Canadian Institute of Actuaries

Institut canadien des actuaires

Canadian Individual Life Experience Updated to Policy Year 2021-2022

June 2024

1 Executive summary

This is the 73rd annual report of the intercompany mortality experience for Canadian individual life insurance policies. The study adds the one-year period beginning with the policy anniversary in 2021 on an age-nearest-birthday basis for data submitted by seven companies and focuses on the most recent five policy years. Approximately 70% of Canadian individual life insurance is covered by this study. This report primarily presents the experience of individual life insurance policies and riders issued in Canada that require full underwriting. However, other individual life insurance segments are also analyzed. More information about the data can be found in Appendix 1.

The most significant observation from the study is that the overall actual-to-expected (A/E) ratio by amount for the most recent policy year has increased for the second year in a row to 95.9%, up slightly from that of the previous year at 95.4%. The overall A/E for the most recent five policy years is 92.9%, which is 0.6% higher than the A/E for 2016-2021. It is likely that the excess mortality due to COVID-19 is the main contributor to the increase in A/E, but there may be other factors as well. Note that the excess mortality calculation from the prior study has been removed, but one can refer to Chart 1 for recent mortality trends.

This report continues to affirm that the A/E ratios decrease with increasing policy size. This fact is certainly the most significant one not currently reflected in published mortality tables. The decrease in A/E is strongest and most consistent for non-smokers. There are some factors that mitigate the effect somewhat for smokers, and these are discussed in section 4.2.

The report also confirms the expectation that A/E ratios would be significantly higher for renewal periods of renewable term insurance than for the initial period. Except for policies with face amount of under $100K, the A/E ratio for renewal periods is consistently more than 50% higher than for the first period.

One notable finding is that the A/E ratio for whole life par policies is consistently lower than for whole life non-par policies.

The analysis of preferred, residual and non-preferred experience has been clarified by removing some heterogeneity in the comparisons and by correcting some data errors that were recently uncovered. The A/E ratio by amount for preferred over the last five policy years is shown to be 75% of the A/E ratio for residual for males and 81% for females.

The report includes analyses of substandard, converted and Simplified Issue policies for which mortality is expected to be much higher than for the standard segment. It is generally thought that A/E ratios for these segments would converge toward standard at high durations. Although the A/E ratios do trend downward with duration, the difference from standard remains considerable throughout with the possible exception of males over age 90 and durations over 20.

One overall feature of this study is that, in spite of its large exposure, it can show significant variations by year of experience and by other categories, such as age grouping. To mitigate this effect, this report focuses on the latest five policy years, as opposed to previous reports, which focused on the latest policy year. The publication of this annual study remains important because individual companies will have even more volatility in their own data.

Actuaries are encouraged to dig deeper with independent study. Section 7 describes the tools that are made available for that work.

2 Table of contents

3 Introduction

3.1 Overview

This is the 73rd annual report of the intercompany mortality experience for Canadian individual life insurance policies.

In the past, this study has focused primarily on the most recent policy year of experience, with additional comments on the last five policy years. This year, to mitigate the effect of year-to-year fluctuations, the focus is primarily on the last five policy years. Often the trend over the last 10 policy years is also shown. More detailed information on the last five policy years is available in a supplementary Excel workbook. As in the past, databases in comma-separated format are published for each policy year since 2009-2010. See Section 7 for more information.

The most recent policy year included in this study is the one-year period of experience beginning with the policy anniversary in 2021 and ending a day before the next anniversary. Age is presented on an age-nearest-birthday basis. When age last birthday was used and a date of birth was provided, age nearest birthday is calculated. Other data submitted on an age-last-birthday basis are split, with half going to the specified age and half to the next age for both exposures and deaths.

Most tables and charts in this study show experience for standard individual life insurance policies and riders issued in Canada that required full underwriting and prior to the first renewal in the case of renewable term policies. This group of records is referred to as "the standard segment" and sometimes simply as "standard." Unless stated otherwise, experience in this report is for the standard segment only. For clarity, the standard segment excludes policies or riders that are:

Joint

- Arising from a conversion
- Substandard with a multiplicative rating
- Simplified Issue
- Guaranteed Issue
- Renewable term after the first renewal
- For attained ages over 100[1]

This report includes an analysis of experience for all excluded segments except joint and Guaranteed Issue.

The data submitted include the standard segment and all the above-listed segments. Records are not accepted for other types of insurance, such as non-life insurance, substandard with a flat extra, policies arising from the election of a guaranteed insurability option, joint policies involving more than two lives and all forms of group insurance.

One should exercise caution in interpreting the tables and charts in this report, particularly when the amount of exposure is relatively small. Differences in actual-to-expected (A/E) ratios and other items shown may be due to differences in demographics or mix of business rather than actual differences in mortality.

Records were submitted by seven companies, the same as last year. There was a total of 11.1 million records submitted for the 2021-2022 policy year, with a total face amount of $2.4 trillion. For more details regarding the data, see Appendix 1. Included in the total was $0.22 trillion of insurance on new issues of 2021. By way of comparison, the Canadian Life and Health Insurance Association (CLHIA) factbook reported $3.4 trillion as in force in 2021, and Life Insurance Marketing and Research Association (LIMRA) reported $0.30 trillion of new business in 2021. CLHIA and LIMRA figures incorporate almost all of the individual life insurance industry in-force and new business volumes in Canada.

[1] See the 2019 report, rp221113, Section 4.9, for more detail on experience at older ages. The analysis is not repeated in this report, but the conclusions are the same: raw mortality rates over age 100 appear to be severely understated. The observed experience from the current year is shown in Appendix 2.

Table 1 shows the quantity of data, both exposure and deaths, included in the standard segment of this study in each of the last six policy years and for the five policy years in each of the periods 2017-2022 and 2016-2021. There were eight contributing companies for the two policy years 2017-2019, and seven for the other years. The table also shows A/E ratios on CIA2014 and the associated standard deviations.

Table 1. Summary of experience for the standard segment by policy year. Expected mortality on CIA2014

Policy year	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
2016-2017	101.9%	93.5%	0.4%	1.7%	8,218.8	1,433,796	66,880	2,769,896
2017-2018	102.8%	96.2%	0.4%	1.7%	8,772.4	1,665,759	70,862	3,311,676
2018-2019	98.9%	88.3%	0.3%	1.6%	8,966.2	1,758,496	70,495	3,306,991
2019-2020	98.9%	88.2%	0.3%	1.6%	8,502.4	1,643,703	71,635	3,268,732
2020-2021	100.9%	95.4%	0.3%	1.7%	8,449.3	1,710,594	74,801	3,791,543
2021-2022	101.0%	95.9%	0.3%	1.7%	8,429.6	1,800,579	76,261	4,061,211
2016-2021	100.6%	92.3%	0.2%	0.7%	42,909.1	8,212,348	354,672	16,448,838
2017-2022	100.5%	92.9%	0.2%	0.7%	43,119.9	8,579,130	364,053	17,740,153

The numbers for the previous studies have changed because of corrections in the data for prior years. More detail on the method can be found in Appendix 1.

3.2 Contributing companies

Table 2. Contributing companies

Company	Exposure %, by amount	
	2020-2021	2021-2022
Canada Life	23.7%	22.2%
Desjardins	5.8%	6.0%
Equitable Life	6.8%	6.8%
Industrial Alliance	14.7%	15.8%
Manulife	23.1%	22.7%
RBC Life	7.4%	8.2%
Sun Life	18.5%	18.4%
Total	100.0%	100.0%

Table 2 lists the companies contributing to the current and previous studies. The percentages shown are the proportion of the total exposure that was submitted by each company, calculated by amount.

On behalf of the CIA, we thank these companies for their willingness to contribute, the effort expended and their care to maintain the quality of the study.

Of course, not all companies have the same experience. For the policy year 2021-2022, the A/E ratios on CIA2014 by company were between 95% and 105% of the aggregate A/E for three of seven companies. Last year, four of seven companies were within 5%.

4 Experience for the standard segment

4.1 Overall

Table 3 shows the overall experience for the standard segment for the last five policy years combined. This table comprises three sections: select experience by policy year, select experience by issue age and ultimate experience

by attained age. The first two sections cover the same experience but group the data differently. Note that, throughout this report, the select period is taken as the first 20 policy years[2] from issue. A/E ratios are shown for both CIA2014 and CIA9704. Standard deviations are calculated on CIA2014 only; if calculated on CIA9704, they would be proportionately smaller because of the A/E ratios being smaller on CIA9704. Tables 4 and 5 present the same data as Table 3, but split between females in Table 4 and males in Table 5.

Overall A/E ratios are virtually unchanged for policy years 2017-2022 compared to policy years 2016-2021. The overall ratios of policy years 2017-2022 are 100.5% for policies and 92.9% for face amount, compared to 100.6% and 92.3% for 2016-2021. The details are shown in Table 3. One would normally expect a decrease in the A/E between adjacent five-year periods of 1-2% due to mortality improvement. The fact that there is essentially no change in A/E by policies and a small increase by amount is a significant finding.

[2] The select period was set at 20 years because CIA2014 is a 20-year select table. For expected on CIA9704, the mortality rates for policy years 16-20 were taken from the ultimate of that table.

Table 3. Experience for all lives in the standard segment, policy years 2017-2022										
	CIA2014				CIA9704		Exposure		Deaths	
	A/E		Std dev		A/E					
	Pols	Amt	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Select by policy year										
1st	115.5%	78.7%	4.1%	11.3%	84.2%	56.2%	1,659.8	752,949	635	168,462
2nd	129.2%	94.6%	3.6%	9.9%	75.1%	57.1%	1,622.4	713,706	921	252,682
3rd	124.3%	103.0%	3.2%	9.1%	73.8%	63.7%	1,572.0	679,259	1,088	329,130
4th	117.3%	82.6%	3.0%	8.6%	71.3%	52.3%	1,514.5	636,932	1,207	296,743
5th	111.2%	86.4%	2.8%	7.7%	68.5%	55.3%	1,471.4	599,271	1,318	345,244
6-10th	107.1%	87.8%	1.0%	2.8%	67.2%	56.3%	6,722.3	2,419,970	9,265	2,184,152
11-15th	106.5%	84.0%	1.0%	3.2%	69.8%	55.0%	4,416.2	1,041,491	10,284	1,491,851
16-20th	108.6%	94.2%	0.7%	2.5%	74.7%	62.3%	3,906.4	598,669	17,851	1,960,309
Subtotal	108.9%	88.9%	0.5%	1.5%	71.5%	57.6%	22,885.0	7,442,247	42,569	7,028,574
Select by issue age										
0-9	117.1%	89.1%	5.0%	17.4%	84.8%	61.7%	2,608.7	280,706	441	31,109
10-19	109.6%	113.9%	4.6%	18.2%	92.7%	94.4%	1,281.0	201,039	486	70,788
20-29	104.8%	98.1%	2.6%	5.9%	74.0%	65.9%	3,772.7	1,055,034	1,484	321,513
30-39	99.2%	88.8%	1.5%	2.8%	69.9%	61.8%	6,378.8	2,795,721	4,018	1,237,979
40-49	101.4%	88.9%	1.1%	2.8%	65.6%	58.8%	4,931.7	2,073,325	7,394	1,906,460
50-59	107.7%	81.6%	1.0%	3.3%	63.5%	48.1%	2,763.4	836,256	10,715	1,570,499
60-69	114.8%	93.6%	1.0%	4.2%	76.5%	57.9%	989.1	176,431	11,507	1,127,058
70-79	114.1%	89.6%	1.3%	6.7%	83.6%	64.2%	150.1	22,483	5,597	635,199
80-100	144.7%	125.3%	3.6%	11.3%	113.2%	96.4%	9.4	1,252	929	127,968
Subtotal	108.9%	88.9%	0.5%	1.5%	71.5%	57.6%	22,885.0	7,442,247	42,569	7,028,574
Ultimate by attained age										
20-29	113.8%	111.7%	4.1%	8.5%	101.5%	95.5%	1,170.0	62,704	620	30,857
30-39	122.2%	114.7%	2.8%	7.2%	116.8%	108.0%	1,743.3	80,446	1,472	60,521
40-49	117.8%	106.2%	1.9%	4.9%	113.1%	97.1%	2,171.0	116,535	3,152	141,586
50-59	106.7%	91.2%	0.9%	2.1%	84.5%	72.1%	4,038.0	301,506	11,683	682,478
60-69	101.1%	92.4%	0.5%	1.4%	67.6%	60.5%	5,077.6	338,762	35,732	1,914,996
70-79	101.3%	92.7%	0.4%	1.2%	77.1%	65.4%	3,676.5	166,602	73,220	2,639,340
80-89	101.1%	99.7%	0.3%	1.4%	92.5%	86.2%	1,868.9	58,548	119,570	3,404,634
90-100	92.9%	96.9%	0.3%	1.6%	78.3%	79.6%	489.7	11,781	76,036	1,837,168
Subtotal	99.5%	95.7%	0.2%	0.7%	81.9%	73.2%	20,235.0	1,136,883	321,484	10,711,579
Total	100.5%	92.9%	0.2%	0.7%	80.5%	66.1%	43,119.9	8,579,130	364,053	17,740,153

