

Study

Group Life Waiver Study Based on 2009– 2015 Canadian Group LTD Termination Experience Report

**Research Council –
Experience Research Committee**

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Executive Summary

This study updates the disabled life mortality and recovery experience using the recent Canadian Institute of Actuaries (CIA) 2009–2015 Group Long-Term Disability (LTD) Termination Study¹. Based on a survey of the Canadian insurance industry, almost all Group Life Waiver plans now follow a Group LTD definition of disability. Consequently, disabled life mortality and recovery rates are used in Waiver of Premium benefits. Group Life Waiver plans are often part of Group Life plans.

To understand changes in the experience, this study compares the updated rates and corresponding waiver liabilities to those seen and calculated from previous Canadian and American disabled life studies.

Since the Group LTD experience study has become a regular study, it is anticipated that the Group Life Waiver review will become part of that regular study.

Key Findings

Canadian regions² show a variation in mortality and recovery experience where Québec is noticeably distinct from the rest of Canada, particularly in the recovery rates. The difference is largely seen in the early durations of a disability, where the Québec recovery rates are approximately 250% higher than the rates in the rest of Canada. Anecdotally this is attributed to a higher incidence rate, particularly in the mental disorders.

Female and male recovery rates are similar; however, the disabled mortality rates of the females are approximately two-thirds of the male rates.

Canadian experience is improving (lower mortality and higher recovery rates) when compared to previous studies. For both mortality and recoveries, the average improvement is about 1% per year with experience outside of Québec showing more improvement than in Québec. This results in a lowering of the Rest of Canada initial waiver liability³ by about 2% per year. Assuming a block of waiver claims has a demographic profile similar to all of Canada in the study, the overall improvements would result in a reduction in waiver liability of approximately 1% per year.

American experience is significantly different from the Canadian experience, with American mortality rates observed at 350% of the Canadian rates and American recovery rates being approximately half of the Canadian experience. This is likely due to different definitions of disability and different claim adjudication practices.

Study Outcomes

The Group LTD study has produced graduated tables for terminations due to recovery from disability or death while disabled, as well as separate disabled mortality and recovery tables. This Life Waiver study has used those tables to produce an in-depth analysis of the new tables in relation to previous Canadian and American disability studies.

¹ (CIA Research Council – Experience Research Committee, January 2019)

² Maritimes, Québec, Ontario, Prairies, BC

³ At four months since disability

Introduction

In 2001, the Canadian Institute of Actuaries (CIA) published a Group Life Waiver study, authored by Peter Muirhead, based on 1988–1994 Canadian Group LTD termination experience⁴. This research paper utilized the 1988–1994 CIA disability study as a starting point that could be used as a base for calculating Life Waiver liabilities. Although the CIA disability study used Canadian Group LTD data, it was thought to be applicable for many Life Waiver plans since many were thought to have definitions of disability similar to those of LTD plans. The tables were graduated to the observed recovery and death rates and contained no margins.

Prior to the 2001 CIA paper, most Group Life Waiver of Premium (Life Waiver) liabilities were calculated based on the 1970 Intercompany Group Life Waiver of Premium Table authored by Raymond Krieger (Krieger Table). This table was based on US experience between 1955 and 1964 and although it was out of date, there were not any industry studies that provided a better basis.

Since the 1988–1994 Canadian Group LTD Termination Study, the CIA has published three LTD termination studies based on data from 1988–1997⁵, 2004–2008⁶ and 2009–2015, and the Society of Actuaries (SOA) has published a 2005 waiver table⁷.

There was a desire to update the CIA Life Waiver studies, and the recent LTD study provides the data to perform such a study.

Study Objective

The objective of this research is to provide:

- A graduated table of disabled mortality and recovery rates by gender, age at disability (by age bands), duration since disability, geographical region, reflective of the recent experience under Canadian disability plans.
- An analytic comparison to previous studies.
- Sample Life Waiver liability levels and sensitivity of the liability levels to the mortality, recovery, and discount rates assumptions.
- Various summaries by region, cause of disability, and level of benefit.

Project Governance

The Project Oversight Group responsible for this project consisted of:

- Frank Reynolds (Chair)
- Lina Forner
- Kali Spencer
- Kamran Quavi

⁴ (Muirhead, 2001). The wording in the Introduction is adapted from the cited report.

⁵ (CIA Group Life and Health Subcommittee – Research Committee, January 2010)

⁶ (CIA Group Life and Health Experience Subcommittee, October 2011)

⁷ (SOA Group Life Insurance Experience Committee, March 2006)

Methodology

Data

The data from the 2009–2015 LTD study were used. This study provides data on the majority of insured LTD claims in Canada. These data separated claims no longer on disability into three reasons: death, expiry of benefits, and other⁸.

A survey of the contributing insurance companies confirmed that Waiver of Premium definitions of disability, for the vast majority of plans, were similar to the definitions used in the LTD plan for which the data were contributed.

Insurance Companies Contributing Data

- Assumption Life
- Blue Cross Life
- Co-operators Life
- Desjardins Financial
- Empire Life
- Equitable Life
- Great-West Life
- Industrial Alliance
- Humania
- La Capitale
- Manulife
- Pacific Blue Cross (BC Life)
- RBC Life
- SSQ
- Sun Life
- Wawanesa Life

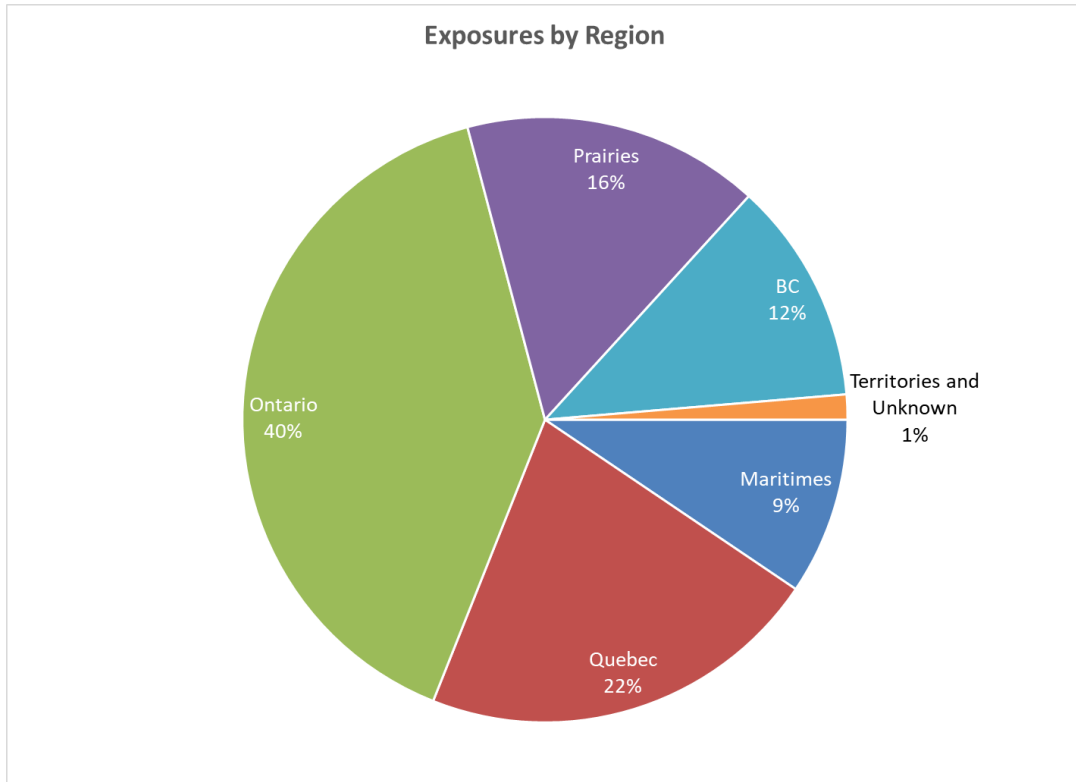
In that study the following data were excluded:

- Claims in litigation
- Claims within two years of benefit termination for durations other than to age 65
- Claims terminations in the two months prior to the date that data were actually extracted
- Exposure data with Change in Definition beyond duration 38 months
- ASO (Administrative Services Only) claims

The following chart outlines the distribution by region of the exposures used in the 2009–2015 CIA LTD Termination Study.

⁸ Expiry of benefits is often attainment of age 65 but some plans had different expiry periods, i.e., after 24 months of payments. Other reasons are both considered as recoveries.

Figure 1: 2009–2015 exposures by region



Project Team

The CIA retained Denis Garand & Associates to act as the study managers. The project leader was Denis Garand.

The project team also included Peter Muirhead, who developed the liabilities, analytical tables, and comparison tools; and Donna Swiderek, who was the project manager and primary liaison with contributing companies, and carried out the literature review.

Intended Uses

Intended uses are similar to the 2009–2015 CIA LTD Termination Study.

The construction of a table from raw data requires decisions on many practical issues and often there is some tension among competing technical objectives. For this reason, it is useful to articulate the expected uses that guided the project team.

The project team would expect the insurance companies or self-funded plans to integrate their emerging experience with these tables.

These uses are identified as:

- Valuation by insurance companies of Canadian Life Waiver open claim liabilities in financial statements.
- Calculation by insurance companies of claim liabilities in the experience-rated accounting for specific policyholders.
- Use by insurance companies in the development of manual rates for Group Life Waiver benefits.
- Valuation by self-funded plan sponsors of Canadian Life Waiver open claim liabilities in financial statements⁹.

It is appropriate to acknowledge that the tables may also be used in other contexts that were not explicitly addressed in the project.

It is important to note that the absolute results of the study are not comparable, but trends in experience are notable for individual disability and Workers' Compensation, as:

- Individual disability policies are sold to a select group of insured (mainly self-employed professionals such as doctors) and are subject to medical questionnaires.
- Workers' Compensation covers only the occupation disabilities while the group studies cover non-occupation disabilities.

Model and Factor Construction

The emerging experience demonstrates that Canadian experience is significantly different from US experience and that regular updates of the recovery and mortality tables are warranted. This can be seen from the following charts.

⁹ However, as noted elsewhere in the report, claims from self-funded (ASO) cases were not used in the development of the tables.

