2008 Group Long Term Disability

Experience Table Report

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Table of Contents

Section 1: Acknowledgements

The 2008 Group Long Term Disability Experience Table Report (the Report) is built upon extensive work over several years (2007 – 2011). We would like to thank the 2008 Group Long Term Disability Experience Committee members who set the foundations for the realization of a new table.

2008 Group Long Term Disability Experience Committee

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The actual 2008 Long Term Disability Experience Table (the Table or Experience Table) and the Report result from the work of five subcommittees each charged of supporting specific steps in the production and presentation of the new Table. We would like to recognize the generous contribution of our subcommittee members.

2008 Group Long Term Disability Experience Subcommittees

Edd Bailey (Formula Subcommittee Chair)[A]
Tom Corcoran (Data Subcommittee Chair)[B]
Rick Leavitt (Experience Study Report Subcommittee Chair)[C]
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Footnotes:

[A]. The Formula Subcommittee set the definitions of exposures and terminations.
[B]. The Data Subcommittee oversaw the collection and auditing of data.
[C]. The Experience Study Report Subcommittee wrote the 2008 LTD Experience Study Report, dated August 14, 2009, that formed the basis for the Table.
[D]. The Experience Table Report Subcommittee wrote the Report.
[E]. The Experience Table Construction Subcommittee oversaw the construction of the Table.

We would like to thank the staff at the Medical Information Bureau for meticulously supporting all data handling steps, as well as our Society of Actuaries partners for their ongoing support.

Medical Information Bureau

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Participating Companies

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Mutual of Omaha
Nippon Life Insurance Company
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OneAmerica
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Section 2: Introduction and Background

In response to the growing need for a comprehensive update of industry experience, the Society of Actuaries' 2008 Group Long Term Disability (GLTD) Experience Committee (the Committee or LTD Experience Committee) gathered and analyzed historical industry data on claim terminations. On August 14, 2009, the Society of Actuaries' (SOA) released the 2008 Long Term Disability Report, which summarized the processes used and the results of the 2008 Group Long Term Disability Claim Termination Study (the 2008 Study). The 2008 Study covered claim termination experience, without smoothing or graduation, for claim exposures between January 1, 1997 and December 31, 2006, with a valuation date of December 31, 2007 (in order to allow for late reporting of claim terminations and new claims). The 2008 Study contained much more extensive data than previous studies, both in terms of depth (the 1.2 million claims exposed was more than four times the exposure underlying Table 95a) and breadth (more than 20 companies submitted data). In addition, the data was subjected to a multi-step audit process in partnership with the Medical Information Bureau (MIB), before being analyzed across 14 experience parameters. Claim terminations were assigned to one of five categories:

- Recovery
- Death
- Contractual maximum benefit duration being reached (Max-Out)
- Expiration due to specified benefit period limit (Limit); e.g., for Mental & Nervous (M&N) diagnosis
- Settlement.

The data associated with the largest contributors was dampened to prevent their experience from dominating the study results. Specifically, the exposure for each of the top five companies was reset to represent 12% of the total study exposure. In addition, data for the smallest four companies were combined and treated as one company for purposes of the 2008 Study. This approach was selected to ensure that the results reasonably represent the experience of a broad base of companies.

It was recognized by the Committee that the next step in the process would be construction of the 2008 GLTD Experience Table (the Experience Table or the Table). The robust nature of the data opened the opportunity to consider reflecting new parameters or combinations of parameters in the experience table (compared to prior studies).

The 2008 Group Long Term Disability (GLTD) Experience Table Construction Subcommittee (the Subcommittee) was formed in November 2009 to make critical decisions about how the Experience Table would be constructed. As a first step, the Smith Group was retained to perform the experience parameter evaluations and develop recommendations for table construction.

Some of the key decision points included:

- Determining the appropriate degree of granularity, especially with respect to Diagnosis, Duration, and Age
- Handling differences in experience by elimination period (EP)
- Handling the spike in termination rates surrounding the change in Definition of Disability
- Handling claim Settlements and mental and nervous limit (M&N Limit) terminations
- Addressing wide variances in results by Calendar Year and participating company
- Determining the optimal analytical and graduation techniques to maximize utilization of the extensive database.

The Smith Group and the Subcommittee worked in partnership to perform an in-depth review that considered multiple approaches, and then made decisions regarding these and other issues. Our evaluations and conclusions in this regard, as well as more specifics on the construction process, table structure and considerations for future use, are described in the following sections of this report.

This document is accompanied by two Excel workbooks containing supplementary material. The first is the actual experience table labeled as “2008 GLTD Experience Table.xls.” This work book presents the study expectations in tabular form, along with some sample claims, including examples of two different methods for accessing the table. One method uses Excel look-up functions to access the table directly in the workbook, while the second method uses internal Visual Basic functions. The structure and use of the table is documented in Chapter Five and Appendix A.

The second work-book is a summary pivot table of termination results, including expectations developed with the 2008 GLTD Experience Table. This table contains summary termination actual and expected counts, rates, and claim exposures, after applying the company-dampening factors described above. This pivot table is labeled “2008 GLTD Experience Pivot Table Results.xls” and is described in more detail in Appendix D.

Section 3: Objectives of the Experience Table Construction Process

3.1 Objectives

The primary objective of the Experience Table construction process was to form an appropriate basis for the eventual development of a new statutory valuation table. However, we also recognized that the Experience Table would be used for other applications. Accordingly, the Subcommittee decided to utilize the large volume of data to develop an Experience Table that would emphasize reserve or claim cost accuracy by reflecting as many of the parameters as produced credible differentiation within the data.

3.2 Alignment of Development Process with Objectives

Consistent with the above objectives, the Subcommittee focused its efforts on development of a no-margin Experience Table by using multivariate analysis to identify and incorporate credible parameters. In constructing the Table some potentially conflicting objectives had to be balanced:

1. The opportunity to increase precision by introducing complex multi-dimensional structures had to be balanced against the need for the Table to be manageable by individual companies.

2. The objective of matching results closely to the underlying experience data (measured by actual-to-expected (A-to-E) ratios) had to be balanced against the need to graduate the inherently uneven experience data and avoid over-fitting.

3. The Committee felt that decisions as to the appropriate level of granularity of any subsequent valuation table should be made by a separate valuation table committee. Therefore, the Table would be constructed so that it could be collapsed to less granular views (e.g., excluding diagnosis), if a future valuation table committee might decide that that would be desirable.

3.3 Considerations for Table Use

The Experience Table contained in this report is reflective of industry experience for the calendar period 1997 – 2006, without explicit margin. While it is intended to provide the maximum level of credible granularity, care should be taken in application, as it may not be representative of a specific company's experience. It does not address the potentially significant differences in experience, especially in early claim durations, which result from company-specific administrative practices and markets. In addition, the experience table does not include the development of termination expectations for claims with Elimination Periods less than 15 days. The committee felt that the supplied information on these early duration claims was too volatile, with the terminations too dependent on company-specific practice to warrant inclusion. To establish reserves for the early durations for LTD claims with short EP's it will be necessary to develop an alternative approach.

Development of a recommended statutory valuation table, including appropriate margins, will be addressed by a separate committee. That work will be done through the American Academy of Actuaries (AAA). The deliverable will be a recommendation to (the Health Actuarial Task Force of) the National Association of Insurance Commissioners (NAIC).

Section 4: Development of Table

4.1 Overview

The Subcommittee's objective was to produce an Experience Table that was more granular than past industry tables; i.e., where all of the significant parameters driving Recovery and Death experience in the Report would be represented. The large amount of experience collected and unprecedented industry participation enabled this more granular approach. The following criteria were used in constructing the Table:

- The Table should include only the parameters that have a material impact on termination rates
- It should include only parameters that have sufficient data to make credible estimates of termination rates
- It should provide a good overall fit to the underlying experience
- It should not over-fit the data and should be smoothed in a manner that is consistent with our understanding of the risk dynamics
- It should be practical to use
- It should allow for use on claims that are missing information on certain parameters.

Recognizing that these criteria can be in conflict with one another, constructing such a Table constituted a significant challenge. This chapter provides a summary of how the Table was developed. Appendix B provides additional detail.

4.2 Source Data

Participating companies' data submissions were provided to MIB for assembly and aggregation. For the Table construction phase, the Subcommittee was not provided with individual claim information, but rather aggregated data summarized by the following variables:

TABLE 4.2.1

Claim Data Variables Captured in Study

Age at Disability	Indexed Gross Monthly Benefit (IGMB) - 15 amount ranges
Attained Age	Definition of Disability (three categories)
Gender	Own Occupation period (six ranges)
Duration - months since incurral date	Change in Definition Transition Month (11 categories)
Elimination Period (EP) - in months	M&N Limit period (six duration ranges)
Duration since the end of the Elimination Period - (Duration Since EP) – in months	M&N Transition month (11 categories)
Diagnosis (13 categories)	Maximum Benefit duration (eight categories)
Calendar Year (ten years – 1997-2006)	

4.3 Exposure Weighting

At the outset of the Experience Study, we noted that the experience of the largest five contributors comprised 75% of the total exposure and so their experience would likely dominate the results. To moderate that influence, we weighted the experience each of the top five contributors to limit exposure of each to 12% of the total. Thus, the combined experience of the top five contributors was weighted to be 60% of the adjusted total.

After weighting, the summarized data contained 20.8 million observations with 17.7 million weighted exposure months, 475,243 weighted Recoveries and 75,539 weighted Deaths. (An observation is defined as a unique combination of variables.) The number of possible observations is much larger, but many combinations of variables contained no exposure.

4.4 Adjustments to Source Data

To maximize exposure in individual observation cells, the Subcommittee decided not to separate Calendar Year as a variable. In addition, some other variables were grouped into fewer categories

during the construction process. For example, Diagnosis was reduced from thirteen categories in the original data to eight categories for Recoveries and six categories for Deaths.

The primary consideration in selecting the groupings for a selected parameter was a similar level of observed termination rates. Secondary considerations used in grouping parameters were the slope of the adjustments by Diagnosis, Age and Duration. Considerable review was performed to make sure that we were not grouping variables with significantly different dynamics.

4.5 Credibility of Data

The Subcommittee decided that, unlike prior studies, this Study included sufficient exposures and terminations to be used as the sole source of data for determining Expected terminations at all durations. In particular, at the later Durations, this Study includes more terminations that have been recorded in any other study of private disability insurance, with more than 2,000 Recoveries and 5,500 Deaths after 10 years, and 200 Recoveries and 1,250 Deaths after 20 years.

In addition, our two-step process of using an exposure-weighted fit to the data, followed by exposure-weighted graduation, ensures that variations in the actual termination rates resulting from the inherent volatility caused by small exposures are not reproduced in the final table. The actual variable groupings were selected so that most observation cells had a credible number of terminations, and the relatively small number of cells with few terminations did not have a significant impact on the final expectations.

4.6 Table Construction

4.6.1 Modeling Technique

Expected termination rates were fit using a “categorical Generalized Linear Model” (GLM)* with a log-

*In statistics, the generalized linear model (GLM) is a flexible generalization of ordinary least squares regression. The GLM allows the linear model to be related to the response variable via a link function and allows the magnitude of each measurement to be a function of its predicted value.
If you would like additional information on GLM, here are some suggested links:
http://data.princeton.edu/wws509/notes/a2.pdf , http://www.statsoft.com/textbook/general-linear-models/ and http://jackman.stanford.edu/papers/glm.pdf .

normal regression and an assumption of normal distribution of variance about the expectation. The rates were then smoothed using a Whittaker-Henderson graduation procedure.

Other statistical predictive modeling or curve-fitting techniques were considered as alternatives to categorical GLM. Many of these other methods depend on generating the best functional form for approximating the observed data, which imposes constraints on how the expected rates can vary along continuous variables such as Age and Duration. The categorical GLM method contains no prior assumptions about the relative value from one value to the next, and so the parameters can more easily match the observed data. However, the categorical GLM method also has the potential for over-fitting. The graduation procedures described above were used to guard against over-fitting.

4.6.2 Multi-Step Construction Process

A multi-step process was used to generate the different components of the Table. There were two reasons for using multiple steps, as opposed to generating a complete table all at once. The first is the potential scarcity of data in certain cells. If all possible combinations of variables were considered at once, there would be a very large number of cells and many would have no exposure or no terminations. The inherent volatility of the results would complicate the fitting procedure. By considering a limited number of variables at one time, the number of cells was reduced in each step, yielding adequate depth of data.

Secondly, there are strong correlations between certain variables. For example, results by EP, Duration, Duration Since EP and Own Occupation (Own Occ) Period are all strongly correlated. The GLM method is not strong at isolating individual effects among strongly correlated variables. The step-wise approach allows additional control over the fitting procedure, and produces results that are consistent with our understanding of disability risk dynamics.

There is not a rigorous way to determine in advance which step-wise approach will work best. The approach we used was to try a variety of different methods and review the results of each, using a variety of perspectives to evaluate goodness of fit against the alternatives. Initial trials that fit poorly were discarded by the Smith Group; the more viable trials were reviewed by the Subcommittee, who ultimately made the decisions about the final format.

4.6.3 Development of Experience Table Recoveries and Deaths

The Experience Table consists of separate Recovery and Death rates. These rates are calculated by the sequential application of various parameters (Adjustment Tables) to Base Termination Rate (Recovery and Death) Tables. We provide below a brief summary of the iterative analyses used to develop Recoveries and Deaths, noting that additional details of the processes are provided in Appendix B.

Recoveries

Development of Recoveries involved seven steps of analysis. The results of these analyses were combined to construct a Base Recovery Rate Table and various Adjustment Factor Tables (described in Section 5). We note that each step of the analysis did not lead to a specific Table by itself, but that components from different analysis steps were combined to produce the final Tables.

Step 1: Create a Base Recovery Rate Table by Age, Gender, Duration, and EP, excluding both exposures and recoveries for claims in the Change in Definition Transition Period. (The change in Definition Transition Period was defined as starting with the month of Change in Definition and extending for three months in this stage.) Ages are capped at a minimum of 20 years and a maximum of 65 years at this stage.

Step 2: Add Adjustment Factors to make a technical correction for early duration experience by EP.

Step 3: Develop Adjustment Factors to eliminate residual variation by EP.

Step 4: Adjust Change in Definition Transition Period claims by measuring the ratio of A-to-E recoveries for exposures within this Transition Period to develop Change in Definition Transition Factors. The Change in Definition Factors was initially calculated for the month of change through three months following the Change in Definition. They were subsequently extended to produce smoother results (see Section 4.6.4 for details).

Step 5: Develop Adjustment Factors that vary by Diagnosis, Indexed Gross Monthly Benefit (IGMB), and Definition of Disability based on the ratio of A-to-E recoveries after step 2. These factors also vary by Age, Gender, and Duration.

Step 6: Extend the Change in Definition factors from three months after the Change in Definition to eight months after the Change in Definition by grading into the “Any Occ” factors.

Step 7: Measure the A-to-E recoveries for the younger and older ages to extend the expectations to the expanded ages. These adjustments are calculated by Duration and Gender.

Deaths

Death rates were calculated separately for select (less than 60 months) and ultimate (greater than 60 months) durations. Interpolations were performed to grade smoothly between the two. Similar to the process for Recoveries, development of Deaths involved five steps of analysis, as follows:

Step 1: We start with exposures and Deaths for Durations 3 through 60 months, excluding months less than three. We use broad Age and Duration groups to create a preliminary table of death rates that vary by EP, Age, Diagnosis, Gender, Duration, and IGMB.

Step 2: We perform A-to-E’s for the EPs less than three months and extend the preliminary Death Rate Table from Step 1 down to Durations 1 and 2.

Step 3: We analyze A-to-E Deaths by finer Duration and Age breakdowns and expand the broad groupings used for those in steps 1 and 2.

Step 4: The expectations later Duration for Deaths after 60 months are created in one step, considering Gender, Age, Duration, Diagnosis and IGMB.

Step 5: We extend the early Duration (Step 3) table from 60 to 84 months by interpolating between the early and later tables over Durations 60 to 84. This provides a smooth transition from the early Duration Death rates, which vary by age to the later Duration Death rates, which do not.

4.6.4 Additional Detail on Change in Definition Recoveries

For those that are interested, we thought it would be useful to provide additional details on the Change in Definition Recoveries analyses (Recoveries, Step 4 above).

The original data request asked participants to identify the Change in Definition date for applicable claims. The aggregated termination results provided to the Committee were segmented by the number of months before or after the change date, ranging from minus three to plus three months. Since we did not see much increase in overall terminations before the transition, our analysis initially focused on the month of the change through three months after the change; i.e., the initial Recovery rates were developed after specifically excluding the "minus" durations.

Once the initial termination rates were developed, we measured A-to-E Recoveries for exposures within the Transition Period. These results were segmented by Own Occ Period, Diagnosis, IGMB and the number of months since the Change in Definition Transition Month. These A-to-E recoveries were put through our fitting and smoothing process to develop the Table of Adjustment Factors by Change in Definition Transition Month (Table 6R). Ultimately, we used interpolation to grade this Table smoothly from the last (Transition Month plus three) Own Occ adjustment we calculated, to the Any Occ adjustments, over months four to eight following the Change in Definition.

4.7 Special Adjustments

Due to data limitations or the unique nature of how different types of claim characteristics are captured, special adjustments were made to the experience data in order to make the best possible use of the data provided. Adjustments were made in the following situations:

4.7.1 Maternity Recoveries

Due to significantly different nature of Maternity claims versus all other types of LTD claims (normal Maternity claims terminate very quickly and at a relatively consistent duration), Recovery rates for Maternity claims with durations less than three years were developed separately. This avoids introducing distortions to the Recovery rates of other claim diagnosis, which would be a concern given the high Maternity recovery rates in the initial months of disability.

Since Maternity claims showed a less complex Recovery pattern than other claim diagnosis, we were able to develop Maternity Recovery assumptions that varied by fewer variables than the other diagnosis groups. The Maternity Recovery rate variables that were selected were (Duration Since EP) + (Age by Duration group) + (Duration).

Note that EP is not an explicit variable for the Maternity Recovery rates as with other diagnoses as the underlying data did not show material variation by EP.

After three years of disability, Maternity Recovery rates are grouped with the “Other / Ill Defined and Miscellaneous Conditions” Recovery rate Diagnosis grouping.

4.7.2 Mental and Nervous Limit Claim Terminations

Study participants were asked to separately identify M&N claims with limited benefit durations (M&N Limit claims) and to categorize terminations due to the Limit as special M&N Limit terminations. Once the data was assembled it was clear that M&N Limit terminations had been characterized in three different ways by the various study participants: as Recoveries, Max-Outs, or M&N Limit terminations. Since the distinction between these types of terminations is somewhat arbitrary, we elected to group all three of these termination types into a single table (separate from the Recovery Rate Table) that represents the probability of any Non-Death termination for M&N claims as they reach the M&N Limit.

These results are captured in Table 4.7.1, which varies by Age at Disability and Gender. There are eight Age at Disability categories. The ages are defined by age last birthday at the time of the disability, with any age less than 25 being included in the first category and any age greater than or equal to 60 being included in the last category. All intervening categories are based on five year increments. These rates represent the total chance of Non-Death termination for M&N claims with a limited duration, once they reach the limit. In practice we observed that these terminations generally take place within three months of the limit date.

TABLE 4.7.1

Total Mental and Nervous Limit Termination Rates

Age at Disability	Male	Female
<= 24	87.5%	89.3%
25 to 29	86.4%	88.0%
30 to 34	85.1%	86.5%
35 to 39	83.5%	84.8%
40 to 44	81.8%	82.9%
45 to 49	79.4%	80.9%
50 to 54	76.5%	79.0%
55 to 59	73.3%	77.3%
>= 60	70.4%	75.8%

4.7.3 Claim Settlements

Participants were asked to identify those closures that were classified as Settlements. These terminations were then excluded from the study. The exposures for claims that ultimately became Settlements were included, but there were no Settlement terminations included in the Recovery or Death Table development.

4.7.4 Indexing of Gross Monthly Benefit

One of the new Table variables (when contrasted against prior industry tables) is IGMB. Both Recovery and Death rates include Adjustment Factors to recognize that terminations are reduced as the IGMB on claimants increase.

To properly incorporate this variable into the Table, gross monthly benefit amounts needed to be indexed to a common base year for salary inflation. The Table was developed using a base year of 2007, with the gross monthly benefit of all claims in the experience study data normalized to 2007 levels using an average annual inflation rate of 2.4%. Accordingly, when using this Table in the future,

the gross monthly benefit of claims should be indexed to 2007 based upon the claimant's year of disability.

4.7.5 No-Diagnosis Tables

As some users may not have access to Diagnosis on a specific claim, No-Diagnosis Adjustments were developed for both Recoveries and Deaths. These adjustments were developed using the same process as the Diagnosis-specific Recovery and Death rates. They reflect the experience of the average diagnosis mix of claims submitted in the study.

However, we note that the differences by Diagnosis can be quite significant in some circumstances. The Recovery and Death rate tables should be more accurate for a specific claim when using the Diagnosis-specific assumptions.

Section 5: Application and Description of Experience Termination Rate Tables

5.1 Overview of the 2008 GLTD Experience Table Termination Rates

The Experience Table consists of separate Recovery and Death rates. These rates are calculated by the multiplicative application of various parameters (Adjustment Tables) to Base Termination Rate (Recovery and Death) Tables.