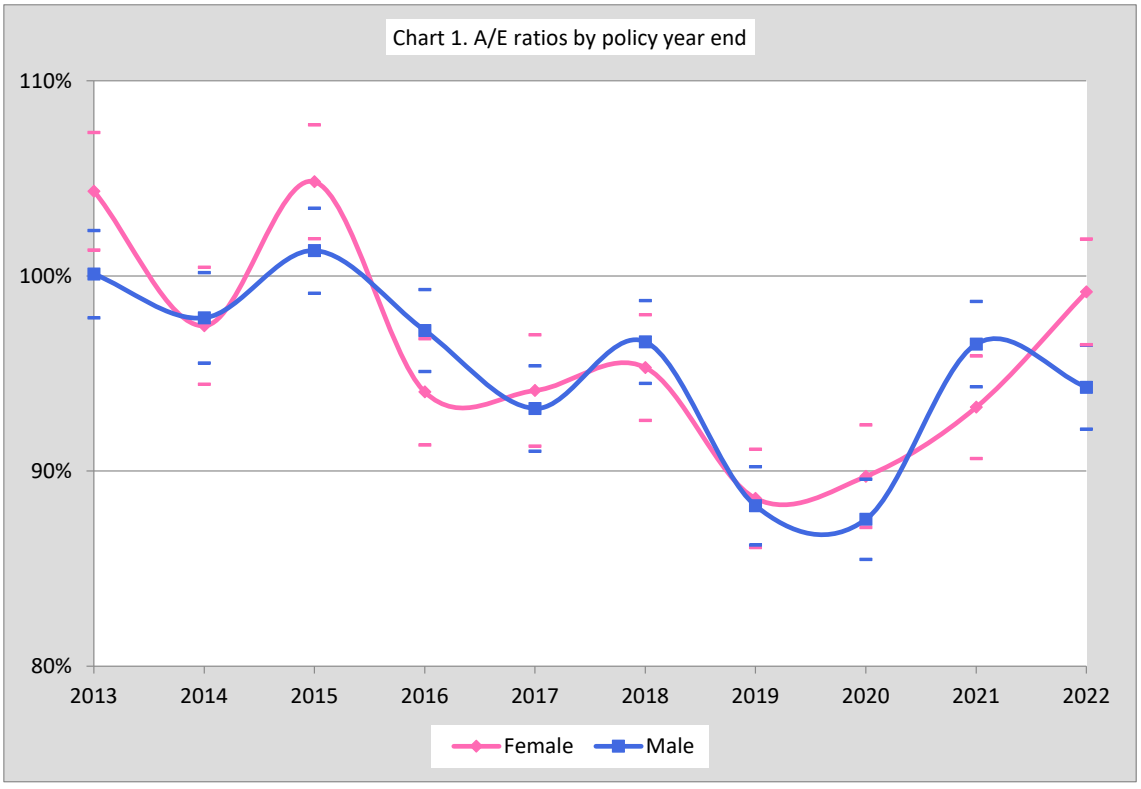
Table 4. Experience for all females in the standard segment, policy years 2017-2022										
	CIA2014				CIA9704		Exposure		Deaths	
	A/E		Std dev		A/E					
	Pols	Amt	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Select by policy year										
1st	123.3%	105.4%	7.4%	20.0%	86.5%	71.3%	796.9	315,456	209	51,091
2nd	124.2%	83.4%	6.2%	16.1%	64.3%	44.8%	782.6	300,619	306	59,239
3rd	130.4%	87.0%	5.4%	14.1%	71.7%	50.5%	762.3	287,152	422	80,571
4th	111.3%	76.2%	4.8%	13.8%	64.8%	46.8%	737.5	271,494	445	85,002
5th	106.5%	111.9%	4.4%	12.5%	64.2%	70.9%	717.3	255,583	506	143,398
6-10th	105.1%	82.0%	1.6%	4.3%	66.4%	53.1%	3,308.1	1,023,736	3,778	672,706
11-15th	105.7%	88.2%	1.4%	4.7%	71.2%	59.4%	2,275.2	466,758	4,814	618,897
16-20th	106.8%	97.0%	1.0%	3.5%	77.8%	68.6%	2,008.8	257,961	8,792	831,109
Subtotal	107.1%	89.8%	0.7%	2.3%	72.7%	59.6%	11,388.8	3,178,758	19,272	2,542,013
Select by issue age										
0-9	132.3%	103.4%	8.9%	33.0%	89.1%	65.6%	1,286.4	141,327	161	12,295
10-19	100.8%	111.7%	8.4%	31.6%	93.6%	103.1%	618.9	98,177	135	21,042
20-29	102.8%	94.6%	4.0%	7.8%	78.7%	69.9%	2,027.4	541,231	600	115,392
30-39	97.1%	85.6%	2.4%	4.0%	70.1%	61.9%	3,187.0	1,232,828	1,629	413,878
40-49	100.4%	94.6%	1.7%	4.6%	65.1%	62.1%	2,342.2	793,657	3,089	645,917
50-59	107.4%	84.6%	1.5%	5.2%	64.5%	48.5%	1,312.9	289,273	4,590	478,802
60-69	112.3%	88.3%	1.4%	5.7%	78.9%	57.2%	517.3	68,114	5,380	404,086
70-79	108.9%	88.0%	1.7%	7.7%	81.8%	64.6%	90.8	13,150	3,190	357,277
80-100	120.9%	112.2%	4.5%	12.6%	94.5%	86.7%	5.8	1,001	501	93,325
Subtotal	107.1%	89.8%	0.7%	2.3%	72.7%	59.6%	11,388.8	3,178,758	19,272	2,542,013
Ultimate by attained age										
20-29	101.8%	102.5%	7.8%	15.5%	92.7%	90.7%	579.9	31,940	162	8,710
30-39	106.3%	99.8%	4.8%	11.4%	111.6%	103.1%	853.1	39,702	454	18,892
40-49	101.5%	93.1%	2.9%	7.6%	99.6%	87.5%	1,077.8	57,048	1,149	51,987
50-59	100.6%	90.1%	1.4%	3.2%	78.7%	70.5%	1,991.2	131,057	4,801	253,613
60-69	97.4%	91.9%	0.8%	2.0%	66.1%	61.0%	2,338.0	123,637	13,628	566,879
70-79	101.0%	93.3%	0.6%	1.9%	86.0%	73.7%	1,591.0	53,189	26,110	664,601
80-89	100.4%	102.0%	0.4%	2.5%	101.6%	96.9%	814.2	19,954	44,494	983,000
90-100	94.9%	98.2%	0.5%	2.3%	84.7%	85.7%	248.5	5,148	35,304	721,804
Subtotal	98.7%	96.4%	0.3%	1.1%	87.4%	79.1%	9,493.6	461,677	126,100	3,269,486
Total	99.7%	93.4%	0.2%	1.2%	85.1%	69.2%	20,882.4	3,640,435	145,372	5,811,499

Table 5. Experience for all males in the standard segment, policy years 2017-2022										
	CIA2014				CIA9704		Exposure		Deaths	
	A/E		Std dev		A/E					
	Pols	Amt	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Select by policy year										
1st	112.1%	70.8%	4.9%	13.4%	83.1%	51.4%	862.9	437,493	426	117,371
2nd	131.9%	98.6%	4.4%	12.2%	82.0%	62.3%	839.8	413,087	615	193,443
3rd	120.8%	109.5%	4.1%	11.4%	75.2%	69.6%	809.7	392,107	666	248,559
4th	121.1%	85.5%	3.8%	10.9%	75.8%	54.9%	777.0	365,439	762	211,742
5th	114.3%	74.4%	3.6%	9.7%	71.5%	47.8%	754.1	343,688	812	201,846
6-10th	108.5%	90.7%	1.3%	3.5%	67.8%	57.8%	3,414.1	1,396,234	5,487	1,511,446
11-15th	107.2%	81.3%	1.3%	4.3%	68.6%	52.2%	2,141.0	574,734	5,470	872,954
16-20th	110.5%	92.2%	1.0%	3.5%	71.8%	58.3%	1,897.6	340,708	9,059	1,129,200
Subtotal	110.4%	88.4%	0.7%	2.0%	70.6%	56.6%	11,496.2	4,263,489	23,297	4,486,561
Select by issue age										
0-9	109.9%	81.7%	6.0%	20.2%	82.6%	59.4%	1,322.3	139,379	280	18,813
10-19	113.4%	114.9%	5.5%	22.1%	92.3%	91.2%	662.1	102,862	351	49,746
20-29	106.3%	100.3%	3.3%	8.1%	71.1%	63.8%	1,745.3	513,804	885	206,122
30-39	100.7%	90.5%	2.0%	3.7%	69.8%	61.7%	3,191.8	1,562,893	2,389	824,100
40-49	102.2%	86.2%	1.5%	3.5%	65.9%	57.3%	2,589.5	1,279,668	4,306	1,260,543
50-59	107.9%	80.3%	1.3%	4.2%	62.8%	47.9%	1,450.5	546,983	6,125	1,091,698
60-69	117.1%	96.9%	1.3%	5.9%	74.5%	58.3%	471.9	108,318	6,127	722,973
70-79	121.8%	91.7%	2.1%	11.9%	86.2%	63.7%	59.3	9,332	2,407	277,922
80-100	188.1%	182.8%	6.1%	25.2%	147.2%	138.4%	3.5	251	429	34,643
Subtotal	110.4%	88.4%	0.7%	2.0%	70.6%	56.6%	11,496.2	4,263,489	23,297	4,486,561
Ultimate by attained age										
20-29	118.8%	115.8%	4.9%	10.1%	105.1%	97.5%	590.1	30,764	458	22,147
30-39	130.9%	123.0%	3.4%	9.3%	119.3%	110.4%	890.2	40,744	1,018	41,630
40-49	129.7%	115.7%	2.5%	6.4%	122.6%	103.7%	1,093.2	59,487	2,004	89,599
50-59	111.4%	91.8%	1.2%	2.8%	89.1%	73.1%	2,046.9	170,448	6,882	428,866
60-69	103.4%	92.7%	0.7%	1.8%	68.6%	60.2%	2,739.6	215,124	22,105	1,348,116
70-79	101.4%	92.5%	0.4%	1.5%	72.9%	63.0%	2,085.5	113,413	47,110	1,974,739
80-89	101.5%	98.8%	0.3%	1.6%	87.8%	82.5%	1,054.7	38,593	75,076	2,421,633
90-100	91.3%	96.1%	0.4%	2.1%	73.5%	76.0%	241.2	6,633	40,732	1,115,363
Subtotal	100.0%	95.4%	0.2%	0.8%	78.7%	70.8%	10,741.4	675,206	195,384	7,442,094
Total	101.0%	92.7%	0.2%	0.9%	77.7%	64.7%	22,237.6	4,938,695	218,681	11,928,655

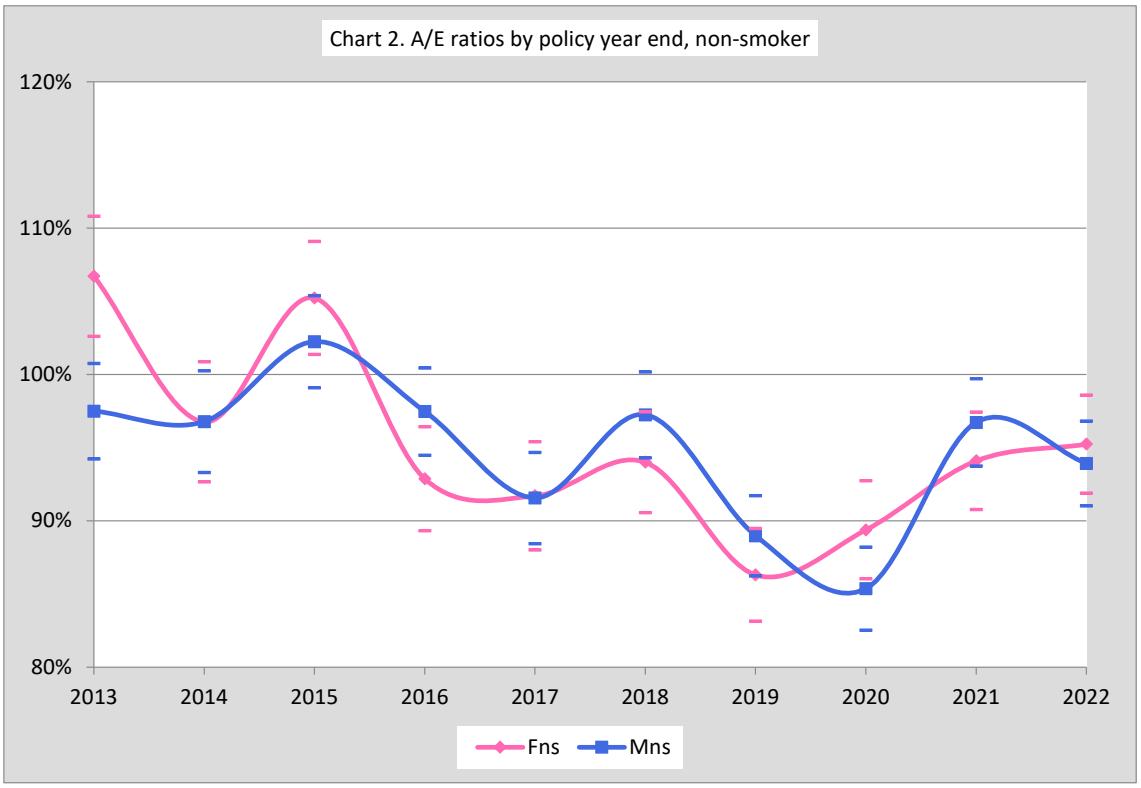
Tables that follow in this report show A/E ratios on CIA2014 only, and not on CIA9704. However, all tables in the Excel workbook supplementary to this study calculate A/E on both mortality tables.

