Health Care Cost Trends

The Impact of Diagnosis on Individual DI Recovery and Mortality Rates from 2006 through 2014 – Phase 1

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The Impact of Diagnosis on Individual DI Recovery and Mortality Rates from 2006 through 2014 – Phase 1

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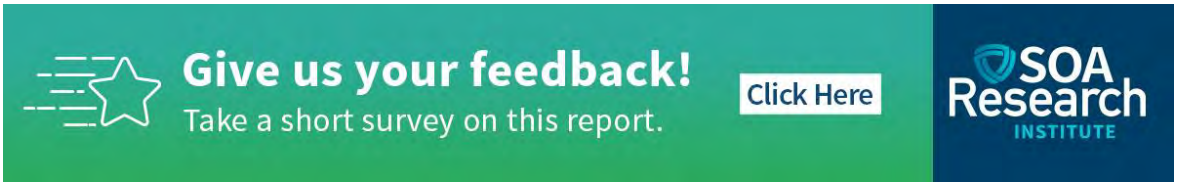

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Section 1: Introduction and Scope

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1.1 STUDY OBJECTIVE

The objective of this study is to analyze how individual disability income (IDI) claim recovery and mortality experience varies by diagnosis, over select claim durations. This study has been prepared by the Individual Disability Experience Committee (IDEC). This is the first IDI experience study to split select claim termination experience between recovery and mortality, as prior IDI claim studies by diagnosis have looked at terminations for recovery and mortality combined. For the purposes of this report, we refer to this study as the "*2024 IDEC Study*".

This study aims to demonstrate how diagnosis is a major driver of claim experience, independent of other claim variables. Termination experience patterns by diagnosis vary significantly between the recovery and mortality components. The 2024 IDEC Study provides new information and insights into how diagnosis codes affect IDI disabled life recovery and mortality experience by gender, occupation class, and onset age.

This is a large undertaking, and the work has been divided into two phases with separate reports for each phase. In the first phase, which this report covers, the scope has been limited to accident and sickness (A&S) policies with a 90-day elimination period and To Age 65-70 benefit periods. As a result of this selection, significant discontinuities in recovery and mortality rates that are associated with different elimination and benefit periods are avoided and the impact on recovery and mortality rates due to the various diagnoses can be observed more clearly. Phase 2 of the 2024 IDEC Study, which will be covered in a subsequent report, will measure the impact of elimination period and benefit period on recovery and mortality rates at the diagnosis level.

1.2 STUDY BACKGROUND

The 2024 IDEC Study is preceded by the following two IDEC studies of IDI claim termination rates:

- "*Claim Termination Experience from 2006 to 2014, revised August 2021,*" [1]

This study analyzed IDI claim termination experience from 2006 to 2014 in terms of actual-to-expected (Actual/Expected) ratios relative to the 2013 Individual Disability Income Valuation Table (2013 IDIVT). Claim termination experience was measured by contract type, calendar year, elimination period, benefit period, occupation class, onset age, gender, duration, monthly indemnity, the presence of cost-of-living adjustment (COLA) benefits and diagnosis category. Results were presented in terms of Actual/Expected claim termination ratios, where the expected terminations were based on the claim

[1] *https://www.soa.org/490ffe/globalassets/assets/files/resources/experience-studies/2021/analysis-claim-termination-report.pdf*

termination rates for recovery and mortality combined from the 2013 IDIVT. For the purposes of this report, this study is referred to as the "*August 2021 IDEC Study*."

- *"2006-2014 Experience Adjustments to the 2013 IDI Valuation Table Claim Termination Rates, November 2021,"* [2]

This study developed adjustments to the 2013 IDIVT claim termination rates to approximate IDI claim termination experience from 2006 through 2014. Claim termination rates over the select claim durations (i.e., the first 10 claim years) during the 2006-2014 period were represented as Actual/Expected adjustment factors to be applied to the 2013 IDIVT select claim termination rates. For claim years 11 and higher (i.e., the ultimate claim durations), a completely new set of claim termination rates were developed from the 2006-2014 data. This was necessary because it had become clear from the 2006-2014 data that the Actual/Expected ratios against the 2013 IDIVT could not adequately capture the new experience (additional explanation is provided below). For the purposes of this report, this second study is referred to as the "*November 2021 IDEC Study*."

The 2024 IDEC Study uses the same data source for IDI claims as the August 2021 and November 2021 IDEC studies. The two prior IDEC studies did not analyze the claim termination data separately for recoveries and mortality during the select claim period. The November 2021 IDEC Study did develop claim termination rates separately for recovery and mortality for ultimate durations because the recovery and mortality termination patterns were so different in the ultimate period. The reader should refer to the November 2021 IDEC Study report for a discussion of the development of ultimate recovery and mortality rates for the 2006-2014 IDI experience table.

The August 2021 IDEC Study showed that diagnosis is a major driver of claim termination rates during the select claim durations. That study grouped select period claims into 15 diagnosis groupings (Appendix A).

Table 1.a shows actual/expected claim termination ratios by diagnosis grouping for all (A&S) claims, where the expected terminations are based on the 2013 IDIVT rates before the prescribed claim termination rate modifiers. These results combine both sexes, all occupation classes, onset ages, benefit periods, and elimination periods. Table 1.a also shows the distribution of these claims by terminations and claim exposure. Consistent with the presentation of results in the August 2021 IDEC Study, the results in Table 1.a are in terms of claim monthly indemnity.

[2] https://www.soa.org/4972b7/globalassets/assets/files/resources/experience-studies/2021/2006-14-idiet-report.pdf

Table 1.a

ACTUAL/EXPECTED CLAIM TERMINATION RATIOS BY DIAGNOSIS GROUPING FOR IDI CLAIMS OVER CLAIM YEARS 1-10; EXPECTED = 2013 IDIVT BEFORE THE PRESCRIBED CLAIM TERMINATION RATE MODIFIERS

DIAGNOSIS GROUPING	ACTUAL/AGGREGATE	% OF ALL TERMINATIONS	% OF CLAIM EXPOSURE
Nervous System	33%	4.1%	13.2%
Diabetes	51%	0.2%	0.6%
Mental & Nervous	54%	7.3%	13.4%
Back	60%	8.8%	14.8%
Other	72%	5.3%	7.4%
Respiratory	76%	0.9%	1.2%
Circulatory	78%	6.9%	9.3%
Ill-defined and Misc Conditions	82%	2.0%	2.5%
Infectious Diseases	82%	1.1%	1.3%
Other Musculoskeletal	89%	12.4%	12.9%
Digestive	132%	2.8%	1.7%
Alcohol & Drug	135%	2.8%	1.8%
Diagnosis Not Provided	139%	1.6%	0.7%
Injury Other Than Back	156%	14.7%	7.0%
Cancer	161%	23.9%	11.7%
Maternity	229%	5.2%	0.4%
Total	**93%**	**100.0%**	**100.0%**

The differences in the actual/aggregate ratios by diagnosis grouping were substantial, i.e., 33% for nervous system claims to 229% for maternity claims, or 8-fold. The differences in the distribution of claim terminations and claim exposure by diagnosis grouping were also large. Cancer claims represented 23.9% of all claim terminations and 11.7% of claim exposure. In comparison, diabetes only represented 0.2% of the claim terminations and 0.6% of claim exposure. Although maternity claims represented 5.2% of all claim terminations, they represented only 0.4% of the claim exposure.

The 2024 IDEC Study focuses on the impact a diagnosis grouping has on disabled life recovery and mortality rates separately and how this impact varies by occupation class, gender, and onset age. The authors recognize that termination rates also vary by other factors, and analyses of these factors may be worthy topics for future IDEC studies.

The 2013 IDIVT maps claims according to their diagnosis groupings into five risk mapping categories that vary by level of their expected claim termination rates. Table 1.b shows the mappings of claims into the five categories according to diagnosis grouping.

Table 1.b
RISK MAPPING OF IDI CLAIMS BY DIAGNOSIS GROUPING

DIAGNOSIS RISK MAPPING	DIAGNOSIS GROUPING
Very Low	Diabetes
	Mental & nervous
	Nervous systems
Low	Back
	Infectious diseases
	Ill-defined & misc. conditions
Mid	Circulatory
	Other musculoskeletal
	Respiratory
High	Alcohol & drug
	Injuries other than back
	Other
Very High	Cancer
	Digestive
	Maternity

The 2013 IDIVT applies separate sets of claim termination rate modifiers to the 2013 IDIVT base claim termination rates according to the diagnosis risk mapping category. The scope of the 2024 IDEC Study does not include a critique of the 2013 IDIVT diagnosis risk mappings or the five sets of claim termination rate modifiers. This report does not analyze mortality and recovery experience relative to the 2013 IDIVT diagnosis risk mappings.

1.3 STUDY SCOPE

As noted earlier, an objective of this study is to demonstrate that diagnosis is a major driver of claim experience, independent of other claim variables. Therefore, one of the major decisions regarding the scope of this report was to utilize a "homogeneous" underlying data set. The objective was to use a consistent set of claims across the variables being analyzed. This meant excluding certain categories of claims, as described below. The intent was to ensure that the differences shown in the exhibits would be driven predominantly by diagnosis, as opposed to being driven by the impact of changes in underlying mix of business on other variables, such as elimination period and benefit period.

The "homogeneous" data set is defined as follows:

- A&S policies
- Benefit periods To Age 65-70
- 90-day elimination period
- Onset ages under 65

The reasons for excluding each of the other claim categories are explained below:

1. Excluding claims from non-A&S policies
   Claims from non-A&S policies are excluded. The two most prominent non-A&S policies are Business Overhead Expense (BOE) and Disability Buy-Out (DBO) policies. BOE policies typically have a 30-day elimination period and a short benefit period, e.g., no longer than 24 months, with benefits covering business overhead expenses during disabilities. DBO policies have long elimination periods, e.g., 360 days or longer, and most DBO benefits are typically paid out as a lump sum benefit upon satisfaction of the elimination period. The differences in the typical elimination period and benefit period for BOE and DBO policies, as well as differences in other contractual benefits and definitions, could distort comparisons by diagnosis to A&S policies.

2. Excluding claims with short-term or lifetime benefit periods
   Only claims from A&S policies with To Age 65-70 benefit periods are included. The August 2021 IDEC Study analyzed how claim termination rates are affected by the length of the benefit period. Claim termination rates for claims with To Age 65-70 benefit periods, in general, are significantly higher than for claims with a lifetime benefit period and significantly lower than for claims with short term benefit periods. It has been surmised that this may be driven largely by differing financial incentives to remain on claim. By limiting the scope of this study to IDI claims with To Age 65-70 benefit periods, potential distortions that might be caused by changes in the mix of business by benefit period have been avoided.

   Phase 2 of the 2024 IDEC Study will demonstrate how recovery and mortality rates differ by benefit period at the diagnosis level. The inclusion of claims with other benefit periods in the Phase 1 analysis could distort the recovery and mortality comparisons where the mix of exposure by benefit period varies.

3. Excluding claims with other than 90-day elimination period
   Only claims with a 90-day elimination period are included. It is well known that claims with shorter elimination periods have significantly higher recovery rates than claims with longer elimination periods during early claim durations. Any shift of exposures by elimination period could affect our analyses of the impact of diagnosis on recovery and mortality rates.

   Phase 2 of the 2024 IDEC Study will demonstrate how recovery and mortality rates differ by elimination period even at the diagnosis level.

4. Excluding claims with onset ages 65 and over
   Claims with onset ages 65 and over have been excluded from this study. These claims with older onset ages typically have been incurred following the end of their contractually guaranteed renewable period. Currently, many companies change their recorded benefit periods to a short-term benefit period, e.g., 24-months. Since only claims with To Age 65-70 benefit periods are included in Phase 1 of this study, the volume of data for claims with onset ages 65 and over would be too limited.

Before any limitations, the IDI records in the 2006-2014 IDI Claim Database in the select claim durations comprised 74,743 recoveries and 16,816 deaths. Table 1.c shows the impact on the number of IDI recoveries and deaths in this study after implementing each of the four claim limitations described above.

Table 1.c

CUMULATIVE REDUCTIONS IN THE NUMBER OF RECOVERIES AND DEATHS FROM IMPLEMENTING THE FOUR CLAIM LIMITATIONS

CLAIM LIMITATIONS	CLAIM COUNT		REDUCTION IN CLAIM COUNT		CUMULATIVE REDUCTION IN CLAIM COUNT	
	Recoveries	Deaths	Recoveries	Deaths	Recoveries	Deaths
All Records in Select Claim Durations	74,743	16,816				
1. A&S Policies Only	66,722	16,053	10.7%	4.5%	10.7%	4.5%
2. To Age 65-70 BP	37,776	10,729	38.7%	31.7%	49.5%	36.2%
3. 90-Day EP Only	25,253	6,825	16.8%	23.2%	66.2%	59.4%
4. Offset Age < 65	25,145	6,766	0.1%	0.4%	66.4%	59.8%

The cumulative impact of the four claim limitations leaves 25,145 recoveries and 6,766 deaths, which represent 34% of the number of recoveries and 40% of the number of deaths among the IDI records in the select claim durations. Although these limitations resulted in large reductions in the number of recoveries and deaths to be studied, the volume of remaining claims is sufficient to achieve the report's objective of identifying and quantifying that diagnosis is a major driver of claim experience independent of other claim variables.

Phase 2 will expand the scope to include more elimination periods and short term and lifetime benefit periods. The number of records in the Phase 2 analysis will increase to 66% of the number of recoveries and 78% of the number of deaths among the IDI records in the select durations. The main categories of the excluded records in Phase 2 will be non-A&S coverages and onset ages over age 65. The data volumes for these two groups of claims would be too small to produce credible analyses when split by diagnosis.

The 2024 IDEC Study presents results in terms of claim count, not claim monthly indemnity. Claim count is a better measurement basis for this study because splitting the data by diagnosis often results in small volumes of data in many cells. When data volumes are small, differences in monthly indemnity are more likely to distort the results. It should also be noted that, since the study period for this analysis ends in 2014, COVID has no impact on these results.

1.4 METHODOLOGY

The traditional format for IDI claim termination experience studies has been to show actual/expected results where the expected basis is an industry table (e.g., the 2013 IDIVT with the prescribed claim termination rate adjustments). However, the 2024 IDEC Study is the first experience study to capture data on IDI terminations separately for recoveries and deaths; thus, there is no corresponding industry table available to determine expected recoveries and deaths. Consequently, it was necessary to adopt alternative methods for measuring IDI recovery and mortality experience in ways that would be effective in providing insights into how they differ by diagnosis grouping.

1.4.1 MEASURING RECOVERY EXPERIENCE

The 2024 IDEC Study measures recovery experience using actual/aggregate recovery ratios corresponding to the various subsets of claims being examined. The aggregate recovery rates are derived by aggregating all occupation classes and non-maternity diagnosis groupings. They vary by gender, onset age grouping and claim duration grouping. Derivation of the aggregate female recovery rates excludes maternity claims because maternity recovery rates are disproportionately large relative to the recovery rates of other diagnosis groupings for claims with onset ages under 40 and could otherwise distort the comparisons. This is particularly important in comparisons of recovery rates between males and females.

It is important to note that the aggregate recovery rates do not represent an "expected" basis. Rather, they are used solely as a basis of normalization to compare the relative recovery experience across diagnosis groupings.

