	5	95	10	89	330	105
66-70	6	113	17	139	307	93
71-75	3	72	18	176	333	105
76-80	5	273	3	63	235	106
81-85	-	-	-	-	93	89
86-90	-	-	-	-	55	95
21-90	32	114	70	110	2,094	101

Temporary Assurances

The comparisons of graduated rates for Temporary Assurance with the data, in the form of 100A/E numbers of deaths, are given on the following pages in landscape format.

Table 8. Males, Combined, comparison basis TM00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	2	61	4	195	1	80	1	106	1	136	-	-
26-30	13	119	12	129	3	42	7	112	7	121	15	113
31-35	18	85	20	100	21	118	15	86	20	117	50	85
36-40	28	89	33	109	23	85	31	116	28	103	127	89
41-45	33	89	35	95	29	87	24	73	36	106	272	94
46-50	49	119	38	88	42	102	38	92	39	89	563	102
51-55	60	114	58	97	68	114	57	91	81	117	958	97
56-60	34	80	56	106	63	110	73	118	71	102	1,071	100
61-65	17	64	35	92	49	107	40	79	55	99	840	100
66-70	21	109	30	105	31	93	30	84	29	80	364	92
71-75	17	156	17	98	21	109	21	107	23	115	320	107
76-80	8	133	10	99	9	82	9	87	12	110	188	107
21-80	300	99	348	100	360	102	346	94	402	103	4,768	99

Table 9. Males, Non-smokers, comparison basis TMN00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	2	106	3	258	-	-	1	186	1	232	-	-
26-30	7	110	9	169	2	50	3	86	5	149	8	104
31-35	9	70	16	134	13	126	10	100	13	130	33	102
36-40	18	89	22	115	11	66	20	124	12	73	65	89
41-45	24	101	24	101	18	86	17	85	24	115	113	92
46-50	27	103	22	80	26	103	20	80	23	86	177	93
51-55	42	125	34	90	31	83	34	89	53	126	325	104
56-60	23	83	36	105	35	97	49	129	40	95	348	105
61-65	12	67	24	93	34	111	26	80	31	89	313	115
66-70	18	129	24	119	23	99	21	87	19	81	117	83
71-75	10	120	15	114	16	115	18	134	12	90	75	88
76-80	6	119	9	110	8	92	6	76	9	111	46	109
21-80	198	100	238	104	217	96	225	98	242	100	1,620	101

Table 10. Males, Smokers, comparison basis TMS00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	-	-	1	113	-	-	-	-	-	-	-	-
26-30	6	123	3	72	1	31	3	115	2	93	2	56
31-35	8	91	3	38	8	112	5	74	7	114	11	67
36-40	9	77	6	58	8	91	5	58	10	119	33	101
41-45	7	53	10	85	11	110	1	42	9	98	49	91
46-50	17	113	15	107	12	97	14	118	12	102	92	106
51-55	13	75	21	117	25	150	16	95	21	118	146	105
56-60	8	69	14	101	21	142	15	93	22	123	153	99
61-65	3	50	9	121	10	111	9	83	17	135	113	95
66-70	2	66	6	140	6	128	7	115	8	115	51	99
71-75	6	423	2	95	3	106	2	65	7	202	27	98
76-80	2	337	-	-	1	82	2	130	1	65	9	101
21-80	81	85	90	94	106	116	82	87	116	118	686	99

Table 11. Females, Combined, comparison basis TF00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	1	118	2	298	-	-	-	-	-	-	-	-
26-30	5	172	5	166	-	-	3	103	-	-	4	41
31-35	10	151	10	145	8	111	5	62	11	124	41	79
36-40	10	83	9	76	14	120	8	60	18	117	141	105
41-45	12	76	18	120	10	68	16	94	19	95	252	105
46-50	17	91	18	102	16	92	21	103	28	112	334	99
51-55	25	121	17	86	23	119	22	96	25	85	359	93
56-60	9	68	10	72	12	83	21	123	31	142	274	97
61-65	4	50	15	176	11	120	13	120	19	139	142	87
66-70	5	107	3	58	8	141	13	188	5	58	140	110
71-75	1	33	2	52	1	24	4	79	8	129	177	113
76-80	3	98	4	91	-	-	2	39	2	33	103	96
21-80	102	93	113	102	103	92	128	98	166	105	1,967	99

Table 12. Females, Non-smokers, comparison basis TFN00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	1	173	2	446	-	-	-	-	-	-	-	-
26-30	5	244	3	145	-	-	2	101	-	-	4	58
31-35	7	147	8	166	6	123	2	36	6	96	21	58
36-40	10	120	6	76	11	147	6	70	9	89	82	102
41-45	4	39	10	106	7	79	12	117	14	114	128	110
46-50	10	89	11	106	6	60	13	111	19	130	153	112
51-55	12	99	6	53	16	150	14	111	14	85	144	98
56-60	5	64	6	74	4	49	11	117	16	134	116	109
61-65	2	40	10	192	7	131	9	148	13	169	64	97
66-70	4	126	2	61	5	148	9	222	1	20	42	101
71-75	-	-	1	37	1	36	2	63	6	154	28	100
76-80	3	124	3	90	-	-	1	27	1	23	15	75
21-80	63	90	68	99	63	94	81	105	99	105	797	101

Table 13. Females, Smokers, comparison basis TFS00 sel

Age group	Duration 0		Duration 1		Duration 2		Duration 3		Duration 4		Durations 5+	
	Deaths	100A/E	Deaths	100A/E								
21-25	-	-	-	-	-	-	-	-	-	-	-	-
26-30	-	-	2	224	-	-	1	126	-	-	-	-
31-35	2	107	1	53	1	53	1	50	4	204	11	105
36-40	-	-	2	67	3	105	1	33	8	249	22	93
41-45	5	106	6	144	2	51	3	73	3	68	43	107
46-50	4	64	6	107	8	161	7	130	7	115	54	94
51-55	11	149	10	149	6	96	5	75	10	123	60	82
56-60	3	63	1	21	8	166	7	125	9	128	52	81
61-65	2	84	2	82	3	107	4	108	2	43	35	84
66-70	-	-	1	79	2	131	3	154	3	117	27	103
71-75	1	171	1	130	-	-	1	81	1	56	20	131
76-80	-	-	1	274	-	-	1	165	-	-	6	96
21-80	28	83	33	103	33	106	34	96	47	113	330	91

5. Comparison with “92” Series tables

The following tables show expectation of life figures calculated from the ultimate rates of the proposed new tables compared with those from the equivalent “92” Series tables. The figures should be treated with a degree of caution as they are based solely on the “snapshot” mortality rates in the relevant tables and take no account of possible future changes in mortality. However, they are useful to the extent that they can highlight broad differences between tables in an intuitive way.

Table 14. Expectation of life in years for males: comparison with “92” Series tables.

Age	Expectation of Life (Years)				
	AM92	TM92	AM00	AMS00	AMN00
20	58.9	58.9	60.9	56.4	62.1
30	49.3	49.2	51.2	46.8	52.3
40	39.6	39.5	41.5	37.2	42.6
50	30.1	30.0	31.9	27.8	33.0
60	21.2	21.1	22.8	19.1	23.7
70	13.5	13.3	14.8	11.9	15.3
80	7.8	7.4	8.5	6.8	8.6
90	4.1	3.6	4.4	3.7	4.4

Table 15. Expectation of life in years for females: comparison with “92” Series tables.

Age	Expectation of Life (Years)				
	AF92	TF92	AF00	AFS00	AFN00
20	64.2	64.1	64.2	58.9	65.8
30	54.4	54.2	54.4	49.1	55.9
40	44.6	44.5	44.6	39.3	46.1
50	35.0	34.9	34.9	29.8	36.4
60	26.0	25.8	25.7	20.9	27.1
70	17.7	17.4	17.3	13.4	18.4
80	10.8	10.5	10.3	7.8	11.0
90	5.8	5.5	5.2	4.2	5.6

From these tables it can be seen that the combined “00” Series tables imply an additional 1–2 years expected lifetime for males, compared with their “92” Series counterparts, whereas there is little difference for females. Of greater interest, perhaps, is the substantial difference in life expectancy between smokers and non-smokers. For males, life expectancy for non-smokers is around 5–6 years higher than for smokers, while for females the difference is even greater at around 6–7 years (for ages below about 60).

6. Comparison of select and ultimate rates

The select and ultimate rates are shown together in the following charts.

