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Mortality Study

Canadian Standard Ordinary Life Experience 2016–2017 Using 86–92 and 97-04 Tables

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Mortality Under Canadian Standard Ordinary Insurance Issues Studied Between the 2016 and 2017 Policy Anniversaries Using the CIA 97–04 and CIA 86–92 Tables

Executive Summary

This is the 68th 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 2016 and 2017 on an age nearest birthday basis. It has been approved by the CIA Research Council.

This report presents the high-level findings of the 2016–2017 mortality study based on the CIA 86–92 and CIA 97–04 expected bases.

The tables listed below are appended in Excel format 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 2016–2017 STUDY RESULTS	
Table A1	Total experience by groups of durations and ages, select and ultimate
Table A2	Table A1 further classified by sex
Table A3	Total experience by smoking status and sex
Table A4	Total experience by policy type
Table A5	Total experience by smoking status, sex, face amount band and preferred status
	Tables A1, A2, A3 based on five-year aggregate data (policy years 2012–2013 through 2016–2017)
	Tables A1, A2, A3 by face amount band

In addition, the data are available in a comma-delimited text file that can be downloaded from the CIA website. The file is ***IndLifeMDB.1617.zip***. Note that this file is for the one-year study period 2016–2017. A description of the fields is included in Appendix 1 to this report.

Previous year data files are also available on the CIA website in the same format. The user may combine the 2016–2017 data with data files from previous study years to generate a multi-year study.

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 Policy Type and Duration filters in the downloadable data files.

Since 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 is 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.

We have attempted to isolate conversions since the 2012–2013 study and the process has improved with successive studies. This is the second year where known conversions have been excluded. Prior study years have some conversions in the study data. Conversions account for 8.2% of total exposures in 2016–2017, ranging from 0% to 16.2% by company. Without conversions, the A/E by count and the A/E by amount are 81.1% and 68.4%, respectively. The comparable A/E results are 82.4% and 70.2% when conversions are included.

Actual and exposure counts were removed for riders and for policies with multiple coverages on the same policy number when the Policy 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. 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.
b. In the 2013–2014 and 2014–2015 studies, we did not include conversions with issue dates equal to the conversion dates.
c. In the 2013–2014 study, we asked each contributing company whether lapse terminations are 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.

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. Starting in 2011–2012, we added more detailed options to the "Type of insurance" field. The number of product type options increased from eight to 19.
f. For the 2010–2011 report, the original version of the C86–92 tables was replaced with the widely used C86–92 tables in the AXIS actuarial software.
g. There were no methodological changes in the 2007–2008, 2008–2009, or 2009–2010 reports.

3. Participating Companies

The 2016–2017 study is based on data from seven 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 2014–2015 AND 2015–2016 STUDIES

Company	Contribution %	
	2015–2016	2016–2017
Desjardins/Laurentian	3.4%	3.8%
Equitable	4.5%	5.3%
Great-West Life	24.4%	27.7%
Industrial Alliance	12.0%	13.4%
ivari	10.2%	0.0%
Manulife	22.6%	24.3%
RBC Insurance	6.1%	6.7%
Sun Life	16.8%	18.7%
Total Exposures	100.0%	100.0%

4. Deviation of Results

Throughout the report, we include the standard deviation (S.D.) for each of the mortality results. The S.D. is an estimate of the 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 S.D. 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 (first line of Table 5a). The absolute relative deviation is calculated as:

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

The median relative Percentage Departure is 8.2% using the 97–04 rates (8.3% using 86–92). The results in Table 2 apply to results on the CIA 97–04 and CIA 86–92 tables.

TABLE 2: COMPANY EXPERIENCE – RATIO VARIABILITY			
Percentage Departure	**Number of Companies**	**Actual Claims**	**Percentage of Claims**
5% or less	2	$440,045,567	14.8%
> 5% and <= 10%	3	$2,355,573,900	79.0%
> 10% and <= 15%	2	$185,646,505	6.2%
Total	7	$2,981,265,972	100.0%

5. Study Data Overview

Tables 3(a–d) provide a comparison of the total exposures, death claims, average claim, and average exposure in the 2016–2017 study to previous policy year studies.

