Canadian Institute of Actuaries / Institut canadien des actuaires

Mortality Study

Canadian Standard Ordinary Life Experience 2017–2018 Using 86–92 and 97–04 Tables

Research Council –
Experience Research Committee

July 2020

Document 220101

Ce document est disponible en français

Mortality Under Canadian Standard Ordinary Insurance Issues Studied Between the 2017 and 2018 Policy Anniversaries Using the CIA 97–04 and CIA 86–92 Tables

Executive Summary

This is the 69th annual report of the intercompany mortality experience for Canadian standard ordinary life insurance policies. The study covers the one-year period between policy anniversaries in 2017 and 2018 on an age-nearest-birthday basis. The study has been approved by the CIA Research Council.

This report presents high-level findings of the 2017–2018 mortality study based on the CIA 86–92 and CIA 97–04 expected bases.

The tables listed below are available in Excel format on the CIA website and provide additional details of the study results. There are indices at the top of each file with links to the individual tables.

TABLE INDICES FOR 2017–2018 STUDY RESULTS	
Table A1	Total experience by groups of durations and ages, select and ultimate based on five-year aggregate data (policy years 2013–2014 through 2017–2018)
Table A2	Table A1 further classified by sex
Table A3	Table A2 further classified by smoking status

In addition, the experience study data used for this report is available in a zipped comma-separated value (.csv) file that can be downloaded from the CIA website. The file name is *IndLifeMDB.1718.zip*. A description of the data fields is included in Appendix 1 of this report.

Note that this file is for the one-year study period 2017–2018. Data files for prior years are also available on the CIA website in the same format. The user may combine the 2017–2018 data with data files from previous study years to generate a multi-year study.

Also note that if mortality rates are derived from the study data by dividing actuals by exposures, rates for ages above 90 may increase slowly or even decrease for subsequent ages, which may not be intuitive. This result may be due to under-reporting of deaths at older ages.

1. Methodology

Data are collected in a seriatim format. Exposures are calculated using the actuarial exposure method, in which a full year of exposure is credited in the year of death. For attained ages less than 16, the expected mortality rates are based on the aggregate CIA tables. For data submitted without classification by sex, the male table is used. For data submitted without classification by smoker status, the aggregate table is used.

The CIA 97–04 and CIA 86–92 tables do not contain mortality rates for issue ages above 80. For the purposes of this study, we have set the expected mortality at these ages to the rate for the previous issue age, shifted by one duration. For example, the expected mortality rate for issue age 81 at duration 1 is set equal to the mortality rate for issue age 80 at duration 2.

The following data were excluded from the study: substandard lives, joint lives, conversions, simplified issue policies, and guaranteed issue policies.

Policies in the post-renewal term period are included. Note that you may exclude or highlight the post-renewal policies using the plan and duration filters in the downloadable data files.

Starting with the 2005–2006 policy anniversary study, contributing companies have been asked to provide a preferred basis indicator (yes, no) to indicate whether the life underwent preferred underwriting or not. Where the preferred indicator was yes, the companies also specified the underwriting class: Preferred (better than Standard) or Standard (residual). The smoker status (smoker, non-smoker, or cigar-smoker) was also provided.

We asked the contributing companies to separately identify converted policies and to provide a date of conversion (which should be different than the original policy issue date). Not all companies were able to provide the required data; as such, we made the decision to exclude all known converted policies in the study. However, at least one company was not able to separately identify converted policies from non-converted policies, so this group of policies with unknown conversion status is still included in the study.

All known conversions were excluded from the study. Conversions account for 8.0% of total exposures in 2017–2018, ranging from 0% to 16.1% by company. Without conversions, the A/E by count and the A/E by amount are 81.5% and 70.4%, respectively, using the CIA 97–04 table. The A/E results including conversions are 82.9% and 72.6% using the CIA 97–04 table.

Actual and exposure counts were removed for riders and for policies with multiple coverages on the same policy number when the plan types were the same. Claim and exposure amounts were not removed for these records. This approach has been used since the 2001–2002 report and may have been used prior to that.

2. History of Data Changes

This section identifies changes made in the underlying data or the data collection over the past 10 years.

a. For the 2010–2011 report, the original version of the CIA 86–92 table was replaced with the widely-used CIA 86–92 table in the AXIS actuarial software.
b. Starting in 2011–2012, we added more detailed options to the “Type of insurance” field. The number of product type options increased from 8 to 19.
c. Starting in 2012–2013, we attempted to isolate converted policies.
d. Starting in 2012–2013, we stopped presenting results by “Evidence” – i.e., medical, nonmedical, and paramedical – as too few companies contributed data for this field and because of inconsistencies in classification approaches among companies.
e. In the 2013–2014 study, we asked each contributing company whether lapse terminations were reported at the beginning or the end of the grace period. More than half of the contributing companies set the effective date of lapse to the beginning of the grace period. No adjustments were made to the termination dates.
f. In the 2013–2014 and 2014–2015 studies, we did not include conversions with issue dates equal to the conversion dates.
g. In the 2014–2015 study, we added two termination type codes – “In-force on waiver” and “In-force with waiver unknown” – and for the first time dropped simplified issue policies.
h. Starting in 2015–2016, we removed all known conversions from the experience study

data file and report.

i. Starting in the 2017–2018 study, table indices are no longer included except for the five-year tables. The $1,000,000-plus face amount band was split into $1,000,000–1,999,999 and $2,000,000-plus.

3. Participating Companies

The 2017–2018 study is based on data from eight contributing companies. The contribution percentages in Table 1 below are based on face amount exposures. (Percentages may not add up to 100% due to rounding.)