1.4.2 MEASURING MORTALITY EXPERIENCE

For mortality experience, an informative approach was chosen to compare disabled life mortality to the mortality we would expect from all IDI lives (i.e., disabled and active lives combined). For this report, we have designated that basis as "Standard." In the absence of an industry standard for all IDI life mortality, we selected a benchmark, i.e., the 2015 Valuation Base Table (VBT) mortality table for ordinary life insurance policies (ultimate policy durations only, smoker and nonsmoker mortality combined). Our analysis suggests that the 2015 VBT is a plausible surrogate for all IDI life mortality since the disabled life mortality for physical claims (i.e., back, injury other than back and other musculoskeletal claims) had actual/standard mortality ratios that were close to 100%. In general, physical claims are not associated with life threatening conditions. The 2015 VBT was also selected as the mortality standard for the November 2021 IDEC Study of ultimate duration claim mortality, so consistency between studies was also a consideration.

1.5 REPORT ORGANIZATION

Section 1 Introduction and Scope

This section describes the objective, scope and methodology of the 2024 IDEC Study, the limits placed on its scope and the methodology used by the study.

Section 2 Study Variables and Values

This section describes the claim variables and values upon which this study focuses.

Section 3 Summary of Key Results and Observations

This section highlights key results from Sections 4, 5 and 6. At the end of Section 3 we also provide observations on potential impact of these study results on future IDEC studies.

Section 4 Disabled Life Recovery Experience

This section discusses how IDI disabled life recovery experience varies by diagnosis grouping across claim year, occupation class and onset age, separately for males and females. Actual recoveries are compared to aggregate recoveries based on aggregate recovery rates.

Section 5 Disabled Life Mortality Experience

This section discusses how IDI disabled life mortality experience varies by diagnosis grouping across claim year, occupation class and onset age, separately for males and females. Actual deaths are compared to "Standard" deaths based on the 2015 VBT ultimate mortality rates.

Section 6 Distribution of Claim Exposure by Diagnosis Grouping

This section explores the distribution of disabled life exposure by diagnosis grouping, varying by gender, claim year, occupation class, and onset age.

Appendix A Definition of Diagnosis Groupings

This appendix lists the ICD-9 codes that comprise the 15 diagnosis groupings, along with samples of the conditions that fall within each diagnosis grouping.

Appendix B Mortality Rates in the Ultimate Policy Years from the 2015 Valuation Base Table

This appendix lists the male and female mortality rates per 1,000 that are used as the "Standard" mortality rates described above and presented in Section 5.

Section 2: Study Variables and Values

This section defines the study values and variables in the following sub-sections:

- Definitions for Study Variables
- Definitions for Study Values for Recovery Experience
- Definitions for Study Values for Mortality Experience

2.1 DEFINITIONS OF STUDY VARIABLES

The 2024 IDEC Study utilizes the same claim database used in the August 2021 and November 2021 IDEC Studies. As discussed in Section 1, the range of claims in this study have been limited in order to maintain a more homogenous set across both recovery and mortality experience.

The following parameters are analyzed in this study:

- Claim duration groupings: Year 1, Year 2, Year 3, Years 4-6, and Years 7-10
- Onset age groupings: Under 40, 40-49, 50-59, and 60-64
- Genders: male, female
- IDEC occupation classes: M, 1 and 2-4
- Diagnoses Groupings: described in Appendix A

Claim expose in Year 1 begins after the end of the elimination period.

2.1.1 OCCUPATION CLASSES

There are five IDEC occupation classes, which are defined as follows:

- Class M—All medical occupations, e.g., doctors, surgeons, dentists, nurses, podiatrists, veterinarians, psychologists, psychiatrists, pharmacists
- Class 1—All nonmedical white-collar and professional occupations
- Class 2—Skilled labor and most sales-related occupations
- Class 3—Blue-collar occupations with light manual duties
- Class 4—Blue-collar occupations with heavy manual duties

The August 2021 IDEC Study lists the specific occupations comprising the five IDEC occupation classes in the claim database. However, we note that there are variations among data contributors as to the specific occupations that they assign to each IDEC occupation class.

Table 2.a shows the distribution of claim exposure by claim count for the A&S claims in this study during the select claim years by the IDEC occupation classes. Claim exposure measures the period that claims are exposed within the study. Male and female claims are combined in the table.

Table 2.a
DISTRIBUTION OF CLAIM EXPOSURE BY COUNT IN CLAIM YEARS 1-10 FOR EACH OF THE IDEC OCCUPATION CLASSES FOR A&S CLAIMS IN THIS STUDY

IDEC OCCUPATION CLASS	PERCENTAGE OF CLAIM EXPOSURE
M	41.6%
1	47.9%
2	10.0%
3	0.4%
4	0.0%
All	**100.0%**

Claims in occupation classes 3 and 4 comprise less than 0.5% of the total claim exposure. For this study, occupation classes 2, 3 and 4 have been combined into one segment labeled "2-4." Claim exposure in this combined occupation segment is attributable mostly to occupation class 2.

We note that a study of claims with Short Term benefit periods would have a higher percentage of claims in occupation classes 3 and 4, since IDI policies sold to occupation classes 3 and 4 generally have short-term benefit periods. These claims will be addressed in Phase 2.

2.1.2 DIAGNOSIS GROUPINGS

This study focuses on the impact of diagnosis on claim recovery and mortality rates. Appendix A lists the 15 diagnosis groupings along with their ICD-9 codes and samples of the types of conditions falling within each diagnosis grouping.

For this study, the 15 diagnosis groupings have been assigned to four categories for the purpose of analyzing claim recovery and mortality differences among key subsets of claims. Table 2.b shows the assignment of the diagnosis groupings into the four categories. The "Other" diagnosis grouping combines certain low frequency diagnosis groupings, i.e., diabetes, digestive, respiratory, ill-defined and miscellaneous conditions, and infectious diseases.

Table 2.b
ASSIGNMENT OF DIAGNOSIS GROUPINGS INTO CATEGORIES

CATEGORY	DIAGNOSIS GROUPING
Physical Claims	Back
	Injury other than back
	Other Musculoskeletal
MNAD Claims	Mental & nervous (MN)
	Alcohol & drug (AD)
Non-Physical & Non-MNAD Claims	Cancer
	Circulatory
	Nervous system
	Other*
Maternity Claims	Maternity

* Diabetes, Digestive, Respiratory, Ill-defined and Miscellaneous Conditions, and Infectious Diseases

These categories are different than the five 2013 IDIVT categories, i.e., very high, high, medium, low, and very low, which were the result of combining diagnosis groupings with similar overall claim termination rate levels for the purpose of valuing claim reserve. The categories shown in Table 2.b were chosen to slot diagnosis groupings with similar characteristics regardless of their relative level of claim termination rates.

2.2 DEFINITIONS OF STUDY VALUES FOR RECOVERY EXPERIENCE

2.2.1 MONTHLY RECOVERY RATES

In this study, recovery experience is measured in terms of monthly recovery rates per 1,000 lives of claim exposure by claim duration. The monthly recovery rates are not graduated. Any reference to recovery rates always refers to "monthly" recovery rates. The recovery rate over a specified claim year represents the aggregate monthly recovery rate in that year and is calculated by dividing the total number of recoveries by the total monthly claim exposure during that claim year. The resulting ratio is then multiplied by 1,000.

2.2.2 AGGREGATE MONTHLY RECOVERY RATES

Section 4 compares the recovery experience among various subsets of claims using actual/aggregate recovery ratios. The aggregate recovery rates are derived by combining all occupation classes and non-maternity diagnosis groupings. They vary by gender, onset age grouping and claim duration grouping. The calculation of the female aggregate recovery rates excludes maternity claims because maternity recovery rates are exceptionally large relative to other female recovery rates. The inclusion of maternity claims could otherwise distort comparisons, particularly in the younger onset ages. The male and female aggregate recovery rates used to derive the actual/aggregate recovery ratios are provided in Section 4.1.

It is important to note that the aggregate recovery rates do not represent an "expected" basis, per se. Rather, they are used solely as a basis of normalization to compare the relative recovery experience across diagnosis groupings.

2.3 DEFINITIONS OF STUDY VALUES FOR MORTALITY EXPERIENCE

Sections 5 compares the mortality experience among subsets of claims using actual/standard mortality ratios. The standard mortality rates are from the 2015 VBT, which is described in Section 1. This is an informative approach to compare disabled life mortality to the mortality which might be expected from all IDI lives, i.e., disabled and active lives combined. That basis has been designated as "Standard." In the absence of an industry standard mortality table representing all IDI life mortality, a benchmark was selected, i.e., the 2015 VBT mortality table for ordinary life insurance policies (ultimate durations only, smoker and nonsmoker mortality combined). The results of this study appear to validate this choice to represent standard mortality since the overall actual/standard mortality ratio for all physical claims was close to 100%. The 2015 VBT mortality rates used in the derivation of Standard deaths are provided in Appendix B.

In Section 5, actual/standard mortality ratios are used to compare observed, or “actual,” disabled life mortality to Standard. The number of Standard deaths for any cell is derived by multiplying the cell’s claim exposure separated into attained age groupings (under 25, 25-29, 30-34, 35-39, …, 60-64) by the 2015 VBT mortality rates (divided by 12 to get monthly rates) at pivotal ages 22, 27, 32, 37, …, 62. In the Section 5 tables, actual/standard mortality ratios are not shown for any cells where the actual number of deaths was less than five.

Section 3: Summary of Key Results and Observations

Summary of Key Results and Observations includes the following subsections:

- Disabled Life Recovery Experience
- Disabled Life Mortality Experience
- Distributions of Claim Exposure by Diagnosis Grouping
- Concluding Thoughts and Potential Next Steps

3.1 DISABLED LIFE RECOVERY EXPERIENCE

Section 4 analyzes how recovery rates varied by diagnosis grouping. Key results of this analysis are shown below in Figure 3.a and Figure 3.b, which compare the actual/aggregate recovery ratios for non-maternity claims by diagnosis grouping for males and females, respectively. All occupation classes, select claim years and onset ages have been combined.

Figure 3.a

MALE ACTUAL/AGGREGATE RECOVERY RATIOS BY DIAGNOSIS GROUPING – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS AND ONSET AGES COMBINED

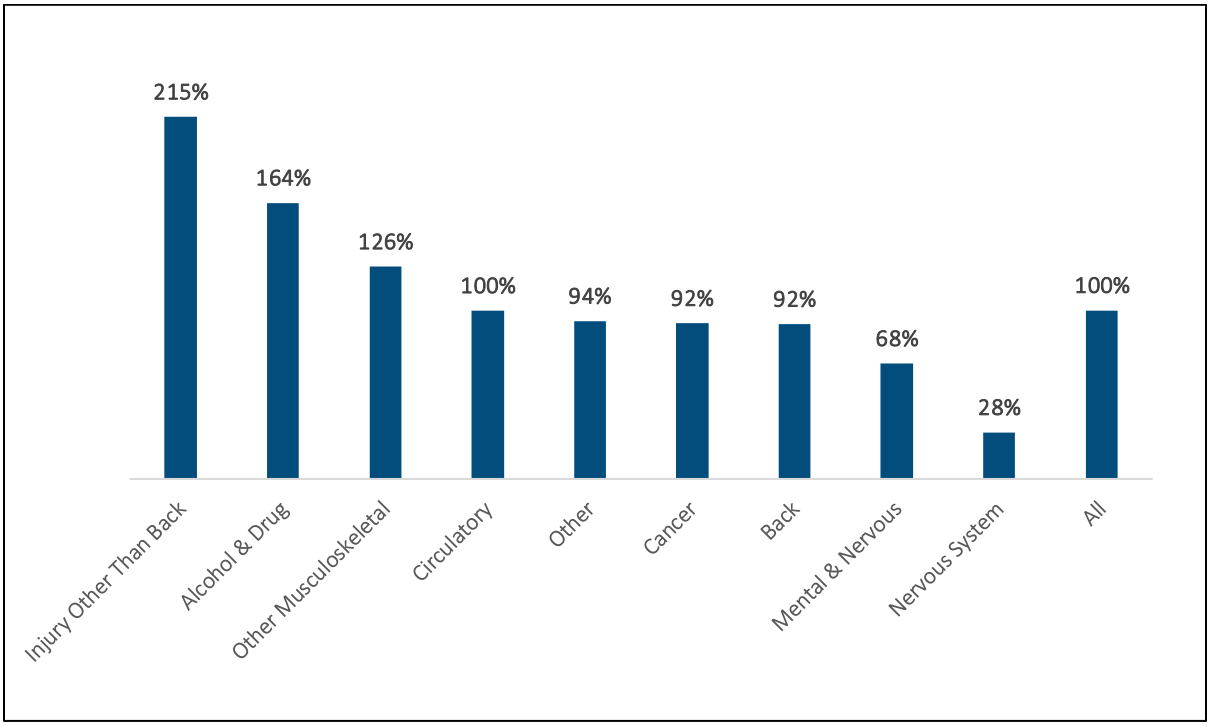
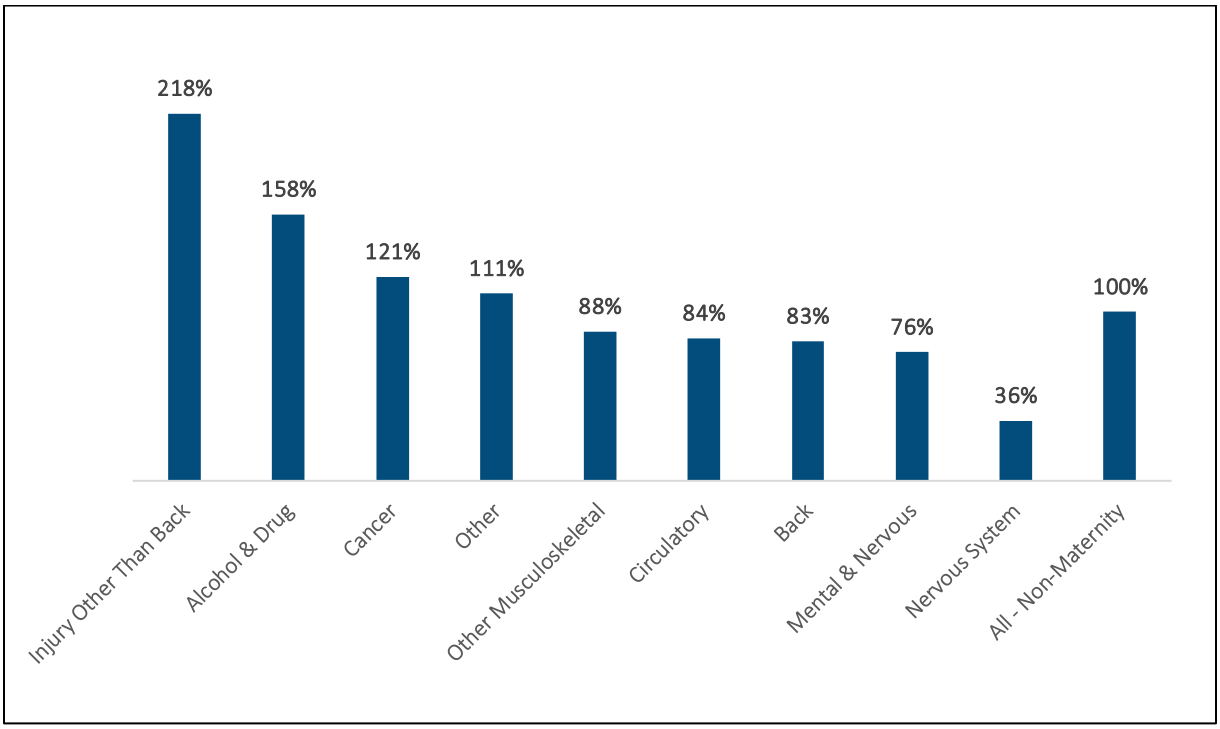


Figure 3.b

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS BY DIAGNOSIS GROUPING – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS AND ONSET AGES COMBINED



Injury other than back claims and alcohol & drug claims had the highest actual/aggregate recovery ratios for both males and females among the non-maternity diagnosis groupings. Back claims, mental & nervous claims and nervous system claims had the lowest actual/aggregate recovery ratios for both males and female. Maternity claims, which are not included in Figure 3.b, have an actual/aggregate recovery ratio of 490%, almost five times the female average over the non-maternity diagnosis groupings.