Key notes for using the Base Termination Rate and Adjustment Tables:

- Unless otherwise noted, Duration is measured from the claimant's Date of Disability
- Age at Disability is defined by the exact age at the last birthday before the date of loss. The tables use quinquinneal ages (20-24, 25-29, etc). Any age less than 20 should use the first age group and any age greater than or equal to 80 should use the last age group.
- Gross Monthly Benefit (IGMB) is indexed to 2007 from year of disability using an average annual inflation rate of 2.4%.
- The various Adjustment Factors that use IGMB were separated out (and centered about 1.0) so that if the user decides not to incorporate IGMB into their reserving, they can simply not apply the tables that include this as a variable. As long as the users' mix of IGMB's is similar to the study data, a similar overall level of termination rates should be produced.
- Calculation of Duration (from date of Disability) for the study was determined by taking the duration relative to the end of the EP and then adding the number of days associated with the EP. This consistently defines the first month of exposure as the durational month following the EP (e.g., a 180 day EP will consistently begin by being exposed in Duration month 7).
- Diagnosis category mappings are listed in Table 5.1.

TABLE 5.1
Mapping of ICD-9 Codes to Diagnosis Categories

Diagnosis Category	ICD-9 Codes
Back	720-724, 737, 847
Cancer	140-209, 230-239
Circulatory System	280-289, 390-459
Diabetes	250
Digestive	520-579
Ill-Defined and Miscellaneous Conditions	780-799
Injury other than Back	800-846, 848-979, E800-E999
Maternity	630-679, 760-779, V20-V39
M&N	290-319, V40
Nervous System	320-359
Other Musculoskeletal	710-719, 725-736, 738-739
Respiratory	460-519
Other	001-139, 210-229, 240-249, 251-279, 360-389, 580-629, 680-709, 740-759, 980-999, V1-V19, V41-V86

Note that each of the Diagnosis-specific tables has a “No-Diagnosis” version that can be used if the claim diagnosis is not available. Of course, the user should be conscious of potential mix differences between their company’s claims and the aggregate set of claims in the Study. Table 5.2 shows the aggregate distribution of claim diagnoses from the 2008 Study, which were used in the development of the “No-Diagnosis” factors:

TABLE 5.2

Distribution of Claims by Diagnosis in the 2008 GLTD Experience Study

	Selected Durations			
	Year 1	**Year 3**	**Year 5**	**Year 10+**
Back	15.1%	16.7%	15.8%	16.5%
Cancer	14.5%	7.5%	5.5%	2.4%
Circulatory	11.8%	16.8%	19.1%	16.0%
Diabetes	1.3%	2.1%	2.5%	1.8%
Digestive	2.4%	2.1%	2.2%	2.3%
Ill-defined and Misc	2.1%	2.4%	2.6%	2.0%
Injury other than Back	8.9%	6.6%	6.1%	8.3%
Maternity	3.7%	0.1%	0.1%	0.0%
Mental and Nervous	9.0%	6.5%	3.2%	6.1%
Nervous System	6.8%	10.1%	11.8%	13.9%
Other	8.3%	10.3%	12.1%	15.4%
Other Musculoskeletal	13.1%	14.7%	15.0%	12.9%
Respiratory	2.8%	4.0%	4.2%	2.4%

5.2 Application of the Tables

Calculation of the Experience Table termination rates starts with Base Termination Rate Tables, which contain separate Recovery and Death rates. These are subsequently adjusted using several Adjustment Tables (e.g., by Diagnosis, EP etc). All rates are monthly rates, even if shown for quarterly or annual durations.

For comparison to the 1987 GLTD or 1987 CGDT Tables, the separate Recovery and Death rates should be added to produce total terminations.

For any Adjustment Table that varies by Diagnosis, we also include a No-Diagnosis factor. This factor can be used when the Diagnosis is unknown. No-Diagnosis factors assume that Maternity claims with Durations less than 36 months will be handled separately.

The following chart provides an overview of the various Base Termination Rate and Adjustment Tables that are applied to develop the 2008 GLTD Experience Table. Up to six Tables can be used to calculate Recovery Rates, depending on the Own / Any Occ status and Maternity / Non-Maternity Diagnosis.

2008 LTD Experience Table Recoveries

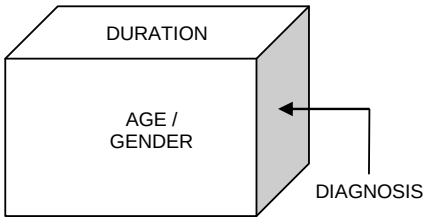


TABLE 1R: Base Recovery Rates by Age / Gender, Duration and Diagnosis

X

TABLE 2R: Adjustment Factors by EP and Duration Since EP

X

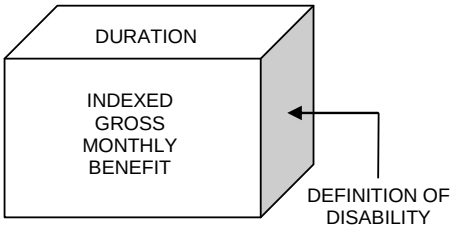


TABLE 3R: Adjustment Factors by IGMB, Duration and Definition of Disability

X

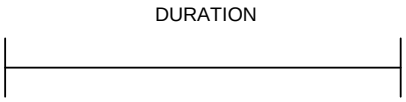


TABLE 4R: Adjustment Factors by Duration (for Any Occ period)

X

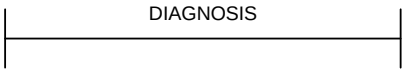


TABLE 5R: Adjustment Factors by Diagnosis (for Any Occ period)

X

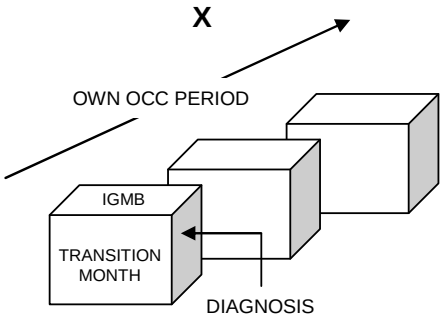


TABLE 6R: Adjustment Factors by Change in Definition Transition Month, IGMB, Diagnosis and Own Occ period

For Maternity Recoveries in the first 36 months, the calculation uses only Table 1R and a simplified version of Table 2R (i.e., Table 2R-M). Maternity claims with a Duration greater than 36 months should be mapped to the "Other" Diagnosis category.

The following narrative provides a more detailed description of the Base Recovery Rate and Adjustment Tables.

- Base Termination Rate Table 1R provides expected monthly Recovery rates that vary by Duration, Gender, Age at Disability and Diagnosis. Durations are shown monthly through 84 months and annually for Durations after 84 months.

- Adjustment Table 2R provides Adjustment Factors that vary by EP and Duration Since EP (i.e., the number of months since the end of the EP). After eighteen months from the EP, this table does not apply. The EP groupings are based on the days in the EP and are grouped into 14 categories in 30 day increments. For example, the first category is for EPs less than or equal to 45 days, the second from 46 to 75 days, and so on. The last category is for EPs greater than 435 days.

- Adjustment Table 3R provides Adjustment Factors that vary by IGMB, Duration and Definition of Disability. There are three sets of factors depending on whether the claim has a duration less than 84 months and is in the Own Occ or Any Occ period. (These Recovery Adjustment Factors do not apply to Maternity claims in the first 36 months of Duration nor to Any Occ claims with a Change in Definition Transition that is less than or equal to nine months.)

- Adjustment Table 4R provides durational Adjustment Factors for Any Occ claims past the Change in Definition Transition Period. This table captures the impact of an Any Occ Definition of Disability and so if this table is dropped, all claims would be treated like Own Occ claims.

- Adjustment Table 5R provides Adjustment Factors that vary by Diagnosis for Any Occ claims past the Change in Definition Transition Period. This table captures the impact of an Any Occ Definition of Disability and so if this table is dropped, all claims will be treated like Own Occ claims.

- Adjustment Table 6R provides Adjustment Factors that vary by Change in Definition Transition Month, IGMB, Diagnosis category and Own Occ period. This table captures the impact of the Change in Definition of Disability and so if this table is dropped, all claims would be treated like Own Occ claims.

Table 3R is used when a claim is either before or after the Disability Transition Period. Table 6R is used when a claim is in the Disability Transition Period.

Maternity claims in the 36 months of Duration use a separate, simplified Table of Claim Recovery Adjustment Factors (Table 2R-M) that apply to the claims in the first 18 months of Duration Since EP. These factors are applied to Table 1R. The other Recovery Adjustment Factor Tables (2R through 6R) are not used.

Death rates use three Termination Rate and Adjustment Factor Tables.

2008 GLTD Experience Table Deaths

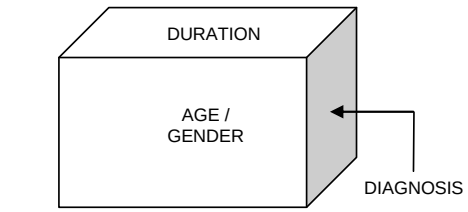


TABLE 1D: Base Death Rates by Age / Gender, Duration and Diagnosis

X

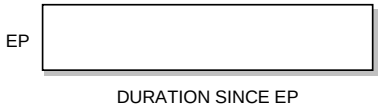


TABLE 2D: Adjustment Factors by EP and Duration Since EP

X

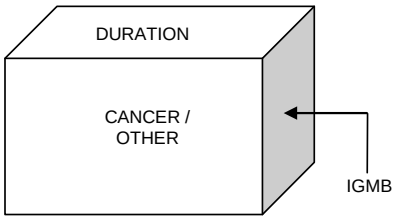


TABLE 3D: Adjustment factors by IGMB, Duration and Cancer / Other

- Base Death Rate Table 1D provides monthly Death indices by Duration, Gender, Age at Disability and Diagnosis category. They vary by monthly duration up through 84 months and annual durations after 84 months.

- Adjustment Table 2D provides Death Adjustment Factors by EP and Duration Since EP.
- Adjustment Table 3D provides Adjustment Factors by IGMB, Duration (less than or greater than 84 months) and Diagnosis. Diagnosis is broken only into Cancer versus Non-Cancer.

5.3 Considerations for Use of the 2008 GLTD Experience Table

There are many considerations when determining the appropriate application of an Experience Table. The 2008 Experience Table is intended to produce the most detailed replication of results from the Study dataset. Users should consider the following:

5.3.1 Availability of Data

Many pieces of data are needed in order to fully use the Table. For example, while the Table does not require use of Diagnosis, use of Diagnosis could materially affect termination rates for a specific claim. The distinctions may be more important for some applications than others.

5.3.2 Intended Purpose

There are many potential applications for an experience table including financial reporting, experience analysis and pricing. Given the derivation of the 2008 GLTD Experience Table, users should first study and understand their actual results in relation to the Experience Study before determining the appropriate usage of the Table for any of these purposes.

5.3.3 Claims Management Practices

Variation in claims practices could have a material impact on the application of these tables. In addition, the Study would capture only those practices in place during the Study period, averaged across multiple carriers. Any significant differences between a specific company's own claim practices and the industry average could affect the practical application of this Experience Table.

5.3.4 Provision for Adverse Deviation

Typically provision for adverse deviation is considered when using Experience Tables. A user should first understand their company's results in relation to the 2008 GLTD Experience Study, and then

determine what level of conservatism may be appropriate to apply for the specific application. Considerations might include block size or potential volatility in claim size.

5.3.5 Handling Durations Past the End of the Table

The Duration categories extend through 252 months for Recoveries and through 480 months for Deaths. For durations beyond these values we recommend moving to the last Duration category for the next age band. For example, for age-band 20-24 you would use the Duration 252 recovery rate for durations 241 through 300, and then move to the age-band 25-29 for Durations from 301 through 360, and so on. When extending deaths, we recommend that the actual age-band and the duration group 469-480 be used for these specific durations, and that the next age-band group be used for durations 481-540. This will make sure the duration groups used for extending the death table will be the same as those used when extending the recovery table.

If you are using age interpolation, then this table extension could be done annually rather than in five year groups. For example for a 22 year-old, you would use the 22 year rate for durations 241 through 252 and the 23-year rate for durations 252-264, and so on.

Section 6: Comparisons of 2008 Experience Table Values to Prior Industry Tables

This section compares common tabular values generated using the 2008 Experience Table to similar values using earlier industry tables, including the 1987 Commissioner's Group Disability Table (1987 CGDT), the 1987 GLTD Experience Table, and Table 1995a.

6.1 Comparison of Table Termination Rates to the 1987 CGDT

The four charts below compare the termination rates, for selected age, EP and gender combinations, for durations 1 through 36 months. The 2008 Experience Table calculations assume No-Diagnosis, 24 Month Own Occ and $3,000 IGMB.

CHART 6.1.1

Termination Rates for 2008 GLTD Experience Table vs. 1987 CGDT by Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Female, Age 27, Six Month Elimination Period

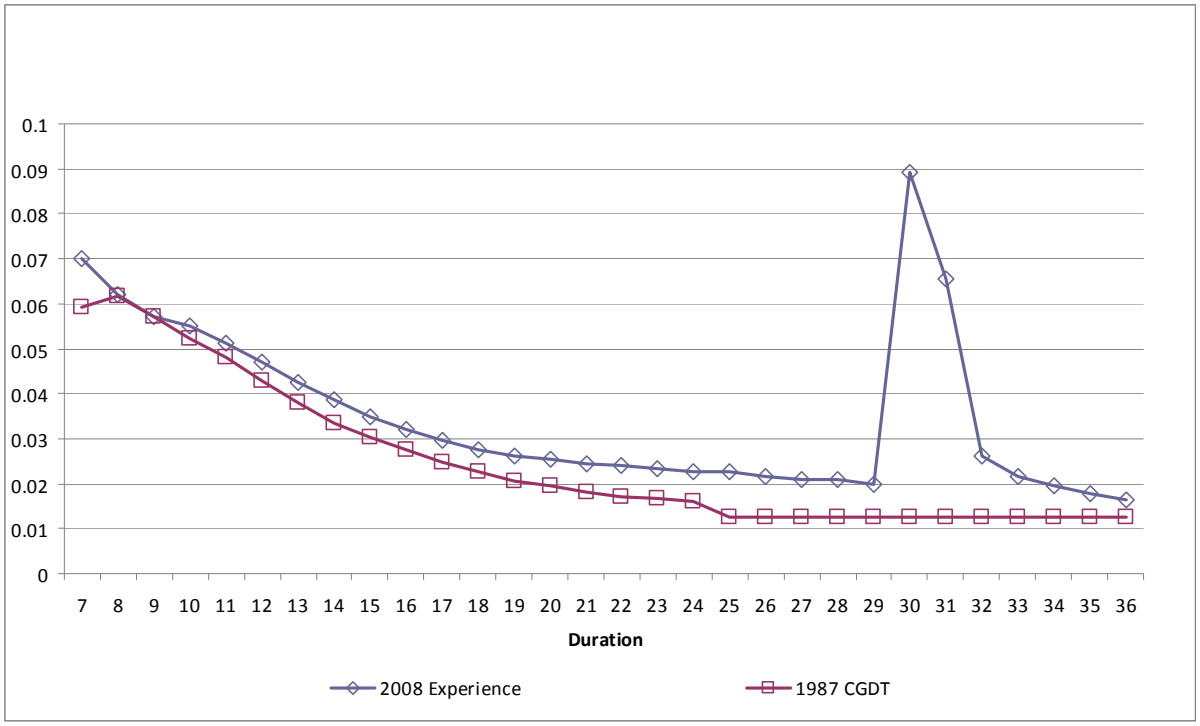


CHART 6.1.2

Termination Rates for 2008 GLTD Experience Table vs. 1987 CGDT by Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Male, Age 37, Three Month Elimination Period

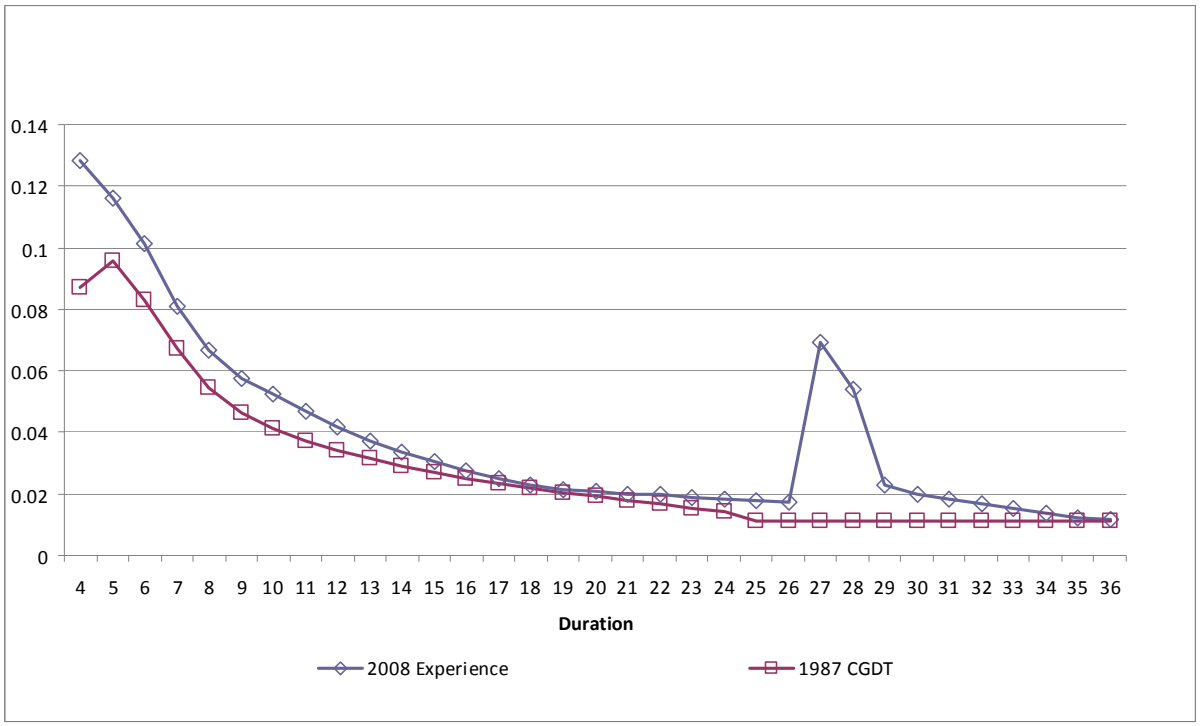


CHART 6.1.3

Termination Rates for 2008 GLTD Experience Table vs. 1987 CGDT by Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Female, Age 47, Six Month Elimination Period

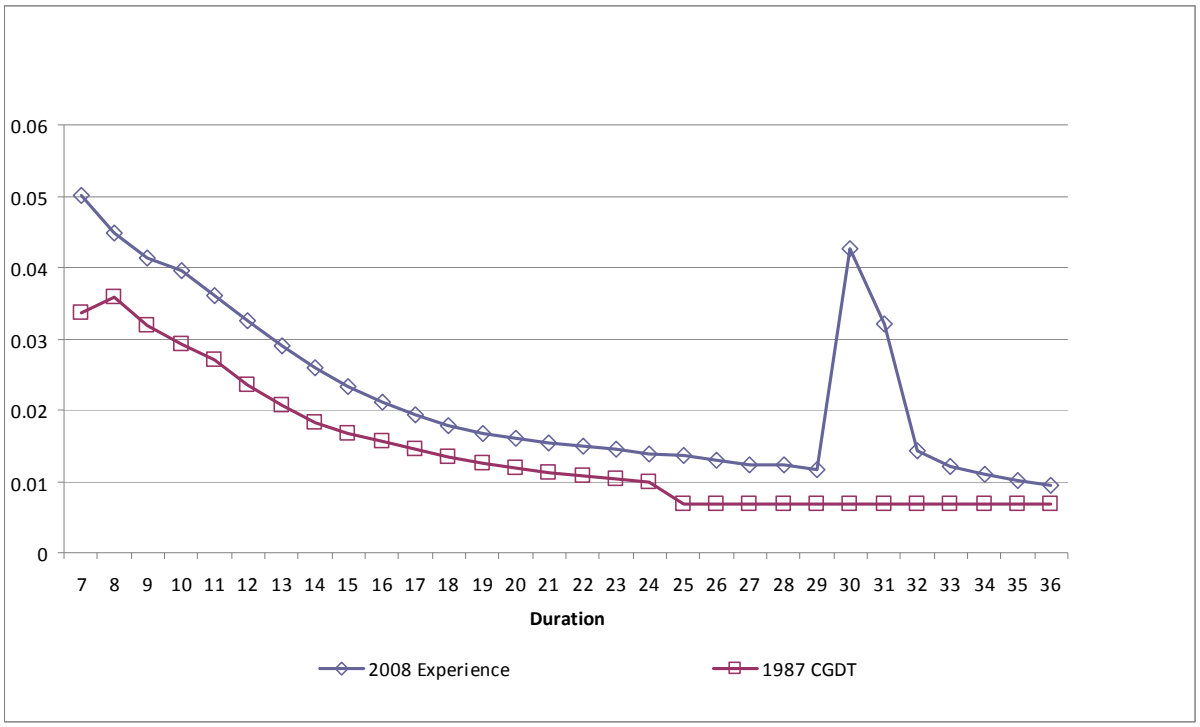
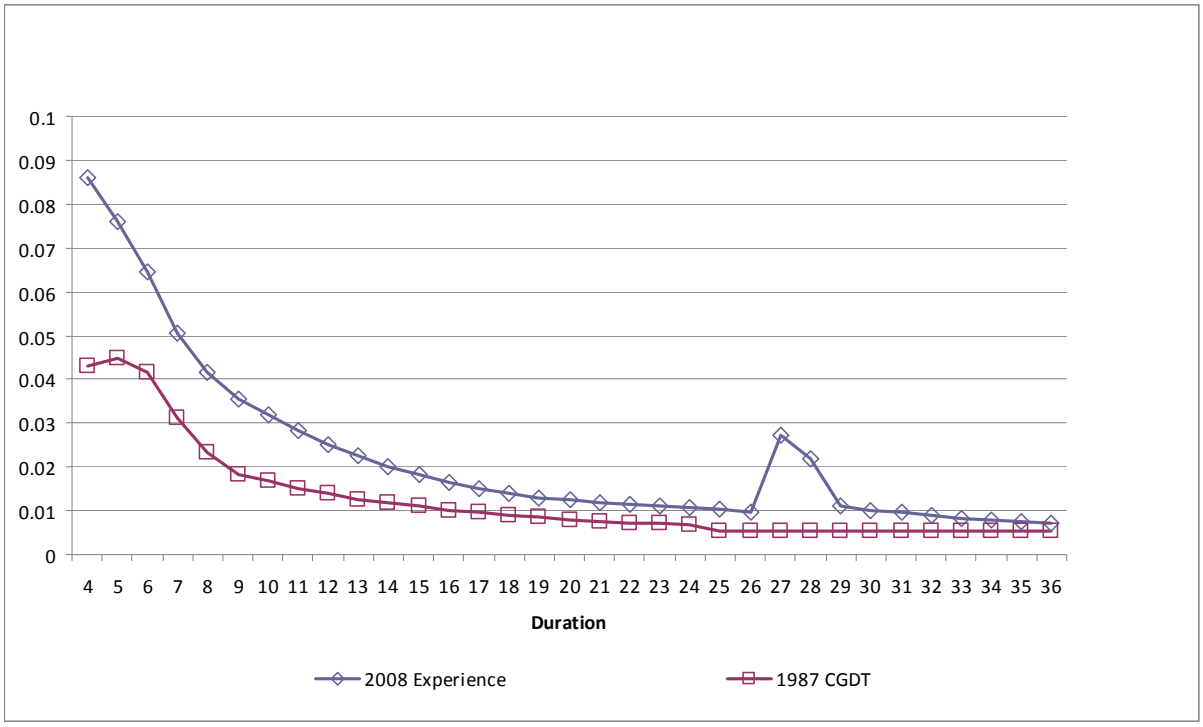


CHART 6.1.4

Termination Rates for 2008 GLTD Experience Table vs. 1987 CGDT by Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Male, Age 57, Three Month Elimination Period



6.2 Internal Relativities of 2008 Experience Table Termination Rates by Age and Duration

Tables 6.2.1 and 6.2.2 show the relative differences in Termination Rates by Age, internally for the 2008 Table.