TABLE 1: PARTICIPATING COMPANIES, 2016–2017 AND 2017–2018 STUDIES

Company	Contribution %	
	2016–2017	2017–2018
Desjardins/Laurentian	3.8%	3.6%
Equitable	5.3%	5.1%
Canada Life	27.7%	24.6%
Industrial Alliance	13.4%	12.3%
Ivari	0.0%	9.8%
Manulife	24.3%	21.5%
RBC Insurance	6.7%	6.2%
Sun Life	18.7%	16.9%
Total Exposures	100.0%	100.0%

4. Deviation of Results

Throughout the report, we include an estimate of the standard deviation (S.D.) for each of the mortality results. This is an estimate of the true standard deviation of the ratios of actual to expected mortality based on the numbers of deaths. The S.D. measures the degree of confidence in the mortality ratios. The formula used to calculate this is:

$$S.D. = \frac{(actual\ \ number\ of\ \ deaths)^{1/2}}{expected\ \ number\ \ of\ \ deaths}$$

There is considerable variation in the A/E results by age, sex, and issue age. For this reason, summaries of A/E for other variables are most useful for fixed segments by age, sex, and issue age.

In Table 2, we show the Percentage Departure. This represents the absolute relative deviation of the company-specific A/E by amount from the overall A/E by amount (shown in the first row of Table 5a). The absolute relative deviation is calculated as:

$$abs[(Company\ A/E)\ /\ (Overall\ A/E)\ -\ 1]$$

The median relative Percentage Departure is 6.1% using the CIA 97–04 table (6.7% using 86–92). The results in Table 2 apply to results on the CIA 97–04 table.

TABLE 2: COMPANY 97–04 TABLE PERCENTAGE DEPARTURE			
Percentage Departure	**Number of Companies**	**Actual Claims**	**Percentage of Claims**
5% or less	3	$1,468,664,365	41.1%
> 5%	5	$2,101,056,121	58.9%
Total	8	$3,569,720,486	100.0%

5. Study Data Overview

Tables 3(a–d) provide a comparison of the total exposures, death claims, average claim, and average exposures in the 2017–2018 study to previous policy year studies.

TABLE 3a: TOTAL EXPOSURES BY POLICY YEAR 2013–2014 TO 2017–2018					
Exposures	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
By Number	8,104,149	8,509,835	8,855,856	8,330,888	8,884,635
By Amount (millions)	1,301,344	1,512,191	1,565,428	1,494,492	1,728,937

TABLE 3b: DEATH CLAIMS BY POLICY YEAR 2013–2014 TO 2017–2018					
Death Claims	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
By Number	64,722	68,583	67,501	66,978	71,230
By Amount (’000)	2,560,849	3,090,612	3,094,109	2,981,266	3,569,720

TABLE 3c: AVERAGE CLAIM BY POLICY YEAR 2013–2014 TO 2017–2018					
Average Claim	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
By Amount	39,567	45,064	45,838	44,511	50,115

TABLE 3d: AVERAGE EXPOSURES (SUM ASSURED) BY POLICY YEAR 2013–2014 TO 2017–2018					
Average Exposures	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
Males	180,663	199,878	198,238	200,856	217,308
Females	138,159	153,142	153,205	156,087	170,167
Combined	160,578	177,699	176,768	179,392	194,598

6. Study Results

Tables 4(a–g) present the study results by the following segments: duration, sex and smoker status, underwriting type and class, issue age, face amount band, policy type, and attained age. Additional data splits and refinements are possible using the study data file from the CIA website. Actual to expected ratios are shown by policy count (#) and sum assured ($).

Note that unless otherwise stated, the results include all durations, select and ultimate.

TABLE 4a. Duration

The 2017–2018 study results by duration are summarized in Table 4a based on the CIA 97–04 and 86–92 tables. The results are shown for the select and ultimate period.

TABLE 4a: CIA 2017–2018 STUDY RESULTS BY DURATION										
	CIA 97–04			**CIA 86–92**			**ACTUAL DEATHS**		**EXPOSURES**	
	A/E #	**S.D.**	**A/E $**	**A/E #**	**S.D.**	**A/E $**	**#**	**$ (,000)**	**#**	**$ (millions)**
SELECT PERIOD										
1–2	70.9	4.0	53.3	54.4	3.1	40.0	311	84,672	757,034	316,346
3–5	69.5	2.6	54.1	56.2	2.1	41.4	731	183,585	940,084	375,541
6–10	65.2	1.6	61.7	49.4	1.2	45.0	1,753	462,388	1,393,282	477,221
11–15	74.1	1.6	60.5	53.0	1.1	42.4	2,206	328,163	901,735	201,159
Total	69.9	1.0	59.2	52.2	0.7	43.1	5,001	1,058,807	3,992,133	1,370,267
ULTIMATE PERIOD										
16–20	78.9	1.2	70.2	55.7	0.9	49.0	4,129	457,499	876,738	126,104
21–25	85.5	1.0	74.1	62.4	0.7	53.2	7,791	563,137	943,388	92,018
26+	82.5	0.4	79.7	64.1	0.3	59.3	54,309	1,490,277	3,072,376	140,548
Total	82.6	0.3	76.5	63.3	0.2	55.7	66,229	2,510,913	4,892,502	358,670
GRAND TOTAL	81.5	0.3	70.4	62.4	0.2	51.3	71,230	3,569,720	8,884,635	1,728,937

TABLE 4b. Sex and Smoker Status

The 2017–2018 study results by sex and smoker status are summarized in Table 4b based on the CIA 97–04 and 86–92 tables. The results for Unknown smoker status are shown separately. Non-Smokers, Smokers, and Unknown smoker status are denoted as NS, SM, and UNK, respectively.