Figure 57. AM00 select and ultimate rates

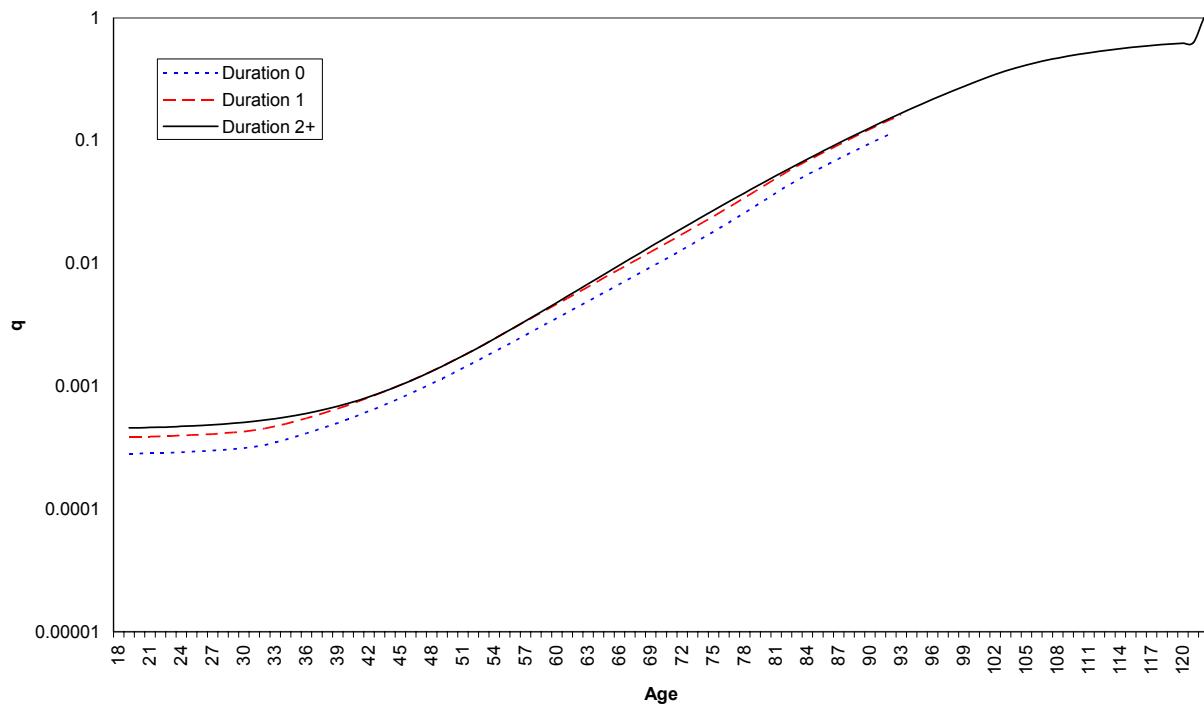


Figure 58. AMS00 select and ultimate rates

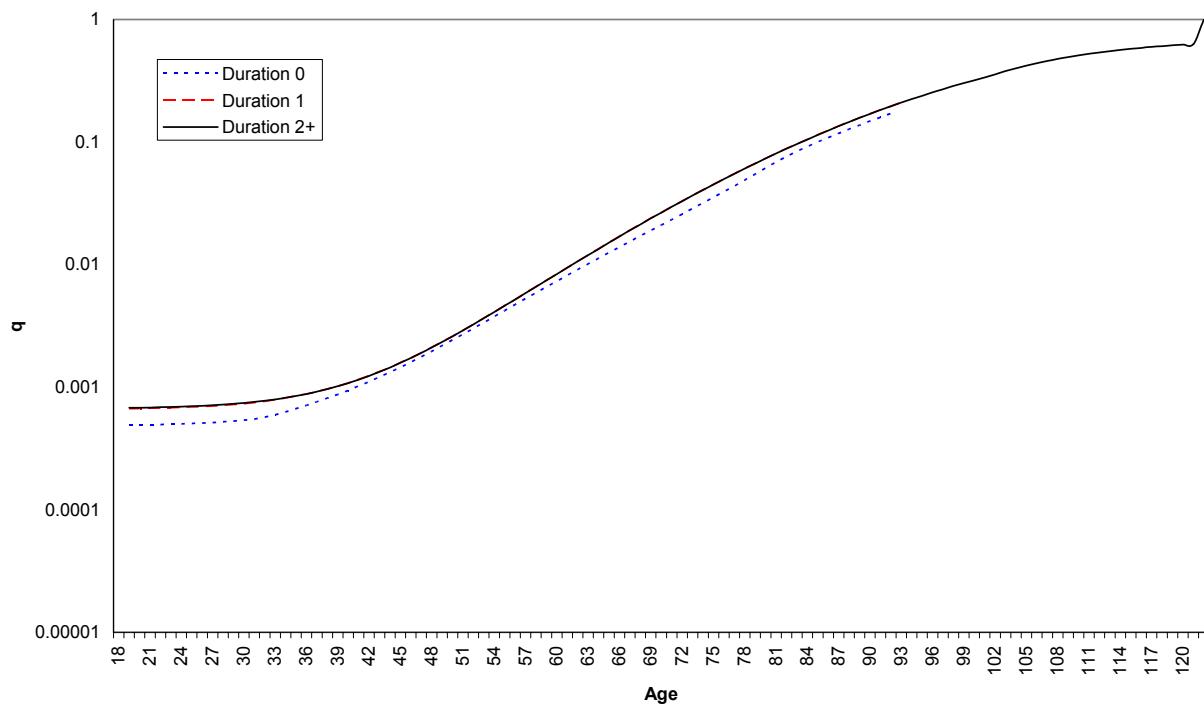


Figure 59. AMN00 select and ultimate rates

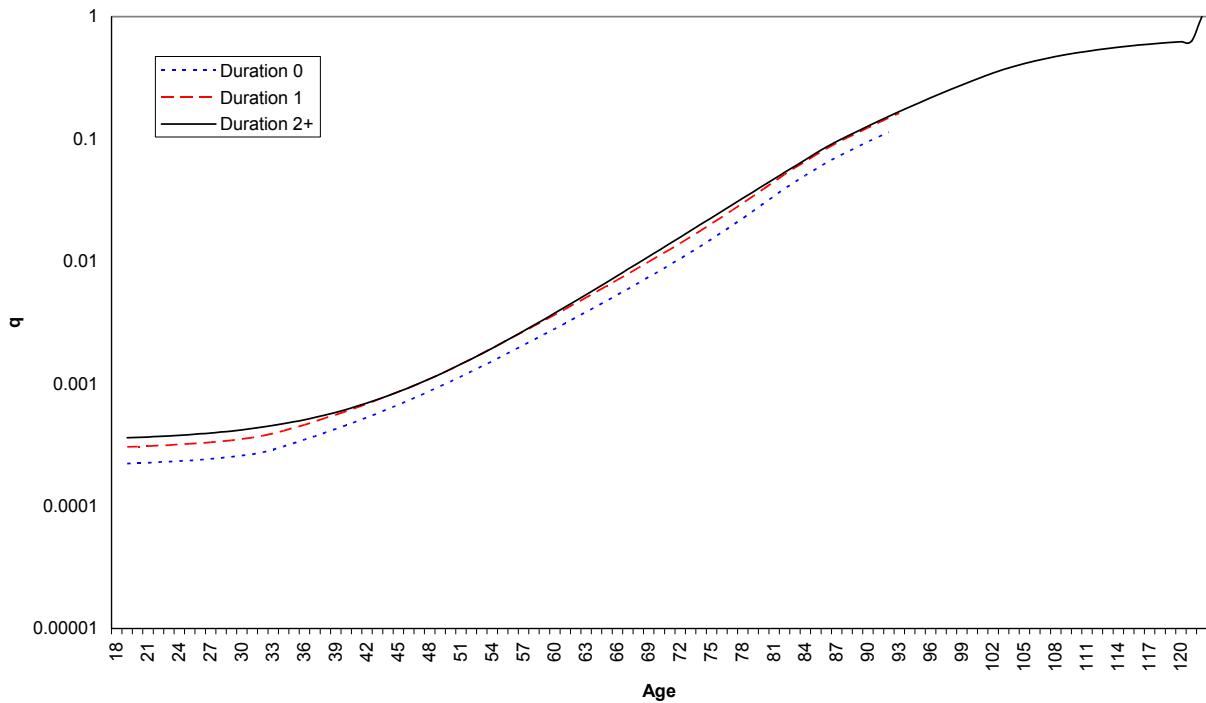


Figure 60. AF00 select and ultimate rates

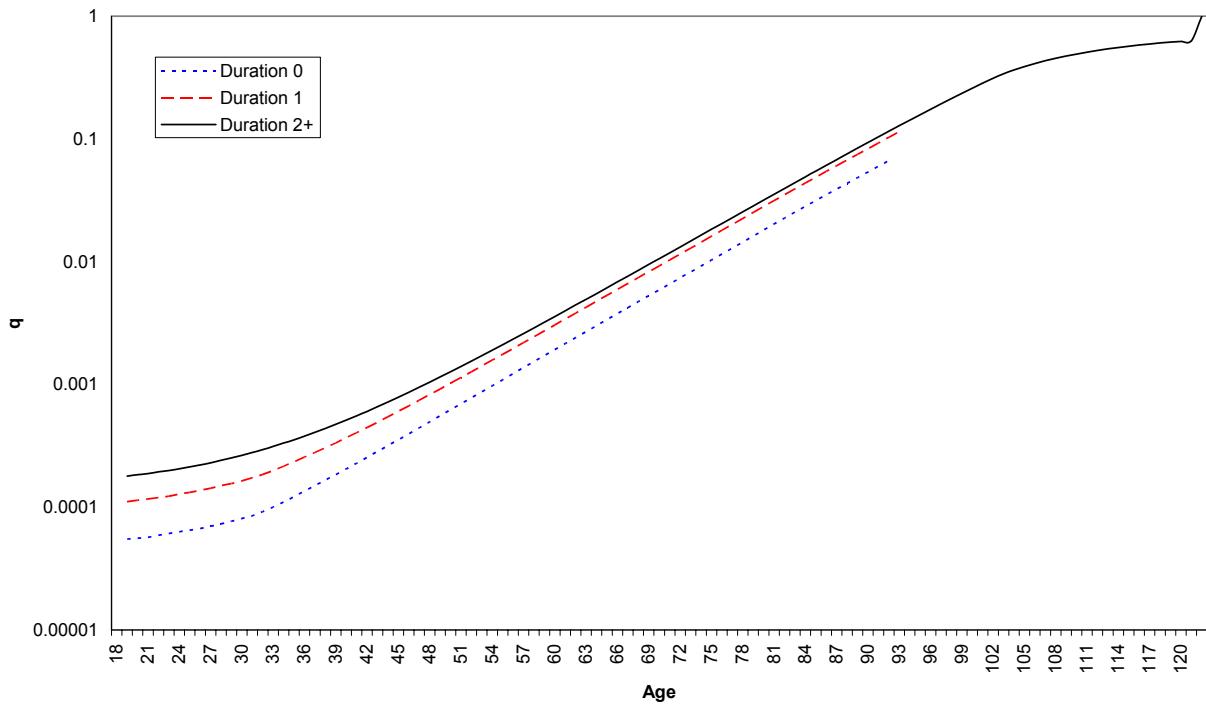


Figure 61. AFS00 select and ultimate rates

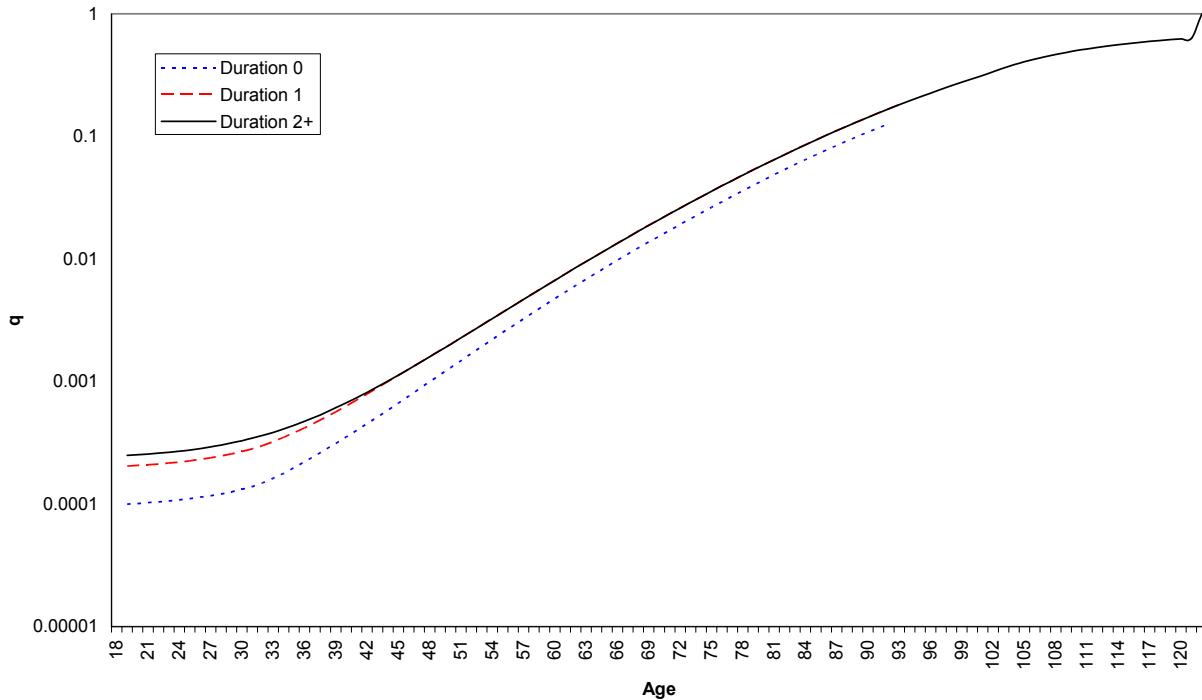


Figure 62. AFN00 select and ultimate rates