CHART 6.2.1

Termination Rates for 2008 GLTD Experience Table by Age and Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Male, Ages 22, 32, 42, 52, 62 , Six Month Elimination Period

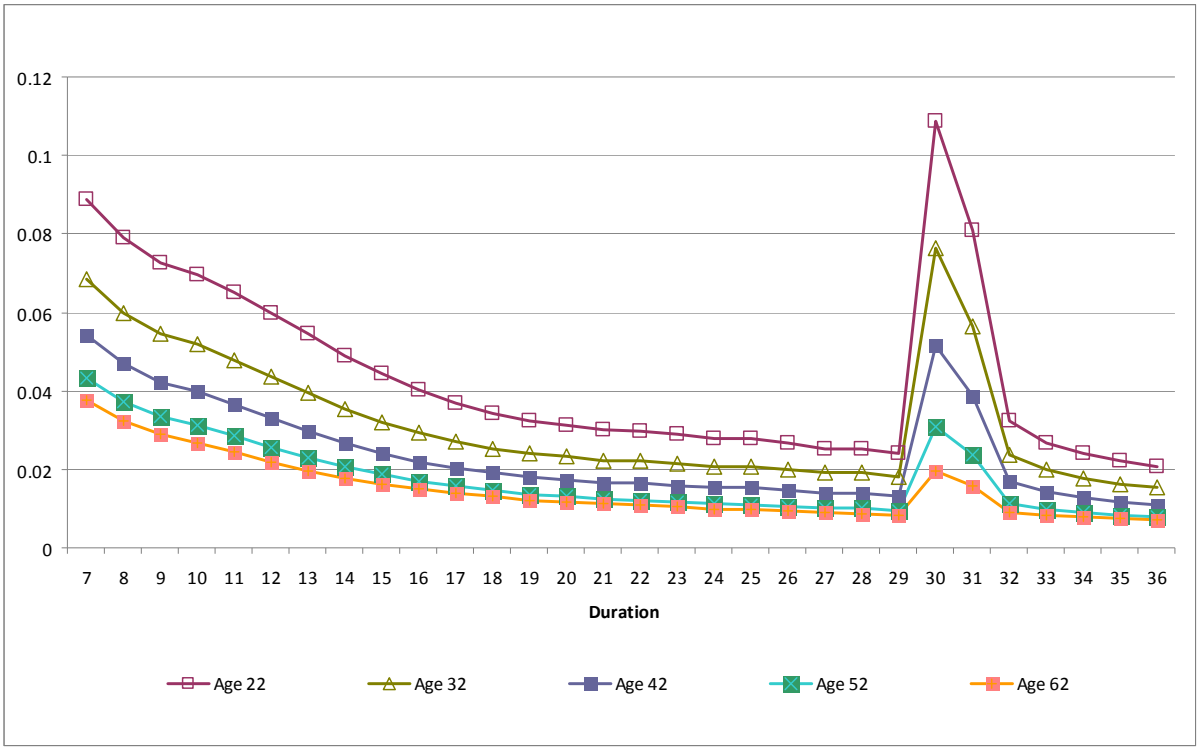
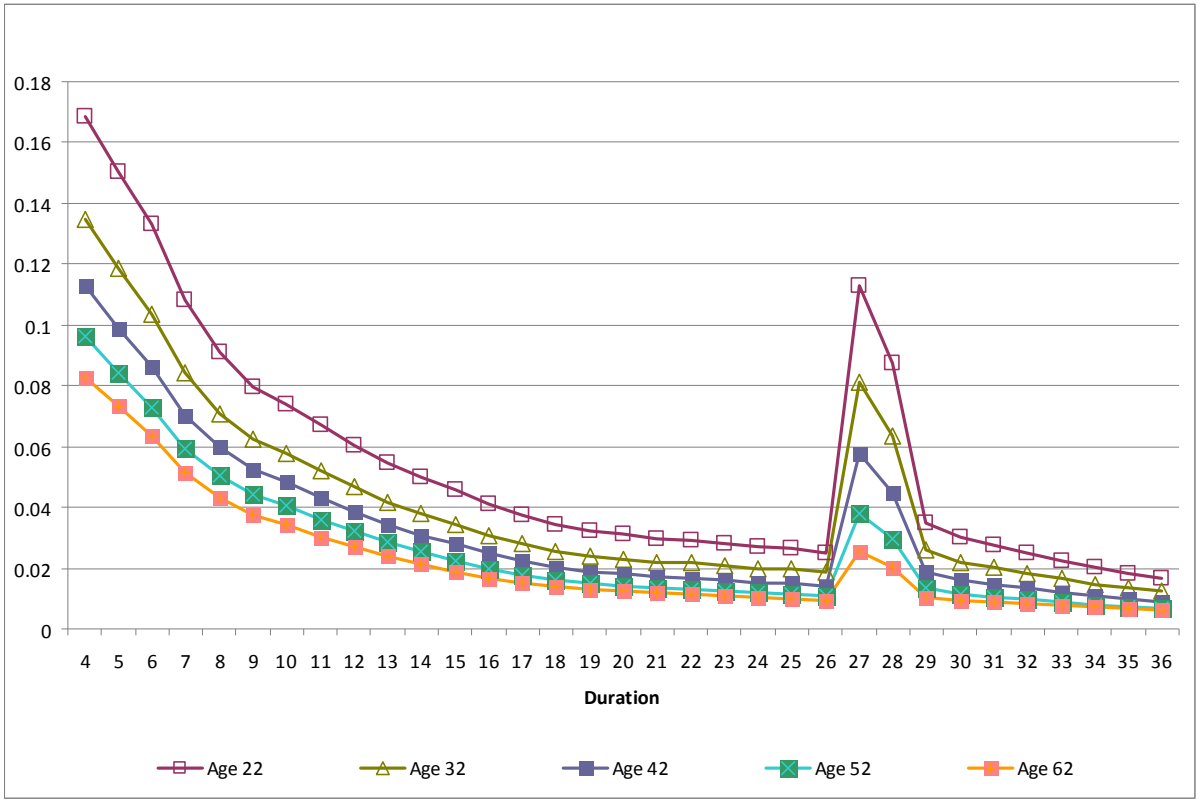


CHART 6.2.2

Termination Rates for 2008 GLTD Experience Table by Age and Duration
No Diagnosis, $3,000 Indexed Gross Monthly Benefit, 24 Month Own Occ
Female, Ages 22, 32, 42, 52, 62 , Three Month Elimination Period



6.3 Reserve Factors

Section 6.3 compares aggregate reserve factors (i.e., annuity factors representing $1 per month of benefits) produced by the 2008 GLTD Experience Table, to annuity factors produced by the 1987 CGDT, the 1987 GLDT and Table 95a. The aggregate reserve factors represent the average reserve factor for a portfolio of claims with the same distribution as the 2008 study. Since the termination rates from the 2008 GLTD Experience Table depend on a number of variables that are not captured in the

prior tables, such as IGMB, Diagnosis, and Definition of Disability, the specific mix of claims selected affects the comparisons shown. Please note, therefore, that if a different selection of claims was used, the results might be different. Also, we note that these reserve factors do not include any offsets, which will impact reserves in practices.

The comparisons shown in Section 6.3 illustrate differences from the prior tables for selected claim variables, particularly those new in the 2008 Table.

Tables 6.3.1 through 6.3.4 show the calculated reserve per $1 of IGMB for each of the four reserve tables. The experience table generated from the 1987 study is labeled as 1987 GLTD Table and, like the 2008 Experience Table and Table95a, excludes any margins. The 1987 CGDT is a statutory valuation table, developed by multiplying the 1987 GLTD Table termination rates by 90%. All reserves are calculated using a discount rate of 5% and do not assume any change in benefit amount due to offsets or additional benefits (e.g., survivor income). All reserves are calculated to age 65. Any claimants older than 65 on the Incurral Date were excluded.

Tables 6.3.1 and 6.3.2 illustrate the impact of differing Diagnosis categories on claims at the end of the elimination period. Please note that while the 1987 GLTD Table and 1987 CGDT do not depend on Diagnosis, the mix of other variables, such as Age and Gender, are different for the different diagnoses in the study and this accounts for the minor differences by Diagnosis shown for these tables. Similarly, Table 95a utilized only four diagnosis categories (M&N, Maternity, AIDS and all Other).

Tables 6.3.3 and 6.3.4 show the reserve factors at the end of the EP and at selected claim Durations. For these calculations, Maternity claims have been specifically excluded.

Following the tables is a description of the methodology used.

TABLE 6.3.1

Average Reserve Factors at End of Elimination Period by Diagnosis
Elimination Period = 90 Days (Age < 65)

Diagnosis	2008 GLTD	Table95a	1987 GLTD	1987 CGDT
Total	34.5	35.3	48.5	53.1
Back	42.3	37.3	49.7	54.4
Cancer	17.2	36.6	48.5	52.5
Circulatory	45.0	35.8	47.0	50.4
Diabetes	49.9	36.5	47.9	51.5
Digestive	31.5	37.3	49.4	54.0
Ill-defined and Misc	42.2	36.9	49.1	53.8
Injury other than Back	24.4	36.2	48.6	53.5
Maternity	2.0	2.5	45.2	52.1
Mental and Nervous	53.6	55.7	50.3	55.5
Nervous System	62.9	37.2	49.4	53.9
Other	39.6	37.0	49.1	53.8
Other Musculoskeletal	37.8	36.6	48.9	53.2
Respiratory	48.0	34.8	46.3	49.6

TABLE 6.3.2

Average Reserve Factors at End of Elimination Period by Diagnosis
Elimination Period = 180 Days (Age < 65)

Diagnosis	2008 GLTD	Table95a	1987 GLTD	1987 CGDT
Total	49.2	53.3	63.9	67.8
Back	54.8	54.3	66.1	70.3
Cancer	20.6	51.6	61.8	65.2
Circulatory	55.9	49.3	57.7	60.5
Diabetes	56.8	51.2	60.2	63.3
Digestive	44.9	54.1	65.4	69.5
Ill-defined and Misc	59.0	53.1	64.8	68.9
Injury other than Back	40.4	53.5	65.9	70.4
Maternity	2.4	3.8	71.8	78.9
Mental and Nervous	65.6	73.8	68.9	73.5
Nervous System	72.5	53.7	65.2	69.3
Other	55.2	53.5	64.6	68.5
Other Musculoskeletal	53.8	52.5	63.6	67.3
Respiratory	52.9	47.6	56.1	58.8

TABLE 6.3.3

Average Reserve Factor by Duration
Elimination Period = 90 Days (No Maternity, Age < 65)

	2008 GLTD	Table95a	1987 GLTD	1987 CGDT
End of EP	37.6	38.5	48.8	53.2
Dur = 1 Yr	57.9	60.4	68.6	72.1
Dur = 3 Yr	68.7	68.4	73.2	76.0
Dur = 5 Yr	69.0	68.8	72.1	74.6
Dur = 10 Yr	66.9	64.8	69.5	71.4

TABLE 6.3.4

Average Reserve Factor by Duration
Elimination Period = 180 Days (No Maternity, Age < 65)

	2008 GLTD	Table95a	1987 GLTD	1987 CGDT
End of EP	50.4	54.6	63.7	67.6
Dur = 1 Yr	58.6	62.4	71.4	74.7
Dur = 3 Yr	67.3	67.5	74.2	76.5
Dur = 5 Yr	67.9	68.0	73.3	75.3
Dur = 10 Yr	65.5	64.1	69.7	71.2

6.3.1 Reserve Factor Algorithm

For comparison purposes we have used a deliberately simple reserve calculation algorithm. In particular, we have assumed that there are no partial month payments, no survivor benefits, and that the payments are made at the end of the month only to those claimants that remain on claim at the end of the month. Furthermore we assume that each individual birthday is exactly six months before the date of loss.

The calculation proceeds as follows:

N: Maximum possible number of monthly payments: *= (65 – Age) * 12 - EP Months - 6*

V: Monthly Discount Factor = *1 / 1.05 ^ (1/12)*

P(n): Chance of remaining on claim at the end of the nth month.

eRecov(n): Monthly recovery rate in duration *n*

eDeath(n): Monthly death rate in duration *n*

$$\textit{Reserve Factor} = \sum_{n=1}^{N} P(n) * V^{n}$$

where P(0) = 1 and P(n) = P(n-1) * (1 – eRecov(n) – eDeath(n))

6.4 Illustrative Reserve Values

This section compares illustrative reserve factors for the 2008 GLTD Experience Table to those calculated using the 1987 CGDT. As noted earlier, the 2008 Table is an Experience Table, while 1987 CGDT is a valuation table; i.e., includes margins. The reserve factor calculations are based on $3,000 of Indexed Monthly Benefit, but are shown as factors per $1. Reserve factors are shown for four central ages for Males and Females using 5% discount rates. No offsets are assumed. The 2008 GLTD Experience Table calculations assume a 24-month Own Occupation Definition of Disability. The reserve algorithm from Section 6.3.1 is used.

Table 6.4.1 compares reserve factors for claims with a three month EP and No Diagnosis.

Table 6.4.2 compares reserve factors for claims with a six month EP and No Diagnosis.

Table 6.4.3 compares reserve factors for claims with several selected Diagnosis categories.

TABLE 6.4.1

Claim Reserve Factors for 2008 GLTD Experience Table versus 1987 CGDT Table
$3,000 Indexed Gross Monthly Benefit to Age 65, Reserves per $1 Benefit, No Diagnosis,
Three Month Elimination Period, 24 Month Own Occupation Period, 5.0% Discount Rate

		2008 GLTD Experience Table		1987 CGDT Table	
Age	**Duration (Months)**	**Male**	**Female**	**Male**	**Female**
27	4	24.7	27.9	44.4	47.2
	9	42.2	46.4	68.7	76.0
	18	60.6	64.9	95.0	110.8
	27	70.1	74.5	108.3	127.5
	48	100.6	105.2	127.5	146.4
	60	106.1	110.2	133.7	151.1
37	4	36.6	40.2	54.9	57.6
	9	56.9	60.9	78.1	84.4
	18	74.1	80.1	99.1	111.2
	27	82.0	88.9	109.6	123.9
	48	103.7	112.5	119.8	133.4
	60	106.3	115.0	121.0	133.6
47	4	43.4	44.0	60.9	62.5
	9	61.5	62.3	78.8	82.6
	18	74.2	77.5	91.2	98.2
	27	78.7	82.8	95.7	103.6
	48	87.6	92.9	95.7	102.6
	60	86.2	91.3	92.6	98.8
57	4	35.2	33.5	47.8	47.8
	9	44.4	42.9	53.5	54.2
	18	47.2	47.2	53.0	54.5
	27	44.9	45.1	49.3	50.8
	48	35.5	36.1	36.4	37.3
	60	27.1	27.4	27.5	28.0

TABLE 6.4.2

Claim Reserve Factors for 2008 GLTD Experience Table versus 1987 CGDT Table
$3,000 Indexed Gross Monthly Benefit to Age 65, Reserves per $1 Benefit, No Diagnosis,
Six Month Elimination Period, 24 Month Own Occupation Period, 5.0% Discount Rate

		2008 GLTD Experience Table		1987 CGDT Table	
Age	**Duration (Months)**	**Male**	**Female**	**Male**	**Female**
27	7	40.8	45.3	67.8	74.4
	9	45.8	50.2	74.4	82.9
	18	62.3	66.8	96.9	113.1
	27	74.6	79.2	111.6	130.9
	48	100.6	105.2	127.5	146.4
	60	106.1	110.2	133.7	151.1
37	7	55.1	59.3	78.6	84.5
	9	60.3	64.7	84.1	91.3
	18	75.6	81.7	100.8	113.2
	27	85.6	92.9	111.8	126.0
	48	103.7	112.5	119.8	133.4
	60	106.3	115.0	121.0	133.6
47	7	59.5	60.5	78.2	81.5
	9	63.9	65.2	81.9	86.1
	18	75.1	78.6	92.1	99.2
	27	80.5	84.9	96.3	104.0
	48	87.6	92.9	95.7	102.6
	60	86.2	91.3	92.6	98.8
57	7	43.6	42.2	53.0	53.3
	9	45.4	44.2	53.5	54.2
	18	47.6	47.6	53.0	54.5
	27	44.0	44.4	47.7	49.1
	48	35.5	36.1	36.4	37.3
	60	27.1	27.4	27.5	28.0

TABLE 6.4.3

1987 CGDT Table versus 2008 GLTD Experience Table
Sample Reserve Factors by Diagnosis Group for selected Gender, Age, EP and Durations
$3,000 Indexed Gross Monthly Benefit to Age 65, Reserve Factors per $1 Benefit
24 Month Own Occupation Period, 5% Discount Rate

	Diagnosis Group					
Table	**Back**	**Circulatory**	**Other Musculo-skeletal**	**Nervous System**	**Cancer**	**No Diagnosis**
Male – 3 Month EP, Age 47, Duration 6 Months						
1987 CGDT Table	69.1	69.1	69.1	69.1	69.1	69.1
2008 GLTD Experience Table	59.8	62.2	52.5	77.0	17.2	52.0
Female – 6 Month EP, Age 52, Duration 18 Months						
1987 CGDT Table	81.9	81.9	81.9	81.9	81.9	81.9
2008 GLTD Experience Table	71.3	74.7	74.9	80.7	38.1	69.2
Male – 6 Month EP, Age 57, Duration 36 Months						
1987 CGDT Table	44.4	44.4	44.4	44.4	44.4	44.4
2008 GLTD Experience Table	44.6	43.4	44.5	44.0	29.8	42.6
Female – 3 Month EP, Age 42, Duration 15 Months						
1987 CGDT Table	101.8	101.8	101.8	101.8	101.8	101.8
2008 GLTD Experience Table	75.5	89.4	86.9	99.7	34.1	78.1

6.5 Claim Continuance Comparisons

This section compares continuance table values for the 2008 GLTD Experience Table to those for the 1987 CGDT table at selected Ages and Durations. Tables 6.5.1 to 6.5.4 reflect Female versus Male and three versus six month EP combinations.

The continuance values for each table are expressed as the number of claims that remain open at the end of the given duration, assuming an initial cohort of 1,000 claims as of the end of the EP. The ratio comparing the two tables is expressed as a percentage.

For example, assuming 1,000 female 32 year old claims disabled as of the end of a 90-day EP, the 2008 GLTD Experience Table projects 865 to remain open at the end of the fourth month (or first month of benefit). The 1987 CGDT projects 901 claims to remain open at this duration, producing a ratio of 96% (865 / 901).

Underlying assumptions selected for the 2008 GLTD Experience Table are: No-Diagnosis, $3,000 Indexed Gross Monthly Benefit and 24 Month Own Occupation period.

