Mortality Study

Canadian Standard Ordinary Life Experience 2013-2014 Using 97-04 Tables

Individual Life Experience Subcommittee – Research Committee

June 2016

Mortality under Canadian Standard Ordinary Insurance Issues Studied Between the 2013 and 2014 Anniversaries Using 97–04 Tables

This is the 65th annual report submitted by the Individual Life Experience Subcommittee of the Research Committee detailing the intercompany mortality experience for Canadian standard ordinary life insurance policies. This is the 21st year that we have collected data in a seriatim format.

We calculated exposure using the "actuarial exposure" method, in which a full year of exposure is credited in the year of death. For data with attained age less than 16, we assigned mortality rates from the aggregate expected table. For data submitted without classification by sex, we used the male table. Substandard policies, joint policies, group conversions, and guarantee issue policies are excluded from the study.

This is the ninth year that participating companies provided a preferred basis indicator (yes, no). Those companies that have that indicator also designated whether the business is standard or preferred, smoker, non-smoker, or cigar-smoker, and the class. If the underwriting type is Preferred, the class is either Preferred (better than Standard) or Standard (last) class.

This year we added UL Limited Pay as an option for Policy Type, Simplified Issue as an option for Underwriting Type, and a Conversion Type indicator. In the case of a conversion, Conversion Date was also included. This year we asked companies to provide experience for converted policies separately. We excluded all policies reported as "conversion" with an issue date equal to the conversion date. However, at least one company was not able to separately identify converted policies, so these policies with unknown conversion status are still included in the study. Since not all companies were able to provide sufficient conversion information, experience for converted policies is not shown separately.

This year the subcommittee continued to remove all "Evidence" information from the tables, as too few companies contributed data for this field. Policies reported as Simplified Issue are included in the study but represent less than 0.2% of deaths by count and less than 0.5% by claim amount. If these policies were removed from the study, the overall A/E by number would change from 84.1% to 84.0%. The A/E by amount would change from 71.3% to 71.2%. As with other Evidence fields, the experience for Simplified Issue business is not shown separately because too few companies provided the information.

Last year we asked each contributing company whether it reports lapse terminations as of the beginning of the grace period or the end of the grace period. More than half of the contributing companies report that lapse terminations' effective dates are set to the beginning of the grace period. No adjustments were made to the termination dates reported.

The table column entitled S.D. provides estimates of the standard deviation of the ratios of actual to expected numbers of deaths. These numbers measure the degree of confidence in the ratios. The formula used to calculate the standard deviations is

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

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

The following appended historically numbered tables comprise the results of the 2013–2014 mortality study and are based on an age-nearest-birthday basis:

- **Table 1** The total experience analyzed for the select period by groups of duration and by groups of ages at issue and for the ultimate period by groups of attained ages;
- **Table 2** Table 1 classified by sex;
- **Table 8** Total experience by smoking status, sex, and band;
- **Table 9** Total experience by type of insurance; and
- **Table 10** Total experience by smoking status, sex, band, and preferred status.
- We show **tables 1, 2,** and **8** based on **five-year aggregate** data (2009–2014).
- We have also included **tables 1, 2**, and **8** broken down by the following **face amount bands**:
  - < $10,000;
  - $10,000–$49,999;
  - $50,000–$99,999;
  - $100,000–$249,999;
  - $250,000–$499,999;
  - $500,000–$999,999; and
  - $1,000,000 and over.

The above tables are appended in Excel format; they have indices at the tops of the files with links to each of the individual tables below the indices.

In addition, we have provided the data as a comma-delimited text file that can be downloaded from the CIA website. The file is IndLifeMDB.1314.zip. A description of the included fields is in the appendix to this report.

The 2013–2014 study is based on data from seven contributing companies. The contribution columns in table C1 below are based on exposure dollar amounts. Percentages may not add up to 100% due to rounding.