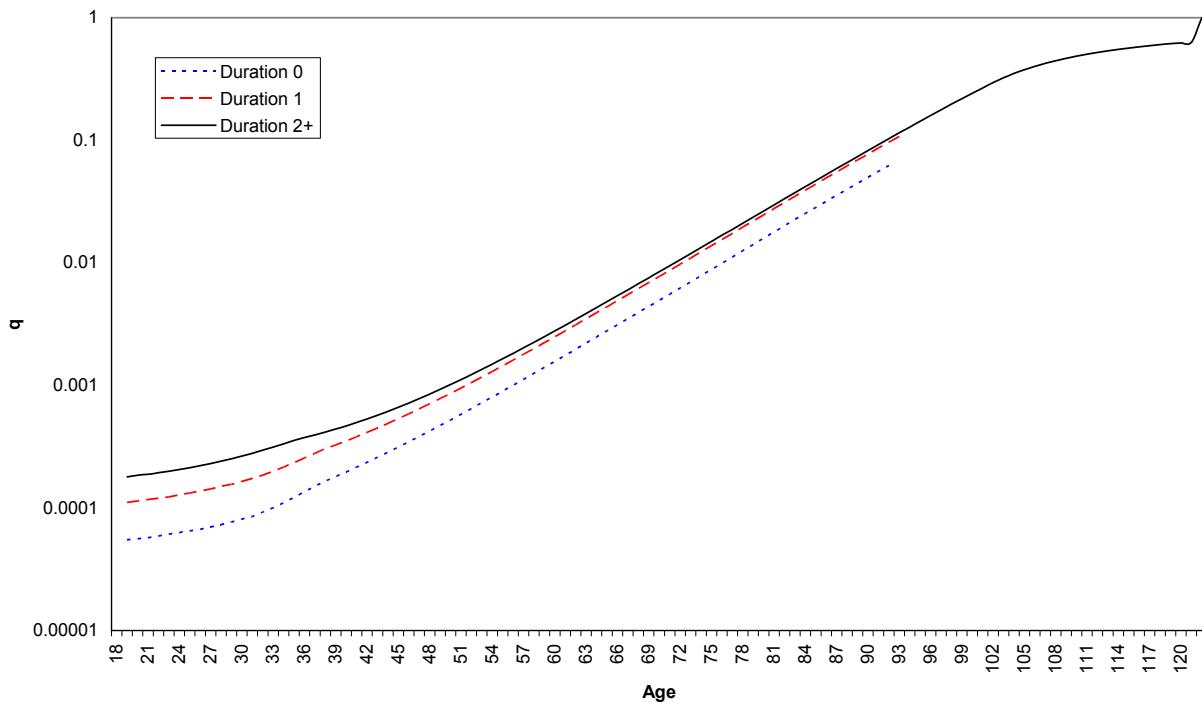


Figure 63. TM00 select and ultimate rates

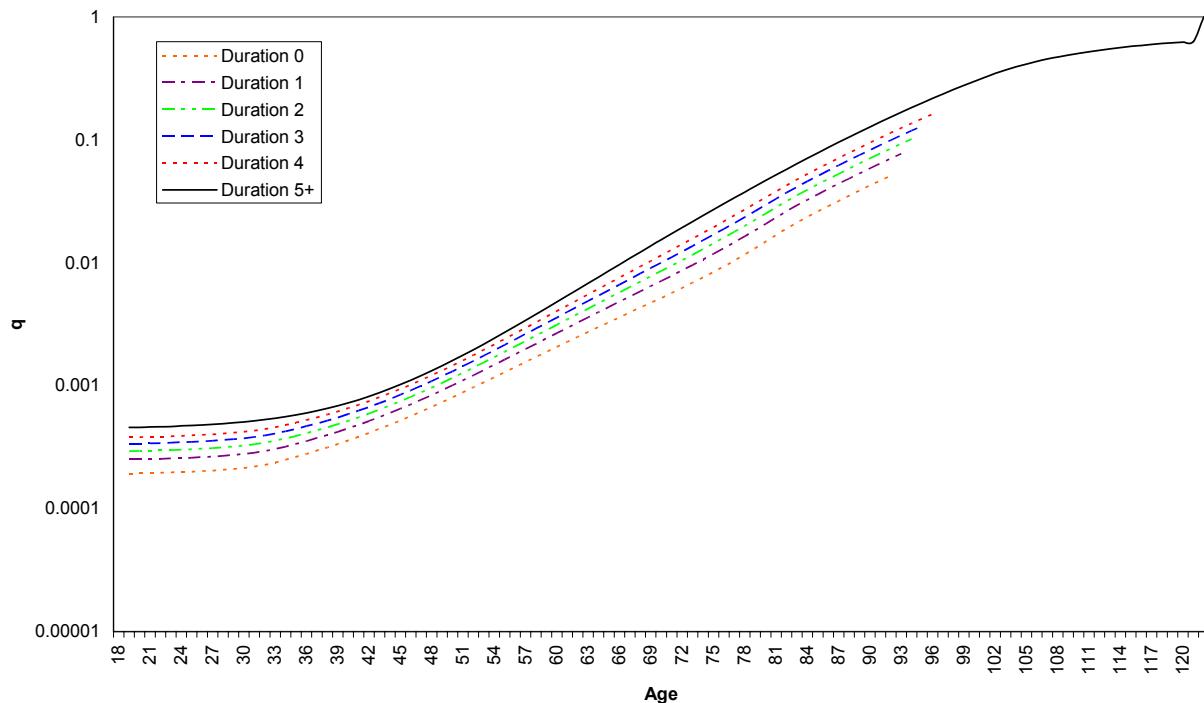


Figure 64. TMS00 select and ultimate rates

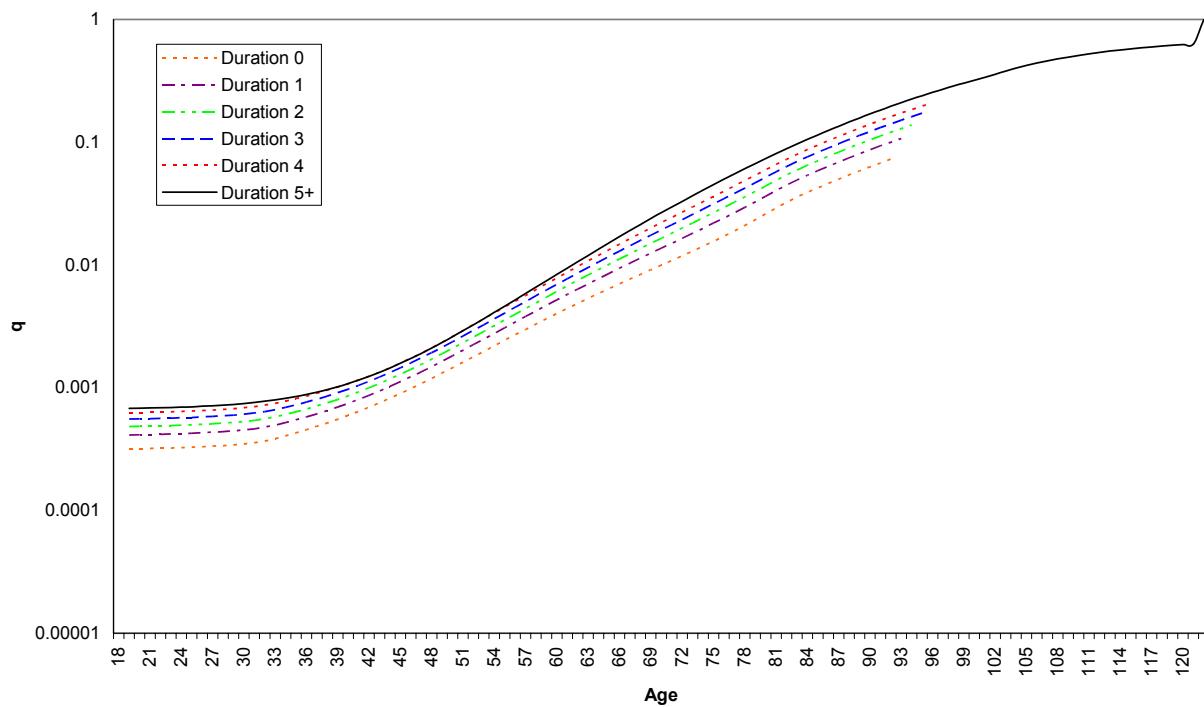


Figure 65. TMN00 select and ultimate rates

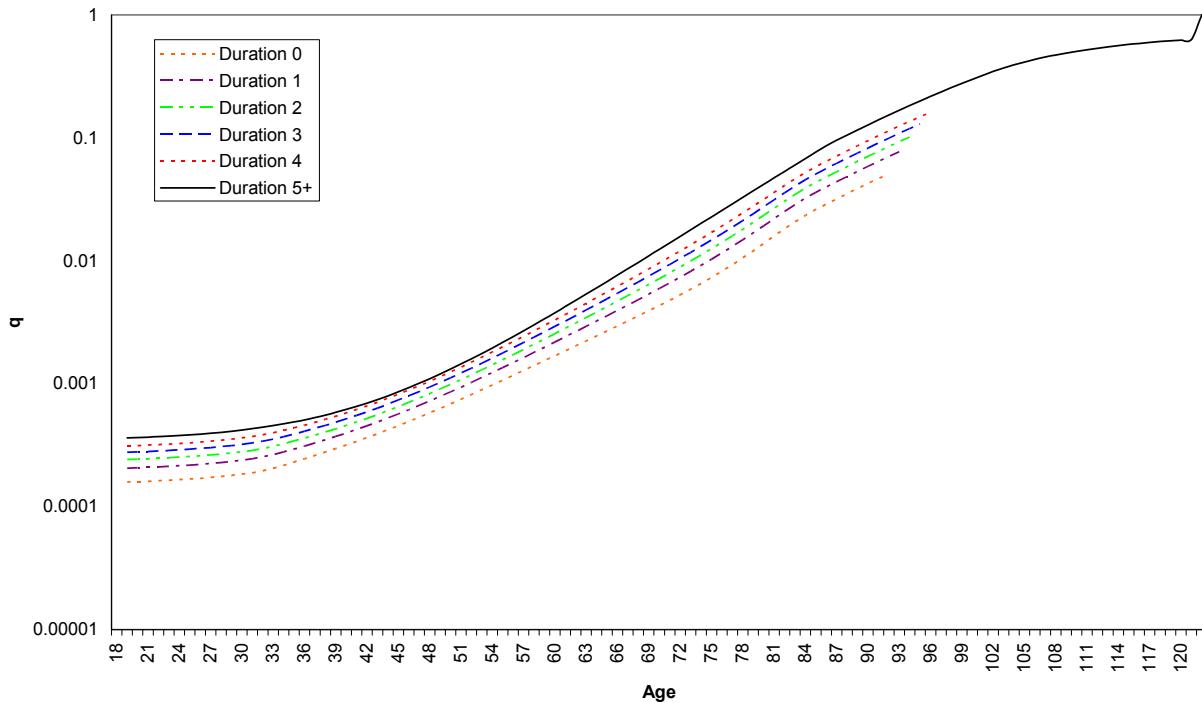


Figure 66. TF00 select and ultimate rates

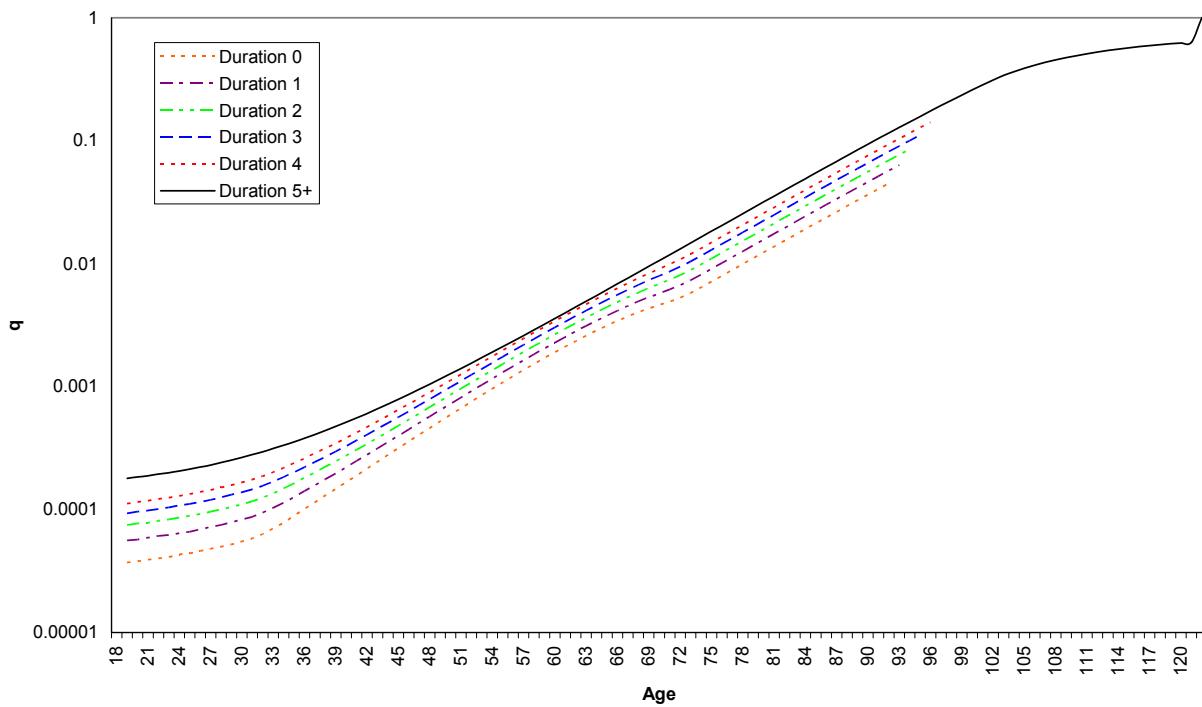


Figure 67. TFS00 select and ultimate rates

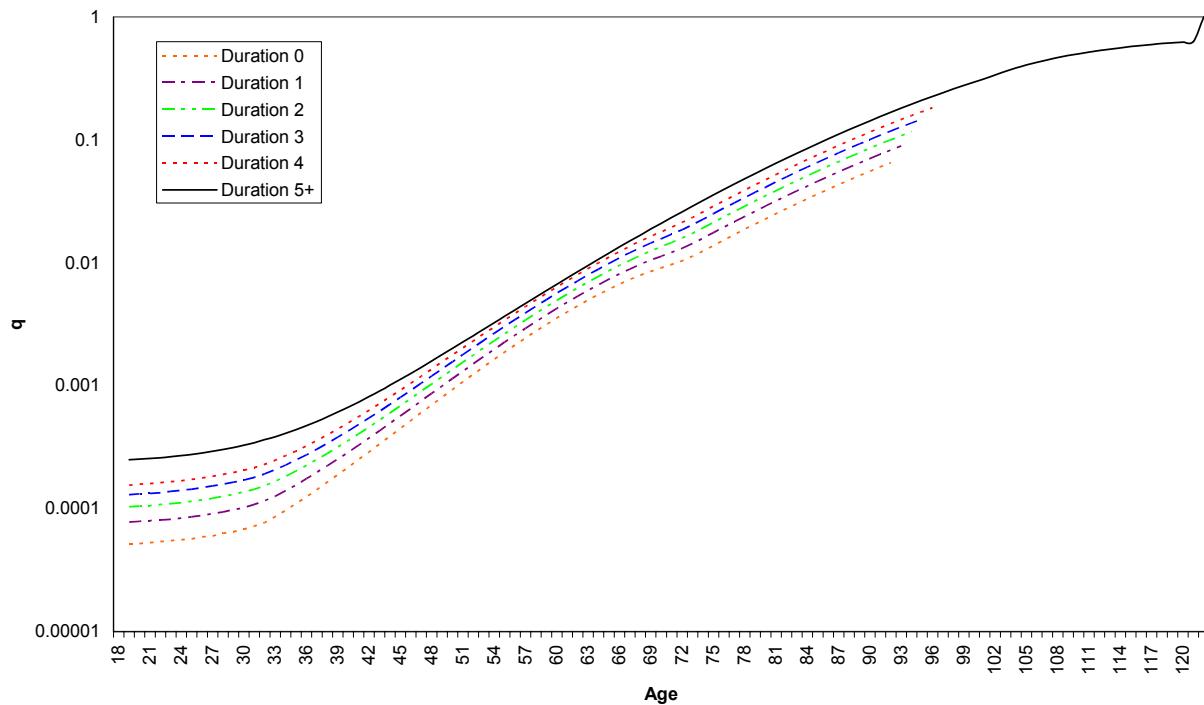
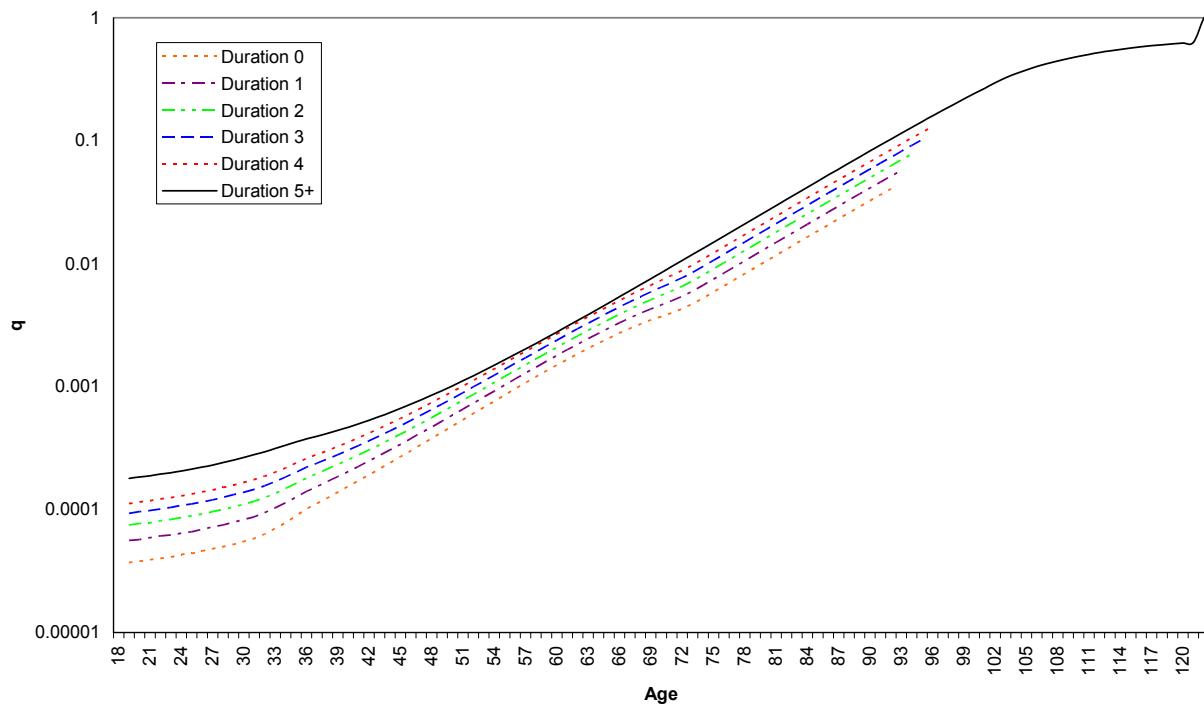