TABLE 6.5.1

Continuance Table Comparisons – 2008 Table versus 1987 CGDT
Female – Three Month Elimination Period

Duration (Months)	2008 Table			1987 CGDT			Ratio 2008 Table / 1987 CGDT		
	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52
4	865	887	904	901	920	941	96%	96%	96%
12	465	529	586	499	586	689	93%	90%	85%
24	332	406	474	368	464	586	90%	88%	81%
36	238	319	401	322	421	547	74%	76%	73%
48	212	293	375	300	401	527	71%	73%	71%
60	194	274	356	285	388	511	68%	71%	70%
72	181	260	341	275	378	498	66%	69%	68%
84	171	249	327	266	368	486	64%	68%	67%
96	161	239	314	260	359	475	62%	67%	66%
120	146	222	292	250	343	453	58%	65%	64%
240	101	160	198	207	275	336	49%	58%	59%

TABLE 6.5.2

Continuance Table Comparisons – 2008 Table versus 1987 CGDT
Male – Three Month Elimination Period

Duration (Months)	2008 Table			1987 CGDT			Ratio 2008 Table / 1987 CGDT		
	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52
4	859	882	905	903	922	943	95%	96%	96%
12	440	524	606	527	611	709	83%	86%	85%
24	309	404	499	393	487	605	79%	83%	82%
36	218	317	425	335	434	559	65%	73%	76%
48	192	288	395	305	408	532	63%	71%	74%
60	173	266	373	283	388	508	61%	69%	73%
72	161	251	354	267	372	488	60%	67%	73%
84	151	238	336	255	358	471	59%	66%	71%
96	141	226	319	246	345	454	57%	66%	70%
120	125	205	288	231	322	423	54%	64%	68%
240	79	131	164	175	230	270	45%	57%	61%

TABLE 6.5.3

Continuance Table Comparisons – 2008 Table versus 1987 CGDT
Female – Six Month Elimination Period

Duration (Months)	2008 Table			1987 CGDT			Ratio 2008 Table / 1987 CGDT		
	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52
7	938	947	954	949	960	973	99%	99%	98%
12	730	767	798	757	809	862	96%	95%	93%
24	535	598	653	587	667	750	91%	90%	87%
36	390	477	557	514	605	700	76%	79%	80%
48	346	437	521	478	577	674	72%	76%	77%
60	317	408	495	455	558	654	70%	73%	76%
72	295	388	473	437	543	637	68%	71%	74%
84	279	372	455	424	529	621	66%	70%	73%
96	264	356	437	414	516	607	64%	69%	72%
120	238	330	405	398	493	580	60%	67%	70%
240	166	239	275	330	395	430	50%	61%	64%

TABLE 6.5.4

Continuance Table Comparisons – 2008 Table versus 1987 CGDT
Male – Six Month Elimination Period

Duration (Months)	2008 Table			1987 CGDT			Ratio 2008 Table / 1987 CGDT		
	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52	Age 32	Age 42	Age 52
7	932	946	957	955	964	975	98%	98%	98%
12	715	772	816	782	829	877	91%	93%	93%
24	515	605	678	610	687	765	84%	88%	89%
36	371	480	582	521	612	706	71%	78%	82%
48	325	435	541	474	575	672	69%	76%	81%
60	294	403	511	440	548	643	67%	74%	79%
72	272	379	484	416	525	618	65%	72%	78%
84	256	361	460	397	505	595	64%	71%	77%
96	239	342	437	382	487	574	63%	70%	76%
120	211	311	394	359	454	535	59%	69%	74%
240	134	198	225	272	325	341	49%	61%	66%

Section 7: Next Steps

The 2008 GLTD Experience Table is expected to form the basis for a new valuation table that will replace the 1987 CGDT. The American Academy of Actuaries, in response to a charge from (the Health Actuarial Task Force of) the National Association of Insurance Commissioners (NAIC) has formed a committee charged with making recommendations related to the formulation of a new statutory table. Some anticipated key considerations include table structure, trend, recognition of a carrier's own experience and margins.

7.1 Table Structure

The 2008 GLTD Experience table uses traditional elements, such as Age, Duration and EP that are unlikely to represent any significant challenges to carriers. However, because of its desire to provide valuable information for a range of potential applications, the Subcommittee elected to introduce more granular functionality (e.g., Diagnosis groups) to the Experience Table. However, the Subcommittee also recognized the need for the upcoming Valuation Table Committee to be able to make decisions on desired granularity, such as whether it is preferable to use a Diagnosis-specific or a simpler diagnosis-free table for statutory reserving applications.

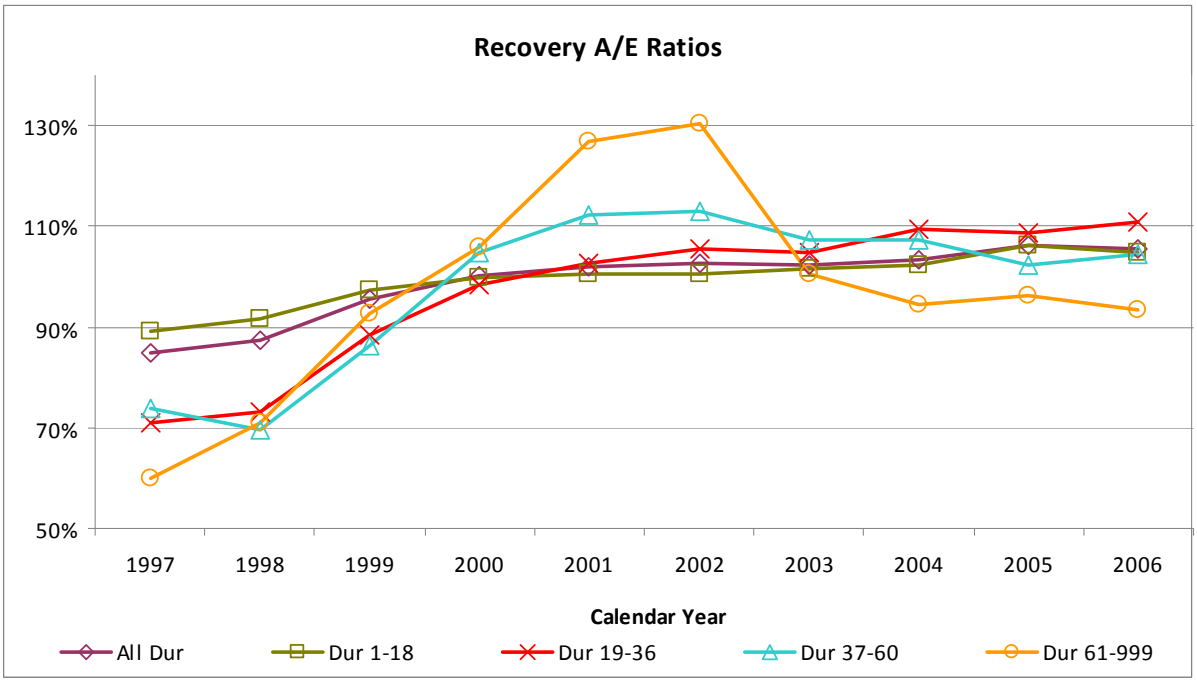
7.2 Termination Experience Trends

The Study covered claims exposed from 1997 through 2006. The Table Construction Subcommittee elected not to attempt identification or quantification of termination trends in the 2008 GLTD Experience table. Consequently, the Table was designed to represent the average experience observed over the study period. Charts 7.1 to 7.5 show difference in experience by Calendar Year, where Expected is the Table.

Chart 7.1 illustrates the Recovery experience by calendar year relative to the new Table.

CHART 7.1

Recovery A/E Ratios by Calendar Year and Duration Grouping



Overall, Recovery experience has steadily improved during the Study period. For the 19 - 36 Duration range, the improvement has been more significant than other Duration groupings, which suggests that Recoveries related to the Change in Definition of Disability might explain much of the trend. A-to-E's for the Change in Definition Months 0 and +1 are illustrated in Chart 7.2.

CHART 7.2

Recovery A/E Ratios for Change in Definition Transition Months 0 and +1, by Calendar Year

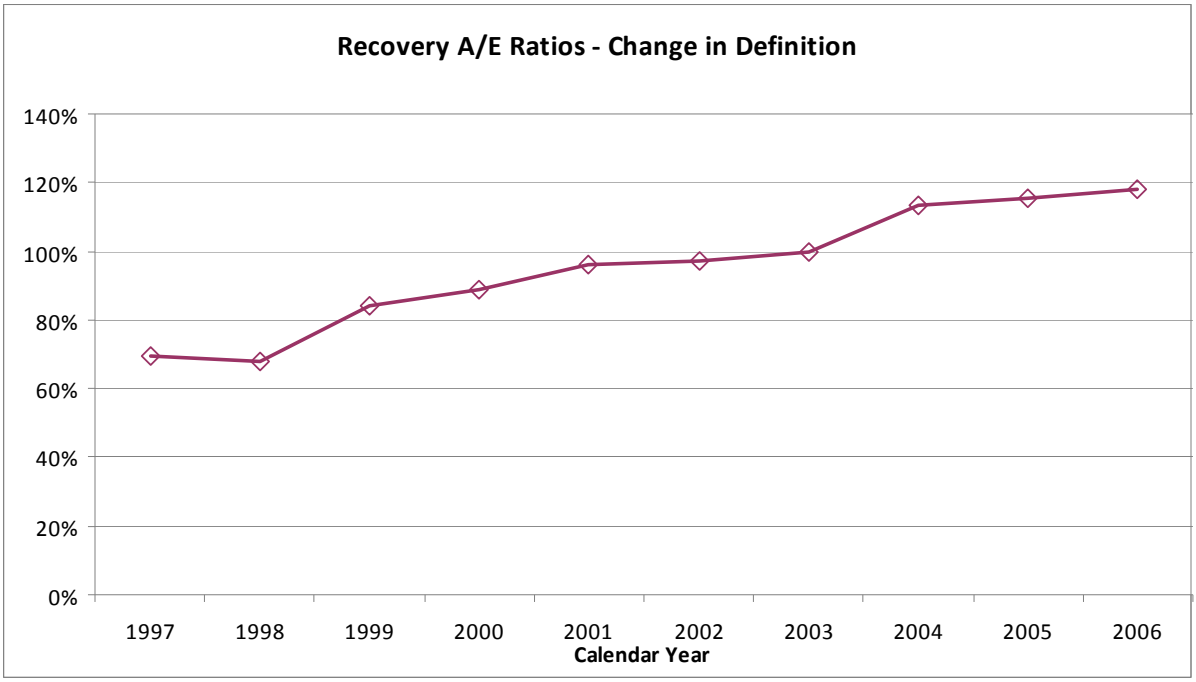
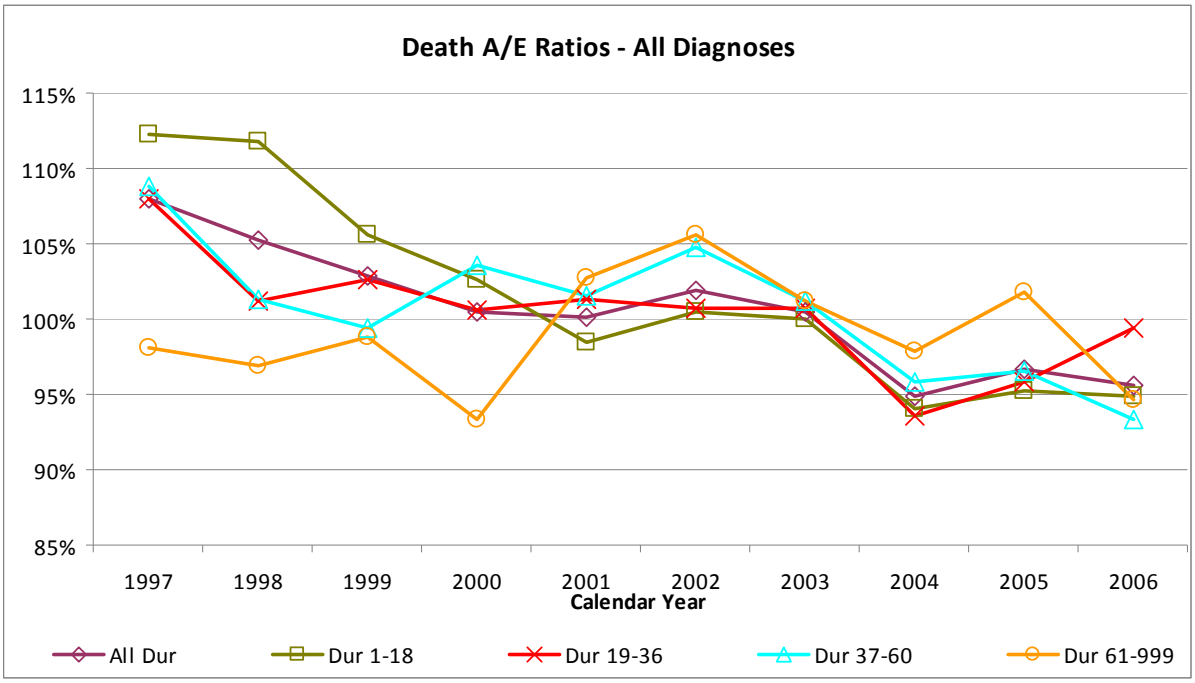


Chart 7.2 confirms that the management of claims in the period including the Change in Definition of Disability has materially changed during the 1997 - 2006 period. This could be due to changes in contract provisions, claim management or other causes.

The Death experience trends are reviewed below using a similar approach.

CHART 7.3

Death A/E Ratios by Calendar Year and Duration



Early Duration mortality experience shows the most significant changes over the study period. Since over 50% of all Deaths observed in the Study relate to Cancer claims, it seems appropriate to separately review mortality trends for that cause.

CHART 7.4

Death A/E Ratios by Calendar Year for Cancer Diagnosis Claims

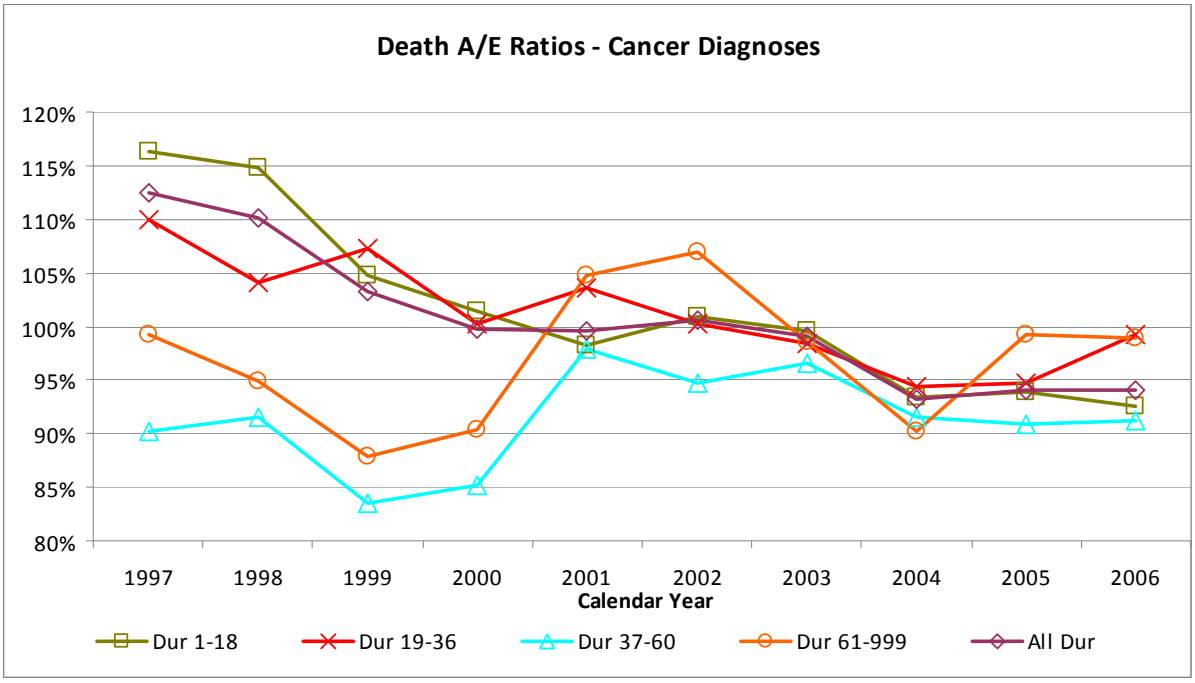
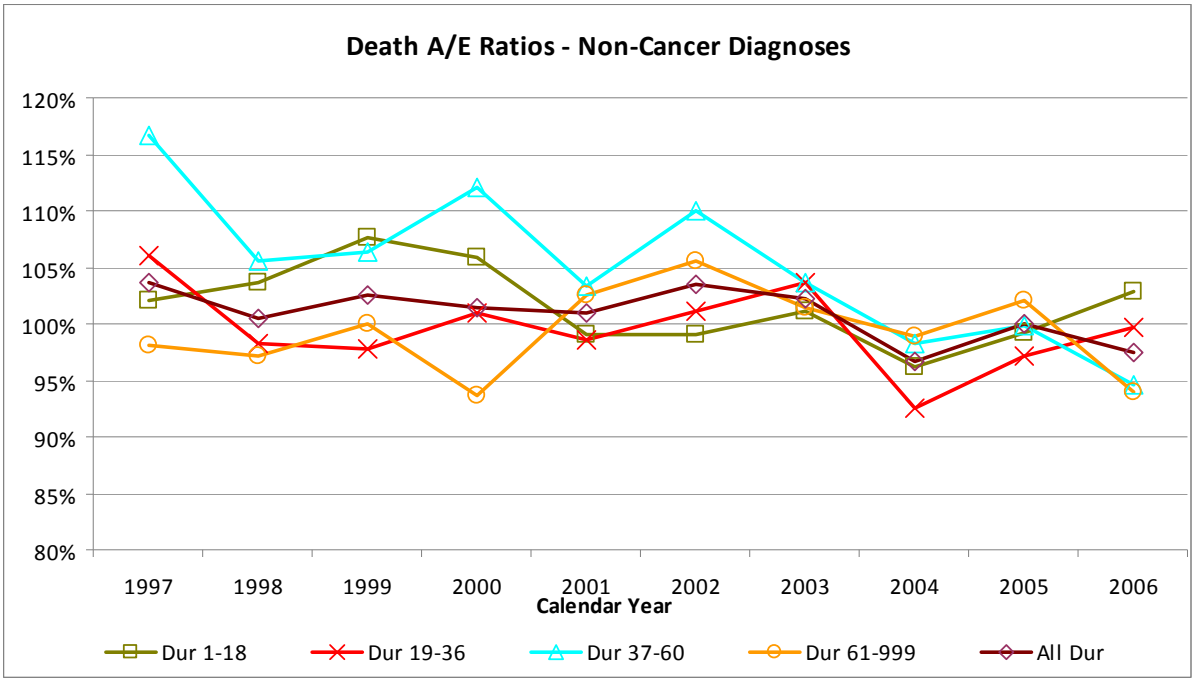


Chart 7.4 clearly shows that the mortality experience has significantly improved in the first three years of disability for Cancer-related claims. The same information is repeated for the Non-Cancer claims in Chart 7.5.

CHART 7.5

Death A/E Ratios by Calendar Year for Non-Cancer Diagnosis Claims



Even if some high level forms of trends might be detectable, improvement in A/E deaths for non-cancer claims is certainly more subtle than what we observed for Cancer claims.

7.3 Use of Carrier's Own Experience

Though the committee is confident that the new table is a fair representation of industry experience, there was a wide range of carrier to carrier results. These differences likely stem from differences in markets, products and claim management practices. The Subcommittee believes that a "safe harbor" approach to reserving would not be appropriate for all companies (without being unduly conservative), and as a result, the recognition of a specific carrier's own experience would be appropriate (subject to credibility).

7.4 Valuation Margin

When recommending a valuation table, the valuation committee will need to consider margin levels as well as how such margins should be applied. The current statutory table (1987 CGDT) is based on an apparently simplistic 10% margin applicable to all claim durations. More recent theories (e.g., principles-based reserving) have suggested more sophisticated approaches, where margins would commensurate to the level of risk a company is exposed to.

Section 8: Frequently Asked Questions on Experience Table Use

8.1 Introduction

In this section we identify and respond to issues or frequently asked questions that may affect how users should work with the Experience Table. These include:

1. Did the Subcommittee consider the differences between “full” and “valuation” views of the experience?

2. What are some pros and cons using all of the detailed parameters in the Experience Table (versus potentially less detail)?

3. Why was mortality improvement not addressed by the Experience Study and Table?

4. Why did the Committee decide to utilize the entire 1997 – 2006 experience period rather than a shorter period that might be more reflective of current experience?

5. How should settlements be addressed?

6. The new table is complicated, and I would like to simplify for implementation. What Adjustment Factors are critical for use?

7. Should I interpolate on Age and Duration when using this table?

8. Should I vary the benefit amount indexing in the future if benefit inflation differs from the assumed annual rate of 2.4%?

8.2 Questions / Answers

1. Q: Did the Subcommittee consider the differences between “full” and “valuation” views of the experience?

   A: The Experience Table measures claim exposures and terminations from a “full” exposure point of view (i.e., for every claim that receives a payment, there is an exposure record in the experience corresponding to the period the payment was for). However, claims are not actually reported to the insurance company that way. For instance, in early claim durations a claim might not be reported to the insurance company for some period of time after the incurral date. Companies hold IBNR reserves of these claims.

   One of the stated objectives of the Experience Table is to serve as a basis for a future valuation table. The Subcommittee discussed whether termination rates calculated using data from the full point of view are an appropriate basis for construction of a valuation table that will be applied to reported claims only.

   The Subcommittee spent a substantial amount of time on this question and came to the conclusion that the Experience Table as currently defined is an appropriate underlying basis for reserving, but that companies should also take other traditional steps to confirm reserve adequacy in aggregate. The Subcommittee’s considerations on this issue included the following:

   — Company administration practices vary widely as to when and how claims are recorded as reported, pending or approved. Similarly, there is a wide range of practice as to when and how tabular claim reserves are initially set up. As a result, the Subcommittee felt that exposed claims based on a valuation view definition would produce inconsistent data sets from company to company. Conversely, the Subcommittee believes that claim exposures based on the full view definition should produce relatively consistent data sets between companies.