TABLE 3a: TOTAL EXPOSURES BY POLICY YEAR 2012–2013 TO 2016–2017					
Exposures	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**
By Number	8,917,330	8,104,149	8,509,835	8,855,856	8,330,888
By Amount (millions)	1,384,280	1,301,344	1,512,191	1,565,428	1,494,492

TABLE 3b: DEATH CLAIMS BY POLICY YEAR 2012–2013 TO 2016–2017					
Death Claims	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**
By Number	65,611	64,722	68,583	67,501	66,978
By Amount (’000)	2,566,749	2,560,849	3,090,612	3,094,109	2,981,266

TABLE 3c: AVERAGE CLAIMS BY POLICY YEAR 2012–2013 TO 2016–2017					
Average Claim	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**
By Amount	39,121	39,567	45,064	45,838	44,511

TABLE 3D: AVERAGE EXPOSURES (SUM ASSURED) BY POLICY YEAR 2012–2013 TO 2016–2017					
Average Exposures	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**
Males	174,962	180,663	199,878	198,238	200,856
Females	133,040	138,159	153,142	153,205	156,087
Combined	155,235	160,578	177,699	176,768	179,392

6. Study Results

Tables 4(a–g) present the study results by the following segments: duration, sex and smoker status, preferred status, issue age, face amount band, policy type, and attained age. Additional data splits are available in the appended tables, and even more refinements are possible using the data downloaded 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 2016–2017 study results by duration are summarized in Table 4a based on the CIA 97–04 and 86–92 tables. The results are shown separately for the select and ultimate period.

TABLE 4a: CIA 2016–2017 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	62.5	4.0	51.7	47.7	3.0	38.6	248	72,298	680,405	279,267
3–5	69.8	2.7	69.7	56.4	2.2	53.4	681	210,786	849,802	327,321
6–10	69.0	1.7	57.6	52.4	1.3	42.0	1,680	371,659	1,264,810	411,395
11–15	76.3	1.6	68.2	54.5	1.2	48.0	2,211	325,500	837,875	165,408
Total	71.9	1.0	62.7	53.6	0.8	45.7	4,820	980,244	3,632,891	1,183,391
Ultimate Period										
16–20	77.1	1.2	65.0	54.5	0.9	45.3	4,063	370,157	852,503	106,990
21–25	85.9	1.0	67.9	62.7	0.7	48.8	7,574	454,312	920,650	82,791
26+	81.7	0.4	75.5	63.6	0.3	56.1	50,521	1,176,552	2,924,843	121,320
Total	81.9	0.3	71.5	62.8	0.3	52.0	62,158	2,001,022	4,697,997	311,101
Grand Total	81.1	0.3	68.4	62.0	0.2	49.8	66,978	2,981,266	8,330,888	1,494,492

TABLE 4b. Sex and Smoker Status

The 2016–2017 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 2016–2017 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	75.1	0.7	63.6	53.4	0.5	44.4	11,344	1,331,204	2,448,068	734,485
M SM	78.7	1.2	69.8	54.5	0.8	49.2	4,625	280,435	636,064	85,020
M UNK	79.6	0.5	78.9	62.7	0.4	60.1	24,608	417,985	1,252,552	51,543
M	78.2	0.4	67.1	58.8	0.3	47.6	40,577	2,029,624	4,336,685	871,049
F NS	79.5	0.8	65.7	59.4	0.6	49.6	9,326	667,847	2,466,901	532,739
F SM	105.4	1.7	91.2	84.3	1.3	76.3	4,050	163,343	572,324	50,059
F UNK	86.1	0.8	85.3	70.4	0.6	71.5	13,025	120,452	954,978	40,646
F	86.0	0.5	71.2	67.7	0.4	55.0	26,401	951,642	3,994,203	623,444
NS	77.0	0.5	64.3	56.0	0.4	46.0	20,670	1,999,051	4,914,969	1,267,224
SM	89.2	1.0	76.4	65.3	0.7	56.6	8,675	443,778	1,208,388	135,080
UNK	81.7	0.4	80.3	65.1	0.3	62.3	37,633	538,437	2,207,530	92,189
Total	81.1	0.3	68.4	62.0	0.2	49.8	66,978	2,981,266	8,330,888	1,494,492

TABLE 4c. Preferred vs. Standard Underwriting

The 2016–2017 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 split into Non-Smoker and Smoker classes. Non-Preferred Underwriting is split into two classes: Non-Smoker and Smoker. At the bottom of the table we include totals by type of underwriting: Preferred Underwriting (Pref UW), which includes four classes, and Non-Preferred Underwriting (Non-Pref UW), which includes two classes. Unknown smoking status is excluded.