TABLE 4b: CIA 2017–2018 STUDY RESULTS BY SEX AND SMOKER STATUS										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E #	S.D.	A/E $	A/E #	S.D.	A/E $	#	$ (,000)	#	$ (millions)
M NS	76.4	0.7	67.7	54.6	0.5	47.3	13,114	1,698,714	2,716,493	853,508
M SM	80.5	1.1	67.5	55.9	0.8	47.6	5,098	306,664	658,965	92,517
M UNK	79.7	0.5	79.1	63.0	0.4	60.4	24,803	432,148	1,229,090	54,580
M	78.7	0.4	69.4	59.3	0.3	49.3	43,015	2,437,526	4,604,549	1,000,605
F NS	79.7	0.8	67.8	59.8	0.6	51.4	10,600	821,257	2,743,732	630,669
F SM	108.2	1.6	92.1	86.6	1.3	77.4	4,475	185,871	587,980	53,688
F UNK	86.0	0.8	84.4	70.2	0.6	70.8	13,140	125,066	948,374	43,975
F	86.2	0.5	72.5	67.8	0.4	56.2	28,215	1,132,194	4,280,087	728,332
NS	77.8	0.5	67.7	56.8	0.4	48.6	23,714	2,519,971	5,460,226	1,484,178
SM	91.4	0.9	75.1	67.0	0.7	55.7	9,573	492,535	1,246,946	146,205
UNK	81.7	0.4	80.2	65.3	0.3	62.5	37,943	557,214	2,177,464	98,554
TOTAL	81.5	0.3	70.4	62.4	0.2	51.3	71,230	3,569,720	8,884,635	1,728,937

TABLE 4c. Underwriting Type and Class

The 2017–2018 study results by type of underwriting are summarized in Table 4c based on the CIA 97–04 and 86–92 tables. There are four possible classes for Preferred Underwriting: Preferred and Standard are further split into Non-Smoker and Smoker classes. There are two possible classes for Non-Preferred Underwriting: Non-Smoker and Smoker. At the bottom of the table we include totals by type of underwriting: Preferred Underwriting (PREF UW) and Non-Preferred Underwriting (NON-PREF UW). Unknown smoking status is excluded.

TABLE 4c: CIA 2017–2018 STUDY RESULTS BY UNDERWRITING TYPE AND UNDERWRITING CLASS										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E #	S.D.	A/E $	A/E #	S.D.	A/E %	#	$ (,000)	#	$ (millions)
PREF M NS	58.1	2.4	59.7	39.9	1.6	41.1	609	301,266	618,386	355,180
STD M NS	67.4	2.2	61.2	47.2	1.6	42.6	911	220,678	591,846	241,342
NON-PREF M NS	78.5	0.7	71.5	56.3	0.5	50.3	11,594	1,176,770	1,506,261	256,987
PREF M SM	65.6	5.9	53.5	49.3	4.5	40.8	122	35,232	61,499	26,502
STD M SM	66.5	3.8	53.5	50.4	2.9	41.2	306	37,983	119,960	27,991
NON-PREF M SM	82.1	1.2	73.6	56.5	0.8	50.1	4,670	233,448	477,507	38,025
PREF F NS	62.3	3.1	57.3	47.4	2.3	43.3	410	140,592	590,319	272,031
STD F NS	72.7	2.6	72.8	55.4	2.0	56.1	781	115,591	589,378	161,401
NON-PREF F NS	81.4	0.8	70.1	60.9	0.6	52.9	9,409	565,074	1,564,035	197,237
PREF F SM	69.5	8.9	74.8	61.8	7.9	65.2	61	18,190	36,108	11,989
STD F SM	80.7	5.2	78.9	72.6	4.7	71.0	237	23,286	93,196	13,956
NON-PREF F SM	111.2	1.7	97.6	88.1	1.4	80.5	4,177	144,395	458,677	27,743
TOTAL PREF UW	66.6	1.1	61.2	49.0	0.8	44.2	3,437	892,818	2,700,692	1,110,392
TOTAL NON-PREF UW	83.4	0.5	72.7	60.9	0.4	52.3	29,850	2,119,687	4,006,480	519,991

TABLE 4d. Issue Age

The 2017–2018 study results by issue age are summarized in Table 4d based on the CIA 97–04 and 86–92 tables. Results are grouped by issue age. These results are for the select period only. Results by issue age for the ultimate period are available in the downloadable study data.

TABLE 4d: CIA 2017–2018 STUDY RESULTS BY ISSUE AGE IN THE SELECT PERIOD										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E#	S.D.	A/E $	A/E #	S.D.	A/E $	#	$ (,000)	#	$ (millions)
0–4	64.3	12.6	48.4	37.5	7.4	27.5	26	1,964	296,179	30,297
5–14	71.7	12.1	54.4	46.1	7.8	34.9	35	3,541	198,592	28,492
15–24	106.9	9.1	97.7	73.7	6.3	68.1	137	25,396	324,315	68,704
25–34	64.1	3.5	61.6	45.5	2.5	44.1	334	116,237	1,011,847	392,431
35–44	69.3	2.6	64.5	47.8	1.8	44.6	732	268,618	1,068,150	492,390
45–54	68.8	2.0	60.0	51.2	1.5	42.7	1,246	314,261	714,502	270,358
55–64	64.3	1.8	53.6	51.8	1.4	42.6	1,303	207,182	299,539	74,931
65–74	75.6	2.5	50.3	54.8	1.8	36.8	884	81,931	72,600	11,380
75–89	86.4	5.0	53.1	71.1	4.1	44.0	301	39,527	6,387	1,283
90–120	69.8	40.3	106.8	67.5	39.0	102.2	3	151	22	0.735
Total	69.9	1.0	59.2	52.2	0.7	43.1	5,001	1,058,807	3,992,133	1,370,267

TABLE 4e. Face Amount Band

The 2017–2018 study results by face amount band are summarized in Table 4e based on the CIA 97–04 and 86–92 tables.