Figure 2: Mortality rates by study (combined genders and all of Canada)

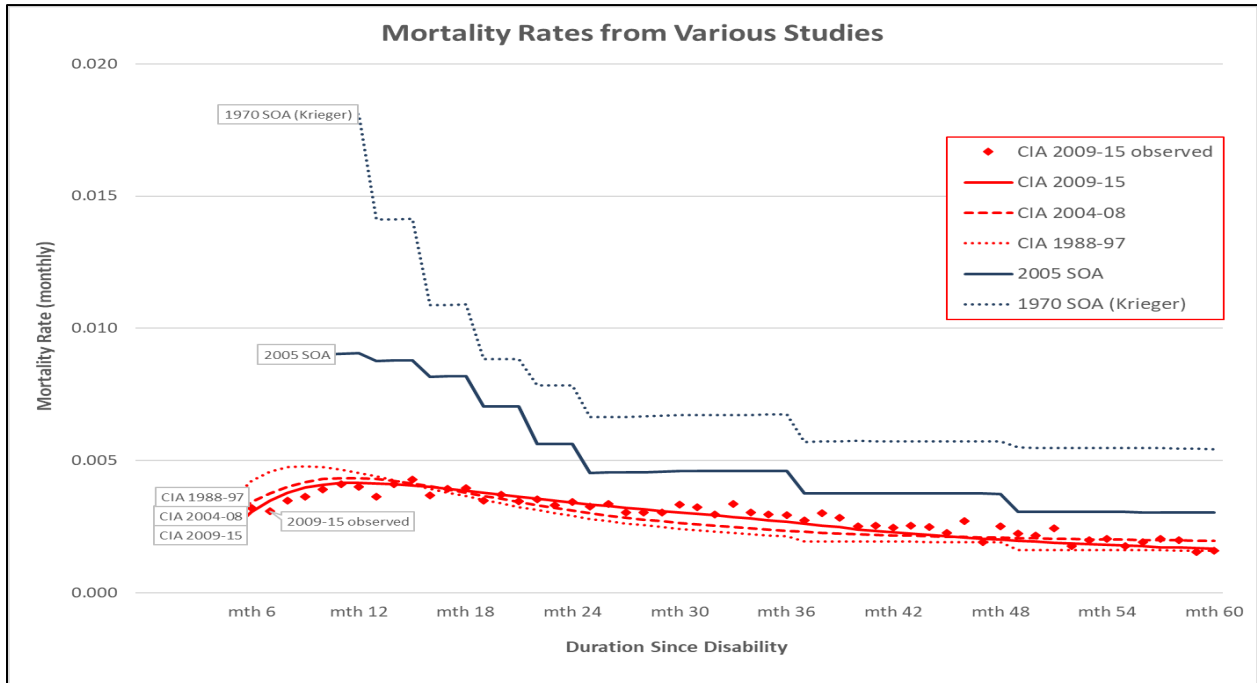
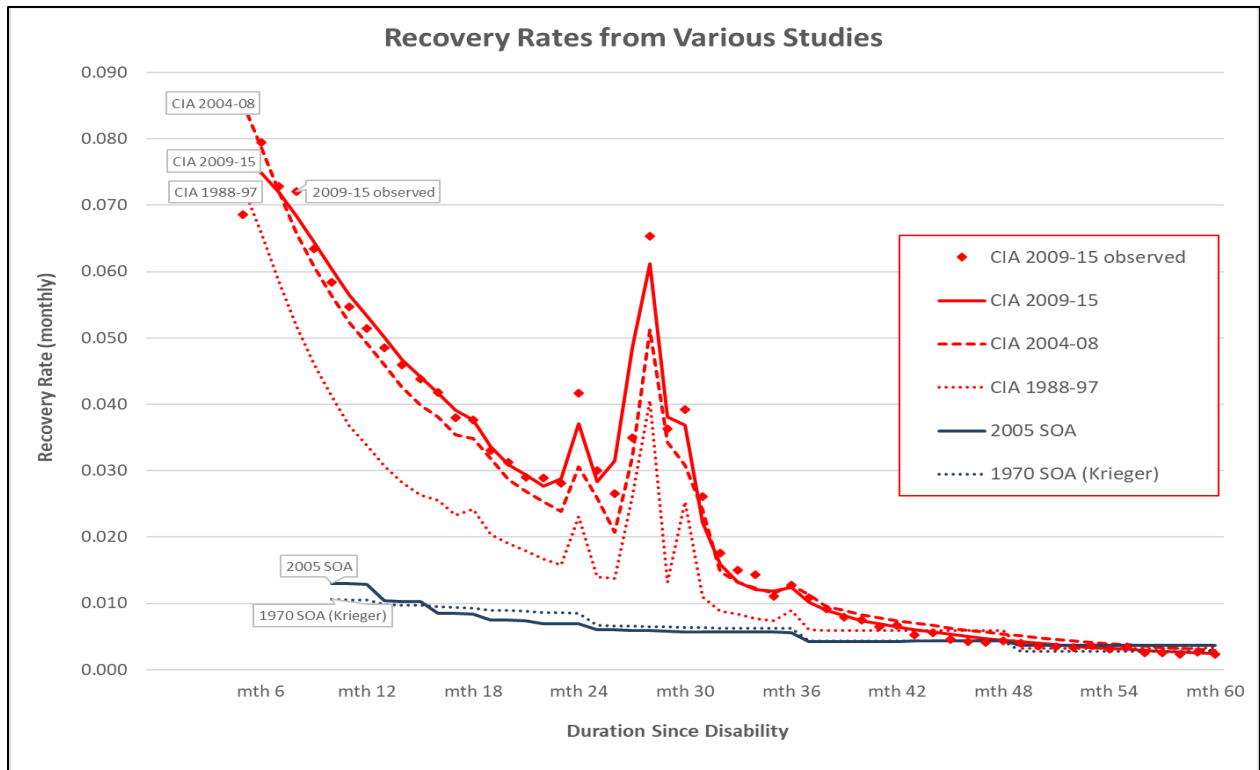


Figure 3: Recovery rates by study (combined genders and all of Canada)



These charts illustrate the improvements over time in recoveries (increasing recovery rates) and a changing shape in the disabled mortality rates.

The charts also illustrate the significant differences between the SOA studies (US experience) and the CIA studies (Canadian experience). This is due to different disability definitions, with the US using a more stringent definition of disability resulting in lower recovery rates and higher mortality rates. A typical definition of disability in the US is *Any Occupation for the entire disabled period*. This results in fewer claims that initially qualify for LTD and a longer duration (most to death) due to the severity of the disability.

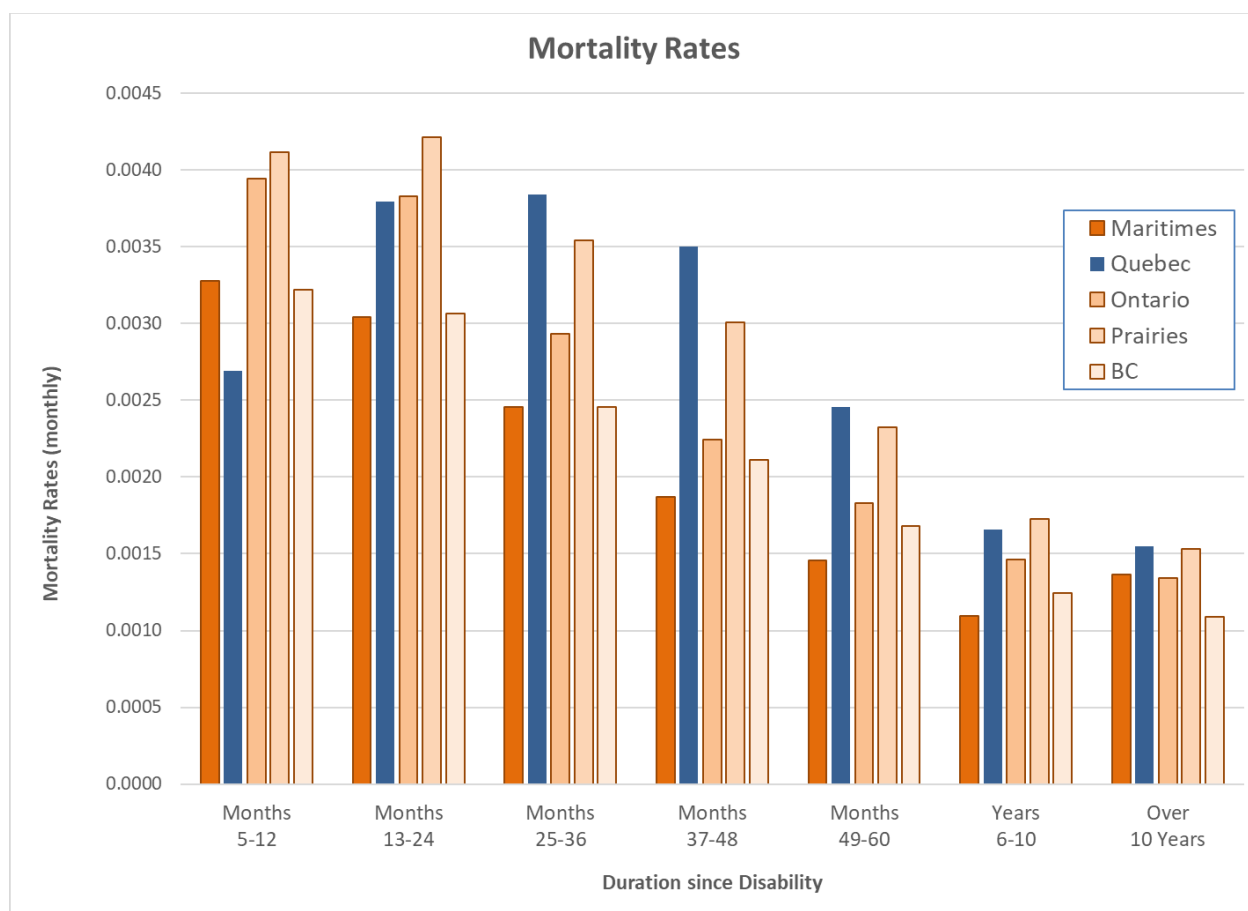
The 2005 SOA study¹⁰ also indicates that exposure starts at nine months, which is the most common elimination period used¹¹ in US industry; another difference compared to Canada.

Many US policies also limit the benefits for mental and nervous conditions.

The 2009–2015 LTD experience data also supported separate tables for Québec and Rest of Canada, mostly because of the recovery rate differences between the two. This can be seen in the following chart. (Rest of Canada and Québec rates are compared later in the report.)

The main output from this Life Waiver study is the mortality and recovery rates.

