SOA Research Institute

Health Care Cost Trends

2006-2014 Experience Adjustments to the 2013 IDI Valuation Table Claim Termination Rates

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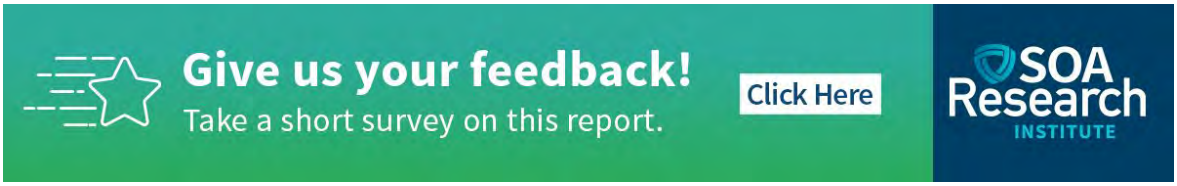

CONTENTS

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Section 1: Overview

This report was originally published in November 2021. Subsequently, an error in the derivation of model office claim reserves was discovered. This revised report corrects that error. The content in Sections 3, 4 and 5 has not changed from the original report. In section 6, the model office claim reserves were revised downward. However, the correction does not materially change the percentage change in the model office claim reserves due to the change in basis from the 2013 Individual Disability Income Valuation Table claim termination rates to claim reserves based on termination experience from years 2006 through 2014.

The Society of Actuaries' report entitled "Analysis of Claim Termination Experience from 2006 through 2014" was released in February 2021 (and subsequently revised in August 2021). This report showed that claim termination rates for certain categories of Individual Disability Income (IDI) claims were lower than what would be expected from the existing industry standard for IDI claim termination experience; i.e., the 2013 IDI Valuation Table (2013 IDIVT). The differences were most noticeable for later claim durations and claims with a lifetime benefit period.

The analyses in this report indicate that no-margin reserves using the 2006-2014 claim experience may be 22% higher for lifetime claims than no-margin reserves using the 2013 IDIVT. Similarly, no-margin reserves for to age 65 claims may be 6% higher using the 2006-2014 experience.

The primary steps involved to produce the analyses in this report include:

1. Development of the 2006-2014 IDI Experience Table (IDIET) claim termination rates, including discussion of how the IDIET should be used.
2. Development of a model office representing aggregate IDI industry claim reserves.
3. Development of no-margin reserve estimates using the 2006-2014 IDIET and comparisons of those to no-margin reserves using the 2013 IDIVT.

1.1 INTRODUCTION

The purpose of this study is to provide a practical set of changes to the claim termination rates (CTRs) of the 2013 Individual Disability Income Valuation Table to reflect key industry individual disability income (IDI) claim experience trends from 2006 through 2014. The goal was to have the resulting 2006-2014 IDIET in a workable format to facilitate its implementation.

The 2006-2014 claim termination experience has been previously documented in a report prepared by the Individual Disability Experience Committee (IDEC) of the Society of Actuaries (SOA), titled "Analysis of Claim

Termination Experience from 2006 through 2014,"[1] which is referred to as the "IDEC 2006-2014 IDI Claim Termination Experience Report" throughout this report. Although relevant information from this report is provided here to support the recommended adjustments to the 2013 IDIVT, readers are encouraged to access the IDEC 2006-2014 IDI Claim Termination Experience Report in order to gain greater insight into IDI claim termination trends over this period of time.

CTR experience in the years 2006-2014 was substantially different than the 2013 IDIVT, which covered the experience years from 1990 to 2007, and the data is more credible, especially in the ultimate durations. The 2006-2014 IDIET CTRs provided in this report consist of:

1. CTR modifiers applied to the 2013 IDIVT CTRs in the select claim durations; i.e., claim years 1 – 10.

   To derive the 2006-2014 IDIET CTRs for the select claim durations, the current set of three CTR modifiers, found in Appendix A, is first applied to the 2013 IDIVT base rates. The newly derived set of five 2006-2014 CTR modifiers must then be multiplied to these rates. Please note, the 2006-2014 IDIET CTR modifier by indemnity amount is a new variable to incorporate. There is no CTR modifier in the 2013 IDIVT that has indemnity amount as a variable.

2. New CTRs in the ultimate claim durations; i.e., claim years 11+, to replace the 2013 IDIVT ultimate CTRs.

   The 2006-2014 IDIET CTRs for the ultimate claim durations consist of completely new base CTRs, as opposed to adjustments to the 2013 IDIVT ultimate CTRs. The new ultimate CTRs vary by attained age, gender, occupation class (M and non-M), and benefit period (lifetime and non-lifetime). Please note, benefit period was not a variable in the 2013 IDIVT ultimate CTRs. In addition, a set of CTR modifiers by indemnity amount is applied to the new ultimate CTRs. This is different from the 2013 IDIVT, which has no CTR modifiers in the ultimate claim durations.

The structure and development of the 2006-2014 IDIET CTRs are described in sections 3, 4 and 5.

The 2006-2014 IDIET is not intended to represent an official SOA experience table. It has not gone through several of the steps that are normally appropriate for an official table, such as graduation and industry review. It is intended to assist companies in their own evaluation of industry experience for reserve adequacy testing. It is not intended to replace companies' own evaluations. There is no official or statutory requirement for companies to use the 2006-2014 IDIET for this purpose. The 2006-2014 IDIET does not replace the 2013 IDIVT as a statutory minimum reserve basis for IDI claims.

In addition to the development of the 2006-2014 IDIET, a model office representing all of the open IDI claims in the industry as of 12/31/2014 was developed from the 2006-2014 IDI experience study claim database. This model office was then used to compare claim reserves based on the 2006-2014 IDIET to claim reserves based on the 2013 IDIVT. Development of the model office and the resulting claim reserve comparisons are discussed in section 6.

[1] IDEC, "Analysis of Claim Termination Experience from 2006 through 2014, the Society of Actuaries, February 2021 – Revised August 2021, "https://www.soa.org/globalassets/assets/files/resources/experience-studies/2021/2021-08-update-analysis-claim-termination-report.pdf

1.2 BACKGROUND

The IDEC 2006-2014 Claim Termination Experience Report provides a comprehensive analysis of IDI experience from 2006 through 2014. The analysis is presented mostly in terms of actual-to-expected ("A/E") claim termination ratios where the expected basis consists of the 2013 IDIVT base termination rates multiplied by the valuation CTR modifiers (provided in Appendix A). This expected CTR basis, before the application of valuation margins, was intended to represent average industry IDI CTR experience from 1990 through 2007.

The following are the major conclusions from the 2006-2014 Claim Termination Experience Report pertaining to the select claim durations:

- The A/E claim termination ratios generally declined by claim duration. The A/E ratios were over 100% in the first claim year. The decline was modest and not steady during the first 24 claim months but, subsequently, the A/E ratios decreased steadily, reaching 63% of the 2013 IDIVT for years 6 through 10.
- A/E claim termination ratios for claims with long-term benefit periods (i.e., To Age 65-70 and a lifetime benefit period) varied by the IDEC occupation classes. Occupation class M had the highest A/E claim termination ratio at 98% averaged over all the select durations. The combined blue-collar occupation classes (3–4) had the lowest average A/E ratio at 79%.
- The presence of cost-of-living-adjustment (COLA) benefits did not appear to have a significant impact on claim termination rates over the select durations during the 2006–2014 study period for claims with long-term benefit periods, i.e., To Age 65-70 and a lifetime benefit period. This is different from the 1990-2006 experience, which showed that the presence of COLA benefits tended to decrease CTRs during the select durations.
- The A/E claim termination ratios for the 2006–2014 study period decreased steadily as the monthly indemnity per claim record increased.

The following are the major conclusions from the 2006-2014 Claim Termination Experience Report pertaining to the ultimate claim durations:

- The A/E claim termination ratios in the ultimate durations of the 2006-2014 IDEC study were considerably lower than those observed in the prior IDEC study (1990-2007). These differences were similar to the ratios for select durations 6 to 10.
- The A/E termination ratios in the ultimate claim durations were consistently higher for non-lifetime benefit periods than for a lifetime benefit period.
- As observed in the select claim durations, the A/E claim termination ratios in the ultimate durations for the 2006–2014 study period decreased steadily as the monthly indemnity per claim increased.

The select and ultimate differences noted above are substantial and lead to the conclusion that the 2013 IDIVT does not adequately reflect the 2006-2014 experience. It is not a simple exercise for a company to adjust the 2013 IDIVT to reflect the 2006-2014 experience directly from the 2006-2014 Claim Termination Report, as the different variables interact with each other. Consequently, the IDEC undertook that task, which has resulted in this report as well as the aforementioned 2006-2014 IDIET.

1.3 SCOPE

The 2006-2014 IDIET applies to accident and sickness ("A&S") IDI claims only, which comprise over 96% of the claim exposure in the 2006-2014 IDEC claim database. Experience-based CTR modifiers were not developed for the other contract types, e.g., business overhead expense, disability buy-out, accident only, etc. The comparison of claim reserves based on the 2006-2014 IDIET to those based on the 2013 IDIVT applies only to A&S claims.

Section 2: Summary of Results

This report discusses two separate but related topics.

The first topic is the 2006-2014 IDIET claim termination rates. The report discusses the structure of the 2006-2014 IDIET CTRs in section 3. Sections 4 and 5 discuss how the 2006-2014 IDIET termination rates were constructed for the select and ultimate durations, respectively.

The second topic is the potential impact of the 2006-2014 IDIET CTRs on claim reserves, relative to the 2013 IDIVT. First, a proxy model office was constructed, comprised of open claims as of 12/31/2014 from the IDEC claim database. Then, analyses were performed to identify the potential impact across various parameters of the 2006-2014 IDIET on the model office claim reserves. The report discusses these in section 6.

2.1 2006-2014 IDIET CLAIM TERMINATION RATES

2.1.1 STRUCTURE OF THE 2006-2014 IDIET

In the select durations, the 2006-2014 IDIET CTRs were equal to the 2013 IDIVT base CTRs times the 2013 IDIVT CTR modifiers times the 2006-2014 IDIET CTR modifiers. The 2006-2014 IDIET CTR modifiers in the select durations consist of five sets of factors for the select durations:

1. Onset age and gender modifiers
2. Occupation class modifiers
3. Diagnosis risk mapping modifiers
4. COLA and benefit period modifiers
5. Indemnity amount modifiers

The formula to calculate the 2006-2014 IDIET select CTRs is:

> *The 2006-2014 IDIET select CTRs = the 2013 IDIVT base CTRs x the 2013 IDIVT Select CTR modifiers x the 2006-2014 IDIVT Select CTR modifiers*

The formula to calculate the 2006-2014 IDIET ultimate CTRs is:

> *The 2006-2014 IDIET ultimate CTRs = 2006-2014 IDIET base CTRs x the 2006-2014 IDIVT CTR ultimate indemnity modifiers*

Each of the 2006-2014 IDIET CTR modifiers, except the COLA and benefit period set, varied by claim duration. Each of the 2006-2014 IDIET modifiers, except the onset age and gender set, produced aggregate A/E claim termination ratios of 100%.

For the ultimate claim durations, the 2006-2014 experience patterns were so different from the patterns underlying the 2013 IDIVT that a different approach was used. A completely new set of 2006-2014 IDIET base CTRs was developed directly from the 2006-2014 termination study data.

The process used for developing the new ultimate base CTRs actually consisted of developing ultimate recovery and mortality rates separately, and then combining these to form the new ultimate CTRs. The new set of ultimate base CTRs varies by attained age, gender, occupation class (M and non-M) and benefit period (lifetime and non-lifetime). CTR modifiers by indemnity amount are subsequently applied to the ultimate base CTRs to reflect lower termination experience from claims with higher indemnity amounts. Benefit period and indemnity amount are new variables for the ultimate claim durations; they were not reflected in the 2013 IDIVT ultimate claim durations.

2.1.2 CONSTRUCTION OF THE 2006-2014 IDIET

Select Durations

The 2006-2014 IDIET CTR modifiers for the select claim durations were applied to the 2013 IDIVT CTRs (after the application of the 2013 IDIVT CTR claim modifiers), to represent average IDI industry claim termination experience from 2006 through 2014.

The 2006-2014 IDIET CTR modifiers were developed using a database constructed from the 2006-2014 IDI experience study data. Experience was measured in terms of A/E claim termination ratios on a claim count basis. (Note: Since one of the sets of modifiers is by indemnity amount, the aggregate impact of the 2006-2014 IDIET validates to 2006-2014 experience by amount.)

The basic approach was to calculate A/E termination ratios for each potential key variable, where the expected basis was the 2013 IDIVT CTRs, after application of the 2013 IDIVT CTR claim modifiers. If A/E results for that variable varied significantly from 100%, a set of IDIET CTR modifiers was developed to bring results for that variable back to 100%. Generally, credibility adjustments and data smoothing were not used in the determination of the 2006-2014 CTR modifiers. This resulted in five sets of modifiers addressing a total of seven variables. Other variables were also analyzed, but their experience did not require additional sets of modifiers.

For ease of administrative update, four of the new select duration IDIET modifiers all use formats and ranges that are consistent with those currently used. The new IDIET modifier for indemnity amount introduces amount bands that were not used in the 2013 IDIVT.

The table of onset age/gender modifiers was calculated first, to better represent the overall change in IDI experience between the 1990-2007 study period and the 2006-2014 study period. The other modifier tables were then all derived so as to produce an aggregate A/E termination ratio that was close to 100% when weighted by exposure (count). In other words, each of the last four modifier tables, including the indemnity table, had an overall neutral impact on the aggregate A/E termination ratio.

The most notable aspects of the 2006-2014 IDIET CTR modifiers for the select durations are:

- CTR modifiers by onset age and gender steeply decreased after the first two years of disability.
- CTR modifiers by occupation class generally decreased slightly going from occupation class M to classes 1, 2, 3 and 4, for the first five years of disability.
- CTR modifiers by diagnosis risk mapping category widened the range from the “very low” category to the “very high” category.
- CTR modifiers by COLA and benefit period essentially offset the COLA differential that was in the 2013 IDIVT.
- CTR modifiers by benefit amount consistently decreased as benefit amount increased.

Ultimate Durations

The 2006-2014 IDIET CTRs for the ultimate durations consist of a set of base CTRs that vary by attained age, gender, occupation class (M and non-M) and benefit period (lifetime and non-lifetime), plus a set of CTR modifiers that vary by indemnity amount. Construction of the new set of ultimate CTRs involved the separate development of ultimate mortality and recovery rates, which were then combined to get the ultimate CTRs. For the valuation of aggregate IDI industry claim reserves in section 6, only the combined CTRs were used. The ultimate mortality rates and recovery rates are provided in Appendix C, along with the ultimate CTRs.

The most notable aspect of the new ultimate CTRs is that they were substantially lower than the corresponding 2013 IDIVT CTRs. The differences generally increased as attained age increased. Furthermore, ultimate CTRs for claims with a lifetime benefit period were generally lower than those with non-lifetime benefit periods. The 2006-2014 IDIET CTR indemnity amount CTR modifiers for the ultimate claim durations consistently decreased as indemnity amount increased in a pattern very similar to the select indemnity amount CTR modifiers.

2.2 CLAIM RESERVE IMPACT

A model office was constructed to evaluate the impact of the 2006-2014 IDIET versus the 2013 IDIVT on claim reserves. The model office approximated the distribution of overall U.S. IDI industry claim reserves as of 12/31/2014 across multiple variables. It was calculated using an inventory of IDI A&S claims open as of 12/31/2014 from the 2006-2014 IDEC study claim database. The model office consists of 19,820 cells, representing 44,572 claims with a combined indemnity of $76,999,200.

For the most part, claim reserves used in this comparison were intended to be "realistic" claims reserves, i.e., the CTRs were not reduced by valuation margins. The valuation interest rates were held at 3% for all claims, regardless of year of incurral. This allowed differences in claim reserves due to the change in the valuation CTR basis to be more in focus. Other simplifying assumptions were incorporated to facilitate the claim reserve calculations, which are discussed in section 6.

Model office claim reserves calculated using the 2006-2014 IDIET resulted in a substantial (16%) increase in claim reserves over reserves calculated using the 2013 IDIVT base CTRs. The most notable finding from the analyses was that the increase in claim reserves became substantially higher as benefit periods lengthened. This pattern is shown in Table 2.1 below.

Table 2.1

MODEL OFFICE CLAIM RESERVES – 2013 IDIVT VERSUS 2006-2014 IDIET BY BENEFIT PERIOD ($ MILLIONS)

Benefit Period	2013 IDIVT	2006-2014 IDIET	Increase in Claim Reserves	% Increase
Short-term	295	298	3	1.1%
To Age 65	3,950	4,167	217	5.5%
Lifetime	6,329	7,706	1,377	21.8%
Total	**10,574**	**12,171**	**1,597**	**15.1%**

Section 6 discusses changes in the model office claim reserves due to the change in the valuation basis across several variables:

- Of the 15% increase in claim reserves due to changing the basis from the 2013 IDIVT to the 2006-2014 IDIET, 13% was due to changes to the ultimate CTRs and only 2% was due to changes in the select CTRs.
- Occupation class had a relatively minor impact compared to benefit period on the percentage increase in claim reserves.
- As expected, the percentage change in claim reserves increased as the indemnity amount increased.
- By claim duration, model office claim reserve increases did not appear to show distinct patterns when looked at within each of the benefit period categories.

- Percentage increases in the model office reserves showed minor patterns by onset age and gender within each of the three benefit period categories.

2.3 CONCLUSIONS

The development of the 2006-2014 IDIET provides considerable understanding into how IDI claim termination experience has changed over the years since the 2013 IDIVT, particularly in later claim durations, which was based on experience from 1990 through 2007. The underlying data is of higher quality and quantity and provides new insights. In particular, the experience has definitely shown significant variation by benefit period, indemnity amount, attained age and claim duration.

The analyses in this report have focused on claim reserves. The committee has not taken a position on the appropriateness of the 2006-2014 IDIET for policy reserves. The 2006-2014 IDIET does not replace the 2013 IDIVT as a statutory minimum valuation basis for claim reserves. Consideration of whether the 2013 IDIVT should be replaced is outside the scope of this report. However, the committee believes that the 2006-2014 IDIET is a more appropriate industry benchmark for claim reserves than the 2013 IDIVT for companies to use when determining their own experience-based claims reserves.

Section 3: Structure of the 2006-2014 IDIET

This section describes the structure of the 2006-2014 IDIET. One goal in its development was to keep the structure of the 2006-2014 IDIET as consistent with the structure of the 2013 IDIVT as was practical, so as to simplify implementation.

3.1 SELECT CLAIM DURATIONS

The 2006-2014 IDIET CTRs in the select claim durations were derived by applying new CTR modifiers to the 2013 IDIVT CTRs after the application of the 2013 IDIVT CTR modifiers. The 2013 IDIVT CTR modifiers are provided in Appendix A; the 2006-2014 IDIET CTR modifiers are provided in Appendix B and are described below. The new CTR modifiers do not replace the 2013 IDIVT CTR modifiers but are applied along with the 2013 IDIVT CTR modifiers to the 2013 IDIVT base CTRs.

The 2006-2014 IDIET CTRs = the 2013 IDIVT base CTRs x the 2013 IDIVT CTR modifiers x the 2006-2014 IDIET CTR modifiers

The 2006-2014 IDIET CTR modifiers in the select claim durations are presented below, and their development is discussed in section 4.

3.1.1 ONSET AGE AND GENDER CTR MODIFIERS

Table 3.1 provides the disability age and gender CTR modifiers, which vary by claim duration.