TABLE 4e: CIA 2017–2018 STUDY RESULTS BY FACE AMOUNT BAND										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E #	S.D.	A/E $	A/E #	S.D.	A/E $	#	$ (,000)	#	$ (millions)
< $10,000	81.1	0.5	89.4	65.1	0.4	71.4	27,025	132,197	899,745	5,731
$10k–$49,999	87.9	0.5	83.7	66.4	0.4	62.8	29,434	656,555	2,524,827	73,488
$50k–$99,999	75.4	1.0	74.6	55.0	0.7	54.4	6,219	404,969	1,329,069	87,066
$100k–$249,999	71.2	0.9	70.9	51.4	0.7	51.2	5,977	818,449	2,139,465	315,338
$250k–$499,999	67.0	1.8	66.0	48.1	1.3	47.5	1,462	464,023	1,018,960	340,799
$500k–$999,999	65.0	2.4	65.3	46.6	1.7	46.8	711	430,172	673,177	410,717
$1m–$1,999,999	70.3	4.0	69.2	50.3	2.8	49.6	315	365,047	240,174	280,805
$2,000,000 +	59.8	6.4	53.9	43.3	4.6	39.2	87	298,308	59,219	214,992
TOTAL	81.5	0.3	70.4	62.4	0.2	51.3	71,230	3,569,720	8,884,635	1,728,937
Total $100k+	69.7	0.8	66.1	50.3	0.5	47.6	8,552	2,375,999	4,130,995	1,562,651

TABLE 4f. Policy Type

The 2017–2018 study results by policy type are summarized in Table 4f based on the CIA 97–04 and 86–92 tables.

The policy types are:

- Whole Life (WL):
  - Participating and Non-Participating plans.
- Term:
  - T10 and T20 are Renewable Level Term plans for 10 and 20 years, respectively.
  - Premium periods are level premium period (Level) and post-level term period (PLT). The level premium periods for T10 and T20 are durations 1–10 and 1–20, respectively. The PLT is defined as durations 11+ and 21+ for T10 and T20, respectively.
  - T100 is Term to 100.
- Universal Life (UL):
  - UL YRT has YRT Cost of Insurance charges.
  - UL LCOI is UL with Level Cost of Insurance charges and Limited Pay.
- Other:
  - These are all other policy types defined in the instructions in Appendix 2.

TABLE 4f: CIA 2017–2018 STUDY RESULTS BY POLICY TYPE										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E #	S.D.	A/E $	A/E #	S.D.	A/E $	#	$ (,000)	#	$ (millions)
WL	82.9	0.4	76.9	64.3	0.3	56.9	52,297	1,350,846	4,029,958	308,711
T10 Level	56.6	2.0	54.4	44.0	1.6	40.6	775	281,547	742,408	370,335
T10 PLT	109.4	3.6	115.0	76.0	2.5	78.2	940	173,452	210,644	45,656
T20 Level	58.7	2.0	58.2	41.8	1.4	40.7	905	276,085	1,036,086	43,648
T20 PLT	113.9	17.8	163.7	78.8	12.3	111.5	41	7,067	7,754	1,023
UL YRT	83.1	2.2	68.4	59.4	1.6	48.7	1,468	162,259	512,463	95,470
UL LCOI	71.2	1.1	61.2	51.4	0.8	43.8	4,045	554,141	1,212,760	194,987
T100	81.3	1.2	73.5	60.8	0.9	55.3	4,883	413,802	371,247	40,299
Other	84.2	1.1	75.9	63.7	0.8	54.5	5,876	350,522	761,315	235,970
Total	81.5	0.3	70.4	62.4	0.2	51.3	71,230	3,569,720	8,884,635	1,728,937

TABLE 4g. Attained Age

The 2017–2018 study results by attained age are summarized in Table 4g based on the CIA 97–04 and 86–92 tables. Results are grouped by attained age for the ultimate period only.

TABLE 4g: CIA 2017–2018 STUDY RESULTS BY ATTAINED AGE IN THE ULTIMATE PERIOD										
	CIA 97–04			CIA 86–92			ACTUAL DEATHS		EXPOSURES	
	A/E#	S.D.	A/E $	A/E #	S.D.	A/E $	#	$ (,000)	#	$ (millions)
15–19	78.7	19.1	79.0	43.4	10.5	43.6	17	1,023	70,151	4,256
20–29	113.8	8.4	100.6	83.9	6.2	74.1	183	9,159	313,608	18,021
30–39	111.7	6.2	98.0	72.0	4.0	63.8	327	14,967	413,502	22,297
40–49	101.8	3.7	82.3	64.6	2.3	52.9	777	56,078	614,643	56,014
50–59	87.1	1.5	82.3	57.9	1.0	52.6	3,270	289,582	1,133,063	119,062
60–69	70.9	0.8	65.3	54.4	0.6	47.9	8,276	524,201	1,149,367	90,000
70–79	80.0	0.7	68.1	57.0	0.5	47.1	14,924	558,258	730,954	34,747
80–89	94.8	0.6	90.5	70.6	0.5	65.7	24,422	729,125	374,322	12,141
90–99	79.9	0.7	80.9	77.1	0.7	78.7	13,496	319,388	87,238	2,097
100–120	23.9	1.0	67.7	15.2	0.7	48.1	537	9,131	5,655	35
Total	82.6	0.3	76.5	63.3	0.2	55.7	66,229	2,510,913	4,892,502	358,670

7. One-Year Policy Year Study Results

This section provides a summary of the individual policy year results over one-year study periods from 2013–2014 to 2017–2018. Results are provided for select, ultimate, and select and ultimate periods combined. Table 5a shows results based on the CIA 97–04 table and Table 5b shows results based on the CIA 86–92 table.