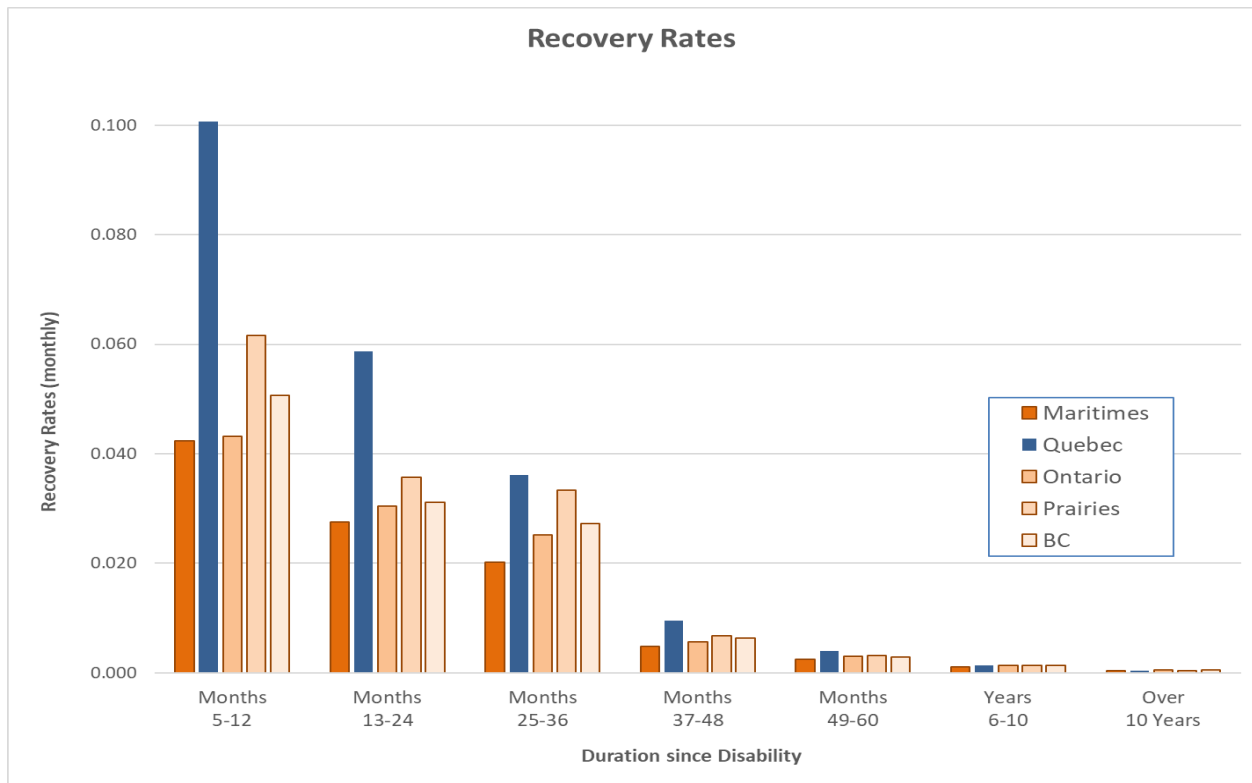
Figure 4: 2009–2015 LTD mortality rates by duration by geographical region



¹⁰ (SOA Group Life Insurance Experience Committee, March 2006)

¹¹ The most common elimination period in the U.S. is nine months, while in Canada the most common elimination period is four months.

Figure 5: 2009–2015 LTD recovery rates by duration by geographical region



Québec recovery rates are significantly higher than the other regions in Canada. Anecdotally this is caused by higher incidence rates with higher early recoveries, particularly with Mental Disorders¹².

The LTD study produced graduated termination (recovery and death) rates as well as graduated disabled mortality rates in a select and ultimate basis for Québec and the Rest of Canada separately. The rates were provided on a quinquennial age at disability with a select period of 10 years since the time of disability. During the first 60 months of the select period the study rates were monthly, with annual rates for durations 5–10 years since disability. Ultimate rates were provided after 10 years of disability. These were provided as annual rates and produced on an attained age basis. For the ultimate period the Québec and Rest of Canada the tables were merged.

Although the LTD study, which is the basis for the disabled tables, did not include coverage after age 65, there are a few Waiver plans that do offer a lifetime waiver benefit. The project team believes the actuary could in those cases extrapolate these tables beyond age 65. Recovery rates are almost zero by the time claimants reach age 65, and mortality rates relative to the Canadian population rates at age 65 were 260% for males and 240% for females.

¹² This can be seen in QPP vs CPP numbers and the disproportionate number of disabilities in early durations relative to the population. We do not have covered population data for an accurate incidence rate.

The graduated recovery and mortality rate tables are developed using three-dimensional regression. In the graduation process an additional recovery rate due to the “recoveries” at the period of the Change in Definition was added. These are terminations due to the disabled member not meeting the more stringent definition of disability with the definition changed from not being able to perform the duties of their “own occupation” to not being able to perform the duties of “any occupation”. The regression fit exponential curves to the termination and mortality rates by duration of claim using parameters that were based on a curve by the age at disability. The parameters used in the curve fitting were established by minimizing the least squared errors in the observed experience to the expected experience. This provided a smooth table both by duration of disability and age at disability.

After 10 Years since Disability

After 10 years since disability the tables become “ultimate” tables and no longer used duration since disability; instead, rates were determined for the attained age of the disabled member. Also, the regional (Québec and Rest of Canada) distinction was removed.

For Durations 5 Years to 10 Years

Rates were exponentially graduated from the 60th month of disability to the ultimate rate at 10 years of disability.

Adjustments

A few manual adjustments were made to the formula rates due to personal judgement. These included preventing the female mortality rates to exceed male rates and to ease the graduation into the ultimate rates.

Study Process

The first step of the study was to conduct a literature review of actuarial sources to compile information on current Life Waiver experience and liability research.

The second step was to collect a survey of insurers comparing Waiver and LTD policies in the areas of plan provisions and disability definitions. The results of this survey supported the assumption that the majority, over 99%, of Life Waiver policies in Canada are following an LTD definition of disability and provided coverage for similar period (mainly to age 65). A summary of the survey requirements is in Appendix A.

A Traditional definition would encompass policies that have a disability definition of total and permanent with a face amount payable upon death. Policies that have benefits payable monthly (rather than a one-time face amount payment) were reported as Traditional.

The third step was to create the analysis files.

Finally, the fourth step was to provide a report with analysis similar to the 2001 CIA Life Waiver Study.

Literature Review

The literature review found group waiver disability studies from the SOA, group and individual disability studies from the CIA and SOA, and Workers' Compensation disability studies. Appendix B provides a synopsis of the literature review.

Survey Results

Based on the study definitions, as at December 31, 2015, the vast majority of Life Waiver policies are following an LTD definition of disability, and permission was received from all companies to use the 2004–2008 and the 2009–2015 CIA LTD Study data for the Life Waiver study.

The study team concluded that the 2009–2015 CIA LTD Termination Study tables were appropriate to apply to the Life Waiver study.

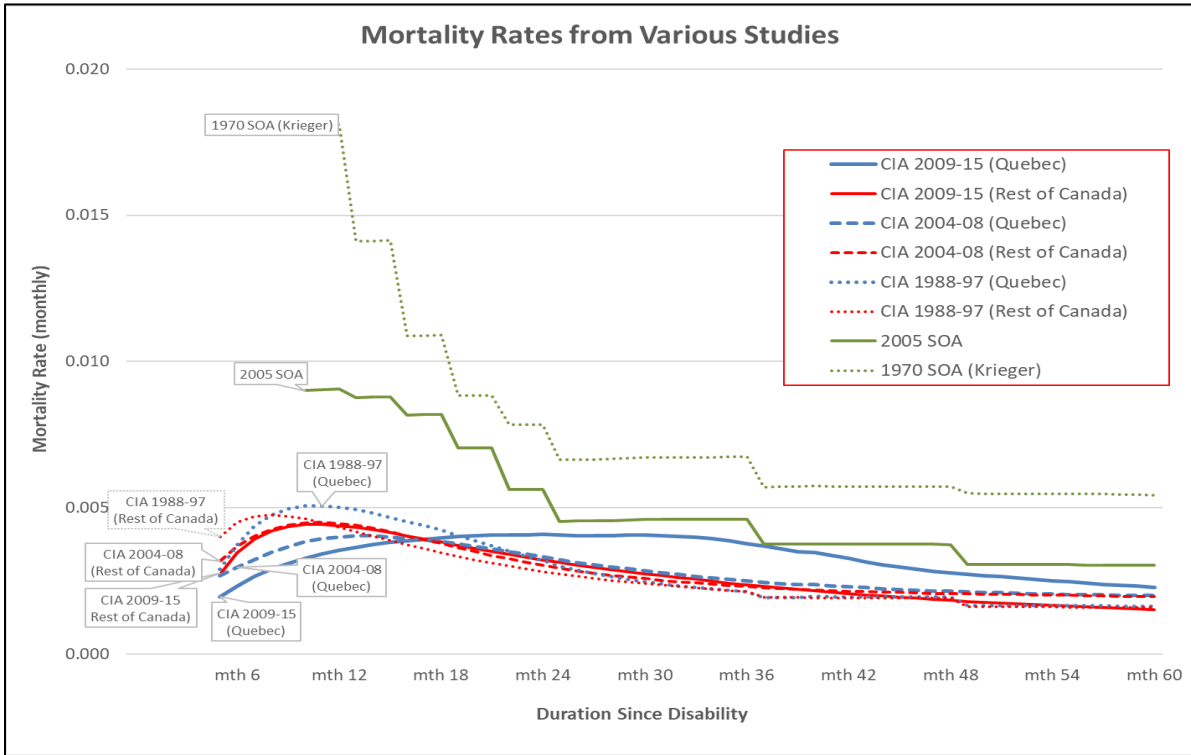
Analysis

1.1 Comparison of the Studies

Tables from the 1970 SOA Krieger Table, the SOA 2005 Group Term Life Waiver Reserve Study, the CIA 1988–1997, 2004–2008, and 2009–2015 Group LTD Termination Studies were compared. The 2009–2015 LTD Termination Study Excel file contains the termination, mortality, and recovery rates along with the Change in Definition (CiD) logic. This file is available with the download of this document.

The following charts illustrate the differences between the published tables for recovery and mortality rates as well as the Life Waiver liability levels per \$1,000 face amount. Liability levels are calculated using a 2% discount rate. Graphs by age at disability are in the Excel file.