Table 3.1
2006-2014 IDIET CTR MODIFIERS – ONSET AGE AND GENDER (SELECT DURATIONS ONLY)

Claim Duration	Under 35	35-39	40-44	45-49	50-54	55-59	60-64	65 & Over
Female								
Year 1	95.0%	96.9%	80.3%	83.4%	90.0%	98.3%	113.0%	137.7%
Year 2	71.4%	58.5%	69.1%	72.7%	80.2%	90.5%	92.6%	98.5%
Years 3-5	69.0%	61.5%	65.7%	70.1%	58.0%	68.5%	86.7%	37.2%
Years 6-10	62.0%	61.4%	51.3%	60.4%	58.2%	60.9%	50.5%	70.2%
Male								
Year 1	114.3%	109.1%	113.4%	106.5%	106.5%	102.5%	98.2%	110.4%
Year 2	81.2%	85.7%	81.3%	96.5%	93.4%	88.3%	94.8%	100.1%
Years 3-5	73.7%	80.0%	77.8%	73.2%	62.9%	58.6%	78.1%	98.6%
Years 6-10	62.8%	64.2%	59.4%	47.6%	56.9%	66.6%	76.5%	39.8%

3.1.2 OCCUPATION CLASS CTR MODIFIERS

Table 3.2 provides the occupation class CTR modifiers, which vary by claim durations.

Table 3.2
2006-2014 IDIET CTR MODIFIERS – OCCUPATION CLASS (SELECT DURATIONS ONLY)

Claim Duration	Occupation Class M	Occupation Class 1	Occupation Class 2	Occupation Classes 3-4
Year 1	106.3%	98.7%	87.5%	87.5%
Year 2	111.2%	92.8%	95.0%	95.0%
Years 3-5	108.3%	96.5%	93.4%	93.4%
Years 6-10	99.1%	101.4%	101.9%	101.9%

3.1.3 DIAGNOSIS RISK MAPPING CTR MODIFIERS

Table 3.3 provides the diagnosis risk mapping CTR modifiers, which vary by claim duration.

Table 3.3
2006-2014 IDIET CTR MODIFIERS – DIAGNOSIS RISK MAPPING (SELECT DURATIONS ONLY)

Claim Duration	Very Low	Low	Mid	High	Very High
Year 1	87.9%	91.7%	93.8%	124.4%	100.5%
Year 2	85.6%	79.8%	92.5%	116.8%	137.1%
Years 3-5	102.2%	94.8%	81.6%	77.2%	177.3%
Years 6-10	99.7%	82.2%	96.1%	87.1%	189.0%

3.1.4 COLA AND BENEFIT PERIOD CTR MODIFIERS

Table 3.4 provides the COLA and benefit period CTR modifiers

Table 3.4
2006-2014 IDIET CTR MODIFIERS – COLA AND BENEFIT PERIOD (SELECT DURATIONS ONLY)

COLA Rider	Short-term	To Age 65-70	Lifetime
No	94.3%	93.5%	108.7%
Yes	89.3%	111.9%	104.4%
Unknown	100.0%	100.0%	100.0%

There was a small volume of claims for which the presence of a COLA rider was not known by the contributors. It was decided that it would not be appropriate to reflect the actual experience of these claims in the 2006-2014 IDIET modifiers. Rather, the CTR modifiers for claims with unknown COLA presence were set to 100%.

3.1.5 INDEMNITY AMOUNT CTR MODIFIERS FOR SELECT DURATIONS

Table 3.5 provides the indemnity amount CTR modifiers, which vary by claim duration. Indemnity amount is a new variable for the IDI CTR modifiers; it was not reflected in the 2013 IDIVT CTR modifiers.

Table 3.5
2006-2014 IDIET CTR MODIFIERS – INDEMNITY AMOUNT (SELECT DURATIONS ONLY)

Claim Duration	Under $2,500	$2,500 - 4,999	$5,000-7,499	$7,500 & Over
Year 1	108.9%	101.1%	98.0%	92.7%
Year 2	109.2%	108.7%	100.6%	91.4%
Years 3-5	110.4%	101.8%	90.9%	86.0%
Years 6-10	109.9%	101.7%	92.0%	80.2%

It is important to point out that indemnity amount is derived at the policy level. It does not combine the indemnity amounts of multiple claims on any claimant who was disabled under multiple policies at the same time. For example, a claim with a $2,500 indemnity amount from one IDI policy could be for a claimant that has a second claim under another IDI policy for $5,000. In total, the combined claimant's indemnity amount is $7,500, but the IDEC claim database is unable to combine these two claims.

3.2 ULTIMATE CLAIM DURATIONS

Rather than developing CTR modifiers to be applied to the 2013 IDIVT ultimate CTRs, a completely new set of ultimate base CTRs was developed for the 2006-2014 IDIET. These CTRs replace the 2013 IDIVT ultimate CTRs. The development of the 2006-2014 IDIET ultimate base CTRs is discussed in section 5. A new CTR modifier by indemnity amount was subsequently applied to the new ultimate base CTRs to reflect lower termination experience from claims with higher indemnity amounts.

3.2.1 ULTIMATE BASE CTRS

In addition to variations by attained age, gender and occupation class (M and non-M), the 2006-2014 IDIET ultimate base CTRs also varied by benefit period (lifetime and non-lifetime). Ultimate mortality and recovery CTRs were calculated separately, and then combined to develop the ultimate CTRs. The combined ultimate base CTRs are provided in Appendix C. The ultimate mortality and recovery components of the base CTRs are also provided in Appendix C for informational purposes.

Table 3.6 shows the weighted average ratios of 2006-2014 IDIET ultimate base CTRs to 2013 IDIVT ultimate CTRs by attained age, benefit period, occupation class and gender, where the weights are based on the 2006-2014 exposures (by count). The weighted age ratios were split between attained ages under 65 and attained ages 65 and over. The ratios in Table 3.6 are before the CTR modifiers by indemnity amount (discussed in 3.2.2) were applied.

Table 3.6

WEIGHTED AVERAGE RATIOS OF 2006-2014 IDIET ULTIMATE BASE CTRS TO 2013 IDIVT ULTIMATE CTRS WEIGHTED BY 2006-2014 EXPOSURE (BY COUNT)

Benefit Period	Occupation Class	Attained Ages Under 65		Attained Age 65 & Over		All Attained Ages Combined	
		Male	Female	Male	Female	Male	Female
Non-lifetime	M	75%	85%	78%	61%	75%	84%
Non-lifetime	Non-M	79%	86%	94%	79%	81%	86%
Lifetime	M	60%	71%	57%	49%	58%	63%
Lifetime	Non-M	59%	67%	78%	64%	72%	65%

Depending on the combination of benefit period, occupation class and gender, the weighted average ratio of 2006-2014 IDIET ultimate CTRs to 2013 IDIVT ultimate CTRs for all attained ages combined ranges from 58% (for a lifetime benefit period, occupation class M, male) to 86% (non-lifetime benefit periods, occupation class non-M, females).

3.2.2 INDEMNITY AMOUNT CTR MODIFIERS FOR ULTIMATE DURATIONS

Table 3.7 shows the CTR modifiers by indemnity amount that were applied to the 2006-2014 IDIET CTRs. These modifiers varied only by the indemnity amount of the policy.

Table 3.7
2006-2014 IDIET CTR MODIFIERS – INDEMNITY AMOUNT (ULTIMATE DURATIONS ONLY)

Indemnity Amount	CTR Modifier
Under $2,500	105.0%
$2,500 - 4,999	90.0%
$5,000 - 7,499	90.0%
$7,500 & Over	70.0%

As in select claim durations, indemnity amount in the ultimate durations is derived at the policy level. It does not combine the indemnity amounts on a claimant who was disabled under multiple policies at the same time.

Section 4: Development of the 2006-2014 IDIET CTR Modifiers for the Select Durations

This section describes the development of the 2006-2014 IDIET CTR modifiers for the select durations. They are applied to the 2013 IDIVT CTRs after the application of the 2013 IDIVT CTR claim modifiers to represent average industry claim termination experience from 2006 through 2014. The 2013 IDIVT CTR modifiers are provided in Appendix A, and the 2006-2014 IDIET CTR modifiers are provided in Appendix B.

4.1 AGGREGATED CLAIM DATA

Experience was measured in terms of A/E claim termination ratios on a count basis. Since there is a separate indemnity amount CTR modifier, the aggregate impact of the 2006-2014 IDIET table validates to 2006-2014 experience by amount. The expected basis for the A/E termination ratios is the 2013 IDIVT CTRs after the application of the 2013 IDIVT claim modifiers.

The following records were excluded from the aggregated claim database:

- All claims incurred in years 2005 and 2015, which were viewed as potentially incomplete.
- Experience of claims with short-term benefit periods of two years or less for claim duration months 25-30 claims with mid-term benefit periods and claim years 6+, as these were viewed as highly likely to contain claim expiries inappropriately labeled as claim terminations.
- Claims with lifetime or to age 65-70 benefit periods that were incurred after age 70, as these records were viewed as potential mis-codings.

Table 4.1 below shows the A/E claim termination ratios by calendar year and each year's percentage of exposure by claim count. Calendar years 2005 and 2015 are included in Table 4.1 for information purposes but were excluded in the development of the 2006-2014 IDIET CTR modifiers.

Table 4.1

A/E CLAIM TERMINATION RATIOS AND PERCENT OF TOTAL EXPOSURE (BY CLAIM COUNT) FOR YEARS 2005 THROUGH 2015

Year	A/E	% of Exposure
2005	89%	2%
2006	98%	10%
2007	102%	10%
2008	99%	10%
2009	94%	10%
2010	100%	10%
2011	98%	10%
2012	96%	10%
2013	95%	10%
2014	100%	9%
2015	94%	9%
Total	**98%**	**100%**

Table 4.2 below shows the A/E claim termination ratios of the excluded records in years 2006 through 2014. These records comprise less than 2% of the total exposure and have A/E materially higher than the other records.

Table 4.2
A/E CLAIM TERMINATION RATIOS AND PERCENT OF TOTAL EXPOSURE (BY CLAIM COUNT) FOR ALL EXCLUDED RECORDS IN YEARS 2006 THROUGH 2014

Year	A/E	% of Exposure
2006	187%	0.20%
2007	160%	0.20%
2008	152%	0.20%
2009	121%	0.20%
2010	143%	0.20%
2011	111%	0.20%
2012	124%	0.20%
2013	135%	0.20%
2014	107%	0.20%
Total	**137%**	**1.60%**

Claim durations in the aggregate claim database were grouped consistently with the 2013 IDIVT groupings, i.e., months 1 to 60 for the first five claim years and annual durations thereafter.

Claim exposure was derived as follows:

- Full exposure was used for durations in which claim terminations occurred.
- Partial exposure was used in durations in which claim expiries occurred.
- Exposure was used only for periods of time following the start of the elimination period.
- Claim settlements were exposed through the claim paid-through date, but not counted as claim terminations.
- Exposure started at the later of the January 1, 2006 or end of elimination period.
- Exposure ended at the later of paid-through date (not the claim termination process date) or date of policy expiry.
- No claim was exposed past December 31, 2014.
- If a claim closed and subsequently reopened (and paid additional benefit), the initial occurrence of termination was not counted. Exposure amount was extended to reflect the period of time the claim was reopened.

Only recoveries and deaths were counted as claim terminations. All other termination types (e.g., settlements, commutations, expiries) contributed exposure but were not counted as claims terminations.

The following data fields were used to determine the 2013 IDIVT claim termination expectations for select durations:

- Gender
- Onset age (i.e., age at disability) – Under 30, 30 to 34, 35 to 39, …, 90 to 94
- Elimination Period – 0, 7, 14, 30, 60, 90, 180, 360, 720 days
- IDEC occupation class – M, 1, 2, 3, 4
- Cost-of-living adjustment (COLA) rider – Yes, No, Unknown. Note the amount of the COLA increase or method was not known.
- Policy type – Accident Only, Accident and Sickness, Business Overhead Expense, Key Person, Disability Buy-Out, Other/Unknown

- Benefit period – short-term, To Age 65-70, lifetime
- 2013 IDIVT diagnosis groupings – Very Low, Low, Mid, High, Very High
- Claim durations – M01 to M60, then Y06 to Y99

Additional data fields were included for the purpose of potentially reflecting new variables in the 2006-2014 IDIET claim modifiers:

- Diagnosis groupings - alcohol and drug, back, cancer, circulatory, diabetes, digestive, ill-defined and miscellaneous conditions, infectious diseases, injury other than back, maternity, mental nervous, other musculoskeletal, respiratory, other and unknown
- Attained age groupings – under 30, 30-34, 35-39, …, 90-94
- Indemnity amount groupings – under $2,500, $2,500 to $4,999, $5,000 to $7,499, $7,500 to $9,999, $10,000 to $14,999, $15,000 to $19,999, $20,000 and over

The following data fields were calculated:

- Exposure by claim count and amount
- Recovery by claim count and amount
- Deaths by claim count and amount
- Expiry by claim count and amount
- 2013 IDIVT expected terminations by claim count and amount – after the application of 2013 IDIVT claim modifiers
- 2013 IDIVT expected terminations by claim count and amount – after the application of 2013 IDIVT claim modifiers and the 2006-2014 IDIET CTR modifiers

Consistent with the development of the 2006-2014 claim database, the exposure records were modified to dampen the impact of one large contributor's data submission.

4.2 2006-2014 IDIET CTR MODIFIER DEVELOPMENT

A/E termination ratios were calculated for each key variable. If A/E results for that variable varied significantly from 100%, an IDIET CTR modifier was developed to bring results for that variable back to 100%. No credibility or smoothing were considered in the determination of the factors.

For ease of administrative update, the four select IDIET CTR modifiers do not require any splits that were not used in the 2013 IDIVT. The new IDIET modifier, indemnity amount, introduces amount bands that were not used in the 2013 IDIVT.

The 2006-2014 IDIET has five sets of CTR modifiers, in addition to those already applied to the 2013 IDIVT for the select durations:

1. Onset Age and Gender
   - Claim duration groups - Year 1, Year 2, Years 3-5 and Years 6-10.
   - Ages under 30 and 30-34 were grouped to increase credibility. Likewise, ages 65 and older were grouped together.
2. Occupation Class
   - Claim duration groups - Year 1, Year 2, Years 3 to 5 and Years 6 to 10.
   - Occupation classes 2, 3 and 4 share experience modifiers to increase credibility of these cells.
3. Diagnosis Risk Mapping
   - Claim duration groups - Year 1, Year 2, Years 3- 5 and Years 6- 10.
   - CTR modifiers for the five 2013 IDIVT risk mappings (i.e., Very Low, Low, Mid, High and Very High). If diagnosis is not known or present on a claim, the CTR modifier should be set to 1.00.

4. COLA and Benefit Period
   - No claim duration split was used as the A/E was reasonably consistent across durations.
   - If COLA status is unknown, the CTR modifier should be set to 1.00.
5. Indemnity Amount
   - Indemnity amounts $7,500 and over were grouped together to increase credibility.

The indemnity amount is a new IDIET CTR modifier introduced in order to better reflect the 2006-2014 IDI claim termination experience. The 2013 IDIVT claim modifiers did not use indemnity amount as a variable.

The onset age/gender CTR modifiers were calculated first to adjust the 2013 IDIVT base CTRs to better represent the overall change in IDI experience between the 1990-2007 study period and the 2006-2014 study period. All the subsequent CTR modifier tables were derived to produce an aggregate A/E termination ratio that is close to 100% when weighted by (count) exposure. As a result, the last four 2006-2014 IDIET CTR modifiers have an overall neutral impact on the aggregate A/E termination ratio.

4.3 SELECT A/E TERMINATION RATIOS, BEFORE AND AFTER THE IDIET CTR MODIFIERS

The impact of each of the 2006-2014 IDIET CTR modifiers on A/E termination ratios are discussed below.

For each of the five sets of CTR modifiers, the 2006-2014 experience is shown below as A/E ratios, using two different expected bases. The first expected basis is the 2013 IDIVT (with original IDIVT modifiers), which basically shows what the IDIET CTR modifiers need to be. The second expected basis is the 2006-2014 IDIET. The results in the tables confirm that, by applying the new CTR modifiers to the 2013 IDIVT (with original modifiers), the 2006-2014 IDIET CTRs validate to the aggregate 2006-2014 experience (i.e., A/E target ratios that are close to 100%).

4.3.1 ONSET AGE AND GENDER

Table 4.3 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by gender. Males represented over 70% of the study's exposure.

Table 4.3

COMPARISON OF A/E TERMINATION RATIOS BY GENDER - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
Females			
Year 1	101%	100%	4.80%
Year 2	90%	100%	4.40%
Years 3-5	78%	100%	9.10%
Years 6-10	66%	100%	10.60%
Total	**94%**	**100%**	**29.00%**
Males			
Year 1	107%	100%	12.70%
Year 2	100%	100%	11.60%
Years 3-5	75%	100%	22.20%
Years 6-10	65%	100%	24.50%
Total	**99%**	**100%**	**71.00%**

*Expected bases include modifiers, as found in Appendices A and B.

For males, the 2013 IDIVT A/E ratio in year 1 indicates the need for 2006-2014 IDIET CTR modifiers greater than 100% to better reflect 2006-2014 experience. The female 2013 IDIVT A/E ratios are a good fit for year 1 but require downward modification in year 2. Years 3-5 and years 6-10 require material adjustments downward for both genders.

Table 4.4 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios for females by onset age grouping.

Table 4.4

COMPARISON OF FEMALE A/E TERMINATION RATIOS BY ONSET AGE - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure	2013 IDIVT	2006-2014 IDIET	% of Exposure
	Onset Ages Under 35			Onset Ages 50-54		
Year 1	106%	100%	0.30%	96%	100%	1.00%
Year 2	86%	100%	0.20%	91%	100%	1.00%
Years 3-5	80%	100%	0.40%	69%	100%	2.20%
Years 6-10	72%	100%	0.50%	67%	100%	2.80%
Total	**101%**	**100%**	**1.30%**	**89%**	**100%**	**6.90%**
	Onset Ages 35-39			Onset Ages 55-59		
Year 1	106%	100%	0.30%	104%	100%	1.10%
Year 2	71%	100%	0.30%	102%	100%	1.00%
Years 3-5	75%	100%	0.60%	79%	100%	2.20%
Years 6-10	71%	100%	1.10%	69%	100%	1.70%34-39)
Total	**95%**	**100%**	**2.30%**	**99%**	**100%**	**6.00%**
	Onset Ages 40-44			Onset Ages 60-64		
Year 1	88%	100%	0.50%	118%	100%	0.80%
Year 2	83%	100%	0.50%	102%	100%	0.70%
Years 3-5	77%	100%	1.20%	98%	100%	0.80%
Years 6-10	58%	100%	2.00%	57%	100%	0.10%
Total	**83%**	**100%**	**4.20%**	**113%**	**100%**	**2.40%**
	Onset Ages 45-49			Onset Ages 65 & Over		
Year 1	90%	100%	0.70%	140%	100%	0.10%
Year 2	84%	100%	0.70%	107%	102%	0.10%
Years 3-5	82%	100%	1.70%	42%	100%	0.00%
Years 6-10	69%	100%	2.40%			0.00%
Total	**86%**	**100%**	**5.60%**	**135%**	**100%**	**0.20%**

* Expected bases include modifiers, as found in Appendices A and B.

Table 4.5 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios for males by onset age grouping.