Recovery experience by diagnosis grouping varied by occupation class (see Section 4.3). Overall, the actual/aggregate recovery ratios for physical claims (i.e., back, injury other than back and other musculoskeletal) are highest for occupation class 2-4 and lowest for occupation class M. The recovery Ratios for MNAD claims (i.e., mental & nervous and alcohol & drug combined) were highest for occupation class M and lowest for occupation class 1. These patterns were similar for males and females, although the actual/aggregate recovery ratios were closer by occupation class for females than observed for males.

3.2 DISABLED LIFE MORTALITY EXPERIENCE

Section 5 discusses how disabled life mortality experience varied by diagnosis grouping over years 2006 through 2014. Key results are provided in Figure 3.c and Figure 3.d below, which compare the actual/standard mortality ratios by diagnosis grouping for males and females, respectively. All occupation classes, select claim years and onset ages have been combined. To be consistent with the recovery experience analysis, maternity claims have been excluded (although there were only three deaths from maternity claims in the claim database).

This is a different approach than was used to analyze recovery experience, where the denominator for recoveries was aggregate recovery experience and the all-diagnosis male mortality ratio in Figure 3.a is 100%.

It is worthwhile to note again that the Standard mortality used as the denominator for the mortality analyses is intended to represent a group of mostly active lives, i.e., lives on claim represent only a small portion of the total population.

Figure 3.c

MALE ACTUAL/STANDARD MORTALITY RATIOS BY DIAGNOSIS GROUPING – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS, AND ONSET AGES COMBINED

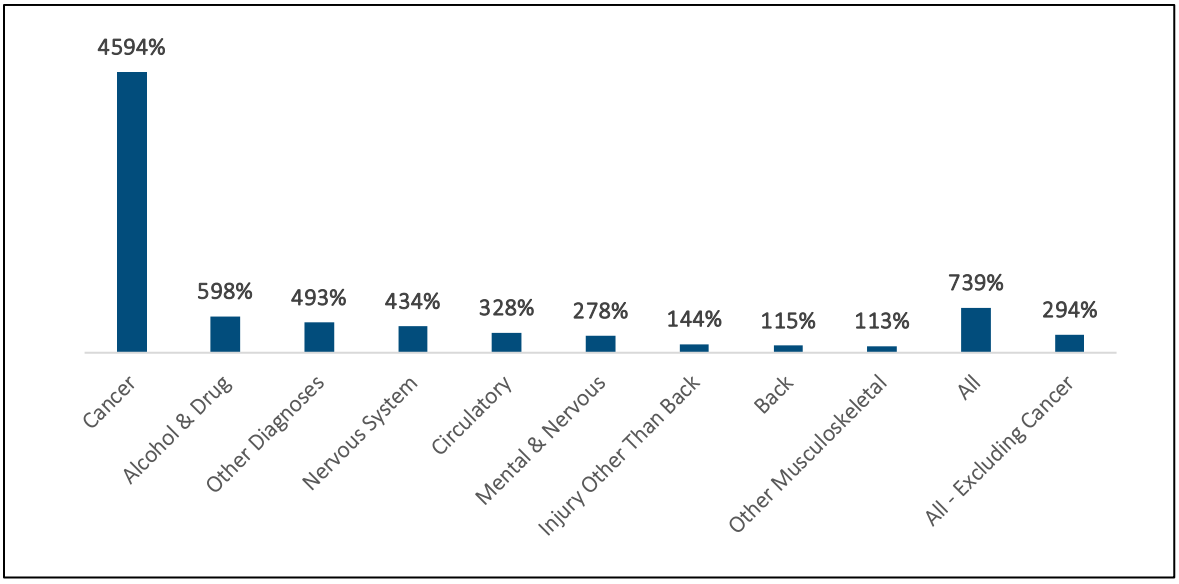
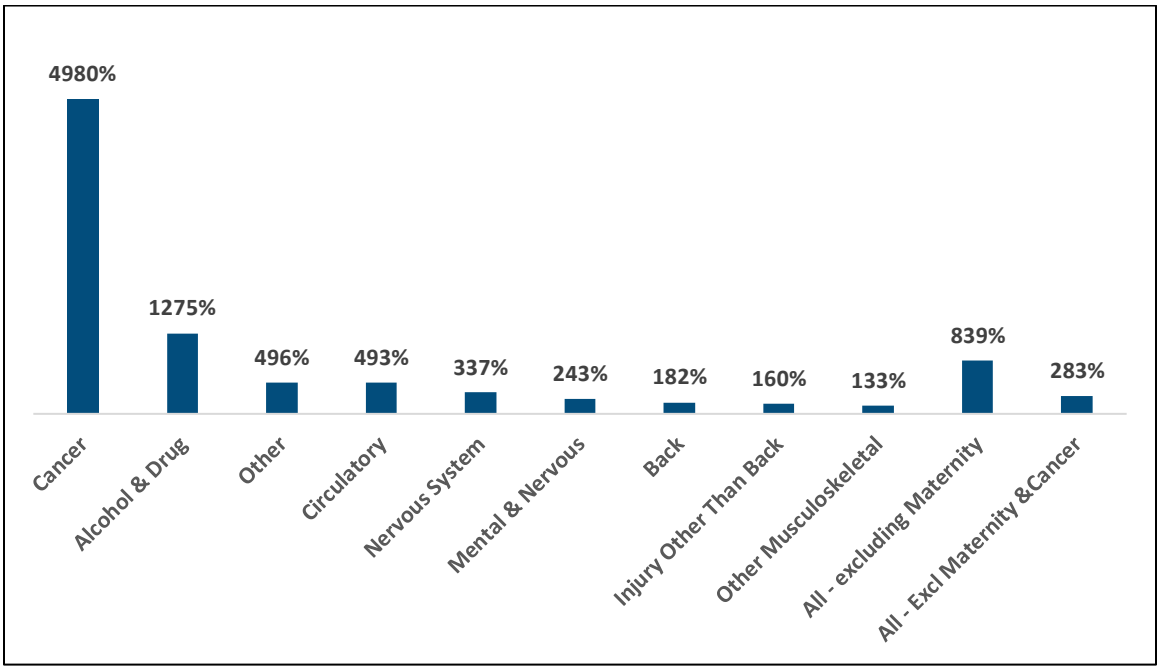


Figure 3.d

FEMALE ACTUAL/STANDARD MORTALITY RATIOS BY DIAGNOSIS GROUPING – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS AND ONSET AGES COMBINED; MATERNITY CLAIMS ARE EXCLUDED



When all non-maternity diagnosis groupings are combined, the actual/standard mortality ratios were 739% for males and 839% for females. There was a wide range of mortality observed among the diagnosis groupings. The highest mortality by far came from cancer claims with mortality ratios of 4,594% for males and 4,980% for females. The mortality associated with the non-cancer diagnosis groupings are significantly lower. The lowest mortality was incurred by other musculoskeletal claims with Actual/Standard Mortality Ratios of 113% for males and 133% for females. The overall non-maternity Actual/Standard Mortality Ratios dropped to 294% for males and 283% for females when cancer claims were excluded.

3.3 DISTRIBUTIONS OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING

Section 6 discusses the distributions of claim exposure by diagnosis grouping. Figure 3.e and Figure 3.f show the distribution of claim exposures by diagnosis grouping over all 10 select claim years for males and females, respectively. All occupation classes and onset ages are combined. The percentages in the figures are the percentages of the total non-maternity claim exposure attributable to each diagnosis grouping.

Figure 3.f

MALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS AND ONSET AGES COMBINED

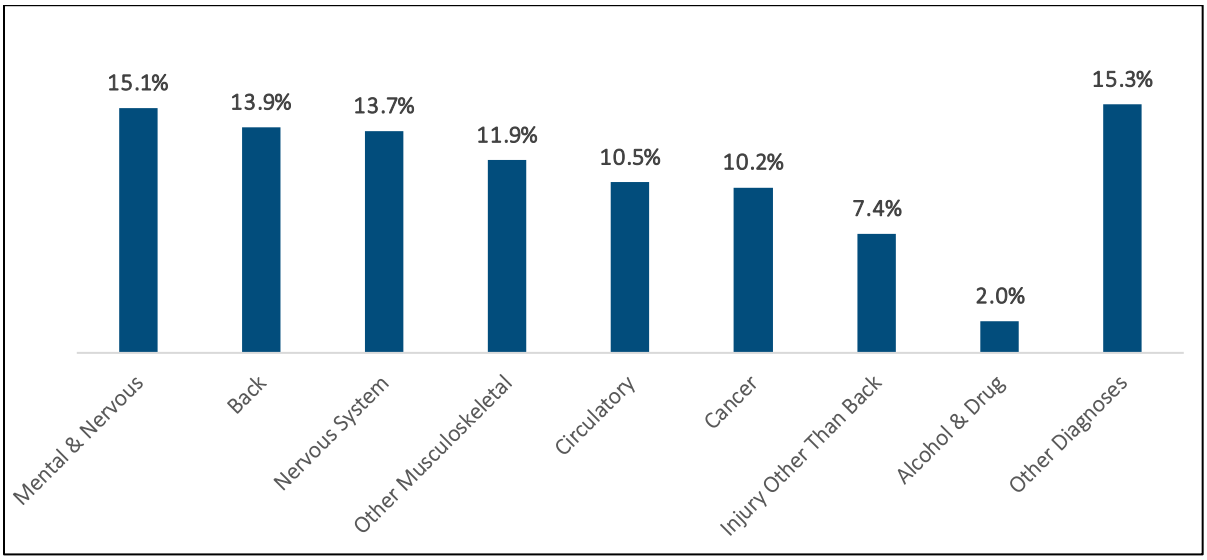
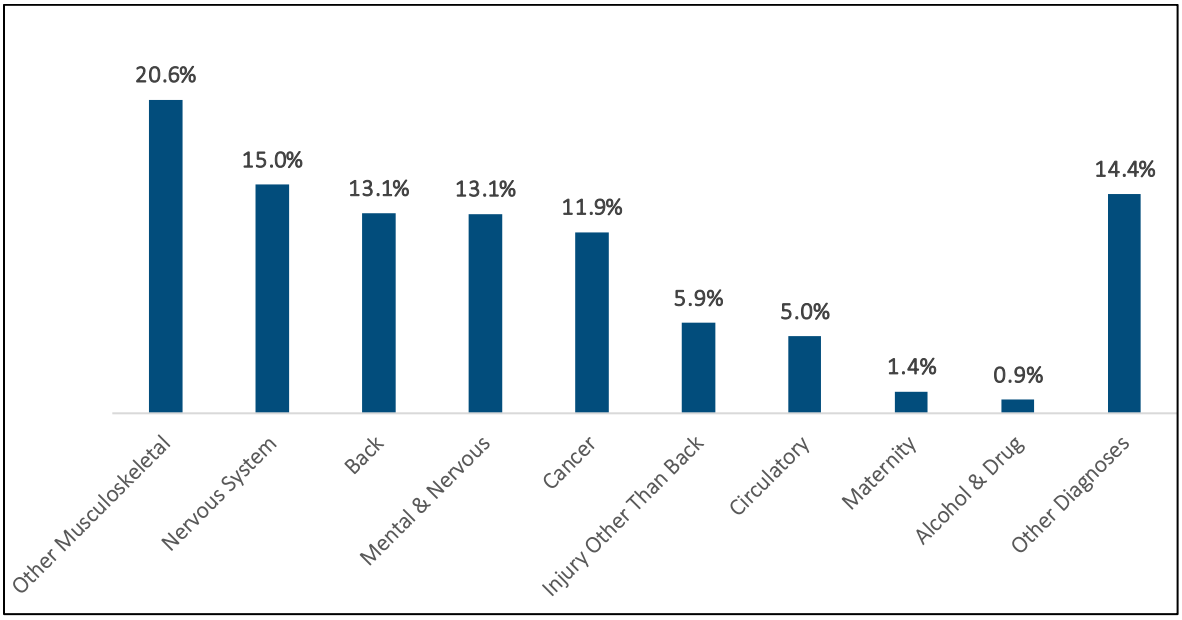


Figure 3.g

FEMALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING FOR FEMALE CLAIMS – ALL OCCUPATION CLASSES, SELECT CLAIM YEARS AND ONSET AGES COMBINED



The diagnosis groupings with the highest percentage of the non-maternity claim exposure over the select claim years were mental & nervous for males and other musculoskeletal for females. Alcohol & drug claims had the lowest percentage of the non-maternity claim exposure for both males and females.

Distributions of claim exposure by diagnosis grouping vary significantly by occupation class. Occupation class 1 has the lowest percent of physical claims and the highest percentages of MNAD claims and non-physical, non-MNAD claims.

3.4 CONCLUDING THOUGHTS AND POTENTIAL NEXT STEPS

This study demonstrates the extent that IDI recovery rates and mortality rates differ by diagnosis grouping. There are multiple benefits to these results:

1. It is our understanding IDI claim termination analysis has never been presented at this level, i.e., termination rates split between recovery and mortality down to the diagnosis grouping level. Consequently, these results provide considerable insight into the IDI risk.

2. IDI carriers could perform similar analyses of their own claim recovery experience and utilize the results in this paper as benchmarks to measure the effectiveness of their claim management practices.

3. Companies that have claim settlement programs could use the disabled life mortality results to derive the present value of disability benefits for the purpose of constructing fair lump sum benefit offers. Such disabled life mortality results have not been available before.

4. The results from the 2024 IDEC Study could provide guidance in the development of new industry claim termination tables. It seems reasonable that a new industry table that replaces the 2013 IDIVT will split claim termination rates between recovery and mortality with experience that is more current than the 2006-2014 IDEC database.

Section 4: Disabled Life Recovery Experience

This section discusses how IDI disabled life recovery experience varies by diagnosis grouping relative to claim duration, occupation class and onset age, separately for males and females. Actual recoveries are compared to "aggregate" recoveries. Aggregate recoveries are based on aggregate recovery rates that vary by gender, onset age and claim year.

There are four subsections:

- Male and Female Aggregate Recovery Rates
- Actual/Aggregate Recovery Ratios by Diagnosis Grouping and Claim Year
- Actual/Aggregate Recovery Ratios by Diagnosis Grouping and Occupation Class
- Actual/Aggregate Recovery Ratios by Diagnosis Grouping and Onset Age

4.1 MALE AND FEMALE AGGREGATE RECOVERY RATES

Table 4.a and Table 4.b show the Aggregate (Monthly) Recovery Rates for males and females, respectively. The method used to derive Actual/Aggregate Recovery Ratios is described in Section 2. The tables also provide the number of actual recoveries used in the derivation of the recovery rates. These tables vary by onset age and claim year. All occupation classes and non-maternity diagnosis groupings have been combined. The female aggregate recovery rates exclude maternity claims. As described in Section 2, the aggregate recovery rates represent actual monthly recovery rates per 1,000 lives.