TABLE 4c: CIA 2016–2017 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	61.9	2.7	61.2	42.7	1.8	42.4	545	255,582	542,274	304,799
STD M NS	72.8	2.7	60.3	51.3	1.9	42.2	707	154,464	455,290	186,069
Non-Pref M NS	76.1	0.8	64.9	54.3	0.5	45.4	10,092	921,158	1,450,504	243,618
Pref M SM	47.6	5.2	39.8	36.1	4.0	30.7	83	24,438	60,904	25,996
STD M SM	66.1	4.3	73.6	50.8	3.3	57.6	239	38,741	99,306	21,752
Non-Pref M SM	80.5	1.2	75.5	55.3	0.8	51.3	4,303	217,255	475,854	37,272
Pref F NS	60.5	3.3	57.3	46.1	2.5	43.3	333	114,080	514,259	228,733
STD F NS	69.2	3.0	62.7	52.7	2.3	48.3	548	68,275	448,214	118,162
Non-Pref F NS	81.3	0.9	68.5	60.6	0.7	51.5	8,445	485,492	1,504,428	185,843
Pref F SM	55.2	8.2	61.2	48.9	7.3	53.3	45	13,607	35,774	11,744
STD F SM	81.4	5.9	58.6	73.3	5.3	52.8	190	12,645	79,248	10,974
Non-Pref F SM	108.1	1.8	101.2	85.7	1.4	83.3	3,815	137,091	457,301	27,341
Total Pref UW	66.5	1.3	59.8	49.2	0.9	43.4	2,690	681,832	2,235,270	908,230
Total Non-Pref UW	82.0	0.5	69.0	59.6	0.4	49.5	26,655	1,760,997	3,888,087	494,074

TABLE 4d. Issue Age

The 2016–2017 study results by issue age are summarized in Table 4d based on the CIA 97–04 and 86–92 tables. Results are shown by 10-year issue age groupings. 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 2016–2017 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	59.4	12.4	40.5	34.6	7.2	22.9	23	1,474	278,775	26,449
5–14	93.8	14.5	102.7	60.2	9.3	66.0	42	5,676	179,495	24,210
15–24	70.5	7.7	53.8	48.7	5.3	37.6	83	11,763	294,154	57,440
25–34	69.7	3.8	63.1	49.4	2.7	45.2	331	101,215	913,532	334,631
35–44	70.8	2.7	65.9	48.9	1.9	45.6	689	236,904	964,264	426,418
45–54	69.1	2.0	71.4	51.6	1.5	50.8	1,152	322,455	652,953	237,380
55–64	65.1	1.9	47.8	52.4	1.5	37.9	1,228	160,456	274,118	65,110
65–74	85.3	2.7	63.3	61.4	2.0	46.1	975	96,999	69,086	10,445
75–89	81.9	4.8	59.0	67.5	3.9	48.8	293	43,242	6,497	1,307
90–120	115.0	57.5	49.4	113.3	56.7	47.6	4	61	17	0.668
Total	71.9	1.0	62.7	53.6	0.8	45.7	4,820	980,244	3,632,891	1,183,391

TABLE 4e. Face Amount Band

The 2016–2017 study results by face amount band are summarized in Table 4e based on the CIA 97–04 and 86–92 tables.

TABLE 4e: CIA 2016–2017 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	81.8	0.5	89.5	65.5	0.4	71.2	27,352	132,748	944,562	6,024
$10k–$49,999	85.7	0.5	82.3	64.5	0.4	61.6	26,980	604,374	2,526,362	73,151
$50k–$99,999	76.1	1.0	75.1	55.4	0.7	54.7	5,592	366,473	1,261,528	82,864
$100k–$249,999	71.5	1.0	70.9	51.5	0.7	51.2	5,095	696,934	1,908,122	279,046
$250k–$499,999	61.8	1.8	62.6	44.4	1.3	45.0	1,116	362,851	873,771	286,446
$500k–$999,999	64.9	2.7	65.5	46.5	1.9	47.0	578	352,197	561,425	341,114
$1,000,000 +	54.2	3.3	52.3	38.9	2.4	37.7	265	465,688	255,117	425,847
Total	81.1	0.3	68.4	62.0	0.2	49.8	66,978	2,981,266	8,330,888	1,494,492
Total $100k+	68.4	0.8	62.8	49.3	0.6	45.2	7,054	1,877,670	3,598,436	1,332,453

TABLE 4f. Policy Type

The 2016–2017 study results by policy type are summarized in Table 4f based on the 97–04 and 86–92 tables. WL includes Participating and Non-Participating Whole Life plans. T10 and T20 are Renewable Term plans for 10 and 20 years, respectively. T10 and T20 are split into the pre-renewal period (PRE) and post-renewal period (POST). The pre-renewal period for T10 and T20 is durations 1–10 and 1–20, respectively. The post-renewal is defined as durations 11+ and 21+ for T10 and T20, respectively. UL-YRT is Universal Life with YRT Cost of Insurance charges. UL-LCOI is Universal Life with Level Cost of Insurance charges and Limited-Pay Universal Life.