   — The data and formulas required to calculate valuation view termination rates would be significantly more complex than the full view basis, because they would need to consider

company-specific claim administration and reserving practices, i.e., there is no standard industry practice regarding “reported” or “reserved for” claim practices.

— The experience study did not collect the company-specific data necessary to support a valuation view study.

— The Subcommittee reviewed valuation view experience provided by a few individual carriers (anonymously). That review suggested that a valuation view basis could result in substantial differences in termination rates by company, driven primarily by differences in administrative and reserving practices.

— The difference between valuation view and full view should be immaterial after the first few months of claim payments. Given the wide range of company practices, the Subcommittee believes that trying to construct a valuation view table of industry experience would not produce useful results. The current NAIC valuation standard allows a company to base termination rates on its own experience in the first two years (if experience is credible) and the Subcommittee believes this is the appropriate way to address the impact of companies’ administrative / reserving practices on early duration termination rates.

In addition, the Subcommittee believes that it is critical that actuaries regularly perform retrospective aggregate reserve adequacy tests, especially in early claim durations, and make appropriate adjustments to their methodologies and assumptions as needed.

2. Q: What are some considerations for using all of the detailed parameters in the Experience Table (versus potentially less detail)?

   A: The Table was designed to take into account the impact of all the parameters that produced credible differences in the experience data. However, the Table is also designed so that every parameter does not need to be used. This could be useful if:

   — Certain claim data is not available for a claim or is of questionable accuracy.

   — A large block of claims is being valued and so using average assumptions for certain parameters may be deemed sufficient.

   — For other reasons, a trade-off between simplicity of calculations and marginal improvements in potential accuracy of individual claim reserves is deemed appropriate.

It is important to keep in mind that a claim reserve is an estimate based on average claim performance for claims with similar parameters. The actual performance of any specific claim will vary, perhaps significantly, from the average. (See Question 6. for additional explanation.)

3. Q: Why was mortality improvement not addressed by the Experience Study and Table?
   A: The Experience Table is intended to be an accurate representation of past experience, as opposed to a prediction of future experience. We felt that mortality improvement would be more appropriately addressed by a valuation table committee. Similarly, individual actuaries should consider this for their specific applications

4. Q: Why did the Committee decide to utilize the entire 1997 – 2006 experience period rather than a shorter period that might be more reflective of current experience?
   A: The Committee decided to confine our analysis to an accurate representation of past experience. Predictions of future experience should include consideration of a wide range of potential influences such as:
   — Changes in policy language and underwriting;
   — Changes in claim management practices;
   — Economic or unemployment cycles;
   — Long-term morbidity trends.
   The Committee felt that evaluations of starting point and trends would be more appropriately addressed by a future valuation table committee on one hand, and individual actuaries (for their specific applications) on the other hand.

5. Q: How should settlements be addressed?
   Settlement practices and results vary widely between companies and the Committee felt that calculating industry averages was neither practical nor useful. Users of the Table should consider whether and how to make any adjustments for settlements based on their own company practices and the purpose of their calculations. (See Section 4.7.3 for additional details.)

6. Q: The new table is complicated and I would like to simplify for my implementation. What Adjustment Factors are critical for use?
   A: The Base Termination Rate Tables and the EP Adjustment Tables are critical, although the Base Rate Tables can be used on a No-Diagnosis basis. The benefit amount adjustment tables can be dropped as long as your company's benefit amount mix is reasonably similar to what was used in the Study. If the Adjustment Factors specific to Definition of Disability are not used, the resulting termination rates will be appropriate to for claims disabled under an unlimited Own Occupation definition, and should be conservative for claims with a limited Own Occupation period

7. Q: Should I interpolate on Age and Duration when using this Table?
   A: It should not make much difference for reserve valuations of significant numbers of claims, but since we used five-year age bands, it does make sense to interpolate for exact age. We did not make any specific recommendation on interpolation method, although the smoothing technique that was deployed in table construction means that linear interpolation should produce reasonably accurate results. Age interpolation can make a big difference for individual claims. For example, the difference between the reserve at end of the EP for a 39 year-old versus a 35 year-old with the same benefit end date can be as much as 15%.

   Claim Durations were defined by whole months since the end of the EP. For most claims the valuation date is likely to fall between whole months and so interpolation of fractional durations makes sense for early duration valuations. We do not recommend interpolation on the other variables, but rather using the groupings as defined in the table descriptions.

   Please note that we have not used any interpolation when generating the expected rates for the pivot tables that accompany this report.

8. Q: Should I vary the benefit amount indexing in the future if benefit inflation differs from the assumed annual rate of 2.4%?
   A: Our intent was to set the benefit amount levels based on 2007 dollars. It makes sense to

use indexing based on actual salary inflation after 2007. The 2.4% used in the Study was obtained from Social Security data.

Section 9: Defined Terms and Acronyms Used

Certain defined terms and acronyms have been summarized in this section for the reader's convenience.

9.1 Defined Terms

Table 9.1 Defined Terms

1987 GLTD	1987 Group Long Term Disability (Experience) Table
1987 CGDT	1987 Commissioners Group Disability (Valuation) Table
Adjustment tables	Defined in Section 5.1
Any Occ	Any Occupation Definition of Disability
Base recovery and rate tables	Defined in Section 5.1
Change in Definition	Change from Own Occupation Definition of Disability to Any Occupation
Change in Definition Transition Month	Duration of and following Change in Definition
Change in Definition Transition Period	Runs from Month of (Own to Any Occ) Definition Change month to 8 months past change
Claim termination categories: Recovery Death Contractual maximum benefit duration reached (Max-out) Internal benefit period limit reached (Limit) Settlement	Defined in Section 2
Claim data variables: Age at Disability (Age) Attained Age Gender Duration Elimination Period (EP) Duration Since EP Diagnosis Calendar Year (ten years: 1997 - 2006) Gross Monthly Benefit amount (IGMB)	Defined in Section 4.2

Table 9.1 Defined Terms

Own Occ Period Change in Def Transition Month M&N Limit Period Maximum Benefit Duration	
Component Tables	Defined in Section B.8
Committee (or LTD Experience Committee)	2008 Group Long Term Disability (GLTD) Experience Committee
Definition of Disability	Own Occ versus Any Occ
Diagnosis categories: Back Cancer Circulatory System Diabetes Digestive ill-Defined and Misc Conditions Maternity Mental and Nervous Nervous System Other Musculoskeletal / Respiratory Other	Defined in Section 5.1
ICD-9 Codes	International Statistical Classification of Diseases and related health problems – version 9w
Incurral Date	Date of loss
Limit	Internal benefit period limit (e.g., for M&N claims)
M&N Limit Duration	Benefit limit for M&N claims
M&N Limit Claims	Claims with a limited benefit duration for M&N claims
M&N Limit Transition Month	
Max-Out	Claim termination due to maximum benefit duration reached
Own Occ	Own Occupation
Report	2008 Group Long Term Disability (GLTD) Table Report, dated April 22, 2011
Subcommittee	2008 Group Long Term Disability (GLTD) Experience Table Construction Subcommittee
Table (or Experience Table)	2008 Group Long Term Disability (GLTD) Table

9.2 Acronyms

Acronyms Used	
AAA	American Academy of Actuaries
A-to-E	Actual-to-expected
EP	Elimination period
GLM	Generalized Linear Model
IGMB	Indexed gross monthly benefit
M&N	Mental and nervous
MIB	Medical Information Bureau
NAIC	National Association of Insurance Commissioners
SOA	Society of Actuaries

Appendix A: 2008 Long Term Disability Study Table Components

The following document describes the layout and use of the 2008 GLTD Experience Table that was generated from the SOA-sponsored 2008 LTD Experience Study.

The Table is based on 1997-2006 experience period and generates expected monthly Recovery and Death rates. Each of Recoveries and Deaths calculations starts with Base Termination Rate Tables of monthly Recovery and Death Rates, followed by several Adjustment Tables that modify the Base Rates, employing additional variables.

Recoveries for Maternity claims with durations less than or equal to 36 months have special handling. Any maternity claim with duration greater than 36 months should be grouped into the "Other" diagnosis category. For all tables that include Diagnosis, there are factors that can be used when Diagnosis is not available. Using the No-Diagnosis factors will produce the same average rates if the Diagnosis distributions match the Study data. These factors assume that Maternity claims with Durations less than or equal to 36 months are identifiable and will use the Maternity Assumptions.

Recovery Rate Tables

- Table 1R: Base Recovery Rates by Duration, Age at Disability, Gender and Diagnosis
- Table 2R: Adjustment Factors by Elimination Period (EP) and Duration Since EP, for Non-Maternity claims
- Table 2R-M: Adjustment Factors by Duration Since EP for Maternity claims
- Table 3R: Adjustment Factors by Indexed Gross Monthly Benefit (IGMB), Definition of Disability and Duration
- Table 4R: Adjustment Factors by Duration
- Table 5R: Adjustment Factors by Diagnosis
- Table 6R: Adjustment Factors by Change in Definition Transition Month, IGMB, Diagnosis and Own Occ Period

Tables 4R to 6R apply only to Any Occ claims

Tables 2R, 3R, 4R, 5R, and 6R are not used for Maternity claims with durations less than or equal to 36 months.

Death Rate Tables

- Table 1D: Base Death Rate Table by Duration, Age at Disability, Gender and Diagnosis
- Table 2D: Adjustment Factors by EP Duration Since EP
- Table 3D: Adjustment Factors by IGMB, Diagnosis and Duration.

Mental and Nervous Limit Termination Table

- Table MN-1: Probabilities of Claim Terminating due to M&N Limit, by Age at Disability and Gender

A.1 Definitions of Variables Used in the Tables

Duration: Duration is roughly equivalent to Duration from Date of Disability, but is actually calculated differently. It is defined by day relative to the end of the EP with the number of months in the EP, added to the Duration Since EP. It is worth stressing that this is a new definition of Duration, where the Duration is not strictly tied to the day of loss, but rather defined relative to the day that benefits begin. For example, for a 90-day claim that has benefits first payable on 3/15, the exposure from 3/15 through 4/14 will count as Duration 4, while exposures from 4/15 through 5/14 will count as Duration 5, etc.

In the Tables, the Duration categories are defined by monthly duration through 84 months and then by year thereafter. For example, the Duration category identified by Duration 96 contains monthly rates for all durations from 85 to 96. The Duration categories extend through 252 months for Recoveries and through 480 months for Deaths. For durations beyond these values we recommend moving to the last Duration category for the next age band. For example, for age-band 20-24 you would use the Duration 252 recovery rate for durations 241 through 300 and then move to the age-band 25-29 for Durations from 301 through 360, and so on. When extending deaths, we recommend that the actual age-band and the duration group 469-480 be used for these specific durations, and that the next age-

band group be used for durations 481-540. This will make sure the duration groups used for extending the death table will be the same as those used when extending the recovery table.

If you are using age interpolation, then this table extension could be done annually rather than in five year groups. For example for a 22 year-old, you would use the 22 year rate for durations 241 through 252 and the 23-year rate for durations 252-264, and so on.

Age at Disability (or Age): Age at Disability is defined by the exact age at the last birthday before the date of loss. The tables use quinquinneal ages (20-24, 25-29, etc). Any age less than 20 should use the first age group and any age greater than or equal to 80 should use the last age group.

Elimination Period (or EP): The EPs are defined monthly. For EP given in days, the number of months is found by rounding the days divided by 30. Claims with EPs less than 15 days were excluded from the study. Any EP greater than 405 days (i.e., greater than 13 months) should use the last category, (EP = 14 months).

Duration Since EP: The Duration Since EP is defined as the Duration minus the Elimination Period in months, capped at 19 months.

Indexed Gross Monthly Benefit (or IGMB): The IGMB is defined as the contractual amount payable before recognition of offsets, cost of living adjusted (COLA), or supplemental benefits. To take into account the impact of salary or benefit inflation, the table was created after converting all benefit amounts to equivalent 2007 dollars. This was accomplished by using an average annual inflation rate of 2.4%. Therefore to use the table all benefit amounts should be converted to 2007 dollars. To do this divide the actual amount by 1.024 raised to the power equal to the number of years between the date of loss and 2007. For example, for a claim that is disabled in 2010, we would divide the IGMB by 1.024 raised to the third power before using the benefit amount Adjustment Factors. It is reasonable for valuation to select different indexing in the future if the average annual changes in benefit amounts differ from assumed indexing. For this study we selected the average indexing based on the cost of living assumed in the Social Security benefit amount calculation. The indexed amounts are grouped as follows: The first group includes amount less than $1,000. The next nine groups are in $500

increments through $4,999. The final three groups are: $5,000 to $9,999, $10,000 to $19,999, and greater than or equal to $20,000.

Definition of Disability: The tables recognize three different definitions of disability. These recognize that a claim can change definitions at different Durations. "Own Occ" represents any claim with a current Own Occ definition, either due to an unlimited definition, or in a Duration prior to the Change in Definition. "Any Occ" represents any claim with both of a current Any Occ definition AND a duration more than nine months past the Change in Definition. Claims with a current Any Occ definition that are within nine months of the Change in Definition are defined as in the "Change in Definition Transition Period" and should get a Recovery Adjustment that depends on the Change in Definition Transition Month.

Change in Definition Transition Month: This variable corresponds to the number of months after the Change in Definition. Claims within one month of the transition are defined as month zero with the table extending through month eight. Any claims more than eight months after the Change in Definition have a Definition of Disability of "Any."

Own Occupation Period: This variable represents the number of months between the end of the EP and the Change in Definition. These values are assigned to one of four groups: Less than 18 months, between 18 and 30 months, from 31 to 47 months and greater than or equal to 48 months.

Diagnosis: Diagnosis is defined by the ICD9 code of the original primary diagnosis with the diagnoses grouped into thirteen categories. The groupings are provided below:

TABLE 5.1
Mapping of ICD-9 Codes to Diagnosis Categories

Diagnosis Category	ICD-9 Codes
Back	720-724, 737, 847
Cancer	140-209, 230-239
Circulatory System	280-289, 390-459
Diabetes	250
Digestive	520-579
Ill-Defined and Miscellaneous Conditions	780-799
Injury other than Back	800-846, 848-979, E800-E999
Maternity	630-679, 760-779, V20-V39
M&N	290-319, V40
Nervous System	320-359
Other Musculoskeletal	710-719, 725-736, 738-739
Respiratory	460-519
Other	001-139, 210-229, 240-249, 251-279, 360-389, 580-629, 680-709, 740-759, 980-999, V1-V19, V41-V86

A.2 Table Descriptions

A.2.1 Base Termination Rate Table 1R and 1D: By Duration, Age at Disability, Gender and Diagnosis Category

These two Base Termination Rate Tables provide expected monthly Recovery and Death rates that vary by Duration, Gender, Age at Disability, and Diagnosis. We note that the last Duration is defined differently for Recoveries (duration >= 21 years) than for Deaths (duration >= 40 years)

A.2.2 Adjustment Tables 2R and 2D: Factors By EP and Duration Since EP

These two Adjustment Tables provide Recovery and Death Adjustment Factors that vary by EP and the number of months since the end of the EP (Duration Since EP). For example, a Duration Since EP

month of one applies to the first month after the end of the EP. The four EP groupings are defined above. Maternity claims with Duration less than or equal to 36 months have their own Recovery Factors (see A.2.3). The factors in these tables are not centered on 1.0 and so their use is required to produce appropriate early duration termination rates.

A.2 3 Recovery Adjustment Table 2R-M (for Maternity Recoveries Only): Factors by Duration Since EP

These Recovery Adjustment factors apply only to Maternity claims with Duration less than or equal to 36 months. They only vary by the Duration Since EP (i.e., not by EP) and apply only to Durations Since EP less than nineteen months. The factors in this table are not centered on 1.0 and so its use is required to produce appropriate early duration termination rates.

A.2.4 Recovery Adjustment Table 3R: Factors by Definition of Disability and Duration

These Recovery Adjustment factors do not apply to Maternity claims within 36 months of duration nor to Any Occ claims with a Change in Definition Transition Duration that is less than or equal to nine months. There are three sets of factors as follows:

Claim duration greater than 84 months.

Claim duration less than 84 months and Definition of Disability is “Own.”

Claim duration less than 84 months and Definition of Disability is “Any.”

The factors in this table are centered on 1.0 and so if this table is not used, the Recovery rates will be appropriate as long as the benefit amount and Definition of Disability mix is similar to the Study.

A.2.5 Death Adjustment Table 3D: Factors by IGMB, Diagnosis and Duration

These Death Adjustment Factors vary by IGMB, Duration and Diagnosis. The Duration break is for Durations less than or equal to 84 months versus greater than 84 months and the Diagnosis break for is Cancer versus non-Cancer. The Factors in this table are centered on 1.0, and so if this table is not used, the Death rates will be appropriate as long as the benefit amount and Diagnosis mix is similar to the Study.

A.2.6 Recovery Adjustment Table 4R: Factors by Duration (for Any Occupation Claims)

These Recovery Adjustment factors apply only to Any Occ claims (past the Change in Definition Transition Period) that do not have a Maternity diagnosis (with a Duration less than 36 months). These factors vary by year of Duration; the last factor is for Durations greater than or equal to 21 years. This table captures the impact of an Any Occ Definition of Disability and so if this table is dropped, all claims will be treated like Own Occ claims.

A.2.7 Recovery Adjustment Table 5R: Factors by Diagnosis (for Any Occupation Claims)

These Adjustment factors apply only to Any Occ claims (past the Change in Definition Transition Period) that do not have a Maternity diagnosis (with Duration less than 36 months). These factors vary by Diagnosis. This table captures the impact of an Any Occ Definition of Disability, and so if this table is dropped, all claims will be treated like Own Occ claims.

A.2.8 Recovery Adjustment Table 6R: Factors by Change in Definition Transition

These Adjustment factors apply to Any Occ claims (past the Change in Definition Transition Period) that do not have a Maternity diagnosis (with a Duration less than 36 months). These factors vary by Change in Definition Transition Month, IGMB, Diagnosis and Own Occ Period. This table captures the impact of the Change in Definition of Disability and so if this table is dropped, all claims will be treated like Own Occ claims.

A.2.9 Recovery Special Adjustment Table MN-1 Special Handling of Claims reaching the end of the Mental and Nervous Limit

Study participants were asked to separately identify M&N claims with limited benefit durations and to categorize terminations due to the limit as special M&N terminations. Once the data were assembled it was clear that M&N Limit terminations had been characterized in three different ways: as Recoveries, Max-outs or M&N Limit terminations. Since the distinction between these types of terminations is somewhat arbitrary, we elected to group these together and provide a single table that represents the probability of any Non-Death termination for M&N claims as they reach the M&N Limit.

These results are captured in Table MN-1, which varies by Age at Disability and Gender. These rates represent the total chance of Non-Death termination for M&N claims with a limited duration, once they reach the Limit. In practice we observed that these terminations actually take place within three months before and after the Limit date.

Appendix B: Table Construction Technical Documentation

B.1 Overview

The purpose of this appendix is to describe in some detail the methodology that was used for the Experience Table construction. While we generally deployed standardized statistical and graduation procedures for the table construction, many of the specific decisions about the structure and form of the tables were made based on details within the claims data after consideration of the consensus opinions of the Experience Table Construction Subcommittee members. That is, while we let the data drive the decisions as much as possible, there often is no unambiguous answer to specific table construction questions, and so we relied on the expertise and judgment of the committee members.

B.2 Source Data

The individual data submissions were provided to MIB for assembly and aggregation. For the table construction phase, we were not provided with individual claim information, but rather summaries of aggregated data.

The variables include the following:

- Duration (months)
- EP (months)
- Duration Since (the end of the) EP-in months
- Diagnosis (13 categories)
- IGMB categories (15 categories)
- Own Occ duration (six categories)
- Change in Definition Transition Month (11 categories)
- Definition of Disability (three categories)
- M&N Limit Duration (six categories)

- M&N Limit Transition Month (11 categories)
- Age
- Attained Age
- Gender
- Maximum Benefit duration (eight categories)
- Calendar Year (ten years – 1997-2006).

The amount variables have all been weighted by a dampening factor used to diminish the impact of the five largest carriers. Amount variables include:

- Exposure Counts (months)
- Exposure IGMB (months)
- Recoveries
- Deaths
- Limits
- Max-outs
- Settlement.

The raw aggregated data contained 20.8M records with 475,243 Recoveries and 75,539 Deaths. We noted that the data were sparse with an average of less than one month of dampened exposure per record and with only 13% of all records having more than one month of exposure. The first decision that was made was to further aggregate the supplied by data by Calendar Year to maximize the exposure across individual cells before implementing the fitting and smoothing procedures. This procedure reduced the number of records to 14.2M, with still only 24% of records having more than one month of exposure. We therefore found it necessary to select additional groupings of variable before proceeding with the fit.

B.3 Fitting Technique

We used the same statistical fitting procedure for all of the table construction exercises. The expected termination rates were developed using a categorical GLM with a log-normal regression and an assumption of normal distribution of variance about the expectation.

The GLM method is defined as “categorical” since each variable is mapped to a discrete set of ranges, and then a new variable is defined that has the value of one if the variable maps to that range and a value of zero, if the variable does not.

For example, age may be grouped into five-year age bands (20-24, 25-29, etc), while Gender is defined as either Male or Female. We can define a variable M22 as representing the age group 20-24 and the Gender = “M”. If the actual age is between 20 and 24 and the Gender is “M” then this variable M22 has the value of one. Otherwise this variable has the value of zero.