TABLE 5a: A/E RATIOS BY AMOUNT FOR ONE-YEAR STUDY PERIODS 2013–2014 to 2017–2018					
CIA 97–04	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
SELECT & ULTIMATE					
Male & Female	71.3	73.8	70.1	68.4	70.4
Male	70.8	71.9	69.8	67.1	69.4
Female	72.5	78.2	70.7	71.2	72.5
Male NS	67.3	69.4	67.6	63.6	67.7
Male SM	73.2	70.8	72.4	69.8	67.5
Male UNK	78.9	80.9	77.3	78.9	79.1
Female NS	67.7	73.9	65.8	65.7	67.8
Female SM	84.7	95.2	86.3	91.2	92.1
Female UNK	82.8	83.4	85.1	85.3	84.4
SELECT					
Male & Female	65.8	67.8	65.5	62.7	59.2
Male	66.7	68.0	66.6	63.7	58.4
Female	63.9	67.5	63.3	60.6	60.6
Male NS	68.1	67.2	66.8	64.5	59.2
Male SM	62.5	63.4	65.9	59.3	53.3
Male UNK	61.8	83.4	52.4	50.6	65.1
Female NS	62.3	65.6	61.3	60.5	58.6
Female SM	69.6	80.7	76.4	61.7	76.5
Female UNK	71.0	65.5	70.2	59.9	44.5
ULTIMATE					
Male & Female	74.6	77.5	72.8	71.5	76.5
Male	73.0	74.2	71.6	68.9	75.1
Female	79.0	86.2	75.8	77.9	79.9
Male NS	66.7	71.1	68.1	63.0	73.5
Male SM	80.2	75.6	76.6	76.2	75.8
Male UNK	81.5	80.5	77.5	79.2	79.2
Female NS	72.9	81.5	69.8	69.9	74.8
Female SM	94.8	104.7	92.3	107.5	100.3
Female UNK	85.2	87.6	85.4	85.8	85.3

TABLE 5b: A/E RATIOS BY AMOUNT FOR ONE-YEAR STUDY PERIODS 2013–2014 to 2017–2018					
CIA 86–92	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
SELECT & ULTIMATE					
Male & Female	51.3	53.1	50.8	49.8	51.3
Male	49.7	50.6	49.3	47.6	49.3
Female	55.5	60.0	54.5	55.0	56.2
Male NS	46.6	48.1	47.0	44.4	47.3
Male SM	51.5	49.8	51.1	49.2	47.6
Male UNK	57.8	59.5	58.5	60.1	60.4
Female NS	50.5	55.4	49.5	49.6	51.4
Female SM	70.8	79.8	72.4	76.3	77.4
Female UNK	65.7	66.2	71.2	71.5	70.8
SELECT					
Male & Female	47.6	49.0	47.7	45.7	43.1
Male	47.1	47.8	47.2	45.1	41.3
Female	48.7	51.7	49.0	47.0	47.1
Male NS	47.6	46.8	46.6	45.0	41.3
Male SM	48.5	49.0	51.2	46.0	41.4
Male UNK	40.7	54.9	31.5	30.1	38.9
Female NS	47.1	49.8	46.6	46.1	44.8
Female SM	61.7	71.8	68.3	55.3	68.9
Female UNK	45.5	42.4	44.6	37.8	28.2
ULTIMATE					
Male & Female	53.5	55.7	52.6	52.0	55.7
Male	51.1	52.1	50.5	49.0	53.4
Female	60.7	66.3	58.3	60.1	61.7
Male NS	45.8	49.1	47.3	44.0	51.5
Male SM	53.2	50.2	51.0	50.9	50.7
Male UNK	60.7	60.4	58.8	60.4	60.7
Female NS	53.7	60.5	52.1	52.4	56.3
Female SM	76.3	84.5	74.6	86.8	81.4
Female UNK	71.0	73.4	71.9	72.4	72.1

8. Five-Year Policy Year Study Results

This section provides a summary of the five-year policy results over the period 2009–2018. Results are provided for select, ultimate, and select and ultimate periods combined. Table 6a shows results on the CIA 97–04 basis and Table 6b shows results on the CIA 86–92 basis. The label *2009–2014* indicates policy years 2009–2010 through 2013–2014, and similar labelling applies for the other five-year study results.