TABLE 4f: CIA 2016–2017 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	82.7	0.4	75.4	64.0	0.3	55.6	50,992	1,235,170	4,059,907	294,746
T10 PRE	59.8	2.2	55.8	46.4	1.7	41.5	710	249,827	670,539	328,394
T10 POST	95.6	3.5	99.6	66.2	2.4	67.6	744	132,949	199,988	41,561
T20 PRE	64.9	2.3	66.9	46.4	1.7	47.0	773	240,917	863,954	357,701
T20 POST	122.2	25.0	104.9	86.4	17.6	71.6	24	2,040	4,204	490
UL-YCOI	85.7	2.4	64.4	61.3	1.7	45.8	1,285	118,468	387,371	66,802
UL-LCOI	69.9	1.2	55.6	50.6	0.9	39.8	3,251	403,337	1,075,617	171,584
T100	75.2	1.3	64.2	56.1	0.9	48.1	3,583	291,885	312,655	32,825
Other	82.2	1.1	73.9	62.0	0.8	53.0	5,616	306,673	756,652	200,390
Total	81.1	0.3	68.4	62.0	0.2	49.8	66,978	2,981,266	8,330,888	1,494,492

TABLE 4g. Attained Age

The 2016–2017 study results by attained age are summarized in Table 4g based on the CIA 97–04 and 86–92 tables. Results are shown by 10-year attained-age groupings for the ultimate period only.

TABLE 4g: CIA 2016–2017 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	102.8	21.0	74.4	56.7	11.6	41.0	24	998	75,528	4,401
20–29	102.9	7.9	104.8	75.7	5.8	77.0	168	9,201	319,559	17,471
30–39	109.2	6.2	87.0	70.5	4.0	56.7	314	12,224	407,811	20,529
40–49	94.6	3.6	80.2	60.0	2.3	51.5	696	48,009	590,439	48,937
50–59	87.7	1.5	74.6	58.3	1.0	47.7	3,227	231,190	1,101,414	103,712
60–69	71.0	0.8	63.8	54.6	0.6	46.8	7,910	434,076	1,080,988	75,249
70–79	79.3	0.7	65.8	56.6	0.5	45.6	13,801	447,674	673,971	28,368
80–89	93.2	0.6	78.7	69.4	0.5	57.2	23,254	560,559	362,932	10,703
90–99	79.4	0.7	78.7	76.6	0.7	76.6	12,313	250,634	80,287	1,702
100–120	22.4	1.1	57.6	14.3	0.7	40.2	451	6,458	5,067	29
Total	81.9	0.3	71.5	62.8	0.3	52.0	62,158	2,001,022	4,697,997	311,101

7. One-Year Policy Year Study Results

This section provides a summary of the individual policy year results over the period 2012–2013 to 2016–2017. Results are provided separately 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 2012–2013 to 2016–2017

CIA 97–04	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017
Select & Ultimate					
Male & Female	73.0	71.3	73.8	70.1	68.4
Male	71.3	70.8	71.9	69.8	67.1
Female	77.4	72.5	78.2	70.7	71.2
Male NS	66.8	67.3	69.4	67.6	63.6
Male SM	77.1	73.2	70.8	72.4	69.8
Male UNK	80.6	78.9	80.9	77.3	78.9
Female NS	74.7	67.7	73.9	65.8	65.7
Female SM	86.5	84.7	95.2	86.3	91.2
Female UNK	81.1	82.8	83.4	85.1	85.3
Select					
Male & Female	66.5	65.8	67.8	65.5	62.7
Male	64.4	66.7	68.0	66.6	63.7
Female	71.0	63.9	67.5	63.3	60.6
Male NS	64.4	68.1	67.2	66.8	64.5
Male SM	66.4	62.5	63.4	65.9	59.3
Male UNK	60.5	61.8	83.4	52.4	50.6
Female NS	71.8	62.3	65.6	61.3	60.5
Female SM	71.3	69.6	80.7	76.4	61.7
Female UNK	60.7	71.0	65.5	70.2	59.9
Ultimate					
Male & Female	77.7	74.6	77.5	72.8	71.5
Male	75.8	73.0	74.2	71.6	68.9
Female	83.1	79.0	86.2	75.8	77.9
Male NS	68.9	66.7	71.1	68.1	63.0
Male SM	85.2	80.2	75.6	76.6	76.2
Male UNK	84.3	81.5	80.5	77.5	79.2
Female NS	78.0	72.9	81.5	69.8	69.9
Female SM	98.3	94.8	104.7	92.3	107.5
Female UNK	86.1	85.2	87.6	85.4	85.8