If we assume that we have defined N such variables labeled X1, X2 to XN. We can then define the target variable (Recovery Rate) as

$$\text{Recovery Rate} = e^{(A1 \cdot X1 + A2 \cdot X2 + \cdots + AN \cdot XN)}$$

Where the values A1, A2, etc are the parameters to be determined. We will be fitting the log of the target variable, which then presents a standard linear equation

$$\text{Log(Recovery Rate)} = (A1 \cdot X1 + A2 \cdot X2 + \cdots + AN \cdot XN)$$

In the simplest example, if we use a single dimension variable (for example Age Band), then the parameters A1, A2, etc will exactly match the observed incidence rate for each segment. If we use multiple dimensions that are independent, then the linear regression procedure will unambiguously allocate the factors to the different variables to minimize the root-mean-square error.

In practice, the variables are not independent and so the regression procedure we use is an iterative process (assuming normal distribution of errors) to land on the best way of allocating the termination risk to the different categorical variables, while minimizing the root-mean-square error.

The common nomenclature for this procedure distinguishes between methods when the variables are fit together as new multi-dimensional categorical variable versus independent variables that are kept separate.

For example, we label the procedure defined by considering Age and Gender together as (Age by Gender). This means that if we have 11 Age variables and two Gender variables, we will actually use 22 distinct categorical variables. The procedure defined as (Age and Gender) will use 11 Age variables and two Gender variables for a total of 13 categorical variables.

The fitting process is performed while weighting the observations by the amount of exposure in each observation.

B.4 Smoothing Technique

Once the fitting procedure is completed we run a Whittaker-Henderson Graduation procedure. This procedure is documented in the text “Graduation: The Revision of Estimates” by Dick London. This method utilizes two metrics; one that measures the accuracy of the fit and one that measures the degree of smoothness. A linear combination is developed between these two metrics using an additional parameter that specifies the relative weighting of fit versus smoothness. A deterministic procedure is then used to determine new factors that minimize this combined metric. When using this method, we use monthly exposures as a weight. This means that cells with relatively low exposure will have less impact than surrounding cells with higher exposure.

B.5 Table Construction Process

B.5.1 Table Construction Approach

The final tables were generated through several steps, which are documented below. There are a couple of reasons for the using multiple steps as opposed to generating the complete table all at once. The first is that, if too many combinations of variables were considered at once, there would be a very large number of combinations, resulting in many exposure cells with either no exposure or no terminations. The resulting inherent volatility would complicate the fitting procedure. As an example, using only Duration, five-year age bands, Gender and EP, there would be approximately 24,150

observations, and 44% of those observations would have no Recoveries or Deaths. More than 6% of all observation cells would have one month of exposure or less.

Second, there are strong correlations between some key variables. For example, EP, Duration, Duration Since EP and Change in Definition Transition Month are all strongly correlated; the GLM method does not do a very good job of isolating individual effects among strongly correlated variables. The step-wise approach allows some additional control over the fitting procedure to produce results that made sense on review.

There is not a clear or rigorous way to determine in advance which step-wise approach will work best. Our approach was to evaluate the results from a variety of perspectives, to gauge the relative success or failure of each method. The perspectives used are as follows:

- **Fit error:** We measure two different fit error metrics, for each of one, two, and three dimensional A-to-E measures. This method is described in more detail below.
- **Table usability:** Do the resultant tables make sense and are they consistent with reasonable interpretations of disability dynamics? Will the table format present difficulties for the users?
- **Anomalous results:** Do the resulting tables contain unusual or unexpected features that are driven by a small number of actual terminations?

The less successful trials were discarded quickly, while more successful ones were reviewed by the 2008 GLTD Experience Table Construction Subcommittee (Construction Subcommittee), who ultimately made the decisions about the final form.

B.5.2 Final Table Construction Process

B.5.2.1 Recoveries

The seven step process defined below specifically excludes Maternity claims with durations less than three years. The first three steps develop the Base Recovery Rate Tables 1R and 2R and Steps 4 through 7 develop Adjustment Tables 3R to 6R.

Step 1: Develop Recovery rates, reflecting (Elimination Period Duration by Elimination Period Group) + (Duration by Gender by Age Band Group) + (Gender by Age Band)

For this step, the EP's are grouped into less than or equal 45 days (Group 1) and greater than 45 days (Group 2). The age bands are capped at less than 25 and greater than 60. For the three dimensional table with Duration and Gender, we group the ages into three broad groups.

- Age Band Group: Less Than 35, 35 to 49, >= 50.

We eliminate all observations within the Change in Definition Transition Period (defined as durations beginning at the month of Change in Definition from Own Occ to Any Occ and extending for three additional months). The Duration since EP factors are capped at twelve months. All analysis was done using the initial definition, but later smoothing in Step 6 resulted in extending the final Change in Definition month factors through month of change plus eight months.

The factors are fitted and smoothed using our standard procedure. The volume of data for these groupings is generally adequate. For long Durations and older Ages, there are a small number of Recoveries (for example, for Males over age 50 and duration greater than 20 years, there are only three Recoveries. However, for durations less than 13 years, we have at least 40 Recoveries in every cell.

Step 2: Correct for Early Duration Elimination Period Factors

The Step 1 procedure does not handle the early duration low EP factors correctly since they are so strongly correlated. For example, Duration 2 occurs only for the EP Group 1 and Duration Since EP of 1. This means that this factor is not uniquely determined. For example, the EP Group 1 Duration Since EP 1 factor can be multiplied by ten and the Duration 2 factors can be divided by ten and the resultant expected Recoveries would be unchanged. We correct the level of these factors as follows: The EP Group 1 factors for Durations Since EP of 1 and 2 are given the same ratio to the Duration Since EP 3 factor as we observed for EP Group 2. Once these modified factors are developed, we adjust the Duration factors so that the total expectations for these Durations are unchanged when the modified tables are combined.

Step 3: Adjust for Residual Elimination Period Variation

We calculate the total A-to-E for each of eight EP categories (EP's greater than 45 days) and for Durations Since EP durations up to 12 months. These EP factors are then smoothed and applied back to the EP duration factors to create a single EP adjustment table with 12 Durations Since EP and nine EP categories. Finally, the EP duration factors are linearly graded down to produce a factor of 1.0 at Durations Since EP of 18 months (see Table 4R). EP Group 1 is not included as part of this process since it was determined relative to EP Group 2 in Step 2.

Step 4: Own Occupation Transition Factors: (Own Occupation Period Group by Change in Definition Transition Month)

We generate A-to-E's from the results of Step 3 specifically for claims within the Change in Definition Transition Period. Adjustment factors are developed for each of four Own Occ Period groupings, for each Change in Definition Transition Month. These factors are left unsmoothed.

There are generally more than 100 Recoveries in every cell. The lowest number of Recoveries occurs for Own Occ Period greater than 48 and Change in Definition Month+2, which has 30 Recoveries.

Step 5a (Duration <= 84 months): (Duration Group by Diagnosis Group) + (Age Band by Gender by Diagnosis Group) + (Gross Monthly Benefit by Definition of Disability) + (Diagnosis Group by Definition of Disability) + (Duration Group 2 by Definition of Disability)

Step 5b (Duration > 84): (Duration Group by Diagnosis Group) + (Age Band by Gender by Diagnosis Group) + Gross Monthly Benefit + (Duration Group 2 by Definition of Disability)

The following are the selected groupings:

- Duration group: Quarterly through three years and annual through 11 years. After 11 years, we group into three groups: 12 to 14, 15 to 17, and 18 +.
- Diagnosis group: Eight distinct groups
- Age Band: Nine five-year groups beginning at Age less than 25 and age greater than 60

- Indexed Gross Monthly Benefit: 11 groups in $500 increments, beginning with less than 1000 through 5,000, followed by 5,000 to 9,999, 10,000 to 19,999, and >= 20,000.
- Definition of Disability: Three groups, defined as follows:

  — Own Occ: i.e., within Own Occ period

  — Any Occ: i.e., within Any Occ period more than three months after the Change in Definition Transition

  — Change in Definition Transition Period: within three months of the Change in Definition Transition Month.

We performed two separate fits; for Durations less than or equal to 84 months versus greater than 84 months. For the ultimate period, we simplify the GMB and Definition of Disability factors.

For the ultimate period, there were only four Recoveries for benefit amounts greater than 20K and so this cell was combined with the greater than 10K to 20K cell. After this correction every cell that we fit has at least 26 Recoveries.

The factors are fitted and smoothed according to the standard procedure.

Step 6: Expand and Smooth Change in Definition Transition Period

After Step five we noticed that for, many cells, the transition from the three month Change in Definition Transition Period to the Any Occ phase was too abrupt and discontinuous. Furthermore, we found that there remained residual high A-to-E's for a few months after the end of the Transition Period. For these reasons we decided to expand the Transition Period from three months to eight months post Transition. This was accomplished by linearly grading the Change in Definition Month+3 factor to the Any Occ factor over the five additional months.

Step 7: Expand Age and Duration Categories

This is the final step, in which we expand the Age and Duration categories to fill out the Table. We generate A-to-E's after Step 6 and the create Adjustment Factors as follows:

- Duration + (Age Band by Gender)

The durations are done monthly through 18 months, quarterly through three years, annually through 11 years and in three year increments through 21 years. The age bands are done in five year bands from less than 20 to greater than 80. Finally, we expand the Duration Adjustment Factors to be annual after year 11 by using three-point Lagrangian interpolation to fill out the missing years.

B.5.2.2 Maternity Recoveries

Due to significantly different dynamics, maternity claims with durations less than three years were handled separately. These expectations were set in a single step.

Step 1: (EP Duration) + (Age Group by Duration Group) + (Duration)

We examined, but found little difference in results by EP, and so this variable was not included.

- Age groups: Five year age bands from less than 20 to greater than or equal to fifty.
- Duration groups: Quarterly to one year and then two or three year groupings after
- Duration: Monthly to 18 months and quarterly to three years.
- Duration Since EP: monthly to nine months, linear grading from 10 to 18 months.

B.5.2.3 Deaths

For Deaths, we separated the experience into an early period (less than or equal to 60 months) and a later period (greater than 84 months). We used interpolation to smooth between the two segments (60 months to 84 months).

Deaths (Less than or Equal to 60 Month Duration)

Step 1: (EP Group + (Age Group 1 by Duration) + (Gender by Age Group 2 by Diagnosis Group 1) + (Diagnosis Group 2 by Gross Monthly Benefit Group)

For this step we exclude Durations 2 and 3 due to ambiguous interactions between the short EP and the short Durations.

- EP group: Two categories: Less than or equal to 45 days and greater than 45 days
- Duration group: Quarterly for two years and annually thereafter
- Age Group 1: Five categories: less than 40,and then five year bands to greater than or equal to 55
- Age Group 2: Three categories: less than 35, 35 to 50, greater than or equal to 50
- Diagnosis Group 1: Six categories of Death Diagnosis groupings
- Diagnosis Group 2: Two categories: Cancer/Non-Cancer
- IGMB group: Five categories: Less than 4,000, 4,009 to 4,499, 4500 to 4,999, 5,000 to 9,999, 10,000 to 19,999 and greater than or equal to 20,000.

Using these groupings, there are a minimum of nine Deaths in every cell. We fit and smooth according to the standard procedure.

Step 2: Early Duration Adjustments (Duration by Age Group 1)

We calculate the A-to-E for Durations 2 and 3 using the results from step one and then create expectations for Durations 2 and 3 based on these results.

Step 3: (Duration by Diagnosis Group 1) + (Age Band by Diagnosis Group 1)

This step expands the Duration and Age groupings that were used Step 1.

- Duration: Monthly to 18 months, quarterly to three years, and annually thereafter
- Age Band: Five-year bands from less than 20 to greater than or equal to 80.

There is a minimum of six Deaths in every cell. We fitted and smoothed according to the standard procedure.

Deaths (Greater than 60 Months)

The ultimate Deaths are fit in one step.

Step 4: (Gender by Age Band by Diagnosis Group 1) by (Duration by Diagnosis Group 1) by (Diagnosis Group 2 by Gross Monthly Benefit Group).

- Durations are annual to greater than 20 years.
- Age Band: Five-year bands from less than 25 to greater than or equal to 60.

All other groupings match the definitions for the select Death rates.

There is one cell with fewer than four Deaths (Male, Diagnosis Group 3 and Age less than 25). All other cells have at least four Deaths.

The tables are fitted and smoothed according to the standard procedure.

Step 5: Interpolation between Select and Ultimate Tables

There are some minor discontinuities that occur between the two tables. For the select period, the Duration table varies by Diagnosis group and by five different Age groups, while the ultimate Duration Death table varies only by Duration group. We extend the select Death table by linearly grading each Age and Diagnosis group into the equivalent Diagnosis group over Durations 60 to 84. This provides for a relatively smooth transition between the two tables.

B.5.2.4 Mental and Nervous Limit Terminations

When collecting the data, we asked participating companies to specifically identify claims that are subject to a M&N Limit, to identify the duration at which this limit applies, and to identify which closures are due to the application of the limit. On reviewing the data actually provided, we found that assignments of the closure reason were not consistent. In particular, at or near the M&N duration limit, we saw both elevated Recoveries and elevated Max-Outs. It is clear that participating carriers were using all three closure reasons to categorize M&N Limit terminations. Therefore, in the table aggregation, MIB was asked to reclassify Recoveries in the month of the M&N Limit duration and in the following month, as “Limit” terminations and not Recoveries.

We decided to explicitly exclude these two durations from the broad table fitting exercise, and then provide separate guidance on how to handle M&N Limit terminations. Since companies’ reserving

practices vary, we decided to provide a table that identifies the percentage of claims that enter the M&N Limit Period (i.e., staring three months prior to the Limit duration and ending three months after) and then survive to the end of the Limit Period. This technique is best illustrated with the following table.

TABLE B.1

Mental and Nervous Limit Calculation

	Expose[A]	Recovs[A]	Expected[B] Recovs	Limits[A]	Max-out[A]	Extra Term Rate	Survivor-ship
Pre Limit	481,198	14,772	14,259	1,002	245		100.0%
MN-3	18,490	291	243	45	28	0.7%	99.3%
MN-2	18,021	304	243	48	10	0.7%	98.7%
MN-1	17,548	484	231	70	47	2.1%	96.6%
MN-0	16,858	0	552	7,646	3,222	61.2%	37.5%
MN+1	5,900	0	147	2,660	27	43.0%	21.4%
MN+2	3,188	86	36	71	56	5.5%	20.2%
MN+3	2,955	87	29	34	51	4.8%	19.2%
Total Limit Termination Rate ==>							80.8%

A: Weighted data as reported by the participating companies
B: Includes extra Change in Definition terminations

For each M&N duration, we determine the total number of terminations that occur due to any of Recovery, Limit, or Max-Outs, subtract from the expected Recoveries, and divide by the exposure to arrive at the “extra” terminations that occur due to the M&N Limit. These extra terminations are assumed to occur through the entire M&N Transition period, arriving at a total survivorship of 19.2% (excluding regular Recoveries), or a M&N termination rate of 80.8%.

This example was calculated for all M&N Limit claims. We tried segmenting these results by various variables and for the final table elected to use age and Gender as the key variables. The final results were graduated using our standard procedure.

B.6 Measurement of Fit Error

The primary measure for evaluating the quality of the fit is to create A-to-E results by a variety of variables. These were manually reviewed to look for systematic (as opposed to random) variations,

which may be a sign that we have missed an important variable or have introduced a bias through the fitting procedure. In addition we created aggregate fit measures which are averaged over all one-dimensional, two-dimensional, and three-dimensional A-to-E reports. The ultimate goal was not to minimize these fit metrics since this could lead to an overly complicated table and over-fitting the data, but rather to use the metrics to evaluate the relative effectiveness of different table construction approaches.

The two metrics that we used were as follows:

- Mean Absolute Percent Error (MAPE): This is the weighted average of the absolute percent error between the actual and expected terminations, weighted by the expected terminations. If there are N observations with Actual (A) and Expected values (E), then the formula is as follows:

$$MAPE = \frac{1}{N}\sum_{i=1}^{N}\frac{|A_i - E_i|}{A_i}$$

- Root Mean Square (RMS) error: This metric is found by taking the square root of the weighted average of the square of the variance between the actual and expected terminations, weighted by the expected terminations.

$$RMS = \frac{1}{\bar{A}}\sqrt{\sum_{i=1}^{N}\frac{(A_i - E_i)^2}{N}}$$

Once an expectation method was established we systematically created A-to-E measures for the following nine variables (Duration, Gender, Age Band, Attained Age Band, EP, Diagnosis, IGMB, Own Occ Period and Own Occ Transition. There were nine one-dimensional A-to-E combinations, 36 two-dimensional A-to-E measures (i.e., for all combinations of the nine variables), and 84 three-dimensional combinations (9*8*7/(3*2))

Examples of these fit statistics are presented below:

TABLE B.2

A-to-E Recoveries - Average Fit Measures

Measures Aggregate Fit to Nine Variables Combined

	Average MAPE (%)					
	Random	**Pass 1**	**Pass 4**	**Pass 5**	**Final-Raw**	**Final-Smooth**
One-D	0.5	2.2	1.2	2.0	1.2	1.8
Two-D	1.3	4.8	3.4	4.5	3.7	4.3
Three-D	3.3	8.2	6.7	7.9	9.0	9.5
	Average RMS (%)					
	Random	**Pass 1**	**Pass 4**	**Pass 5**	**Final-Raw**	**Final-Smooth**
One-D	0.7	3.2	2.5	3.7	2.8	3.4
Two-D	2.6	7.5	6.8	8.0	8.2	8.5
Three-D	8.3	14.1	13.9	15.3	22.4	22.5

The “Random” column represents the average errors we would expect to see if the expectations were also 100% correct. This error shows what we expect if the actual outcomes were randomly distributed about the expected rates, assuming a normal distribution of outcomes with a standard deviation equal to the square root of the number of expected claims. These numbers are provided to illustrate the expected error in the event of a “perfect” fit.

The “Pass” columns represent different trial versions of the fit process, including a variety of different methods of fitting the data. The final selected result was based on the seventh pass. There are a couple of items to note. The details of the initial few passes were based on observing discrepancies in the outcome and modifying the structure to improve the fit. Beginning with Pass four we began to focus on simplifying the structure of the table, thus worsening this fit. For example, for Pass five, we

decided to simplify the long duration Recovery expectation and simplify the Own Occ transition expectations.

Secondly, the difference between the average metrics for the “raw” versus “smooth” represents the incremental additional error produced by smoothing the expected outcomes.

We did not retain a similar logging of fit measures for the different iterations of the Death table construction.

B.7 Key Decision Points

As noted above, there were many decision points in the table construction process. In general, the decisions were made by the consensus of the Construction Subcommittee after examining relevant material. In this section we present some of this material and the relevant considerations for several of the key decisions.

B.7.1 Fit Technique

Before deciding on the selected fit method (categorical log-normal regression) we did consider a variety of other predictive modeling, or curve-fitting techniques. We found that many of the other methods depend on generating the best functional form for approximating the observed data, which implies constraints on how the expected rates vary with continuous variables such as Age and Duration. The categorical method contains no *a-priori* assumptions about the relative value from one value to the next and so the parameters can more easily match the observed data. This method is subject to the potential for over-fitting, but we can explicitly handle this potential through the graduation process.

Briefly, the predictive modeling or curve-fitting techniques make implicit assumptions about the dynamics that drive the results and hence produce expected values that do not match actual observations of the data. This is very useful when the data is sparse and does not cover the complete range of possible combinations of variables. However, for this study the data were fairly complete across the range of variables and so it is less important to use a technique whose strength is estimating expectations in the absence of actual observations.

However, we also note that many of the non-categorical techniques do not do well at the ends of the data (for example low and high ages), where the exposures may be much lower than in the middle ages. When the exposure is low, we prefer to preserve the functional form of the expectations over actually matching the data closely. The categorical method will fit the actual results directly, and then we can explicitly decide through the graduation process how much weight to give to the data end points.

Secondly, there are known strong correlations between some variables, such as Duration, EP and Change in Definition Transition Duration. These interdependencies will complicate any fitting procedure since the data will not contain information necessary to resolve the various interdependencies. We opted for the approach of recognizing these dependencies explicitly and proceeding in a step-wise fashion based on explicit decisions about how to account for each effect. An example would be our decision to remove the Change in Definition Transition Period exposures from the initial fit and then account for this effect in the next step. We found that using the categorical fitting procedure with post-fit graduation allowed better flexibility and control over the table construction process.

B.7.2 Diagnosis Groupings

The original assembly of the data requested that supplied diagnosis codes be grouped into 13 broad categories. It was the judgment of the LTD Experience Committee that these 13 categories broadly capture the different risk dynamics. Clearly there are variations within these categories, but we decided that by being consistent with prior experience tables, we would not have to deal with consideration of open-ended diagnosis definitions. When the aggregate tables were created we found that some diagnosis groupings had many more actual terminations than others. Since we were producing tables that vary by Diagnosis and several other variables (Age, Gender, Duration, etc), we found that these more sparsely populated diagnoses did not have sufficient exposure coverage across the other variables. For this reason we decided to further group some Diagnoses, focusing on grouping those with the fewest terminations.

The primary consideration in selecting the groupings was to group Diagnoses according to the level of the observed terminations rates. However, in addition we reviewed the slope of the termination

adjustment by Diagnosis, Age and Duration to make sure that we were not grouping Diagnoses that have significantly different dynamics as the Ages and Durations change. The following tables illustrate the final selections.