Table 4.5

COMPARISON OF MALE A/E TERMINATION RATIOS BY ONSET AGE - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure	2013 IDIVT	2006-2014 IDIET	% of Exposure
	Onset Ages Under 35			Onset Ages 50-54		
Year 1	122%	100%	0.20%	111%	100%	2.40%
Year 2	91%	100%	0.20%	103%	100%	2.30%
Years 3-5	82%	100%	0.30%	70%	100%	5.30%
Years 6-10	70%	100%	0.40%	63%	100%	7.50%
Total	**107%**	**100%**	**1.20%**	**98%**	**100%**	**17.50%**
	Onset Ages 35-39			Onset Ages 55-59		
Year 1	116%	100%	0.40%	105%	100%	3.50%
Year 2	98%	100%	0.30%	96%	100%	3.30%
Years 3-5	89%	100%	0.70%	66%	100%	7.20%
Years 6-10	69%	100%	1.10%	73%	100%	6.50%
Total	**104%**	**100%**	**2.40%**	**96%**	**100%**	**20.50%**
	Onset Ages 40-44			Onset Ages 60-64		
Year 1	121%	100%	0.70%	99%	100%	3.30%
Year 2	91%	100%	0.70%	102%	100%	2.80%
Years 3-5	85%	100%	1.70%	86%	100%	3.70%
Years 6-10	65%	100%	3.00%	79%	100%	0.90%
Total	**102%**	**100%**	**6.10%**	**98%**	**100%**	**10.70%**
	Onset Ages 45-49			Onset Ages 65 & Over		
Year 1	112%	100%	1.40%	111%	100%	0.90%
Year 2	108%	100%	1.40%	107%	100%	0.70%
Years 3-5	81%	100%	3.20%	107%	100%	0.10%
Years 6-10	53%	100%	5.00%	39%	100%	0.00%
Total	**99%**	**100%**	**11.00%**	**111%**	**100%**	**1.60%**

* Expected bases include modifiers, as found in Appendices A and B.

The previous two tables show that the 2006-2014 IDIET CTR modifiers align the CTRs to the observed experience by attained age bands for each gender.

4.3.2 OCCUPATION CLASS

Table 4.6 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by occupation class. Occupation classes M and 1 are over 85% of the total exposure in the study.

Table 4.6

COMPARISON OF A/E TERMINATION RATIOS BY OCCUPATION CLASS WHEN EXPECTED IS EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
Occupation Class M			
Year 1	111%	100%	6.80%
Year 2	104%	100%	6.00%
Years 3-5	80%	100%	12.10%
Years 6-10	62%	100%	15.20%
Total	**103%**	**100%**	**40.00%**
Occupation Class 1			
Year 1	106%	100%	7.70%
Year 2	93%	100%	7.50%
Years 3-5	75%	100%	15.10%
Years 6-10	67%	100%	16.60%
Total	**95%**	**100%**	**46.90%**
Occupation Class 2			
Year 1	102%	107%	2.00%
Year 2	98%	103%	1.70%
Years 3-5	77%	105%	3.20%
Years 6-10	67%	100%	3.10%
Total	**97%**	**106%**	**9.90%**
Occupation Class 3			
Year 1	88%	90%	0.60%
Year 2	91%	95%	0.40%
Years 3-5	55%	81%	0.60%
Years 6-10	66%	103%	0.20%
Total	**87%**	**90%**	**1.90%**
Occupation Class 4			
Year 1	95%	96%	0.50%
Year 2	89%	96%	0.40%
Years 3-5	60%	93%	0.40%
Years 6-10	60%	115%	0.00%
Total	**92%**	**96%**	**1.30%**

* Expected bases include modifiers, as found in Appendices A and B.

4.3.3 DIAGNOSIS RISK MAPPING

Table 4.7 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by diagnosis risk level.

Table 4.7

COMPARISON OF MALE A/E TERMINATION RATIOS BY DIAGNOSIS RISK MAPPING - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
Very Low			
Year 1	91%	100%	3.50%
Year 2	76%	100%	4.10%
Years 3-5	72%	100%	9.10%
Years 6-10	62%	100%	11.10%
Total	**78%**	**100%**	**27.70%**
Low			
Year 1	95%	100%	2.70%
Year 2	72%	100%	2.70%
Years 3-5	67%	100%	5.90%
Years 6-10	51%	100%	7.00%
Total	**83%**	**100%**	**18.20%**
Mid			
Year 1	96%	100%	4.30%
Year 2	84%	100%	4.00%
Years 3-5	57%	100%	8.00%
Years 6-10	60%	100%	8.80%
Total	**88%**	**100%**	**25.10%**
High			
Year 1	128%	100%	3.30%
Year 2	106%	100%	2.50%
Years 3-5	55%	100%	4.70%
Years 6-10	54%	100%	5.50%
Total	**113%**	**100%**	**16.00%**
Very High			
Year 1	103%	100%	3.50%
Year 2	122%	100%	2.50%
Years 3-5	123%	100%	3.30%
Years 6-10	117%	100%	2.60%
Total	**110%**	**100%**	**12.00%**

* Expected bases include modifiers, as found in Appendices A and B.

The 2006-2014 IDIVT A/E termination ratios are 100% in all duration groups for all diagnosis risk mappings. The 2013 IDIVT claim modifiers already take into account differences in A/E termination ratios by diagnosis risk mapping. The recent IDEC study showed an even wider gap between the CTRs for the highest and lowest diagnosis groupings.

4.3.4 COLA AND BENEFIT PERIOD

Table 4.8 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by COLA status.

Table 4.8

COMPARISON OF A/E TERMINATION RATIOS BY COLA STATUS - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
No COLA Rider			
Year 1	103%	100%	12.60%
Year 2	93%	99%	11.30%
Years 3-5	72%	99%	21.50%
Years 6-10	63%	99%	23.80%
Total	**95%**	**100%**	**69.20%**
COLA Rider			
Year 1	115%	99%	4.60%
Year 2	108%	102%	4.40%
Years 3-5	87%	103%	9.20%
Years 6-10	72%	103%	10.60%
Total	**106%**	**100%**	**28.70%**

* Expected bases include modifiers, as found in Appendices A and B.

The 2006-2014 IDIET A/E termination ratios equal 100% when all select durations are combined for each COLA status. The A/E termination ratios vary somewhat from 100% for the various claim duration bands, since the COLA CTR modifiers do not vary by claim duration.

Table 4.9 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by benefit period.

Table 4.9

COMPARISON OF A/E TERMINATION RATIOS BY BENEFIT PERIOD - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
Short-term			
Year 1	101%	99%	5.10%
Year 2	93%	99%	3.60%
Years 3-5	76%	107%	3.00%
Years 6-10	-	-	-
Total	**99%**	**100%**	**11.70%**
To Age 65-70			
Year 1	106%	100%	10.10%
Year 2	98%	101%	10.00%
Years 3-5	77%	100%	22.30%
Years 6-10	65%	100%	26.00%
Total	**96%**	**100%**	**68.50%**
Lifetime			
Year 1	120%	103%	2.40%
Year 2	100%	95%	2.40%
Years 3-5	74%	93%	6.00%
Years 6-10	67%	102%	9.10%
Total	**102%**	**100%**	**19.80%**

* Expected bases include modifiers, as found in Appendices A and B.

The 2006-2014 IDIET A/E termination ratios equal 100% when all benefit periods are combined in the select durations. As expected, the A/E termination ratios varied somewhat from 100% for the various claim duration bands, since the benefit period modifiers did not vary by claim duration.

4.3.5 INDEMNITY AMOUNT

Table 4.10 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by indemnity amount and duration.

Table 4.10

COMPARISON OF A/E TERMINATION RATIOS BY INDEMNITY AMOUNT - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Claim Duration	2013 IDIVT	2006-2014 IDIET	% of Exposure
Under $2,500			
Year 1	107%	100%	11.40%
Year 2	99%	101%	10.30%
Years 3-5	78%	100%	20.30%
Years 6-10	68%	100%	22.40%
Total	**99%**	**100%**	**64.40%**
$2,500 - $4,999			
Year 1	104%	100%	3.50%
Year 2	99%	100%	3.20%
Years 3-5	76%	100%	6.40%
Years 6-10	64%	100%	7.30%
Total	**96%**	**100%**	**20.40%**
$5,000 - $7,499			
Year 1	102%	99%	1.50%
Year 2	93%	99%	1.30%
Years 3-5	70%	100%	2.60%
Years 6-10	59%	100%	3.00%
Total	**93%**	**99%**	**8.50%**
$7,500 & Over			
Year 1	102%	100%	1.30%
Year 2	81%	90%	1.10%
Years 3-5	63%	96%	2.00%
Years 6-10	50%	100%	2.30%
Total	**90%**	**97%**	**6.70%**

* Expected bases include modifiers, as found in Appendices A and B.

The 2006-2014 IDIET A/E termination ratios are quite close to 100% for most indemnity amount bands and claim duration groupings. The IDIET A/E ratios for indemnity amounts $7,500 and over are not quite as close to 100% as the lower bands due to the smaller exposure.

4.4 OTHER FACTORS CONSIDERED

This section discusses the impact of the 2006-2014 IDIET on other variables. These other variables were reviewed both on the 2013 IDIVT and 2006-2014 IDIET bases. The A/E termination ratios were close enough to 100% to not warrant the inclusion of any of these other variables in the 2006-2014 IDIET CTR modifiers.

4.4.1 CALENDAR YEAR

Table 4.11 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by calendar year.

Table 4.11

COMPARISON OF A/E TERMINATION RATIOS BY CALENDAR YEAR - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Calendar Year	2013 IDIVT	2006-2014 IDIET	% of Exposure
2006	97%	100%	11.50%
2007	101%	104%	11.40%
2008	99%	102%	11.30%
2009	93%	96%	11.30%
2010	100%	102%	11.30%
2011	97%	100%	11.10%
2012	95%	98%	10.90%
2013	95%	96%	10.70%
2014	100%	102%	10.50%
Total	**98%**	**100%**	**100.00%**

* Expected bases include modifiers, as found in Appendices A and B.

The 2006-2014 IDIET A/E termination ratios for all calendar years were within +/- 4% of 100%.

4.4.2 ELIMINATION PERIOD

Table 4.12 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by elimination period in the first two claim years.

Table 4.12

COMPARISON OF A/E TERMINATION RATIOS BY ELIMINATION PERIOD IN YEARS 1 AND 2 ONLY - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Elimination Period (Days)	2013 IDIVT	2006-2014 IDIET	% of Exposure
0	101%	95%	0.20%
7	101%	103%	0.40%
14	113%	112%	0.70%
30	97%	93%	14.90%
60	98%	94%	11.80%
90	109%	104%	61.00%
180	106%	107%	10.20%
360	78%	82%	0.80%
Total	**104%**	**100%**	**100.00%**

* Expected bases include modifiers, as found in Appendices A and B.

Except for a few low exposure elimination periods (i.e., 14 and 360 days), the 2006-2014 IDIET A/E termination ratios were close to 100%. As a result, it was decided that adding new CTR modifiers for the elimination period was not advisable as it would increase complexity without having a significant impact on overall experience.

4.4.3 DIAGNOSIS GROUPING

Experience by diagnosis grouping (16 categories) was examined to evaluate if there was a need to change the five diagnosis risk mappings that were defined in the 2013 IDIVT (e.g., by adding or realigning categories). The analysis did not indicate any simple revisions that would be materially better. It was also decided not to introduce CTR modifiers at the diagnosis grouping level, which comprise the diagnosis risk levels, as it would add unnecessary complexity.

Table 4.13 shows the impact of the 2006-2014 IDIET CTR modifiers on A/E termination ratios by diagnosis. The diagnoses are grouped by their respective diagnosis risk levels.

Table 4.13

COMPARISON OF A/E TERMINATION RATIOS BY DIAGNOSIS - EXPECTED EQUAL TO 2013 IDIVT VERSUS 2006-2014 IDIET*

Diagnosis Grouping	2013 IDIVT	2006-2014 IDIET	% of Exposure
Diagnosis Risk Level - Very Low			
Diabetes	76%	97%	0.70%
Mental & Nervous	93%	119%	13.70%
Nervous System	63%	81%	13.40%
Total - Very Low	**78%**	**100%**	**27.70%**
Diagnosis Risk Level - Low			
Infectious Diseases	99%	122%	1.70%
Back	77%	93%	14.50%
Ill-defined and Misc. Conditions	111%	133%	2.00%
Total - Low	**83%**	**100%**	**18.20%**
Diagnosis Risk Level - Mid			
Circulatory	82%	94%	9.40%
Respiratory	76%	87%	1.40%
Other Musculoskeletal	92%	104%	14.40%
Total - Mid	**88%**	**100%**	**25.10%**
Diagnosis Risk Level – High			
Other	75%	70%	7.30%
Alcohol & Drug	123%	105%	1.40%
Injury Other Than Back	135%	117%	7.40%
Total - High	**113%**	**100%**	**16.00%**
Diagnosis Risk Level - Very High			
Cancer	105%	95%	9.90%
Digestive	96%	87%	1.80%
Maternity	175%	170%	0.30%
Total - Very High	**110%**	**100%**	**12.00%**
Diagnosis Not Provided	131%	100%	0.90%
Total	**98%**	**100%**	**100.00%**

* Expected bases include modifiers, as found in Appendices A and B.

While there were noticeable variations from 100% in some material cells (e.g., backs at 93%), it was decided to avoid the complexity of further splitting diagnosis modifiers beyond the IDIVT's current five risk levels or reassigning some diagnoses to different risk levels.

It should be pointed out that the IDEC claim analysis by diagnosis uses only the most recent diagnosis on claims provided by the contributors. It does not take into account co-morbidity or changes in diagnosis codes. Furthermore, claim terminations resulting from the expiration of mental nervous two-year limitations could be coded unintentionally as recoveries.

Section 5: Development of the 2006-2014 IDIET CTRs for the Ultimate Durations

This section describes the development of the 2006-2014 IDIET CTRs for the ultimate claim durations. The supporting analysis references the A/E claim termination ratios for the ultimate claim durations from the IDEC 2006-2014 IDI Claim Termination Experience Report. The final 2006-2014 IDIET CTRs for the ultimate durations were derived by combining recovery and mortality rates, which were developed separately.

5.1 ANALYSES

The IDEC 2006-2014 Claim Termination Experience Report showed the extent to which the CTRs in the ultimate claim durations varied by attained age, gender and occupation class (IDEC occupation class M and Non-M) from the 2013 IDIVT ultimate CTRs. In addition, this report shows the extent to which the ultimate CTRs vary by benefit period, specifically lifetime vs. non-lifetime (non-lifetime is mainly comprised of claims with To Age 65-70 benefit periods, but also includes a small volume of short-term claims). Most non-lifetime claims at attained ages 65+ typically occurred during a contingently renewable period, which followed the end of policies' standard renewable period.

Claim termination experience in Tables 5.1 and 5.2 are described in terms of A/E claim termination ratios using the 2013 IDIVT base as the expected basis. A/E ratios are not shown for cells with less than ten terminations. The A/E termination ratios in Tables 5.1 and 5.2 for non-lifetime claims in attained age grouping 65-69 were adjusted to remove the potential impact of maximum benefit period expiries that were miscoded as recoveries. This adjustment is discussed in detail in the 2006-2014 IDI Claim Experience Report.

Table 5.1 shows the A/E claim termination ratios in the ultimate claim durations by attained age and gender in occupation class M, separately for non-lifetime benefit periods, the lifetime benefit period and combined benefit periods.

Table 5.1

A/E CLAIM TERMINATION RATIOS FOR A&S CLAIMS FOR **OCCUPATION CLASS M** IN THEIR ULTIMATE CLAIM DURATIONS BY ATTAINED AGE AND BENEFIT PERIOD (EXPECTED = 2013 IDIVT)

Attained Age	Male			Female		
	Non-lifetime	Lifetime	All Benefit Periods	Non-lifetime	Lifetime	All Benefit Periods
Under 50	61%	44%	54%	69%	80%	73%
50–54	66%	44%	56%	83%	42%	69%
55–59	60%	46%	53%	123%	65%	102%
60–64	69%	43%	56%	86%	44%	70%
65–69	76%	58%	60%		55%	54%
70–74	83%	46%	47%	-	-	-
75–79	69%	46%	47%	-	-	-
80–89	114%	49%	55%	-	-	-
90 & Over				-	-	-
Total	**61%**	**44%**	**54%**	**92%**	**51%**	**73%**
Attained Age	Number of Terminations					
Under 50	25	8	32	31	9	39
50–54	76	25	101	40	14	54
55–59	127	60	188	69	18	86
60–64	192	86	278	37	12	50
65–69	32	153	185	5	10	16
70–74	13	122	135	0	7	7
75–79	14	75	89	0	3	3
80–89	16	44	60	1	3	4
90 & Over	-	-	-	-	-	-
Total	**495**	**573**	**1,068**	**184**	**75**	**259**

Table 5.2 shows the A/E termination ratios in the ultimate claim durations by attained age and gender in the non-M occupation classes, separately for non-lifetime benefit periods, lifetime benefit period and combined benefit periods. The Non-M occupation class combines experience from occupation classes 1 through 4.

Table 5.2

A/E CLAIM TERMINATION RATIOS FOR A&S CLAIMS FOR THE **NON-M OCCUPATION CLASSES** IN THEIR ULTIMATE CLAIM DURATIONS BY ATTAINED AGE AND BENEFIT PERIOD (EXPECTED = 2013 IDIVT)

Attained Age	Male			Female		
	Non-lifetime	Lifetime	All Benefit Periods	Non-lifetime	Lifetime	All Benefit Periods
Under 50	41%	31%	38%	55%	50%	54%
50–54	62%	44%	56%	64%	51%	61%
55–59	71%	48%	64%	75%	96%	80%
60–64	65%	47%	59%	88%	39%	76%
65–69	72%	60%	62%	89%	45%	54%
70–74	79%	66%	67%	-	62%	62%
75–79	79%	72%	73%	-	71%	69%
80–89	112%	69%	73%	-	-	-
90 & Over		64%	64%	-	-	-
Total	**66%**	**56%**	**61%**	**74%**	**58%**	**69%**
Attained Age	**Number of Terminations**					
Under 50	71	13	84	50	8	57
50–54	133	36	169	84	21	105
55–59	369	96	464	129	27	157
60–64	489	107	596	163	18	181
65–69	99	141	240	20	16	36
70–74	36	150	186	2	18	20
75–79	29	144	173	3	10	13
80–89	19	175	195	1	7	9
90 & Over	0	28	28	0	3	3
Total	**1,245**	**890**	**2,135**	**452**	**128**	**581**

The A/E termination ratios for claims with non-lifetime benefit periods are generally higher than claims with a lifetime benefit period. As a result, the 2006-2014 IDIET ultimate CTRs have been differentiated between non-lifetime and lifetime benefit periods. This is different from the 2013 IDIVT, which did not differentiate the ultimate CTRs by benefit period.

The 2006-2014 IDIET contains ultimate base termination rates that varied by attained age, gender, occupation class and benefit period. It also contains modifiers by benefit amount. The IDEC 2006-2014 Claim Termination Experience Report showed the extent to which the CTRs in the ultimate claim durations varied by benefit amount. The 2013 IDIVT did not contain modifiers by benefit amount.

Table 5.3 shows how the A/E claim termination ratios in the ultimate claim durations vary by benefit amount.

Table 5.3
A/E CLAIM TERMINATION RATIOS FOR A&S CLAIMS FOR YEARS 2006 THROUGH 2014 BY MONTHLY INDEMNITY—ALL OCCUPATION CLASSES, GENDERS AND ATTAINED AGES COMBINED

Monthly Indemnity	Non-lifetime	Lifetime	All Benefit Periods
Under $2,500	82%	67%	76%
$2,500-4,999	73%	53%	63%
$5,000-7,499	59%	58%	58%
$7,500-9,999	68%	32%	44%
$10,000-14,999	33%	41%	39%
$15,000-19,999	-	35%	37%
$20,000 & Over	-	-	-
Total	**71%**	**51%**	**60%**
Monthly Indemnity	**Number of Terminations**		
Under $2,500	1,902	1,109	2,557
$2,500-4,999	400	309	602
$5,000-7,499	105	150	237
$7,500-9,999	37	34	64
$10,000-14,999	12	48	58
$15,000-19,999	2	10	12
$20,000 & Over	1	7	7
Total	**2,460**	**1,666**	**3,537**

5.2 BASE CTR DEVELOPMENT AND VALIDATION

Considerably more claim data in the ultimate durations were available in the 2006-14 study than in the experience study underlying the 2013 IDIVT. The IDEC 2006-2014 IDI claim database split claim terminations between deaths and recoveries, which was the first time an IDEC claim termination study split terminations between deaths and recoveries. Studying ultimate recovery and mortality rates separately has provided a greater understanding of how the terminations from recoveries decrease over time, while terminations due to deaths increase. By attained age 70, essentially all ultimate duration terminations were due to death.