Figure 68. TFN00 select and ultimate rates



References

- Benjamin, B and Pollard, J H (1993) The Analysis of Mortality and Other Actuarial Statistics.
- C.M.I. (1990) Standard Tables of Mortality Based on the 1979-82 Experiences. *C.M.I.R.* **10**, 31-34.
- C.M.I. (1999) Standard Tables of Mortality Based on the 1991-94 Experiences. *C.M.I.R.* **17**, 1-227.
- C.M.I. (2003) Standard Tables Program for Windows Version 3.1.
- C.M.I. (2004) The Mortality of Holders of Permanent (Whole Life and Endowment) Policies of Assurance 1999-2002. *C.M.I.R.* **21**, 1-30.
- C.M.I. (2004) The Mortality of Holders of Temporary Assurances Issued in the United Kingdom, 1999-2002. *C.M.I.R.* **21**, 31-40.
- C.M.I. (2004) Working Paper 8: Considerations for the Graduation of the CMI 1999-2002 Mortality Experience.
- Forfar, D O, McCutcheon, J J and Wilkie, A D (1988) On Graduation by Mathematical Formula. *J.I.A.* **115**, 1-149 and *T.F.A.* **41**, 97-269 and discussion thereon *J.I.A.* **115**, 693-708.
- Hustead, E C (2005) Ending the Mortality Table. Presented to the Society of Actuaries International Symposium: Living to 100 and beyond.
- Neill, A (1983) Life Contingencies.
- Thatcher, A R, Kannisto, V and Vaupel, J W (1998) The Force of Mortality at Ages 80 to 120. Monographs on Population Ageing, Odense University Press.

Appendix

Proposed values of mortality rates for the “00” Series Assured Lives tables.

TABLE		Page
A1	Permanent Assurances, males, combined – AM00	59
A2	Permanent Assurances, males, smokers – AMS00	62
A3	Permanent Assurances, males, non-smokers – AMN00	65
A4	Permanent Assurances, females, combined – AF00	68
A5	Permanent Assurances, females, smokers – AFS00	71
A6	Permanent Assurances, females, non-smokers – AFN00	74
A7	Temporary Assurances, males, combined – TM00	77
A8	Temporary Assurances, males, smokers – TMS00	80
A9	Temporary Assurances, males, non-smokers – TMN00	83
A10	Temporary Assurances, females, combined – TF00	86
A11	Temporary Assurances, females, smokers – TFS00	89
A12	Temporary Assurances, females, non-smokers – TFN00	92

Table A1. Permanent Assurances, males, combined – AM00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000282	0.000386	0.000458
18	0.000283	0.000386	0.000459
19	0.000285	0.000389	0.000462
20	0.000286	0.000391	0.000464
21	0.000288	0.000393	0.000467
22	0.000290	0.000397	0.000471
23	0.000293	0.000400	0.000475
24	0.000296	0.000404	0.000480
25	0.000299	0.000408	0.000485
26	0.000303	0.000414	0.000492
27	0.000308	0.000421	0.000500
28	0.000313	0.000428	0.000508
29	0.000321	0.000438	0.000519
30	0.000332	0.000452	0.000531
31	0.000348	0.000471	0.000545
32	0.000367	0.000494	0.000561
33	0.000389	0.000520	0.000579
34	0.000414	0.000549	0.000601
35	0.000441	0.000582	0.000626
36	0.000470	0.000617	0.000654
37	0.000502	0.000657	0.000687
38	0.000539	0.000703	0.000726
39	0.000580	0.000753	0.000769
40	0.000626	0.000810	0.000820
41	0.000677	0.000873	0.000878
42	0.000734	0.000942	0.000944
43	0.000800	0.001021	0.001021
44	0.000873	0.001108	0.001108
45	0.000956	0.001208	0.001208
46	0.001049	0.001322	0.001322
47	0.001153	0.001452	0.001452
48	0.001271	0.001601	0.001601
49	0.001404	0.001770	0.001770
50	0.001552	0.001963	0.001963
51	0.001720	0.002183	0.002183
52	0.001906	0.002432	0.002432
53	0.002115	0.002713	0.002715
54	0.002349	0.003026	0.003036

Table A1. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.002609	0.003374	0.003400
56	0.002900	0.003759	0.003812
57	0.003223	0.004187	0.004277
58	0.003582	0.004664	0.004802
59	0.003982	0.005198	0.005395
60	0.004428	0.005794	0.006064
61	0.004922	0.006457	0.006816
62	0.005471	0.007197	0.007662
63	0.006082	0.008023	0.008613
64	0.006762	0.008943	0.009679
65	0.007520	0.009970	0.010875
66	0.008366	0.011118	0.012214
67	0.009313	0.012402	0.013712
68	0.010373	0.013839	0.015385
69	0.011565	0.015452	0.017252
70	0.012908	0.017264	0.019333
71	0.014426	0.019303	0.021649
72	0.016147	0.021605	0.024224
73	0.018106	0.024208	0.027084
74	0.020342	0.027159	0.030255
75	0.022905	0.030512	0.033767
76	0.025850	0.034333	0.037652
77	0.029246	0.038696	0.041942
78	0.033172	0.043688	0.046672
79	0.037594	0.049283	0.051882
80	0.042409	0.055389	0.057610
81	0.047427	0.061823	0.063897
82	0.052694	0.068642	0.070787
83	0.058305	0.075952	0.078325
84	0.064432	0.083933	0.086556
85	0.071111	0.092634	0.095529
86	0.078378	0.102099	0.105290
87	0.086267	0.112376	0.115888
88	0.094814	0.123510	0.127370
89	0.104053	0.135546	0.139782
90	0.114018	0.148527	0.153168
91		0.162493	0.167571
92			0.183029
93			0.199573
94			0.217232

Table A1. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.236024
96			0.255963
97			0.277048
98			0.299269
99			0.322606
100			0.346759
101			0.370214
102			0.392528
103			0.413752
104			0.433932
105			0.453110
106			0.471326
107			0.488618
108			0.505018
109			0.520556
110			0.535256
111			0.549141
112			0.562225
113			0.574517
114			0.586017
115			0.596712
116			0.606569
117			0.615519
118			0.623412
119			0.629815
120			1.000000

Table A2. Permanent Assurances, males, smokers – AMS00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000491	0.000670	0.000679
18	0.000492	0.000672	0.000681
19	0.000494	0.000675	0.000684
20	0.000496	0.000678	0.000687
21	0.000499	0.000681	0.000690
22	0.000502	0.000686	0.000695
23	0.000506	0.000691	0.000700
24	0.000510	0.000697	0.000706
25	0.000515	0.000704	0.000713
26	0.000522	0.000712	0.000722
27	0.000529	0.000722	0.000732
28	0.000538	0.000734	0.000744
29	0.000550	0.000750	0.000759
30	0.000569	0.000769	0.000776
31	0.000595	0.000792	0.000796
32	0.000629	0.000819	0.000820
33	0.000668	0.000848	0.000848
34	0.000711	0.000881	0.000881
35	0.000759	0.000920	0.000920
36	0.000813	0.000966	0.000966
37	0.000873	0.001019	0.001019
38	0.000941	0.001081	0.001081
39	0.001019	0.001154	0.001154
40	0.001107	0.001238	0.001238
41	0.001207	0.001336	0.001336
42	0.001321	0.001449	0.001449
43	0.001452	0.001581	0.001581
44	0.001599	0.001732	0.001732
45	0.001768	0.001907	0.001907
46	0.001961	0.002109	0.002109
47	0.002178	0.002340	0.002340
48	0.002425	0.002605	0.002605
49	0.002704	0.002909	0.002909
50	0.003018	0.003256	0.003256
51	0.003372	0.003652	0.003652
52	0.003769	0.004103	0.004103
53	0.004214	0.004615	0.004615
54	0.004711	0.005196	0.005196

Table A2. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.005266	0.005855	0.005855
56	0.005884	0.006599	0.006599
57	0.006569	0.007438	0.007438
58	0.007330	0.008383	0.008383
59	0.008172	0.009446	0.009446
60	0.009102	0.010637	0.010637
61	0.010131	0.011971	0.011971
62	0.011265	0.013462	0.013462
63	0.012517	0.015124	0.015124
64	0.013898	0.016974	0.016974
65	0.015422	0.019029	0.019029
66	0.017105	0.021307	0.021307
67	0.018965	0.023826	0.023826
68	0.021025	0.026607	0.026607
69	0.023310	0.029670	0.029670
70	0.025851	0.033036	0.033036
71	0.028683	0.036728	0.036728
72	0.031849	0.040768	0.040768
73	0.035397	0.045179	0.045179
74	0.039387	0.049983	0.049983
75	0.043887	0.055205	0.055205
76	0.048975	0.060865	0.060865
77	0.054745	0.066988	0.066988
78	0.061303	0.073593	0.073593
79	0.068536	0.080703	0.080703
80	0.076211	0.088334	0.088334
81	0.083952	0.096506	0.096506
82	0.091808	0.105232	0.105232
83	0.099917	0.114527	0.114527
84	0.108530	0.124399	0.124399
85	0.117653	0.134856	0.134856
86	0.127290	0.145902	0.145902
87	0.137440	0.157536	0.157536
88	0.148099	0.169754	0.169754
89	0.159261	0.182548	0.182548
90	0.170914	0.195905	0.195905
91		0.209808	0.209808
92			0.224234
93			0.239158
94			0.254548

Table A2. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.270369
96			0.286580
97			0.303139
98			0.319997
99			0.337105
100			0.357329
101			0.379761
102			0.401123
103			0.421463
104			0.440820
105			0.459236
106			0.476745
107			0.493381
108			0.509174
109			0.524150
110			0.538332
111			0.551739
112			0.564383
113			0.576272
114			0.587403
115			0.597764
116			0.607319
117			0.616001
118			0.623662
119			0.629881
120			1.000000

Table A3. Permanent Assurances, males, non-smokers – AMN00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000223	0.000305	0.000363
18	0.000225	0.000307	0.000365
19	0.000226	0.000309	0.000368
20	0.000229	0.000313	0.000372
21	0.000231	0.000315	0.000375
22	0.000234	0.000319	0.000380
23	0.000236	0.000323	0.000384
24	0.000240	0.000328	0.000390
25	0.000244	0.000333	0.000396
26	0.000248	0.000339	0.000403
27	0.000253	0.000345	0.000411
28	0.000259	0.000354	0.000421
29	0.000266	0.000363	0.000431
30	0.000276	0.000376	0.000443
31	0.000290	0.000393	0.000456
32	0.000308	0.000414	0.000471
33	0.000328	0.000438	0.000489
34	0.000349	0.000463	0.000508
35	0.000373	0.000492	0.000531
36	0.000399	0.000524	0.000556
37	0.000427	0.000558	0.000585
38	0.000458	0.000596	0.000617
39	0.000492	0.000639	0.000654
40	0.000530	0.000686	0.000696
41	0.000572	0.000738	0.000744
42	0.000620	0.000795	0.000798
43	0.000672	0.000858	0.000860
44	0.000731	0.000927	0.000929
45	0.000796	0.001006	0.001008
46	0.000869	0.001096	0.001098
47	0.000951	0.001198	0.001200
48	0.001042	0.001312	0.001315
49	0.001145	0.001444	0.001447
50	0.001259	0.001592	0.001595
51	0.001387	0.001760	0.001764
52	0.001529	0.001951	0.001955
53	0.001689	0.002166	0.002172
54	0.001867	0.002405	0.002418

