

Mortality Study

Canadian Standard Ordinary Life Experience 2011-2012 Using 97-04 Tables

Individual Life Experience Subcommittee –
Research Committee

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MORTALITY UNDER CANADIAN STANDARD ORDINARY INSURANCE ISSUES STUDIED BETWEEN THE 2011 AND 2012 ANNIVERSARIES USING 97-04 TABLES

This is the 63rd 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 19th year that we have collected data in a serialim 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 seventh 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.

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.

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

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:

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

The following appended historically-numbered tables comprise the results of the 2011–2012 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 3** Select period of table 2 classified by:
 - Medical Males/Females;
 - Non-medical Males/Females;
 - Paramedical Males/Females; and
 - Unknown Evidence Males/Females.
- **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 (2007–2012).
- 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 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.1112.zip. A description of the included fields is in the appendix to this report.

The 2011–2012 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 to 100% due to rounding.

Table C1. Companies that Participated in the 2010–2011 and 2011–2012 Studies

Company	Includes	Contribution	
		2010–2011	2011–2012
Desjardins Laurentian Life	Imperial Life; Laurier	3.18%	3.12%
Great-West Life	London Life; Canada Life	25.10%	24.53%
Industrial Alliance		11.50%	11.75%
Manulife Financial	Maritime Life	23.94%	23.48%
RBC		5.31%	6.28%
Sun Life		19.41%	19.58%
Transamerica		11.55%	11.26%
Total Exposures		100.00%	100.00%

Table C2. Company Experience Ratio Variability

PERCENTAGE DEPARTURE	NUMBER OF COMPANIES	ACTUAL CLAIMS	PERCENTAGE OF CLAIMS
Within 5%	3	\$1,349,803,365	55.6%
5% and over	4	\$1,077,869,963	44.4%
Total	7	\$2,427,673,328	100.0%

Percentage Departure represents the deviation of the company specific A/E ratio from the overall table 1 A/E.

Tables C3(a–d): Comparison of 2011–2012 Total Exposures, Death Claims, Average Claim, and Average Exposure with Previous Studies

Table C3a. Total Exposures

Exposures	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
By Number	7,907,321	8,291,257	8,895,687	8,937,129	8,779,040
By Amount ('000,000)	\$826,652	\$940,255	\$1,169,855	\$1,217,823	\$1,270,814

Table C3b. Death Claims

Death Claims	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
By Number	57,694	60,882	62,851	63,901	63,269
By Amount ('000)	\$1,592,540	\$1,913,597	\$2,166,285	\$2,320,143	\$2,427,673

Table C3c. Average Claims

Average Claim	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
By Amount	\$27,603	\$31,431	\$34,467	\$36,308	\$38,371

Table C3d. Average Exposures (Sum Assured)

Average Exposures	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
Males	\$118,023	\$128,328	\$148,989	\$154,464	\$163,491
Females	\$88,604	\$95,955	\$111,209	\$115,397	\$123,431
Combined	\$104,543	\$113,403	\$131,508	\$136,266	\$144,755