**Figure 6: Monthly mortality rates by duration of disability for various studies
(Canadian tables are split Rest of Canada and Québec)**



**Figure 7: Monthly recovery rates by duration of disability for various studies
(Canadian tables are split Rest of Canada and Québec)**

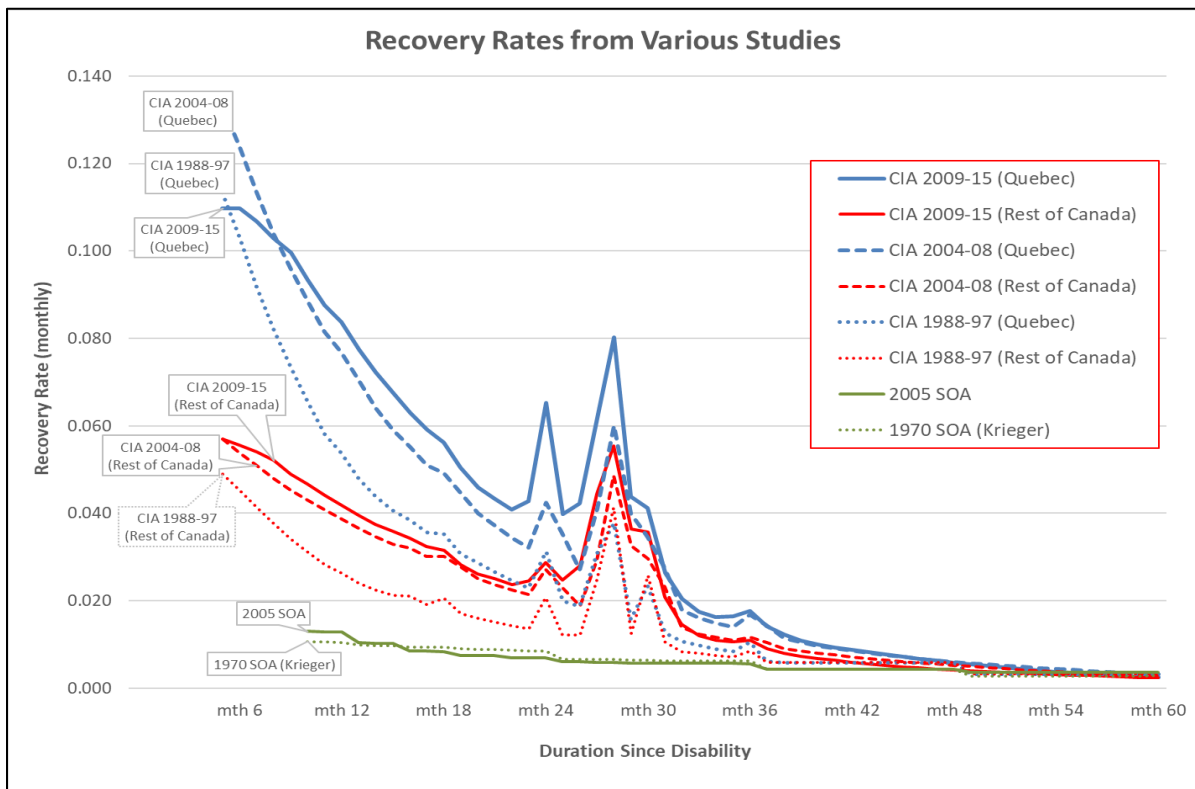
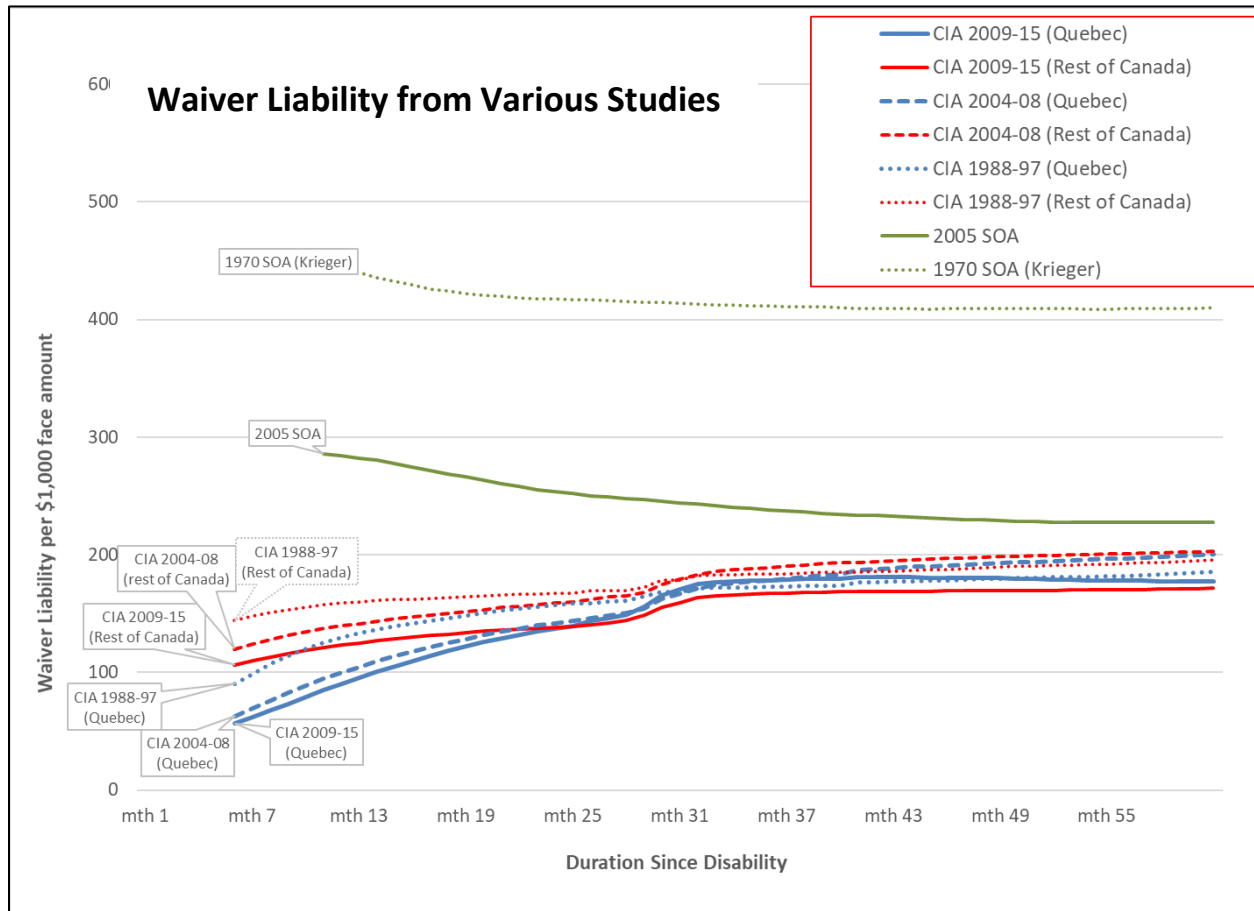


Figure 8: Life Waiver liability levels (per 1,000) by duration of disability for various studies at 2% interest discount



These charts illustrate the significant differences between the SOA studies (US experience) and the CIA studies (Canadian experience). They also illustrate the improvements over time in recoveries (increasing recovery rates) and changing pattern of mortality rates.

1.1.1 Comparing the Various Tables

The following table provides a comparison of the actual to expected deaths and recoveries as well as the waiver liability rates per \$1,000 face amount. The rates are standardized by applying the exposures from the LTD 2009–2015 LTD study by age, duration, and region. All tables used the table excluding any margins.

The liabilities have been calculated based on the following assumptions:

- Life coverage to age 65
- CiD occurs at the point provided in the 2009–2015 LTD data; the CiD logic applied varies based on the published tables
- No margins have been added to the mortality or recovery rates
- Face amount of \$1,000

The average liability methodology is discussed in Appendix C, and comparisons of liabilities at various ages and durations of disability are included in the Excel file.

Table 1: Comparison of Average Monthly Rates, Actual 2009–2015 Experience to Expected Death and Recoveries as Well As Annual Improvements and Average Waiver Liability Levels at 2% per \$1,000 Face Amount

									Observed		
	1970 SOA (Krieger)	2005 SOA	CIA 1988–97 (Qc)	CIA 1988–97 (ROC)	CIA 2004–08 (Qc)	CIA 2004–08 (ROC)	CIA 2009–15 (Qc)	CIA 2009–15 (ROC)	CIA 2009–15 (Qc)	CIA 2009–15 (ROC)	CIA 2009–15 (all Canada)
Average Monthly Rates											
Mortality	0.0090	0.0047	0.0030	0.0024	0.0028	0.0026	0.0028	0.0024	0.0027	0.0024	0.0025
Recovery	0.0047	0.0064	0.0312	0.0114	0.0416	0.0156	0.0430	0.0166	0.0428	0.0164	0.0221
Actual CIA 2009–15 Experience to Expected											
Mortality	28%	52%	91%	97%	97%	93%	98.6%	100%			
Recovery	470%	343%	137%	144%	103%	105%	99.4%	98.8%			
Annual Improvements since Previous Study (Higher Recoveries, Lower Mortality)											
Mortality		1.8%			0.5%	-0.3%	0.3%	1.2%			
Recovery		0.9%			2.1%	2.3%	0.6%	1.1%			
Average Liability	414	246	159	180	146	172	136	153	145	154	152

Expected terminations, deaths, and recoveries were determined by applying the monthly exposure¹³ by gender and age band to the corresponding mortality and recovery rates of the various published tables¹⁴. The 2009–2015 exposure, termination, and death data¹⁵ are in the Excel file. Definitions and a further description of the methodologies are in Appendices D and E.

A comparison of exposures in years and the number of deaths and recoveries used in the last three CIA LTD termination studies shows an increase between the studies in all categories except Rest of Canada, Male, which decreased from CIA 1988–1997 to CIA 2004–2008.

¹³ This study used a modified version of the 2009–2015 LTD exposure data. The Life Waiver study used as a base the CIA 2009–2015 study; however, it had minor differences, such as cutting off exposures past age 65. Therefore, this study has lower exposure and deaths of less than 0.7% and lower recoveries by 1.8%.

¹⁴ Total exposure of Québec and Rest of Canada was applied to the Krieger and SOA tables. Rest of Canada and Québec exposure was applied to the corresponding Canadian rates. Monthly exposure for each claimant is calculated for each duration a payment is made. The expected values are summed over all claims by duration and age band.

¹⁵ (CIA Research Council – Experience Research Committee, January 2019). An Excel file of tables is also on the CIA website.