TABLE 6a: A/E RATIOS BY AMOUNT FOR FIVE-YEAR STUDY PERIODS					
CIA 97–04	**2009–2014**	**2010–2015**	**2011–2016**	**2012–2017**	**2013–2018**
SELECT & ULTIMATE					
Male & Female	74.8	74.2	72.7	71.2	70.7
Male	74.1	73.1	71.7	70.1	69.8
Female	76.6	76.8	74.9	73.8	73.0
Male NS	70.8	70.0	68.8	66.9	67.1
Male SM	78.3	75.3	73.9	72.5	70.6
Male UNK	80.8	80.7	79.6	79.4	79.1
Female NS	72.5	72.7	70.7	69.2	68.0
Female SM	87.0	89.4	88.1	88.9	90.1
Female UNK	84.3	83.3	82.8	83.4	84.1
SELECT					
Male & Female	69.7	68.4	67.1	65.7	64.0
Male	69.7	68.2	67.1	65.9	64.5
Female	69.7	68.8	67.0	65.2	63.1
Male NS	69.8	68.7	67.5	66.2	64.9
Male SM	70.9	65.9	64.8	63.6	60.8
Male UNK	64.6	68.8	67.3	68.4	72.1
Female NS	69.3	67.9	65.9	64.0	61.5
Female SM	72.4	74.3	74.2	72.2	73.2
Female UNK	68.3	67.5	65.9	65.5	66.7
ULTIMATE					
Male & Female	78.5	78.1	76.3	74.6	74.6
Male	77.1	76.2	74.5	72.5	72.6
Female	82.7	83.6	81.0	80.1	79.7
Male NS	71.8	71.2	69.9	67.5	68.8
Male SM	84.4	82.4	80.2	78.5	76.8
Male UNK	83.0	82.7	81.3	80.5	79.6
Female NS	76.4	78.0	75.4	73.9	73.6
Female SM	99.3	100.9	97.7	99.7	100.1
Female UNK	87.3	86.9	85.9	86.0	85.9

TABLE 6b: A/E RATIOS BY AMOUNT FOR FIVE-YEAR STUDY PERIODS					
CIA 86–92	**2009–2014**	**2010–2015**	**2011–2016**	**2012–2017**	**2013–2018**
SELECT & ULTIMATE					
Male & Female	53.5	53.2	52.3	51.4	51.2
Male	51.8	51.2	50.4	49.4	49.3
Female	58.3	58.6	57.3	56.7	56.2
Male NS	48.8	48.3	47.6	46.4	46.7
Male SM	55.1	53.0	52.0	51.1	49.8
Male UNK	59.0	59.0	58.6	58.9	59.2
Female NS	53.8	54.2	52.8	51.9	51.2
Female SM	72.3	74.5	73.6	74.4	75.5
Female UNK	66.3	65.5	65.8	67.2	68.8
SELECT					
Male & Female	50.3	49.4	48.5	47.6	46.5
Male	49.2	48.1	47.3	46.5	45.6
Female	52.9	52.3	51.2	50.0	48.7
Male NS	48.7	47.9	47.1	46.2	45.2
Male SM	54.5	50.7	50.1	49.2	47.2
Male UNK	42.8	45.5	44.4	44.9	47.1
Female NS	52.0	51.2	49.9	48.6	46.8
Female SM	63.2	65.3	65.6	64.2	65.4
Female UNK	43.4	43.0	41.9	41.8	42.8
ULTIMATE					
Male & Female	55.9	55.8	54.7	53.8	54.0
Male	53.6	53.1	52.2	51.0	51.3
Female	63.1	63.9	62.2	61.6	61.4
Male NS	48.8	48.7	48.1	46.7	47.8
Male SM	55.6	54.4	53.1	52.1	51.1
Male UNK	61.4	61.4	60.7	60.6	60.2
Female NS	55.9	57.3	55.8	54.9	55.0
Female SM	79.3	80.9	78.6	80.4	80.9
Female UNK	72.0	72.0	71.6	72.0	72.2

9. Policy Sizes $1 Million and Higher

Table 7 provides an overview of the data for policies with face amounts of $1,000,000 and higher in the 2017–2018 study by policy count (#) and sum assured ($). Results are also shown for individual policy year studies from 2013–2014 onwards. More refined policy size breakdowns are available in the study data file.

TABLE 7: DATA FOR POLICIES WITH FACE AMOUNT ≥ $1,000,000 2013–2014 to 2017–2018					
	2013–2014	**2014–2015**	**2015–2016**	**2016–2017**	**2017–2018**
Exposure Count	155,360	189,836	253,340	255,117	299,393
Exposure Amount (millions)	315,770	381,070	412,786	425,847	495,798
Claim Count	206	269	264	265	402
Claim Amount (’000)	362,575	538,340	477,345	465,688	663,355
CIA 97–04					
A/E Count	63.1	64.9	54.0	54.2	67.7
A/E Amount	56.5	66.6	55.3	52.3	61.4
CIA 86–92					
A/E Count	44.6	45.9	38.7	38.9	48.6
A/E Amount	40.1	47.3	39.7	37.7	44.4

10. Credits

This report was approved by the CIA Research Council, the Experience Research Committee, and the Project Oversight Group:

Keith Walter	(Research Council Chair)
Damien Lapointe Nguyen	(Experience Research Committee Chair)
Colin Sproat	(Project Oversight Group Chair)

Project oversight group:

Leena Lalith Kumar	Simon Martel
Vera Ljucovic	John Pfeffer
Donna Mann-Campbell	Marie-Claude Rioux

Appendix 1: A description of the fields included in the comma-delimited text file IndLifeMDB.1718.csv.