The next three charts show A/E ratios for each of the last 10 policy years for females (in pink) and males (in blue). The pink and blue tick marks above and below the A/E lines represent one standard deviation above and below the mean. The years shown on the horizontal axis are the years in which the policy year ends (also called year of experience).

Chart 1 shows A/E ratio by amount for females and males, all smoking classes. Chart 2 shows non-smokers, and Chart 3 shows smokers.



Note that there is a definite upswing in A/E ratios for the last two years. It is likely that the increase in mortality relates to the pandemic. It is also important to note the variability from one year to the next. One might expect a fairly smooth progression due to overall mortality improvement, but it is clear that other unidentified factors besides mortality improvement and statistical fluctuation are involved.



It is not surprising that Chart 2 looks very similar to Chart 1 because 89% of the exposure by amount is for non-smokers.

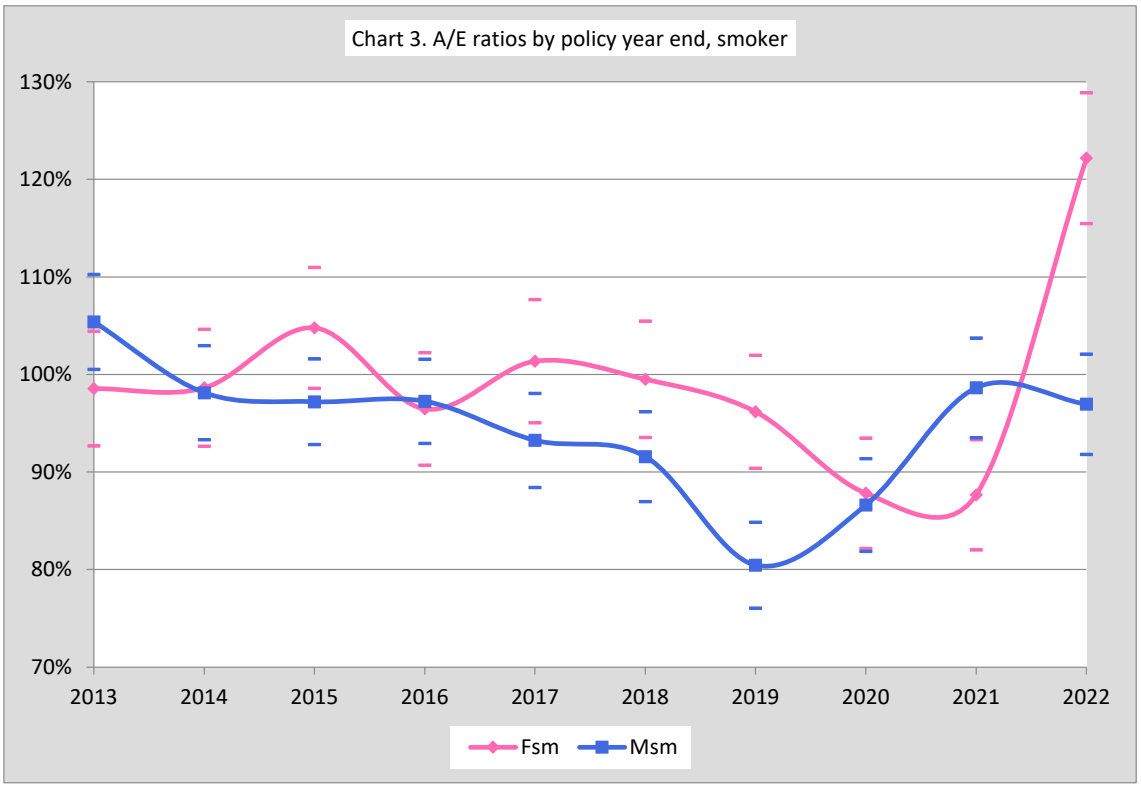


Chart 3 shows some similarity to the earlier charts, but the downward slope in the early years is less steep. Smokers represent 6.6% of the standard segment. The high value of A/E in 2021-2022 for female smokers results primarily from a single death claim for almost $60 million.

4.2 Distinguishing by size

Table 6 shows the experience for eight size bands of face amount, separately for females and males. Note that each band is closed-open; that is, it begins with the first specified amount and ends at less than the second specified amount. Size bands are determined by the total face amount for the coverages in a policy issued on the same date and to the same life. For example, if the base plan was for $80K, and a rider was for $200K, then both records would be assigned to the $250K-500K band.

The findings in this table are particularly significant. There is a strong downward trend in A/E ratios with increasing size, except for the first band.

Table 6. Summary of experience by sex and size, policy years 2017-2022. Expected mortality on CIA2014								
Size band	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Female								
0-10K	94.1%	102.0%	0.4%	0.5%	1,726.9	6,505	49,350	181,649
10K-50K	106.5%	105.1%	0.4%	0.4%	5,933.3	137,186	67,894	1,265,909
50K-100K	97.8%	97.3%	0.8%	0.8%	3,665.5	211,360	13,403	759,504
100K-250K	94.6%	94.3%	0.9%	0.9%	4,958.3	680,172	10,750	1,359,335
250K-500K	90.1%	89.7%	1.8%	1.8%	2,426.6	765,030	2,463	741,475
500K-1M	82.5%	81.7%	2.7%	2.7%	1,587.1	932,244	1,033	592,817
1M-2M	82.8%	81.0%	4.5%	4.6%	482.5	542,306	361	402,065
2M+	79.3%	89.0%	7.7%	11.2%	102.2	365,633	119	508,745
All	99.7%	93.4%	0.2%	1.2%	20,882.4	3,640,435	145,372	5,811,499
Male								
0-10K	94.5%	102.3%	0.3%	0.4%	1,886.7	7,965	66,966	292,031
10K-50K	108.2%	107.2%	0.3%	0.4%	5,894.4	136,612	96,422	1,971,016
50K-100K	101.8%	100.7%	0.6%	0.6%	3,607.8	213,054	25,730	1,519,772
100K-250K	97.2%	96.4%	0.7%	0.7%	5,152.4	699,885	20,527	2,599,630
250K-500K	92.4%	92.1%	1.3%	1.3%	2,588.5	810,017	5,017	1,515,519
500K-1M	88.6%	88.8%	1.8%	1.8%	1,956.1	1,143,400	2,572	1,488,272
1M-2M	82.5%	82.0%	2.6%	2.7%	880.9	988,244	1,086	1,224,063
2M+	76.9%	76.2%	4.4%	6.2%	270.9	939,518	362	1,318,351
All	101.0%	92.7%	0.2%	0.9%	22,237.6	4,938,695	218,681	11,928,655

Chart 4 displays the same data in graphical form for A/E by amount only. Note the steepness of the decline in A/E with increasing size.

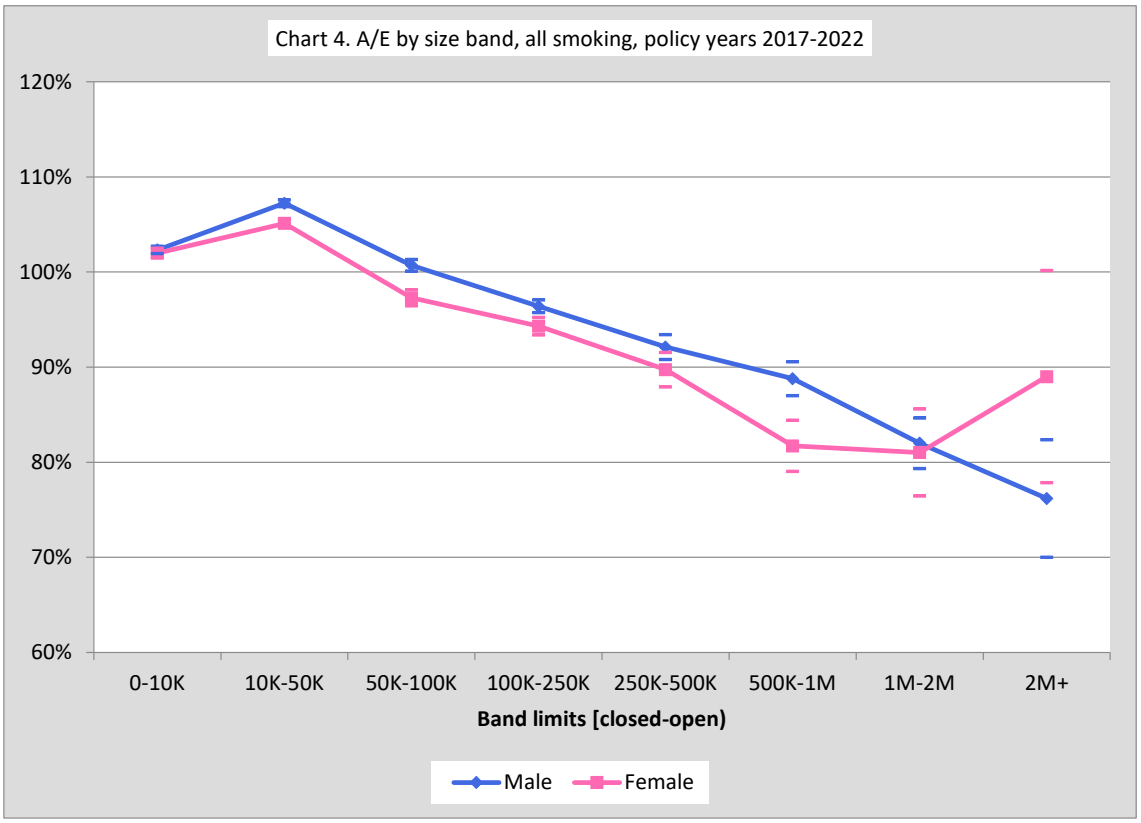


Chart 5 shows similar data, but for non-smokers only, and Chart 6 for smokers only.