Table A3. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.002066	0.002671	0.002697
56	0.002288	0.002965	0.003013
57	0.002535	0.003293	0.003371
58	0.002813	0.003662	0.003778
59	0.003122	0.004075	0.004238
60	0.003469	0.004539	0.004760
61	0.003856	0.005059	0.005351
62	0.004291	0.005644	0.006021
63	0.004779	0.006304	0.006781
64	0.005327	0.007045	0.007640
65	0.005945	0.007882	0.008614
66	0.006643	0.008827	0.009717
67	0.007432	0.009898	0.010965
68	0.008329	0.011112	0.012378
69	0.009351	0.012493	0.013977
70	0.010519	0.014068	0.015786
71	0.011858	0.015868	0.017832
72	0.013401	0.017931	0.020145
73	0.015184	0.020302	0.022759
74	0.017253	0.023034	0.025712
75	0.019664	0.026196	0.029048
76	0.022483	0.029861	0.032813
77	0.025790	0.034123	0.037060
78	0.029685	0.039095	0.041849
79	0.034165	0.044788	0.047245
80	0.039172	0.051161	0.053319
81	0.044559	0.058084	0.060153
82	0.050394	0.065646	0.067833
83	0.056798	0.073989	0.076454
84	0.063941	0.083293	0.086068
85	0.070969	0.092449	0.095529
86	0.078221	0.101895	0.105290
87	0.086094	0.112151	0.115888
88	0.094624	0.123263	0.127370
89	0.103845	0.135275	0.139782
90	0.113790	0.148229	0.153168
91		0.162168	0.167571
92			0.183029
93			0.199573
94			0.217232

Table A3. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.236024
96			0.255963
97			0.277048
98			0.299269
99			0.322606
100			0.346759
101			0.370214
102			0.392528
103			0.413752
104			0.433932
105			0.453110
106			0.471326
107			0.488618
108			0.505018
109			0.520556
110			0.535256
111			0.549141
112			0.562225
113			0.574517
114			0.586017
115			0.596712
116			0.606569
117			0.615519
118			0.623412
119			0.629815
120			1.000000

Table A4. Permanent Assurances, females, combined – AF00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000055	0.000111	0.000179
18	0.000056	0.000114	0.000184
19	0.000057	0.000117	0.000188
20	0.000059	0.000120	0.000194
21	0.000061	0.000123	0.000199
22	0.000063	0.000128	0.000206
23	0.000065	0.000132	0.000213
24	0.000067	0.000137	0.000221
25	0.000070	0.000143	0.000230
26	0.000073	0.000150	0.000241
27	0.000077	0.000156	0.000252
28	0.000081	0.000164	0.000265
29	0.000085	0.000174	0.000279
30	0.000092	0.000185	0.000295
31	0.000100	0.000199	0.000313
32	0.000110	0.000215	0.000333
33	0.000122	0.000234	0.000355
34	0.000135	0.000255	0.000380
35	0.000150	0.000278	0.000408
36	0.000166	0.000305	0.000439
37	0.000184	0.000333	0.000473
38	0.000205	0.000367	0.000512
39	0.000228	0.000404	0.000556
40	0.000254	0.000445	0.000604
41	0.000284	0.000492	0.000659
42	0.000317	0.000544	0.000720
43	0.000354	0.000603	0.000788
44	0.000396	0.000669	0.000864
45	0.000442	0.000742	0.000949
46	0.000495	0.000825	0.001044
47	0.000554	0.000917	0.001150
48	0.000620	0.001021	0.001269
49	0.000694	0.001136	0.001401
50	0.000777	0.001267	0.001550
51	0.000870	0.001412	0.001716
52	0.000975	0.001575	0.001901
53	0.001092	0.001758	0.002109
54	0.001223	0.001962	0.002341

Table A4. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.001370	0.002191	0.002600
56	0.001534	0.002446	0.002890
57	0.001717	0.002731	0.003213
58	0.001922	0.003052	0.003576
59	0.002151	0.003408	0.003980
60	0.002408	0.003808	0.004433
61	0.002694	0.004253	0.004938
62	0.003014	0.004752	0.005503
63	0.003371	0.005308	0.006134
64	0.003770	0.005930	0.006840
65	0.004216	0.006625	0.007628
66	0.004714	0.007401	0.008508
67	0.005271	0.008268	0.009492
68	0.005893	0.009237	0.010591
69	0.006588	0.010320	0.011818
70	0.007365	0.011529	0.013188
71	0.008234	0.012883	0.014719
72	0.009207	0.014395	0.016427
73	0.010296	0.016086	0.018333
74	0.011516	0.017977	0.020460
75	0.012883	0.020094	0.022833
76	0.014417	0.022464	0.025480
77	0.016139	0.025117	0.028431
78	0.018073	0.028090	0.031720
79	0.020235	0.031410	0.035385
80	0.022636	0.035099	0.039466
81	0.025281	0.039179	0.044009
82	0.028200	0.043694	0.049064
83	0.031430	0.048699	0.054684
84	0.035018	0.054260	0.060928
85	0.039004	0.060435	0.067862
86	0.043425	0.067286	0.075555
87	0.048326	0.074879	0.084081
88	0.053752	0.083286	0.093522
89	0.059753	0.092584	0.103963
90	0.066381	0.102854	0.115495
91		0.114182	0.128215
92			0.142221
93			0.157615
94			0.174502

Table A4. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.192984
96			0.213160
97			0.235123
98			0.258956
99			0.284727
100			0.312189
101			0.339060
102			0.364540
103			0.388697
104			0.411593
105			0.433285
106			0.453826
107			0.473266
108			0.491649
109			0.509014
110			0.525398
111			0.540829
112			0.555332
113			0.568922
114			0.581604
115			0.593370
116			0.604189
117			0.613992
118			0.622620
119			0.629607
120			1.000000

Table A5. Permanent Assurances, females, smokers – AFS00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000100	0.000204	0.000250
18	0.000101	0.000207	0.000253
19	0.000103	0.000209	0.000256
20	0.000104	0.000212	0.000260
21	0.000106	0.000216	0.000265
22	0.000108	0.000220	0.000270
23	0.000111	0.000225	0.000276
24	0.000114	0.000232	0.000284
25	0.000117	0.000239	0.000293
26	0.000121	0.000247	0.000303
27	0.000126	0.000257	0.000315
28	0.000132	0.000269	0.000329
29	0.000139	0.000282	0.000345
30	0.000149	0.000300	0.000364
31	0.000162	0.000322	0.000385
32	0.000178	0.000349	0.000411
33	0.000198	0.000381	0.000440
34	0.000221	0.000418	0.000474
35	0.000247	0.000461	0.000513
36	0.000278	0.000509	0.000558
37	0.000312	0.000566	0.000610
38	0.000352	0.000630	0.000669
39	0.000399	0.000705	0.000738
40	0.000452	0.000791	0.000816
41	0.000513	0.000889	0.000906
42	0.000584	0.001000	0.001009
43	0.000666	0.001124	0.001127
44	0.000760	0.001260	0.001261
45	0.000868	0.001415	0.001415
46	0.000991	0.001589	0.001589
47	0.001133	0.001788	0.001788
48	0.001294	0.002013	0.002013
49	0.001478	0.002269	0.002269
50	0.001688	0.002558	0.002558
51	0.001926	0.002886	0.002886
52	0.002197	0.003257	0.003257
53	0.002503	0.003674	0.003674
54	0.002850	0.004146	0.004146

Table A5. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.003241	0.004676	0.004676
56	0.003681	0.005272	0.005272
57	0.004176	0.005941	0.005941
58	0.004732	0.006691	0.006691
59	0.005355	0.007530	0.007530
60	0.006052	0.008469	0.008469
61	0.006831	0.009517	0.009517
62	0.007700	0.010686	0.010686
63	0.008667	0.011987	0.011987
64	0.009742	0.013433	0.013433
65	0.010936	0.015039	0.015039
66	0.012261	0.016819	0.016819
67	0.013726	0.018789	0.018789
68	0.015348	0.020967	0.020967
69	0.017139	0.023370	0.023370
70	0.019117	0.026019	0.026019
71	0.021296	0.028932	0.028932
72	0.023696	0.032133	0.032133
73	0.026337	0.035643	0.035643
74	0.029241	0.039486	0.039486
75	0.032431	0.043686	0.043686
76	0.035935	0.048270	0.048270
77	0.039779	0.053262	0.053262
78	0.043997	0.058691	0.058691
79	0.048591	0.064583	0.064583
80	0.053552	0.070965	0.070965
81	0.058851	0.077867	0.077867
82	0.064515	0.085314	0.085314
83	0.070579	0.093334	0.093334
84	0.077098	0.101954	0.101954
85	0.084089	0.111199	0.111199
86	0.091571	0.121093	0.121093
87	0.099560	0.131658	0.131658
88	0.108072	0.142914	0.142914
89	0.117118	0.154877	0.154877
90	0.126711	0.167563	0.167563
91		0.180981	0.180981
92			0.195138
93			0.210036
94			0.225672

Table A5. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.242039
96			0.259122
97			0.276902
98			0.295354
99			0.314444
100			0.336839
101			0.361264
102			0.384479
103			0.406538
104			0.427492
105			0.447389
106			0.466271
107			0.484178
108			0.501148
109			0.517211
110			0.532397
111			0.546727
112			0.560221
113			0.572889
114			0.584732
115			0.595738
116			0.605875
117			0.615073
118			0.623181
119			0.629754
120			1.000000

Table A6. Permanent Assurances, females, non-smokers – AFN00 two years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Durations 2+
17	0.000055	0.000111	0.000179
18	0.000056	0.000114	0.000184
19	0.000057	0.000117	0.000188
20	0.000059	0.000120	0.000194
21	0.000061	0.000123	0.000199
22	0.000063	0.000128	0.000206
23	0.000065	0.000132	0.000213
24	0.000067	0.000137	0.000221
25	0.000070	0.000143	0.000230
26	0.000073	0.000150	0.000241
27	0.000077	0.000156	0.000252
28	0.000081	0.000164	0.000265
29	0.000085	0.000174	0.000279
30	0.000092	0.000185	0.000295
31	0.000100	0.000199	0.000313
32	0.000110	0.000215	0.000333
33	0.000122	0.000234	0.000355
34	0.000135	0.000255	0.000375
35	0.000150	0.000278	0.000394
36	0.000165	0.000303	0.000416
37	0.000180	0.000326	0.000440
38	0.000196	0.000351	0.000467
39	0.000215	0.000380	0.000498
40	0.000235	0.000412	0.000532
41	0.000258	0.000448	0.000571
42	0.000284	0.000487	0.000614
43	0.000313	0.000533	0.000663
44	0.000345	0.000583	0.000718
45	0.000382	0.000641	0.000780
46	0.000423	0.000705	0.000850
47	0.000469	0.000777	0.000928
48	0.000521	0.000857	0.001015
49	0.000579	0.000949	0.001114
50	0.000645	0.001052	0.001225
51	0.000719	0.001166	0.001349
52	0.000802	0.001296	0.001489
53	0.000895	0.001442	0.001647
54	0.001001	0.001606	0.001824

Table A6. (continued)

Age x	Duration 0	Duration 1	Durations 2+
55	0.001118	0.001789	0.002022
56	0.001252	0.001996	0.002246
57	0.001401	0.002229	0.002497
58	0.001569	0.002490	0.002779
59	0.001757	0.002784	0.003096
60	0.001969	0.003115	0.003453
61	0.002207	0.003485	0.003853
62	0.002475	0.003902	0.004303
63	0.002775	0.004370	0.004809
64	0.003112	0.004896	0.005377
65	0.003491	0.005486	0.006015
66	0.003917	0.006149	0.006732
67	0.004395	0.006895	0.007538
68	0.004932	0.007732	0.008442
69	0.005536	0.008673	0.009458
70	0.006215	0.009730	0.010599
71	0.006979	0.010919	0.011880
72	0.007839	0.012255	0.013318
73	0.008805	0.013757	0.014931
74	0.009895	0.015447	0.016742
75	0.011124	0.017349	0.018774
76	0.012509	0.019491	0.021053
77	0.014073	0.021902	0.023609
78	0.015839	0.024618	0.026473
79	0.017825	0.027669	0.029684
80	0.020044	0.031080	0.033280
81	0.022504	0.034876	0.037307
82	0.025236	0.039102	0.041813
83	0.028279	0.043816	0.046854
84	0.031680	0.049086	0.052489
85	0.035478	0.054972	0.058783
86	0.039719	0.061543	0.065810
87	0.044448	0.068870	0.073645
88	0.049717	0.077035	0.082375
89	0.055581	0.086120	0.092090
90	0.062098	0.096219	0.102889
91		0.107427	0.114874
92			0.128157
93			0.142850
94			0.159072

Table A6. (continued)