TABLE 5b: A/E RATIOS BY AMOUNT FOR ONE-YEAR STUDY PERIODS 2012–2013 to 2016–2017					
CIA 86–92	**2012–2013**	**2013–2014**	**2014–2015**	**2015–2016**	**2016–2017**
Select & Ultimate					
Male & Female	52.3	51.3	53.1	50.8	49.8
Male	49.9	49.7	50.6	49.3	47.6
Female	59.0	55.5	60.0	54.5	55.0
Male NS	46.1	46.6	48.1	47.0	44.4
Male SM	54.2	51.5	49.8	51.1	49.2
Male UNK	58.7	57.8	59.5	58.5	60.1
Female NS	55.6	50.5	55.4	49.5	49.6
Female SM	72.2	70.8	79.8	72.4	76.3
Female UNK	63.2	65.7	66.2	71.2	71.5
Select					
Male & Female	47.9	47.6	49.0	47.7	45.7
Male	45.3	47.1	47.8	47.2	45.1
Female	53.8	48.7	51.7	49.0	47.0
Male NS	44.9	47.6	46.8	46.6	45.0
Male SM	51.1	48.5	49.0	51.2	46.0
Male UNK	40.0	40.7	54.9	31.5	30.1
Female NS	54.0	47.1	49.8	46.6	46.1
Female SM	62.8	61.7	71.8	68.3	55.3
Female UNK	38.1	45.5	42.4	44.6	37.8
Ultimate					
Male & Female	55.4	53.5	55.7	52.6	52.0
Male	52.8	51.1	52.1	50.5	49.0
Female	63.5	60.7	66.3	58.3	60.1
Male NS	47.1	45.8	49.1	47.3	44.0
Male SM	56.2	53.2	50.2	51.0	50.9
Male UNK	62.7	60.7	60.4	58.8	60.4
Female NS	57.3	53.7	60.5	52.1	52.4
Female SM	78.8	76.3	84.5	74.6	86.8
Female UNK	71.3	71.0	73.4	71.9	72.4

8. Five-Year Policy Year Study Results

This section provides a summary of the five-year policy results over the period 2008–2017. Results are provided separately 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 2008–2013 indicates policy years 2008–2009 through 2012–2013, 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	2008–2013	2009–2014	2010–2015	2011–2016	2012–2017
Select & Ultimate					
Male & Female	77.6	74.8	74.2	72.7	71.2
Male	76.9	74.1	73.1	71.7	70.1
Female	79.5	76.6	76.8	74.9	73.8
Male NS	73.8	70.8	70.0	68.8	66.9
Male SM	81.7	78.3	75.3	73.9	72.5
Male UNK	82.6	80.8	80.7	79.6	79.4
Female NS	75.9	72.5	72.7	70.7	69.2
Female SM	88.8	87.0	89.4	88.1	88.9
Female UNK	86.2	84.3	83.3	82.8	83.4
Select					
Male & Female	72.5	69.7	68.4	67.1	65.7
Male	71.8	69.7	68.2	67.1	65.9
Female	73.9	69.7	68.8	67.0	65.2
Male NS	71.3	69.8	68.7	67.5	66.2
Male SM	75.8	70.9	65.9	64.8	63.6
Male UNK	65.6	64.6	68.8	67.3	68.4
Female NS	73.7	69.3	67.9	65.9	64.0
Female SM	76.5	72.4	74.3	74.2	72.2
Female UNK	68.0	68.3	67.5	65.9	65.5
Ultimate					
Male & Female	81.6	78.5	78.1	76.3	74.6
Male	80.5	77.1	76.2	74.5	72.5
Female	84.9	82.7	83.6	81.0	80.1
Male NS	76.3	71.8	71.2	69.9	67.5
Male SM	87.2	84.4	82.4	80.2	78.5
Male UNK	84.4	83.0	82.7	81.3	80.5
Female NS	78.8	76.4	78.0	75.4	73.9
Female SM	100.4	99.3	100.9	97.7	99.7
Female UNK	89.2	87.3	86.9	85.9	86.0