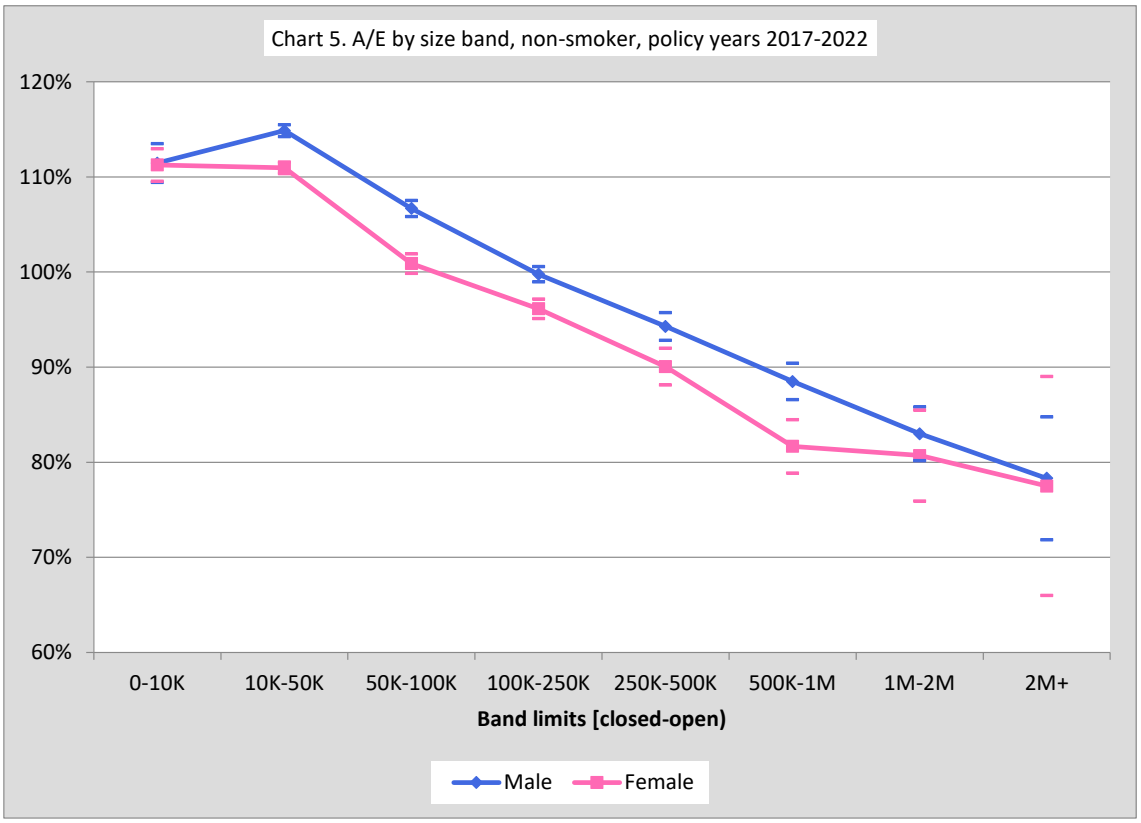
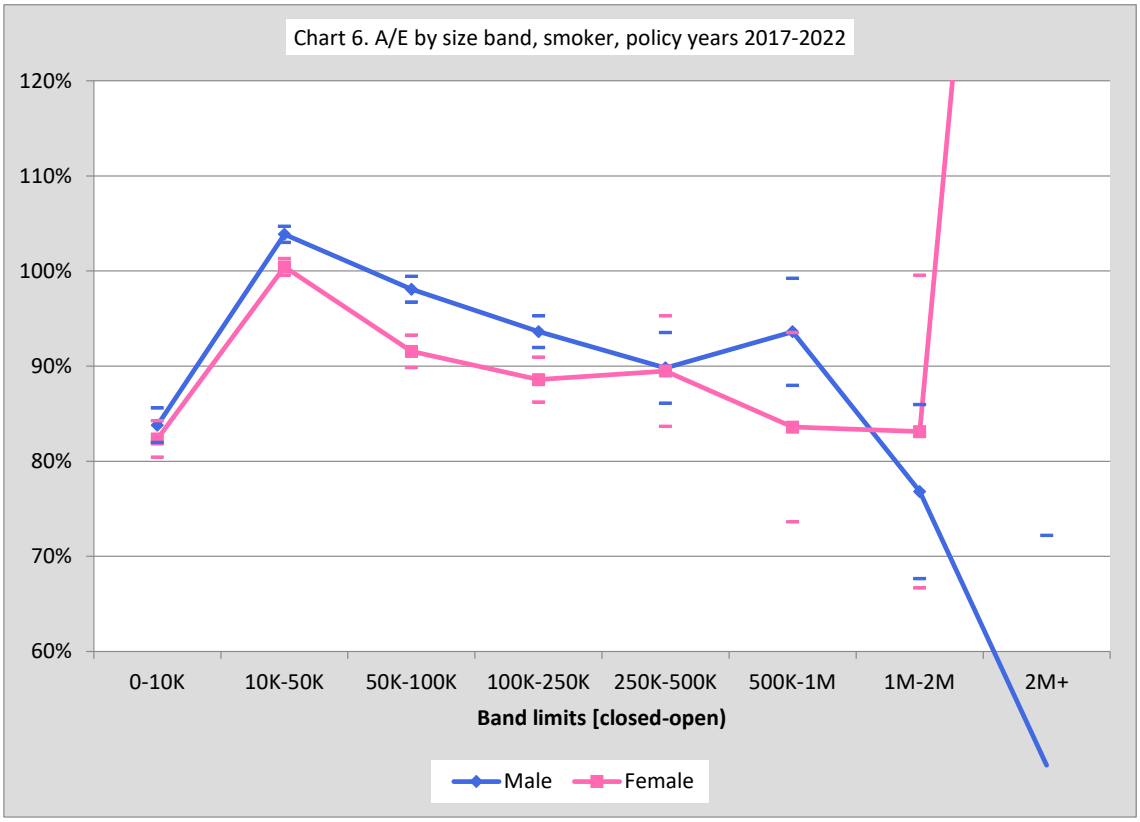


Chart 5. A/E by size band, non-smoker, policy years 2017-2022
120%
110%
100%
90%
80%
70%
60%
0-10K
10K-50K
50K-100K
100K-250K
250K-500K
500K-1M
1M-2M
2M+
Band limits [closed-open)
Male
Female



The A/E ratio for the highest band is 226% for females, driven principally by a single death claim in 2021-2022 for almost $60 million. The A/E for males in that band is 48%. The A/E ratios by policy are 111% and 54% for females and males, respectively; there were only 13 and 19 deaths in the five policy years for females and males, respectively.

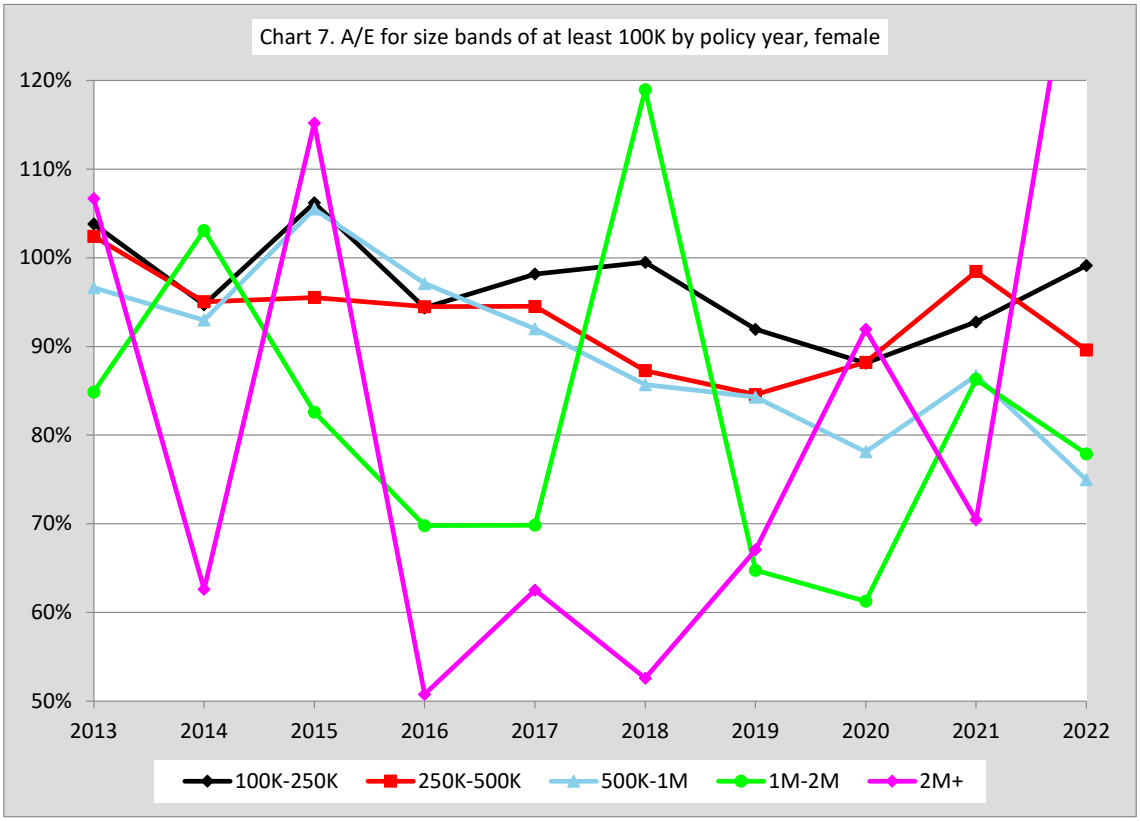
Three things are immediately evident in comparing the charts for smokers and non-smokers. The standard deviations are much larger for smokers because there is less than one-tenth as much exposure for smokers as for non-smokers. The downward slope of the chart is less steep for smokers than for non-smokers, suggesting that the impact of size on mortality is less strong for smokers. The A/E ratio for band 1 (amounts under $10K) is much lower relative to band 2 ($10K-50K) for smokers than for non-smokers.

This last fact is surprising. It warrants further investigation. The explanation likely lies in the ratio of smoker to non-smoker exposure in each size band. Those ratios are 62%, 46%, 30% and 14% for the first four size bands, respectively. The ratios are all under 10% for the remaining bands. Recall that the smoking class is normally determined at issue, although some companies allow a subsequent change from smoker to non-smoker with an acceptable declaration. All exposure under attained age 16 is considered “smoking unknown.” Although it cannot be proven from the data, it is likely that there are current non-smokers (former smokers) in the smoker class, and the proportion of current non-smokers in the smoker class decreases as size increases. A recent estimate of smoking prevalence among Canadians aged 15 and older is 12%.[3] Accordingly, the smoker proportions for at least the first three bands seem unlikely to represent the current state. If the proportion of current non-smokers in the smoking class decreases with increasing size band, that would explain why the slopes of the above charts are less steep for the smoker class than the non-smoker.

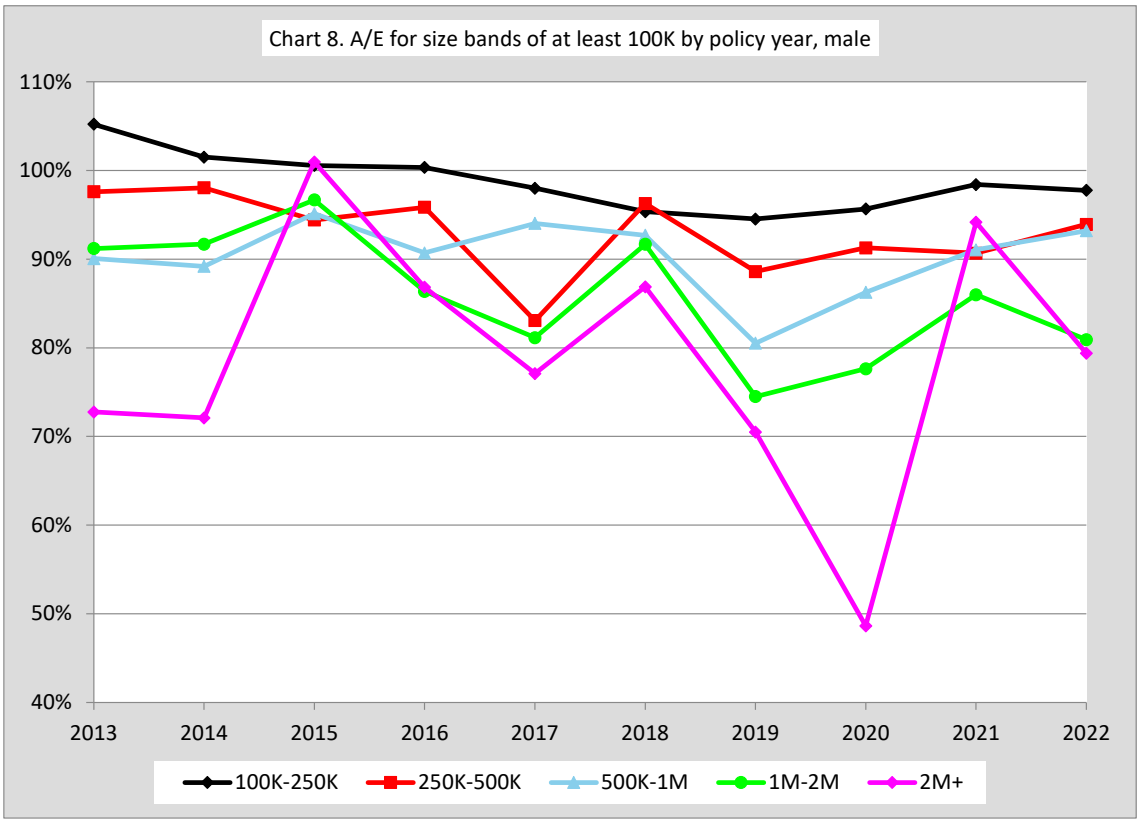
[3] According to “Smoking in Canada: What we know,” accessed December 29, 2023.

Just as there are variations in experience year-to-year, there are also variations within each size band year-to-year, and the variations tend to increase with increasing size.