TABLE B.3

Diagnosis Groupings for Recoveries

Diagnosis	Number of Recoveries	Recovery Groupings
Maternity	52,414	
Back	48,915	
Injury other than Back	44,330	
Other Musculoskeletal	44,303	w/ Digestive
Cancer	30,323	
Other	27,581	w/ Ill-Defined and Misc Conditions
Circulatory	23,387	
Mental and Nervous	21,982	w/ Respiratory and Diabetes
Nervous System	12,740	w/ Diabetes and Respiratory
Digestive	9,704	w/ Other Musculoskeletal
Ill-Defined and Misc Conditions	6,595	w/ Other
Respiratory	4,033	w/ Nervous System and Diabetes
Diabetes	2,058	w/ Nervous System and Respiratory

TABLE B.4

Diagnosis Groupings for Deaths

Diagnosis	Number of Deaths	Death Groupings
Cancer	40,138	
Circulatory	9,546	
Other	7,254	
Nervous System	3,756	w/ Ill-Defined and Misc Conditions
Respiratory	3,460	w/ Diabetes and Digestive
Other Musculoskeletal	2,356	Grouping #1: Acute
Back	2,100	Grouping #1: Acute
Digestive	1,950	w/ Respiratory and Diabetes
Diabetes	1,501	w/ Respiratory and Digestive
Injury other than Back	1,373	Grouping #1: Acute
Mental and Nervous	1,059	Grouping #1: Acute
Ill-Defined and Misc Conditions	1,009	w/ Nervous System
Maternity	38	Grouping #1: Acute

B.7.3 Handling of Elimination Period

The handling of EP for the 2008 GLTD Experience Table represents a departure from prior industry tables in which the EP represented an additional dimension that accompanied the other dimensions such as Duration, Age, and Diagnosis. In essence the prior tables contain separate tables for each EP, at least for a select period.

Aggregate data for the 2008 Study contained 13 distinct EPs. One reason for changing the approach to EP is that we wanted to include so many other variables, in particular the many Diagnosis categories. If we added separate tables for EP, the total number of cells would increase from the current 38,000 cells to 500,000 cells.

We found that the EP effects are strongly affected by the duration since the end of the EP (Duration Since EP) for the first several months, but that these effects wear off as the claim ages. Furthermore, the Duration Since EP simultaneously captures both the Duration and EP effects and so, outside of the 30-day EP, we did not need to capture the separate EP effects. We demonstrate this is showing the success of the EP duration formulation in capturing the observed rates.

TABLE B.5

Recovery A-to-E Percentages for Claims with Duration Since EP > Twelve Months

Elimination Period in Days	Recoveries	A-to-E (%)
30	409,451	99
60	419,183	95
90	4,897,988	97
120	308,354	93
150	298,277	99
180	6,388,348	100
210	387,173	141
240	55,840	115
270	55,076	104
300	34,699	105
330	23,006	98
360	405,402	109

We note that the expectations have no explicit EP adjustment after twelve months.

TABLE B.6

Recovery A-to-E Percentages by Duration and Elimination Period

	A-to-E %		
Durations (Months)	**30**	**90**	**180**
2	101.1		
3	105.9		
4	99.9	98.3	
5	91.2	98.5	
6	92.1	98.1	
7	101.0	104.3	102.6
8	101.1	101.0	104.7
9	90.8	102.1	105.1
10	93.5	95.1	94.4
11	98.7	93.4	91.9
12	111.9	103.0	105.0

We also note that the table has no explicit variation by EP and Duration.

B.8 Component Tables

For those readers interested in the technical details of Table construction, this section provides additional detail. Construction of the final Base Termination Rate and Adjustment Tables from the analysis steps involved the development of a set of interim or "Component" Tables. These Component Tables were consolidated into the full final Experience Table for publication. We note that the Component Tables would produce the same expected rates as the published Table. They are presented here as documentation of the construction process.

B.8.1 Recoveries – Non-Maternity

For Recoveries, Maternity claims with durations less than or equal to 36 months are given special handling. Any claim with a Maternity diagnosis after 36 months should be treated as "Other."

Component Table RC-a: Duration by Gender by Age at Disability

This table provides expected monthly Recovery rates that vary by monthly durations up through 84 months and by annual durations after 84 months. There are nine Age at Disability categories. The ages are defined by calendar age at the time of the disability, with any age less than 25 being included in the first category and any age greater than or equal to 60 being included in the last category. All other categories are based on five year increments: For example 25-29, 30-34, etc. These apply to all diagnoses other than maternity at durations less than or equal to 36 months.

Component Table RC-b: Duration by Diagnosis Group

These Recovery Adjustment Factors apply to all claims other than maternity with duration less than or equal to 36 months. The diagnosis groups are defined above and the durations vary by month through 18 months, by quarter from 19 months through 84 months, and by year after 84 months.

Component Table RC-c: Age at Disability by Gender by Diagnosis Group

These Recovery Adjustment Factors apply at all durations and apply to all diagnoses other than Maternity with duration less than or equal to 36 months. The ages are defined by calendar age at the time of the disability, with any age less than 20 being included in the first category and any age greater

than or equal to 80 being included in the last category. All other categories are based on five year increments.

Component Table RC-d: Elimination Period Duration Multipliers

These Recovery Adjustment Factors vary by EP and the number of months since the end of the EP. For example, an EP month of one applies in the first month after the end of the EP. The EP groupings are based on the days in the EP and grouped into nine categories as follows:

TABLE B.7

Component Table EP Categories

Category	EP Range
EP Group 1	1 to 45 Days
EP Group 2	46 to 75 Days
EP Group 3	76 to 105 Days
EP Group 4	106 to 135 Days
EP Group 5	136 to 165 Days
EP Group 6	166 to 195 Days
EP Group 7	196 to 240 Days
EP Group 8	241 to 315 Days
EP Group 9	316+ Days

We use factors for the first eighteen months after the end of the EP. After eighteen months the table does not apply. These factors do not apply to Maternity claims with duration less than or equal to 36 months.

Component Table RC-e: Indexed Gross Monthly Benefit by Definition of Disability

These Recovery Adjustment Factors do not apply to Maternity claims within 36 months of duration nor to Any Occ claims within nine months of the Change in Definition. There are three sets of factors depending on whether the claim has a duration less than 84 months and is in the own occupation period or has a duration less than 84 months and is in the any occupation period, or has a duration greater than 84 months.

The gross monthly benefit is indexed to 2007 with an average annual inflation rate of 2.4%. The table includes twelve categories for benefit amount. Any amount less than $1000 is in the first category. The categories proceed in $500 increments through $5,000 per month. The final three categories are for benefits greater than or equal to $5,000 and less than $10,000, greater than or equal to $10,000 and less than $20,000 and greater than or equal to $20,000 per month.

Component Table RC-f: Duration Factors for Any Occupation Claims

These Recovery Adjustment Factors apply only to Any Occ claims that are more than nine months after the Change in Definition and do not have a Maternity diagnosis with a duration less than 36 months. There is one factor for any duration less than 48 months and one factor for any duration greater than or equal to 18 years. The factors vary by annual duration between 48 months and 18 years.

Component Table RC-g: Diagnosis Group Factors for Any Occupation Claims

These Recovery Adjustment Factors apply only to Any Occ claims that are more than nine months after the Change in Definition and do not have a Maternity diagnosis with a duration less than 36 months. These factors vary by the diagnosis groups that are listed above.

Component Table RC-h: Change in Definition Transition Claims

These Recovery Adjustment Factors apply only to Any Occ claims that are within nine months of the Change in Definition and do not have a Maternity diagnosis with a duration less than 36 months. These factors vary by the number of months since the Change in Definition, by the IGMB, by the Diagnosis group, and by the Own Occ period. The gross benefit categories are the same as used for component table 5R, and the Diagnosis groups are listed above. The Own Occ periods are grouped into four categories: Own Occ period less than or equal to 18 months, greater than 18 and less than or equal to 30 months, greater than 30 and less than or equal to 48 months, and greater than 48 months.

B.8.2 Recoveries – Maternity

Component Table RC-Ma

This table provides expected monthly Recovery rates for maternity claims with durations less than or equal to 36 months. The rates vary by monthly durations up through 18 months and by quarterly durations through 36 months. The ages are defined by calendar age at the time of the disability, with any age less than 20 being included in the first category and any age greater than or equal to 50 being included in the last category. All other categories are based on five year increments.

Component Table RC-Mb: Elimination Period Duration Multipliers for Maternity claims

These Recovery Adjustment Factors vary by the number of months since the end of the EP and apply only to Maternity claims with duration less than or equal to 36 months. These factors do not vary by EP and apply only to the first eighteen months since the end of the EP.

B.8.3 Deaths

Component Table DC-a: Early Death Rates by Duration by Diagnosis by Age at Disability (Duration <= 84 months)

This table provides expected monthly Death rates that vary by monthly durations up through 84 months. There are five Age at Disability categories. The ages are defined by calendar age at the time of the disability, with any age less than or equal to 40 being included in the first category and any age greater than or equal to 55 being included in the last category. All other categories are based on five year increments. The table also varies by the six diagnosis groups listed above.

Component Table DC-b: Later Death Rates by Duration by Diagnosis (Duration > 84 months)

This table provides expected monthly Death rates that vary by annual durations after 84 months, and by the six diagnosis groups listed above.

Component Table DC-c: Adjustment Factors by Age at Disability by Gender by Diagnosis Group (Duration <= 60 Months)

These Death Adjustment Factors apply to all claims with duration less than or equal to 60 months. The diagnosis groups are defined above. There are fourteen Age at Disability categories. The ages are defined by calendar age at the time of the disability, with any age less than 20 being included in the first category and any age greater than or equal to 80 being included in the last category. All other categories are based on five year increments

Component Table DC-d: Adjustment Factors by Age at Disability by Gender by Diagnosis Group (Duration > 60 Months)

These Death Adjustment Factors apply to all claims with duration greater than 60 months. The diagnosis groups are defined above. There are fourteen Age at Disability categories. The ages are defined by calendar age at the time of the disability, with any age less than 20 being included in the first category and any age greater than or equal to 80 being included in the last category. All other categories are based on five year increments.

Component Table DC-e: Adjustment Factors by Elimination Period

These Death Adjustment Factors apply only to claims with 12 months of the end of the EP. There is one factor for EPs less than or equal to 45 days, and another factor for EPs greater than 45 days.

Component Table DC-f: Adjustment Factors by Indexed Gross Monthly Benefit by Duration and Diagnosis

These Death Adjustment Factors vary by IGMB, by Duration, and by Diagnosis. There duration break is for durations less than or equal to 84 months, and greater than 84 months, and the diagnoses vary by Cancer and non-Cancer.

Appendix C: Raw-to-Modeled Comparison

To illustrate the fit of the Experience Table to the underlying experience, this appendix provides Actual-to-Expected comparisons, where the expected basis is the Experience Table. The comparisons show the fit by the key variables included within the Experience Table as well as for combinations of several of the variables. Many of the comparisons exclude Maternity claims (as noted in the heading of each comparison) to avoid distorting the comparison results in the early claim durations.

Additional comparisons showing the fit of the Experience Table to the underlying data can be created with the pivot tables that are described in Appendix D.

C.1 Outline of Actual–to–Expected Comparisons

Recovery Rate Actual-to-Expected (A-to-E) Comparisons

- Table C.1: Duration
- Table C.2: Age
- Table C.3: Age / Gender
- Table C.4:A Age / Gender / Duration – Male
- Table C.4:B Age / Gender / Duration – Female
- Table C.5: Elimination Period
- Table C.6: Diagnosis
- Table C.7: Diagnosis / Duration
- Table C.8: Indexed Gross Monthly Benefit
- Table C.9: Own Occ Transition
- Table C.10: Own Occ Transition / Indexed Gross Monthly Benefit
- Table C.11: Own Occ Transition / Diagnosis
- Table C.12: Maternity by Duration

Death Rate A-to-E Comparisons

- Table C.13: Duration
- Table C.14: Age
- Table C.15: Age / Gender
- Table C.16:A Age / Gender / Duration – Male
- Table C.16:B Age / Gender/ Duration – Female
- Table C.17: Attained Age
- Table C.18: Attained Age / Gender
- Table C.19: Elimination Period
- Table C.20: Diagnosis
- Table C.21: Diagnosis / Duration
- Table C.22: Indexed Gross Monthly Benefit

TABLE C.1

Recovery Rates by Duration from Disability Date

Month/Year	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
1-3	78,988	17,141	17,054	100.5%
4-6	758,207	68,278	69,900	97.7%
7-9	1,233,115	54,833	52,975	103.5%
10-12	1,077,912	31,118	31,715	98.1%
13-15	978,890	19,937	19,972	99.8%
16-18	889,082	13,190	12,977	101.6%
19-21	813,681	10,500	10,107	103.9%
22-24	756,928	8,199	8,179	100.3%
25-27	701,808	9,304	10,087	92.2%
28-30	614,954	10,646	10,603	100.4%
31-33	525,717	6,726	6,567	102.4%
34-36	488,448	3,895	3,803	102.4%
Year 4	1,666,603	9,310	8,979	103.7%
Year 5	1,311,385	4,164	4,517	92.2%
Year 6	1,027,103	2,579	2,748	93.9%
Year 7	815,957	1,607	1,596	100.7%
Year 8	672,275	1,061	1,066	99.6%
Year 9	554,143	766	772	99.2%
Year 10	458,611	610	595	102.5%
Year 11+	2,192,625	2,090	2,097	99.7%
Total	17,616,433	275,952	276,307	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.2

Recovery Rates by Age at Disability

Age at Disability	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
< 25	152,127	6,249	6,029	103.7%
25 - 29	504,150	15,294	15,396	99.3%
30 - 34	1,075,548	26,351	26,449	99.6%
35 - 39	1,807,634	36,327	36,850	98.6%
40 - 44	2,554,502	44,734	44,763	99.9%
45 - 49	3,181,738	47,371	46,699	101.4%
50 - 54	3,618,106	44,293	43,928	100.8%
55 - 59	3,115,526	33,271	34,529	96.4%
60 - 64	1,386,589	17,107	16,946	100.9%
65+	220,513	4,954	4,718	105.0%
Total	17,616,433	275,952	276,307	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.3

Recovery Rates by Age at Disability and Gender

	Males			Females		
Age at Disability	**Exposure**	**Actual Recoveries**	**A-to-E Ratio**	**Exposure**	**Actual Recoveries**	**A-to-E Ratio**
< 25	71,432	2,982	104.4%	80,695	3,267	102.9%
25 - 29	200,526	6,264	98.7%	303,623	9,030	99.8%
30 - 34	443,900	10,730	99.1%	631,647	15,621	100.0%
35 - 39	779,821	15,076	98.7%	1,027,814	21,251	98.5%
40 - 44	1,129,261	18,509	99.9%	1,425,242	26,226	100.0%
45 - 49	1,439,031	19,254	101.6%	1,742,707	28,117	101.3%
50 - 54	1,760,444	18,084	99.6%	1,857,661	26,209	101.7%
55 - 59	1,628,054	14,301	95.1%	1,487,472	18,971	97.3%
60 - 64	741,899	7,689	101.9%	644,690	9,418	100.2%
65+	114,326	2,278	105.0%	106,187	2,676	105.0%
Total	8,308,694	115,167	99.6%	9,307,739	160,785	100.1%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.4.A

Recovery Rates by Age at Disability, Gender and Duration

Year of Disability	Recovery A-to-E Ratios - Male by Age at Disability										
	< 25	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65+	Total
1	108.3%	97.8%	97.3%	94.7%	97.4%	99.9%	97.9%	96.9%	100.6%	109.4%	98.3%
2	104.2%	99.6%	98.2%	100.7%	102.1%	105.2%	103.0%	92.6%	107.6%	91.0%	101.0%
3	93.1%	97.5%	101.8%	105.9%	107.0%	104.2%	104.1%	94.3%	102.4%	37.6%	102.4%
4	86.9%	108.2%	118.5%	114.3%	107.9%	109.7%	100.1%	95.1%	94.2%	31.0%	105.8%
5	92.3%	90.7%	104.3%	102.6%	93.6%	93.0%	92.8%	76.2%	98.5%	76.9%	93.1%
6	69.1%	96.2%	107.5%	115.4%	105.1%	97.3%	94.9%	74.4%	113.8%	614.4%	98.7%
7	62.5%	83.5%	100.0%	125.6%	109.8%	101.4%	108.2%	81.4%	474.7%	0.0%	104.1%
8	103.4%	118.7%	102.1%	97.7%	90.7%	106.3%	95.0%	108.7%	0.0%	0.0%	100.3%
9	120.6%	113.4%	89.1%	107.7%	74.0%	112.1%	124.8%	76.3%	0.0%	0.0%	101.6%
10	57.1%	111.1%	86.5%	96.9%	108.9%	126.2%	97.5%	86.5%	0.0%	0.0%	102.8%
11 +	88.8%	118.8%	110.7%	102.2%	104.6%	84.0%	91.5%	82.8%	140.1%	0.0%	101.4%
Male Total	104.4%	98.7%	99.1%	98.7%	99.9%	101.6%	99.6%	95.1%	101.9%	105.0%	99.6%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.4.B

Recovery Rates by Age at Disability, Gender and Duration

Year of Disability	Recovery A-to-E Ratios - Female by Age at Disability										
	< 25	**25 - 29**	**30 - 34**	**35 - 39**	**40 - 44**	**45 - 49**	**50 - 54**	**55 - 59**	**60 - 64**	**65+**	**Total**
1	105.5%	102.2%	100.3%	98.0%	99.6%	101.2%	102.2%	100.3%	102.8%	109.9%	100.9%
2	109.6%	99.0%	102.8%	100.4%	100.9%	102.9%	103.1%	96.9%	102.0%	91.4%	101.2%
3	89.4%	91.6%	90.4%	94.5%	99.7%	98.8%	100.4%	93.0%	84.2%	41.6%	95.5%
4	92.7%	105.6%	107.9%	105.7%	106.7%	107.5%	103.0%	83.5%	82.6%	98.1%	102.1%
5	74.7%	89.9%	100.8%	100.1%	97.5%	97.5%	85.3%	65.4%	91.0%	204.2%	91.5%
6	98.2%	90.3%	102.7%	99.2%	92.8%	83.2%	91.3%	66.4%	127.4%	0.0%	90.3%
7	87.2%	96.3%	92.2%	100.4%	97.5%	117.6%	98.2%	65.4%	0.0%	0.0%	98.1%
8	64.0%	99.2%	96.8%	104.4%	103.2%	104.2%	95.4%	76.7%	0.0%	0.0%	99.1%
9	84.6%	79.8%	108.0%	102.7%	109.7%	99.9%	74.1%	77.2%	0.0%	0.0%	97.3%
10	31.2%	88.3%	90.4%	106.1%	109.0%	121.9%	101.1%	97.5%	0.0%	0.0%	102.2%
11 +	77.2%	91.9%	110.1%	98.5%	91.6%	99.8%	103.5%	322.5%	1385.7%	0.0%	98.3%
Male Total	102.9%	99.8%	100.0%	98.5%	100.0%	101.3%	101.7%	97.3%	100.2%	105.0%	100.1%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.5

Recovery Rates by Elimination Period

Elimination Period	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
30 Days	564,947	28,963	29,012	99.8%
60 Days	527,760	10,739	11,320	94.9%
90 Days	6,445,633	129,638	131,629	98.5%
120 - 150 Days	744,176	8,836	9,340	94.6%
180 Days	7,995,291	84,630	84,533	100.1%
210 - 330 Days	716,419	10,284	7,884	130.4%
360 Days	622,207	2,861	2,589	110.5%
Total	17,616,433	275,952	276,307	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.6

Recovery Rates by Diagnosis

Diagnosis	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
Injury other than Back	1,286,371	44,330	44,076	100.6%
Digestive	396,634	9,704	8,749	110.9%
Other Musculoskeletal	2,490,623	44,303	44,942	98.6%
Back	2,853,128	48,915	48,528	100.8%
Ill-defined and Misc Conditions	413,507	6,595	6,735	97.9%
Other	1,996,306	27,581	27,772	99.3%
Cancer	1,366,482	30,323	30,682	98.8%
Mental and Nervous	1,155,849	21,982	22,157	99.2%
Circulatory	2,834,923	23,387	23,896	97.9%
Diabetes	351,532	2,058	2,048	100.4%
Respiratory	611,181	4,033	3,768	107.0%
Nervous System	1,859,898	12,740	12,954	98.3%
Total	17,616,433	275,952	276,307	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.7

Recovery Rates by Diagnosis and Duration

	Recovery A-to-E Ratios by Diagnosis								
Year of Disability	**Injury other than Back**	**Digestive/ Other MuscSkel**	**Back**	**Other/ Ill Defined**	**Cancer**	**Mental and Nervous**	**Circulatory**	**Diabetes/ Nervous/ Respiratory**	**Total**
1	100.6%	101.4%	101.6%	97.8%	97.0%	99.2%	98.3%	101.3%	99.8%
2	100.0%	100.7%	99.8%	103.6%	102.0%	102.6%	99.9%	102.1%	101.2%
3	100.3%	95.7%	98.4%	102.0%	107.7%	90.7%	98.7%	99.3%	98.4%
4	106.5%	102.2%	102.6%	106.2%	113.8%	108.0%	98.5%	102.2%	103.7%
5	94.6%	90.5%	95.2%	90.9%	90.6%	106.7%	83.0%	92.8%	92.2%
6	94.5%	96.8%	104.5%	88.3%	88.5%	94.4%	84.0%	88.3%	93.9%
7	102.7%	109.1%	107.1%	100.9%	100.0%	80.5%	88.0%	97.6%	100.7%
8	91.5%	119.4%	109.8%	105.8%	99.7%	80.2%	71.7%	93.3%	99.6%
9	94.0%	127.7%	111.4%	89.1%	92.1%	97.3%	100.9%	77.7%	99.2%
10	97.0%	114.2%	107.5%	100.5%	119.5%	127.4%	90.2%	89.7%	102.5%
11 +	119.6%	101.8%	104.2%	95.4%	105.0%	90.3%	93.3%	97.4%	99.7%
Total	100.6%	100.6%	100.8%	99.0%	98.8%	99.2%	97.9%	100.3%	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.8