Table 2: Exposure, Deaths, and Recovery Comparisons for Various Studies

Study	Combined Region, Combined Gender	Rest of Canada, Combined Gender	Québec, Combined Gender	Rest of Canada, Male	Québec, Male	Rest of Canada, Female	Québec, Female
Exposure (Years)							
CIA 2009–15	931,987	730,899	201,088	331,331	97,678	399,568	103,410
CIA 2004–08	635,696	482,309	153,387	223,705	76,898	258,604	76,489
CIA 1988–97	623,644	512,785	110,859	287,898	73,561	224,887	37,298
2005 SOA ¹⁶	666,259			409,784		256,475	
1970 Krieger ¹⁷	Approximately 1/6 the exposure of the 2005 SOA study						
Recoveries							
CIA 2009–15	247,157	143,910	103,247	63,629	44,457	80,281	58,790
CIA 2004–08	179,356	106,435	72,921	50,013	34,556	56,422	38,365
CIA 1988–97	108,207	102,198	6,009	54,244	3,857	47,954	2,152
Deaths							
CIA 2009–15	27,738	21,121	6,617	11,910	3,786	9,211	2,831
CIA 2004–08	18,621	13,896	4,725	8,037	2,831	5,859	1,894
CIA 1988–97	17,993	16,196	1,797	11,051	1,440	5,145	357

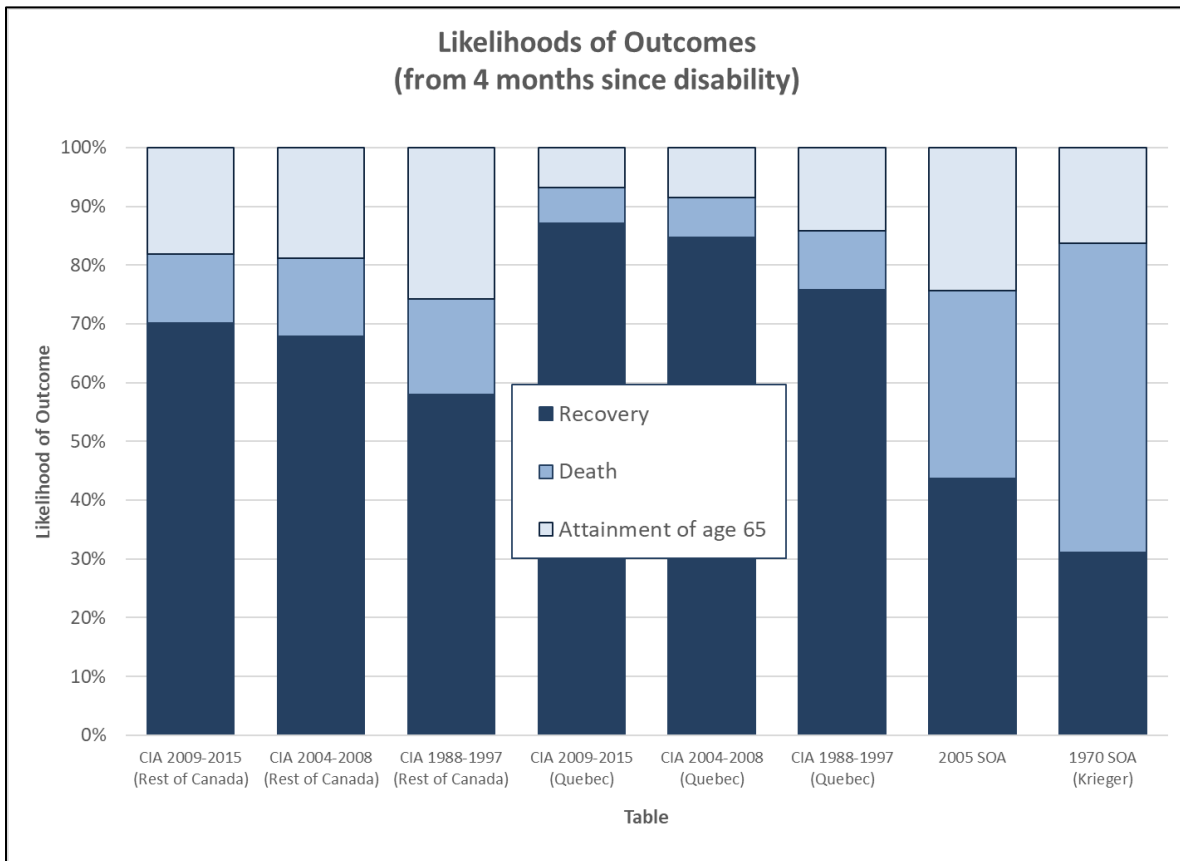
Expected Reasons for Moving off Disability

Another method to display results is to look at the expected outcome of a disability (recovery, death prior to age 65 while still disabled, and attainment of age 65 while disabled). This is shown for a disabled claim from the inception of a claim (assumed to be at four months since disability) in the 2009–2015 study.

¹⁶ (SOA Group Life Insurance Experience Committee, March 2006)

¹⁷ Ibid.

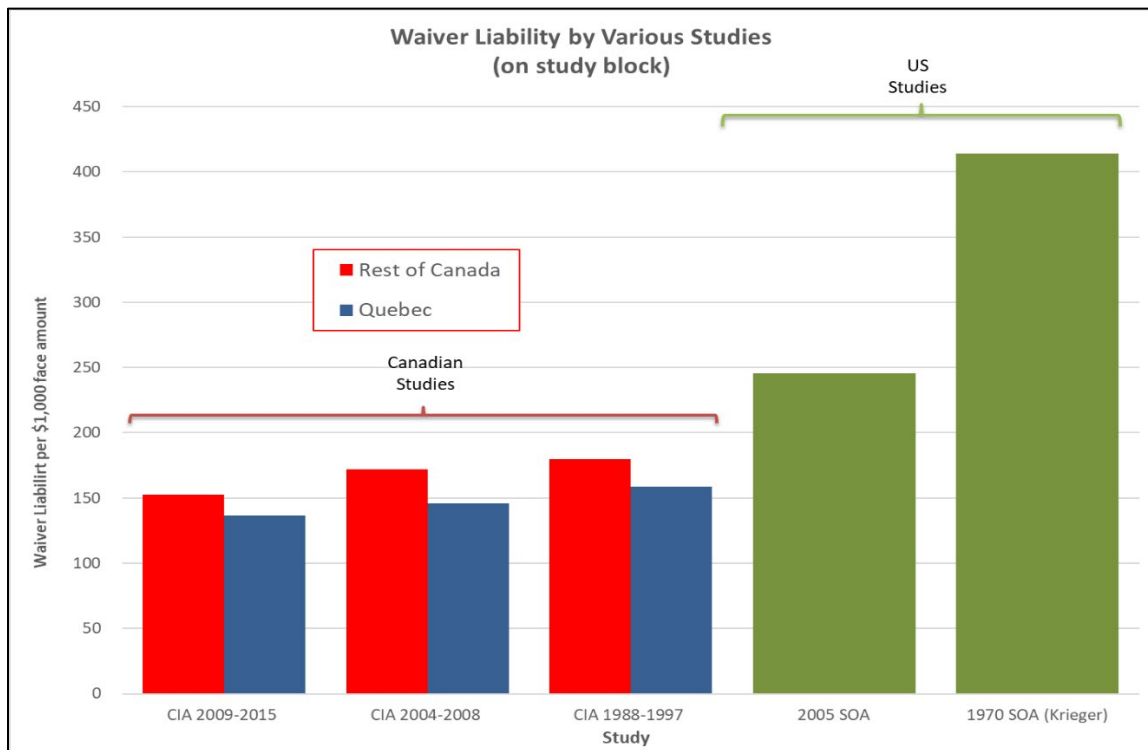
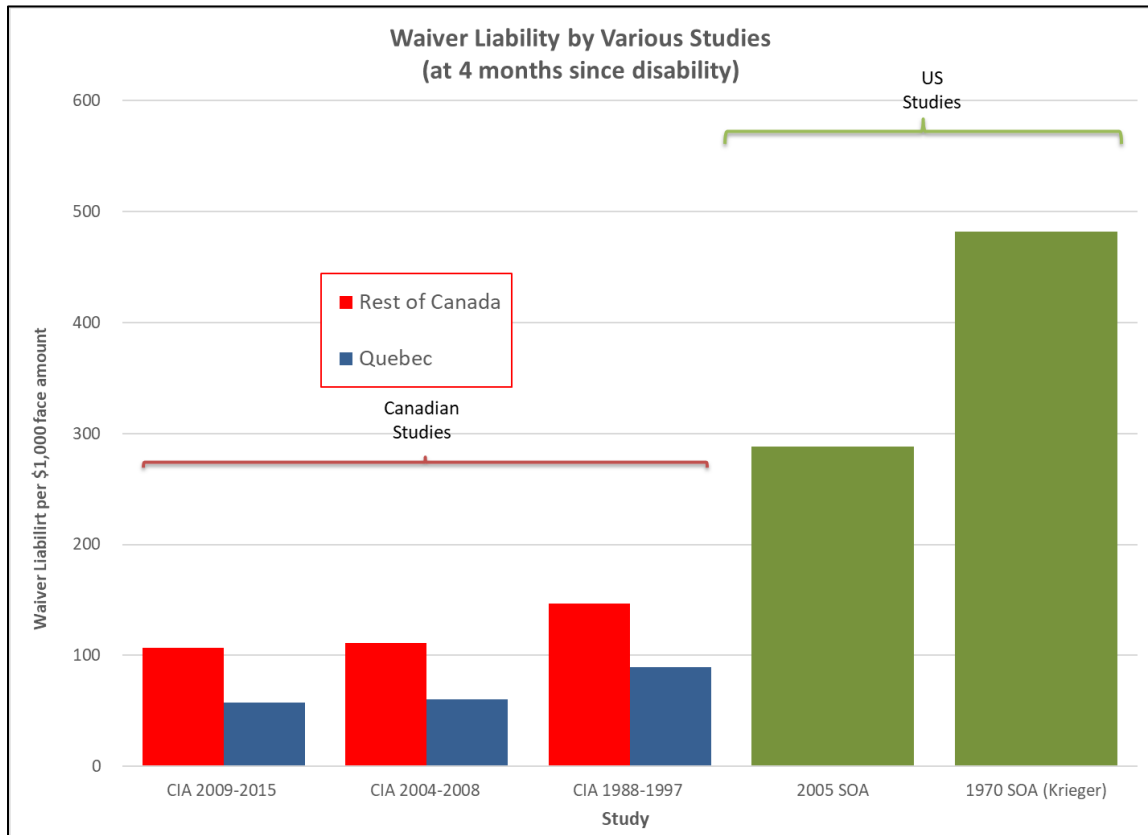
Figure 9: Expected outcomes by the various tables



This also shows the differences between SOA and CIA studies and the improvements in the decrements.

What might be of more interest is the average level of a Life Waiver liability at inception of a claim (assumed to be at four months since disability), or the Life Waiver average liability level on the block of disabled claims. These are displayed in the two charts below (liability discount rate of 2% used for these comparisons). Liability levels at inception would impact the setting of the Waiver Premium where the Liability levels for the whole block would impact the Balance Sheet liability.