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

	EXPERIENCE	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
Male & Female	Select & Ultimate	84.3	87.9	77.2	77.8	75.9
Male	Select & Ultimate	83.5	87.1	77.1	77.0	75.6
Female	Select & Ultimate	86.4	89.7	77.5	79.7	76.4
Male & Female	Select	80.7	82.1	74.4	72.4	69.9
Male	Select	79.4	79.2	75.4	72.7	69.8
Female	Select	83.6	88.3	72.2	71.8	70.1
Male & Female	Ultimate	87.6	92.9	79.5	82.0	80.2
Male	Ultimate	86.9	93.5	78.4	80.1	79.5
Female	Ultimate	90.0	91.2	83.1	87.7	82.3
Male, Medical	Select	74.4	74.4	70.5	67.3	71.1
Male, Non-medical	Select	90.7	88.8	79.4	79.0	86.7
Male, Paramedical	Select	79.9	72.1	75.6	71.6	65.9
Female, Medical	Select	85.1	88.4	66.0	65.9	70.7
Female, Non-medical	Select	95.2	102.7	71.6	78.5	72.3
Female, Paramedical	Select	73.8	87.2	82.4	69.0	69.4
Male, Smoker	Select	80.2	89.2	86.6	71.0	65.8
Male, Non-smoker	Select	79.1	76.8	72.8	72.8	71.5
Male, Unclassified	Select	88.2	67.6	78.9	75.6	62.3
Female, Smoker	Select	92.6	91.6	72.0	77.0	72.0
Female, Non-smoker	Select	80.8	87.7	72.2	70.4	70.0
Female, Unclassified	Select	132.2	83.2	75.2	76.6	66.6
Male, Smoker	Ultimate	90.1	96.2	83.9	88.0	85.9
Male, Non-smoker	Ultimate	79.7	95.9	74.7	75.1	76.0
Male, Unclassified	Ultimate	93.5	89.6	81.5	84.8	82.9
Female, Smoker	Ultimate	99.1	98.3	97.5	108.2	99.3
Female, Non-smoker	Ultimate	81.7	86.3	75.5	80.5	76.5
Female, Unclassified	Ultimate	97.3	95.9	90.4	90.7	85.3
Male, Smoker, Preferred	Select & Ultimate	52.0	109.6	78.3	61.8	65.1
Male, Non-smoker, Preferred	Select & Ultimate	61.3	68.2	62.8	62.5	66.0
Female, Smoker, Preferred	Select & Ultimate	74.0	91.8	38.0	52.1	51.5
Female, Non-smoker, Preferred	Select & Ultimate	77.1	82.8	65.3	63.6	64.0

Table C5. Comparison of Ratios (A/E) by Amount—Select Experience Only

	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
KNOWN UNDERWRITING					
Male, Smoker	77.7	89.4	92.2	70.3	66.6
Male, Non-smoker	80.3	74.9	69.9	70.4	74.7
Male, Unclassified	90.0	60.8	68.4	75.9	62.2
Female, Smoker	97.0	98.1	74.8	75.6	74.7
Female, Non-smoker	84.0	91.7	71.5	68.6	70.4
Female, Unclassified	109.4	80.5	44.1	75.5	67.1
UNKNOWN UNDERWRITING					
Male, Smoker	85.0	89.0	72.9	72.6	63.9
Male, Non-smoker	76.5	80.3	81.0	78.7	63.2
Male, Unclassified	87.1	72.8	94.4	63.5	66.6
Female, Smoker	83.9	80.2	65.1	80.1	65.7
Female, Non-smoker	73.5	79.3	74.4	75.1	69.1
Female, Unclassified	144.6	85.0	117.3	97.0	53.7

We extracted the following select ratios for smokers and non-smokers from the 2011–2012 study using only data for which the underwriting classifications were known. We show comparable ratios from the 2010–2011 study. The expected columns are select, smoker and non-smoker distinct.

Table C6. Ratios for Smokers and Non-smokers—Select Experience Only

Smoking Status	A/E % (by amount)		Expected Death Claims ('000)	
	2010–2011	2011–2012	2010–2011	2011–2012
Male, Smoker	70.3	66.6	\$105,088	\$103,934
Male, Non-smoker	70.4	74.7	\$491,940	\$505,786
Male, Unclassified	75.9	62.2	\$58,946	\$71,210
Female, Smoker	75.6	74.7	\$43,446	\$43,984
Female, Non-smoker	68.6	70.4	\$236,879	\$251,847
Female, Unclassified	75.5	67.1	\$21,879	\$25,699

Table C7. Exposures for Policies with Face Amounts \geq \$1,000,000 Included in the Most Recent Five Studies

	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
Exposure #	83,000	104,746	142,230	158,982	174,737
Exposure Amount ('000)	\$128,772,736	\$166,777,644	\$230,526,620	\$252,392,630	\$278,461,795
A/E #	75.0	85.7	69.8	64.0	61.0
A/E Amount	69.4	100.6	62.4	60.9	62.7

Table C8. Claims for Policies with Death Benefit Amounts \geq \$1,000,000 Included in the Most Recent Five Studies