Age x	Duration 0	Duration 1	Durations 2+
95			0.176942
96			0.196576
97			0.218089
98			0.241586
99			0.267157
100			0.295467
101			0.324026
102			0.351066
103			0.376663
104			0.400888
105			0.423806
106			0.445478
107			0.465958
108			0.485298
109			0.503543
110			0.520734
111			0.536905
112			0.552084
113			0.566290
114			0.579532
115			0.591804
116			0.603076
117			0.613278
118			0.622250
119			0.629510
120			1.000000

Table A7. Temporary Assurances, males, combined – TM00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000193	0.000251	0.000294	0.000337	0.000381	0.000458
18	0.000194	0.000251	0.000295	0.000338	0.000381	0.000459
19	0.000195	0.000253	0.000297	0.000340	0.000384	0.000462
20	0.000196	0.000254	0.000298	0.000342	0.000386	0.000464
21	0.000197	0.000256	0.000300	0.000344	0.000388	0.000467
22	0.000199	0.000258	0.000302	0.000347	0.000391	0.000471
23	0.000200	0.000260	0.000305	0.000350	0.000395	0.000475
24	0.000202	0.000263	0.000308	0.000353	0.000399	0.000480
25	0.000204	0.000265	0.000311	0.000357	0.000403	0.000485
26	0.000207	0.000269	0.000316	0.000362	0.000409	0.000492
27	0.000211	0.000274	0.000321	0.000368	0.000415	0.000500
28	0.000214	0.000278	0.000326	0.000374	0.000422	0.000508
29	0.000220	0.000285	0.000334	0.000383	0.000432	0.000519
30	0.000227	0.000294	0.000344	0.000394	0.000444	0.000531
31	0.000237	0.000306	0.000357	0.000409	0.000460	0.000545
32	0.000250	0.000320	0.000373	0.000426	0.000479	0.000561
33	0.000264	0.000337	0.000391	0.000446	0.000501	0.000579
34	0.000280	0.000355	0.000412	0.000469	0.000526	0.000601
35	0.000297	0.000376	0.000435	0.000494	0.000553	0.000626
36	0.000315	0.000398	0.000459	0.000521	0.000583	0.000654
37	0.000336	0.000422	0.000487	0.000552	0.000617	0.000687
38	0.000359	0.000451	0.000519	0.000588	0.000657	0.000726
39	0.000385	0.000481	0.000554	0.000627	0.000699	0.000769
40	0.000413	0.000517	0.000594	0.000672	0.000749	0.000820
41	0.000445	0.000556	0.000639	0.000722	0.000805	0.000878
42	0.000481	0.000600	0.000689	0.000778	0.000867	0.000944
43	0.000521	0.000650	0.000746	0.000843	0.000939	0.001021
44	0.000566	0.000705	0.000810	0.000915	0.001019	0.001108
45	0.000616	0.000768	0.000882	0.000996	0.001111	0.001208
46	0.000672	0.000838	0.000963	0.001088	0.001213	0.001322
47	0.000735	0.000917	0.001054	0.001192	0.001329	0.001452
48	0.000804	0.001006	0.001157	0.001308	0.001460	0.001601
49	0.000882	0.001105	0.001272	0.001439	0.001606	0.001770
50	0.000968	0.001215	0.001401	0.001586	0.001772	0.001963
51	0.001064	0.001339	0.001545	0.001751	0.001958	0.002183
52	0.001170	0.001476	0.001706	0.001935	0.002165	0.002432
53	0.001287	0.001628	0.001885	0.002141	0.002398	0.002715
54	0.001415	0.001797	0.002084	0.002371	0.002658	0.003036

Table A7. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.001557	0.001985	0.002306	0.002627	0.002949	0.003400
56	0.001713	0.002192	0.002552	0.002913	0.003273	0.003812
57	0.001882	0.002421	0.002825	0.003229	0.003633	0.004277
58	0.002068	0.002672	0.003126	0.003580	0.004034	0.004802
59	0.002271	0.002950	0.003460	0.003970	0.004479	0.005395
60	0.002493	0.003256	0.003829	0.004402	0.004975	0.006064
61	0.002734	0.003591	0.004235	0.004880	0.005524	0.006816
62	0.002997	0.003960	0.004685	0.005409	0.006133	0.007662
63	0.003283	0.004367	0.005181	0.005995	0.006808	0.008613
64	0.003595	0.004813	0.005728	0.006642	0.007557	0.009679
65	0.003937	0.005305	0.006332	0.007360	0.008388	0.010875
66	0.004311	0.005847	0.007001	0.008156	0.009310	0.012214
67	0.004722	0.006447	0.007742	0.009038	0.010334	0.013712
68	0.005175	0.007111	0.008564	0.010018	0.011472	0.015385
69	0.005678	0.007848	0.009479	0.011109	0.012739	0.017252
70	0.006239	0.008671	0.010498	0.012325	0.014152	0.019333
71	0.006869	0.009592	0.011638	0.013684	0.015730	0.021649
72	0.007581	0.010628	0.012917	0.015206	0.017496	0.024224
73	0.008392	0.011799	0.014358	0.016918	0.019477	0.027084
74	0.009322	0.013128	0.015987	0.018846	0.021705	0.030255
75	0.010396	0.014644	0.017835	0.021026	0.024217	0.033767
76	0.011647	0.016383	0.019941	0.023500	0.027058	0.037652
77	0.013110	0.018386	0.022350	0.026313	0.030277	0.041942
78	0.014832	0.020703	0.025114	0.029524	0.033935	0.046672
79	0.016799	0.023326	0.028229	0.033132	0.038034	0.051882
80	0.018962	0.026209	0.031653	0.037097	0.042542	0.057610
81	0.021217	0.029256	0.035294	0.041332	0.047370	0.063897
82	0.023580	0.032485	0.039174	0.045864	0.052553	0.070787
83	0.026091	0.035944	0.043346	0.050748	0.058150	0.078325
84	0.028833	0.039722	0.047901	0.056081	0.064260	0.086556
85	0.031822	0.043840	0.052867	0.061895	0.070922	0.095529
86	0.035074	0.048319	0.058269	0.068219	0.078169	0.105290
87	0.038604	0.053183	0.064134	0.075085	0.086037	0.115888
88	0.042429	0.058452	0.070488	0.082525	0.094561	0.127370
89	0.046563	0.064148	0.077357	0.090567	0.103776	0.139782
90	0.051022	0.070291	0.084765	0.099240	0.113714	0.153168
91		0.076901	0.092736	0.108572	0.124407	0.167571
92			0.101291	0.118587	0.135883	0.183029
93				0.129306	0.148166	0.199573
94					0.161276	0.217232

Table A7. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.236024
96						0.255963
97						0.277048
98						0.299269
99						0.322606
100						0.346759
101						0.370214
102						0.392528
103						0.413752
104						0.433932
105						0.453110
106						0.471326
107						0.488618
108						0.505018
109						0.520556
110						0.535256
111						0.549141
112						0.562225
113						0.574517
114						0.586017
115						0.596712
116						0.606569
117						0.615519
118						0.623412
119						0.629815
120						1.000000

Table A8. Temporary Assurances, males, smokers – TMS00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000318	0.000413	0.000484	0.000555	0.000627	0.000679
18	0.000319	0.000414	0.000486	0.000557	0.000629	0.000681
19	0.000320	0.000416	0.000488	0.000560	0.000631	0.000684
20	0.000322	0.000418	0.000490	0.000562	0.000634	0.000687
21	0.000323	0.000420	0.000492	0.000564	0.000637	0.000690
22	0.000325	0.000423	0.000496	0.000569	0.000641	0.000695
23	0.000328	0.000426	0.000499	0.000573	0.000646	0.000700
24	0.000331	0.000429	0.000503	0.000578	0.000652	0.000706
25	0.000334	0.000434	0.000508	0.000583	0.000658	0.000713
26	0.000338	0.000439	0.000515	0.000591	0.000666	0.000722
27	0.000343	0.000445	0.000522	0.000599	0.000676	0.000732
28	0.000348	0.000452	0.000530	0.000609	0.000687	0.000744
29	0.000357	0.000463	0.000542	0.000622	0.000702	0.000759
30	0.000368	0.000477	0.000558	0.000639	0.000721	0.000776
31	0.000385	0.000496	0.000579	0.000663	0.000746	0.000796
32	0.000405	0.000520	0.000606	0.000692	0.000778	0.000820
33	0.000429	0.000548	0.000637	0.000726	0.000815	0.000848
34	0.000455	0.000579	0.000671	0.000764	0.000856	0.000881
35	0.000485	0.000613	0.000710	0.000806	0.000903	0.000920
36	0.000517	0.000652	0.000754	0.000855	0.000956	0.000966
37	0.000554	0.000696	0.000803	0.000910	0.001014	0.001019
38	0.000595	0.000746	0.000859	0.000973	0.001080	0.001081
39	0.000641	0.000802	0.000924	0.001045	0.001154	0.001154
40	0.000693	0.000866	0.000996	0.001126	0.001238	0.001238
41	0.000753	0.000940	0.001080	0.001220	0.001336	0.001336
42	0.000820	0.001022	0.001175	0.001327	0.001449	0.001449
43	0.000897	0.001118	0.001284	0.001450	0.001581	0.001581
44	0.000983	0.001225	0.001407	0.001588	0.001732	0.001732
45	0.001080	0.001347	0.001547	0.001747	0.001907	0.001907
46	0.001191	0.001486	0.001707	0.001928	0.002109	0.002109
47	0.001315	0.001642	0.001887	0.002133	0.002340	0.002340
48	0.001454	0.001818	0.002091	0.002365	0.002605	0.002605
49	0.001610	0.002016	0.002322	0.002627	0.002908	0.002909
50	0.001784	0.002239	0.002581	0.002922	0.003250	0.003256
51	0.001977	0.002488	0.002871	0.003255	0.003632	0.003652
52	0.002192	0.002766	0.003196	0.003627	0.004056	0.004103
53	0.002429	0.003074	0.003559	0.004043	0.004528	0.004615
54	0.002691	0.003417	0.003962	0.004508	0.005053	0.005196

Table A8. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.002978	0.003797	0.004411	0.005026	0.005640	0.005855
56	0.003293	0.004215	0.004908	0.005601	0.006293	0.006599
57	0.003637	0.004676	0.005457	0.006237	0.007018	0.007438
58	0.004011	0.005182	0.006062	0.006942	0.007822	0.008383
59	0.004417	0.005737	0.006729	0.007720	0.008712	0.009446
60	0.004857	0.006344	0.007460	0.008577	0.009693	0.010637
61	0.005334	0.007006	0.008263	0.009520	0.010776	0.011971
62	0.005848	0.007730	0.009143	0.010556	0.011969	0.013462
63	0.006404	0.008517	0.010105	0.011692	0.013280	0.015124
64	0.007004	0.009376	0.011157	0.012939	0.014721	0.016974
65	0.007652	0.010311	0.012308	0.014306	0.016303	0.019029
66	0.008353	0.011330	0.013567	0.015804	0.018040	0.021307
67	0.009113	0.012443	0.014944	0.017445	0.019946	0.023826
68	0.009942	0.013660	0.016452	0.019245	0.022038	0.026607
69	0.010847	0.014993	0.018108	0.021222	0.024337	0.029670
70	0.011843	0.016459	0.019927	0.023395	0.026862	0.033036
71	0.012944	0.018077	0.021932	0.025787	0.029643	0.036728
72	0.014172	0.019869	0.024148	0.028427	0.032707	0.040768
73	0.015549	0.021863	0.026605	0.031347	0.036090	0.045179
74	0.017106	0.024091	0.029338	0.034584	0.039831	0.049983
75	0.018880	0.026594	0.032389	0.038184	0.043979	0.055205
76	0.020913	0.029418	0.035807	0.042196	0.048585	0.060865
77	0.023259	0.032620	0.039651	0.046683	0.053715	0.066988
78	0.025978	0.036262	0.043987	0.051712	0.059437	0.073593
79	0.029027	0.040304	0.048775	0.057247	0.065718	0.080703
80	0.032296	0.044639	0.053912	0.063184	0.072457	0.088334
81	0.035596	0.049082	0.059212	0.069342	0.079473	0.096506
82	0.038938	0.053643	0.064689	0.075736	0.086782	0.105232
83	0.042378	0.058381	0.070403	0.082425	0.094447	0.114527
84	0.046030	0.063414	0.076472	0.089530	0.102588	0.124399
85	0.049900	0.068744	0.082900	0.097056	0.111212	0.134856
86	0.053987	0.074375	0.089691	0.105006	0.120321	0.145902
87	0.058292	0.080306	0.096842	0.113379	0.129916	0.157536
88	0.062813	0.086534	0.104353	0.122172	0.139992	0.169754
89	0.067547	0.093056	0.112218	0.131380	0.150542	0.182548
90	0.072489	0.099865	0.120429	0.140993	0.161558	0.195905
91		0.106952	0.128976	0.150999	0.173023	0.209808
92			0.137844	0.161382	0.184920	0.224234
93				0.172123	0.197227	0.239158
94					0.209919	0.254548

Table A8. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.270369
96						0.286580
97						0.303139
98						0.319997
99						0.337105
100						0.357329
101						0.379761
102						0.401123
103						0.421463
104						0.440820
105						0.459236
106						0.476745
107						0.493381
108						0.509174
109						0.524150
110						0.538332
111						0.551739
112						0.564383
113						0.576272
114						0.587403
115						0.597764
116						0.607319
117						0.616001
118						0.623662
119						0.629881
120						1.000000