Figure 10: Average level of Life Waiver liability per 1,000 at duration four months since disability and for the entire block



1.1.2 Comparison to Population Mortality¹⁸

The tables below compare the mortality experience in the study database against the expected mortality from the Canadian Life Tables 2011–2013, published by Statistics Canada. An A/E methodology is used.

The Canadian life tables do not differentiate between Québec and Rest of Canada. The relative mortality is highest in the earliest durations and diminishes as the claims continue. Mortality in the ultimate period after 10 years is approximately 350% of Canadian population mortality.

By age at incidence, relative mortality is highest for under age 30 and then declines as the claimants become older.

Table 3: Actual 2009–2015 Mortality Compared to Canadian Life Tables by Duration

Duration since Disability	Québec		Rest of Canada		Total
	Female	Male	Female	Male	
1st year	1149%	1165%	1466%	1474%	1379%
2nd year	1740%	1199%	1536%	1163%	1330%
3rd year	1536%	1039%	1169%	767%	986%
4th year	1362%	793%	836%	592%	743%
5th year	868%	565%	613%	488%	560%
6th year	617%	411%	474%	425%	450%
7th year	622%	325%	439%	428%	430%
8th year	587%	382%	393%	379%	396%
9th year	477%	348%	326%	376%	362%
10th year	500%	350%	320%	314%	332%
Over 10 years	355%	388%	323%	346%	342%
Total	1035%	774%	768%	685%	679%

Table 4: Actual Mortality Compared to Canadian Life Tables by Age at Incidence

Age at Disability	Québec		Rest of Canada		Total
	Female	Male	Female	Male	
Under 25	1266%	1285%	1350%	1220%	1263%
25–29	1154%	798%	1252%	1127%	1189%
30–34	1135%	974%	817%	799%	808%
35–39	860%	875%	705%	749%	728%
40–44	956%	768%	694%	658%	675%
45–49	1072%	790%	734%	709%	720%
50–54	1110%	803%	813%	693%	742%
55–59	1010%	726%	772%	650%	694%
60 and over	973%	745%	757%	644%	679%
Total	1035%	774%	768%	685%	679%

¹⁸ (CIA Research Council – Experience Research Committee, January 2019)

Table 5: Actual Mortality Compared to Canadian Life Tables by Age after 10 years of Disability

Age	Male	Female
35	1228%	900%
40	885%	687%
45	695%	566%
50	553%	475%
55	436%	388%
60	344%	315%
65	259%	243%

1.2 Sensitivity Testing

The liabilities were also tested for sensitivity to changes in discount rates and decrements. The 10% recovery margin was implemented as 90% times the recovery rates. The 10% mortality margin was implemented as 111%¹⁹ times the mortality rates.

Table 6: Liability Sensitivity to Changes in Discount Rates, Recovery, and Mortality

Impact on Waiver Liability of Changes to Decrements and Discount Rate						
	From Inception of Claim (Assumed to Be Four Months)			On Total Block		
	ROC	Québec	Total	ROC	Québec	Total
Base (no margins, 2% discount)	106.62	57.59	87.86	152.71	136.44	149.19
3% discount, no margins	102.09	55.65	84.36	143.66	129.32	140.56
10% recovery, no mortality margin, 2% discount	115.66	66.02	96.54	156.36	141.71	153.20
No recovery, 10% mortality margin, 2% discount	116.81	63.12	96.24	167.43	149.50	163.56
10% recovery, 10% mortality margin, 2% discount	126.66	72.29	105.69	171.41	155.24	167.92
Impact of 1% change in discount rate	-4.3%	-3.4%	-4.0%	-5.9%	-5.2%	-5.8%
Impact of 10% recovery margin	8.5%	14.6%	9.9%	2.4%	3.9%	2.7%
Impact of 10% mortality margin	9.6%	9.6%	9.5%	9.6%	9.6%	9.6%
Impact of 10% margin on both recovery and mortality	18.8%	25.5%	20.3%	12.2%	13.8%	12.6%

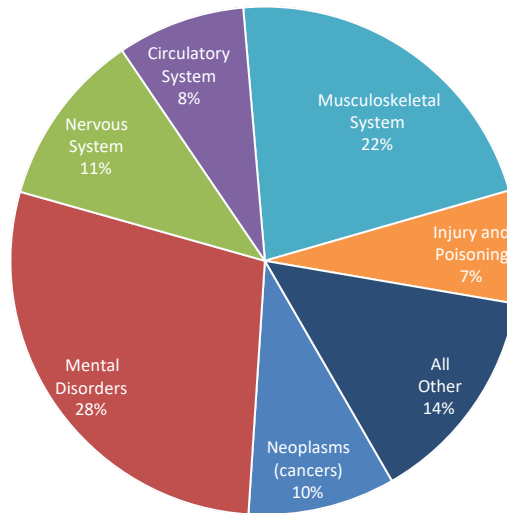
¹⁹ 1 / (1-10%).

1.3 Reserve Factors

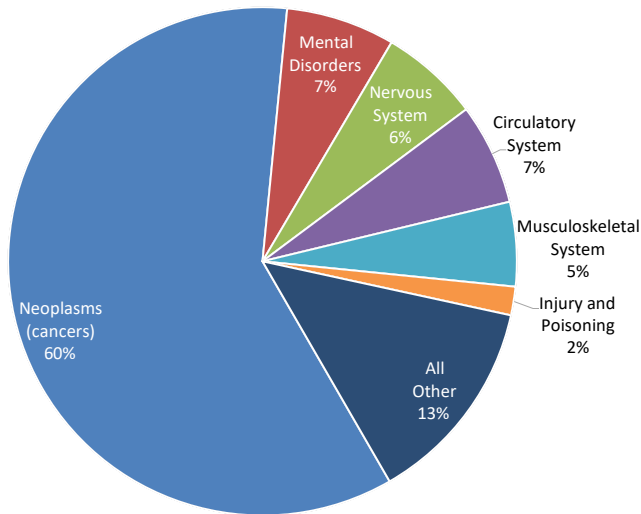
Liabilities per \$1,000 of face amount were also calculated. These are provided in Appendix C.

Comparisons by Cause of Disability

Exposures by Cause of Disability



Deaths



Recoveries

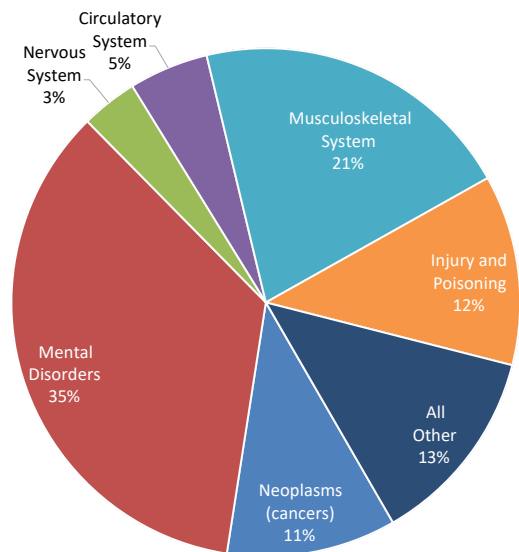


Figure 11: Mortality rates by cause of disability and duration

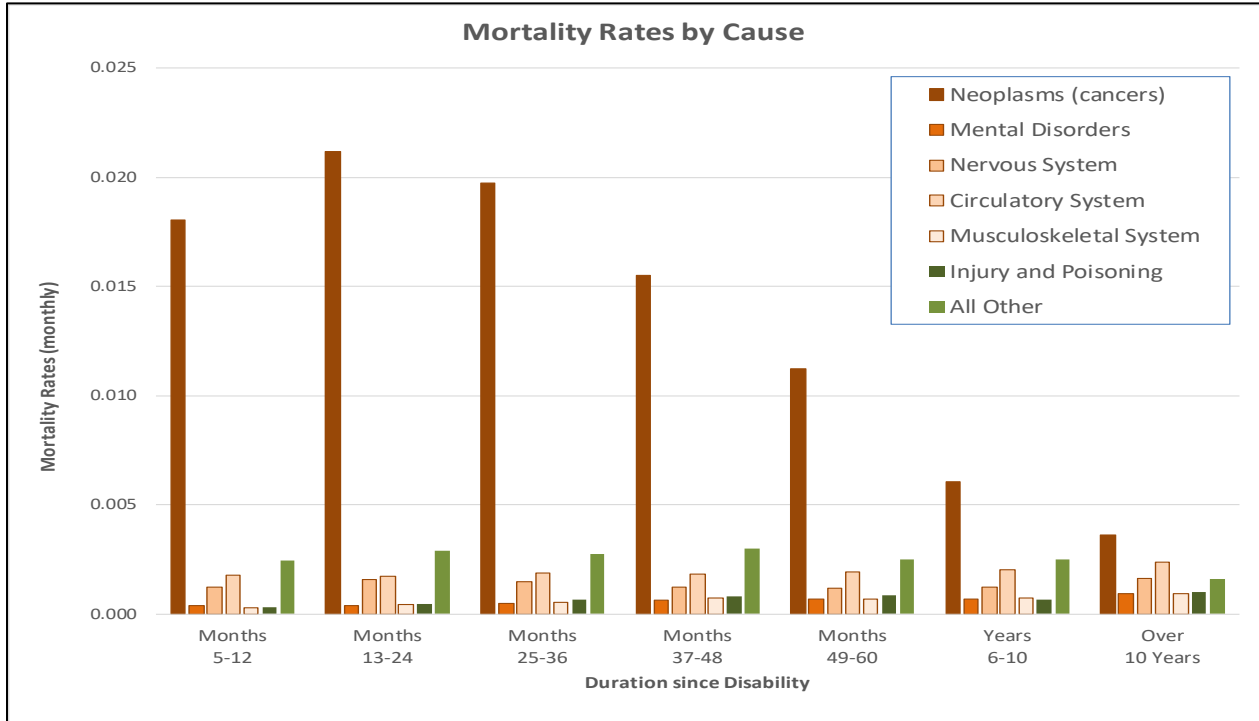
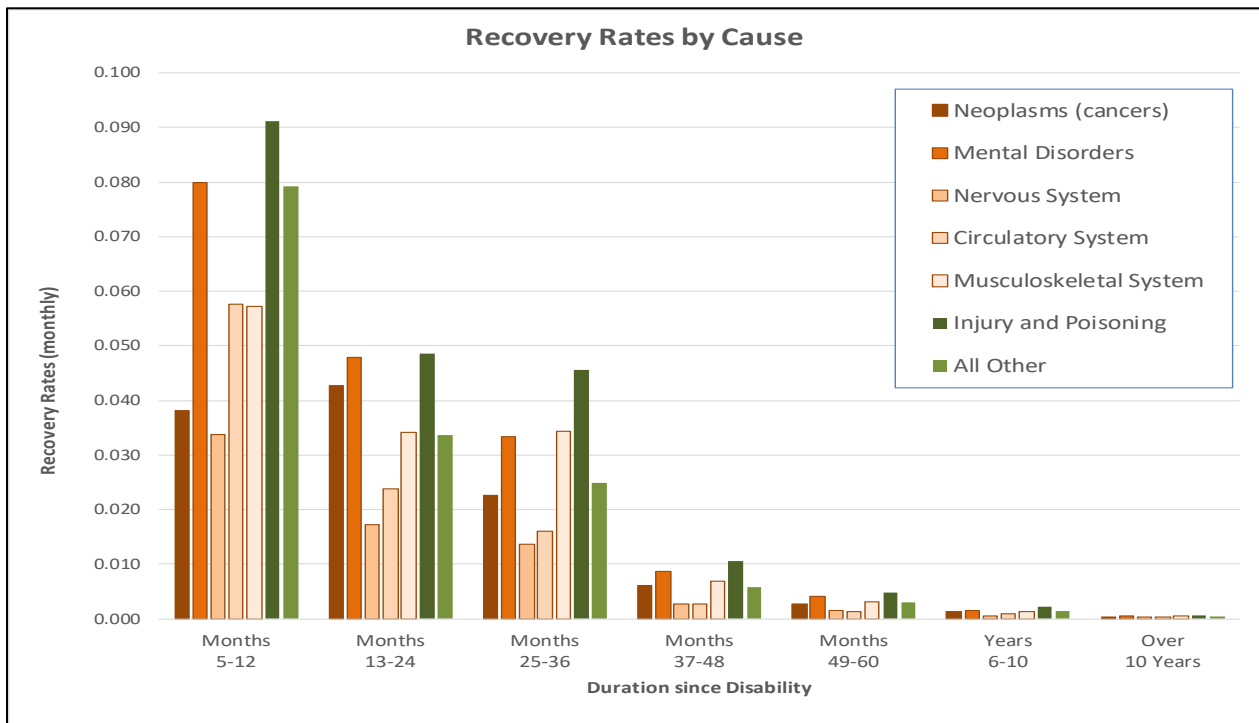


