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Mortality Study

Canadian Standard Ordinary Life Experience 2012-2013 Using 97-04 Tables

Individual Life Experience Subcommittee – Research Committee

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Mortality under Canadian Standard Ordinary Insurance Issues Studied Between the 2012 and 2013 Anniversaries Using 97–04 Tables

This is the 64th 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 20th 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. This is the eighth 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. For data submitted without classification by sex, we used the male table. For data with attained age less than 16, we assigned mortality rates from the aggregate expected table. Substandard policies, joint policies, group conversions, and guarantee issue policies are excluded from the study.

Table 10 further subdivides **table 8** by Underwriting Type and 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.

Last year we expanded **table 9** (Type of Insurance) by including a more detailed breakdown of type of insurance.

This year the subcommittee decided to remove all "Evidence" information, as too few companies contributed data for this field.

Also this 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 by each company.

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:

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

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 2012–2013 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**   Smoking habits classified by sex
- **Table 9**   Type of insurance
- **Table 10**   Smoking habits classified by sex and preferred status
- We show **tables 1, 2,** and **8** based on **five-year aggregate** data (2008–2013).
- 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
  - $1,000,000 and over

The above tables are appended in two formats: html and Excel; both formats 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.1213.zip. A description of the included fields is in the appendix to this report. The 2008–2009 database will not match exactly the results shown in this report for 2008–2009. As a result, the five-year aggregate values in the report and summary tables will not match exactly the five-year aggregate data in the databases; for explanations, see the CIA Mortality Report #213016.

The 2012–2013 study is based on data from eight 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 2011–2012 and 2012–2013 Studies

Company	Includes	Contribution	
		2011–2012	**2012–2013**
Desjardins Laurentian Life	Imperial Life; Laurier	3.12%	3.07%
Equitable		0.00%	3.76%
Great-West Life	London Life; Canada Life	24.53%	23.80%
Industrial Alliance		11.75%	11.50%
Manulife Financial	Maritime Life	23.48%	21.84%
RBC		6.28%	6.64%
Sun Life		19.58%	18.84%
Transamerica		11.26%	10.55%
Total Exposures		100.00%	100.00%

Table C2. Company Experience Ratio Variability

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
Within 5%	0	$0	0%
5% and over	8	$2,566,748,658	100%

Percentage Departure represents the relative deviation of the company-specific A/E ratio from the overall table 1 A/E. The median relative Percentage Departure = 8.7%.

Tables C3(a–d): comparison of 2012–2013 total exposures, death claims, average claim, and average exposure with previous studies.

Table C3a. Total Exposures

Exposures	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
By Number	8,291,257	8,895,687	8,937,129	8,779,040	8,917,330
By Amount ('000,000)	$940,255	$1,169,855	$1,217,823	$1,270,814	$1,384,280

Table C3b. Death Claims

Death Claims	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
By Number	60,882	62,851	63,901	63,269	65,611
By Amount ('000)	$1,913,597	$2,166,285	$2,320,143	$2,427,673	$2,566,749

Table C3c. Average Claims

Average Claim	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
By Amount	$31,431	$34,467	$36,308	$38,371	$39,121

Table C3d. Average Exposures (Sum Assured)

Average Exposures	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
Males	$128,328	$148,989	$154,464	$163,491	$174,962
Females	$95,955	$111,209	$115,397	$123,431	$133,040
Combined	$113,403	$131,508	$136,266	$144,755	$155,235

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

	Experience	2008–2009	2009–2010	2010–2011	2011–2012	2012–2013
Male & Female	Select & Ultimate	87.9	77.2	77.8	75.9	73.0
Male	Select & Ultimate	87.1	77.1	77.0	75.6	71.3
Female	Select & Ultimate	89.7	77.5	79.7	76.4	77.4
Male & Female	Select	82.1	74.4	72.4	69.9	66.5
Male	Select	79.2	75.4	72.7	69.8	64.4
Female	Select	88.3	72.2	71.8	70.1	71.0
Male & Female	Ultimate	92.9	79.5	82.0	80.2	77.7
Male	Ultimate	93.5	78.4	80.1	79.5	75.8
Female	Ultimate	91.2	83.1	87.7	82.3	83.1
Male, Smoker	Select	89.2	86.6	71.0	65.8	66.4
Male, Non-smoker	Select	76.8	72.8	72.8	71.5	64.4
Male, Unclassified	Select	67.6	78.9	75.6	62.3	60.5
Female, Smoker	Select	91.6	72.0	77.0	72.0	71.3
Female, Non-smoker	Select	87.7	72.2	70.4	70.0	71.8
Female, Unclassified	Select	83.2	75.2	76.6	66.6	60.7
Male, Smoker	Ultimate	96.2	83.9	88.0	85.9	85.2
Male, Non-smoker	Ultimate	95.9	74.7	75.1	76.0	68.9
Male, Unclassified	Ultimate	89.6	81.5	84.8	82.9	84.3
Female, Smoker	Ultimate	98.3	97.5	108.2	99.3	98.3
Female, Non-smoker	Ultimate	86.3	75.5	80.5	76.5	78.0
Female, Unclassified	Ultimate	95.9	90.4	90.7	85.3	86.1
Male, Smoker, Preferred	Select & Ultimate	109.6	78.3	61.8	65.1	47.7
Male, Non-smoker, Preferred	Select & Ultimate	68.2	62.8	62.5	66.0	53.2
Female, Smoker, Preferred	Select & Ultimate	91.8	38.0	52.1	51.5	44.2
Female, Non-smoker, Preferred	Select & Ultimate	82.8	65.3	63.6	64.0	53.7