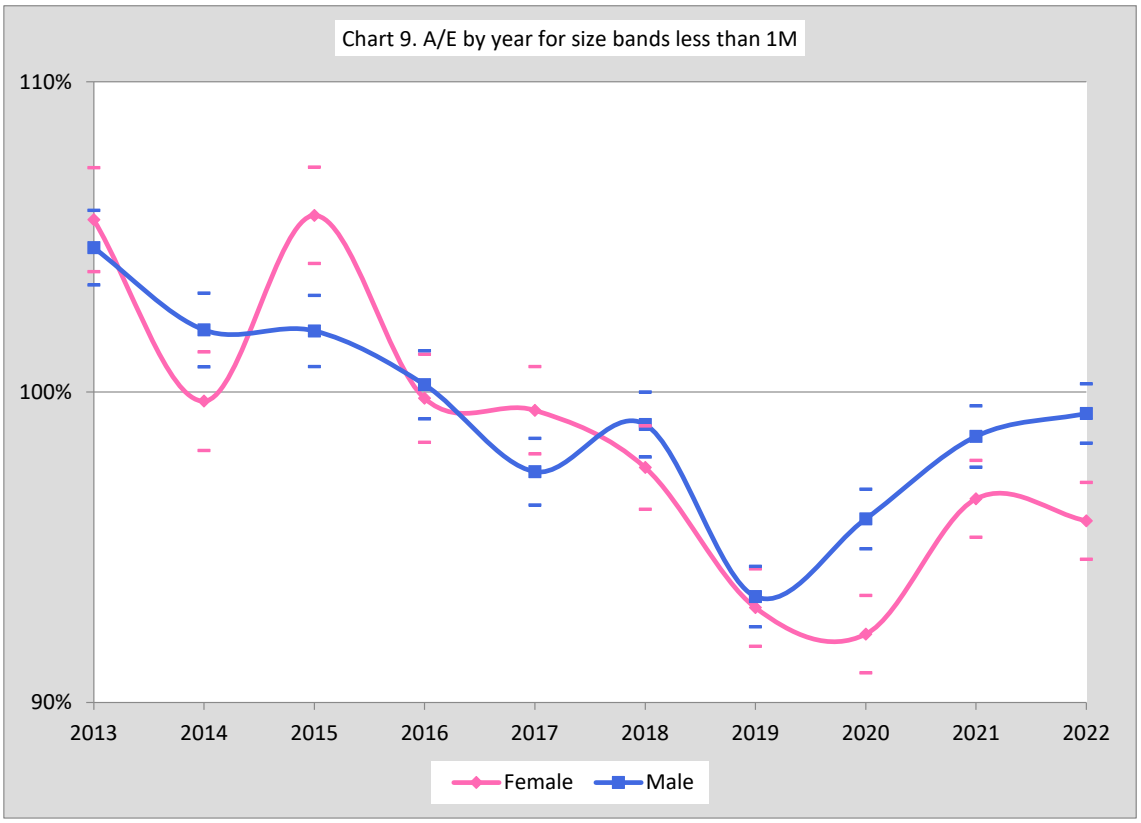
Charts 7 and 8 show the A/E ratios by amount for each of the top five size bands by policy year, for females and males, respectively. The increase in volatility with increase is size is immediately apparent.



The A/E ratio for females in the 2021-2022 policy year for the highest size band is more than 600% primarily because of one very large death claim.



The A/E ratios for size bands 7 and 8 vary so much year-to-year that the variability in these bands can mask the overall trend in A/E ratios. Accordingly, we get a better view of the trend in A/E ratios by omitting these two bands. That is shown in Chart 9. This chart is comparable to Chart 1 but is a little less volatile. The reverse of the downward trend during the last three years is much more evident.



4.3 *Distinguishing by preferred underwriting*

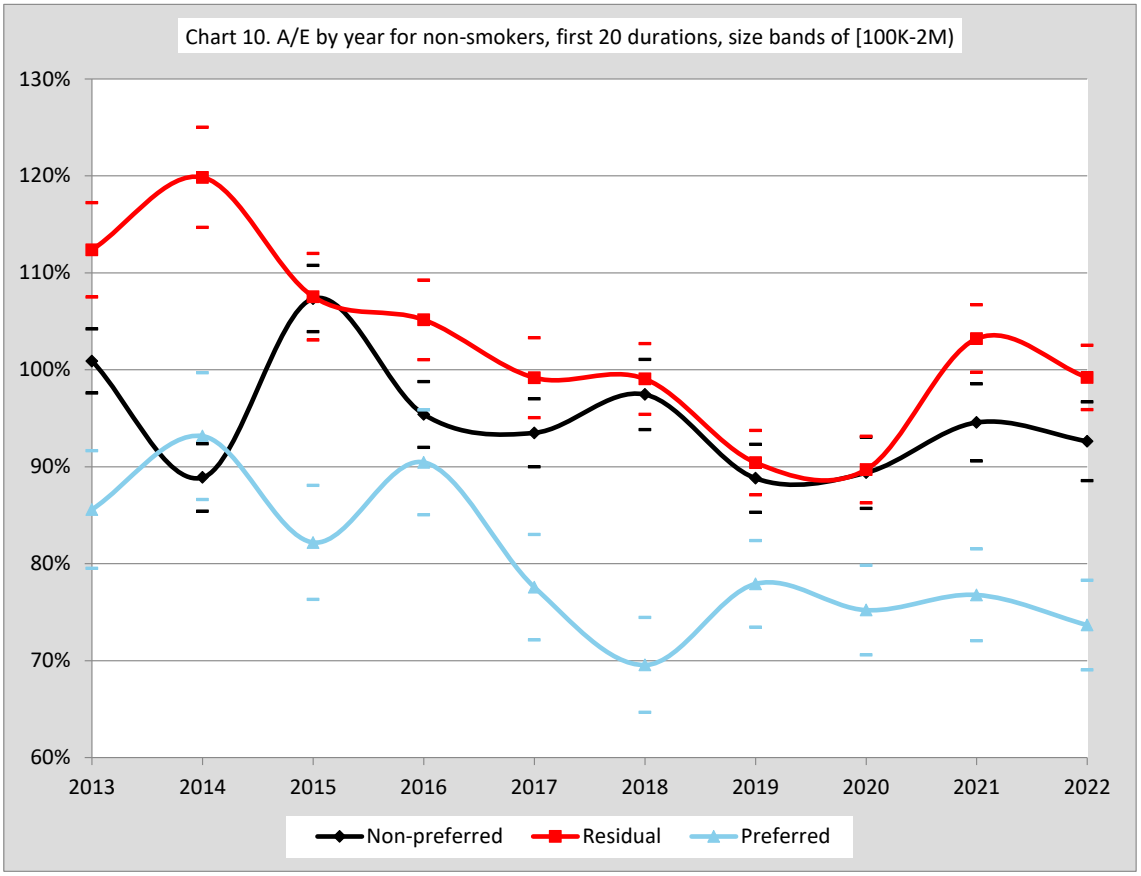
As was observed in last year's report, almost all the exposure for preferred is non-smoker in the first 20 policy years and for amounts of at least $100K. Therefore, the focus in this subsection is on that portion of the standard segment. Also, as was done last year, amounts of $2 million and more are excluded to decrease volatility. Table 7 shows the experience for different classes of preferred, separately for males and females. The three classes presented are non-preferred (preferred rates were not available for this plan), residual (preferred rates were available, but the life insured did not qualify) and preferred (the life insured qualified for preferred rates).

One would expect preferred to have the lowest A/E ratios of the three classes, and residual the highest. For the last five policy years, that is indeed what we see for females in the table below. It is true for males as well except that the A/E ratio for non-preferred is higher than for residual by policies. The differences between residual and preferred are statistically significant[4] for both males and females. The differences are less for females than for males.

[4] "Statistically significant" generally connotes a confidence of at least 95% that the difference is not due to random fluctuation.

Table 7. Summary of experience, by sex and preferred class, face amounts of $100K or more and less than $2M, non-smoker only, policy years 2017-2022. Expected mortality on CIA2014								
Risk class	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Select experience								
Female non-preferred	97.3%	89.0%	1.7%	2.4%	2,140.1	489,324	2,975	630,613
Female residual	99.9%	95.5%	1.9%	2.5%	2,963.2	1,119,969	2,425	665,536
Female preferred	81.2%	77.2%	2.7%	3.2%	1,743.6	838,106	1,030	364,881
Male non-preferred	104.3%	95.3%	1.6%	2.3%	1,982.9	529,952	3,607	869,913
Male residual	99.6%	96.9%	1.5%	1.9%	3,371.2	1,520,361	3,939	1,397,183
Male preferred	75.8%	73.1%	2.3%	2.8%	1,568.8	815,606	1,333	542,593
All	96.1%	89.9%	0.8%	1.0%	13,769.9	5,313,318	15,309	4,470,720

Chart 10 shows the trend in A/E for the three classes, male and female combined, over the last 10 years. There can be considerable variation from one year to the next. Note in particular that A/E for non-preferred is lower than for preferred in the 2014 year of experience, but almost equal to residual in the next year.



4.4 Distinguishing by policy type

Table 8 shows the experience for various policy types (also known as plans of insurance or products), separately by sex. The table uses abbreviations for each policy type to save space. “Whole life” means a permanent plan that does not expire but may include endowments. “T100” is term to 100 and similar products. “UL-YRT” means universal life with cost of insurance generally varying each year. “UL-LCOI” means universal life with level cost of insurance. “UL-LP” means universal life with cost of insurance level for a limited period of years and zero thereafter. “T10” means 10-year renewable term; typically, the premium rates for successive terms are much higher than for a newly underwritten T10 at the same attained age; the renewal periods could be 10 years, one year or some other length. “T20” is similar for 20-year terms. “Other term” means other lengths of renewable term and any other product design that is properly considered term insurance but not T10, T20 or T100. “Other” means all other product designs that do not reasonably fit in any of the preceding types.

For both males and females, both by policies and by amount, T10 and T20 A/E ratios may be statistically significantly lower than for the overall, and T100 may be higher.

One might expect that experience for T100 and UL-LCOI would be similar because of similar product designs and similar patterns of lapse rates. However, UL-LCOI has A/E ratios much lower than T100 when measured by amount. The difference is smaller by policy but still statistically significant.

Table 8. Summary of experience by sex and policy type, policy years 2017-2022. Expected mortality on CIA2014								
Policy type	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Female								
Whole life	99.4%	93.7%	0.3%	1.7%	10,210.5	786,330	106,979	2,231,654
T100	102.9%	98.6%	0.9%	3.2%	877.0	68,271	11,262	701,262
UL-YRT	106.5%	90.5%	1.7%	5.7%	1,221.3	189,375	3,258	280,636
UL-LCOI	99.5%	93.8%	0.9%	3.7%	2,103.6	281,471	10,015	1,171,450
UL-LP	98.0%	96.0%	3.7%	13.5%	835.0	106,312	668	72,530
T10	90.5%	85.2%	2.8%	4.4%	1,362.0	653,664	1,105	345,775
T20	94.2%	87.6%	2.1%	2.8%	2,622.1	1,239,479	2,018	603,117
Other term	95.4%	93.6%	2.1%	4.6%	826.6	245,163	1,914	150,997
Other	101.6%	106.0%	1.0%	3.0%	824.3	70,369	8,153	254,077
All	99.7%	93.4%	0.2%	1.2%	20,882.4	3,640,435	145,372	5,811,499
Male								
Whole life	100.4%	94.7%	0.2%	1.3%	11,133.8	965,734	171,402	5,314,407
T100	105.4%	96.9%	0.8%	2.7%	776.0	91,312	12,590	1,244,341
UL-YRT	115.8%	100.2%	1.4%	5.4%	1,249.1	233,619	5,064	631,265
UL-LCOI	100.6%	83.1%	0.9%	3.1%	2,020.5	402,163	10,725	1,568,631
UL-LP	94.6%	84.1%	3.5%	9.9%	691.4	94,756	716	82,395
T10	94.6%	88.8%	1.9%	3.7%	1,824.6	1,163,188	2,511	1,103,247
T20	95.7%	89.4%	1.6%	2.6%	2,842.9	1,586,246	3,280	1,260,937
Other term	100.7%	96.9%	1.6%	4.2%	929.0	324,785	3,471	344,932
Other	104.8%	107.0%	1.0%	3.9%	770.3	76,893	8,922	378,499
All	101.0%	92.7%	0.2%	0.9%	22,237.6	4,938,695	218,681	11,928,655

4.5 Distinguishing by par/non-par (whole life only)

In order to make a more consistent comparison, only whole life policies are included in this subsection.

Table 9 shows select and ultimate separately, and size bands within each, for the last five policy years combined. For the higher size bands, the standard deviations are so large that no valid statistical inferences can be drawn; therefore, the highest three size bands have been combined into $500K+.

The A/E ratio for par is lower than for non-par overall and for most size bands. The differences for size bands under $250K appear to be statistically significant. The magnitude of the difference in A/E, particularly for select, is surprising. An explanation may lie in differences in product design and differences between companies in what products are offered as par or non-par. Not all companies have an appreciable amount of whole life non-par.