Because of the relatively low volume of claims in the ultimate durations compared to the select durations, claim terminations for this analysis included all IDI contract types with claims in the ultimate durations. Table 5.4 shows the volume of claim terminations by contract type, split between recoveries and deaths.

Table 5.4
CLAIM TERMINATIONS BY CONTRACT TYPE IN THE ULTIMATE CLAIM DURATIONS, SPLIT BETWEEN RECOVERIES AND DEATHS

Contract Type	Recoveries	Deaths	Total
Accident & Sickness	756	3,370	**4,127**
Accident Only	0	18	**18**
Business Overhead Expense	3	3	**6**
Other	23	57	**80**
Unknown	5	105	**110**
Total	**788**	**3,553**	**4,341**

A&S claim terminations accounted for 95% of all IDI terminations in the ultimate claim durations. Deaths represent 82% of all claim terminations in the ultimate durations, and recoveries represent 18%, over all attained ages combined.

5.2.1 ULTIMATE RECOVERY RATES

Tables 5.5 and 5.6 compare ultimate recovery rates per 1,000 by attained age groupings, gender and occupation class for non-lifetime and lifetime benefit periods, respectively. The exposure and recovery rates are based on claim count. Ultimate recovery rates were calculated by attained age, occupation class, gender and benefit period. Recovery rates are left blank in cells where there are fewer than ten recoveries.

Actual recoveries for non-lifetime claims in the attained ages 65-69 grouping were adjusted to remove the potential impact of benefit period expiries being coded as recoveries. The adjustment resulted in the recovery rates for non-lifetime claims in the ages 65-69 grouping having the same recovery rates as those in the ages 60-64 grouping, within each occupation class and gender grouping. This adjustment, and the adjustment applied to the A/E claim termination ratios from the 2006-2014 Claim Termination Experience Report (seen in Tables 5.1 and 5.2, above), both attempt to remove potential mis-codings of benefit expiries as terminations. The difference in approach is that the potential mis-codings in this analysis have been narrowed down to recoveries only and do not apply to deaths, which do not appear to have this potential mis-coding issue. The adjustment from the 2006-2014 Claim Termination Experience Report applied to all terminations.

Table 5.5

DERIVATION OF ULTIMATE RECOVERY RATES PER 1,000 BY ATTAINED AGE, GENDER AND OCCUPATION CLASS – **NON-LIFETIME BENEFIT PERIODS**

	Exposure - Male			Exposure - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	2,163	3,948	6,111	2,800	4,043	6,844
50-54	5,804	8,850	14,654	4,163	6,753	10,916
55-59	10,995	17,793	28,789	5,534	9,430	14,965
60-64	13,601	26,323	39,924	4,722	10,481	15,203
65-69*	1,775	4,007	5,782	399	823	1,221
Under 70	34,338	60,920	95,258	17,619	31,530	49,149
70+	758	1,967	2,725	97	178	275
	Recoveries - Male			Recoveries - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	8	33	41	24	35	58
50-54	18	34	52	29	37	66
55-59	34	82	116	32	42	74
60-64	29	86	114	9	38	47
65-69*	4	13	17	1	3	4
Under 70	93	248	340	95	154	249
70+	1	3	4	0	0	0
	Recovery Rates - Male			Recovery Rates - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	-	8.40	6.77	8.40	8.61	8.53
50-54	3.14	3.79	3.53	7.07	5.46	6.08
55-59	3.10	4.63	4.04	5.76	4.45	4.93
60-64	2.10	3.25	2.86	-	3.61	3.10
65-69	-	3.25	2.90	-	-	-
Under 70	2.70	4.07	3.57	5.39	4.90	5.07
70+	-	-	-	-	-	-

* Recoveries for attained ages 65-69 have been adjusted for potential mis-coding of benefit expiries.

Table 5.6

DERIVATION OF ULTIMATE RECOVERY RATES PER 1,000 BY ATTAINED AGE, GENDER AND OCCUPATION CLASS – **LIFETIME BENEFIT PERIOD**

	Exposure - Male			Exposure - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	1,119	1,503	2,621	1,102	807	1,908
50-54	3,418	2,739	6,158	1,626	1,699	3,326
55-59	6,757	5,046	11,802	1,951	2,015	3,965
60-64	9,511	7,642	17,154	1,617	2,109	3,726
65-69	8,818	7,368	16,186	1,025	1,775	2,800
Under 70	29,623	24,298	53,921	7,321	8,405	15,726
70+	9,617	11,885	21,502	685	1,674	2,359
	Recoveries - Male			Recoveries - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	3	4	8	5	7	12
50-54	12	10	22	11	11	21
55-59	19	19	37	9	7	17
60-64	15	7	22	-	3	3
65-69	14	2	17	1	1	3
Under 70	63	43	106	27	30	56
70+	3	2	5	-	1	1
	Recovery Rates - Male			Recovery Rates - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	-	-	-	-	-	6.42
50-54	3.48	3.79	3.61	6.49	6.33	6.41
55-59	2.74	3.75	3.17	-	-	4.21
60-64	1.58	-	1.29	-	-	-
65-69	1.62	-	1.02	-	-	-
Under 70	2.13	1.76	1.97	3.65	3.53	3.59
70+	-	-	-	-	-	-

Figures 5.1 and 5.2 below illustrate the differences in the ultimate raw recovery rates for attained ages under 70 by benefit period, gender, occupation class and attained age groupings. Recovery rates for attained ages 70 and over are negligible. Figure 5.1 shows occupation class M and Figure 5.2 shows occupation class non-M. As with Tables 5.3 and 5.4, cells with less than ten recoveries are not shown in the figures. The recovery rates for non-lifetime claims with attained ages 65-69 have been adjusted for potential mis-codings of benefit expiries as discussed above.

Figure 5.1
RECOVERY RATES BY BENEFIT PERIOD, GENDER AND ATTAINED AGE – **OCCUPATION CLASS M**

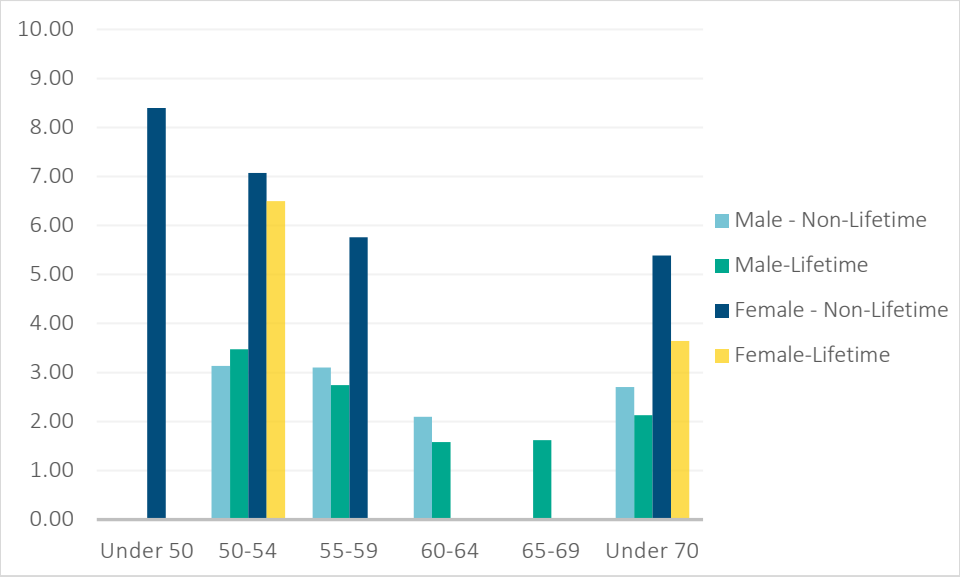
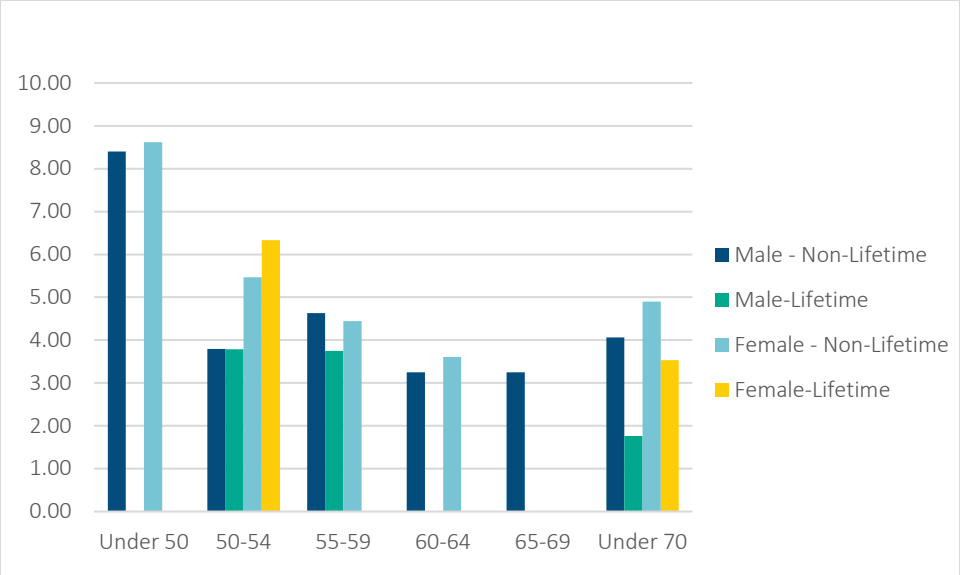


Figure 5.2
RECOVERY RATES BY BENEFIT PERIOD, GENDER AND ATTAINED AGE – **NON-M OCCUPATION CLASSES**



When all ages under 70 are combined, the differences between recovery rates for claims with and without lifetime benefits is larger for males in the non-M occupation classes than occupation class M.

The recovery rates vary by attained age, gender, occupation class and benefit period, although differences in some variables are more material than others. In general, recovery rates decrease with attained age, and non-lifetime claims have higher recovery rates than lifetime claims. Differences in recovery rates by occupation class were more significant in the non-lifetime claims than the lifetime claims. Actual recoveries for attained ages 70 and older were negligible for both lifetime and non-lifetime benefit periods.

The following steps were taken to derive expected ultimate recovery rates for the 2006-2014 IDIET from the raw recovery rates:

1. Recovery rates for attained ages 70 and over were set to zero.
2. Aggregate recovery rates with occupation classes and genders combined were calculated for attained age groupings under 50, 50-54, 55-59, 60-64 and 65-69, separately for each of the non-lifetime and lifetime benefit periods.
3. Scalar adjustment factors were applied to the recovery rates from step 2 to reproduce the total actual recovery rates for all attained ages under 70 combined, separately for each of the subsets listed in Table 5.7 below, when applied to the corresponding exposures. These scalar adjustment factors did not vary by attained age.
4. The 2006-2014 IDIET ultimate expected recovery rates by age, gender, benefit period and occupation class equal the recovery rates from step 2 times the scalar adjustment factors from step 3 (see Tables 5.8 and 5.9).

Table 5.7

RECOVERY RATE SUBSETS

Subset	Benefit Period	Occupation Class	Gender
1	Non-lifetime	M	Male
2	Non-lifetime	Non-M	Male
3	Non-lifetime	M	Female
4	Non-lifetime	Non-M	Female
5	Lifetime	M	Male
6	Lifetime	Non-M	Male
7	Lifetime	M	Female
8	Lifetime	Non-M	Female

Tables 5.8 (non-lifetime benefit periods) and 5.9 (lifetime benefit period) show the resulting 2006-2014 expected recovery rates for the attained age, gender, occupation class and benefit period groupings.

Table 5.8

EXPECTED RECOVERY RATES (PER 1,000) BY ATTAINED AGE, GENDER AND OCCUPATION CLASS **FOR CLAIMS WITH NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
Under 50	5.24	8.03	9.14	8.72
50-54	3.14	4.82	5.49	5.23
55-59	2.96	4.54	5.17	4.92
60-64	1.99	3.05	3.48	3.31
65-69	1.99	3.06	3.48	3.32
70+	0.00	0.00	0.00	0.00

Table 5.9

EXPECTED RECOVERY RATES (PER 1,000) BY ATTAINED AGE, GENDER AND OCCUPATION CLASS **FOR CLAIMS WITH A LIFETIME BENEFIT PERIOD**

Attained Age	Pivotal Age	Male		Female	
		M	Non-M	M	Non-M
Under 50	50	4.30	3.52	5.32	5.75
50-54	52	4.50	3.69	5.57	6.03
55-59	57	3.37	2.76	4.17	4.51
60-64	62	1.19	0.98	1.48	1.60
65-69	67	1.00	0.82	1.23	1.34
70+	70	0.00	0.00	0.00	0.00

Table 5.10 shows a validation comparing the resulting ratios of actual recoveries to the expected recoveries by attained age groupings, gender and benefit period. Expected recoveries are equal to the expected recovery rates times the corresponding exposures.

Table 5.10

RATIOS OF ACTUAL RECOVERIES TO EXPECTED RECOVERIES BY ATTAINED AGE GROUPING, GENDER AND BENEFIT PERIOD (FOR COMBINED OCC CLASSES)

	Non-lifetime Benefit Periods		Lifetime Benefit Period			
Attained Age	Male	Female	Male	Female	Non-lifetime	Lifetime
Under 50	96%	96%	75%	117%	96%	96%
50-54	85%	114%	87%	110%	99%	97%
55-59	103%	98%	102%	97%	101%	101%
60-64	106%	92%	117%	58%	102%	103%
65-69	106%	91%	112%	77%	103%	105%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Overall, the expected recovery rates reproduce the actual recoveries quite closely by claim duration when the genders are combined. There is some variability in the A/E recovery ratios among the attained age groupings when males and females are separated, but this was deemed acceptable given that the ratios are 100% by gender for all attained ages combined and the much lower A/Es are in female, older age cells with little credibility

The expected age grouping recovery rates shown in Tables 5.8 and 5.9 were then interpolated by individual attained ages to produce the final 2006-2014 ultimate recovery rates provided in Appendix C.

Figures 5.3 (occupation class M) and Figure 5.4 (non-M occupation classes) compare the resulting 2006-2014 ultimate recovery rates by gender, benefit period and attained age. They illustrate how recovery rates decline quickly by attained age.

Figure 5.3

2006-2014 IDIET RECOVERY RATES PER 1,000 BY BENEFIT PERIOD, GENDER AND ATTAINED AGE FOR **OCCUPATION CLASS M**

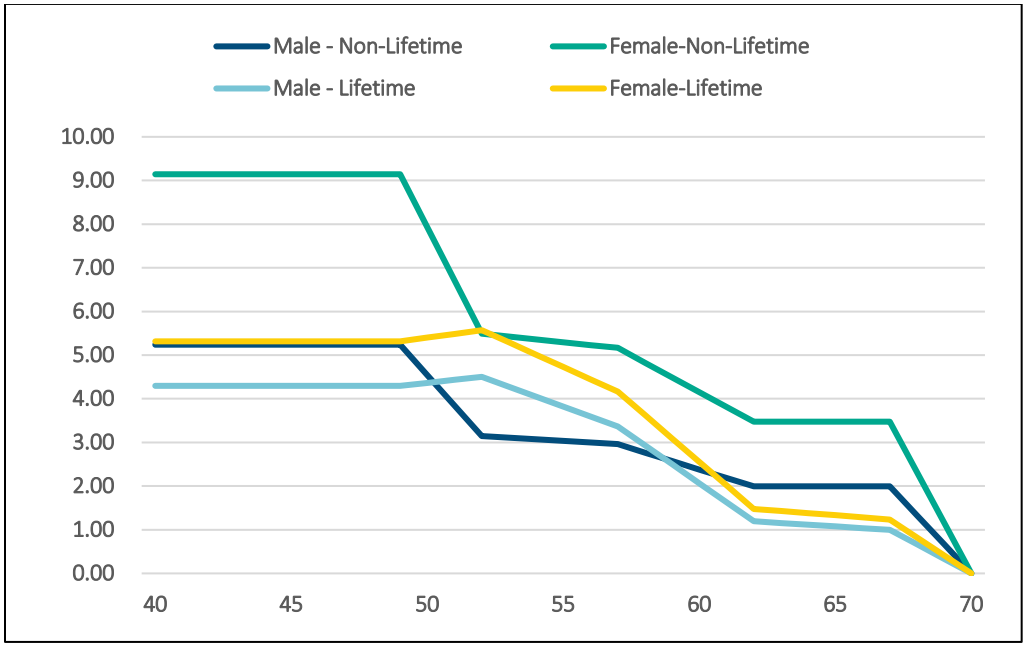
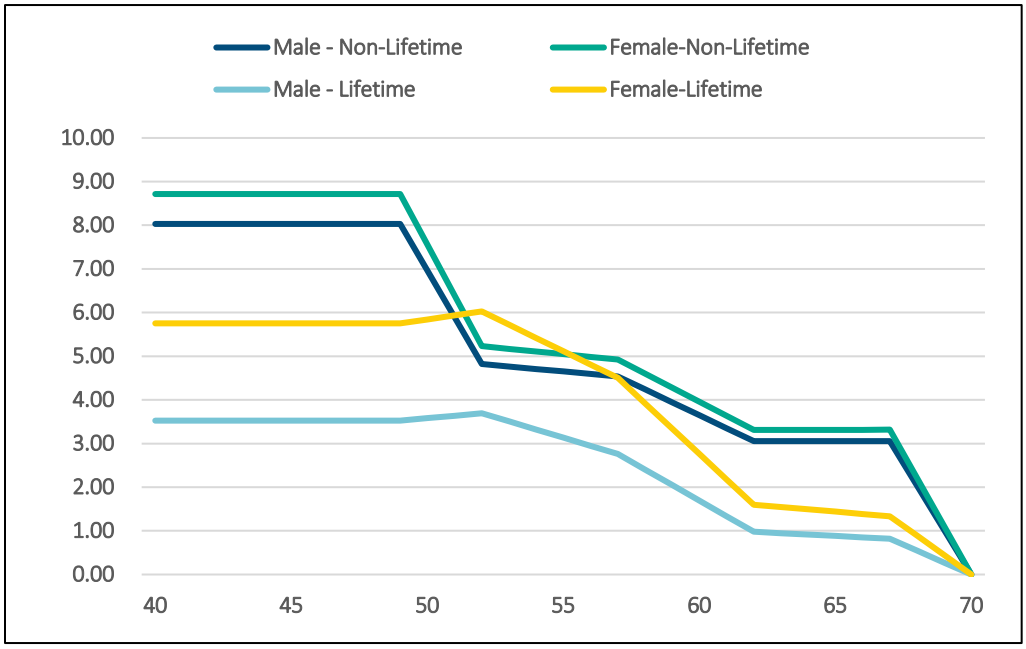


Figure 5.4

2006-2014 IDIET RECOVERY RATES PER 1,000 BY BENEFIT PERIOD, GENDER AND ATTAINED AGE FOR **NON-M OCCUPATION CLASSES**



5.2.2 ULTIMATE MORTALITY RATES

The development of the 2006-2014 IDIET mortality rates began with a comparison of actual mortality rates to mortality rates from the 2015 Valuation Base Table (VBT), which was developed by the Joint Academy of Actuaries' Life Experience Committee and the Society of Actuaries' Preferred Mortality Oversight Group from ordinary life insurance experience covering years 2002 through 2009. Using the 2015 VBT ultimate mortality rates as a benchmark to measure IDI deaths provides useful insight into the extent that IDI claim mortality is substandard.

The 2006-2014 IDIET contains termination rates through attained age 120. Since the actual experience data above age 84 is not credible, the expected mortality rates for attained ages 85+ were set to 100% of the VBT by age and gender. The following analyses describe the calculation of 2006-2014 expected mortality for attained ages under 85.