Select	2007–2008		2008–2009		2009–2010		2010–2011		2011–2012	
	#	\$ (Millions)	#	\$ (Millions)	#	\$ (Millions)	#	\$ (Millions)	#	\$ (Millions)
Male Smokers	9	11.862	18	25.838	15	34.350	10	13.150	10	13.640
Male Non-smokers	57	87.619	67	124.539	88	142.046	80	142.714	92	164.421
Unclassified Males	0	0	0	0	0	0	13	17.000	5	14.000
Female Smokers	2	2.200	4	6.500	2	3.007	1	1.000	3	3.000
Female Non-smokers	14	23.600	23	38.597	20	27.591	14	16.888	17	26.880
Unclassified Females	0	0	0	0	0	0	2	2.000	0	0.000
Ultimate All	31	46.601	48	122.003	57	75.216	68	109.145	70	123.378
TOTAL	113	171.882	160	317.478	182	282.210	188	301.896	197	345.319

In table C8, the Ultimate claims for 2011–2012 were for 58 males (four smokers, 53 non-smokers, one unclassified) and 12 females (two smokers, 10 non-smokers).

Table C9. Comparison of Ratios (A/E) by Amount for Five-Year Periods

	EXPERIENCE	2003–2008	2004–2009	2005–2010	2006–2011	2007–2012
Male & Female	Select & Ultimate	90.0	88.4	84.7	82.4	79.8
Male	Select & Ultimate	88.7	87.0	83.7	81.6	79.3
Female	Select & Ultimate	93.7	92.3	87.6	84.5	81.1
Male & Female	Select	87.1	84.6	81.3	78.4	75.2
Male	Select	84.7	81.7	79.3	77.4	74.8
Female	Select	92.7	91.4	85.7	80.7	76.2
Male & Female	Ultimate	93.4	92.5	88.0	85.8	83.6
Male	Ultimate	92.9	92.1	87.4	84.9	82.7
Female	Ultimate	95.3	93.7	90.1	88.7	86.2
Male, Medical	Select	75.9	74.4	71.9	70.9	71.2
Male, Non-medical	Select	98.9	93.3	90.8	85.5	84.6
Male, Paramedical	Select	85.1	81.4	79.8	76.7	71.8
Female, Medical	Select	92.3	91.0	86.0	79.6	73.9
Female, Non-medical	Select	100.7	100.3	93.2	87.8	82.9
Female, Paramedical	Select	89.6	87.9	85.4	77.8	74.8
Male, Smoker	Select	87.1	86.0	86.6	83.1	78.5
Male, Non-smoker	Select	83.9	80.4	77.5	76.0	74.2
Male, Unclassified	Select	93.3	85.6	79.3	76.3	69.2
Female, Smoker	Select	94.2	92.7	85.8	84.0	80.4
Female, Non-smoker	Select	92.2	90.9	85.5	79.9	75.3
Female, Unclassified	Select	98.3	101.7	97.2	84.4	75.3
Male, Smoker	Ultimate	95.4	93.8	91.5	90.3	88.2
Male, Non-smoker	Ultimate	88.9	90.7	84.3	80.8	79.0
Male, Unclassified	Ultimate	95.7	93.0	89.7	88.4	85.9
Female, Smoker	Ultimate	98.7	99.0	98.1	101.3	100.8
Female, Non-smoker	Ultimate	88.5	87.0	82.7	81.2	79.3
Female, Unclassified	Ultimate	101.7	100.1	97.8	95.0	91.3

NB: Starting with the 2006–2011 study period, we used revised rates. (See the 2010–2011 report for more details.) The ratios for the three 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.

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

Dave Dickson (Research Committee Chair)
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This report was prepared by Barbara Thomson of Thomson Data Analysis, Toronto, ON.
 May 2014.

APPENDIX

A description of the fields included in the comma-delimited text file IndLifeMDB.1112.txt.

Year	2012 = Policy Year 2011-2012	
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	
Evidence	Underwriting Type:	
	1. Medical	3. Unknown
	2. Non-medical	4. Paramedical
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:		
	<i>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:</i>	
	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 $8692 \text{ QX} \times \text{Sum of \# Exposed} / 1000$

8692 \$ Exp Claims $8692 \text{ QX} \times \text{Sum of \$ Exposed} / 1000$

9704 # Exp Deaths $9704 \text{ QX} \times \text{Sum of \# Exposed} / 1000$

9704 \$ Exp Claims $9704 \text{ QX} \times \text{Sum of \$ Exposed} / 1000$