Table 9. Summary of experience by par and size, whole life policies only, policy years 2017-2022. Expected mortality on CIA2014								
Size band	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Non-par select								
0-10K	220.8%	183.0%	3.7%	6.1%	95.9	242	1,460	1,996
10K-50K	133.9%	134.0%	2.0%	2.2%	751.7	16,256	3,080	59,394
50K-100K	130.1%	130.2%	4.4%	4.5%	529.9	27,255	627	32,776
100K-250K	124.0%	124.5%	4.9%	5.3%	542.6	56,877	476	50,256
250K-500K	99.9%	88.1%	11.1%	13.2%	121.2	20,147	74	13,423
500K+	81.7%	90.0%	11.7%	22.6%	94.8	65,953	55	58,701
All	145.5%	113.1%	1.5%	7.9%	2,136.1	186,730	5,772	216,545
Par select								
0-10K	143.3%	125.7%	4.3%	5.1%	55.1	250	710	2,724
10K-50K	117.4%	113.2%	1.8%	2.0%	1,156.7	34,248	3,165	78,546
50K-100K	106.3%	103.4%	3.2%	3.3%	775.6	50,399	964	58,786
100K-250K	98.1%	96.6%	3.2%	3.4%	966.5	128,799	883	113,129
250K-500K	94.4%	93.7%	5.4%	5.8%	384.1	101,547	300	85,779
500K+	69.8%	62.8%	4.8%	10.6%	412.1	575,507	272	396,966
All	110.3%	75.9%	1.3%	6.9%	3,750.1	890,750	6,294	735,929
Non-par ultimate								
0-10K	83.8%	95.6%	0.7%	0.9%	403.4	1,457	13,852	50,512
10K-50K	111.0%	110.0%	0.6%	0.7%	1,483.7	27,241	23,104	385,553
50K-100K	99.1%	99.5%	1.4%	1.5%	709.0	37,291	4,276	231,394
100K-250K	99.0%	99.7%	2.3%	2.4%	245.9	26,222	1,654	191,127
250K-500K	91.9%	91.0%	6.1%	6.3%	18.2	4,968	212	60,884
500K+	92.3%	83.0%	8.3%	11.0%	7.2	5,709	115	95,088
All	98.9%	100.5%	0.4%	1.5%	2,867.4	102,887	43,212	1,014,557
Par ultimate								
0-10K	95.2%	102.9%	0.3%	0.3%	2,844.1	11,654	95,481	395,781
10K-50K	104.9%	103.7%	0.3%	0.3%	5,899.2	139,176	99,749	2,045,656
50K-100K	96.9%	95.3%	0.7%	0.7%	2,218.4	138,735	17,525	1,081,124
100K-250K	90.2%	89.1%	1.0%	1.0%	1,393.3	170,348	8,499	1,076,585
250K-500K	89.0%	87.6%	2.5%	2.6%	173.3	51,708	1,253	390,076
500K+	86.9%	86.8%	3.6%	5.4%	62.3	60,075	597	589,807
All	99.2%	95.8%	0.2%	0.7%	12,590.6	571,697	223,103	5,579,029

4.6 Distinguishing by province/region

Contributing companies are asked to provide information on province of residence, but not all companies are able to do so. Table 10 shows experience by province (or region) of residence for those companies that do distinguish by

province. "Other" includes the territories[5] and business that was issued as Canadian but for which the residence is now outside of Canada. The four Atlantic provinces are combined into one region. The table begins with the policy year 2018-2019 because province codes were not reliable before then.

The exposure and deaths are shown as a percentage of the total reported for those companies that distinguished province. The absolute amounts are not shown in order to protect the privacy of company-specific information.

Table 10. Summary of experience by sex and province/region, policy years 2018-2022. Excluding companies that could not distinguish province. Expected mortality on CIA2014

Province/Region	A/E		Std dev		Exposure dist		Death dist	
	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt
Female								
Atlantic	106.7%	91.2%	1.5%	5.9%	4.6%	3.8%	6.0%	4.4%
Quebec	99.3%	91.9%	0.5%	2.3%	37.6%	19.7%	45.3%	26.3%
Ontario	97.7%	85.5%	0.6%	2.8%	30.2%	35.9%	31.0%	33.6%
Manitoba	98.6%	154.5%	2.9%	13.7%	2.2%	2.8%	1.6%	4.3%
Saskatchewan	97.9%	97.2%	2.9%	8.7%	1.7%	2.3%	1.5%	2.5%
Alberta	93.2%	90.5%	1.7%	6.0%	7.8%	12.5%	4.3%	8.5%
British Columbia	89.4%	88.0%	1.4%	5.7%	9.7%	16.1%	5.5%	12.2%
Other	141.2%	173.9%	2.0%	10.8%	6.3%	7.0%	4.8%	8.3%
All	99.7%	94.3%	0.4%	1.7%	100.0%	100.0%	100.0%	100.0%
Male								
Atlantic	110.7%	103.7%	1.2%	4.3%	5.1%	4.0%	7.2%	5.6%
Quebec	100.6%	91.1%	0.5%	2.4%	35.1%	19.8%	36.2%	26.0%
Ontario	98.1%	87.4%	0.5%	2.3%	30.0%	34.7%	32.2%	34.2%
Manitoba	101.8%	101.1%	1.9%	6.0%	2.5%	3.0%	2.4%	3.1%
Saskatchewan	100.1%	86.6%	2.0%	6.8%	2.0%	2.4%	2.2%	2.0%
Alberta	96.9%	92.8%	1.2%	4.7%	8.4%	13.0%	6.1%	9.5%
British Columbia	92.6%	84.9%	1.0%	3.7%	10.0%	14.6%	7.7%	11.5%
Other	144.8%	123.3%	1.4%	8.6%	6.9%	8.4%	6.0%	8.1%
All	101.4%	91.9%	0.3%	1.4%	100.0%	100.0%	100.0%	100.0%

4.7 Distinguishing by cause of death

Table 11 shows the causes of death identified in this study, for the three policy years 2019-2022.[6] This table includes the data from only the five companies that were able to submit cause of death consistently. The number and amount (in thousands) of death claims are shown in the second and third columns, respectively. The fourth and fifth columns show the proportion of the number of deaths and amount of death claims of the total for which the cause of death is identified as one of our listed causes except "other" and "unknown." "Unknown" means that no cause of death was provided to the company or that the cause was stated as "unknown." "Other" means that the company specified a

[5] There were only 99 deaths for the territories during the five policy years, and thus it is not reasonable to distinguish them in the table.

[6] Cause of death was not submitted for the 2017-2019 policy years.

cause of death not among the 14 codes distinguished by the CIA. The sixth and seventh columns show the ratio of cause-specific actual to overall expected; the same expected is used for each row.

Unfortunately for our study, "unknown" represents a large proportion of the total. However, the proportion does not seem unreasonable when compared to the data published by Statistics Canada; particularly at the older ages, the cause of death is often listed as unknown by Statistics Canada.

The "proportion of policies identified" is generally greater than the "proportion of amount identified." The exceptions are malignant neoplasms, accidents, intentional self-harm, liver disease and cirrhosis, and assault.

The ranking of COVID-19 is notable. It lies in fifth place for the three policy years combined. Last year it was in third place, and for the current policy year it is in seventh. (Recall that about 30% of the 2019-2020 policy year overlaps with the pandemic.) COVID-19 remains a serious disease, but it has fallen considerably in prevalence from its peak.

Table 11. Analysis by cause of death, policy year 2019-2022

Cause of death	Number of deaths	Death claims K$	Proportion of policies identified	Proportion of amount identified	A/E by policies	A/E by amount
Malignant neoplasms	41,283	2,532,024	47.3%	48.6%	28.5%	31.0%
Diseases of heart	18,810	1,077,443	21.6%	20.7%	13.0%	13.2%
Cerebrovascular	5,130	263,383	5.9%	5.1%	3.5%	3.2%
Influenza and pneumonia	4,955	217,175	5.7%	4.2%	3.4%	2.7%
COVID-19	4,110	209,267	4.7%	4.0%	2.8%	2.6%
Alzheimer	3,416	181,408	3.9%	3.5%	2.4%	2.2%
Chronic lower respiratory	3,281	144,435	3.8%	2.8%	2.3%	1.8%
Accidents	2,735	265,134	3.1%	5.1%	1.9%	3.2%
Intentional self-harm	1,169	165,402	1.3%	3.2%	0.8%	2.0%
Nephritis, etc.	841	44,945	1.0%	0.9%	0.6%	0.5%
Liver disease and cirrhosis	815	69,044	0.9%	1.3%	0.6%	0.8%
Diabetes mellitus	512	16,465	0.6%	0.3%	0.4%	0.2%
Assault	102	15,885	0.1%	0.3%	0.1%	0.2%
Unintended drug overdose	39	4,636	0.0%	0.1%	0.0%	0.1%
Subtotal: identified causes	87,198	5,206,646	100.0%	100.0%	60.1%	63.7%
Other/unknown	56,822	2,499,077	65.2%	48.0%	39.2%	30.6%
Total	144,020	7,705,724	n/a	n/a	99.3%	94.3%

The following two tables show raw mortality rates for selected causes. The rates are annual per thousand, averaged over the three policy years 2019-2022. The top five causes are shown as well as all causes combined. As with the above table, data is included only for those companies that were able to provide causes of death.

Table 12. Female raw mortality rates per K in attained age groups, policy years 2019-2022												
Attained ages	All		Malignant neoplasms		Diseases of heart		Cerebrovascular		Influenza and pneumonia		COVID-19	
	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt
0-49	0.41	0.28	0.18	0.14	0.03	0.01	0.01	0.01	0.00	0.00	0.00	0.00
50-59	1.76	1.13	1.03	0.70	0.15	0.06	0.06	0.03	0.03	0.01	0.03	0.03
60-69	4.86	3.63	2.64	1.83	0.56	0.32	0.16	0.09	0.11	0.05	0.08	0.05
70-79	14.86	9.68	5.73	4.00	1.73	1.12	0.64	0.49	0.45	0.24	0.37	0.22
80-89	50.81	44.29	11.22	8.87	5.68	4.46	2.21	1.75	1.78	1.28	1.62	1.06
90-100	138.57	133.81	19.22	13.41	12.73	18.60	4.50	8.72	4.65	3.94	5.05	3.68

Table 13. Male raw mortality rates per K in attained age groups, policy years 2019-2022												
Attained ages	All		Malignant neoplasms		Diseases of heart		Cerebrovascular		Influenza and pneumonia		COVID-19	
	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt	Pols	Amt
0-49	0.74	0.45	0.14	0.10	0.13	0.08	0.02	0.01	0.01	0.00	0.01	0.01
50-59	2.30	1.38	0.83	0.47	0.48	0.29	0.07	0.04	0.03	0.01	0.07	0.03
60-69	6.91	4.44	2.88	2.04	1.35	0.75	0.23	0.15	0.18	0.09	0.18	0.15
70-79	21.14	15.04	7.67	5.49	3.48	2.24	0.85	0.57	0.69	0.58	0.54	0.51
80-89	69.58	57.23	16.56	13.26	9.03	7.55	2.36	1.86	3.17	3.07	2.19	2.14
90-100	166.38	174.21	24.58	21.55	18.01	28.37	4.32	4.82	7.60	9.10	5.16	4.33

5 Experience outside the standard segment

The mortality study collects data on classes of individual business not included in the standard segment. Typically, these are much smaller; therefore, their experience is less credible. The intercompany experience may not give as much confidence as one would like, but it may still be found useful.

In each subsection below, the experience for the named segment appears in that subsection only and not elsewhere in this report. Records that are excluded from the standard segment for more than one reason are not included in any of the subsections. For example, a substandard renewable term policy that is in a renewal period would not be included in either.

5.1 Renewable term insurance, after the first renewal

Beginning with the report for the 2020-2021 policy year, the experience of renewable term insurance after the first renewal has been considered outside the standard segment. It is generally expected that mortality will be much heavier[7] after renewal than before because those who can still qualify for standard insurance at renewal have a strong financial incentive to move to a new policy. Earlier reports included the experience after the first renewal within the standard segment. This fact must be borne in mind when interpreting differences between the earlier reports[8] and later ones. The database that accompanies this report includes experience after renewal; that is the only non-standard segment included in the database.

[7] See the joint CIA and SOA research paper.

[8] The comment is with respect to published reports. Historical data included in this report consistently excludes renewable term after the first renewal from the standard segment.

Term insurance represents more than half of the exposure in the study by amount. There are two aspects of term insurance that can influence the experience.

The first is that most renewable term insurance is designed with the expectation that those who can qualify for a newly underwritten policy at the end of the first term will choose to do so (selective lapsation), and those remaining will exhibit markedly higher A/E ratios than would be experienced for a comparable policy with a longer term. The second aspect is that term insurance can be used either as a base policy or as rider on another policy, and experience may differ between the two.

Table 14 shows the experience for renewable term plans with an initial term of 5, 10, 15 or 20 years,[9] base policies compared to term riders and first term compared to renewal. “Renewal” could mean another term of the same length or some other term, as provided by the policy. As mentioned above, note that experience after the first renewal is not part of the standard segment and is shown in Table 14 only.

A/E ratios are markedly higher for renewal terms compared to the initial term for base policies and for riders.

A/E ratios for riders are not significantly different from those for base policies in the initial term. After the first renewal, A/E ratios are lower for riders than for base policies; the difference appears to be statistically significant overall but not within any of the size bands. The difference between rider and base is much smaller than the difference between the first and renewal terms.

[9] The data specifications do not permit identifying any other length of term. For term lengths that are not a multiple of five, the code used on the record is for the next shorter term that is a multiple of five. For example, if a coverage had a specified term of 13 years, it would be coded as T10, and the first 10 years would be shown under “first term” and the remaining years under “renewal.” As a result, policy years 11-13 would be assigned to the wrong section of the table. This is a limitation in the data. It is not possible to estimate how much of the experience is incorrectly assigned, but it is likely to be small enough that no conclusions would be different.