Tables 5.11 and 5.12 compare actual deaths to VBT deaths (in terms of claim count) for attained ages under 85 by age grouping, gender and occupation class for non-lifetime and lifetime benefit periods, respectively. VBT deaths were derived by multiplying IDI exposure by ultimate mortality rates from the 2015 VBT (unismoker, age-last-birthday). The 2015 VBT mortality rates are provided in Appendix D. Because the 2015 VBT was based on ordinary life insurance products, its mortality rates did not vary by occupation class or benefit period. Actual/VBT ratios are left blank in cells where there are fewer than ten deaths.

Table 5.11

COMPARISON OF ACTUAL DEATHS TO VBT DEATHS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS** BY ATTAINED AGE (UNDER 85), GENDER AND OCCUPATION CLASS

	Actual Deaths - Male			Actual Deaths - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	17	41	57	7	20	27
50-54	58	110	167	12	51	63
55-59	96	313	409	37	95	132
60-64	172	423	594	30	133	163
65-69	32	147	180	4	15	19
70-84	34	77	111	1	6	7
Total – Under 85	**408**	**1,111**	**1,519**	**91**	**320**	**411**
	VBT Deaths - Male			VBT Deaths - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	5	9	14	4	5	9
50-54	17	26	42	9	14	23
50-59	47	76	124	18	31	49
60-64	96	187	283	26	57	83
65-69	21	47	68	4	8	11
70-84	20	54	74	2	4	6
Total - Under 85	**207**	**398**	**604**	**62**	**119**	**182**
	Actual / VBT Ratio - Male			Actual / VBT Ratio - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	-	-	420%	-	-	-
50-54	344%	427%	394%	-	358%	273%
50-59	203%	410%	331%	202%	305%	267%
60-64	178%	226%	210%	114%	233%	196%
65-69	155%	314%	266%	-	-	165%
70-84	166%	144%	150%	-	-	-
Total - Under 85	**198%**	**279%**	**251%**	**146%**	**268%**	**226%**

Table 5.12

COMPARISON OF ACTUAL DEATHS TO VBT DEATHS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD** BY ATTAINED AGE (UNDER 85), GENDER AND OCCUPATION CLASS

	Actual Deaths – Male			Actual Deaths - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	4	9	13	3	1	4
50-54	13	25	39	4	11	15
55-59	42	78	120	8	20	28
60-64	71	102	173	12	15	27
65-69	139	142	280	9	14	23
70-84	222	464	687	9	39	48
Total - Under 85	**492**	**820**	**1,312**	**46**	**100**	**146**
	VBT Deaths - Male			VBT Deaths - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	3	3	6	1	1	2
50-54	10	8	18	3	4	7
55-59	29	22	51	6	7	13
60-64	67	54	122	9	12	20
65-69	103	86	189	10	17	26
70-84	251	335	586	13	32	45
Total - Under 85	**463**	**508**	**972**	**43**	**71**	**114**
	Actual / VBT Ratio - Male			Actual / VBT Ratio - Female		
Attained Age	M	Non-M	All	M	Non-M	All
Under 50	-	-	-	-	-	-
50-54	135%	-	217%	-	-	-
50-59	145%	361%	237%	-	-	217%
60-64	106%	189%	143%	-	127%	132%
65-69	135%	164%	148%	95%	87%	90%
70-84	89%	139%	117%	72%	122%	107%
Total - Under 85	**106%**	**161%**	**135%**	**107%**	**140%**	**128%**

Table 5.13 shows the ratios of actual deaths to VBT deaths for attained ages 85 and over. Due to the low volume of deaths, all benefit periods and occupation classes were combined, resulting in ratios that vary only by gender.

Table 5.13

COMPARISON OF ACTUAL DEATHS TO VBT DEATHS FOR ATTAINED AGES 85 & OVER – ALL BENEFIT PERIODS AND OCCUPATION CLASSES COMBINED

Gender	Actual Deaths	VBT Deaths	Actual / VBT
Male	154	160	96%
Female	11	16	69%

Figures 5.5 and 5.6 illustrate the differences in the ratios of actual deaths to VBT deaths for attained ages under 85 by benefit period, gender, occupation class and attained age groupings. Figure 5.5 shows occupation class M and Figure 5.6 shows the non-M occupation. Cells with less than ten deaths are not shown in the figures.

Figure 5.5

RATIOS OF ACTUAL DEATHS TO VBT DEATHS BY BENEFIT PERIOD, GENDER AND ATTAINED AGE (UNDER 85) – **OCCUPATION CLASS M**

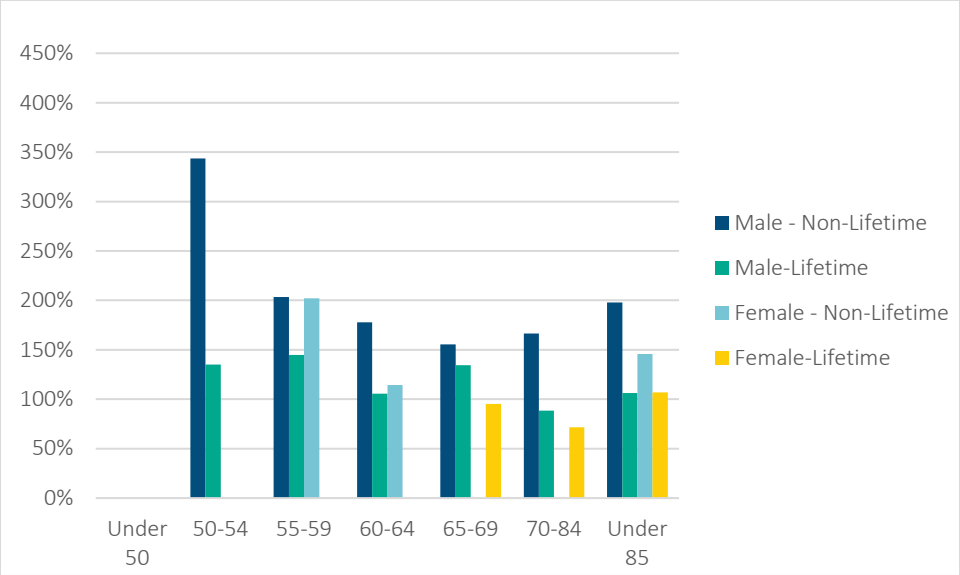
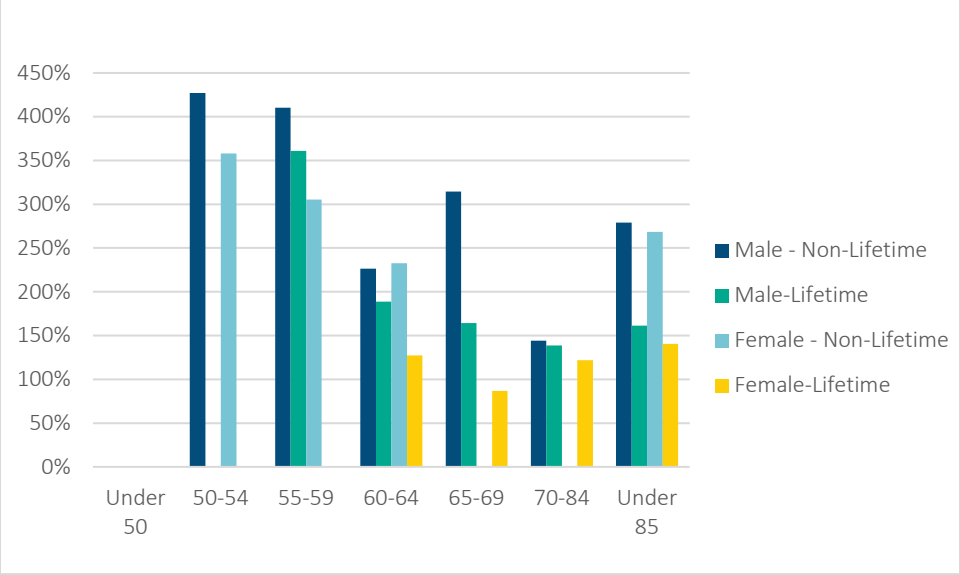


Figure 5.6

RATIOS OF ACTUAL DEATHS TO VBT DEATHS BY BENEFIT PERIOD, GENDER AND ATTAINED AGE (UNDER 85) – **OCCUPATION CLASS NON-M**



The following steps were taken to derive the scalar adjustment factors applied to the VBT tables for the subsets listed in Table 5.7

1. Ratios of aggregate to VBT deaths were calculated separately by gender and attained age groupings under 50, 50-54, 55-59, 60-64, 65-69, 70-84 (ages 85+ were set to 100% as described above), with benefit periods and occupation classes combined.
2. Scalar adjustment factors were applied to the ratios of actual to VBT deaths from step 1 to reproduce the total actual deaths for all attained ages under 85 combined, separately for each of the subsets listed in Table 5.7. These scalar adjustment factors did not vary by attained age.
3. The 2006-2014 ultimate expected mortality rates by age, gender, BP and occ class equal the mortality ratios from step 1 times the scalar adjustment factors from step 2 (see Tables 5.14 and 5.15).

Tables 5.14 (non-lifetime benefit periods) and 5.15 (lifetime benefit period) show the resulting Expected / VBT ratios for the eight subsets listed in Table 5.7.

Table 5.14

EXPECTED / VBT RATIOS USED TO DERIVE THE EXPECTED ULTIMATE MORTALITY RATES FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Pivotal Age	Male		Female	
		M	Non-M	M	Non-M
Under 50	50	319%	471%	188%	355%
50-54	52	301%	444%	176%	332%
55-59	57	268%	395%	175%	330%
60-64	62	167%	247%	125%	236%
65-69	67	158%	233%	77%	145%
70-84	77	107%	157%	74%	140%
85+	85	100%	100%	100%	100%

Table 5.15

EXPECTED / VBT RATIOS USED TO DERIVE THE EXPECTED ULTIMATE MORTALITY RATES FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Pivotal Age	Male		Female	
		M	Non-M	M	Non-M
Under 50	50	239%	387%	179%	265%
50-54	52	225%	366%	168%	249%
55-59	57	200%	325%	167%	247%
60-64	62	125%	203%	119%	177%
65-69	67	118%	192%	73%	108%
70-84	77	80%	129%	71%	105%
85+	85	100%	100%	100%	100%

The resulting 2006-2014 expected deaths, i.e., the expected mortality rates, as derived above, times the exposures, were compared to the actual deaths. Table 5.16 shows a validation comparing the ratios of actual deaths to expected deaths by attained age under 85, gender and benefit period.

Table 5.16
RATIOS OF ACTUAL DEATHS TO EXPECTED DEATHS BY ATTAINED AGES UNDER 85, GENDER AND BENEFIT PERIOD

	Non-lifetime Benefit Periods		Lifetime Benefit Period			
Attained Age	Male	Female	Male	Female	Male	Female
Under 50	101%	107%	70%	76%	93%	102%
50-54	102%	100%	76%	100%	95%	100%
55-59	96%	98%	94%	105%	95%	99%
60-64	96%	97%	89%	87%	94%	96%
65-69	127%	134%	98%	94%	107%	109%
70-84	105%	107%	108%	113%	108%	112%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Overall, the expected mortality rates reproduce 100% of the actual deaths. The variability in the A/E ratios by attained age is to be expected given the methodology.

The Expected / VBT ratios shown in Tables 5.14 and 5.15 were then interpolated to produce the expected ultimate ratios for all attained ages, which were then multiplied by the 2015 VBT mortality rates (in Appendix D) to produce the 2006-2014 ultimate expected mortality rates (in Appendix C).

Figures 5.7 (occupation class M) and 5.8 (occupation class non-M) illustrate the resulting 2006-2014 ultimate recovery rates by attained age.

Figure 5.7
2006-2014 IDIET MORTALITY RATES BY BENEFIT PERIOD, GENDER AND ATTAINED AGE **FOR OCCUPATION CLASS M**

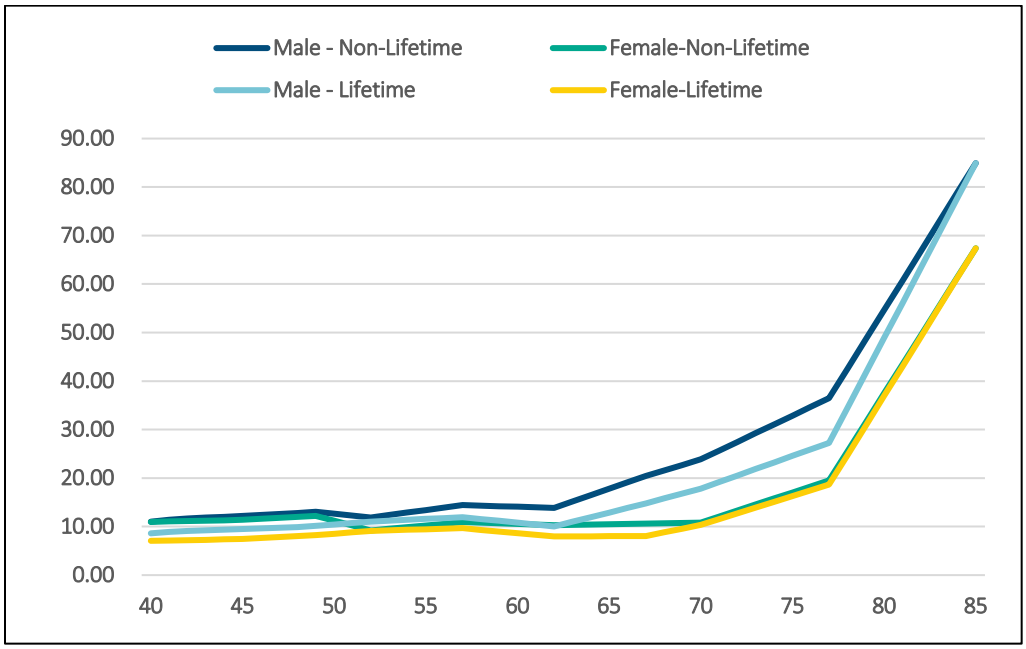
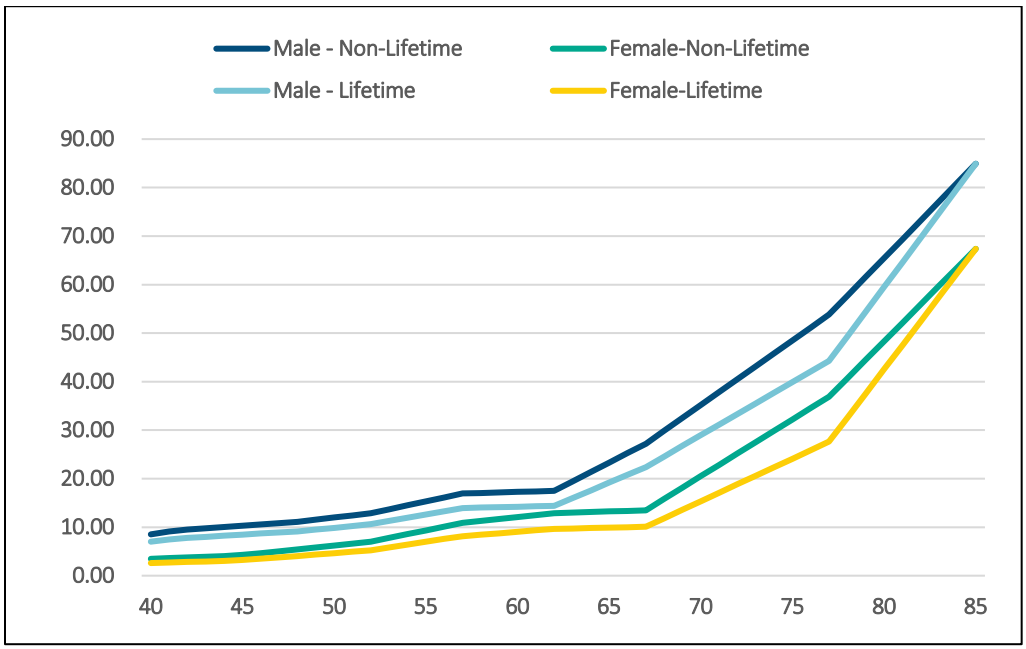


Figure 5.8

2006-2014 IDIET MORTALITY RATES BY BENEFIT PERIOD, GENDER AND ATTAINED AGE **FOR THE NON-M OCCUPATION CLASSES**



Figures 5.7 and 5.8 show how the claims with a lifetime benefit period have somewhat lower mortality ratios than claims with non-lifetime benefit periods. One reason for this could be changes in the distribution of claims by diagnosis as attained ages increase. Lifetime claims have a higher proportion of claims with less life-threatening diagnoses, such as back, musculoskeletal and injury related, than non-lifetime claims. Analysis of this possibility, as well as other potential explanations, is a subject for future studies.

5.2.3 ULTIMATE BASE TERMINATION RATES

Appendix C provides the ultimate base CTRs for the 2006-2014 study period, along with the ultimate mortality and recovery rates. Figures 5.9 (occupation class M) and 5.10 (non-M occupation classes) illustrate the resulting 2006-2014 ultimate termination rates by attained age.

Figure 5.9

2006-2014 IDIET TERMINATION RATES PER 1,000 BY BENEFIT PERIOD, GENDER AND ATTAINED AGE **FOR OCCUPATION CLASS M**

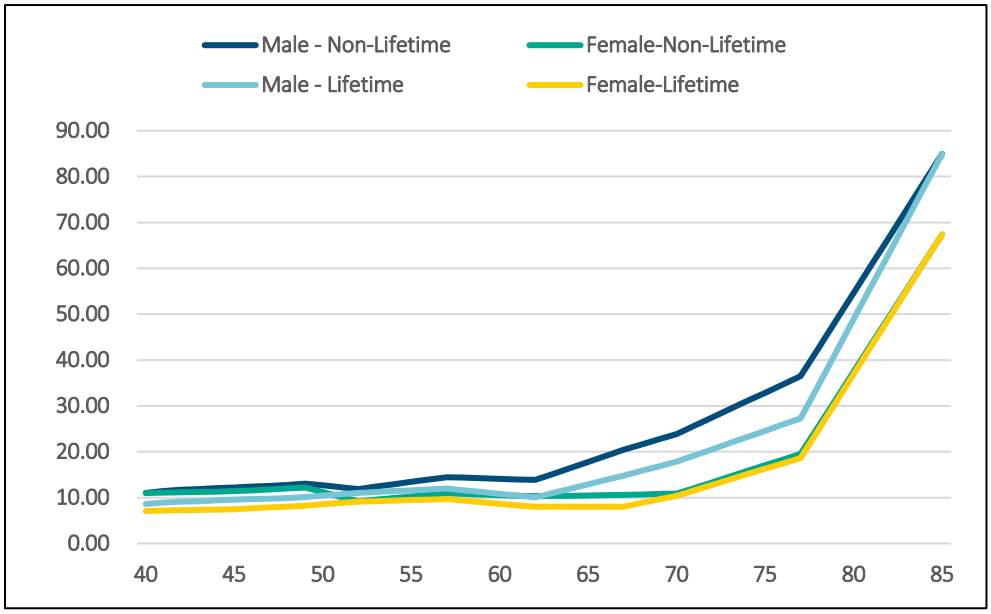
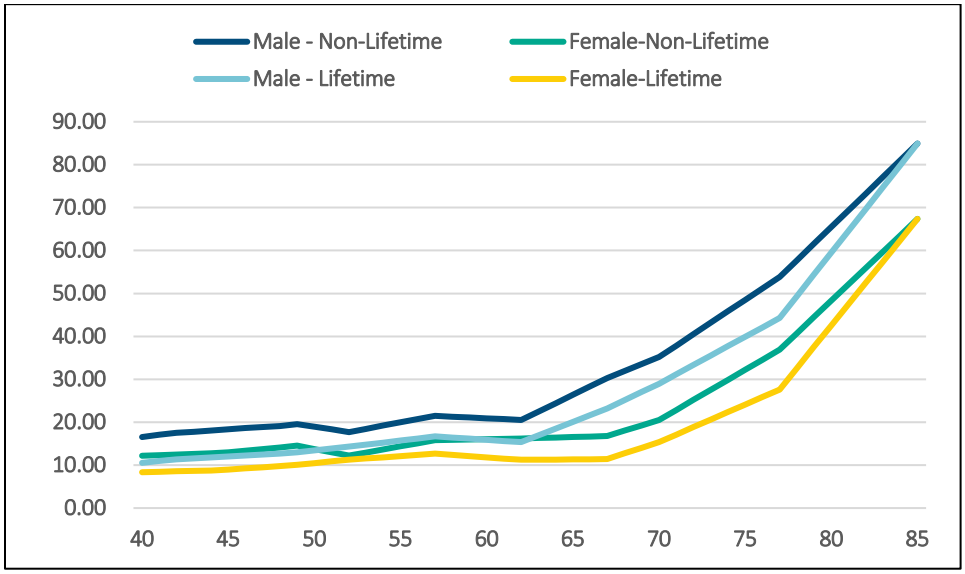


Figure 5.10

2006-2014 IDIET MORTALITY RATES PER 1,000 BY BENEFIT PERIOD, GENDER AND ATTAINED AGE **FOR NON-M OCCUPATION CLASSES**



As attained ages increase, decreasing recovery rates are largely offset by increasing mortality rates, keeping the slope of aggregate CTRs modest through age 62 for males and age 67 for females. Subsequently, mortality increases more steeply and recoveries cease, resulting in much steeper aggregate CTR slopes.