Figure 12: Recovery rates by cause of disability and duration



Actual to expected ratios by cause of disability show that Neoplasms have the highest mortality A/E at 503% and Injury and Poisonings have the highest recovery A/E at 132%. More detailed tables for each cause by age and duration bands are in the Excel file.

Table 7: Actual to Expected by Cause of Disability and Rest of Canada, Québec

Cause of Disability	Actual/Expected Deaths			Actual/Expected Recoveries		
	ROC	Québec	Total	ROC	Québec	Total
Neoplasms	502%	504%	503%	96%	63%	83%
Mental Disorders	29%	24%	28%	95%	117%	106%
Nervous System and Sense Organs	66%	63%	65%	52%	50%	51%
Circulatory System	68%	66%	68%	94%	78%	89%
Musculoskeletal and Connective Tissues	24%	18%	23%	103%	92%	99%
Injury and Poisoning	25%	20%	24%	139%	121%	132%
Other	100%	94%	99%	106%	104%	105%
Total	100%	99%	100%	99%	99%	99%

A chart indicating the cause groupings is in Appendix F.

Variations

1.4 Experience by Benefit Amount

All liabilities in the report are calculated with \$1,000 of face amount. Using benefit amount as a proxy for volume, the variations in the actual to expected using benefit amounts were explored in the recent CIA LTD termination study. The A/E experience by the amount of monthly benefit is presented below, based on the 2009–2015 CIA LTD Termination Study. The following table excludes approximately 1% of the database where the amount of monthly benefit was not available²⁰.

²⁰ Also note that two companies did not provide gross benefit amounts. Their net benefit amounts are included in the table. This represents 12.4% of the total records or 8.3% of the exposure.

Table 8: Variation of A/E Experience by Gross Monthly Benefit

Gross Monthly Benefit (\$)	Terminations	Mortality
Under 1,000	110%	95%
1,000 to 1,499	97%	103%
1,500 to 1,999	101%	100%
2,000 to 2,499	103%	102%
2,500 to 2,999	102%	102%
3,000 to 3,499	96%	90%
3,500 to 3,999	95%	95%
4,000 to 4,499	97%	106%
4,500 to 4,999	96%	98%
5,000 to 5,499	96%	106%
5,500 to 5,999	99%	111%
6,000 to 6,999	91%	106%
7,000 to 7,999	101%	143%
8,000 and over	91%	142%
Total	100%	100%

1.5 Experience by Carrier

For mortality only, the variation in termination experience by carrier ranges from a low of 91% to a high of 161%. The variation among the largest²¹ eight carriers is from 95% to 128%²².

For recoveries only, the variation in termination experience by carrier ranges from a low of 80% to a high of 123%. The variation among the largest eight carriers is from 87% to 123%.

²¹ Measured by exposure in life years.

²² (CIA Research Council – Experience Research Committee, January 2019)

Appendix A: Survey Requirements Summary

The survey requested:

- Permission to use the data from the 2004–2008 and 2009–2015 CIA LTD termination studies for the CIA Life Waiver study.
- A summary of the number and face amount of Life Waiver claims as at December 31, 2015, by pre-defined year of disability groups. This was to be reported separately by those following an LTD definition as described later in this report and those following a Traditional definition.
- The percentage of Life Waiver liabilities that follow a Traditional or LTD definition of disability.
- A response to various questions to assess the appropriateness of using the LTD data. Questions involved the Life Waiver extract creation process, data irregularities, system changes, data issues, or possible distortion in the data.
- A description of the definition of disability for Life Waiver policies.

For the purposes of the study, an LTD definition means that the waiver claim follows an LTD definition where:

- Benefit duration is specified.
- Definition changes from Own to Any Occupation or is always defined as Any Occupation.
- Elimination period is specified. No elimination period was considered as an elimination period of 0.

Appendix B: Literature Review Synopsis

Papers were reviewed from the CIA, SOA (Group and Individual), Workers' Compensation Board, and Casualty Actuarial Society (CAS).

Group

Research from the CIA Study on Canadian Group Long-Term Disability Termination Experience (1988–1997)²³ concluded that US waiver experience was significantly different from LTD experience in Canada. In the Group Life Waiver Study Based on 1988–1997 Canadian Group LTD Termination Experience²⁴, 1988–97 recovery rates were significantly higher and Canadian mortality lower than the Krieger Table.

The SOA Report of the Society of Actuaries Group Life Insurance Experience Committee – March 2006²⁵ indicates that the A/E ratios for deaths and recoveries by age and sex (no margin) show lower, i.e., more favourable, A/E ratios for deaths for females than for males, so sex-specific rates make a clear difference.

The SOA Report of the Society of Actuaries Group Life Insurance Experience Committee Waiver Experience Report – December 2014²⁶ says Group Life carriers who offer LTD products to common customers have historically demonstrated that linking the reporting of waiver claims to LTD claims results in higher rates of waiver incidence due to shortened elimination periods, two-year Own Occupation definition of disability versus Any Occupation, and differences in waiver claim monitoring practices to align with LTD claims. Regional differences were observed in the US and the cost of waiver varies substantially by age and gender.

The SOA 2016 Group Life Insurance Experience Committee Report – October 2016²⁷ confirms the expected relationship of incidence rates by elimination period, with incidence rates decreasing as the elimination period increases, and also supports the findings of the 2013 study of a strong correlation of higher waiver incidence with combined LTD/waiver reporting. The same report demonstrates that incidence varies by face amount, salary, industry category, and region.

The SOA Group Long-Term Disability Experience Study Report – April 2018²⁸ found that recovery A/Es were much lower for Life Waiver Premium than LTD in the first five years of the claim. Life Waiver Premium Death A/Es were materially higher than LTD death A/Es. The differences converged substantially by later claim durations.

Individual

²³ (CIA Group Life and Health Subcommittee – Research Committee, January 2010)

²⁴ (Muirhead, 2001)

²⁵ (SOA Group Life Insurance Experience Committee, March 2006)

²⁶ (SOA Group Life Insurance Experience Committee, December 2014)

²⁷ (SOA Group Life Insurance Experience Committee, October 2016)

²⁸ (SOA Group Long-Term Disability Experience Committee, April 2018)

A 2018 SOA Survey of Waiver of Premium/Monthly Deduction Rider Assumptions and Experience²⁹ for individual disability products found that Disabled claimants have been staying on claim longer than in the past (lower claim termination rates), which can be attributed in part to improved medical care and decreased population mortality. Life Waiver elimination periods are three, four, or six months and less than the typical group elimination period of nine months. Therefore, the use of Group Life Waiver tables is less appropriate for the valuation of these waiver benefits.

Workers' Compensation

The Workers' Compensation Board Paper Work Disability Duration: A Comparative Analysis of Three Canadian Provinces³⁰ states that "The difference in work disability by gender over the duration of claim is a unique result of this study." The findings suggest that men and women may have different vulnerabilities or face different barriers that may vary across the disability duration distribution as well across jurisdiction. Analysis is provided by province, industry, and cause. The results find mixed support for the 2008/2009 recession as an explanation for the observed time trends in disability duration.

Key results from a CAS Workers' Compensation paper, Indemnity Benefit Duration, Maximum Weekly Benefits, and Claim Attributes³¹, indicated that an increase in the maximum weekly benefit leads to a lengthening of the average benefit duration in the group of affected claimants.

Table Development

The CIA and SOA used graduation methods on the Life Waiver tables. The CIA then applied two tests: i) comparing the observed mortality and recovery rates to the graduated values, and ii) comparing the liabilities generated by using the observed mortality and recovery rates, to the liabilities generated by using the graduated rates. The SOA tested the graduation by ensuring that the averages (across duration and age) of the graduated rates stayed relatively close to the averages observed in the raw data. There was a great desire to reflect the raw data to the extent the data were credible. The previous CIA Life Waiver study (1988–1994) used three-dimensional regression. The Workers' Compensation Board used Survival Analysis and the Cox Proportional Hazards model while the CAS Workers' Compensation paper used two partial linear regression models (generalized additive regression (GAM), quantile regression) and the "difference in differences" approach.