Year 2018 = Policy Year 2017–2018

Sex 1 = Male; 2 = Female; 0 = Unknown

Smoker 1 = Smoker; 2 = Non-smoker; 3 = Smoking status unknown

Type of Insurance Policy Type:

1. Whole Life
2. Renewable Term with 10-Year Renewal Term (T10)
3. Renewable Term with 20-Year Renewal Term (T20)
4. Other Renewable Terms (ART, T5, T15, Other)
5. Term Rider with 10-Year Renewal Term (T10)
6. Term Rider with 20-Year Renewal Term (T20)
7. Other Renewable Term Riders (ART, T5, T15)
8. Universal Life with YRT Cost of Insurance (UL YRT)
9. Universal Life with Level Cost of Insurance (UL LCOI) or Limited Pay
10. Term to 100
11. Other Permanent
12. Other (includes Other Terms and Other Term Riders)

Face Size

1. < $10,000
2. $10,000–$49,999
3. $50,000–$99,999
4. $100,000–$249,999
5. $250,000–$499,999
6. $500,000–$999,999
7. $1,000,000–$1,999,999
8. $2,000,000 and over

Preferred Class

Policy experience is divided between Preferred and Standard underwriting types. If the underwriting type is Preferred, the policy experience is further divided by Preferred Class as either Preferred (better than standard) or Standard (last) class:

01 = standard underwriting and N/A for preferred class

02 = preferred underwriting and preferred class = standard

03 = preferred underwriting and preferred class = preferred

DB Dur Policy duration

DB Issue Age Issue age

Sum of # Exposed

Sum of $ Exposed

Sum of # Deaths

Sum of $ Claims

8692 # Exp Deaths 8692 QX × Sum of # Exposed / 1000

8692 $ Exp Claims 8692 QX × Sum of $ Exposed / 1000

9704 # Exp Deaths 9704 QX × Sum of # Exposed / 1000

9704 $ Exp Claims 9704 QX × Sum of $ Exposed / 1000

Appendix 2:

THE CANADIAN INSTITUTE OF ACTUARIES INSTRUCTIONS FOR COMPANIES CONTRIBUTING TO THE CANADIAN MORTALITY INVESTIGATION FOR POLICY YEAR 2017-2018

1. BASIS OF MORTALITY INVESTIGATION

a. The study will be carried out on a fifteen-year select and ultimate basis. The age nearest birthday at the anniversary will be used throughout.

b. The expected mortality bases will be CIA 86-92 and CIA 97-04.

c. The mortality investigation will be focused on studying variations by issue age, duration, sex, smoking status, face amount band, preferred class and policy type. Policy type "Other" refers to those policies that cannot be accurately described by any of the given categories. Such plans should be described in a letter accompanying your company's submission.

2. INFORMATION TO BE SUBMITTED

a. *Form of submission:*

The 112-column file may be compressed and should be forwarded to Barbara Thomson no later than September 15, 2019.

b. *Requirements:*

The information required for the investigation will be the exposure between the policy anniversaries in 2017 and 2018. Deaths from those policies will be exposed for the full policy year.

The data should follow these general conditions:

c. *Data to be included:*

1) Policies classified by the Company as "Canadian".
2) Standard issues of the Ordinary Department only.
3) Direct written business (cessions should not be deducted nor accessions added).

d. *Data to be excluded:*

1) Substandard policies.
2) Policies issued without evidence of insurability, i.e., Group Conversions, Pure Endowments, etc.
3) Policies in force under Extended Term Insurance or Reduced Paid-Up provisions.
4) Reinsurance received.
5) Child's Deferred Insurance and similar plans with nominal benefits to age 21, issued without the normal evidence of insurability.
6) Children insured under policies insuring an entire family in one contract.
7) Policies issued as a result of exercise of an option under a guaranteed insurability rider.

8) Policies issued on a "Guaranteed Issue" basis (such as certain Pension Trust business). For example, products that ask few or no questions and guarantee insurance coverage should be excluded. These products sometimes offer a reduced benefit for a period of time.

9) Simplified Issue business. Simplified Issue refers to products that ask a short list of health questions and require no physical evidence. Such products may be included if indicated as Simplified Issue in column 94.

10) Family policy conversions on dependents.

11) Funeral insurance.

12) Bank mortgage insurance. However, decreasing term products that require the same evidence of insurability as ordinary life insurance products may be included.

13) Multi-life policies.

14) Policies with flat extra premiums.

e. *Optional*

The following is the recommended practice for special groups of policies. Any variations from this recommended practice, and your estimate of the extent of the data involved, should be submitted along with your experience.

1) Suicide during the exclusion period. For policies, include both exposures and claims. Include the full amount for exposure and the amount paid for claims.

2) Compromised claims. Same as 1) above.

3) Limited benefits under exclusion clauses (e.g., for aviation, foreign travel, motor sports, sky diving, etc.) Same as 1) above.

4) Term Conversions (original age or attained age). Include if possible but use the issue date of the original term policy.

5) Increasing or decreasing insurance such as pension policies or family income. The exposures and claims by amount must be reported on the same basis.

6) Children's policies. Policies with return of premium benefits or limited death benefits below age 10 are to be included for the ultimate sum assured in both the exposure and the claims.

7) Family policies and Riders. For policies insuring an entire family in one contract, include in the experience the exposures and deaths for the lead policyholder, using, where possible, the amount of insurance on the lead policyholder's life. If it is not feasible to show the amount of insurance on the lead policyholder only and some other amount is reported, then the claims should be reported on the same basis as the exposures. The determination of the amount to be included in both exposures and claims will be left with the individual company reporting. If companies wish to include the data on the spouses insured under such policies, then such data should be included only if normal underwriting standards were applicable to spouses at the time of issue and the true ages can be reported for both exposures and deaths.

8) Joint Life policies. Exclude if more than two lives are involved. If death benefits are payable on both lives, then the data are to be included as two individual records and column 90 = 0, with attention being paid to the classification of the data on each life as to sex, etc. Otherwise, the joint policies are first/last to die and all data should be shown

in one record with column 90 = 1 or 2.

9) Age adjustments on death claims. Where the age is adjusted at the time of a claim, report the death claim according to the true age for the adjusted amount of insurance and leave the exposure unchanged.