Ultimate termination rates for attained ages above age 69 are based on mortality only, as described above in section 5.2.2.

Table 5.17 shows the weighted average ratios of 2006-2014 IDIET ultimate base CTRs to 2013 IDIVT ultimate CTRs by attained age, benefit period, occupation class and gender, where the weights are based on the 2006-2014 exposures (by count). The weighted age ratios were split between attained ages under 65 and attained ages 65 and over. The ratios in Table 5.17 are before the CTR modifiers by indemnity amount (discussed in 5.3) are applied.

Table 5.17
WEIGHTED AVERAGE RATIOS OF 2006-2014 IDIET ULTIMATE BASE CTRS TO 2013 IDIVT ULTIMATE CTRS WEIGHTED BY 2006-2014 EXPOSURE (BY COUNT)

Benefit Period	Occupation Class	Attained Ages Under 65		Attained Age 65 & Over		All Attained Ages Combined	
		Male	Female	Male	Female	Male	Female
Non-lifetime	M	75%	85%	78%	61%	75%	84%
Non-lifetime	Non-M	79%	86%	94%	79%	81%	86%
Lifetime	M	60%	71%	57%	49%	58%	63%
Lifetime	Non-M	59%	67%	78%	64%	72%	65%

Depending on the combination of benefit period, occupation class and gender, the weighted average ratio of 2006-2014 IDIET ultimate CTRs to 2013 IDIVT ultimate CTRs for all attained ages' combined ranges from 49% (for a lifetime benefit period, occupation class M, female over age 65) to 94% (for non-lifetime benefit periods, occupation class non-M, male over age 65).

5.3 CTR MODIFIER DEVELOPMENT AND VALIDATION

As discussed above, the development of the 2006-2014 IDIET base recovery and mortality rates was based on claim count and not claim amount. However, the ultimate base termination rates provided in Appendix C were subsequently adjusted by CTR modifiers by amount that lower the CTRs as the indemnity amount per claim increased.

Table 5.18 shows the CTR modifiers by indemnity amount that were applied to the 2006-2014 IDIET CTRs. These modifiers vary only by the indemnity amount of the claim.

Table 5.18
2006-2014 IDIET CTR MODIFIERS – INDEMNITY AMOUNT (ULTIMATE DURATIONS ONLY)

Indemnity Amount	CTR Modifier
Under $2,500	105.0%
$2,500 - 4,999	90.0%
$5,000 - 7,499	90.0%
$7,500 & Over	70.0%

As in select claim durations, indemnity amount in the ultimate durations is derived at the claim record level. It does not combine the indemnity amounts of multiple claims on a claimant who was disabled under multiple policies at the same time.

Table 5.19 compares the A/E termination ratios (by claim count) in the ultimate durations for an expected basis of the 2006-2014 IDIET, both before and after the application of the 2006-2014 ultimate CTR modifiers by benefit amount.

Table 5.19

2006-2014 IDIET ULTIMATE A/E TERMINATION RATIOS) BEFORE AND AFTER APPLICATION OF CTR MODIFIERS BY INDEMNITY AMOUNT PER CLAIM RECORD

Indemnity Amount per Claim Record	2006-2014 IDIET Base Rates	2006-2014 IDIET after Amount Modifiers	% of Exposure
Male			
Under $2,500	105%	100%	45.4%
$2,500-7,499	86%	96%	21.2%
$7,500 & Over	67%	95%	5.4%
Total	**97%**	**99%**	**72.0%**
Female			
Under $2,500	101%	96%	21.1%
$2,500-7,499	96%	107%	6.2%
$7,500 & Over	51%	73%	0.6%
Total	**99%**	**98%**	**28.0%**
Combined			
Under $2,500	104%	99%	66.5%
$2,500-7,499	88%	97%	27.4%
$7,500 & Over	66%	94%	6.1%
Total	**98%**	**98%**	**100.0%**

The ultimate A/E termination ratios by indemnity amount per claim record before the CTR modifiers show a distinct downward pattern as the indemnity amount increases. The CTR modifiers brought the ultimate A/E termination ratios much closer to 100% in the three indemnity amount bands. Because of lower exposure, the female A/E termination ratios after the CTR modifiers showed more variability around 100% than the males.

Section 6: Impact on Claim Reserves

This section discusses the potential impact of the 2006-2014 IDIET on claim reserves relative to the 2013 IDIVT. The impact can vary widely by occupation class, onset age, gender, claim duration and many other variables, which can make this type of analysis unwieldy and difficult to assess the overall impact. To have a more manageable analysis, a model office representing industry open IDI claims on 12/31/2014 was developed. The analysis of the potential impact of the 2006-2014 IDIET on claims reserves relative to the model office is discussed below.

In order to focus only on how claim reserves can change due to the CTR basis, the valuation interest rate in all of the comparisons was kept at 3% in all claim durations. Furthermore, the 2013 IDIVT CTRs used in the calculation of claim reserves were, for the most part, before the application of valuation margins.

6.1 MODEL OFFICE

In order to obtain a comprehensive understanding on the change in realistic claim reserves going from the 2013 IDIVT to the 2006-2014 IDIET, a model office of A&S claims open as of 12/31/2014 from the most recent IDEC claim database was constructed. Claim reserves were then calculated using each of the two expected bases using a modified version of the 2013 IDI Valuation Workbook.

6.1.1 MODEL OFFICE ASSUMPTIONS

Several items are important to note for the development of this inventory.

- Record characteristics – Only claim records noted as "open" as of 12/31/2014 were considered, as this was the latest date in the study that was considered to have complete data. The valuation date of 12/31/2014 is consistent with that.
- Record selection – In order to maintain data confidentiality, policy numbers and company identifiers were not part of the database. Records in the database were aggregations of multiple policy records that had common demographic and plan parameter characteristics.
- Record keying – Model office cells were determined by rolling up database records with like characteristics (ICD9/10 category, disability age band, occupation, gender, EP and BP, COLA presence and indemnity bands).
- Duration determination for each valuation record – As the database had all claim durations exposed during the experience period (2006 to 2014), the longest duration was selected as the model office cell for the valuation record. For example; if the claim was incurred on 1/1/2010 with a 90-day elimination period and still open on 12/31/2014, there would be 57 records in our exposure data for the claim, in other words, one record for each of the months of exposure from the end of EP to the end of the study period (4/1/2010 to 12/31/2014). For the model office, only the 12/31/2014 record was extracted.

To maintain confidentiality of the records, no actual dates were maintained in the model office database. The date of birth and date of disability for each model office record were estimated using the available information in the model office database.

The dates of disability, i.e., incurral dates, were determined as follows:

- Durations for each record were available from the claim database.
- Monthly durations were present for the first 60 months. This is consistent with the 2013 IDIVT table.
- After 60 months, durations were grouped into claim years. Each of these was mapped to the mid-year; i.e., Year 6 was mapped to month 66, Year 7 to month 78, etc.
- All dates of disability were assumed to be on the first of the month.

The dates of birth were determined as follows:

- Claimants' ages were assigned to quinquennial age bands. For example, with ages 30 to 34 and ages 35 to 39, the midpoints (age 32 and age 37 above) were used to estimate the onset age for all claims within the age band.
- The estimated age in years was subtracted from the date of disability to determine the date of birth.

The benefit start dates were determined by adding the Elimination Period to the date of disability determined above.

The benefit end dates were determined as follows:

- Exact benefit period classifications were not available in the claims database. Instead, claims were classified as short-term, To Age 65-70 or lifetime.
- Short-term benefit periods were estimated to be 36 months for claims in the first three years of disability. If the claim duration of the open record was over 36 months, the benefit period was assumed to be 60 months.
- All To Age 65-70 claims were assumed to be To Age 65, with the benefit period ending exactly on the birthday of the attainment of age 65.
- Lifetime claims were assumed to end on the birthday of the attainment of age 100.
- Older age claim incurrals; i.e., onset age over 65, were assumed to have a 24-month benefit period.

The indemnity amount for each model office record was set equal to the total exposure indemnity amount divided by the exposure count, rounded to the nearest $100.

Claims with COLA benefits were assumed to be compounded on each disability anniversary date after 360 days, using a constant COLA index rate of 2.5%. COLA increases were assumed to cease on the disability anniversary of the claimant's 65th birthday.

6.1.2 ANALYSIS OF MODEL OFFICE RECORDS

The model office consisted of 19,820 cells, representing 44,572 claims with a combined indemnity of $76,999,200. In general, the model office provided a reasonable representation of industry IDI open claims around 12/31/2014.

Table 6.1 shows the distribution of the indemnity for the model office records by benefit period and IDEC occupation class.

Table 6.1
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY BENEFIT PERIOD AND OCCUPATION CLASS

Benefit Period	Occ Cl M	Occ Cl 1	Occ Cl 2	Occ Cl 2	Occ Cl 4	Total
24M	0.93%	0.74%	0.04%	0.00%	0.00%	**1.73%**
36M	1.43%	1.64%	0.38%	0.20%	0.19%	**3.84%**
60M	0.53%	0.69%	0.23%	0.14%	0.17%	**1.76%**
To Age 65	21.51%	21.43%	3.93%	0.31%	0.04%	**47.21%**
Lifetime	28.74%	15.08%	1.53%	0.10%	0.00%	**45.46%**
Total	**53.14%**	**39.59%**	**6.11%**	**0.76%**	**0.40%**	**100.00%**

Occupation class M represents 53% of the total model office indemnity and occupation class 1 represents 40%. Claim records with the To Age 65 benefit period represent 47% of the total model office indemnity, and claim records with a lifetime benefit period represent 45%.

Table 6.2 shows the distribution of the indemnity for the model office records by onset age and gender.

Table 6.2
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY ONSET AGE AND GENDER

Onset Age	Female	Male
Under 30	0.63%	0.70%
30-34	1.37%	2.25%
35-39	3.08%	6.20%
40-44	4.40%	9.92%
45-49	5.07%	12.48%
50-54	5.40%	14.78%
55-59	4.35%	14.27%
60-64	2.37%	10.16%
65-69	0.25%	2.31%
Total	**26.92%**	**73.08%**

Males represent 73% of the model office open claim indemnity and females represent 27%. A negligible number of claim records showed an onset age after age 69; these were ignored for the model office.

Table 6.3 shows the distribution of the model office indemnity by benefit period and claim duration.

Table 6.3
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY BENEFIT PERIOD AND CLAIM DURATION

Benefit Period	Years 1-2	Years 3-5	Years 6-10	Years 11+	Total
24M	1.7%	0.0%	0.0%	0.0%	**1.7%**
36M	3.3%	0.5%	0.0%	0.0%	**3.8%**
60M	0.0%	1.6%	0.0%	0.0%	**1.8%**
To Age 65	6.2%	9.4%	11.6%	20.1%	**47.2%**
Lifetime	1.8%	3.7%	6.6%	33.4%	**45.5%**
Total	**13.1%**	**15.2%**	**18.2%**	**53.5%**	**100.0%**

Over 73% of the lifetime indemnity claims fall in claim durations 11+, compared to only 42% for To Age 65.

Table 6.4 shows the distribution of the model office indemnity by year of incurral and benefit period.

Table 6.4
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY YEAR OF INCURRAL AND BENEFIT PERIOD

Year of Incurral	Short-term	To Age 65	Lifetime	Total
Before 1985	0.01%	0.11%	0.68%	**0.80%**
1985-1989	0.01%	0.82%	2.97%	**3.80%**
1990-1994	0.01%	3.53%	8.38%	**11.92%**
1995-1999	0.03%	6.95%	12.17%	**19.15%**
2000-2004	0.14%	8.52%	9.15%	**17.81%**
2005-2009	0.00%	11.62%	6.61%	**18.23%**
2010-2014	7.14%	15.65%	5.49%	**28.29%**
Total	**7.33%**	**47.21%**	**45.46%**	**100.00%**

Over 64% of the model office indemnity was incurred in calendar years 2000 through 2014. This percentage is 99% for claims with short-term benefit periods, 76% for claims with To Age 65-70 benefit periods and 47% for claims with a lifetime benefit period.

Table 6.5 shows the distribution of the model office indemnity by benefit period and the presence of COLA benefits.

Table 6.5
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY BENEFIT PERIOD AND PRESENCE OF COLA BENEFITS

Benefit Period	Without COLA	With COLA	Unknown	Total
Short-term	5.57%	1.63%	0.13%	**7.33%**
To Age 65	25.73%	20.19%	1.29%	**47.21%**
Lifetime	21.90%	21.23%	2.33%	**45.46%**
Total	**53.20%**	**43.05%**	**3.75%**	**100.00%**

Over 49% of the indemnity on lifetime claims has COLA benefits, compared to 44% for claims with To Age 65-70 benefit periods.

Table 6.6 shows the distribution of the model office indemnity by indemnity amount per claim record and benefit period.

Table 6.6
DISTRIBUTION OF MODEL OFFICE INDEMNITY BY INDEMNITY AMOUNT PER CLAIM RECORD AND BENEFIT PERIOD

Indemnity Amount	Short-term	To Age 65	Lifetime	Total
Under $2,500	1.98%	6.54%	4.69%	**13.21%**
$2,500-4,999	1.84%	10.85%	9.01%	**21.69%**
$5,000-7,499	1.53%	10.51%	9.49%	**21.53%**
$7,500 & Over	1.99%	19.31%	22.26%	**43.57%**
Total	**7.33%**	**47.21%**	**45.46%**	**100.00%**

Almost 44% of the total indemnity is on claims with indemnity amount per claim record of $7,500 and over.

6.2 CLAIM RESERVE CALCULATION AND RESULTS

The 2013 IDIVT Workbook was modified to calculate claim reserves using either the 2013 IDIVT or the 2006-2014 IDIET. The model office claim reserves for the two expected bases are compared in a variety of ways below.

6.2.1 CLAIM RESERVE IMPACT FOR ALL MODEL OFFICE CLAIMS COMBINED

Table 6.7 compares the model office claim reserves, split by benefit period groupings, calculated using the two different bases. No valuation margins are added to either basis.

Table 6.7
MODEL OFFICE CLAIM RESERVES – 2013 IDIVT VERSUS 2006-2014 IDIET ($ MILLIONS)

Benefit Period	2013 IDIVT	2006-2014 IDIET	Increase in Claim Reserves	% of Increase
Short-term	295	298	3	1.1%
To Age 65	3,950	4,167	217	5.5%
Lifetime	6,329	7,706	1,377	21.8%
Total	**10,574**	**12,171**	**1,597**	**15.1%**

The 2006-2014 IDIET increases the model office claim reserves by 15%. Lifetime claims had the biggest percentage increase among the three benefit period groupings at 22%.

The 2006-2014 IDIET consists of two sets of CTRs:

1. CTR modifiers to the 2013 IDIVT CTRs in the select durations, shown in Appendix B, and
2. New base CTRs in the ultimate durations, shown in Appendix C, with further CTR modifiers by indemnity amount, shown in Appendix B.

Table 6.8 compares the impact on the model office claim reserves from using (1) only CTR changes in the select claim durations, (2) only CTR changes in the ultimate durations, and (3) the combined changes.

Table 6.8

MODEL OFFICE CLAIM RESERVES – COMPARISON OF THE IMPACT OF 2006-2014 IDIET CTR CHANGES IN THE SELECT AND ULTIMATE DURATIONS

Benefit Period	2013 IDIVT	2006-2014 IDIET		
		Select Duration Changes Only	Ultimate Duration Changes Only	All Changes Combined
Short-term	295	298	295	298
To Age 65	3,950	4,076	4,037	4,167
Lifetime	6,329	6,408	7,611	7,706
Total	**10,574**	**10,782**	**11,944**	**12,171**
% Change from the 2013 IDIVT Claim Reserves				
Short-term	0.0%	1.1%	0.0%	1.1%
To Age 65	0.0%	3.2%	2.2%	5.5%
Lifetime	0.0%	1.2%	20.3%	21.8%
Total	**0.0%**	**2.0%**	**13.0%**	**15.1%**

For all model office claims combined, the changes in the select duration CTRs increased the claim reserves by 2%, and the changes in the ultimate duration CTRs increased the claim reserves by 13%. Not surprisingly, the changes in the ultimate duration CTRs had the greatest impact on lifetime claim reserves at 20%.

6.2.2 CLAIM RESERVE IMPACT BY OCCUPATION CLASS

Table 6.9 compares the change in the model office claim reserves by occupation class.

Table 6.9

MODEL OFFICE CLAIM RESERVES – COMPARISON OF THE IMPACT OF 2006-2014 IDIET CTR CHANGES BY IDEC OCCUPATION CLASS

IDEC Occupation Class	Short-term Benefit Periods		To Age 65 Benefit Periods		Lifetime Benefit Period		All Benefit Periods	
	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET
M	116	116	1,838	1,920	4,015	4,969	5,969	7,006
1	136	138	1,700	1,805	2,011	2,381	3,847	4,323
2	21	21	397	425	292	345	710	791
3-4	23	23	15	16	10	12	48	51
Total	**295**	**298**	**3,950**	**4,167**	**6,329**	**7,706**	**10,574**	**12,171**
% Change from the 2013 IDIVT Claim Reserves								
M		0.2%		4.5%		23.8%		17.4%
1		1.3%		6.2%		18.4%		12.4%
2		2.4%		7.2%		18.0%		11.5%
3-4		3.9%		6.1%		11.7%		6.3%
Total		**1.1%**		**5.5%**		**21.8%**		**15.1%**

The 2006-2014 IDIET had the biggest impact on occupation class M claim reserves due to a higher percentage of claims with lifetime benefit periods in this occupation class.

6.2.3 CLAIM RESERVE IMPACT BY INDEMNITY AMOUNT

Table 6.10

MODEL OFFICE CLAIM RESERVES – COMPARISON OF THE IMPACT OF 2006-2014 IDIET CTR CHANGES BY INDEMNITY AMOUNT PER CLAIM RECORD

Indemnity Amount per Claim Record	Short-term Benefit Periods		To Age 65 Benefit Periods		Lifetime Benefit Period		All Benefit Periods	
	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET
Under $2,500	110	111	674	688	884	987	1,668	1,786
$2,500-4,999	79	80	930	967	1,393	1,644	2,402	2,691
$5,000-7,499	57	57	851	896	1,296	1,539	2,203	2,492
$7,500 & Over	50	51	1,495	1,616	2,755	3,536	4,300	5,203
Total	**295**	**298**	**3,950**	**4,167**	**6,329**	**7,706**	**10,574**	**12,171**
% Change from the 2013 IDIVT								
Under $2,500		0.7%		2.0%		11.6%		7.0%
$2,500-4,999		1.0%		4.0%		18.0%		12.0%
$5,000-7,499		1.4%		5.3%		18.7%		13.1%
$7,500 & Over		2.1%		8.1%		28.3%		21.0%
Total		**1.1%**		**5.5%**		**21.8%**		**15.1%**

The percentage increase in the claim reserves due to the change in basis increases as the indemnity amount per claim record increases, 7% for amounts under $2,500, increasing to 21% for amounts of $7,500 and over, when all benefit periods are combined.