Table 4.a

MALE AGGREGATE (MONTHLY) RECOVERY RATES PER 1,000 BY ONSET AGE AND CLAIM DURATION GROUPING

CLAIM YEAR	MALE AGGREGATE RECOVERY RATES				NUMBER OF MALE RECOVERIES				
	Under 40	40-49	50-59	60-64	Under 40	40-49	50-59	60-64	Total
1	59.95	44.89	32.56	23.91	1,205	3,060	4,427	1,312	10,004
2	19.61	15.37	9.44	7.03	330	980	1,269	382	2,961
3	9.20	6.05	3.13	2.05	116	319	357	81	873
4	5.73	3.74	1.54	1.73	61	183	189	45	478
5	3.87	2.64	0.80	1.44	39	127	67	20	253
6	2.56	1.69	0.75	1.25	26	80	53	5	164
7	1.51	0.89	0.49		16	38	59		113
8	1.10	0.71	0.49		11	39	31		81
9	1.00	0.54	0.49		11	30	14		55
10	0.73	0.48	0.48		8	14	22		44
TOTAL					1,823	4,870	6,488	1,845	15,026

Table 4.b

FEMALE AGGREGATE (MONTHLY) RECOVERY RATES PER 1,000 BY ONSET AGE AND CLAIM DURATION GROUPING.

CLAIM YEAR	MALE AGGREGATE RECOVERY RATES				NUMBER OF MALE RECOVERIES				
	Under 40	40-49	50-59	60-64	Under 40	40-49	50-59	60-64	Total
1	59.42	44.55	35.76	30.66	1,080	1,729	1,888	414	5,111
2	21.48	15.45	10.41	6.13	327	581	544	78	1,530
3	8.43	7.69	4.03	3.22	104	247	181	29	561
4	3.85	2.70	1.79	1.73	49	96	72	11	228
5	2.09	2.00	0.96	1.26	23	45	35	4	107
6	1.99	1.78	0.72	1.26	17	54	25	1	97
7	1.77	1.08	0.91		20	31	28		79
8	1.24	0.67	0.29		14	19	8		41
9	0.88	0.60	0.12		10	16	3		29
10	0.42	0.46	0.12		5	12	2		19
TOTAL					1,649	2,830	2,786	537	7,802

The recovery experience in claim years 9 and 10 for onset ages 50-59 have been combined due to having less than five actual recoveries in each claim year. Similarly, recovery experience in claim years 5 and 6 for onset ages 60-64 have been combined.

4.2 ACTUAL/AGGREGATE RECOVERY RATIOS BY DIAGNOSIS GROUPING AND CLAIM YEAR

Table 4.c compares the male actual/aggregate recovery ratios by diagnosis grouping by claim year. By definition, the recovery ratios shown in the All Diagnosis Groupings row are 100% in each claim year.

Table 4.c

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES BY DIAGNOSIS GROUPING AND CLAIM YEAR.

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	89%	92%	86%	118%	95%	92%
Injury Other Than Back	232%	190%	138%	89%	222%	215%
Other Musculoskeletal	139%	99%	85%	124%	87%	126%
All Physical	**150%**	**118%**	**97%**	**114%**	**121%**	**138%**
Mental & Nervous	49%	85%	156%	95%	108%	68%
Alcohol & Drug	143%	227%	223%	200%	106%	164%
All MNAD	**68%**	**108%**	**164%**	**106%**	**108%**	**86%**
Cancer	72%	148%	170%	153%	143%	92%
Circulatory	103%	91%	56%	129%	132%	100%
Nervous System	31%	23%	11%	30%	27%	28%
Other	99%	81%	99%	83%	74%	94%
All Non-Physical, Non-MNAD	**76%**	**86%**	**80%**	**88%**	**81%**	**79%**
All Diagnosis Groupings	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4.c
CONTINUED

DIAGNOSIS GROUPING	NUMBER OF MALE RECOVERIES					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	1,062	345	105	158	43	1,712
Injury Other Than Back	2,436	423	85	57	49	3,051
Other Musculoskeletal	1,627	347	89	130	28	2,221
All Physical	**5,124**	**1,116**	**279**	**345**	**119**	**6,984**
Mental & Nervous	618	379	207	138	59	1,401
Alcohol & Drug	469	194	42	34	6	746
All MNAD	**1,087**	**573**	**249**	**173**	**64**	**2,147**
Cancer	1,253	597	150	110	24	2,134
Circulatory	864	239	46	114	40	1,302
Nervous System	331	87	14	39	11	482
Other	1,344	348	134	116	34	1,976
All Non-Physical, Non-MNAD	**3,792**	**1,271**	**345**	**378**	**109**	**5,895**
All Diagnosis Groupings	**10,004**	**2,960**	**873**	**896**	**293**	**15,025**

The two diagnosis groupings with the lowest male actual/aggregate recovery ratios over all select claims years combined were nervous system (28%) and mental & nervous (68%). The actual/aggregate recovery ratios for male nervous system claims were exceptionally low in all claim years, while those for male mental & nervous claims were lower primarily in the first claim year.

The two diagnosis groupings with the highest male actual/aggregate recovery ratios over all 10 claim years combined were injury other than back (215%) and alcohol & drug (164%). The recovery ratio for male cancer claims was lowest in the first claim year (72%) but exceeds 100% in subsequent claim years.

Table 4.d compares the female actual/aggregate recovery ratios by diagnosis grouping by claim year. The recovery ratio for all non-maternity diagnosis groupings combined is 100% in each claim year.

Table 4.d

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS BY DIAGNOSIS GROUPING AND CLAIM YEAR

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	81%	81%	71%	111%	94%	83%
Injury Other Than Back	239%	159%	166%	137%	138%	218%
Other Musculoskeletal	95%	81%	58%	88%	94%	88%
All Physical	**125%**	**94%**	**78%**	**102%**	**100%**	**114%**
Mental & Nervous	54%	79%	183%	129%	133%	76%
Alcohol & Drug	119%	104%	359%	589%	409%	158%
All MNAD	**61%**	**81%**	**198%**	**162%**	**146%**	**84%**
Cancer	99%	201%	156%	147%	120%	121%
Circulatory	93%	77%	56%	64%	77%	84%
Nervous System	34%	34%	42%	49%	34%	36%
Other	122%	88%	93%	78%	130%	111%
All Non-Physical, Non-MNAD, Non-Maternity	**91%**	**110%**	**89%**	**80%**	**83%**	**94%**
All Diagnosis Groupings, Excluding Maternity	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Maternity	499%	393%	301%	170%	588%	490%
	NUMBER OF FEMALE RECOVERIES					
Back	466	149	50	65	21	752
Injury Other Than Back	1,091	153	52	31	12	1,340
Other Musculoskeletal	820	229	66	80	34	1,229
All Physical	**2,377**	**531**	**169**	**176**	**67**	**3,321**
Mental & Nervous	311	160	131	72	33	707
Alcohol & Drug	74	20	23	25	5	147
All MNAD	**384**	**180**	**154**	**97**	**38**	**853**
Cancer	1,105	507	110	59	13	1,794
Circulatory	201	53	15	14	6	289
Nervous System	184	71	38	36	10	339
Other	859	188	75	50	32	1,203
All Non-Physical, Non-MNAD, Non-Maternity	**2,350**	**819**	**238**	**159**	**61**	**3,626**
All Diagnosis Groupings, Excluding Maternity	**5,111**	**1,530**	**560**	**432**	**166**	**7,800**
Maternity	2,211	81	14	5	8	2,320

Like male claims, the diagnosis groupings with the lowest female actual/aggregate recovery ratios over the combined 10-year period were nervous system (36%) and mental & nervous (76%). The recovery ratios for female nervous system claims were very low in all claim years while the recovery ratios for female mental & nervous claims are lower in only the first two claim years.

Like males, the diagnosis groupings with the highest female recovery ratios over the aggregate 10-year period were injury other than back (218%) and alcohol & drug (158%).

The actual/average recovery ratios for female cancer claims over all 10 claim years combined was 121%, compared to the male cancer recovery ratio of 92%. Like males, the recovery ratio for female cancer claims was lowest in the first claim year (99%) but exceeds 100% in the subsequent claim years.

The actual/average recovery ratios for maternity claims were multiples of the recovery ratios for all non-maternity diagnosis groupings combined in every claim year and five times when all 10 claim years are combined.

4.3 ACTUAL/AGGREGATE RECOVERY RATIOS BY OCCUPATION CLASS

Table 4.e and Table 4.f compare the actual/aggregate recovery ratios for male and female claims, respectively, by diagnosis grouping and occupation class in the first claim year.

Table 4.e

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES OVER THE FIRST CLAIM YEAR BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEAR 1			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	78%	99%	99%	89%
Injury Other Than Back	231%	227%	248%	232%
Other Musculoskeletal	115%	157%	173%	139%
All Physical	**137%**	**157%**	**174%**	**150%**
Mental & Nervous	64%	41%	48%	49%
Alcohol & Drug	167%	78%	69%	143%
All MNAD	**105%**	**44%**	**50%**	**68%**
Cancer	73%	72%	72%	72%
Circulatory	104%	102%	104%	103%
Nervous System	33%	31%	25%	31%
Other	91%	96%	136%	99%
All Non-Physical, Non-MNAD	**73%**	**76%**	**86%**	**76%**
All Diagnosis Groupings	**103%**	**93%**	**117%**	**100%**
	NUMBER MALE RECOVERIES – CLAIM YEAR 1			
Back	421	491	149	1,062
Injury Other Than Back	1,101	944	390	2,436
Other Musculoskeletal	656	680	291	1,627
All Physical	**2,179**	**2,115**	**831**	**5,124**
Mental & Nervous	238	307	73	618
Alcohol & Drug	403	54	12	469
All MNAD	**641**	**361**	**85**	**1,087**
Cancer	476	648	128	1,253
Circulatory	326	442	96	864
Nervous System	145	159	28	331
Other	436	699	210	1,344
All Non-Physical, Non-MNAD	**1,382**	**1,948**	**461**	**3,792**
All Diagnosis Groupings	**4,203**	**4,424**	**1,377**	**10,004**

The actual/aggregate recovery ratio in first claim year for male physical claims was lower for occupation class M than those for occupation classes 1 and 2-4. In contrast, the actual/aggregate recovery ratio in first

claim year for male MNAD claims was significantly higher than for the other two occupation classes. The recovery ratio for male alcohol & drug from occupation class M was over twice that for the other occupation classes. Occupation class M comprised 86% (403/469) of all male alcohol & drug recoveries in claim year 1. In the first claim year, the actual/aggregate recovery ratios for the male non-physical, non-MNAD claims did not vary significantly among the three occupation classes.

Table 4.f

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS IN THE FIRST CLAIM YEAR BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEAR 1			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	68%	96%	103%	81%
Injury Other Than Back	247%	222%	247%	239%
Other Musculoskeletal	94%	92%	104%	95%
All Physical	**126%**	**123%**	**130%**	**125%**
Mental & Nervous	54%	54%	52%	54%
Alcohol & Drug	145%	42%		119%
All MNAD	**71%**	**54%**	**56%**	**61%**
Cancer	100%	104%	74%	99%
Circulatory	106%	75%	124%	93%
Nervous System	46%	22%	33%	34%
Other	140%	103%	136%	122%
All Non-Physical, Non-MNAD, Non-Maternity	**99%**	**84%**	**90%**	**91%**
All Diagnosis Groupings, Excluding Maternity	**108%**	**91%**	**104%**	**100%**
Maternity	494%	536%	414%	499%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEAR 1			
Back	216	187	63	466
Injury Other Than Back	671	332	89	1,091
Other Musculoskeletal	431	287	101	820
All Physical	**1,318**	**807**	**253**	**2,377**
Mental & Nervous	109	181	21	311
Alcohol & Drug	64	7	3	74
All MNAD	**173**	**187**	**24**	**384**
Cancer	494	542	70	1,105
Circulatory	97	81	23	201
Nervous System	113	56	15	184
Other	416	337	106	859
All Non-Physical, Non-MNAD, Non-Maternity	**1,120**	**1,016**	**214**	**2,350**
All Diagnosis Groupings, Excluding Maternity	**2,611**	**2,010**	**491**	**5,111**
Maternity	1,607	501	103	2,211

For all non-maternity diagnosis groupings combined, occupation class M has the highest actual/aggregate recovery ratio in the first claim year for female claims, and occupation class 1 has the lowest. The first claim year recovery ratios for female physical claims are consistent among the occupation classes. Also, the first

claim year recovery ratios for female mental & nervous claims for the three occupation classes are quite close. The first claim year recovery ratio for female alcohol & drug claims is higher in occupation class M than in occupation class 1. For all non-physical, non-MNAD and non-maternity claims combined, female claims in the first claim year from occupation class M had the highest recovery ratio, and female claims from occupation class 1 had the lowest. The recovery ratios for female cancer claims in claims years 2-10 for occupation classes M vs. 1 are quite close and noticeably higher than observed for occupation class 2-4. The first claim year recovery ratio for maternity claims is highest in occupation class 1 and lowest in occupation class 2-4, although the first claim year recovery ratios for all three occupation classes are substantially higher than those for female claims from the other diagnosis groupings.

Table 4.g and Table 4.h compare the actual/aggregate recovery ratios for male and female claims, respectively, by diagnosis grouping and occupation class over claim years 2-10 combined.

Table 4.g

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES OVER CLAIM YEARS 2-10 BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 2-10			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	80%	111%	108%	96%
Injury Other Than Back	142%	180%	207%	166%
Other Musculoskeletal	77%	120%	136%	100%
All Physical	92%	130%	141%	113%
Mental & Nervous	109%	95%	108%	100%
Alcohol & Drug	256%	121%	226%	218%
All MNAD	150%	97%	115%	117%
Cancer	165%	140%	161%	152%
Circulatory	102%	88%	102%	95%
Nervous System	26%	19%	22%	22%
Other	79%	86%	94%	84%
All Non-Physical, Non-MNAD	88%	81%	92%	85%
All Diagnosis Groupings	**99%**	**97%**	**114%**	**100%**

Table 4.g
CONTINUED

	NUMBER OF MALE RECOVERIES – CLAIM YEARS 2-10			
Back	253	306	91	650
Injury Other Than Back	241	276	98	615
Other Musculoskeletal	229	261	105	594
All Physical	**723**	**843**	**294**	**1,859**
Mental & Nervous	240	435	107	782
Alcohol & Drug	220	42	14	277
All MNAD	**460**	**478**	**122**	**1,059**
Cancer	375	408	98	882
Circulatory	172	216	51	439
Nervous System	71	65	15	151
Other	208	351	72	632
All Non-Physical, Non-MNAD	**826**	**1,041**	**236**	**2,103**
All Diagnosis Groupings	**2,009**	**2,361**	**651**	**5,022**

When all diagnosis groupings are combined, the male actual/aggregate recovery ratios in claim years 2-10 combined did not vary significantly from those in the first claim year for all three occupation classes. However, a few noticeable variations between the first claim year and years 2-10 occur for some diagnosis groupings for specific occupation classes. For example, occupation class M had a substantial reduction in its actual/aggregate recovery ratios in years 2-10 for male physical claims, compared to the first claim year. On the other hand, occupation class M had a substantial increase in the actual/aggregate recovery ratios in years 2-10 for male MNAD claims, compared to the first claim year. The other two occupation classes incurred more moderate increases in their actual/aggregate recovery ratios for male MNAD claims in years 2-10.