Table 14. Summary of experience for term policies and riders, policy years 2017-2022. Expected mortality on CIA2014								
Size band	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
First term, base policies								
0-100K	118.9%	117.4%	3.3%	3.5%	238.4	11,991	994	46,025
100-250K	98.4%	97.5%	1.6%	1.7%	2,069.0	282,312	3,496	453,014
250-500K	91.9%	91.4%	1.8%	1.8%	2,903.8	839,790	2,577	735,795
500K-1M	88.4%	88.7%	2.3%	2.4%	2,497.5	1,383,799	1,522	842,966
1M+	79.3%	81.4%	3.4%	4.7%	1,172.5	1,661,506	641	981,874
All	94.9%	88.3%	1.0%	1.8%	8,881.2	4,179,398	9,230	3,059,674
First term, riders								
0-100K	n/a	124.6%	n/a	7.5%	n/a	5,972	n/a	10,327
100-250K	n/a	103.4%	n/a	3.8%	n/a	118,358	n/a	93,996
250-500K	n/a	97.8%	n/a	5.1%	n/a	174,635	n/a	98,137
500K-1M	n/a	86.4%	n/a	7.6%	n/a	167,155	n/a	72,781
1M+	n/a	68.0%	n/a	15.5%	n/a	116,129	n/a	47,740
All	n/a	91.2%	n/a	4.0%	n/a	582,249	n/a	322,981
Renewal terms, base policies								
0-100K	140.5%	139.3%	3.8%	4.1%	214.5	10,391	1,526	68,113
100-250K	150.7%	151.1%	2.7%	2.9%	649.8	81,911	3,178	391,130
250-500K	168.2%	167.9%	5.7%	5.8%	236.7	66,913	819	231,271
500K-1M	181.3%	181.0%	9.7%	9.9%	90.2	48,604	308	166,110
1M+	200.5%	191.9%	17.6%	23.2%	24.3	31,751	103	127,825
All	152.0%	163.0%	2.0%	3.5%	1,215.6	239,570	5,934	984,448
Renewal terms, riders								
0-100K	n/a	142.0%	n/a	6.1%	n/a	4,447	n/a	26,935
100-250K	n/a	146.0%	n/a	6.2%	n/a	19,136	n/a	69,197
250-500K	n/a	139.1%	n/a	14.7%	n/a	9,920	n/a	25,176
500K-1M	n/a	155.7%	n/a	29.9%	n/a	5,341	n/a	13,155
1M+	n/a	249.3%	n/a	62.4%	n/a	3,127	n/a	12,050
All	n/a	149.9%	n/a	5.8%	n/a	41,971	n/a	146,512

5.2 Distinguishing by rating

The data specifications have allowed, since policy year 2018-2019, the submission of substandard policies for which the mortality rating was a multiple of standard, but not those with flat extras. For the last two policy years, data has been submitted on the mortality rating of the substandard policies. There is too little data that includes ratings for including experience by rating in this report. However, it may be of interest to note that 48% of substandard policies have a rating of at most 150% (standard + 50%). Another 37% have ratings of 151% to 200%. Only 1.3% of substandard policies have a rating of more than 300%. The average rating among substandard policies is 185%, 180% if weighted by amounts. The average rating does not change much by duration from issue.

Table 15 compares the experience over the last four policy years for the standard segment with the records indicated as substandard, in quinquennial groups of durations. The expected is on CIA2014 in both cases, with no adjustment for the rating.

There is much less substandard experience than standard, and accordingly, standard deviations are much higher for substandard.

It is difficult to discern any trend in A/E by duration because of the standard deviations being so large, when measured by amounts. The trend looks fairly flat by policies except that the group of durations 16-20 is an outlier.

Table 15. Summary of experience by rating, policy years 2018-2022. Expected mortality on CIA2014

Policy years	A/E		Std dev		Exposure		Deaths	
	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Standard								
1-5	118.8%	89.3%	1.5%	4.1%	7,840.1	3,382,117	5,169	1,392,261
6-10	107.1%	87.8%	1.0%	2.8%	6,722.3	2,419,970	9,265	2,184,152
11-15	106.5%	84.0%	1.0%	3.2%	4,416.2	1,041,491	10,284	1,491,851
16-20	108.6%	94.2%	0.7%	2.5%	3,906.4	598,669	17,851	1,960,309
Ultimate	99.5%	95.7%	0.2%	0.7%	20,235.0	1,136,883	321,484	10,711,579
All	100.5%	92.9%	0.2%	0.7%	43,119.9	8,579,130	364,053	17,740,153
Substandard								
1-5	154.2%	133.3%	6.6%	22.0%	343.9	173,088	493	168,797
6-10	154.9%	150.2%	4.3%	15.4%	346.7	134,431	1,169	326,935
11-15	156.3%	143.3%	4.6%	17.0%	161.0	42,953	995	173,895
16-20	181.8%	125.5%	5.0%	16.9%	72.9	11,648	947	89,815
Ultimate	167.2%	140.7%	1.9%	19.1%	154.3	8,215	5,699	198,165
All	164.9%	141.2%	1.5%	8.3%	1,078.9	370,335	9,303	957,607

5.3 Converted policies

The data specifications distinguish several types of conversions: term to permanent, term to term, from UL-YRT, from group, from other types of policies and unknown type of conversion. Table 16 keeps term to permanent and group conversions separate and combines all other types of conversions. Expected mortality uses the duration from conversion, not from original issue. The latter would be preferred (except for group conversion for which it is not applicable), but too few companies are able to provide the date of original issue.

A/E ratios for conversions from term to permanent are quite high in the initial five policy years, but there is a strong downward trend with increasing duration. The ultimate is closer to what is observed for the standard segment but is still significantly higher at 109.4% compared to 95.7% for the standard segment.

A/E ratios for other individual conversions[10] do not show a clear pattern.

A/E ratios for group conversions are very high initially, but they decrease rapidly. Group conversions have significantly higher mortality than term-to-permanent conversions at all durations. Ultimate group conversion mortality

[10] It was discovered after the prior report was published that some records for “other individual conversions” had been incorrectly excluded. That error is corrected in this report. The incorrect exclusion was not biased either for or against death records; the A/E ratios did not change much because of the correction.

is higher than ultimate standard mortality for all attained ages. As can be seen in the supplementary workbook, ultimate group conversion mortality A/E decreases by attained age; however, it does not converge to the standard segment mortality A/E by attained ages 90-100.

Further investigation done for a previous report showed that the higher mortality is not related to differences in size.

Table 16. Summary of experience for converted policies, policy years 2017-2022. Expected mortality on CIA2014

Policy	A/E		Std dev		Exposure		Deaths	
years	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Converting term to permanent								
1-5	241.3%	200.3%	4.1%	13.2%	557.8	132,258	1,841	230,322
6-10	168.5%	141.2%	2.8%	8.6%	495.1	90,903	2,666	287,002
11-15	145.5%	124.3%	2.5%	7.0%	366.6	57,511	2,936	291,435
16-20	135.6%	124.7%	2.4%	7.3%	248.3	32,000	2,778	260,672
21+	108.3%	109.4%	1.1%	2.9%	557.9	46,214	10,582	655,069
All	128.5%	126.7%	0.9%	2.7%	2,225.6	358,887	20,803	1,724,499
Other individual conversions								
1-5	148.8%	147.5%	5.6%	10.4%	468.4	212,966	597	207,085
6-10	128.6%	106.6%	4.1%	7.3%	429.6	170,076	948	245,301
11-15	128.1%	110.0%	4.1%	8.9%	223.1	54,280	959	128,692
16-20	119.7%	106.2%	3.5%	8.2%	159.3	25,133	1166	124,897
21+	112.9%	112.6%	1.6%	4.1%	281.7	28,285	5307	434,350
All	118.7%	115.1%	1.3%	3.1%	1,562.1	490,741	8,977	1,140,325
Group conversions								
1-5	634.6%	849.3%	9.0%	13.4%	45.2	3,485	981	65,766
6-10	245.4%	254.7%	6.4%	9.8%	42.2	3,114	738	36,877
11-15	205.9%	212.1%	5.7%	9.0%	34.6	2,501	767	36,783
16-20	168.8%	175.6%	5.2%	8.1%	23.8	1,557	753	32,444
21+	135.8%	133.9%	1.7%	2.7%	142.9	4,738	5,560	130,600
All	163.9%	194.4%	1.5%	2.5%	288.7	15,394	8,799	302,471

5.4 Simplified Issue

Data has been submitted for Simplified Issue policies for several years. As stated in the request for data to contributing companies, “Simplified Issue refers to products that ask a short list of health questions and require no physical evidence.”

For these products, there may be proportionately more claims for less than the face amount, particularly in the first two years. However, this report uses the face amount for all deaths even if the claim is settled for some lesser amount.

Table 17 shows experience for Simplified Issue for the last five policy years. As expected, A/E ratios are much higher than for the standard segment, and the difference remains large into the ultimate period.

Table 17. Summary of experience for Simplified Issue policies, policy years 2017-2022. Expected mortality on CIA2014								
Policy	A/E		Std dev		Exposure		Deaths	
years	Pols	Amt	Pols	Amt	Pols K	Amt M$	Pols	Amt K$
Females								
1-5	349.0%	181.8%	10.3%	21.0%	234.4	70,201	547	28,476
6-10	328.6%	194.8%	9.8%	16.4%	84.1	9,420	562	15,089
11-15	202.9%	123.1%	8.8%	15.8%	57.1	7,033	410	10,566
16-20	189.6%	155.8%	7.0%	17.5%	17.7	1,291	559	5,999
21+	141.6%	156.0%	5.5%	7.0%	14.0	183	627	5,214
All	213.4%	166.7%	3.4%	9.8%	407.3	88,127	2,705	65,344
Males								
1-5	311.6%	176.7%	8.6%	16.1%	232.4	74,686	695	53,469
6-10	319.4%	191.7%	9.6%	15.5%	72.0	8,115	564	18,062
11-15	208.8%	121.1%	9.7%	15.8%	43.8	5,676	347	11,450
16-20	209.3%	157.6%	10.0%	23.7%	11.9	1,028	311	4,771
21+	145.2%	142.9%	8.4%	12.3%	11.1	189	290	2,898
All	241.5%	167.3%	4.1%	9.9%	371.3	89,695	2,207	90,648

5.5 Guaranteed Issue

Data has been submitted for Guaranteed Issue policies since the 2018-2019 policy year. However, there appear to be data issues that remain unresolved. Accordingly, the experience on these policies is not included in this report.

5.6 Joint

Data is submitted on joint two-life policies, both first to die and last to die. Most companies provide data on both lives. Because of the complexity in calculating expected claims, this report does not include the experience under joint policies.

6 Significant observations

The more significant observations for the study are:

1. The increase in overall A/E ratios that was noted in the last report has continued for the most recent policy year compared to earlier years. There appears to be a clear interruption in the overall downward trend in A/E ratios over the last several years. It is likely that COVID-19 is a contributing factor, but there may be other factors involved.
2. The A/E ratios decrease strongly with increasing face amount, especially for non-smokers. Size and mortality are strongly correlated. Size is probably the most significant factor not currently reflected in CIA mortality tables.
3. The A/E ratios (considering whole life policies only) for par are significantly lower than for non-par, and the difference persists within most size bands.
4. The A/E ratio for preferred is 75% of the A/E ratio for residual for males and 81% for females by amount. The differences between preferred, residual and non-preferred vary considerably over time.

5. The A/E ratios for the renewal periods of renewable term policies are much higher than for the first period. The difference tends to increase with size.
6. The A/E ratios for substandard are much higher than for standard, as expected. The difference between standard and substandard does not vary greatly by duration, when measured by policies.
7. The mortality experience for group conversions and for term policies converted to permanent is significantly higher than for the standard segment and remains higher in the ultimate period.
8. Mortality experience for Simplified Issue policies is higher than the standard segment, and this persists into the ultimate policy years.

7 For further study

7.1 Additional tables available

More detailed tables for the last five years are available in an Excel workbook. The format of all tables is the same as shown above for Table 3. There is a worksheet called “index” that lists all tables available and provides a hyperlink to each table.

7.2 Database for independent study

The format for the database is the same as last year. There is a file, in comma-separated-value format, for each policy year beginning with 2009-2010 containing the most up-to-date[11] information. Note that the database contains records only for the standard subset and for renewable term after the first renewal; other segments are excluded. Province and cause of death are not included in the database because these fields were not provided by all contributors.

The databases contain expected fields on CIA2014. There is a supplied Excel workbook that may be used to change the table for expected mortality to any table desired by the member. CIA2014, CIA9704 and CIA8692 are supplied in the workbook. The member may use one of these tables as published, apply a multiple to it or add a worksheet for a completely different table.

There is a zipped archive, containing the databases, text file files with a detailed description of each database and its codes, and the workbook mentioned above, available here.

[11] Databases for all prior years are being republished because there have been some changes to the data of those years. The overall impact of the changes is minor.