Table C1. Companies that Participated in the 2012–2013 and 2013–2014 Studies

Company	Includes	Contribution	
		2012–2013	**2013–2014**
Desjardins Laurentian Life	Imperial Life; Laurier	3.1%	3.5%
Equitable		3.8%	4.7%
Great-West Life	London Life; Canada Life	23.8%	27.3%
Industrial Alliance		11.5%	13.0%
Manulife	Maritime Life	21.8%	25.4%
RBC		6.6%	7.4%
Sun Life		18.8%	18.7%
Transamerica/ivari		10.6%	0.00%
Total Exposures		100.00%	100.00%

Table C2. Company Experience Ratio Variability

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
10% or less	2	$1,024,312,950	40.0%
Over 10%	5	$1,536,536,047	60.0%
Total	7	$2,560,848,997	100%

Percentage Departure represents the absolute relative deviation of the company-specific A/E by amount from the overall A/E by amount (first line of table C4). The absolute relative deviation is calculated as abs[(Company A/E) / (Overall A/E) – 1]. The median relative Percentage Departure = 11.4%.

Tables C3(a–d): comparison of 2013–2014 total exposures, death claims, average claims, and average exposures with previous studies.

Table C3a. Total Exposures

Exposures	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
By Number	8,895,687	8,937,129	8,779,040	8,917,330	8,104,149
By Amount (Millions)	$1,169,855	$1,217,823	$1,270,814	$1,384,280	$1,301,344

Table C3b. Death Claims

Death Claims	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
By Number	62,851	63,901	63,269	65,611	64,722
By Amount ('000)	$2,166,285	$2,320,143	$2,427,673	$2,566,749	$2,560,849

Table C3c. Average Claims

Average Claim	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
By Amount	$34,467	$36,308	$38,371	$39,121	$39,567

Table C3d. Average Exposures (Sum Assured)

Average Exposures	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
Males	$148,989	$154,464	$163,491	$174,962	$180,663
Females	$111,209	$115,397	$123,431	$133,040	$138,159
Combined	$131,508	$136,266	$144,755	$155,235	$160,578

Table C4. Comparison of Ratios (A/E) by Amount

	Experience	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
Male & Female	Select & Ultimate	77.2	77.8	75.9	73.0	71.3
Male	Select & Ultimate	77.1	77.0	75.6	71.3	70.8
Female	Select & Ultimate	77.5	79.7	76.4	77.4	72.5
Male & Female	Select	74.4	72.4	69.9	66.5	65.8
Male	Select	75.4	72.7	69.8	64.4	66.7
Female	Select	72.2	71.8	70.1	71.0	63.9
Male & Female	Ultimate	79.5	82.0	80.2	77.7	74.6
Male	Ultimate	78.4	80.1	79.5	75.8	73.0
Female	Ultimate	83.1	87.7	82.3	83.1	79.0
Male, Smoker	Select	86.6	71.0	65.8	66.4	62.5
Male, Non-smoker	Select	72.8	72.8	71.5	64.4	68.1
Male, Unclassified	Select	78.9	75.6	62.3	60.5	61.8
Female, Smoker	Select	72.0	77.0	72.0	71.3	69.6
Female, Non-smoker	Select	72.2	70.4	70.0	71.8	62.3
Female, Unclassified	Select	75.2	76.6	66.6	60.7	71.0
Male, Smoker	Ultimate	83.9	88.0	85.9	85.2	80.2
Male, Non-smoker	Ultimate	74.7	75.1	76.0	68.9	66.7
Male, Unclassified	Ultimate	81.5	84.8	82.9	84.3	81.5
Female, Smoker	Ultimate	97.5	108.2	99.3	98.3	94.8
Female, Non-smoker	Ultimate	75.5	80.5	76.5	78.0	72.9
Female, Unclassified	Ultimate	90.4	90.7	85.3	86.1	85.2
Male, Smoker, Preferred	Select & Ultimate	78.3	61.8	65.1	47.7	48.7
Male, Non-smoker, Preferred	Select & Ultimate	62.8	62.5	66.0	53.2	66.9
Female, Smoker, Preferred	Select & Ultimate	38.0	52.1	51.5	44.2	58.1
Female, Non-smoker, Preferred	Select & Ultimate	65.3	63.6	64.0	53.7	66.4

Table C5. Exposures for Policies with Face Amounts ≥ $1,000,000 Included in the Most Recent Five Studies

	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
Exposure #	142,230	158,982	174,737	199,553	155,360
Exposure Amount ('000)	$230,526,620	$252,392,630	$278,461,795	$317,479,575	$315,769,764
A/E #	69.8	64.0	61.0	61.7	63.1
A/E Amount	62.4	60.9	62.7	57.7	56.5

Table C6. Claims for Policies with Death Benefit Amounts ≥ $1,000,000 Included in the Most Recent Five Studies