Table 4.h

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS IN CLAIM YEARS 2-10 BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 2-10			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	84%	90%	76%	85%
Injury Other Than Back	140%	174%	199%	156%
Other Musculoskeletal	66%	85%	112%	78%
All Physical	**84%**	**100%**	**109%**	**93%**
Mental & Nervous	110%	111%	125%	112%
Alcohol & Drug	238%	239%		234%
All MNAD	**129%**	**117%**	**122%**	**121%**
Cancer	210%	166%	145%	184%
Circulatory	63%	64%	155%	70%
Nervous System	42%	33%	52%	38%
Other	69%	96%	144%	90%
All Non-Physical, Non-MNAD, Non-Maternity	**103%**	**92%**	**120%**	**99%**
All Diagnosis Groupings, Excluding Maternity	**98%**	**99%**	**116%**	**100%**
Maternity	408%	441%	143%	364%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEARS 2-10			
Back	152	107	27	285
Injury Other Than Back	127	100	22	249
Other Musculoskeletal	178	165	66	409
All Physical	**457**	**371**	**115**	**943**
Mental & Nervous	133	228	34	396
Alcohol & Drug	49	25	0	73
All MNAD	**182**	**253**	**34**	**469**
Cancer	357	283	49	689
Circulatory	32	42	14	88
Nervous System	75	64	16	155
Other	108	178	58	345
All Non-Physical, Non-MNAD, Non-Maternity	**572**	**567**	**137**	**1,276**
All Diagnosis Groupings, Excluding Maternity	**1,211**	**1,191**	**287**	**2,689**
Maternity	82	19	8	108

For all non-maternity diagnosis groupings combined, occupation class 2-4 had the highest actual/aggregate recovery ratio for female claims over claim years 2-10 combined, while the recovery ratios for female claims from occupation classes M and 1 were lower but close. Occupation class M had the lowest recovery ratios over claim years 2-10 for female physical claims among the occupation classes. Occupation class 2-4 had the highest recovery ratio over years 2010 for female mental & nervous claims among the occupation classes. For all non-physical, non-MNAD and non-maternity claims combined, female claims from occupation class 2-4 had the highest recovery ratio over years 2-10, and female claims from occupation class 1 had the lowest. Occupation class M had the highest recovery ratio over years 2-10 from female

cancer claims among the occupation classes, while occupation class 1-2 has the higher recovery ratio for female circulatory claims. The recovery ratio for maternity claims over years 2-10 was over 400% for occupation classes M and 1.

Table 4.i and Table 4.j compare the actual/aggregate recovery ratios for male and female claims respectively, by diagnosis grouping and occupation class over all 10 claim years combined.

Table 4.i

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS OVER CLAIM YEARS 1-10 BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 1-10			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	78%	104%	103%	92%
Injury Other Than Back	208%	214%	238%	215%
Other Musculoskeletal	102%	144%	161%	126%
All Physical	**`122%**	**149%**	**164%**	**138%**
Mental & Nervous	81%	62%	72%	68%
Alcohol & Drug	190%	93%	112%	164%
All MNAD	**120%**	**64%**	**75%**	**86%**
Cancer	97%	89%	95%	92%
Circulatory	103%	97%	103%	100%
Nervous System	30%	26%	24%	28%
Other	87%	92%	122%	94%
All Non-Physical, Non-MNAD	**78%**	**77%**	**88%**	**79%**
All Diagnosis Groupings	**102%**	**95%**	**116%**	**100%**
	NUMBER OF MALE RECOVERIES – CLAIM YEARS 1-10			
Back	675	797	240	1,712
Injury Other Than Back	1,342	1,220	488	3,051
Other Musculoskeletal	885	940	396	2,221
All Physical	**2,902**	**2,958**	**1,124**	**6,984**
Mental & Nervous	478	742	180	1,401
Alcohol & Drug	623	97	26	746
All MNAD	**1,101**	**839**	**206**	**2,147**
Cancer	851	1,057	226	2,134
Circulatory	498	658	147	1,302
Nervous System	215	224	43	482
Other	644	1,050	281	1,976
All Non-Physical, Non-MNAD	**2,209**	**2,989**	**697**	**5,895**
All Diagnosis Groupings	**6,211**	**6,786**	**2,028**	**15,025**

When all diagnosis groupings are combined over all ten claim years, occupation class 1 had the lowest male actual/aggregate recovery ratio and occupation class 2-4 had the highest. For male physical claims, occupation class M had the lowest recovery ratio over years 1-10. For male MNAD claim diagnosis category, class M had the highest recovery ratio over years 1-10 among all three occupation classes. The recovery ratios over years 1-10 for male non-physical, non-MNAD and non-maternity claims were quite close among the three occupation classes.

Table 4.j

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS OVER CLAIM YEARS 1-10 BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 1-10			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	74%	93%	93%	83%
Injury Other Than Back	220%	209%	235%	218%
Other Musculoskeletal	84%	89%	107%	88%
All Physical	**112%**	**115%**	**123%**	**114%**
Mental & Nervous	75%	76%	81%	76%
Alcohol & Drug	174%	119%		158%
All MNAD	**92%**	**78%**	**82%**	**84%**
Cancer	128%	119%	92%	121%
Circulatory	91%	71%	135%	84%
Nervous System	45%	27%	40%	36%
Other	116%	100%	139%	111%
All Non-Physical, Non-MNAD, Non-Maternity	**101%**	**86%**	**100%**	**94%**
All Diagnosis Groupings, Excluding Maternity	**105%**	**94%**	**108%**	**100%**
Maternity	489%	532%	365%	490%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEARS 1-10			
Back	368	294	90	752
Injury Other Than Back	797	432	111	1,340
Other Musculoskeletal	610	452	167	1,229
All Physical	**1,774**	**1,178**	**368**	**3,321**
Mental & Nervous	242	409	56	707
Alcohol & Drug	113	31	3	147
All MNAD	**355**	**440**	**58**	**853**
Cancer	851	825	118	1,794
Circulatory	130	123	37	289
Nervous System	188	120	31	339
Other	524	515	165	1,203
All Non-Physical, Non-MNAD, Non-Maternity	**1,692**	**1,583**	**351**	**3,626**
All Diagnosis Groupings, Excluding Maternity	**3,821**	**3,201**	**778**	**7,800**
Maternity	1,689	519	111	2,320

Like male claims, when all non-maternity diagnosis groupings are combined, occupation class 1 had the lowest female actual/aggregate recovery ratio over claim years 1-10 and occupation class 2-4 had the highest (although the differences between the recovery ratios for occupation classes M and 2-4 were minor). For the female physical claim diagnosis groupings only, occupation class 2-4 had the highest recovery ratio, while the recovery ratios for occupation classes 1 and M were comparable. For the female MNAD claim diagnosis groupings, occupation class M had the highest recovery ratio among the three occupation classes due to substantial differences in the alcohol & drug claims component. For all non-physical, non-MNAD and non-maternity claims combined, female claims from occupation class 1 had the

lowest recovery ratio over years 1-10, and while the recovery ratios for female claims from occupation classes M and 2-4 were close. The recovery ratio for maternity claims over years 1-10 were highest for occupation class 1. Occupation class 2-4 had the lowest maternity recovery ratio among the three occupation classes over years 1-10.

4.4 ACTUAL/AGGREGATE RECOVERY RATIOS BY DIAGNOSIS GROUPING AND ONSET AGE

Table 4.k and Table 4.l compare the actual/aggregate recovery ratios for male and female claims, respectively, by diagnosis grouping and onset age in the first claim year. All occupation classes have been combined. Since onset age is a variable for the aggregate recovery rates, the actual/aggregate recovery ratios equal 100% when all diagnosis groupings are combined.

Table 4.k

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES IN THE FIRST CLAIM YEAR BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEAR 1				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	96%	101%	85%	72%	89%
Injury Other Than Back	201%	214%	248%	304%	232%
Other Musculoskeletal	115%	126%	140%	174%	139%
All Physical	**143%**	**149%**	**149%**	**165%**	**150%**
Mental & Nervous	56%	46%	46%	60%	49%
Alcohol & Drug	145%	130%	155%	237%	143%
All MNAD	**79%**	**67%**	**64%**	**72%**	**68%**
Cancer	68%	72%	79%	57%	72%
Circulatory	64%	102%	107%	105%	103%
Nervous System	29%	40%	29%	23%	31%
Other	104%	103%	95%	96%	99%
All Non-Physical, Non-MNAD	**71%**	**79%**	**77%**	**71%**	**76%**
All Diagnosis Groupings	**100%**	**100%**	**100%**	**100%**	**100%**
	NUMBER OF MALE RECOVERIES – CLAIM YEAR 1				
Back	151	350	457	103	1,062
Injury Other Than Back	371	791	1,021	253	2,436
Other Musculoskeletal	132	400	783	312	1,627
All Physical	**654**	**1,541**	**2,261**	**668**	**5,124**
Mental & Nervous	108	220	224	65	618
Alcohol & Drug	98	207	146	18	469
All MNAD	**207**	**427**	**370**	**84**	**1,087**
Cancer	124	353	629	147	1,253
Circulatory	35	214	441	173	864
Nervous System	30	114	152	35	331
Other	156	409	574	204	1,344
All Non-Physical, Non-MNAD	345	1,091	1,796	560	3,792
All Diagnosis Groupings	**1,205**	**3,060**	**4,427**	**1,312**	**10,004**

In the first claim year, the actual/aggregate recovery ratios by diagnosis groupings for male claims were consistent by onset age with a few exceptions. For example, the actual/aggregate recovery ratios for male injury other than back and other musculoskeletal claims increased steadily by onset age grouping. Male

circulatory claims with onset ages under 40 had a recovery ratio of 64% compared to recovery ratios for onset ages 40 and up that exceed 100%.

Table 4.I

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS IN THE FIRST CLAIM YEAR BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEAR 1				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	91%	86%	70%	88%	81%
Injury Other Than Back	182%	222%	284%	260%	239%
Other Musculoskeletal	84%	88%	105%	90%	95%
All Physical	**112%**	**121%**	**135%**	**128%**	**125%**
Mental & Nervous	68%	48%	48%	66%	54%
Alcohol & Drug	126%	76%	184%		119%
All MNAD	**74%**	**52%**	**59%**	**67%**	**61%**
Cancer	84%	113%	97%	87%	99%
Circulatory	142%	83%	85%	84%	93%
Nervous System	45%	31%	30%	23%	34%
Other	159%	136%	92%	108%	122%
All Non-Physical, Non-MNAD, Non-Maternity	**100%**	**98%**	**82%**	**84%**	**91%**
All Diagnosis Groupings, Excluding Maternity	**100%**	**100%**	**100%**	**100%**	**100%**
Maternity	490%	559%			499%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEAR 1				
Back	121	160	145	40	466
Injury Other Than Back	177	349	467	98	1,091
Other Musculoskeletal	126	245	376	73	820
All Physical	**424**	**754**	**988**	**211**	**2,377**
Mental & Nervous	100	98	93	20	311
Alcohol & Drug	20	22	31	1	74
All MNAD	**120**	**119**	**124**	**21**	**384**
Cancer	177	449	402	78	1,105
Circulatory	44	55	79	22	201
Nervous System	61	64	52	8	184
Other	254	287	243	74	859
All Non-Physical, Non-MNAD, Non-Maternity	**536**	**855**	**776**	**182**	**2,350**
All Diagnosis Groupings, Excluding Maternity	**1,080**	**1,729**	**1,888**	**414**	**5,111**
Maternity	1,854	353	4	0	2,211

Like male claims, the actual/aggregate recovery ratios by diagnosis groupings for female claims in the first claim year were consistent by onset age with a few exceptions. For example, female circulatory claims with onset ages under 40 had a recovery ratio of 142% compared to recovery ratios for onset ages over 40 that were 85% or lower. This pattern of recovery ratios for female circulatory claims was just the opposite of that observed for male circulatory claims. The number of maternity claims for onset ages under 40

exceeded the number of non-maternity female claims, i.e., 1,854 versus 1,080. The recovery ratio for maternity claims was higher for onset ages 40-49 (599%) than for onset ages under 40 (490%).

Table 4.m and Table 4.n compare the actual/aggregate recovery ratios for male and female claims, respectively, by diagnosis grouping and onset age over claim years 2-10 combined.

Table 4.m

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES OVER CLAIM YEARS 2-10 BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 2-10				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	114%	91%	99%	81%	96%
Injury Other Than Back	120%	158%	187%	205%	166%
Other Musculoskeletal	54%	95%	113%	112%	100%
All Physical	**97%**	**110%**	**122%**	**113%**	**113%**
Mental & Nervous	97%	106%	97%	92%	100%
Alcohol & Drug	196%	201%	242%	468%	218%
All MNAD	**115%**	**121%**	**113%**	**112%**	**117%**
Cancer	181%	160%	148%	121%	152%
Circulatory	125%	82%	91%	115%	95%
Nervous System	30%	23%	20%	20%	22%
Other	74%	81%	84%	105%	84%
All Non-Physical, Non-MNAD	**94%**	**83%**	**82%**	**91%**	**85%**
All Diagnosis Groupings	**100%**	**100%**	**100%**	**100%**	**100%**
	NUMBER OF MALE RECOVERIES – CLAIM YEARS 2-10				
Back	104	220	272	54	650
Injury Other Than Back	72	241	252	50	615
Other Musculoskeletal	36	183	295	80	594
All Physical	212	644	819	185	1,859
Mental & Nervous	113	355	268	47	782
Alcohol & Drug	49	129	86	13	277
All MNAD	162	484	353	60	1,059
Cancer	119	302	365	95	882
Circulatory	38	112	204	85	439
Nervous System	22	55	59	15	151
Other	64	213	262	93	632
All Non-Physical, Non-MNAD	242	682	890	289	2,103
All Diagnosis Groupings	616	1,810	2,062	533	5,022

Over claim years 2-10, the actual/aggregate recovery ratios for male injury other than back and other musculoskeletal increased with onset age, while the recovery ratios for male back claims decreased with onset age. The recovery ratios for male mental & nervous claims in years 2-10 combined jumped up from the low first year recovery ratios observed in Table 4.k. The replacement ratios for male cancer claims decreased with onset age. The recovery ratio for male circulatory claims under age 40 jumps up to 125% over years 2-10, compared to 64% in the first claim year.

Table 4.n

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS OVER CLAIM YEARS 2-10 BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 2-10				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	90%	82%	79%	135%	85%
Injury Other Than Back	166%	135%	171%	179%	156%
Other Musculoskeletal	80%	89%	65%	74%	78%
All Physical	**99%**	**94%**	**85%**	**110%**	93%
Mental & Nervous	121%	116%	107%		112%
Alcohol & Drug	236%	218%	289%		234%
All MNAD	**129%**	**127%**	**116%**		**121%**
Cancer	209%	171%	194%	126%	184%
Circulatory	31%	69%	80%	106%	70%
Nervous System	34%	45%	28%	60%	38%
Other	78%	87%	100%	109%	90%
All Non-Physical, Non-MNAD, Non-Maternity	**92%**	**95%**	**108%**	**105%**	**99%**
All Diagnosis Groupings, Excluding Maternity	**100%**	**100%**	**100%**	**100%**	**100%**
Maternity	387%	275%			364%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEARS 2-10				
Back	67	109	90	19	285
Injury Other Than Back	62	85	87	15	249
Other Musculoskeletal	75	189	126	19	409
All Physical	**205**	**383**	**302**	**54**	**943**
Mental & Nervous	95	182	116	3	396
Alcohol & Drug	13	43	17	0	73
All MNAD	**108**	**225**	**133**	**3**	**469**
Cancer	149	255	259	26	689
Circulatory	6	30	43	9	88
Nervous System	35	81	31	7	155
Other	67	126	128	24	345
All Non-Physical, Non-MNAD, Non-Maternity	**257**	**493**	**461**	**66**	**1,276**
All Diagnosis Groupings, Excluding Maternity	**569**	**1,100**	**896**	**123**	**2,689**
Maternity	90	17	1	1	108

The actual/aggregate recovery ratios for female physical claims did not have any obvious trends by onset age. The recovery ratios for female mental & nervous claims in years 2-10 increased substantially from the low first year recovery ratios observed in Table 4.l. The recovery ratios for female circulatory claims with onset ages under 40 decreased sharply over years 2-10 from the high level observed in the first claim year.

Table 4.o and Table 4.p compare the actual/aggregate recovery ratios for male and female claims, respectively, by diagnosis grouping and onset age over all 10 select years combined.