8 Credits

This report was prepared by R.C.W. (Bob) Howard and approved by the CIA Research Council, the Mortality Risk Research Committee and the Canadian Insured Life Annual Mortality Study Subcommittee:

Alison Rose, FCIA (Chair, Research Council)
Martin Labelle, FCIA (Chair, Mortality Risk Research Committee)

Canadian Insured Life Annual Mortality Study Subcommittee:

Mayur Shah, FCIA, Chair
Junyu Chen, FCIA, Vice-chair
Guillaume Ducharme, FCIA
Aaron Lam, FCIA
Stella Ma, FCIA
Donna Mann-Campbell, FCIA
Joel Smith, FCIA
Colin Sproat, FCIA
Rita Wu, FCIA

Appendix 1 Details of data and method

1.1 History of changes

1.1.1 2021-2022

No changes to the data specifications from the prior year.

Some changes were made to data of prior years, correcting errors related to preferred type and conversion type.

1.1.2 2020-2021

The data specifications allowed for a numeric rating for substandard policies rated as a multiple of a standard table. The change was optional for this year of experience.

The experience of renewable term policies and riders after the first renewal was removed from the standard segment and studied only separately.

1.1.3 2019-2020

There were no changes in the data specifications for this year.

Some changes were made to data of prior years. The most significant change is in the preferred type indicator; two companies discovered errors affecting many prior years. An error was found and corrected in the categorizing of term plans between base and rider for one company. Other changes have only a small impact on the previously reported results of prior years. A few deaths in prior years were found to have been reported in error. Some policies that had been reported as lapses were subsequently reinstated; the correction causes a very small increase in exposure.

1.1.4 2018-2019

1. Cause of death is requested for all death records.
2. Substandard business may be included if separately identified and the rating is a multiple of the standard class. Business with flat extras is still excluded.
3. Province code is to refer to current residence.
4. Guaranteed Issue business may be included and separately identified.
5. Policies are counted after combining records with the same policy number and other identifying fields. Previously, one policy was counted for each unique combination of policy number, sex, date of birth and policy type. In both cases, riders were ignored for policy count.
6. The size band was determined by totalling the amounts for all records with the same policy number, date of issue and date of birth. Previously, the size band was determined for each record independently.

1.1.5 2017-2018

1. Province code was requested, based on province of residence at issue.
2. Codes were added to indicate whether blood, urine or saliva were used in the underwriting process.

1.1.6 2013-2014

1. Codes to indicate the type of conversion and the date of conversion were added. In 2013-2014 and 2014-2015 conversions with issue date equal to conversion date were excluded. Subsequently all conversions were excluded.

2. Simplified Issue business may be included and separately identified.

Not all companies were able to provide the data requested in the first year of the request.

The experience of prior years was restated to be consistent with the current method.

1.2 Size of standard segment and excluded segments

Table 18 shows a summary of all the records submitted by the contributing companies for the current policy year, divided into segments. The first row of the table, the standard segment, represents the records included in most tables in this report. That row is followed by several rows, each representing segments of records excluded from the standard segment. The experience for the standard segment through to Simplified Issue is included in at least one table in this report; other segments are excluded.

Table 18. Reconciliation from standard segment to all data submitted for policy year 2021-2022

Category	Records	Exposure		Deaths	
		Pols K	Amt M$	Pols	Amt K$
Standard segment	9,065,568	8,429.6	1,800,579	76,261	4,061,211
Attd age > 100	6,514	6.0	53	554	8,690
Renewal periods	318,909	212.7	51,930	1,122	206,279
Substandard	278,332	255.4	93,438	2,280	251,122
Converted	843,917	815.9	179,263	8,455	731,364
Simplified Issue	238,716	228.7	74,601	1,116	48,335
Guaranteed Issue	45,091	44.2	3,315	1,770	26,539
Joint	202,965	195.0	90,301	1,421	351,357
Multiple exclusions	109,534	93.1	31,554	793	230,040
Other exclusions	7,413	5.0	1,937	13	3,002
All submitted	11,116,958	10,285.7	2,326,971	93,782	5,917,937

1.3 Policies and amounts

Policies can be counted only approximately. Records identified as riders have no policy count associated with them. Some companies submit multiple records for a policy. An attempt is made to count each policy only once, but the process is not perfect. The current algorithm combines into one record a group of records having all the same identifying fields (excluding amounts, which are summed). For example, if there are two distinct issue dates for the same life and the same policy number, these would be counted as two policies. Conversely, if there are three records for base policies all with the same policy number and other identifying fields, these would be counted as one policy. The same algorithm applies to both exposure and deaths.

1.4 Policy year and duration

By tradition, policy years are referred to as ordinals – first, second, third, etc. – relative to the issue date or collectively as the calendar years in which the policy year starts and ends, as in 2018-2019. Durations are referred to as the exact number of years since issue, or as cardinals – 0, 1, 2, etc. – referring to entire years beginning at issue or on anniversaries of issue. Both terms are used in this report, although “policy year” is more common.

A policy year is taken as starting on a policy anniversary and ending just before the next anniversary. One might call this an “on-before” definition. This definition is consistent with how durations are defined, how annual premiums are billed and how we typically refer to our own age (we go to the next number on our birthday).

However, some companies submit data on the basis of an “after-on” definition; that is, the policy year begins after an anniversary and ends exactly on the next anniversary. That is significant for the study because some deaths would be submitted on the first day of the next policy year (by the standard definition). The record is accepted, nonetheless. It is counted as in force for the entire current duration, and a death is recorded for the next duration, with all being reported in the policy year under study.

Note that the issue date is specified on the records provided by the contributing companies. But that date is not always, strictly speaking, the issue date of the policy; it could be a later effective date for the coverage described by the record. For example, if a term rider were added subsequently to the issue of the policy, the “issue” date on the record would be the date that the new rider becomes effective; it would not necessarily be a policy anniversary.

Deaths reported too late to be included in one study are submitted in the next. They are counted as deaths at the appropriate duration for the date of death, but there is no exposure in the current study at that duration, because the exposure was captured in an earlier study. There is no adjustment made to exposure for deaths reported several years late.

1.5 Age nearest and last birthday

Age nearest birthday is used throughout this report. If the record indicates that age last birthday was used, age nearest birthday is calculated from the date of birth and the date of issue. If the record indicates age last birthday and the date of birth is not given, then the stated age at issue is used, and half of the exposure and deaths are assigned to the stated age, and the other half assigned to the next age. The policy year is calculated from the date of issue and is the same regardless of the calculation of issue age.

1.6 Exposure and expected

Exposure is calculated using the Balducci hypothesis, as is traditional for mortality studies of the CIA. Therefore, exposure on deaths continues to the next anniversary. Exposure on non-death terminations stops at the date of termination. That is, exposure is calculated as the number of days plus one from the anniversary on or last before termination to the date of termination, divided by 365. (February 29 is ignored in this calculation.)

Expected mortality is calculated in all cases on CIA2014 and in some cases also on CIA9704.[12]

1.7 Standard deviations

Several tables in this report show standard deviations in the actual-to-expected ratios. When comparing two ratios, it is important to note the standard deviation for each to determine if the difference between the ratios is significant. Generally, we expect that the true mean lies within one standard deviation of the observed mean about two-thirds of the time.

These standard deviations are calculated on the assumption that the exposure of each life to death in the next year is independent of the exposure for all other lives, that the number of deaths for any group of lives with the same sex-smoke-age-duration is binomially distributed, and that the mean of the distribution is given by a multiple of the

[12] CIA9704 was published to issue age 80 in publication 210028. The table has an unofficial extension to issue age 85. It has been further extended to issue age 105. Select rates for issue age 105 were taken as 20% of the corresponding ultimate rate at duration 0, increasing by 10% each duration to 100% for durations 10-14. Rates for issue ages 86-104 were calculated by fitting an exponential to the rates for ages 85 and 105 for each duration. The minimum issue age published was 16 for smokers and non-smokers. The table is extended for all issue ages and durations using the rates for combined. Rates over attained age 100 are not used. Rates for smokers and non-smokers under attained age 16 are not used.

mortality table used for expected deaths. The formula for standard deviation is shown below, by face amount, where A_i is the face amount, n_i is the number of policies exposed with that face amount and that sex-smoke-age-duration, q_i is the mortality rate for that cell, and m is the ratio of actual to expected claim amounts separately for each sex-smoke over all ages and durations, not for each cell or a subset of the whole. The sum is over all records under consideration. The same formula may be used by policies except that A_i is 1 in all cases.

Standard deviation of A/E by amount = $\frac{\left(\sum_i A_i{}^2 n_i (1-\mathrm{mq}_i)\mathrm{mq}_i\right)^{0.5}}{\sum_i A_i n_i q_i}$

The factor m ensures that the standard deviation is reasonable even though the mortality table used for expected deaths may differ substantially from the actual. There is a separate calculation of m for each policy year, for each segment (standard, term renewals, substandard, converted and simplified) and for the standard segment only for each sex and smoking class. There is also a separate calculation when the last five policy years are combined.

1.8 Prior reports

Prior annual mortality studies are available on the CIA website. Accession numbers for the last several reports are rp223111 for 2020-2021, rp222119 for 2019-2020, rp221113 for 2018-2019, rp220101 for 2017-2018, 219099 for 2016-2017 and 218110 for 2015-2016.

Appendix 2 Oldest ages

The exposure in the ultimate period is substantial over age 100, but it is difficult to believe that it can be accurate. It is likely that too much of the exposure results from deaths that have not been reported.[13] Tables 19 and 20 show exposure, deaths and mortality rates for each attained age 95 to 120, for females and males, respectively. The mortality rates look reasonable until about age 100, but after that they decrease precipitously, especially for males. The reader is *strongly cautioned against using data over age 100 for any purpose.*

[13] There is more discussion on this matter in the 2018-2019 report, Section 4.9.

Table 19. Female experience by attained age, for policy year 2021-2022. WARNING: Data over age 100 is not considered reliable and should not be used for actuarial assumptions						
Attained	Exposure		Deaths		Mortality rate	
age	Pols	**Amt ₭$**	Pols	**Amt ₭$**	Pols	Amt
95	4,359	119,891	763	17,764	0.175	0.148
96	3,602	91,314	663	15,411	0.184	0.169
97	2,835	69,766	536	15,507	0.189	0.222
98	2,186	61,290	430	19,031	0.196	0.311
99	1,502	26,962	276	5,027	0.183	0.186
100	1,136	22,629	220	4,656	0.194	0.206
101	856	17,734	154	3,327	0.179	0.188
102	515	5,126	74	1,520	0.143	0.296
103	396	4,022	72	388	0.181	0.096
104	229	1,515	29	759	0.127	0.501
105	157	911	17	111	0.108	0.122
106	143	670	8	47	0.052	0.070
107	151	363	3	10	0.017	0.028
108	90	184	0	0	0.000	0.000
109	99	229	0	0	0.000	0.000
110	87	105	0	0	0.000	0.000
111	71	83	1	1	0.014	0.012
112	72	118	0	0	0.000	0.000
113	60	57	0	0	0.000	0.000
114	68	104	0	0	0.000	0.000
115	16	59	0	0	0.000	0.000
116	11	61	0	0	0.000	0.000
117	10	14	0	0	0.000	0.000
118	11	20	0	0	0.000	0.000
119	12	26	0	0	0.000	0.000
120	7	6	0	0	0.000	0.000

Table 20. Male experience by attained age, for policy year 2021-2022. WARNING: Data over age 100 is not considered reliable and should not be used for actuarial assumptions

Attained	Exposure		Deaths		Mortality rate	
age	Pols	Amt K$	Pols	Amt K$	Pols	Amt
95	3,755	112,022	766	27,134	0.204	0.242
96	2,782	66,609	553	15,330	0.199	0.230
97	2,120	50,331	482	18,917	0.227	0.376
98	1,594	30,786	301	7,520	0.189	0.244
99	1,122	18,718	218	4,016	0.194	0.215
100	783	11,030	144	3,156	0.184	0.286
101	574	9,700	69	1,134	0.120	0.117
102	411	3,700	38	789	0.092	0.213
103	341	2,720	63	385	0.183	0.142
104	224	990	14	131	0.063	0.133
105	186	884	8	38	0.040	0.043
106	175	995	4	25	0.023	0.025
107	188	619	1	16	0.005	0.026
108	105	277	0	0	0.000	0.000
109	152	431	0	0	0.000	0.000
110	109	186	0	0	0.000	0.000
111	96	191	2	9	0.021	0.047
112	86	238	0	0	0.000	0.000
113	79	211	0	0	0.000	0.000
114	67	160	0	0	0.000	0.000
115	29	86	0	0	0.000	0.000
116	28	112	0	0	0.000	0.000
117	18	121	0	0	0.000	0.000
118	16	63	0	0	0.000	0.000
119	18	55	0	0	0.000	0.000
120	15	269	0	0	0.000	0.000

Canadian Institute of Actuaries
360 Albert Street, Suite 1740
Ottawa, ON K1R 7X7
613-236-8196
head.office@cia-ica.ca
cia-ica.ca
seeingbeyondrisk.ca

The Canadian Institute of Actuaries (CIA) is the qualifying and governing body of the actuarial profession in Canada. We develop and uphold rigorous standards, share our risk management expertise, and advance actuarial science to improve lives in Canada and around the world. Our more than 6,000 members apply their knowledge of math, statistics, data analytics, and business in providing services and advice of the highest quality to help Canadian people and organizations face the future with confidence.