6.2.4 CLAIM RESERVE IMPACT BY CLAIM DURATION

Table 6.11 compares the change in the model office claim reserves by claim duration.

Table 6.11

MODEL OFFICE CLAIM RESERVES – COMPARISON OF THE IMPACT OF 2006-2014 IDIET CTR CHANGES BY CLAIM DURATION

Claim Duration	Short-term Benefit Periods		To Age 65 Benefit Periods		Lifetime Benefit Period		All Benefit Periods	
	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET	2013 IDIVT	2006-2014 IDIET
Y1-2	250	253	543	588	277	330	1,070	1,170
Y3-5	45	46	797	869	573	693	1,415	1,608
Y6-10	0	0	1,074	1,135	1,022	1,239	2,097	2,375
Y11+	0	0	1,536	1,574	4,456	5,444	5,992	7,019
Total	**295**	**298**	**3,950**	**4,167**	**6,329**	**7,706**	**10,574**	**12,171**
% Change from the 2013 IDIVT								
Y1-2		1.0%		8.3%		19.0%		9.4%
Y3-5		1.8%		9.1%		20.8%		13.6%
Y6-10				5.7%		21.3%		13.3%
Y11+				2.5%		22.2%		17.1%
Total		**1.1%**		**5.5%**		**21.8%**		**15.1%**

The percentage increase in the claim reserves due to the change in basis is fairly constant at all durations for lifetime claims and is largest for claims in ultimate claim years (11+), when considering the current mix of claims.

6.2.5 CLAIM RESERVE IMPACT BY ONSET AGE AND GENDER

Table 6.12 compares the percentage change in claim reserves between the two valuation bases by disability age and gender.

Table 6.12

CHANGE IN MODEL OFFICE CLAIM RESERVES BY ONSET AGE AND GENDER BETWEEN THE TWO VALUATION BASES – AS PERCENTAGES OF 2013 IDIVT CLAIM RESERVES

Onset Age	Short-term Benefit Periods		To Age 65 Benefit Periods		Lifetime Benefit Period		All Benefit Periods	
	Male	Female	Male	Female	Male	Female	Male	Female
Under 30	4.1%	7.8%	16.5%	8.4%	26.7%	19.6%	20.7%	13.2%
30-34	5.7%	7.7%	8.9%	4.7%	22.0%	14.2%	15.5%	9.0%
35-39	5.0%	9.0%	7.3%	4.1%	20.6%	15.3%	14.4%	9.1%
40-44	1.5%	6.8%	5.4%	4.8%	21.8%	16.7%	15.4%	11.2%
45-49	1.4%	3.8%	5.4%	4.7%	23.8%	18.1%	17.0%	12.2%
50-54	3.0%	2.5%	4.7%	4.9%	24.8%	19.6%	17.6%	14.0%
55-59	2.7%	1.3%	3.5%	2.1%	24.8%	19.5%	18.1%	13.2%
60-64	1.5%	-0.7%	0.3%	-1.0%	22.4%	17.3%	17.3%	12.5%
65-69	-0.4%	-2.9%	-1.1%	-4.5%	24.4%	17.1%	8.2%	4.9%
Total	**1.1%**	**1.2%**	**6.0%**	**4.6%**	**23.3%**	**17.7%**	**16.5%**	**11.7%**

The changes in model claim reserves as percentage of the 2013 IDIVT claim reserves are somewhat higher for males than females. The percentages tend to increase slightly with onset age through 59 for claims with a lifetime benefit period. Different companies may limit the benefit period after incurral ages 55 and above, but this is not reflected here. On the other hand, the percentages tend to decrease slightly with disability age for claims with short-term and To Age 65 benefit periods.

Section 7: Reliance and Limitations

No assessment has been made concerning the applicability of this experience to other purposes. In developing this report, the SOA relied on data and information supplied by the participating companies. For each participant, this information includes, but is not limited to, the data submission for claims experience and the responses to follow-up questions.

The results in this report are technical in nature and dependent on certain assumptions and methods. No party should rely on these results without a thorough understanding of those assumptions and methods. Such an understanding may require consultation with qualified professionals. This report should be distributed and reviewed only in its entirety.

Section 8: Acknowledgements

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Section 9: List of Participating Companies

Ameritas Life Insurance Corporation (Union Central)

Assurity Life Insurance Company

Berkshire Life Insurance Company of America

Guardian Life Insurance Company

Illinois Mutual Life Insurance Company

Massachusetts Casualty Insurance Company

Massachusetts Mutual (including Connecticut Mutual)

Monarch Life Insurance Company (including Penn Mutual)

Mutual of Omaha Insurance Company

Northwestern Mutual Life Insurance Company

Paul Revere Life Insurance Company

Principal Financial Group

Provident Life & Accident Insurance Company

RiverSource Life Insurance Company

Standard Life Insurance Company

Trustmark Life Insurance Company

UNUM

Appendix A: 2013 IDIVT CTR Modifiers for Select Period Only

There are three types of CTR modifiers for the 2013 IDIVT:

1. By contract type
2. By benefit period and COLA benefits
3. By diagnosis rating level

The claim incidence modifiers by diagnosis rating are only applied in the calculation of claim reserves, not active life reserves. The 2013 IDIVT CTR modifiers were applied only in the select claim durations. There were no 2013 IDIVT CTR modifiers applied in the ultimate claim durations.

Table A.1
CTR MODIFIERS BY CONTRACT TYPE

Claim Duration	BOE	All Other
Year 1	94.70%	100.00%
Year 2	259.40%	100.00%
Years 3–5	259.40%	100.00%
Years 6–10	259.40%	100.00%

Table A.2
CTR MODIFIERS BY BENEFIT PERIOD AND COLA BENEFIT

Claim Duration	To Age 65-70	Lifetime	Short-term
Without COLA Benefits			
Year 1	100.00%	78.30%	117.20%
Year 2	100.00%	78.30%	117.20%
Years 3–5	100.00%	78.30%	117.20%
Years 6–10	100.00%	78.30%	117.20%
With COLA Benefits			
Year 1	83.50%	78.30%	117.20%
Year 2	83.50%	78.30%	117.20%
Years 3–5	83.50%	78.30%	117.20%
Years 6–10	83.50%	78.30%	117.20%

Table A.3
CTR MODIFIERS BY DIAGNOSIS RISK MAPPING

Claim Duration	Very Low	Low	Mid	High	Very High
Year 1	44.40%	87.00%	113.00%	115.00%	132.70%
Year 2	69.10%	97.40%	94.30%	114.10%	212.60%
Years 3–5	84.80%	85.60%	96.30%	134.30%	209.60%
Years 6–10	108.50%	92.90%	97.20%	122.20%	176.10%

Appendix B: 2006-2014 IDIET CTR Rate Modifiers

There are five types of CTR modifiers for the select durations (to apply in addition to the 2013 IDIVT modifiers):

1. By onset age and gender
2. By occupation class
3. By diagnosis risk mapping
4. By benefit period and COLA benefits
5. By indemnity amount

The CTR modifier by indemnity amount is the only modifier for the ultimate durations.

Table B.1

2006-2014 IDIET CTR MODIFIERS – ONSET AGE AND GENDER (SELECT DURATIONS ONLY)

Claim Duration	Onset Age Under 35	Onset Age 35-39	Onset Age 40-44	Onset Age 45-49	Onset Age 50-54	Onset Age 55-59	Onset Age 60-64	Onset Age 65 & Over
Female								
Year 1	95.0%	96.9%	80.3%	83.4%	90.0%	98.3%	113.0%	137.7%
Year 2	71.4%	58.5%	69.1%	72.7%	80.2%	90.5%	92.6%	98.5%
Years 3-5	69.0%	61.5%	65.7%	70.1%	58.0%	68.5%	86.7%	37.2%
Years 6-10	62.0%	61.4%	51.3%	60.4%	58.2%	60.9%	50.5%	70.2%
Male								
Year 1	114.3%	109.1%	113.4%	106.5%	106.5%	102.5%	98.2%	110.4%
Year 2	81.2%	85.7%	81.3%	96.5%	93.4%	88.3%	94.8%	100.1%
Years 3-5	73.7%	80.0%	77.8%	73.2%	62.9%	58.6%	78.1%	98.6%
Years 6-10	62.8%	64.2%	59.4%	47.6%	56.9%	66.6%	76.5%	39.8%

Table B.2

2006-2014 IDIET CTR MODIFIERS – OCCUPATION CLASS (SELECT DURATIONS ONLY)

Claim Duration	Occupation Class M	Occupation Class 1	Occupation Class 2	Occupation Classes 3-4
Year 1	106.3%	98.7%	87.5%	87.5%
Year 2	111.2%	92.8%	95.0%	95.0%
Years 3-5	108.3%	96.5%	93.4%	93.4%
Years 6-10	99.1%	101.4%	101.9%	101.9%

Table B.3

2006-2014 IDIET CTR MODIFIERS – DIAGNOSIS RISK MAPPING (SELECT DURATIONS ONLY)

Claim Duration	Very Low	Low	Mid	High	Very High
Year 1	87.9%	91.7%	93.8%	124.4%	100.5%
Year 2	85.6%	79.8%	92.5%	116.8%	137.1%
Years 3-5	102.2%	94.8%	81.6%	77.2%	177.3%
Years 6-10	99.7%	82.2%	96.1%	87.1%	189.0%

Table B.4

2006-2014 IDIET CTR MODIFIERS – COLA AND BENEFIT PERIOD (SELECT DURATIONS ONLY)

COLA Rider	Short-term	To Age 65-70	Lifetime
No	94.3%	93.5%	108.7%
Yes	89.3%	111.9%	104.4%
Unknown	100.0%	100.0%	100.0%

Table B.5

2006-2014 IDIET CTR MODIFIERS – INDEMNITY AMOUNT (SELECT DURATIONS ONLY)

Claim Duration	Under $2,500	$2,500 - 4,999	$5,000-7,499	$7,500 & Over
Year 1	108.9%	101.1%	98.0%	92.7%
Year 2	109.2%	108.7%	100.6%	91.4%
Years 3-5	110.4%	101.8%	90.9%	86.0%
Years 6-10	109.9%	101.7%	92.0%	80.2%

Table B.6

2006-2014 IDIET CTR MODIFIERS – INDEMNITY AMOUNT (ULTIMATE DURATIONS ONLY)

Indemnity Amount	CTR Modifier
Under $2,500	105.0%
$2,500 - 4,999	90.0%
$5,000 - 7,499	90.0%
$7,500 & Over	70.0%

Appendix C: 2006-2014 IDIET Ultimate Claim Termination Rates per 1,000

Table C.1

BASE CLAIM TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	8.05	12.17	9.82	9.99
26	8.02	12.13	9.80	9.96
27	7.98	12.08	9.80	9.96
28	7.92	11.98	9.82	9.99
29	7.92	11.98	9.86	10.06
30	7.98	12.08	9.91	10.17
31	8.11	12.27	9.97	10.28
32	8.34	12.60	10.04	10.42
33	8.59	12.97	10.12	10.56
34	8.85	13.35	10.21	10.74
35	9.17	13.82	10.34	10.99
36	9.48	14.29	10.49	11.27
37	9.84	14.81	10.64	11.55
38	10.19	15.33	10.78	11.80
39	10.57	15.89	10.89	12.01
40	11.02	16.55	10.98	12.19
41	11.40	17.12	11.06	12.33
42	11.69	17.54	11.13	12.47
43	11.85	17.77	11.21	12.62
44	12.04	18.06	11.28	12.76
45	12.23	18.34	11.41	13.01
46	12.42	18.62	11.60	13.36
47	12.58	18.86	11.79	13.72
48	12.77	19.14	12.00	14.11
49	13.06	19.56	12.22	14.53
50	12.67	18.94	11.21	13.77
51	12.27	18.32	10.20	13.00
52	11.88	17.70	9.20	12.24
53	12.40	18.46	9.54	12.95
54	12.91	19.22	9.89	13.67
55	13.42	19.97	10.24	14.38
56	13.94	20.73	10.58	15.10
57	14.45	21.49	10.93	15.82
58	14.33	21.30	10.80	15.89
59	14.21	21.11	10.68	15.97
60	14.09	20.92	10.55	16.04
61	13.97	20.72	10.42	16.12
62	13.85	20.53	10.29	16.19
63	15.17	22.48	10.36	16.31
64	16.49	24.43	10.42	16.43
65	17.80	26.37	10.48	16.55
66	19.12	28.32	10.55	16.67
67	20.44	30.27	10.61	16.79
68	21.58	31.91	10.69	18.03
69	22.72	33.55	10.77	19.27
70	23.86	35.19	10.85	20.50
71	25.67	37.85	12.09	22.84
72	27.47	40.51	13.33	25.19
73	29.27	43.17	14.57	27.53
74	31.08	45.83	15.81	29.87

Table C.1 - Continued

BASE CLAIM TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
75	32.88	48.49	17.05	32.22
76	34.69	51.15	18.29	34.56
77	36.49	53.81	19.53	36.90
78	42.55	57.70	25.51	40.71
79	48.60	61.59	31.49	44.52
80	54.66	65.48	37.47	48.33
81	60.71	69.37	43.45	52.14
82	66.77	73.26	49.44	55.95
83	72.82	77.15	55.42	59.76
84	78.88	81.04	61.40	63.57
85	84.93	84.93	67.38	67.38
86	96.15	96.15	76.12	76.12
87	108.69	108.69	85.66	85.66
88	122.34	122.34	96.11	96.11
89	136.76	136.76	107.46	107.46
90	151.63	151.63	119.54	119.54
91	166.51	166.51	132.30	132.30
92	181.13	181.13	145.88	145.88
93	195.09	195.09	159.87	159.87
94	207.76	207.76	174.25	174.25
95	221.27	221.27	190.71	190.71
96	237.50	237.50	209.82	209.82
97	255.11	255.11	230.48	230.48
98	274.22	274.22	252.51	252.51
99	294.48	294.48	275.55	275.55
100	315.52	315.52	299.21	299.21
101	336.99	336.99	323.14	323.14
102	358.54	358.54	346.98	346.98
103	379.81	379.81	370.36	370.36
104	400.44	400.44	392.92	392.92
105	420.09	420.09	414.30	414.30
106	438.40	438.40	434.13	434.13
107	455.01	455.01	452.05	452.05
108	469.56	469.56	467.69	467.69
109	481.70	481.70	480.68	480.68
110	491.07	491.07	490.65	490.65
111	497.31	497.31	497.23	497.23
112	500.00	500.00	500.00	500.00
113	500.00	500.00	500.00	500.00
114	500.00	500.00	500.00	500.00
115	500.00	500.00	500.00	500.00
116	500.00	500.00	500.00	500.00
117	500.00	500.00	500.00	500.00
118	500.00	500.00	500.00	500.00
119	500.00	500.00	500.00	500.00
120	500.00	500.00	500.00	500.00

Table C.2

BASE CLAIM TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	6.40	6.93	5.96	6.71
26	6.37	6.89	5.94	6.68
27	6.35	6.86	5.94	6.68
28	6.30	6.78	5.96	6.71
29	6.30	6.78	6.00	6.76
30	6.35	6.86	6.05	6.84
31	6.44	7.01	6.10	6.92
32	6.61	7.28	6.18	7.02
33	6.80	7.59	6.25	7.13
34	6.99	7.90	6.34	7.26
35	7.23	8.29	6.46	7.45
36	7.47	8.68	6.61	7.66
37	7.73	9.10	6.75	7.87
38	7.99	9.53	6.87	8.06
39	8.28	9.99	6.98	8.22
40	8.61	10.54	7.07	8.35
41	8.90	11.00	7.14	8.46
42	9.11	11.35	7.22	8.56
43	9.23	11.54	7.29	8.67
44	9.38	11.78	7.36	8.78
45	9.52	12.01	7.48	8.96
46	9.66	12.24	7.66	9.23
47	9.78	12.43	7.84	9.49
48	9.93	12.67	8.04	9.78
49	10.14	13.02	8.26	10.10
50	10.44	13.44	8.54	10.49
51	10.74	13.87	8.83	10.88
52	11.03	14.30	9.11	11.27
53	11.22	14.78	9.22	11.55
54	11.40	15.26	9.34	11.83
55	11.59	15.75	9.45	12.10
56	11.77	16.23	9.56	12.38
57	11.96	16.71	9.67	12.66
58	11.58	16.44	9.33	12.38
59	11.20	16.17	9.00	12.09
60	10.81	15.90	8.66	11.81
61	10.43	15.64	8.32	11.52
62	10.05	15.37	7.99	11.24
63	11.00	16.94	8.00	11.28
64	11.95	18.50	8.01	11.31
65	12.89	20.07	8.02	11.35
66	13.84	21.64	8.03	11.39
67	14.79	23.21	8.05	11.42
68	15.80	25.13	8.82	12.73
69	16.82	27.05	9.59	14.04
70	17.84	28.96	10.36	15.35
71	19.18	31.15	11.55	17.10
72	20.53	33.34	12.73	18.85
73	21.88	35.53	13.92	20.61
74	23.23	37.72	15.10	22.36

Table C.2 - Continued

BASE CLAIM TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
75	24.58	39.91	16.28	24.11
76	25.93	42.10	17.47	25.87
77	27.27	44.29	18.65	27.62
78	34.48	49.37	24.74	32.59
79	41.69	54.45	30.83	37.56
80	48.90	59.53	36.92	42.53
81	56.10	64.61	43.02	47.50
82	63.31	69.69	49.11	52.47
83	70.52	74.77	55.20	57.44
84	77.72	79.85	61.29	62.41
85	84.93	84.93	67.38	67.38
86	96.15	96.15	76.12	76.12
87	108.69	108.69	85.66	85.66
88	122.34	122.34	96.11	96.11
89	136.76	136.76	107.46	107.46
90	151.63	151.63	119.54	119.54
91	166.51	166.51	132.30	132.30
92	181.13	181.13	145.88	145.88
93	195.09	195.09	159.87	159.87
94	207.76	207.76	174.25	174.25
95	221.27	221.27	190.71	190.71
96	237.50	237.50	209.82	209.82
97	255.11	255.11	230.48	230.48
98	274.22	274.22	252.51	252.51
99	294.48	294.48	275.55	275.55
100	315.52	315.52	299.21	299.21
101	336.99	336.99	323.14	323.14
102	358.54	358.54	346.98	346.98
103	379.81	379.81	370.36	370.36
104	400.44	400.44	392.92	392.92
105	420.09	420.09	414.30	414.30
106	438.40	438.40	434.13	434.13
107	455.01	455.01	452.05	452.05
108	469.56	469.56	467.69	467.69
109	481.70	481.70	480.68	480.68
110	491.07	491.07	490.65	490.65
111	497.31	497.31	497.23	497.23
112	500.00	500.00	500.00	500.00
113	500.00	500.00	500.00	500.00
114	500.00	500.00	500.00	500.00
115	500.00	500.00	500.00	500.00
116	500.00	500.00	500.00	500.00
117	500.00	500.00	500.00	500.00
118	500.00	500.00	500.00	500.00
119	500.00	500.00	500.00	500.00
120	1000.00	1000.00	1000.00	1000.00