Table 4.o

MALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES OVER CLAIM YEARS 1-10 BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	MALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 1-10				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	103%	96%	89%	75%	92%
Injury Other Than Back	181%	198%	233%	282%	215%
Other Musculoskeletal	92%	115%	131%	157%	126%
All Physical	**128%**	**135%**	**141%**	**150%**	**138%**
Mental & Nervous	71%	71%	65%	70%	68%
Alcohol & Drug	159%	151%	179%	299%	164%
All MNAD	**92%**	**88%**	**81%**	**85%**	86%
Cancer	98%	96%	95%	72%	92%
Circulatory	86%	94%	101%	108%	100%
Nervous System	29%	32%	26%	22%	28%
Other	93%	94%	92%	99%	94%
All Non-Physical, Non-MNAD	**79%**	**80%**	**79%**	**77%**	**79%**
All Diagnosis Groupings	**100%**	**100%**	**100%**	**100%**	**100%**
	NUMBER OF MALE RECOVERIES – CLAIM YEARS 1-10				
Back	255	570	729	158	1,712
INJURY OTHER THAN BACK	443	1,032	1,273	303	3,051
OTHER MUSCULOSKELETAL	168	583	1,078	392	2,221
ALL PHYSICAL	**866**	**2,185**	**3,080**	**853**	**6,984**
MENTAL & NERVOUS	221	575	492	112	1,401
ALCOHOL & DRUG	147	336	232	32	746
ALL MNAD	**368**	**911**	**723**	**144**	**2,147**
CANCER	242	655	994	243	2,134
CIRCULATORY	73	327	645	258	1,302
NERVOUS SYSTEM	52	169	211	50	482
OTHER	220	622	836	298	1,976
ALL NON-PHYSICAL, NON-MNAD	**587**	**1,773**	**2,686**	**849**	**5,895**
ALL DIAGNOSIS GROUPINGS	**1,821**	**4,870**	**6,489**	**1,845**	**15,025**

Over all ten claim years combined, increasing trends in the actual/aggregate recovery ratios by onset age for male claims can be observed for injury other than back, other musculoskeletal, alcohol & drug, and circulatory diagnosis groupings. Decreasing trends by onset age can be observed for back and cancer diagnosis groupings.

Table 4.p

FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS AND THE NUMBER OF RECOVERIES FOR NON-MATERNITY CLAIMS OVER CLAIM YEARS 1-10 BY DIAGNOSIS GROUPING AND ONSET AGE

DIAGNOSIS GROUPING	FEMALE ACTUAL/AGGREGATE RECOVERY RATIOS – CLAIM YEARS 1-10				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	90%	84%	73%	99%	83%
Injury Other Than Back	178%	197%	257%	245%	218%
Other Musculoskeletal	83%	89%	91%	86%	88%
All Physical	**107%**	**111%**	**119%**	**124%**	**114%**
Mental & Nervous	87%	78%	69%	56%	76%
Alcohol & Drug	154%	134%	212%		158%
All MNAD	**93%**	**85%**	**79%**	**57%**	**84%**
Cancer	116%	129%	120%	94%	121%
Circulatory	100%	78%	83%	89%	84%
Nervous System	40%	38%	29%	33%	36%
Other	131%	116%	95%	109%	111%
All Non-Physical, Non-MNAD, Non-Maternity	**97%**	**97%**	**90%**	**88%**	**94%**
All Diagnosis Groupings, Excluding Maternity	**100%**	**100%**	**100%**	**100%**	**100%**
Maternity	484%	534%	265%		490%
	NUMBER OF FEMALE RECOVERIES – CLAIM YEARS 1-10				
Back	188	269	235	60	752
Injury Other Than Back	240	434	554	113	1,340
Other Musculoskeletal	201	434	502	92	1,229
All Physical	**628**	**1,137**	**1,290**	**265**	**3,321**
Mental & Nervous	195	280	208	24	707
Alcohol & Drug	33	65	48	1	147
All MNAD	**228**	**344**	**257**	**24**	**853**
Cancer	326	704	662	103	1,794
Circulatory	50	86	122	31	289
Nervous System	96	145	83	15	339
Other	321	413	371	99	1,203
All Non-Physical, Non-MNAD, Non-Maternity	**793**	**1,348**	**1,238**	**248**	**3,626**
All Diagnosis Groupings, Excluding Maternity	**1,649**	**2,829**	**2,785**	**537**	**7,800**
Maternity	1,944	370	5	1	2,320

Over all 10 claim years combined, increasing trends in the actual/aggregate recovery ratios by onset age for female claims can be observed for injury other than back diagnosis groupings. There is a decreasing trend in recovery ratios for mental & nervous claims.

Section 5: Disabled Life Mortality Experience

Section 5 discusses how IDI disabled life mortality experience varies by diagnosis grouping across claim year, occupation class and onset age, separately for males and females.

There are three subsections:

- Actual/Standard Mortality Ratios by Diagnosis Grouping and Claim Year
- Actual/ Standard Mortality Ratios by Diagnosis Grouping and Occupation Class
- Actual/ Standard Mortality Ratios by Diagnosis Grouping and Onset Age

Actual/standard mortality ratios corresponding to the various subsets of claims were examined. Standard mortality is based on the ultimate 2015 VBT mortality rates, which vary by gender and attained age and are provided in Appendix B. The method used to derive actual/standard mortality ratios is described in Section 2.

5.1 ACTUAL/STANDARD MORTALITY RATIOS BY DIAGNOSIS GROUPING AND CLAIM YEAR

Table 5a compares the actual/standard mortality ratios for male claims by diagnosis grouping and claim year. All onset ages and occupation classes have been combined.

Table 5.a

MALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS BY DIAGNOSIS GROUPING AND CLAIM YEAR

DIAGNOSIS GROUPING	MALE ACTUAL/STANDARD MORTALITY RATIOS					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	100%	109%	115%	147%	90%	115%
Injury Other Than Back	226%			163%	150%	144%
Other Musculoskeletal	57%	199%	101%	91%	126%	113%
All Physical	**116%**	**134%**	**99%**	**129%**	**115%**	**120%**
Mental & Nervous	346%	244%	206%	362%	218%	278%
Alcohol & Drug		1289%	720%	526%	472%	598%
All MNAD	**324%**	**370%**	**253%**	**375%**	**239%**	**308%**
Cancer	7419%	7759%	4426%	2076%	935%	4594%
Circulatory	834%	341%	409%	221%	213%	328%
Nervous System	397%	502%	534%	420%	387%	434%
Other	937%	566%	504%	388%	378%	493%
All Non-Physical, Non-MNAD	**2995%**	**2421%**	**1297%**	**633%**	**410%**	**1258%**
All Diagnosis Groupings	**1710%**	**1413%**	**766%**	**427%**	**281%**	**739%**
All (Excluding Cancer)	**422%**	**335%**	**310%**	**275%**	**237%**	**294%**

Table 5.a
CONTINUED

DIAGNOSIS GROUPING	NUMBER OF MALE DEATHS					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	11	13	13	44	27	109
Injury Other Than Back	18	3	3	21	22	67
Other Musculoskeletal	7	25	11	24	30	96
All Physical	**35**	**42**	**27**	**89**	**79**	**272**
Mental & Nervous	34	30	22	107	73	266
Alcohol & Drug	4	21	8	14	14	61
All MNAD	**38**	**51**	**30**	**120**	**88**	**327**
Cancer	1,270	1,108	420	368	121	3,286
Circulatory	79	37	42	58	55	270
Nervous System	42	68	68	131	112	420
Other	126	85	69	130	120	530
All Non-Physical, Non-MNAD	**1,516**	**1,297**	**599**	**686**	**408**	**4,506**
All Diagnosis Groupings	**1,590**	**1,389**	**656**	**895**	**574**	**5,105**
All (Excluding Cancer)	**320**	**282**	**236**	**527**	**453**	**1,819**

When all 10 claim years are combined, the male actual/standard mortality ratio was 739%. The male mortality ratio was 1,710% in the first claim year and decreased steadily in subsequent claim years, reaching 281% by claim years 7-10.

Back and other musculoskeletal claims had the lowest male actual/standard mortality ratios, averaging 115% and 113%, respectively, over all 10 claim years combined. Cancer claims, which represented 64% of all male deaths, had the highest male mortality ratios by far, averaging 4,594% over all 10 claim years combined. The average male mortality ratios for alcohol & drug claims over the 10 claim years combined was more than two times that of male mental & nervous claims.

Cancer claims comprised 80% of all male deaths in the first claim year and 57% of all male deaths in claim years 2-10, combined. The overall male actual/standard mortality ratio drops from 739% to 294% when cancer claims are excluded. The decreasing male actual/standard mortality ratios by claim year is attributable primarily to cancer claims, which had mortality ratios of 7,419% and 7,759% in the first two claim years, decreasing to 935% in claim years 7-10. The circulatory and other diagnosis groupings also exhibited downward trends in the actual/standard mortality ratios by claim year but not as steep as cancer.

Table 5.b compares the female actual/standard mortality ratios by diagnosis grouping and claim year. All onset ages and occupation classes have been combined.

Table 5.b

FEMALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS FOR NON-MATERNITY CLAIMS BY DIAGNOSIS GROUPING AND CLAIM YEAR

DIAGNOSIS GROUPING	FEMALE ACTUAL/STANDARD MORTALITY RATIOS					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back			264%	267%	178%	182%
Injury Other Than Back						160%
Other Musculoskeletal			160%	60%	247%	133%
All Physical	**72%**		**214%**	**141%**	**209%**	**153%**
Mental & Nervous	394%		247%	335%	158%	243%
Alcohol & Drug				1893%	3252%	1275%
All MNAD	**363%**		**233%**	**403%**	**241%**	**289%**
Cancer	7178%	7153%	6171%	3370%	1729%	4980%
Circulatory	873%	917%	537%	292%	399%	493%
Nervous System	369%	430%	568%	365%	208%	337%
Other	913%	783%	306%	315%	467%	496%
All Non-Physical, Non-MNAD	**3502%**	**2911%**	**2057%**	**975%**	**582%**	**1597%**
All Diagnosis Groupings	**1860%**	**1482%**	**1100%**	**560%**	**373%**	**839%**
All (Excluding Cancer)	**358%**	**310%**	**310%**	**255%**	**266%**	**283%**
	NUMBER OF FEMALE DEATHS					
Back	0	1	7	22	17	48
Injury Other Than Back	5	1	4	5	4	18
Other Musculoskeletal	2	2	8	8	36	56
All Physical	**7**	**4**	**19**	**35**	**58**	**122**
Mental & Nervous	9	5	7	25	15	61
Alcohol & Drug	0	0	0	6	9	15
All MNAD	**9**	**5**	**7**	**31**	**24**	**76**
Cancer	384	312	189	197	82	1,166
Circulatory	11	13	7	12	15	58
Nervous System	9	13	17	32	21	91
Other	32	30	11	29	43	146
All Non-Physical, Non-MNAD	**436**	**369**	**224**	**269**	**161**	**1,460**
- Excluding Cancer	52	56	35	72	79	294
All Diagnosis Groupings	**452**	**378**	**250**	**335**	**242**	**1,658**
All (Excluding Cancer)	**68**	**66**	**61**	**138**	**160**	**492**

Over all 10 claim years combined, the overall female actual/standard mortality ratio was 839%. In the first claim year, the female actual/standard mortality ratio was 1,860%, decreasing by claim year and reaching 373% in claim years 7-10.

Female other musculoskeletal claims had the lowest actual/standard mortality ratios, averaging 133% over all 10 claim years. Female cancer claims, which represented 70% of all female deaths, had the highest actual/standard mortality ratios by far, averaging 4,980% over all 10 claim years. The average actual/standard mortality ratio for female alcohol & drug claims over the 10 claim years was more than five times that of female mental & nervous claims.

Cancer claims comprised 85% of all female deaths in the first claim year and 65% of all female deaths in claim years 2-10, combined. The overall male actual/standard mortality ratio drops from 839% to 283% when cancer claims are excluded. The decreasing female actual/standard mortality ratios by claim year was

due primarily to cancer claims, which had mortality ratios of 7,178% and 7,153% in the first two claim years, decreasing to 1,729% in claim years 7-10. The circulatory and other diagnosis groupings also exhibited downward trends in the actual/standard mortality ratios by claim year but not as steep as cancer.

5.2 ACTUAL/STANDARD MORTALITY RATIOS BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

Table 5.c compares the actual/standard mortality ratios for male claims by diagnosis grouping and occupation class. All onset ages and the 10 claim years have been combined.

Table 5.c

MALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS BY DIAGNOSIS GROUPING AND OCCUPATION CLASS OVER ALL SELECT CLAIM YEARS COMBINED

DIAGNOSIS GROUPING	MALE ACTUAL/STANDARD MORTALITY RATIOS			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	107%	133%	77%	115%
Injury Other Than Back	103%	169%	213%	144%
Other Musculoskeletal	91%	128%	164%	113%
All Physical	**100%**	**139%**	**138%**	**120%**
Mental & Nervous	213%	295%	357%	278%
Alcohol & Drug	448%	787%	1728%	598%
All MNAD	**258%**	**320%**	**408%**	**308%**
Cancer	3843%	5212%	4132%	4594%
Circulatory	216%	397%	366%	328%
Nervous System	320%	508%	521%	434%
Other	418%	517%	672%	493%
All Non-Physical, Non-MNAD	**1019%**	**1421%**	**1293%**	**1258%**
All Diagnosis Groupings	**563%**	**881%**	**744%**	**739%**
All (Excluding Cancer)	**218%**	**345%**	**350%**	**294%**

Table 5.c
CONTINUED

	NUMBER OF MALE DEATHS			
Back	48	53	8	109
Injury Other Than Back	22	34	12	67
Other Musculoskeletal	40	41	15	96
All Physical	**110**	**128**	**35**	**272**
Mental & Nervous	60	171	35	266
Alcohol & Drug	30	24	6	61
All MNAD	**90**	**195**	**42**	**327**
Cancer	1,023	1,965	299	3,286
Circulatory	67	172	31	270
Nervous System	124	252	45	420
Other	160	304	65	530
All Non-Physical, Non-MNAD	**1,374**	**2,693**	**439**	**4,506**
All Diagnosis Groupings	**1,574**	**3,016**	**516**	**5,105**
All (Excluding Cancer)	**551**	**1,051**	**217**	**1,819**

When all diagnosis groupings were combined, occupation class M has the lowest male actual/standard mortality ratios among the three occupation classes: 563% for occupation class M, compared to 881% and 744% for occupation classes 1 and 2-4, respectively.

For all diagnosis groupings except back claims, occupation class M has the lowest male actual/standard mortality ratios among the three occupation classes. Occupation class 2-4 has the lowest mortality ratio (77%) for back claims among the three occupation classes, but this is only based on eight claims. Male back claims for occupation class M have a mortality ratio of 107% compared to 133% for occupation class 1.

Table 5.d compares the actual/standard mortality ratios for female claims by diagnosis grouping and occupation class. All onset ages and the 10 claim years have been combined.