Table A9. Temporary Assurances, males, non-smokers – TMN00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000159	0.000206	0.000242	0.000277	0.000313	0.000363
18	0.000160	0.000207	0.000243	0.000279	0.000314	0.000365
19	0.000161	0.000209	0.000245	0.000281	0.000317	0.000368
20	0.000163	0.000211	0.000248	0.000284	0.000320	0.000372
21	0.000164	0.000213	0.000250	0.000286	0.000323	0.000375
22	0.000166	0.000216	0.000253	0.000290	0.000327	0.000380
23	0.000168	0.000218	0.000256	0.000293	0.000331	0.000384
24	0.000170	0.000221	0.000260	0.000298	0.000336	0.000390
25	0.000173	0.000225	0.000264	0.000302	0.000341	0.000396
26	0.000176	0.000229	0.000268	0.000308	0.000347	0.000403
27	0.000180	0.000233	0.000274	0.000314	0.000354	0.000411
28	0.000184	0.000239	0.000280	0.000321	0.000363	0.000421
29	0.000189	0.000245	0.000287	0.000330	0.000372	0.000431
30	0.000196	0.000254	0.000297	0.000341	0.000384	0.000443
31	0.000206	0.000265	0.000310	0.000354	0.000399	0.000456
32	0.000217	0.000279	0.000325	0.000371	0.000417	0.000471
33	0.000231	0.000295	0.000343	0.000391	0.000439	0.000489
34	0.000245	0.000311	0.000361	0.000411	0.000461	0.000508
35	0.000261	0.000330	0.000382	0.000434	0.000486	0.000531
36	0.000278	0.000350	0.000405	0.000459	0.000514	0.000556
37	0.000297	0.000373	0.000430	0.000488	0.000545	0.000585
38	0.000317	0.000397	0.000458	0.000518	0.000579	0.000617
39	0.000339	0.000424	0.000489	0.000553	0.000617	0.000654
40	0.000364	0.000455	0.000523	0.000591	0.000659	0.000696
41	0.000391	0.000488	0.000561	0.000634	0.000707	0.000744
42	0.000422	0.000526	0.000604	0.000682	0.000760	0.000798
43	0.000455	0.000567	0.000652	0.000736	0.000820	0.000860
44	0.000492	0.000613	0.000704	0.000795	0.000886	0.000929
45	0.000533	0.000665	0.000763	0.000862	0.000961	0.001008
46	0.000579	0.000722	0.000830	0.000937	0.001045	0.001098
47	0.000629	0.000786	0.000903	0.001021	0.001139	0.001200
48	0.000685	0.000857	0.000985	0.001114	0.001243	0.001315
49	0.000747	0.000936	0.001078	0.001220	0.001362	0.001447
50	0.000816	0.001024	0.001180	0.001336	0.001493	0.001595
51	0.000892	0.001122	0.001294	0.001467	0.001640	0.001764
52	0.000975	0.001230	0.001422	0.001613	0.001805	0.001955
53	0.001067	0.001350	0.001563	0.001776	0.001989	0.002172
54	0.001169	0.001484	0.001721	0.001958	0.002195	0.002418

Table A9. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.001281	0.001632	0.001897	0.002161	0.002425	0.002697
56	0.001403	0.001796	0.002092	0.002387	0.002682	0.003013
57	0.001538	0.001978	0.002308	0.002639	0.002969	0.003371
58	0.001687	0.002180	0.002550	0.002920	0.003290	0.003778
59	0.001850	0.002403	0.002818	0.003233	0.003648	0.004238
60	0.002029	0.002650	0.003116	0.003582	0.004049	0.004760
61	0.002225	0.002923	0.003447	0.003972	0.004496	0.005351
62	0.002441	0.003227	0.003817	0.004407	0.004997	0.006021
63	0.002680	0.003564	0.004229	0.004893	0.005558	0.006781
64	0.002942	0.003939	0.004687	0.005436	0.006184	0.007640
65	0.003233	0.004356	0.005200	0.006044	0.006888	0.008614
66	0.003556	0.004823	0.005775	0.006727	0.007679	0.009717
67	0.003915	0.005345	0.006419	0.007493	0.008568	0.010965
68	0.004317	0.005931	0.007144	0.008357	0.009570	0.012378
69	0.004769	0.006592	0.007962	0.009331	0.010701	0.013977
70	0.005282	0.007341	0.008888	0.010434	0.011981	0.015786
71	0.005866	0.008192	0.009939	0.011686	0.013433	0.017832
72	0.006536	0.009164	0.011138	0.013111	0.015085	0.020145
73	0.007311	0.010280	0.012509	0.014739	0.016969	0.022759
74	0.008214	0.011567	0.014086	0.016606	0.019125	0.025712
75	0.009273	0.013061	0.015907	0.018753	0.021599	0.029048
76	0.010523	0.014803	0.018018	0.021233	0.024448	0.032813
77	0.012010	0.016844	0.020475	0.024106	0.027737	0.037060
78	0.013789	0.019247	0.023347	0.027447	0.031548	0.041849
79	0.015861	0.022023	0.026652	0.031281	0.035910	0.047245
80	0.018195	0.025150	0.030374	0.035598	0.040822	0.053319
81	0.020709	0.028555	0.034449	0.040342	0.046236	0.060153
82	0.023428	0.032275	0.038921	0.045567	0.052213	0.067833
83	0.026091	0.035944	0.043346	0.050748	0.058150	0.076454
84	0.028833	0.039722	0.047901	0.056081	0.064260	0.086068
85	0.031822	0.043840	0.052867	0.061895	0.070922	0.095529
86	0.035074	0.048319	0.058269	0.068219	0.078169	0.105290
87	0.038604	0.053183	0.064134	0.075085	0.086037	0.115888
88	0.042429	0.058452	0.070488	0.082525	0.094561	0.127370
89	0.046563	0.064148	0.077357	0.090567	0.103776	0.139782
90	0.051022	0.070291	0.084765	0.099240	0.113714	0.153168
91		0.076901	0.092736	0.108572	0.124407	0.167571
92			0.101291	0.118587	0.135883	0.183029
93				0.129306	0.148166	0.199573
94					0.161276	0.217232

Table A9. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.236024
96						0.255963
97						0.277048
98						0.299269
99						0.322606
100						0.346759
101						0.370214
102						0.392528
103						0.413752
104						0.433932
105						0.453110
106						0.471326
107						0.488618
108						0.505018
109						0.520556
110						0.535256
111						0.549141
112						0.562225
113						0.574517
114						0.586017
115						0.596712
116						0.606569
117						0.615519
118						0.623412
119						0.629815
120						1.000000

Table A10. Temporary Assurances, females, combined – TF00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000037	0.000056	0.000075	0.000093	0.000112	0.000179
18	0.000038	0.000057	0.000077	0.000096	0.000115	0.000184
19	0.000039	0.000059	0.000078	0.000098	0.000118	0.000188
20	0.000040	0.000061	0.000081	0.000101	0.000122	0.000194
21	0.000041	0.000062	0.000083	0.000104	0.000125	0.000199
22	0.000043	0.000064	0.000086	0.000108	0.000129	0.000206
23	0.000044	0.000066	0.000089	0.000111	0.000134	0.000213
24	0.000046	0.000069	0.000092	0.000115	0.000139	0.000221
25	0.000048	0.000072	0.000096	0.000120	0.000144	0.000230
26	0.000050	0.000075	0.000100	0.000126	0.000151	0.000241
27	0.000052	0.000079	0.000105	0.000132	0.000158	0.000252
28	0.000055	0.000083	0.000110	0.000138	0.000166	0.000265
29	0.000058	0.000087	0.000117	0.000146	0.000175	0.000279
30	0.000063	0.000094	0.000125	0.000156	0.000187	0.000295
31	0.000070	0.000103	0.000135	0.000168	0.000201	0.000313
32	0.000078	0.000113	0.000148	0.000183	0.000218	0.000333
33	0.000089	0.000126	0.000163	0.000201	0.000238	0.000355
34	0.000101	0.000141	0.000181	0.000220	0.000260	0.000380
35	0.000114	0.000157	0.000200	0.000243	0.000286	0.000408
36	0.000130	0.000176	0.000222	0.000268	0.000314	0.000439
37	0.000147	0.000196	0.000246	0.000296	0.000345	0.000473
38	0.000167	0.000220	0.000274	0.000328	0.000382	0.000512
39	0.000189	0.000248	0.000306	0.000364	0.000423	0.000556
40	0.000215	0.000278	0.000342	0.000405	0.000468	0.000604
41	0.000244	0.000313	0.000382	0.000452	0.000521	0.000659
42	0.000277	0.000353	0.000428	0.000504	0.000580	0.000720
43	0.000315	0.000397	0.000480	0.000563	0.000646	0.000788
44	0.000357	0.000448	0.000538	0.000629	0.000720	0.000864
45	0.000405	0.000505	0.000604	0.000704	0.000804	0.000949
46	0.000459	0.000569	0.000678	0.000788	0.000898	0.001044
47	0.000520	0.000641	0.000762	0.000883	0.001003	0.001150
48	0.000589	0.000722	0.000856	0.000989	0.001122	0.001269
49	0.000666	0.000813	0.000960	0.001108	0.001255	0.001401
50	0.000753	0.000916	0.001079	0.001242	0.001404	0.001550
51	0.000850	0.001030	0.001211	0.001391	0.001571	0.001716
52	0.000958	0.001158	0.001357	0.001557	0.001757	0.001901
53	0.001079	0.001300	0.001522	0.001743	0.001965	0.002109
54	0.001213	0.001459	0.001704	0.001950	0.002196	0.002341

Table A10. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.001360	0.001633	0.001907	0.002180	0.002453	0.002600
56	0.001523	0.001827	0.002131	0.002434	0.002738	0.002890
57	0.001702	0.002039	0.002377	0.002714	0.003052	0.003213
58	0.001898	0.002273	0.002649	0.003025	0.003400	0.003576
59	0.002110	0.002528	0.002946	0.003364	0.003782	0.003980
60	0.002340	0.002805	0.003271	0.003737	0.004202	0.004433
61	0.002586	0.003105	0.003623	0.004142	0.004661	0.004938
62	0.002849	0.003427	0.004005	0.004583	0.005161	0.005503
63	0.003126	0.003770	0.004414	0.005059	0.005703	0.006134
64	0.003416	0.004134	0.004853	0.005571	0.006290	0.006840
65	0.003714	0.004516	0.005317	0.006118	0.006919	0.007628
66	0.004017	0.004910	0.005804	0.006698	0.007591	0.008508
67	0.004317	0.005314	0.006311	0.007308	0.008305	0.009492
68	0.004606	0.005718	0.006830	0.007943	0.009055	0.010591
69	0.004908	0.006150	0.007391	0.008633	0.009874	0.011818
70	0.005270	0.006655	0.008041	0.009426	0.010811	0.013188
71	0.005762	0.007308	0.008854	0.010400	0.011946	0.014719
72	0.006384	0.008109	0.009835	0.011560	0.013286	0.016427
73	0.007125	0.009050	0.010976	0.012902	0.014827	0.018333
74	0.007951	0.010100	0.012249	0.014399	0.016548	0.020460
75	0.008873	0.011272	0.013670	0.016069	0.018467	0.022833
76	0.009902	0.012579	0.015255	0.017931	0.020608	0.025480
77	0.011049	0.014035	0.017022	0.020008	0.022995	0.028431
78	0.012327	0.015659	0.018991	0.022323	0.025655	0.031720
79	0.013751	0.017468	0.021185	0.024902	0.028619	0.035385
80	0.015337	0.019483	0.023628	0.027774	0.031919	0.039466
81	0.017103	0.021726	0.026348	0.030971	0.035594	0.044009
82	0.019067	0.024221	0.029375	0.034528	0.039682	0.049064
83	0.021252	0.026996	0.032740	0.038484	0.044228	0.054684
84	0.023678	0.030078	0.036478	0.042878	0.049278	0.060928
85	0.026373	0.033501	0.040629	0.047757	0.054886	0.067862
86	0.029362	0.037299	0.045235	0.053171	0.061108	0.075555
87	0.032676	0.041508	0.050340	0.059171	0.068003	0.084081
88	0.036345	0.046168	0.055992	0.065816	0.075639	0.093522
89	0.040403	0.051323	0.062243	0.073163	0.084084	0.103963
90	0.044884	0.057016	0.069147	0.081279	0.093410	0.115495
91		0.063295	0.076763	0.090231	0.103698	0.128215
92			0.085148	0.100087	0.115026	0.142221
93				0.110921	0.127476	0.157615
94					0.141134	0.174502

Table A10. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.192984
96						0.213160
97						0.235123
98						0.258956
99						0.284727
100						0.312189
101						0.339060
102						0.364540
103						0.388697
104						0.411593
105						0.433285
106						0.453826
107						0.473266
108						0.491649
109						0.509014
110						0.525398
111						0.540829
112						0.555332
113						0.568922
114						0.581604
115						0.593370
116						0.604189
117						0.613992
118						0.622620
119						0.629607
120						1.000000