TABLE 6b: A/E RATIOS BY AMOUNT FOR FIVE-YEAR STUDY PERIODS					
CIA 86–92	**2008–2013**	**2009–2014**	**2010–2015**	**2011–2016**	**2012–2017**
Select & Ultimate					
Male & Female	55.4	53.5	53.2	52.3	51.4
Male	53.7	51.8	51.2	50.4	49.4
Female	60.4	58.3	58.6	57.3	56.7
Male NS	50.7	48.8	48.3	47.6	46.4
Male SM	57.6	55.1	53.0	52.0	51.1
Male UNK	60.2	59.0	59.0	58.6	58.9
Female NS	56.1	53.8	54.2	52.8	51.9
Female SM	73.5	72.3	74.5	73.6	74.4
Female UNK	67.9	66.3	65.5	65.8	67.2
Select					
Male & Female	52.3	50.3	49.4	48.5	47.6
Male	50.7	49.2	48.1	47.3	46.5
Female	56.1	52.9	52.3	51.2	50.0
Male NS	49.7	48.7	47.9	47.1	46.2
Male SM	58.2	54.5	50.7	50.1	49.2
Male UNK	43.5	42.8	45.5	44.4	44.9
Female NS	55.2	52.0	51.2	49.9	48.6
Female SM	66.2	63.2	65.3	65.6	64.2
Female UNK	43.1	43.4	43.0	41.9	41.8
Ultimate					
Male & Female	57.8	55.9	55.8	54.7	53.8
Male	55.8	53.6	53.1	52.2	51.0
Female	64.6	63.1	63.9	62.2	61.6
Male NS	51.6	48.8	48.7	48.1	46.7
Male SM	57.2	55.6	54.4	53.1	52.1
Male UNK	62.2	61.4	61.4	60.7	60.6
Female NS	57.3	55.9	57.3	55.8	54.9
Female SM	79.7	79.3	80.9	78.6	80.4
Female UNK	73.1	72.0	72.0	71.6	72.0

9. Policy Sizes $1 Million and Higher

Table 7 provides an overview of the data for policies with face amounts $1,000,000 and higher in the 2016–2017 study. Results by policy count (#) and sum assured ($) are also shown for individual policy year studies from 2012–2013 on.

TABLE 7: DATA FOR POLICIES WITH FACE AMOUNT ≥ $1,000,000 2012–2013 to 2016–2017

	2012–2013	2013–2014	2014–2015	2015–2016	2016–2017
Exposure Count	199,553	155,360	189,836	253,340	255,117
Exposure Amount (millions)	317,480	315,770	381,070	412,786	425,847
Claim Count	226	206	269	264	265
Claim Amount (’000)	362,579	362,575	538,340	477,345	465,688
CIA 97–04					
A/E Count	61.7	63.1	64.9	54.0	54.2
A/E Amount	57.7	56.5	66.6	55.3	52.3
CIA 86–92					
A/E Count	43.6	44.6	45.9	38.7	38.9
A/E Amount	40.9	40.1	47.3	39.7	37.7

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:

Donna Mann-Campbell
Dan (Anh-Khoa) Le
Vera Ljucovic
Simon Martel
John Pfeffer
Marie-Claude Rioux

Appendix 1: A Description of the Fields Included in the Comma-Delimited Text File IndLifeMDB.1617.csv

Year 2017 = Policy Year 2016–2017

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 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 2016-2017

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. Males and females will be studied separately.

d. Smokers and non-smokers will be studied separately.

e. Policies will be studied separately by plan of insurance. "Other" policies refer to those that cannot be accurately described as 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 109-column file may be compressed and should be forwarded to Barbara Thomson no later than September 15, 2018.

b. *Requirements:*

The information required for the investigation will be the exposure between the policy anniversaries in 2016 and 2017. 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 (also see below).

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. Products that fall into the Simplified Issue definition above should be included if they can be separately identified.

9) Family policy conversions on dependents.

10) Funeral insurance.

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

12) Multi-life policies.

13) 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.

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.

11) Policies with flat extra premiums. These are to be excluded.

4. *INSTRUCTIONS FOR COMPLETION OF 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	Study year (2017)
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 Leave blank

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)
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)

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[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.

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, 2, 3, 4, or 5 above.

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.