Table 5.d

FEMALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS FOR NON-MATERNITY CLAIMS BY DIAGNOSIS GROUPING AND OCCUPATION CLASS OVER ALL SELECT CLAIM YEARS COMBINED

DIAGNOSIS GROUPING	FEMALE ACTUAL/STANDARD MORTALITY RATIOS			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	223%	169%		182%
Injury Other Than Back		270%		160%
Other Musculoskeletal	140%	138%		133%
All Physical	**155%**	**167%**	**95%**	**153%**
Mental & Nervous	297%	231%		243%
Alcohol & Drug	1975%			1275%
All MNAD	**448%**	**230%**		**289%**
Cancer	3905%	5702%	5101%	4980%
Circulatory	457%	473%	822%	493%
Nervous System	89%	529%	371%	337%
Other	378%	580%	453%	496%
All Non-Physical, Non-MNAD	**1204%**	**1848%**	**1693%**	**1597%**
All Diagnosis Groupings	**631%**	**1012%**	**803%**	**839%**
All (Excluding Cancer)	**337%**	**240%**	**283%**	**337%**
	NUMBER OF FEMALE DEATHS			
Back	26	20	3	48
Injury Other Than Back	4	12	2	18
Other Musculoskeletal	28	24	4	56
All Physical	**57**	**56**	**9**	**122**
Mental & Nervous	22	36	3	61
Alcohol & Drug	14	1	0	15
All MNAD	**36**	**37**	**3**	**76**
Cancer	337	710	119	1,166
Circulatory	18	33	7	58
Nervous System	10	73	8	91
Other	38	92	15	146
All Non-Physical, Non-MNAD	**402**	**908**	**150**	**1,460**
All Diagnosis Groupings	**495**	**1,001**	**162**	**1,658**
All (Excluding Cancer)	**159**	**291**	**43**	**492**

Because of the low volume of female deaths compared to male deaths, the female tables have more blank cells (fewer than five deaths). Blank cells are seen more frequently for female claims in occupation class 2-4.

When all non-maternity diagnosis groupings were combined, the resulting female actual/standard mortality ratios had similar relative relationships among the occupation classes as males did. Occupation class M had the lowest female actual/standard mortality ratios among the three occupation classes: 631% for occupation class M, compared to 1,012% and 803% for occupation classes 1 and 2-4, respectively.

The female actual/standard mortality ratios for occupation class M were not as consistently lower by diagnosis grouping as observed for males. As observed with males, the mortality ratio for occupation class

M female cancer claims (3,905%) is lower than the mortality ratios for occupation classes 1 and 2-4, i.e., 5,702% and 5,101%, respectively.

The female actual/standard mortality ratio for nervous system claims in occupation class M was very low at 89% but was based on only 10 deaths. In comparison, the mortality ratio for female nervous system claims in occupation class 1 was 529%, which was based on 73 deaths.

5.3 ACTUAL/STANDARD MORTALITY RATIOS BY DIAGNOSIS GROUPING AND ONSET AGE

Table 5.e compares the actual/standard mortality ratios for male claims by diagnosis grouping and onset age. All occupation classes and all 10 claim years have been combined.

Table 5.e

MALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS BY DIAGNOSIS GROUPING AND ONSET AGE OVER ALL SELECT CLAIM YEARS COMBINED

DIAGNOSIS GROUPING	MALE ACTUAL/STANDARD MORTALITY RATIOS				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	325%	138%	113%	68%	115%
Injury Other Than Back	450%	168%	126%	109%	144%
Other Musculoskeletal	854%	193%	95%	44%	113%
All Physical	**509%**	**163%**	**109%**	**64%**	**120%**
Mental & Nervous	535%	361%	242%	232%	278%
Alcohol & Drug	2299%	447%	547%		598%
All MNAD	**801%**	**373%**	**268%**	**235%**	**308%**
Cancer	10305%	6687%	4443%	3589%	4594%
Circulatory	964%	420%	327%	262%	328%
Nervous System	783%	524%	431%	337%	434%
Other	809%	687%	470%	380%	493%
All Non-Physical, Non-MNAD	**2506%**	**1720%**	**1157%**	**1134%**	**1258%**
All Diagnosis Groupings	**1376%**	**905%**	**677%**	**708%**	**739%**
All (Excluding Cancer)	**693%**	**373%**	**279%**	**220%**	**294%**
	NUMBER OF MALE DEATHS				
Back	9	23	64	13	109
Injury Other Than Back	8	16	35	8	67
Other Musculoskeletal	15	24	49	9	96
All Physical	**32**	**63**	**148**	**29**	**272**
Mental & Nervous	18	76	141	31	266
Alcohol & Drug	14	15	29	2	61
All MNAD	**32**	**92**	**170**	**33**	**327**
Cancer	126	643	1,764	754	3,286
Circulatory	8	39	170	53	270
Nervous System	17	80	257	67	420
Other	22	117	300	91	530
All Non-Physical, Non-MNAD	**172**	**878**	**2,492**	**965**	**4,506**
All Diagnosis Groupings	**236**	**1,032**	**2,810**	**1,027**	**5,105**
All (Excluding Cancer)	**110**	**390**	**1,046**	**274**	**1,819**

The male actual/standard mortality ratio for onset ages under 40 (1,376%) was the highest among the onset age groupings. The mortality ratio decreased as onset age increased. This pattern, i.e., higher mortality ratios in the younger onset ages, was consistent among the diagnosis groupings. The highest male mortality ratios for onset ages under 40 was for cancer claims at 10,305% and alcohol & drugs claims at 2,299%.

Table 5.f compares the actual/standard mortality ratios for female claims by non-maternity diagnosis grouping and onset age. All occupation classes and claim years 1-10 have been combined.

Table 5.f

FEMALE ACTUAL/STANDARD MORTALITY RATIOS AND THE NUMBER OF DEATHS FOR NON-MATERNITY CLAIMS BY DIAGNOSIS GROUPING AND ONSET AGE OVER ALL SELECT CLAIM YEARS COMBINED

DIAGNOSIS GROUPING	FEMALE ACTUAL/STANDARD MORTALITY RATIOS				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back		402%	122%		182%
Injury Other Than Back		466%			160%
Other Musculoskeletal		167%	141%		133%
All Physical	**177%**	**284%**	**125%**	**52%**	**153%**
Mental & Nervous		302%	232%		243%
Alcohol & Drug	9197%	1250%			1275%
All MNAD	**885%**	**375%**	**225%**		**289%**
Cancer	10122%	7009%	4361%	3758%	4980%
Circulatory		737%	446%	391%	493%
Nervous System	369%	154%	423%	345%	337%
Other	597%	551%	499%	384%	496%
All Non-Physical, Non-MNAD	**2364%**	**1879%**	**1463%**	**1453%**	**1597%**
All Diagnosis Groupings	**1345%**	**1000%**	**755%**	**758%**	**839%**
All (Excluding Cancer)	**428%**	**337%**	**270%**	**187%**	**283%**
	NUMBER OF FEMALE DEATHS				
Back	3	24	20	1	48
Injury Other Than Back	1	11	5	2	18
Other Musculoskeletal	2	16	36	2	56
All Physical	**6**	**51**	**60**	**6**	**122**
Mental & Nervous	4	21	33	2	61
Alcohol & Drug	8	7	0	0	15
All MNAD	**12**	**28**	**33**	**2**	**76**
Cancer	90	315	602	159	1,166
Circulatory	3	14	35	7	58
Nervous System	7	12	63	9	91
Other	9	34	85	18	146
All Non-Physical, Non-MNAD	**108**	**374**	**785**	**192**	**1,460**
All Diagnosis Groupings	**126**	**453**	**879**	**200**	**1,658**
All (Excluding Cancer)	**36**	**138**	**277**	**42**	**492**

When all non-maternity diagnosis groupings were combined, the female actual/standard mortality ratios were highest for onset ages under 40 at (1,345%). The female mortality ratios dropped through onset ages 40-49 and leveled out by onset age 50.

Section 6: Distribution of Claim Exposure by Diagnosis Grouping

This section examines the different distributions of disabled life exposure by diagnosis grouping, varying by gender, claim year, occupation class, and onset age.

There are four sub-sections:

- Distribution of Disabled Life Exposure by Diagnosis Grouping and Claim Year
- Distribution of Disabled Life Exposure by Diagnosis Grouping and Gender
- Distribution of Disabled Life Exposure by Diagnosis Grouping and Occupation Class
- Distribution of Disabled Life Exposure by Diagnosis Grouping and Onset Age

Claim exposure represents the period following the elimination period that a claim is open, i.e., the claim has not closed due to recovery, death, or expiration. Claim exposure is the same for both claim recovery analysis (Section 4) and claim mortality analysis (Section 5).

6.1 DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND CLAIM YEAR

Tables 6.a and 6.b compare the distributions of claim exposure by diagnosis grouping and claim year, separately for male and female claims. The tables show the percentages of the exposures by diagnosis grouping to the total exposure for each claim year grouping. The total exposure for female claims used to derive the percentages excludes maternity claims, thus facilitating the comparison of male and female distributions of non-maternity diagnosis groupings. All occupation classes and onset ages have been combined.

Table 6.a

MALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND CLAIM YEAR AS PERCENT OF TOTAL CLAIM EXPOSURE – ALL OCCUPATION CLASSES AND ONSET AGES ARE COMBINED

DIAGNOSIS GROUPING	MALE DISTRIBUTION OF CLAIM EXPOSURE					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	11.8%	12.7%	13.7%	14.6%	15.2%	13.9%
Injury Other Than Back	9.8%	7.0%	6.4%	6.7%	7.3%	7.4%
Other Musculoskeletal	12.1%	12.2%	12.4%	12.1%	11.2%	11.9%
All Physical	**33.7%**	**31.9%**	**32.6%**	**33.3%**	**33.6%**	**33.2%**
Mental & Nervous	12.0%	14.0%	14.1%	15.3%	17.8%	15.1%
Alcohol & Drug	2.8%	2.4%	1.7%	1.6%	1.7%	2.0%
All MNAD	**14.8%**	**16.4%**	**15.8%**	**16.8%**	**19.6%**	**17.1%**
Cancer	17.7%	13.9%	10.5%	8.1%	6.0%	10.2%
Circulatory	9.0%	9.7%	10.6%	11.1%	11.1%	10.5%
Nervous System	11.0%	13.3%	14.6%	14.7%	14.0%	13.7%
Other	13.9%	14.8%	15.8%	15.8%	15.7%	15.3%
All Non-Physical, Non-MNAD	**51.5%**	**51.7%**	**51.6%**	**49.8%**	**46.8%**	**49.8%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The percentage of claim exposure for male physical claims, as a group, stayed stable throughout the 10 claim years. However, the distribution among the three diagnosis groupings that comprise the physical claims shifted as back claims became more prevalent by years 7-10 and injury other than back claims became less prevalent. The percentage of male mental & nervous claims increased from 12.0% in the first claim year to 17.8% in claim years 7-10, due to the low recovery rates associated with mental & nervous claims. The percentage of male alcohol & drug claims decreased from 2.8% in the first claim year to 1.7% due to the high recovery rates associated with alcohol & drug claims. The percentage of male cancer claims decreased sharply from 17.7% in the first claim year to 6.0% by claim years 7-10 due the high mortality rates associated with cancer claims. The percentage of male circulatory claims increased by claim year due to the lower-than-average recovery rates associated with circulatory claims.

Table 6.b

FEMALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND CLAIM YEAR AS PERCENT OF TOTAL NON-MATERNITY CLAIM EXPOSURE – ALL OCCUPATION CLASSES AND ONSET AGES ARE COMBINED

DIAGNOSIS GROUPING	FEMALE DISTRIBUTION OF EXPOSURE					
	Year 1	Year 2	Year 3	Years 4-6	Years 7-10	Years 1-10
Back	11.2%	11.9%	12.5%	13.8%	14.3%	13.1%
Injury Other Than Back	8.9%	6.2%	5.7%	5.3%	5.0%	5.9%
Other Musculoskeletal	17.4%	19.2%	20.8%	21.4%	21.9%	20.6%
All Physical	**37.4%**	**37.3%**	**39.1%**	**40.5%**	**41.3%**	**39.7%**
Mental & Nervous	10.9%	12.7%	12.5%	12.7%	15.0%	13.1%
Alcohol & Drug	1.1%	1.1%	1.0%	0.9%	0.6%	0.9%
All MNAD	**12.0%**	**13.8%**	**13.4%**	**13.6%**	**15.6%**	**14.0%**
Cancer	21.9%	16.7%	13.0%	9.4%	6.8%	11.9%
Circulatory	4.5%	4.9%	5.2%	5.5%	4.9%	5.0%
Nervous System	10.4%	13.0%	14.9%	16.2%	17.1%	15.0%
Other	13.8%	14.2%	14.4%	14.8%	14.3%	14.4%
All Non-Physical, Non-MNAD	**50.5%**	**48.9%**	**47.5%**	**45.9%**	**43.1%**	**46.4%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Maternity	6.4%	0.9%	0.6%	0.5%	0.5%	1.4%

The percentage of female physical claims increased by claim year from 37.4% in year 1 to 41.3% in years 7-10. The increase in this percentage by claim year appears to be driven by back claims and other musculoskeletal claims, while the percentage of female injury other than back claims decreased by claim year. The physical claims in total produced a noticeably higher percentage of the female claim exposure, averaging 39.7% over the 10 claim years, compared to the male claim exposure, which averaged 33.2% over the 10 claim years.

The percentage of female mental & nervous claims increased from 10.9% in the first claim year to 15.0% in years 7-10, due to their low recovery rates while the percentage of female alcohol & drug claims decreased due to their high recovery rates. MNAD claim in total represented a lower percentage of female claim closure, averaging 14.0% over the 10 claim years, compared to the male claim exposure, averaging 17.1%. This difference in MNAD claim exposure by gender was driven primarily by the higher male claim exposure from alcohol & drug claims.

The percentage of female cancer claims decreased sharply from 21.9% in claim year 1 to 6.8% by years 7-10 due the high mortality rates associated with cancer claims. Cancer claims represented on average 11.9% of the total female claim exposure, which was a little higher than seen in male claim exposure (10.2%).

Maternity claims comprised 6.4% of female non-maternity claims in the first claim year. This percentage dropped sharply after year 1 due to the extremely high maternity recovery rates in the first claim year.

The percentage of female circulatory claims over the 10 claim years (5.0%) was roughly half the percentage of male circulatory claims (10.5%).

6.2 DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND GENDER

Table 6.c compares the distribution of the non-maternity claim exposures by diagnosis grouping between males and females in the first claim year, claim years 2-10 and all 10 claim years combined. The results in Table 6.c are from Tables 6.a and 6.b, arranged to facilitate the comparison of the percentages by gender. All occupation classes and onset ages have been combined.

Table 6.c

DISTRIBUTION OF THE NON-MATERNITY CLAIM EXPOSURE BY DIAGNOSIS GROUPING FOR MALES AND FEMALES, ALL OCCUPATION CLASSES AND ONSET AGES COMBINED

DIAGNOSIS GROUPING	CLAIM YEAR 1		CLAIM YEARS 2-10		CLAIM YEARS 1-10	
	Male	Female	Male	Female	Male	Female
Back	11.8%	11.2%	14.3%	13.5%	13.9%	13.1%
Injury Other Than Back	9.8%	8.9%	6.9%	5.4%	7.4%	5.9%
Other Musculoskeletal	12.1%	17.4%	11.9%	21.2%	11.9%	20.6%
All Physical	**33.7%**	**37.4%**	**33.1%**	**40.0%**	**33.2%**	**39.7%**
Mental & Nervous	12.0%	10.9%	15.7%	13.5%	15.1%	13.1%
Alcohol & Drug	2.8%	1.1%	1.8%	0.8%	2.0%	0.9%
All MNAD	**14.8%**	**12.0%**	**17.5%**	**14.3%**	**17.1%**	**14.0%**
Cancer	17.7%	21.9%	8.8%	10.2%	10.2%	11.9%
Circulatory	9.0%	4.5%	10.8%	5.2%	10.5%	5.0%
Nervous System	11.0%	10.4%	14.2%	15.8%	13.7%	15.0%
Other	13.9%	13.8%	15.6%	14.5%	15.3%	14.4%
All Non-Physical, Non-MNAD	**51.5%**	**50.5%**	**49.4%**	**45.6%**	**49.8%**	**46.4%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The physical claims represented a higher percentage of the female non-maternity claims than observed in the male claims. This was primarily due to differences in the percentages of other musculoskeletal claims between males and females. The percentage of exposure due to back claims was comparable in both genders in the first claim year, but the female percentage of back claims was lower in years 2-10. Injury other than back claims represented a higher percentage of male claims than female non-maternity claims, and this difference increased over the claim years.