10) Policies with liens or rated in age. Companies may not be able to separate these classes from standard policies. In such cases:

   i. Liens. Consider liens in the exposed for the full amount and in the claims for amounts paid.

   ii. Rated in age. Consider exposure and deaths at rated age.

4. *INSTRUCTIONS FOR COMPLETION OF THE EXPOSURE FILE*

The format of the experience file detailing both the exposure and death claims is as follows:

Columns	
1-3	Company code number. The company code allotted in 1951 will be continued for the original companies contributing. New contributors will be advised individually of the company code to use.
4-7	Policy year end (2018)
8-23	Policy number
24-33	Face amount ($)
34-41	Date of issue (ddmmyyyy)
42-49	Date of birth, life 1 (ddmmyyyy)
50-51	Age at issue, life 1 (if DOB not available)
52	Sex, life 1 0 = Unknown 1 = Male 2 = Female
53	Smoking Status, life 1 1 = Smoker 2 = Nonsmoker 3 = Unknown
54-61	Date of birth, life 2 (ddmmyyyy), blank if N/A
62-63	Age at issue, life 2 (if DOB not available), blank if N/A
64	Sex, life 2, blank if N/A 0 = Unknown 1 = Male 2 = Female
65	Smoking status, life 2, blank if N/A 1 = Smoker

2 = Nonsmoker
3 = Unknown

66-73 Date of termination (ddmmyyyy), blank if none

74-75 Duration of termination (if date not available)

76 Termination type

0 = In force (not on waiver)
1 = Death[a]
2 = Surrender
3 = Lapse
4 = Maturity
5 = Reduced paid-up[b]
6 = Conversion (if conversions cannot be separately identified, please code as lapse)
7 = Expiry
8 = Extended term[2]
9 = In force (on waiver)
A = In force (waiver status unknown)

77-86 Death benefit ($)

87-88 Province/territory code for residence at policy issue

AB = Alberta
BC = British Columbia
MB = Manitoba
NB = New Brunswick
NL = Newfoundland and Labrador
NS = Nova Scotia
NT = Northwest Territories
NU = Nunavut
ON = Ontario
PE = Prince Edward Island
QC = Quebec
SK = Saskatchewan
YT = Yukon
UN = Unknown

89 Policy Type

1 = Whole Life (including enhancement plans & paid-up additions)

Renewable Term (previously coded as 2)
A = annual renewal term (ART)
B = 5 year renewal term (T05)
C = 10 year renewal term (T10)
D = 15 year renewal term (T15)

---

[a] Late-reported claims: Previously submitted deaths should not be in your current data submission. If you have late-reported claims, please submit them in this year's data so that they can be assigned the correct age and policy year based on the actual date of death.

[b] Only for the participants who do not exclude those termination types from their data.

E = 20 year renewal term (T20)
F = other renewal term

Universal Life (previously coded as 3)
G = UL YRT Cost of Insurance (UL YRT)
H = UL Level Cost of Insurance (UL LCOI)
P = UL Limited Pay

Term Rider (previously coded as 4)
I = annual renewal term (ART)
J = 5 year renewal term (T05)
K = 10 year renewal term (T10)
L = 15 year renewal term (T15)
M = 20 year renewal term (T20)
N = other term rider

5 = Term to 100
6 = Other Permanent
7 = Other Term
8 = Other (please indicate what plans are being included)

90 Joint Life

0 = No
1 = Last to die
2 = First to die
3 = Unknown type of joint life policy

91 Premium payment mode

0 = Undetermined
1 = Annual
2 = Monthly
3 = Other

92 Source of business

0 = Career agent
1 = Broker
2 = PPGA
3 = Other
4 = Unknown

93 Age last/nearest

0 = Age nearest
1 = Age last
2 = Other

94 Underwriting type

1 = Medical
2 = Nonmedical
3 = Unknown
4 = Paramedical
5 = Simplified Issue*

* If Simplified Issue business cannot be separately identified, please provide the researcher with an estimate of the total block exposure that is Simplified Issue.

95 Leave blank

96 Adjustable Plan (some feature of the plan is adjustable to reflect experience, e.g., Premium, death benefit, cash values)

0 = Unknown
1 = No
2 = Yes

97 Participating

0 = No
1 = Yes

98 Preferred basis indicator

0 = No
1 = Yes

99-100 Preferred class (if column 98 = 1; otherwise leave blank)

01 = Preferred Class 1 Non-smoker
02 = Preferred Class 2 Non-smoker
03 = Preferred Class 3 Non-smoker
….
10 = Standard Class Non-smoker

11 = Preferred Class 1 Smoker
12 = Preferred Class 2 Smoker
….
20 = Standard Class Smoker

21 = Preferred Class 1 Cigar
22 = Preferred Class 2 Cigar
….
30 = Standard Class Cigar

101 Conversion Code

0 = Not from a conversion
1 = Term to Permanent conversion
2 = Term to Term Exchange
3 = Converted from UL YRT
4 = Group Conversion
5 = Converted from other type
6 = Converted from unknown type
7 = Unknown whether this is a conversion

102-109 Date of Conversion (ddmmyyyy) for policies with conversion codes 1-6 above.

110 Did underwriting include a blood test?

0 = Unknown

1 = Yes
2 = No

111 Did underwriting include a urine test?

0 = Unknown
1 = Yes
2 = No

112 Did underwriting include a saliva test?

0 = Unknown
1 = Yes
2 = No

5. AGE LAST BIRTHDAY

The expected mortality rate for age last birthday is equal to the mean of the mortality rates at the particular age at issue/attained age and the rate at the next higher age for the same policy year code.