Recovery Rates by Indexed Gross Monthly Benefit

Indexed Gross Monthly Benefit	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
$ < 1000	1,595,222	30,118	29,601	101.7%
$ 1000 - $1499	4,229,935	76,908	76,845	100.1%
$ 1500 - $1999	3,798,329	62,691	62,739	99.9%
$ 2000 - $2499	2,726,091	41,056	41,383	99.2%
$ 2500 - $2999	1,830,262	25,024	25,293	98.9%
$ 3000 - $3499	1,105,920	14,442	14,686	98.3%
$ 3500 - $3999	666,914	8,312	8,348	99.6%
$ 4000 - $4499	430,299	4,947	4,974	99.5%
$ 4500 - $4999	280,532	3,197	3,119	102.5%
$ 5000 - $9999	760,387	7,748	7,738	100.1%
$10000 - $19999	153,500	960	1,215	79.0%
$20000 And Over	16,541	52	72	72.4%
Total	17,616,433	275,952	276,307	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.9

Recovery Rates by Own to Any Occupation Transition

Own to Any Occ Transition Month	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
Own+0	199,632	10,507	10,651	98.6%
Own+1	168,207	6,841	6,927	98.8%
Own+2	156,900	2,346	2,276	103.1%
Own+3	152,144	1,891	1,831	103.3%
Own+4	147,670	1,548	1,591	97.3%
Own+5	144,047	1,263	1,383	91.3%
Own+6	140,798	1,092	1,204	90.7%
Own+7	135,920	1,016	1,012	100.4%
Own+8	133,200	891	880	101.3%
Total	1,378,519	27,396	27,755	98.7%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.10

Recovery Rates by Indexed Gross Monthly Benefit and Own Occupation Transition

Own to Any Occupation Transition Month	Recovery A-to-E Ratios by Indexed Gross Monthly Benefit						
	$ < 1000	$1000 - $2000	$2000 - $3000	$3000 - $4000	$4000 - $5000	$5000+	Total
Own+0	88.9%	104.2%	91.4%	93.9%	103.6%	98.2%	98.6%
Own+1	113.6%	98.7%	93.6%	90.8%	84.2%	84.0%	98.8%
Own+2	108.4%	102.7%	101.8%	98.0%	106.0%	100.4%	103.1%
Own+3	109.9%	101.3%	103.4%	102.6%	106.2%	124.6%	103.3%
Own+4	97.7%	91.6%	101.3%	117.9%	118.3%	116.4%	97.3%
Own+5	96.5%	90.7%	95.3%	69.9%	105.2%	81.9%	91.3%
Own+6	76.5%	89.5%	95.0%	99.5%	91.9%	137.3%	90.7%
Own+7	95.2%	94.9%	113.3%	107.6%	108.0%	87.8%	100.4%
Own+8	95.3%	102.2%	104.2%	112.7%	90.0%	62.2%	101.3%
Total	99.1%	100.2%	95.8%	95.7%	99.4%	97.3%	98.7%

Excludes Maternity Claims – Results on a Dampened Basis

TABLE C.11

Recovery Rates by Diagnosis and Own Occupation Transition

Own to Any Occupation Transition Month	Recovery A-to-E Ratios by Diagnosis								
	Injury other than Back	Digestive/ Other MuscSkel	Back	Other/ Ill Defined	Cancer	Mental and Nervous	Circulatory	Diabetes/ Nervous/ Respiratory	Total
Own+0	105.0%	99.7%	100.9%	99.7%	94.3%	65.8%	105.3%	104.3%	98.6%
Own+1	98.0%	106.9%	108.9%	83.7%	78.4%	62.1%	96.0%	100.9%	98.8%
Own+2	109.2%	96.0%	105.7%	94.3%	114.2%	127.3%	103.4%	97.7%	103.1%
Own+3	105.1%	96.7%	106.4%	113.2%	97.6%	125.6%	89.8%	104.2%	103.3%
Own+4	99.7%	88.6%	97.7%	109.0%	81.9%	128.7%	91.7%	100.6%	97.3%
Own+5	89.8%	90.9%	97.7%	105.4%	90.9%	106.6%	65.2%	82.9%	91.3%
Own+6	90.6%	92.1%	94.9%	88.6%	84.7%	112.1%	74.2%	90.3%	90.7%
Own+7	108.3%	108.5%	100.2%	94.1%	106.6%	116.9%	90.7%	83.7%	100.4%
Own+8	110.9%	96.1%	107.8%	98.7%	108.2%	100.8%	83.0%	104.4%	101.3%
Total	102.3%	99.8%	103.3%	96.3%	91.8%	78.9%	95.7%	100.0%	98.7%

Excludes Maternity Claims – Results on a Dampened Basis

TABLE C.12

Maternity Recovery Rates by Duration from Disability Date
Duration 1 – 36 Only

Month/Year	Exposure	Actual Recoveries	Expected Recoveries	A-to-E Ratio
1-3	29,580	17,113	17,250	99.2%
4-6	57,447	21,758	21,372	101.8%
7-9	28,274	11,256	11,117	101.2%
10-12	4,213	1,817	1,904	95.4%
13-15	1,505	200	229	87.5%
16-18	1,015	95	91	104.5%
19-21	764	39	43	90.4%
22-24	668	26	34	77.0%
25-27	568	28	27	104.8%
28-30	422	19	18	102.9%
31-33	325	8	12	70.9%
34-36	290	9	9	91.6%
Total	125,069	52,369	52,107	100.5%

TABLE C.13

Death Rates by Duration from Disability Date

Month/Year	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
1-3	78,988	280	283	99.0%
4-6	758,207	5,778	5,835	99.0%
7-9	1,233,115	10,110	10,134	99.8%
10-12	1,077,912	8,502	8,346	101.9%
13-15	978,890	6,669	6,668	100.0%
16-18	889,082	5,184	5,199	99.7%
19-21	813,681	4,094	4,074	100.5%
22-24	756,928	3,304	3,293	100.3%
25-27	701,808	2,665	2,713	98.2%
28-30	614,954	2,236	2,260	99.0%
31-33	525,717	1,945	1,921	101.2%
34-36	488,448	1,689	1,713	98.6%
Year 4	1,666,603	5,310	5,294	100.3%
Year 5	1,311,385	3,609	3,636	99.2%
Year 6	1,027,103	2,614	2,610	100.2%
Year 7	815,957	2,019	2,003	100.8%
Year 8	672,275	1,658	1,613	102.8%
Year 9	554,143	1,270	1,295	98.1%
Year 10	458,611	1,039	1,043	99.6%
Year 11+	2,192,625	5,527	5,680	97.3%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.14

Death Rates by Age at Disability

Age at Disability	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
< 25	152,127	312	285	109.6%
25 - 29	504,150	1,051	1,018	103.2%
30 - 34	1,075,548	2,519	2,418	104.2%
35 - 39	1,807,634	4,481	4,517	99.2%
40 - 44	2,554,502	7,898	7,805	101.2%
45 - 49	3,181,738	12,238	12,828	95.4%
50 - 54	3,618,106	16,639	15,708	105.9%
55 - 59	3,115,526	17,404	17,978	96.8%
60 - 64	1,386,589	10,090	10,385	97.2%
65+	220,513	2,870	2,670	107.5%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.15

Death Rates by Age at Disability and Gender

Age at Disability	Males			Females		
	Exposure	Actual Deaths	A-to-E Ratio	Exposure	Actual Deaths	A-to-E Ratio
< 25	71,432	180	108.4%	80,695	132	111.4%
25 - 29	200,526	544	101.8%	303,623	507	104.8%
30 - 34	443,900	1,358	107.3%	631,647	1,161	100.7%
35 - 39	779,821	2,337	99.9%	1,027,814	2,144	98.4%
40 - 44	1,129,261	4,039	102.2%	1,425,242	3,859	100.2%
45 - 49	1,439,031	6,248	96.7%	1,742,707	5,990	94.0%
50 - 54	1,760,444	8,803	105.1%	1,857,661	7,836	106.8%
55 - 59	1,628,054	9,699	96.6%	1,487,472	7,705	97.1%
60 - 64	741,899	5,769	96.5%	644,690	4,320	98.0%
65+	114,326	1,670	109.8%	106,187	1,201	104.5%
Total	8,308,694	40,647	100.0%	9,307,739	34,854	99.6%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.16.A

Death Rates by Age at Disability, Gender and Duration

Year of Disability	Death A-to-E Ratios - Male by Age at Disability										
	< 25	**25 - 29**	**30 - 34**	**35 - 39**	**40 - 44**	**45 - 49**	**50 - 54**	**55 - 59**	**60 - 64**	**65+**	**Total**
1	105.7%	94.5%	108.4%	114.0%	110.9%	106.3%	114.6%	100.2%	102.9%	114.7%	106.9%
2	104.3%	98.7%	96.5%	93.7%	99.8%	95.6%	103.7%	96.6%	95.8%	98.9%	98.0%
3	88.7%	105.7%	93.3%	93.6%	92.6%	85.3%	102.3%	93.2%	89.8%	115.1%	93.4%
4	111.8%	99.7%	109.4%	94.1%	94.2%	87.9%	100.4%	95.9%	87.7%	164.8%	94.6%
5	106.4%	87.7%	119.7%	83.8%	98.9%	81.8%	105.8%	95.6%	92.0%	136.7%	95.5%
6	252.1%	110.4%	113.4%	115.6%	122.0%	98.1%	97.1%	90.0%	82.5%	101.0%	98.5%
7	57.1%	117.3%	138.1%	113.4%	103.2%	101.9%	96.4%	93.4%	77.4%	0.0%	99.3%
8	239.4%	129.0%	127.9%	108.1%	106.8%	109.3%	105.2%	93.8%	124.3%	314.3%	104.7%
9	139.8%	106.1%	80.9%	87.3%	109.6%	91.5%	94.9%	96.9%	96.7%	0.0%	95.4%
10	69.8%	128.6%	136.9%	123.0%	125.8%	93.8%	103.6%	77.0%	37.4%	0.0%	105.1%
11 +	110.7%	111.4%	115.1%	93.3%	93.7%	97.1%	98.9%	97.8%	89.1%	139.2%	97.8%
Male Total	108.4%	101.8%	107.3%	99.9%	102.2%	96.7%	105.1%	96.6%	96.5%	109.8%	100.0%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.16.B

Death Rates by Age at Disability, Gender and Duration

Year of Disability	Death A-to-E Ratios - Female by Age at Disability										
	< 25	**25 - 29**	**30 - 34**	**35 - 39**	**40 - 44**	**45 - 49**	**50 - 54**	**55 - 59**	**60 - 64**	**65+**	**Total**
1	94.7%	100.9%	92.5%	91.0%	94.2%	86.7%	99.5%	88.7%	95.8%	107.8%	93.6%
2	101.3%	109.2%	106.8%	100.7%	103.7%	94.1%	111.7%	102.5%	97.9%	102.2%	102.4%
3	142.5%	90.5%	96.6%	115.1%	108.6%	99.7%	116.0%	103.2%	104.8%	81.4%	106.0%
4	52.8%	104.2%	103.9%	104.1%	107.9%	100.5%	123.1%	109.5%	96.6%	85.7%	107.8%
5	163.5%	106.4%	115.7%	99.4%	102.5%	100.6%	114.5%	98.3%	109.4%	70.6%	104.3%
6	262.1%	108.9%	91.8%	97.4%	104.7%	102.3%	105.1%	102.1%	78.8%	0.0%	102.4%
7	129.1%	91.5%	97.8%	83.9%	116.3%	105.8%	110.1%	93.3%	34.2%	0.0%	102.8%
8	143.1%	117.7%	122.1%	89.4%	96.8%	110.1%	99.5%	90.4%	261.2%	0.0%	100.2%
9	32.3%	165.8%	103.6%	88.4%	107.0%	96.9%	108.3%	89.9%	0.0%	0.0%	101.6%
10	311.0%	98.3%	80.8%	88.0%	92.6%	89.5%	97.2%	77.4%	0.0%	0.0%	92.2%
11 +	116.6%	105.9%	105.4%	101.3%	93.3%	94.9%	91.9%	90.6%	87.1%	0.0%	96.6%
Female Total	111.4%	104.8%	100.7%	98.4%	100.2%	94.0%	106.8%	97.1%	98.0%	104.5%	99.6%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.17

Death Rates by Attained Age

Attained Age	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
< 30	263,101	655	654	100.2%
30 - 34	535,195	1,393	1,400	99.5%
35 - 39	1,051,740	2,914	2,846	102.4%
40 - 44	1,764,947	5,513	5,488	100.5%
45 - 49	2,466,500	9,286	9,516	97.6%
50 - 54	3,178,396	13,860	13,382	103.6%
55 - 59	3,777,210	17,622	17,783	99.1%
60 - 64	3,861,516	18,469	18,888	97.8%
65 - 69	533,061	3,941	3,852	102.3%
70 +	184,766	1,847	1,804	102.4%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.18

Death Rates by Attained Age and Gender

Age at Disability	Males			Females		
	Exposure	Actual Deaths	A-to-E Ratio	Exposure	Actual Deaths	A-to-E Ratio
< 30	114,702	358	97.4%	148,399	296	103.7%
30 - 34	218,061	722	100.0%	317,135	671	98.9%
35 - 39	440,519	1,518	106.6%	611,221	1,396	98.2%
40 - 44	753,616	2,766	102.2%	1,011,331	2,747	98.7%
45 - 49	1,071,815	4,654	100.5%	1,394,685	4,632	94.8%
50 - 54	1,430,583	7,003	104.5%	1,747,814	6,857	102.6%
55 - 59	1,841,699	9,411	98.2%	1,935,511	8,211	100.2%
60 - 64	2,017,972	10,613	96.7%	1,843,545	7,856	99.3%
65 - 69	291,186	2,280	101.5%	241,876	1,661	103.5%
70 +	128,542	1,321	104.0%	56,224	526	98.7%
Total	8,308,694	40,647	100.0%	9,307,739	34,854	99.6%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.19

Death Rates by Elimination Period

Elimination Period	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
30 Days	564,947	1,983	2,023	98.0%
60 Days	527,760	2,161	2,184	98.9%
90 Days	6,445,633	31,039	30,270	102.5%
120 - 150 Days	744,176	2,934	2,931	100.1%
180 Days	7,995,291	32,577	33,006	98.7%
210 - 330 Days	716,419	2,855	2,992	95.4%
360 Days	622,207	1,952	2,205	88.5%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.20

Death Rates by Diagnosis

Diagnosis	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
Cancer	1,366,482	40,138	40,472	99.2%
Respiratory	611,181	3,460	3,217	107.5%
Diabetes	351,532	1,501	1,780	84.3%
Digestive	396,634	1,950	1,808	107.8%
Circulatory	2,834,923	9,546	9,474	100.8%
Back	2,853,128	2,100	2,587	81.1%
Injury other than back	1,286,371	1,373	1,115	123.1%
Mental and Nervous	1,155,849	1,059	941	112.5%
Other Musculoskeletal	2,490,623	2,356	2,249	104.8%
Ill-defined and Misc Conditions	413,507	1,009	889	113.5%
Nervous System	1,859,898	3,756	3,818	98.4%
Other	1,996,306	7,254	7,260	99.9%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.21

Death Rates by Diagnosis and Duration

Duration-Year of Disability	Death A-to-E Ratios by Diagnosis						
	Cancer	Respiratory/ Diabetes/ Digestive	Circulatory	Back/Injury/ M&N/ MuscSkel	Ill Defined/ Nervous System	Other	Grand Total
1	99.3%	104.4%	101.8%	101.7%	103.5%	107.2%	100.3%
2	101.4%	98.1%	97.1%	95.7%	102.3%	95.8%	100.1%
3	97.8%	104.0%	102.0%	93.1%	107.2%	97.3%	99.2%
4	93.0%	106.7%	104.6%	109.8%	99.0%	102.7%	100.3%
5	89.1%	101.6%	112.8%	102.3%	94.2%	97.9%	99.2%
6	94.0%	98.3%	101.4%	104.5%	102.5%	102.6%	100.2%
7	99.4%	102.8%	97.3%	112.4%	99.5%	96.2%	100.8%
8	96.8%	103.0%	102.6%	106.2%	93.5%	109.7%	102.8%
9	98.9%	97.0%	97.2%	102.3%	98.5%	95.2%	98.1%
10	98.3%	96.1%	97.3%	101.5%	107.9%	98.4%	99.6%
11 +	102.0%	97.4%	96.0%	96.4%	99.2%	97.8%	97.3%
Total	99.2%	101.5%	100.8%	99.9%	101.2%	99.9%	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

TABLE C.22

Death Rates by Indexed Gross Monthly Benefit

Indexed Gross Monthly Benefit	Exposure	Actual Deaths	Expected Deaths	A-to-E Ratio
$ < 1000	1,595,222	6,411	6,416	99.9%
$ 1000 - $1499	4,229,935	17,272	17,061	101.2%
$ 1500 - $1999	3,798,329	15,804	15,658	100.9%
$ 2000 - $2499	2,726,091	11,519	11,708	98.4%
$ 2500 - $2999	1,830,262	7,709	7,978	96.6%
$ 3000 - $3499	1,105,920	5,018	5,138	97.7%
$ 3500 - $3999	666,914	3,145	3,295	95.4%
$ 4000 - $4499	430,299	2,170	2,099	103.4%
$ 4500 - $4999	280,532	1,490	1,411	105.6%
$ 5000 - $9999	760,387	4,018	3,947	101.8%
$10000 - $19999	153,500	646	743	87.0%
$20000 And Over	16,541	54	67	81.6%
Total	17,616,433	75,501	75,612	99.9%

Excludes Maternity Claims - Results on a Dampened Basis

Appendix D: Description of Summary Pivot Table

D.1 Summary Data Pivot Table

To supplement the analysis provided in this report, an Excel™ pivot table has been made available. The data in the pivot table has been provided to enable readers to evaluate many of the key aspects covered in this report. We note that not all of the data items reviewed by the Committee were incorporated into the final pivot summary. A description of the final pivot table structure and contents follows:

D.1.1 Pivot Table Variables

TABLE D.1

Pivot Variables

Variable	Values
Gender	Male or Female
Age at Disability	15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, …
Duration	Quarterly for 1st 3 years of disability, annually for years 4 to 10 of disability, years 11+ combined
Elimination Period	By number of months: 1, 2, 3, 4-5, 6, 7-11, 11+ months
Diagnosis Category	13 diagnosis groups as defined in Table D.2
Calendar Year	1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006
Indexed Gross Monthly Benefit	Less than $1000, over $1000 but less than $2000, over $2000 but less than $3000, over $3000 but less than $4000, over $4000 but less than $5000, over $5000

TABLE 5.1
Mapping of ICD-9 Codes to Diagnosis Categories

Diagnosis Category	ICD-9 Codes
Back	720-724, 737, 847
Cancer	140-209, 230-239
Circulatory System	280-289, 390-459
Diabetes	250
Digestive	520-579
Ill-Defined and Miscellaneous Conditions	780-799
Injury other than Back	800-846, 848-979, E800-E999
Maternity	630-679, 760-779, V20-V39
M&N	290-319, V40
Nervous System	320-359
Other Musculoskeletal	710-719, 725-736, 738-739
Respiratory	460-519
Other	001-139, 210-229, 240-249, 251-279, 360-389, 580-629, 680-709, 740-759, 980-999, V1-V19, V41-V86

TABLE D.2
Mapping of ICD-9 Codes to Diagnosis Categories

Diagnosis Category	ICD-9 Codes
Back	720-724, 737, 847
Cancer	140-209, 230-239
Circulatory System	280-289, 390-459
Diabetes	250
Digestive	520-579
Ill-Defined and Miscellaneous Conditions	780-799
Injury other than Back	800-846, 848-979, E800-E999
Maternity	630-679, 760-779, V20-V39
M&N	290-319, V40
Nervous System	320-359

TABLE 5.1
Mapping of ICD-9 Codes to Diagnosis Categories

Diagnosis Category	ICD-9 Codes
Other Musculoskeletal	710-719, 725-736, 738-739
Respiratory	460-519
Other	001-139, 210-229, 240-249, 251-279, 360-389, 580-629, 680-709, 740-759, 980-999, V1-V19, V41-V86

D.1.2 Pivot Table Data Fields

A description of the data fields provided with the pivot tables is provided below. The expected values for all A-to-E calculations are based on the Experience Table. As described in the 2008 Long Term Disability Experience Study Report, termination count and exposure values shown in the pivot are shown after the application of dampening factors, which dampens the impact of any single company on the study. Specifically, the exposure from the largest five participating companies was reduced to limit each to 12% of the total study exposure.

TABLE D.3

Pivot Table Data Fields

Data Field	Description
Exposure Dampened	Monthly exposure (dampened as described above)
Recovery Count	Actual Recovery Count (dampened)
Death Count	Actual Death Count (dampened)
Expected Recovery Count	Expected Recovery Count (dampened)
Expected Death Count	Expected Death Count (dampened)
Recovery A-to-E	Actual to Expected Recovery Rate Ratio
Death A-to-E	Actual to Expected Death Rate Ratio
Recovery Rate	Actual Recovery Count divided by Exposure
Death Rate	Actual Death Count divided by Exposure

TABLE D.3

Pivot Table Data Fields

Data Field	Description
Limit Count	Actual Mental and Nervous Limit Closures (dampened)
MaxOut Count	Actual End-of-Benefit closures (dampened)
Settlement Count	Actual Claim Settlements (dampened)
Limit Rate	Actual M&N Limit Closures divided by Exposure
MaxOut Rate	Actual End-of-Benefit closures divided by Exposure
Settlement Rate	Actual Claim Settlements divided by Exposure