Male claims had a higher percentage of mental & nervous and alcohol & drug claims than females. Male claims had a lower percentage of cancer claims than female non-maternity claims but a higher percentage of circulatory claims.

6.3 DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND OCCUPATION CLASS

Table 6.d and Table 6.e compare the distribution of claim exposure by diagnosis grouping and occupation class over claim years 1-10, separately for male and female claims. All onset ages are combined.

Table 6.d

MALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND OCCUPATION CLASS OVER CLAIM YEARS 1-10, AS PERCENT OF TOTAL CLAIM EXPOSURE

DIAGNOSIS GROUPING	MALE DISTRIBUTION OF EXPOSURE			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	16.0%	11.9%	15.1%	13.9%
Injury Other Than Back	8.4%	6.2%	8.9%	7.4%
Other Musculoskeletal	15.0%	9.0%	13.2%	11.9%
All Physical	**39.4%**	**27.0%**	**37.2%**	**33.2%**
Mental & Nervous	11.1%	18.3%	16.1%	15.1%
Alcohol & Drug	3.2%	1.1%	0.8%	2.0%
All MNAD	**14.3%**	**19.5%**	**16.9%**	**17.1%**
Cancer	9.6%	10.8%	9.8%	10.2%
Circulatory	9.7%	11.3%	10.1%	10.5%
Nervous System	13.7%	14.1%	12.0%	13.7%
Other	13.4%	17.3%	14.0%	15.3%
All Non-Physical, Non-MNAD	**46.3%**	**53.5%**	**45.9%**	**49.8%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The percentage of male claim exposure from physical claims in occupation class 1 over the 10 claim years (27.0%) was lower than that in occupation classes M and 2-4 (39.4% and 37.2%, respectively). This difference is observed in all three diagnosis groupings that comprise the physical claims.

The percentage of male claim exposure due to mental & nervous claims in occupation class 1 over the 10 claim years (18.3%) was higher than that observed in occupation classes M and 2-4, (11.1% and 16.1%, respectively). In comparison, occupation class M had the highest percentage of claim exposure from alcohol & drug claims than either occupation class 1 or 2-4.

The percentage of male claim exposure from non-physical, non-MNAD claims was higher in occupation class 1 (53.5%) than either occupation class M or 2-4 (46.3% and 45.9%, respectively). This was consistent among the various diagnoses of claims that comprise non-physical, non-MNAD claims.

Table 6.e

FEMALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND OCCUPATION CLASS OVER CLAIM YEARS 1-10, AS PERCENT OF TOTAL NON-MATERNITY CLAIM EXPOSURE

DIAGNOSIS GROUPING	FEMALE DISTRIBUTION OF EXPOSURE			
	Occupation Class M	Occupation Class 1	Occupation Class 2-4	All Occupation Classes
Back	14.6%	11.2%	15.6%	13.1%
Injury Other Than Back	7.4%	4.6%	5.6%	5.9%
Other Musculoskeletal	23.2%	17.5%	23.3%	20.6%
All Physical	**45.2%**	**33.4%**	**44.5%**	**39.7%**
Mental & Nervous	9.7%	16.7%	11.3%	13.1%
Alcohol & Drug	1.3%	0.6%	0.3%	0.9%
All MNAD	**11.0%**	**17.3%**	**11.7%**	**14.0%**
Cancer	11.5%	12.4%	11.3%	11.9%
Circulatory	4.4%	5.9%	3.9%	5.0%
Nervous System	15.0%	15.5%	12.6%	15.0%
Other	12.9%	15.5%	16.1%	14.4%
All Non-Physical, Non-MNAD	**43.8%**	**49.2%**	**43.9%**	**46.4%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Maternity	2.3%	0.6%	1.7%	1.4%

As observed in male claims, physical claims in occupation class 1 had the lowest percentage of female claim exposure over the 10 claim years (33.4%) compared to physical claims in occupation classes M and 2-4 (45.2% and 44.5%, respectively).

As observed in male claims, mental & nervous claims in occupation class 1 had the highest percentage of female claim exposure over the 10 claim years compared to mental & nervous claims in the other two occupation classes. Alcohol & drug claims in occupation class M had the highest percentage of female claim exposure among the occupation classes.

As observed in male claims, the percentage of female claim exposure from non-physical, non-MNAD claims was higher for occupation class 1 (49.2%) than either occupation class 1 or 2-4 (43.8% and 43.9%, respectively). This was consistent among the various diagnosis groups that comprise non-physical, non-MNAD claims.

Maternity claims from occupation class M had the highest percentage of female claim exposure over the 10 claim years (2.3%) compared to maternity claims from occupation classes 1 and 2-4 (0.6% and 1.7%, respectively).

6.4 DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND ONSET AGE

Table 6.f and Table 6.g compare the distributions of claim exposure by diagnosis grouping and occupation class over the 10 claim years combined, separately for male and female claims. All occupation classes are combined.

Table 6.f

MALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND ONSET AGE OVER THE 10 CLAIM YEARS, AS PERCENT OF TOTAL CLAIM EXPOSURE

DIAGNOSIS GROUPING	MALE DISTRIBUTION OF EXPOSURE				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	15.9%	14.5%	13.6%	12.7%	13.9%
Injury Other Than Back	10.5%	8.6%	6.7%	5.1%	7.4%
Other Musculoskeletal	10.3%	10.6%	12.4%	13.6%	11.9%
All Physical	**36.7%**	**33.7%**	**32.8%**	**31.4%**	**33.2%**
Mental & Nervous	19.6%	18.4%	14.0%	9.1%	15.1%
Alcohol & Drug	3.6%	3.1%	1.4%	0.5%	2.0%
All MNAD	**23.3%**	**21.5%**	**15.4%**	**9.7%**	**17.1%**
Cancer	7.9%	8.9%	10.3%	15.0%	10.2%
Circulatory	4.8%	7.9%	12.0%	13.8%	10.5%
Nervous System	12.4%	13.1%	14.2%	13.7%	13.7%
Other	15.0%	14.9%	15.4%	16.5%	15.3%
All Non-Physical, Non-MNAD	**40.1%**	**44.8%**	**51.8%**	**58.9%**	**49.8%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

The percentages of claim exposure for male physical and MNAD claims decreased with onset age while the percentages from male non-physical, non-MNAD claims increased by onset age.

The drop in the percentages for male physical claims by onset age was much more moderate than observed for MNAD claims.

The significant jump in the percentage of male non-physical, non-MNAD claims by onset age is driven primarily by cancer and circulatory claims.

Table 6.g

FEMALE DISTRIBUTION OF CLAIM EXPOSURE BY DIAGNOSIS GROUPING AND ONSET AGE OVER THE 10 CLAIM YEARS, AS PERCENT OF TOTAL NON-MATERNITY CLAIM EXPOSURE BY OCCUPATION CLASS

DIAGNOSIS GROUPING	FEMALE DISTRIBUTION OF EXPOSURE				
	Under 40	40-49	50-59	60-64	All Onset Ages
Back	12.5%	13.0%	13.6%	12.3%	13.1%
Injury Other Than Back	7.2%	5.4%	5.8%	7.5%	5.9%
Other Musculoskeletal	17.8%	20.3%	21.9%	20.6%	20.6%
All Physical	**37.4%**	**38.6%**	**41.3%**	**40.4%**	**39.7%**
Mental & Nervous	13.0%	15.1%	12.0%	8.9%	13.1%
Alcohol & Drug	0.9%	1.4%	0.5%	0.1%	0.9%
All MNAD	**13.9%**	**16.5%**	**12.5%**	**9.0%**	**14.0%**
Cancer	9.8%	10.9%	12.9%	16.7%	11.9%
Circulatory	3.8%	3.9%	6.3%	6.6%	5.0%
Nervous System	19.3%	16.7%	12.8%	9.6%	15.0%
Other	15.8%	13.5%	14.3%	17.6%	14.4%
All Non-Physical, Non-MNAD	**48.7%**	**44.9%**	**46.3%**	**50.5%**	**46.4%**
All Diagnosis Groupings	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Maternity	7.4%	0.8%	0.1%	0.1%	1.4%

Unlike male physical claims, the percentage of the female claim exposure for physical claims increased slightly by onset age until age 60.

As observed in male MNAD claims, the percentage of female exposure for MNAD claims decreased with onset age, while the percentage of female exposure for non-physical, non-MNAD claims increased by onset age after age 40.

The percentage of the female claim exposure for maternity claims was 7.4% for onset ages under 40 and dropped below 1% thereafter for ages 40-49. Not surprising, maternity claims accounted for only 0.1% of the female exposure for onset ages 50 and higher.

Section 7: Acknowledgments

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Appendix A: Definition of Diagnosis Groupings

Table A.1 defines the various diagnosis groupings by their ICD-9 codes. Table A.2 lists a sample of conditions falling in the 15 diagnosis groupings. This list is provided to give the reader an understanding of the types of conditions that are included in the diagnosis groupings. However, this list of conditions is not exhaustive.

Table A.1

ICD-9 CODES FOR DIAGNOSIS GROUPINGS

DIAGNOSIS GROUPINGS	3-DIGIT ICD-9 CODES
Alcohol & drug	291, 292, 303, 304
Back	720-724, 737, 805, 806, 847, 952
Cancer	140-165, 170-176, 179-209, 230-239
Circulatory	280-289. 390-398, 401-405, 410-417, 420-438, 440-449, 451-459
Diabetes	250
Digestive	520-543, 550-560, 562, 564-579
Ill-defined and misc. conditions	780-799
Infectious diseases	001-004, 011-118, 120-139, 279
Injuries other than back	800-804, 807-846, 848-854, 860-887, 890-897, 900-979, E000-E030, E800-E888, E990-E999, NOIN
Maternity	630-679, 760-779
Mental & nervous	290, 293-319
Nervous system	320-327, 330, 359
Other conditions	210-229, 240-246, 249, 251-278, 360-389, 580-629, 680-686, 690-698, 700-709, 740-759, 980-999
Other musculoskeletal	710-719, 725-739
Respiratory	460-466, 470-478, 480-488, 490-496, 500-508, 510-519

Table A.2

SAMPLE CONDITIONS WITHIN EACH DIAGNOSIS GROUPING

The lists of conditions below are not complete but are intended to provide a representative sample of the conditions that fall within each diagnosis grouping.

DIAGNOSIS GROUPING	SAMPLE CONDITIONS
ALCOHOL & DRUG	Alcohol withdrawal delirium
	Drug-induced mental disorders
	Acute alcoholic intoxication in alcoholism, unspecified
	Opioid type dependence unspecified use
BACK	Ankylosing spondylitis and other inflammatory spondylopathies
	Spondylosis and allied disorders
	Intervertebral disc disorders
	Chronic lumbosacral sprain/strain
	Curvature of spine
	Fracture of neck, unspecified
	Neck sprain
	Unspecified injury of cervical spinal cord
CANCER	Malignant neoplasm
CIRCULATORY	Diseases of the blood and blood-forming organs
	Rheumatic fever and rheumatic heart disease
	Hypertensive disease
	Myocardial infarction; angina pectori
	Other forms of heart disease
	Cerebrovascular disease
DIABETES	Diabetes - types 1 and 2, not secondary diabetes
DIGESTIVE	Diseases of oral cavity, salivary glands, and jaws
	Diseases of esophagus, stomach, and duodenum
	Appendicitis
	Hernia of abdominal cavity
	Noninfectious enteritis and colitis
	Other diseases of intestine
ILL-DEFINED AND MISCELLANEOUS CONDITIONS	Symptoms, signs, and ill-defined conditions
	Coma, hallucinations, dizziness, lack of coordination, symptoms involving skin, anorexia, septic shock
INFECTIOUS DISEASES	Intestinal infectious diseases (e.g., choldera, typhoid fever, salmonella)
	Tuberculosis
	Polio, other infectious and parasitic diseases
	Immunodeficiency
INJURIES OTHER THAN BACK	Fractures
	Sprains, strains
	Concussion, cerebral laceration
	Internal injury of thorax, abdomen, and pelvis
	Open wounds
	Injury to nerves and spinal cord
	Burns
	Poisoning
	Late effects of injury, poisoning
	Accidental falls

Table A.2
CONTINUED

DIAGNOSIS GROUPING	SAMPLE CONDITIONS
MATERNITY	Complications of pregnancy, childbirth, and puerperium
	Certain conditions originating in the perinatal period
MENTAL & NERVOUS	Dementia
	Psychotic conditions, excludes senility, alcohol, and drug psychoses
	Schizophrenia
	Paranoia
	Neurotic and personality disorders
NERVOUS SYSTEM	Meningitis
	Encephalitis myelitis and encephalomyelitis
	Intracranial and intraspinal abscess
	Phlebitis and thrombophlebitis of intracranial venous sinuses
	Organic sleep disorders
	Cerebral degeneration
	Muscular dystrophies and other myopathies
	Amyotrophic lateral sclerosis
	Multiple sclerosis
	Epilepsy
OTHER CONDITIONS	Benign neoplasms
	Disorders of thyroid gland
	Secondary diabetes
	Disorders of pancreas, parathyroid, pituitary glands
	Ovarian and testicular disorders
	Nutritional deficiencies
	Other metabolic disorders, e.g., gout, obesity
	Disorders of the eye and ears
	Diseases of the genitourinary system
	Diseases of the skin
	Congenital anomalies
	Toxic effects of substances
	Radiation, heat stroke
OTHER MUSCULOSKELETAL	Arthropathies, e.g., osteoarthritis, and related disorders
	Rheumatism
	Disorders of muscle, ligament, and fascia
	Other disorders of soft tissues
	Osteopathies, chondroplasties, and acquired musculoskeletal deformities
RESPIRATORY	Acute nasopharyngitis (common cold), acute sinusitis; acute pharyngitis; acute tonsillitis;
	Diseases of upper respiratory tract
	Pneumonia, influenza
	Bronchitis, chronic bronchitis, emphysema
	Pneumoconioses and other lung diseases
	Pleurisy

Appendix B: Mortality Rates in the Ultimate Policy Years from the 2015 Valuation Base Table

Table B.1

2015 VBT MORTALITY RATES – NONSMOKER, ULTIMATE POLICY DURATIONS

ATTAINED AGE	MORTALITY RATES / 1,000		ATTAINED AGE	MORTALITY RATES / 1,000	
	Male	Female		Male	Female
25	0.88	0.36	**45**	2.19	1.21
26	0.87	0.35	**46**	2.25	1.31
27	0.86	0.35	**47**	2.30	1.41
28	0.84	0.36	**48**	2.36	1.52
29	0.84	0.38	**49**	2.45	1.64
30	0.86	0.41	**50**	2.57	1.78
31	0.90	0.44	**51**	2.72	1.94
32	0.97	0.48	**52**	2.90	2.11
33	1.05	0.52	**53**	3.10	2.30
34	1.13	0.57	**54**	3.34	2.51
35	1.23	0.64	**55**	3.62	2.74
36	1.33	0.72	**56**	3.93	3.00
37	1.44	0.80	**57**	4.29	3.30
38	1.55	0.87	**58**	4.71	3.63
39	1.67	0.93	**59**	5.19	4.01
40	1.81	0.98	**60**	5.75	4.43
41	1.93	1.02	**61**	6.38	4.92
42	2.02	1.06	**62**	7.09	5.46
43	2.07	1.10	**63**	7.89	6.08
44	2.13	1.14	**64**	8.75	6.76

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