²⁹ (Fleck, Jennifer, and Correia, Paul; Milliman, March 2018)

³⁰ (McLeod, et al., July 2017)

³¹ (Schmid, 2011)

Appendix C: Liabilities

Average Liability Methodology

Liabilities were calculated on a per 1,000 basis, i.e., assuming a sum insured of \$1,000.

$$\$1,000 \times \sum v^{(n-k)} {}_{(n-k)}p_{x+k}^{(\tau)} q_{x+n}^{(d)}$$

Where

- Interest discount rate is 2% ($v = 1/1.02$)
- x = age at disability
- n = time from date of disability to end of benefit
- k = duration since date of disability with a maximum k value of duration at time of valuation
- $p^{(\tau)}$ = probability of surviving both decrements (withdrawal and death) between age $x+k$ and $x+n$
- $q^{(d)}$ = probability of dying between age $x+n$ and $x+n+1$

The overall average liability for each table was used for comparison purposes. The average liability is the weighting of the gender and region portfolio reserve per 1,000³² (see tables below) by exposure.

Waiver Liability per 1,000

The gender and region reserves per 1,000 weights the age group and duration reserves by the applicable exposures.

The average recovery rate and mortality rate (which would include the average CiD) are used in the gender and region reserves per 1,000.

Waiver Liability per \$1,000

Male – Rest of Canada

Duration of Disability	Age at Disability									All Ages
	under 25	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
at 4 months	33	46	62	82	104	123	142	159	151	123
at 6 months	38	52	67	89	111	132	150	166	154	131
at 12 months	51	68	83	108	132	152	167	173	144	145
at 24 months	76	101	115	142	166	180	183	166	101	156
at 36 months	137	176	187	212	228	228	209	164	64	183
at 60 months	195	219	232	248	252	235	200	130		197
at 120 months	245	258	264	261	244	205	131			200

³² The reserve per 1,000 is calculated on a portfolio basis. This means that all ages in an age band have the same reserve per 1,000 at each duration. For example, age band 60+ at duration 12 months has the same reserve per 1,000 for exact age 60, 61, 62, 63, and 64.

Female – Rest of Canada

Duration of Disability	Age at Disability									All Ages
	under 25	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
at 4 months	21	34	42	60	75	89	97	108	102	83
at 6 months	26	41	49	66	81	95	103	114	107	89
at 12 months	37	55	64	79	92	106	113	121	105	100
at 24 months	51	76	84	100	112	125	126	119	79	111
at 36 months	79	111	123	141	153	157	146	118	51	133
at 60 months	109	132	143	158	163	156	132	87		135
at 120 months	139	152	161	162	151	126	79			128

Male – Québec

Duration of Disability	Age at Disability									All Ages
	under 25	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
at 4 months	21	25	29	33	43	58	78	116	124	70
at 6 months	25	30	34	39	51	68	91	134	138	83
at 12 months	43	50	56	63	81	103	136	173	156	120
at 24 months	79	91	100	116	140	165	190	191	130	161
at 36 months	165	167	182	196	225	238	228	189	90	196
at 60 months	236	227	242	252	259	242	210	130		199
at 120 months	234	251	264	261	244	205	131			199

Female – Québec

Duration of Disability	Age at Disability									All Ages
	under 25	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
at 4 months	15	18	21	23	30	41	53	73	100	43
at 6 months	18	22	25	28	36	48	62	85	113	51
at 12 months	30	36	41	45	55	72	91	117	139	77
at 24 months	57	68	75	82	98	117	139	146	126	116
at 36 months	97	108	120	128	142	160	164	150	87	145
at 60 months	118	129	144	154	157	157	137	99		138
at 120 months	135	147	161	162	151	126	79			129

Appendix D: Experience Data Methodology

Methodology

Expected terminations, deaths, and recoveries were determined by applying the monthly exposure³³ by gender and age band to the corresponding mortality and recovery rates of the various published tables³⁴. The CiD adjustment was applied using the distribution of the exact CiD period from the LTD 2009–2015 study exposure data. The applicable CiD methodology was applied depending on the published logic of the CIA recovery tables being compared. Anybody working with these mortality and recovery rates should make an appropriate CiD adjustment for the liability being measured.

Actual 2009–2015 terminations, deaths and recoveries were compared to the expected terminations, deaths, and recoveries to determine the actual to expected ratio.

Average monthly rates are the rates from the various tables weighted by exposure. The rates are based on expected deaths or recoveries divided by exposure.

Observed rates are the rates from the various tables weighted by exposure. The rates are based on actual deaths or recoveries divided by exposure.

³³ Total exposure of Québec and Rest of Canada was applied to the Krieger and the SOA tables. Rest of Canada and Québec exposure was applied to the corresponding Canadian rates. Monthly exposure for each claimant is calculated for each duration a payment is made. The exposures are summed over all claims by duration and age band.

³⁴ Note that a modified version of the 2009–2015 LTD exposures was used for this study.

Appendix E: Improvement Factor Methodology

Annual improvement factors (increased recoveries or decreased deaths between studies) by age and duration are shown in the Excel file.

The formula for Mortality improvement is:

$$1 - (\text{Table 2 average rate} / \text{Table 1 average rate})^{(1 / (\text{Mid year of Table 2 study} - \text{midyear of Table 1 study}))}$$

The formula for Recovery improvement is:

$$(\text{Table 2 average rate} / \text{Table 1 average rate})^{(1 / (\text{Mid year of Table 2 study} - \text{midyear of Table 1 study}))} - 1$$

Appendix F: Diagnosis Coding³⁵

Most companies have coding systems based on the International Classification of Diseases, 9th Revision (ICD-9). Three companies use ICD-10. A few have proprietary schemes. One company provided only free-form text descriptions and was manually coded onto each record into the coding scheme.

For the purposes of this study, the following coding scheme, which is also based on ICD-9, was created.

Code	Description
A	Infectious and Parasitic Diseases
B	Neoplasms
C	Endocrine, Nutritional and Metabolic Diseases, and Immunity Disorders
D	Diseases of the Blood and Blood-Forming Organs
E	Mental Disorders
F	Diseases of the Nervous System and Sense Organs
G	Diseases of the Circulatory System
H	Diseases of the Respiratory System
I	Diseases of the Digestive System
J	Diseases of the Genitourinary System
K	Complications of Pregnancy, Childbirth, and the Puerperium
L	Diseases of the Skin and Subcutaneous Tissue
M	Diseases of the Musculoskeletal System and Connective Tissue
N	Congenital Anomalies
O	Certain Conditions Originating in the Perinatal Period
P	Symptoms, Signs, and Ill-Defined Conditions
Q	Injury and Poisoning
U	Unknown
X	No Data
Y	Unmappable

As is typical of claim records, there is often some ambiguity as to the exact cause of disability or the appropriate code to be used when the claimant suffers from several conditions. Where necessary, judgement was exercised. Normally, additional data from the actual claim file were not requested.

³⁵ (CIA Research Council – Experience Research Committee, May 2019)

Appendix G: Terminology

This section is adapted from the 2009–2015 CIA LTD Termination Study³⁶ and discusses several key terms used throughout this study.

A/E means *Actual to Expected* and normally refers to a ratio between the number of actual claim terminations, deaths, or recoveries and the number of expected terminations, deaths, or recoveries computed from a reference table applied to the exposure. The exposure and the reference table will have the same durations.

Any Occ and *Own Occ* refer to the definitions of disability being used in the LTD contract. *Own Occ* defines disability as the inability of the claimant to perform the essential duties of his *own* occupation while *Any Occ* defines disability as the inability of the claimant to perform the duties of *any* occupation for which the employee is qualified by training, education, or experience.

ASO means *Administrative Services Only*, referring to arrangements where insurance companies administer benefit programs but do not assume any financial liability for the benefits that are self-insured by the plan sponsor (employer).

Average monthly rates are the rates from the various tables weighted by exposure. These rates are based on the expected recoveries or deaths divided by exposure.

Change in Definition (CiD) refers to the provision in most LTD contracts that shifts the definition of disability from *Own Occ* to the more stringent *Any Occ* basis after an initial period of disability (usually two years). Thus, an individual may qualify for disability benefits for a certain period and then be ineligible for benefits even though there has been no change in the medical or vocational evidence.

Duration refers to the time period since disability. This is typically in months or years. The duration shown is the top of the unit range. For example, a policy at 10.3 months since disability is shown at duration 11 and a policy at 8.3 years is in duration 9.

Entire block: All of the data are included. Therefore, results are a weighted average of the exposures. This analysis would represent the impact on a block of claims assuming their distribution is similar to the study's exposure.

Exposure refers to claims which are active and thus "exposed" to a contingent termination event. In this study, exposure quantities are expressed in "life-years"³⁷ where a life-year represents a disability claim active for 12 months. Exposure is quantified as the number of claims (rather than amount of benefit). The quantum used in the computation of exposure may be months, years, or fractions thereof. To calculate expected terminations, deaths, or recoveries exposure is calculated monthly and then annually. This means that each policy that is active at the end of each monthly duration contributes an exposure of 1 to that duration.

³⁶ (CIA Research Council – Experience Research Committee, January 2019)

³⁷ Other disability termination studies have used "life-months" as a measure of exposure.

Improvement factors represent an increase in the average recovery rate or decrease in the average mortality rate between studies. Methodology is described in Appendix E.

Inception of a claim (assumed to be four months since disability): The event is measured from the beginning of the claim, after the assumed elimination period.

LTD means *long-term disability insurance*. In this study, it exclusively refers to coverage provided on a group basis.

Mortality refers to terminations that result from the death of the claimant. There is a subtle but important difference between the use in this study and elsewhere. In most actuarial studies, a mortality event in a period means the insured person has died in that period. That is not necessarily so in the case of LTD terminations. In contracts with survivor benefits, the claim will continue to be active for several months after the claimant has died. Thus, *mortality* should be interpreted to mean that the claim has met two conditions: it is terminated and the reason for termination is death (two separate and not necessarily contemporary events).

Observed rates are the rates from the various tables weighted by exposure. These rates are based on the actual deaths or recoveries divided by exposure.

Recovery is used in this study to refer to any termination that is not due to mortality or expiry of benefit period. While this includes the plain-language meaning (i.e., claimants have made a medical recovery from their injury or illness and have returned to work), *recovery* in this study also includes any situation where a claim was terminated by an insurance company other than for death. Notably, this includes changes in definition scenarios where the claimant no longer qualifies under a more stringent definition of disability. It would also include situations where claimants abandon a claim by not submitting required information, and situations where the insurance company determines that the evidence does not support the continued payment of benefits.

Rest of Canada means Canada excluding the province of Québec. Depending on context, it may or may not include the three northern territories.

Study database refers to the entire set of claims data that were accepted into the study. For various technical reasons, most analyses including construction of the termination tables used subsets of this database. Exclusions were negligible.

Termination refers to any contingent event that terminates an otherwise active claim. Thus, a claim that ends due to the attainment of a maximum benefit period (e.g., age 65 or the end of a five-year term) is not a termination. In this study, *termination* is used to include both mortality and recovery (see above).

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