Table A11. Temporary Assurances, females, smokers – TFS00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000052	0.000078	0.000104	0.000130	0.000156	0.000250
18	0.000052	0.000079	0.000105	0.000132	0.000158	0.000253
19	0.000053	0.000080	0.000106	0.000133	0.000160	0.000256
20	0.000054	0.000081	0.000108	0.000135	0.000163	0.000260
21	0.000055	0.000082	0.000110	0.000138	0.000166	0.000265
22	0.000056	0.000084	0.000112	0.000141	0.000169	0.000270
23	0.000057	0.000086	0.000115	0.000144	0.000173	0.000276
24	0.000059	0.000088	0.000118	0.000148	0.000178	0.000284
25	0.000060	0.000091	0.000122	0.000153	0.000183	0.000293
26	0.000063	0.000094	0.000126	0.000158	0.000190	0.000303
27	0.000065	0.000098	0.000131	0.000164	0.000197	0.000315
28	0.000068	0.000102	0.000137	0.000171	0.000206	0.000329
29	0.000072	0.000108	0.000144	0.000180	0.000216	0.000345
30	0.000077	0.000116	0.000154	0.000192	0.000230	0.000364
31	0.000086	0.000126	0.000166	0.000207	0.000247	0.000385
32	0.000097	0.000140	0.000183	0.000226	0.000269	0.000411
33	0.000110	0.000156	0.000202	0.000248	0.000294	0.000440
34	0.000125	0.000175	0.000225	0.000274	0.000324	0.000474
35	0.000143	0.000197	0.000251	0.000305	0.000358	0.000513
36	0.000164	0.000223	0.000281	0.000340	0.000398	0.000558
37	0.000189	0.000253	0.000317	0.000381	0.000444	0.000610
38	0.000217	0.000287	0.000357	0.000427	0.000498	0.000669
39	0.000251	0.000328	0.000405	0.000483	0.000560	0.000738
40	0.000289	0.000375	0.000460	0.000546	0.000631	0.000816
41	0.000335	0.000430	0.000525	0.000619	0.000714	0.000906
42	0.000387	0.000493	0.000599	0.000705	0.000810	0.001009
43	0.000449	0.000567	0.000685	0.000803	0.000921	0.001127
44	0.000520	0.000652	0.000784	0.000916	0.001048	0.001261
45	0.000602	0.000751	0.000899	0.001047	0.001195	0.001415
46	0.000697	0.000864	0.001030	0.001197	0.001363	0.001589
47	0.000807	0.000994	0.001182	0.001369	0.001556	0.001788
48	0.000932	0.001143	0.001354	0.001565	0.001776	0.002013
49	0.001076	0.001314	0.001552	0.001789	0.002027	0.002269
50	0.001240	0.001508	0.001776	0.002044	0.002312	0.002558
51	0.001426	0.001729	0.002031	0.002334	0.002636	0.002886
52	0.001638	0.001979	0.002320	0.002661	0.003003	0.003257
53	0.001875	0.002260	0.002645	0.003030	0.003415	0.003674
54	0.002142	0.002577	0.003011	0.003446	0.003880	0.004146

Table A11. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.002441	0.002931	0.003421	0.003911	0.004401	0.004676
56	0.002772	0.003325	0.003877	0.004430	0.004982	0.005272
57	0.003139	0.003762	0.004384	0.005007	0.005629	0.005941
58	0.003542	0.004243	0.004944	0.005646	0.006347	0.006691
59	0.003982	0.004771	0.005560	0.006349	0.007138	0.007530
60	0.004459	0.005346	0.006234	0.007121	0.008009	0.008469
61	0.004972	0.005969	0.006966	0.007964	0.008961	0.009517
62	0.005518	0.006638	0.007758	0.008878	0.009997	0.010686
63	0.006094	0.007350	0.008606	0.009862	0.011118	0.011987
64	0.006692	0.008100	0.009507	0.010915	0.012323	0.013433
65	0.007305	0.008881	0.010457	0.012033	0.013609	0.015039
66	0.007921	0.009684	0.011446	0.013209	0.014971	0.016819
67	0.008525	0.010493	0.012462	0.014431	0.016400	0.018789
68	0.009096	0.011293	0.013490	0.015687	0.017884	0.020967
69	0.009683	0.012132	0.014581	0.017030	0.019479	0.023370
70	0.010373	0.013099	0.015826	0.018552	0.021279	0.026019
71	0.011298	0.014330	0.017362	0.020393	0.023425	0.028932
72	0.012458	0.015825	0.019192	0.022559	0.025926	0.032133
73	0.013818	0.017553	0.021288	0.025023	0.028758	0.035643
74	0.015308	0.019446	0.023584	0.027721	0.031859	0.039486
75	0.016937	0.021514	0.026092	0.030670	0.035248	0.043686
76	0.018714	0.023772	0.028830	0.033888	0.038946	0.048270
77	0.020649	0.026230	0.031812	0.037393	0.042974	0.053262
78	0.022754	0.028904	0.035054	0.041204	0.047354	0.058691
79	0.025038	0.031806	0.038573	0.045341	0.052108	0.064583
80	0.027513	0.034949	0.042385	0.049821	0.057258	0.070965
81	0.030188	0.038348	0.046507	0.054667	0.062826	0.077867
82	0.033075	0.042015	0.050955	0.059895	0.068835	0.085314
83	0.036185	0.045965	0.055745	0.065526	0.075306	0.093334
84	0.039527	0.050210	0.060894	0.071577	0.082261	0.101954
85	0.043111	0.054763	0.066415	0.078068	0.089720	0.111199
86	0.046947	0.059636	0.072325	0.085014	0.097703	0.121093
87	0.051043	0.064839	0.078635	0.092431	0.106227	0.131658
88	0.055407	0.070382	0.085358	0.100333	0.115309	0.142914
89	0.060044	0.076274	0.092503	0.108732	0.124961	0.154877
90	0.064963	0.082521	0.100080	0.117638	0.135197	0.167563
91		0.089129	0.108094	0.127059	0.146023	0.180981
92			0.116549	0.136998	0.157446	0.195138
93				0.147457	0.169466	0.210036
94					0.182082	0.225672

Table A11. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.242039
96						0.259122
97						0.276902
98						0.295354
99						0.314444
100						0.336839
101						0.361264
102						0.384479
103						0.406538
104						0.427492
105						0.447389
106						0.466271
107						0.484178
108						0.501148
109						0.517211
110						0.532397
111						0.546727
112						0.560221
113						0.572889
114						0.584732
115						0.595738
116						0.605875
117						0.615073
118						0.623181
119						0.629754
120						1.000000

Table A12. Temporary Assurances, females, non-smokers – TFN00 five years select:
values of $q_{[x-t]+t}$

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
17	0.000037	0.000056	0.000075	0.000093	0.000112	0.000179
18	0.000038	0.000057	0.000077	0.000096	0.000115	0.000184
19	0.000039	0.000059	0.000078	0.000098	0.000118	0.000188
20	0.000040	0.000061	0.000081	0.000101	0.000122	0.000194
21	0.000041	0.000062	0.000083	0.000104	0.000125	0.000199
22	0.000043	0.000064	0.000086	0.000108	0.000129	0.000206
23	0.000044	0.000066	0.000089	0.000111	0.000134	0.000213
24	0.000046	0.000069	0.000092	0.000115	0.000139	0.000221
25	0.000048	0.000072	0.000096	0.000120	0.000144	0.000230
26	0.000050	0.000075	0.000100	0.000126	0.000151	0.000241
27	0.000052	0.000079	0.000105	0.000132	0.000158	0.000252
28	0.000055	0.000083	0.000110	0.000138	0.000166	0.000265
29	0.000058	0.000087	0.000117	0.000146	0.000175	0.000279
30	0.000063	0.000094	0.000125	0.000156	0.000187	0.000295
31	0.000070	0.000103	0.000135	0.000168	0.000201	0.000313
32	0.000078	0.000113	0.000148	0.000183	0.000218	0.000333
33	0.000089	0.000126	0.000163	0.000201	0.000238	0.000355
34	0.000101	0.000140	0.000180	0.000220	0.000260	0.000375
35	0.000112	0.000153	0.000195	0.000237	0.000279	0.000394
36	0.000124	0.000168	0.000213	0.000257	0.000301	0.000416
37	0.000138	0.000185	0.000232	0.000278	0.000325	0.000440
38	0.000154	0.000203	0.000253	0.000303	0.000352	0.000467
39	0.000172	0.000224	0.000277	0.000330	0.000383	0.000498
40	0.000191	0.000248	0.000304	0.000361	0.000417	0.000532
41	0.000214	0.000275	0.000335	0.000396	0.000457	0.000571
42	0.000239	0.000304	0.000370	0.000435	0.000500	0.000614
43	0.000268	0.000338	0.000409	0.000479	0.000550	0.000663
44	0.000300	0.000376	0.000453	0.000529	0.000605	0.000718
45	0.000337	0.000420	0.000502	0.000585	0.000668	0.000780
46	0.000378	0.000468	0.000559	0.000649	0.000739	0.000850
47	0.000425	0.000523	0.000622	0.000720	0.000819	0.000928
48	0.000477	0.000585	0.000692	0.000800	0.000908	0.001015
49	0.000536	0.000654	0.000773	0.000891	0.001009	0.001114
50	0.000602	0.000732	0.000862	0.000993	0.001123	0.001225
51	0.000676	0.000819	0.000963	0.001106	0.001249	0.001349
52	0.000759	0.000917	0.001076	0.001234	0.001392	0.001489
53	0.000852	0.001027	0.001202	0.001377	0.001552	0.001647
54	0.000956	0.001150	0.001343	0.001537	0.001731	0.001824

Table A12. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
55	0.001070	0.001285	0.001500	0.001715	0.001930	0.002022
56	0.001198	0.001436	0.001675	0.001914	0.002152	0.002246
57	0.001338	0.001603	0.001869	0.002134	0.002399	0.002497
58	0.001492	0.001787	0.002082	0.002378	0.002673	0.002779
59	0.001660	0.001989	0.002318	0.002647	0.002976	0.003096
60	0.001844	0.002210	0.002577	0.002944	0.003311	0.003453
61	0.002041	0.002451	0.002860	0.003269	0.003679	0.003853
62	0.002253	0.002710	0.003168	0.003625	0.004082	0.004303
63	0.002479	0.002990	0.003501	0.004012	0.004523	0.004809
64	0.002716	0.003288	0.003859	0.004430	0.005002	0.005377
65	0.002963	0.003602	0.004241	0.004880	0.005519	0.006015
66	0.003215	0.003930	0.004646	0.005361	0.006076	0.006732
67	0.003468	0.004269	0.005070	0.005871	0.006672	0.007538
68	0.003714	0.004611	0.005508	0.006405	0.007302	0.008442
69	0.003974	0.004979	0.005984	0.006989	0.007994	0.009458
70	0.004285	0.005411	0.006537	0.007663	0.008790	0.010599
71	0.004704	0.005967	0.007229	0.008491	0.009754	0.011880
72	0.005236	0.006651	0.008066	0.009481	0.010896	0.013318
73	0.005870	0.007456	0.009043	0.010629	0.012216	0.014931
74	0.006582	0.008361	0.010140	0.011919	0.013698	0.016742
75	0.007381	0.009376	0.011370	0.013365	0.015360	0.018774
76	0.008277	0.010514	0.012751	0.014988	0.017225	0.021053
77	0.009281	0.011790	0.014299	0.016807	0.019316	0.023609
78	0.010407	0.013220	0.016033	0.018846	0.021659	0.026473
79	0.011670	0.014824	0.017978	0.021132	0.024286	0.029684
80	0.013083	0.016620	0.020156	0.023692	0.027229	0.033280
81	0.014667	0.018631	0.022595	0.026559	0.030523	0.037307
82	0.016438	0.020881	0.025324	0.029767	0.034210	0.041813
83	0.018420	0.023398	0.028377	0.033356	0.038334	0.046854
84	0.020635	0.026213	0.031790	0.037367	0.042945	0.052489
85	0.023109	0.029356	0.035602	0.041848	0.048094	0.058783
86	0.025872	0.032865	0.039858	0.046851	0.053843	0.065810
87	0.028952	0.036778	0.044603	0.052428	0.060254	0.073645
88	0.032384	0.041137	0.049890	0.058643	0.067396	0.082375
89	0.036204	0.045989	0.055774	0.065560	0.075345	0.092090
90	0.040449	0.051382	0.062315	0.073247	0.084180	0.102889
91		0.057367	0.069573	0.081780	0.093986	0.114874
92			0.077618	0.091236	0.104854	0.128157
93				0.101696	0.116875	0.142850
94					0.130147	0.159072

Table A12. (continued)

Age x	Duration 0	Duration 1	Duration 2	Duration 3	Duration 4	Durations 5+
95						0.176942
96						0.196576
97						0.218089
98						0.241586
99						0.267157
100						0.295467
101						0.324026
102						0.351066
103						0.376663
104						0.400888
105						0.423806
106						0.445478
107						0.465958
108						0.485298
109						0.503543
110						0.520734
111						0.536905
112						0.552084
113						0.566290
114						0.579532
115						0.591804
116						0.603076
117						0.613278
118						0.622250
119						0.629510
120						1.000000