	2009–2010		2010–2011		2011–2012		2012–2013		2013–2014	
	#	$ (Millions)	#	$ (Millions)	#	$ (Millions)	#	$ (Millions)	#	$ (Millions)
Select										
Male Smokers	15	34.350	10	13.150	10	13.640	14	21.002	10	15.556
Male Non-smokers	88	142.046	80	142.714	92	164.421	87	133.613	78	156.222
Unclassified Males	0	0	13	17.000	5	14.000	17	20.100	11	16.000
Female Smokers	2	3.007	1	1.000	3	3.000	1	1.000	1	1.400
Female Non-smokers	20	27.591	14	16.888	17	26.880	28	50.882	29	46.052
Unclassified Females	0	0	2	2.000	0	0.000	2	2.000	3	3.500
Ultimate All	57	75.216	68	109.145	70	123.378	77	133.982	74	123.846
TOTAL	182	282.210	188	301.896	197	345.319	226	362.579	206	362.575

In table C6, the Ultimate claims for 2013–2014 were for 61 males (six smokers, 50 non-smokers, five unclassified) and 13 females (one smoker, 12 non-smokers).

Table C7. Comparison of Ratios (A/E) by Amount for Five-Year Periods

	Experience	2005–2010	2006–2011	2007–2012	2008–2013	2009–2014
Male & Female	Select & Ultimate	84.7	82.4	79.8	77.6	74.8
Male	Select & Ultimate	83.7	81.6	79.3	76.9	74.1
Female	Select & Ultimate	87.6	84.5	81.1	79.5	76.6
Male & Female	Select	81.3	78.4	75.2	72.5	69.7
Male	Select	79.3	77.4	74.8	71.8	69.7
Female	Select	85.7	80.7	76.2	73.9	69.7
Male & Female	Ultimate	88.0	85.8	83.6	81.6	78.5
Male	Ultimate	87.4	84.9	82.7	80.5	77.1
Female	Ultimate	90.1	88.7	86.2	84.9	82.7
Male, Smoker	Select	86.6	83.1	78.5	75.8	70.9
Male, Non-smoker	Select	77.5	76.0	74.2	71.3	69.8
Male, Unclassified	Select	79.3	76.3	69.2	65.6	64.6
Female, Smoker	Select	85.8	84.0	80.4	76.5	72.4
Female, Non-smoker	Select	85.5	79.9	75.3	73.7	69.3
Female, Unclassified	Select	97.2	84.4	75.3	68.0	68.3
Male, Smoker	Ultimate	91.5	90.3	88.2	87.2	84.4
Male, Non-smoker	Ultimate	84.3	80.8	79.0	76.3	71.8
Male, Unclassified	Ultimate	89.7	88.4	85.9	84.4	83.0
Female, Smoker	Ultimate	98.1	101.3	100.8	100.4	99.3
Female, Non-smoker	Ultimate	82.7	81.2	79.3	78.8	76.4
Female, Unclassified	Ultimate	97.8	95.0	91.3	89.2	87.3

NB: Starting with the 2006–2011 study period, we used revised rates. The ratios for the previous five-year study have not been recomputed using those revised rates. Comparison of table C4 to table C4a in the 2010–2011 report indicates that any differences would be non-significant. Refer to this mortality report and this mortality study for more information.

Extension for Issue Ages 81+

The original published CIA 86–92 and CIA 97–04 tables do not contain mortality rates for issue ages beyond 80. In this study, the expected select mortality rates for issue ages 81+ are set equal 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.

This report was approved by the Individual Life Experience Subcommittee of the Research Committee:

Faizel Alladina   (Research Committee Chair)
Johnny Lam   (Subcommittee Chair)
Damien Lapointe Nguyen   (Subcommittee Vice-chair)

Lynn Allen   Vera Ljucovic
Renaud Guilbert   John Pfeffer
Donna Mann-Campbell   Nicolas Rochon
Dan (Anh-Khoa) Le   Lisa Zwicker

It was prepared by Barbara Thomson of Thomson Data Analysis, Toronto, ON.
May 2016.

Appendix: A description of the fields included in the comma-delimited text file IndLifeMDB.1314.csv.

Year	2014 = Policy Year 2013–2014
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	5.	$250,000–$499,999
2.	$10,000–$49,999	6.	$500,000–$999,999
3.	$50,000–$99,999	7.	$1,000,000 and over
4.	$100,000–$249,999		

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