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

	2008–2009	**2009–2010**	**2010–2011**	**2011–2012**	**2012–2013**
Exposure #	104,746	142,230	158,982	174,737	199,553
Exposure Amount ('000)	$166,777,644	$230,526,620	$252,392,630	$278,461,795	$317,479,575
A/E #	85.7	69.8	64.0	61.0	61.7
A/E Amount	100.6	62.4	60.9	62.7	57.7

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

Select	**2008–2009**		**2009–2010**		**2010–2011**		**2011–2012**		**2012–2013**	
	#	**$ (Millions)**	**#**	**$ (Millions)**	**#**	**$ (Millions)**	**#**	**$ (Millions)**	**#**	**$ (Millions)**
Male Smokers	18	25.838	15	34.350	10	13.150	10	13.640	14	21.002
Male Non-smokers	67	124.539	88	142.046	80	142.714	92	164.421	87	133.613
Unclassified Males	0	0	0	0	13	17.000	5	14.000	17	20.100
Female Smokers	4	6.500	2	3.007	1	1.000	3	3.000	1	1.000
Female Non-smokers	23	38.597	20	27.591	14	16.888	17	26.880	28	50.882
Unclassified Females	0	0	0	0	2	2.000	0	0.000	2	2.000
Ultimate All	48	122.003	57	75.216	68	109.145	70	123.378	77	133.982
TOTAL	160	317.478	182	282.210	188	301.896	197	345.319	226	362.579

In table C6, the Ultimate claims for 2012–2013 were for 62 males (four smokers, 54 non-smokers, four unclassified) and 15 females (14 non-smokers, one unclassified).

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

	Experience	2004–2009	2005–2010	2006–2011	2007–2012	2008–2013
Male & Female	Select & Ultimate	88.4	84.7	82.4	79.8	77.6
Male	Select & Ultimate	87.0	83.7	81.6	79.3	76.9
Female	Select & Ultimate	92.3	87.6	84.5	81.1	79.5
Male & Female	Select	84.6	81.3	78.4	75.2	72.5
Male	Select	81.7	79.3	77.4	74.8	71.8
Female	Select	91.4	85.7	80.7	76.2	73.9
Male & Female	Ultimate	92.5	88.0	85.8	83.6	81.6
Male	Ultimate	92.1	87.4	84.9	82.7	80.5
Female	Ultimate	93.7	90.1	88.7	86.2	84.9
Male, Smoker	Select	86.0	86.6	83.1	78.5	75.8
Male, Non-smoker	Select	80.4	77.5	76.0	74.2	71.3
Male, Unclassified	Select	85.6	79.3	76.3	69.2	65.6
Female, Smoker	Select	92.7	85.8	84.0	80.4	76.5
Female, Non-smoker	Select	90.9	85.5	79.9	75.3	73.7
Female, Unclassified	Select	101.7	97.2	84.4	75.3	68.0
Male, Smoker	Ultimate	93.8	91.5	90.3	88.2	87.2
Male, Non-smoker	Ultimate	90.7	84.3	80.8	79.0	76.3
Male, Unclassified	Ultimate	93.0	89.7	88.4	85.9	84.4
Female, Smoker	Ultimate	99.0	98.1	101.3	100.8	100.4
Female, Non-smoker	Ultimate	87.0	82.7	81.2	79.3	78.8
Female, Unclassified	Ultimate	100.1	97.8	95.0	91.3	89.2

NB: starting with the 2006–2011 study period, we used revised rates. (See below.) The ratios for the two previous five-year studies 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.

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:

Dave Dickson	(Research Committee Chairperson)
Johnny Lam	(Subcommittee Chairperson)

Mark Andrews	Vera Ljucovic
Rhys DeGrave	Nicolas Rochon
Blake Hill	Scott Spencer
Damien Lapointe Nguyen	Lisa Zwicker

It was prepared by Barbara Thomson of Thomson Data Analysis, Toronto, ON. June 2015.

Appendix

A description of the fields included in the comma-delimited text file IndLifeMDB.1213.csv.

Year   2013 = Policy Year 2012-2013

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)

10. Term to 100

11. Other Permanent (includes UL policies and riders with other or unknown COI)

12. Other

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