Table C.3

RECOVERY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	5.24	8.03	9.14	8.72
26	5.24	8.03	9.14	8.72
27	5.24	8.03	9.14	8.72
28	5.24	8.03	9.14	8.72
29	5.24	8.03	9.14	8.72
30	5.24	8.03	9.14	8.72
31	5.24	8.03	9.14	8.72
32	5.24	8.03	9.14	8.72
33	5.24	8.03	9.14	8.72
34	5.24	8.03	9.14	8.72
35	5.24	8.03	9.14	8.72
36	5.24	8.03	9.14	8.72
37	5.24	8.03	9.14	8.72
38	5.24	8.03	9.14	8.72
39	5.24	8.03	9.14	8.72
40	5.24	8.03	9.14	8.72
41	5.24	8.03	9.14	8.72
42	5.24	8.03	9.14	8.72
43	5.24	8.03	9.14	8.72
44	5.24	8.03	9.14	8.72
45	5.24	8.03	9.14	8.72
46	5.24	8.03	9.14	8.72
47	5.24	8.03	9.14	8.72
48	5.24	8.03	9.14	8.72
49	5.24	8.03	9.14	8.72
50	4.54	6.96	7.92	7.55
51	3.84	5.89	6.71	6.39
52	3.14	4.82	5.49	5.23
53	3.11	4.76	5.42	5.17
54	3.07	4.71	5.36	5.11
55	3.03	4.65	5.29	5.05
56	3.00	4.59	5.23	4.99
57	2.96	4.54	5.17	4.92
58	2.77	4.24	4.83	4.60
59	2.57	3.94	4.49	4.28
60	2.38	3.65	4.15	3.96
61	2.19	3.35	3.81	3.63
62	1.99	3.05	3.48	3.31
63	1.99	3.05	3.48	3.31
64	1.99	3.05	3.48	3.31
65	1.99	3.05	3.48	3.31
66	1.99	3.05	3.48	3.32
67	1.99	3.06	3.48	3.32
68	1.33	2.04	2.32	2.21
69	0.66	1.02	1.16	1.11
70 & Over	0.00	0.00	0.00	0.00

Table C.4

RECOVERY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	4.30	3.52	5.32	5.75
26	4.30	3.52	5.32	5.75
27	4.30	3.52	5.32	5.75
28	4.30	3.52	5.32	5.75
29	4.30	3.52	5.32	5.75
30	4.30	3.52	5.32	5.75
31	4.30	3.52	5.32	5.75
32	4.30	3.52	5.32	5.75
33	4.30	3.52	5.32	5.75
34	4.30	3.52	5.32	5.75
35	4.30	3.52	5.32	5.75
36	4.30	3.52	5.32	5.75
37	4.30	3.52	5.32	5.75
38	4.30	3.52	5.32	5.75
39	4.30	3.52	5.32	5.75
40	4.30	3.52	5.32	5.75
41	4.30	3.52	5.32	5.75
42	4.30	3.52	5.32	5.75
43	4.30	3.52	5.32	5.75
44	4.30	3.52	5.32	5.75
45	4.30	3.52	5.32	5.75
46	4.30	3.52	5.32	5.75
47	4.30	3.52	5.32	5.75
48	4.30	3.52	5.32	5.75
49	4.30	3.52	5.32	5.75
50	4.36	3.58	5.40	5.84
51	4.43	3.64	5.49	5.93
52	4.50	3.69	5.57	6.03
53	4.28	3.51	5.29	5.72
54	4.05	3.32	5.01	5.42
55	3.82	3.13	4.73	5.11
56	3.59	2.95	4.45	4.81
57	3.37	2.76	4.17	4.51
58	2.93	2.40	3.63	3.92
59	2.50	2.05	3.09	3.34
60	2.06	1.69	2.55	2.76
61	1.63	1.34	2.01	2.18
62	1.19	0.98	1.48	1.60
63	1.15	0.95	1.43	1.55
64	1.12	0.91	1.38	1.49
65	1.08	0.88	1.33	1.44
66	1.04	0.85	1.28	1.39
67	1.00	0.82	1.23	1.34
68	0.67	0.55	0.82	0.89
69	0.33	0.27	0.41	0.45
70 & Over	0.00	0.00	0.00	0.00

Table C.5

MORTALITY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	2.81	4.14	0.68	1.28
26	2.78	4.10	0.66	1.24
27	2.75	4.05	0.66	1.24
28	2.68	3.95	0.68	1.28
29	2.68	3.95	0.71	1.35
30	2.75	4.05	0.77	1.45
31	2.87	4.24	0.83	1.56
32	3.10	4.57	0.90	1.70
33	3.35	4.94	0.98	1.84
34	3.61	5.32	1.07	2.02
35	3.93	5.79	1.20	2.27
36	4.25	6.26	1.35	2.55
37	4.60	6.78	1.50	2.84
38	4.95	7.30	1.63	3.09
39	5.33	7.86	1.75	3.30
40	5.78	8.52	1.84	3.48
41	6.16	9.09	1.91	3.62
42	6.45	9.51	1.99	3.76
43	6.61	9.74	2.06	3.90
44	6.80	10.03	2.14	4.04
45	6.99	10.31	2.27	4.29
46	7.18	10.59	2.46	4.65
47	7.34	10.83	2.65	5.00
48	7.53	11.11	2.85	5.39
49	7.82	11.53	3.08	5.82
50	8.13	11.98	3.29	6.21
51	8.43	12.43	3.50	6.61
52	8.74	12.88	3.71	7.00
53	9.29	13.70	4.12	7.78
54	9.84	14.51	4.53	8.56
55	10.39	15.32	4.94	9.34
56	10.94	16.14	5.35	10.11
57	11.49	16.95	5.76	10.89
58	11.57	17.06	5.98	11.29
59	11.64	17.16	6.19	11.69
60	11.71	17.27	6.40	12.09
61	11.78	17.38	6.61	12.48
62	11.85	17.48	6.82	12.88
63	13.17	19.43	6.88	13.00
64	14.49	21.37	6.94	13.12
65	15.81	23.32	7.01	13.24
66	17.13	25.26	7.07	13.36
67	18.45	27.21	7.13	13.47
68	20.26	29.87	8.37	15.82
69	22.06	32.53	9.61	18.16
70	23.86	35.19	10.85	20.50
71	25.67	37.85	12.09	22.84
72	27.47	40.51	13.33	25.19
73	29.27	43.17	14.57	27.53
74	31.08	45.83	15.81	29.87

Table C.5 - Continued

MORTALITY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH **NON-LIFETIME BENEFIT PERIODS**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
75	32.88	48.49	17.05	32.22
76	34.69	51.15	18.29	34.56
77	36.49	53.81	19.53	36.90
78	42.55	57.70	25.51	40.71
79	48.60	61.59	31.49	44.52
80	54.66	65.48	37.47	48.33
81	60.71	69.37	43.45	52.14
82	66.77	73.26	49.44	55.95
83	72.82	77.15	55.42	59.76
84	78.88	81.04	61.40	63.57
85	84.93	84.93	67.38	67.38
86	96.15	96.15	76.12	76.12
87	108.69	108.69	85.66	85.66
88	122.34	122.34	96.11	96.11
89	136.76	136.76	107.46	107.46
90	151.63	151.63	119.54	119.54
91	166.51	166.51	132.30	132.30
92	181.13	181.13	145.88	145.88
93	195.09	195.09	159.87	159.87
94	207.76	207.76	174.25	174.25
95	221.27	221.27	190.71	190.71
96	237.50	237.50	209.82	209.82
97	255.11	255.11	230.48	230.48
98	274.22	274.22	252.51	252.51
99	294.48	294.48	275.55	275.55
100	315.52	315.52	299.21	299.21
101	336.99	336.99	323.14	323.14
102	358.54	358.54	346.98	346.98
103	379.81	379.81	370.36	370.36
104	400.44	400.44	392.92	392.92
105	420.09	420.09	414.30	414.30
106	438.40	438.40	434.13	434.13
107	455.01	455.01	452.05	452.05
108	469.56	469.56	467.69	467.69
109	481.70	481.70	480.68	480.68
110	491.07	491.07	490.65	490.65
111	497.31	497.31	497.23	497.23
112	500.00	500.00	500.00	500.00
113	500.00	500.00	500.00	500.00
114	500.00	500.00	500.00	500.00
115	500.00	500.00	500.00	500.00
116	500.00	500.00	500.00	500.00
117	500.00	500.00	500.00	500.00
118	500.00	500.00	500.00	500.00
119	500.00	500.00	500.00	500.00
120	1000.00	1000.00	1000.00	1000.00

Table C.6

MORTALITY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	2.10	3.41	0.65	0.96
26	2.08	3.37	0.63	0.93
27	2.05	3.33	0.63	0.93
28	2.00	3.25	0.65	0.96
29	2.00	3.25	0.68	1.01
30	2.05	3.33	0.73	1.09
31	2.15	3.49	0.79	1.17
32	2.31	3.76	0.86	1.27
33	2.51	4.07	0.93	1.38
34	2.70	4.38	1.02	1.51
35	2.93	4.77	1.15	1.70
36	3.17	5.15	1.29	1.91
37	3.44	5.58	1.43	2.12
38	3.70	6.00	1.56	2.31
39	3.98	6.47	1.67	2.47
40	4.32	7.01	1.76	2.60
41	4.60	7.48	1.83	2.71
42	4.82	7.83	1.90	2.81
43	4.94	8.02	1.97	2.92
44	5.08	8.25	2.04	3.03
45	5.22	8.48	2.17	3.21
46	5.37	8.72	2.35	3.48
47	5.49	8.91	2.53	3.74
48	5.63	9.14	2.72	4.03
49	5.85	9.49	2.94	4.35
50	6.07	9.86	3.14	4.65
51	6.30	10.23	3.34	4.95
52	6.53	10.60	3.54	5.24
53	6.94	11.27	3.93	5.83
54	7.35	11.94	4.33	6.41
55	7.77	12.61	4.72	6.99
56	8.18	13.28	5.11	7.57
57	8.59	13.95	5.51	8.15
58	8.64	14.04	5.71	8.45
59	8.70	14.12	5.91	8.75
60	8.75	14.21	6.11	9.05
61	8.81	14.30	6.31	9.34
62	8.86	14.39	6.51	9.64
63	9.85	15.99	6.57	9.73
64	10.83	17.59	6.63	9.82
65	11.82	19.19	6.69	9.91
66	12.80	20.79	6.75	10.00
67	13.79	22.39	6.81	10.09
68	15.14	24.58	8.00	11.84
69	16.49	26.77	9.18	13.59
70	17.84	28.96	10.36	15.35
71	19.18	31.15	11.55	17.10
72	20.53	33.34	12.73	18.85
73	21.88	35.53	13.92	20.61
74	23.23	37.72	15.10	22.36

Table C.6 - Continued

MORTALITY RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS WITH A **LIFETIME BENEFIT PERIOD**

Attained Age	Male		Female	
	M	Non-M	M	Non-M
75	24.58	39.91	16.28	24.11
76	25.93	42.10	17.47	25.87
77	27.27	44.29	18.65	27.62
78	34.48	49.37	24.74	32.59
79	41.69	54.45	30.83	37.56
80	48.90	59.53	36.92	42.53
81	56.10	64.61	43.02	47.50
82	63.31	69.69	49.11	52.47
83	70.52	74.77	55.20	57.44
84	77.72	79.85	61.29	62.41
85	84.93	84.93	67.38	67.38
86	96.15	96.15	76.12	76.12
87	108.69	108.69	85.66	85.66
88	122.34	122.34	96.11	96.11
89	136.76	136.76	107.46	107.46
90	151.63	151.63	119.54	119.54
91	166.51	166.51	132.30	132.30
92	181.13	181.13	145.88	145.88
93	195.09	195.09	159.87	159.87
94	207.76	207.76	174.25	174.25
95	221.27	221.27	190.71	190.71
96	237.50	237.50	209.82	209.82
97	255.11	255.11	230.48	230.48
98	274.22	274.22	252.51	252.51
99	294.48	294.48	275.55	275.55
100	315.52	315.52	299.21	299.21
101	336.99	336.99	323.14	323.14
102	358.54	358.54	346.98	346.98
103	379.81	379.81	370.36	370.36
104	400.44	400.44	392.92	392.92
105	420.09	420.09	414.30	414.30
106	438.40	438.40	434.13	434.13
107	455.01	455.01	452.05	452.05
108	469.56	469.56	467.69	467.69
109	481.70	481.70	480.68	480.68
110	491.07	491.07	490.65	490.65
111	497.31	497.31	497.23	497.23
112	500.00	500.00	500.00	500.00
113	500.00	500.00	500.00	500.00
114	500.00	500.00	500.00	500.00
115	500.00	500.00	500.00	500.00
116	500.00	500.00	500.00	500.00
117	500.00	500.00	500.00	500.00
118	500.00	500.00	500.00	500.00
119	500.00	500.00	500.00	500.00
120	1000.00	1000.00	1000.00	1000.00

Appendix D: 2015 VBT Mortality Rates per 1,000

Table D.1 shows the 2015 ultimate VBT mortality rates per 1,000 for unismoker, age last birthday.

Table D.1

2015 VBT MORTALITY PER 1,000 – BY ATTAINED AGE AND GENDER

Attained Age	Male	Female
25	0.88	0.36
26	0.87	0.35
27	0.86	0.35
28	0.84	0.36
29	0.84	0.38
30	0.86	0.41
31	0.90	0.44
32	0.97	0.48
33	1.05	0.52
34	1.13	0.57
35	1.23	0.64
36	1.33	0.72
37	1.44	0.80
38	1.55	0.87
39	1.67	0.93
40	1.81	0.98
41	1.93	1.02
42	2.02	1.06
43	2.07	1.10
44	2.13	1.14
45	2.19	1.21
46	2.25	1.31
47	2.30	1.41
48	2.36	1.52
49	2.45	1.64
50	2.57	1.78
51	2.72	1.94
52	2.90	2.11
53	3.10	2.30
54	3.34	2.51
55	3.62	2.74
56	3.93	3.00
57	4.29	3.30
58	4.71	3.63
59	5.19	4.01
60	5.75	4.43
61	6.38	4.92
62	7.09	5.46
63	7.89	6.08
64	8.75	6.76
65	9.67	7.53
66	10.65	8.37
67	11.69	9.31
68	12.85	10.35
69	14.18	11.49
70	15.74	12.74
71	17.56	14.10
72	19.69	15.59
73	22.11	17.25
74	24.79	19.11

Table D.1 - Continued

2015 VBT MORTALITY PER 1,000 – BY ATTAINED AGE AND GENDER

Attained Age	Male	Female
75	27.71	21.21
76	30.85	23.60
77	34.26	26.30
78	38.02	29.34
79	42.27	32.78
80	47.14	36.77
81	52.61	41.41
82	58.97	46.66
83	66.47	52.66
84	75.06	59.53
85	84.93	67.38
86	96.15	76.12
87	108.69	85.66
88	122.34	96.11
89	136.76	107.46
90	151.63	119.54
91	166.51	132.30
92	181.13	145.88
93	195.09	159.87
94	207.76	174.25
95	221.27	190.71
96	237.50	209.82
97	255.11	230.48
98	274.22	252.51
99	294.48	275.55
100	315.52	299.21
101	336.99	323.14
102	358.54	346.98
103	379.81	370.36
104	400.44	392.92
105	420.09	414.30
106	438.40	434.13
107	455.01	452.05
108	469.56	467.69
109	481.70	480.68
110	491.07	490.65
111	497.31	497.23
112	500.00	500.00
113	500.00	500.00
114	500.00	500.00
115	500.00	500.00
116	500.00	500.00
117	500.00	500.00
118	500.00	500.00
119	500.00	500.00
120	500.00	500.00

Appendix E: 2013 IDIVT Ultimate Claim Termination Rates per 1,000

Table E.1

CLAIM TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS

Attained Age	Male		Female	
	M	Non-M	M	Non-M
25	25.64	36.33	19.73	27.96
26	25.64	36.33	19.73	27.96
27	25.64	36.33	19.73	27.96
28	25.64	36.33	19.73	27.96
29	25.64	36.33	19.73	27.96
30	25.64	36.33	19.73	27.96
31	25.64	36.33	19.73	27.96
32	25.64	36.33	19.73	27.96
33	25.86	36.63	19.86	28.13
34	26.07	36.93	20.10	28.47
35	26.39	37.38	20.34	28.82
36	25.75	36.48	19.74	27.96
37	25.12	35.58	19.14	27.11
38	24.48	34.68	18.53	26.26
39	23.85	33.78	17.93	25.40
40	23.21	32.88	17.33	24.55
41	22.58	31.98	16.72	23.69
42	21.94	31.09	16.12	22.84
43	21.31	30.19	15.52	21.98
44	20.67	29.29	14.92	21.13
45	20.04	28.39	14.31	20.27
46	19.77	28.01	14.03	19.87
47	19.50	27.63	13.74	19.46
48	19.23	27.25	13.45	19.06
49	18.97	26.87	13.17	18.65
50	18.70	26.49	12.88	18.25
51	18.43	26.11	12.60	17.84
52	18.16	25.73	12.31	17.44
53	17.89	25.35	12.03	17.04
54	17.62	24.97	11.74	16.63
55	17.36	24.59	11.45	16.23
56	17.50	24.78	11.50	16.29
57	17.64	24.98	11.55	16.36
58	17.78	25.18	11.60	16.43
59	17.92	25.38	11.64	16.49
60	18.06	25.58	11.69	16.56
61	18.20	25.78	11.74	16.63
62	18.34	25.98	11.79	16.70
63	19.20	27.20	12.48	17.68
64	20.06	28.41	13.17	18.66
65	20.91	29.63	13.86	19.64
66	22.65	30.81	15.14	20.60
67	24.45	31.99	16.47	21.55
68	27.01	34.04	18.55	23.38
69	29.69	36.08	20.74	25.21
70	32.48	38.12	23.03	27.03
71	35.40	40.15	25.43	28.84
72	38.43	42.18	27.93	30.66
73	42.38	45.06	31.35	33.33
74	46.50	47.93	34.93	36.00

Table E.1 - Continued

TERMINATION (MORTALITY + RECOVERY) RATES PER 1,000 – BY ATTAINED AGE, GENDER AND OCCUPATION CLASS FOR CLAIMS

Attained Age	Male		Female	
	M	Non-M	M	Non-M
75	50.79	50.79	38.66	38.66
76	53.70	53.70	41.37	41.37
77	56.61	56.61	44.07	44.07
78	60.68	60.68	47.44	47.44
79	65.61	65.61	51.07	51.07
80	70.69	70.69	55.00	55.00
81	76.11	76.11	59.24	59.24
82	81.98	81.98	63.79	63.79
83	88.27	88.27	70.79	70.79
84	96.30	96.30	78.45	78.45
85	107.56	107.56	86.77	86.77
86	120.19	120.19	95.80	95.80
87	134.46	134.46	105.55	105.55
88	150.67	150.67	116.10	116.10
89	168.48	168.48	127.32	127.32
90	188.27	188.27	139.10	139.10
91	210.09	210.09	151.58	151.58
92	232.99	232.99	164.89	164.89
93	256.18	256.18	179.05	179.05
94	277.79	277.79	194.09	194.09
95	298.72	298.72	210.03	210.03
96	320.55	320.55	226.89	226.89
97	343.80	343.80	251.29	251.29
98	370.68	370.68	284.44	284.44
99	399.28	399.28	318.04	318.04
100	427.04	427.04	351.65	351.65
101	452.86	452.86	384.78	384.78
102	475.70	475.70	416.88	416.88
103	494.76	494.76	446.83	446.83
104	510.79	510.79	474.69	474.69
105	525.11	525.11	497.83	497.83
106	538.30	538.30	513.30	513.30
107	548.91	548.91	527.99	527.99
108	555.21	555.21	541.80	541.80
109	560.03	560.03	554.65	554.65
110	562.50	562.50	562.50	562.50
111	562.50	562.50	562.50	562.50
112	562.50	562.50	562.50	562.50
113	562.50	562.50	562.50	562.50
114	562.50	562.50	562.50	562.50
115	562.50	562.50	562.50	562.50
116	562.50	562.50	562.50	562.50
117	562.50	562.50	562.50	562.50
118	562.50	562.50	562.50	562.50
119	562.50	562.50	562.50	562.50
120	562.50	562.50	562.50	562.50

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