

Morbidity Study

Canadian Individual Critical Illness Insurance Morbidity Experience Study Including Policy Anniversaries Between 2003 and 2011 Using Expected Incidence Rate Tables 2008 CANCI

Individual Living Benefits Experience Subcommittee –
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Canadian Individual Critical Illness Insurance Morbidity Experience Study Including Policy Anniversaries Between 2003 and 2011 Using Expected Incidence Rate Tables 2008 CANCI

This is the second report submitted by the Individual Living Benefits Experience Subcommittee of the Canadian Institute of Actuaries (CIA) Research Committee detailing the intercompany morbidity experience for Canadian individual critical illness (CI) insurance policies.

Expected CIA Incidence: 2008 CANCI Tables

The Expected tables used throughout this study refer to the 2008 CANCI tables published by the CIA in July 2012. For additional information, please refer to:

[Research paper](#)
[Excel tables.](#)

General comments on the use of the 2008 CANCI tables:

- The Expected tables used in the Actual to Expected (A/E) results are unismoke and do not reflect any impact from the insurance underwriting process;
- The Expected tables reflect a distribution by smoking status found in the general population, which may differ from the distribution seen in an insured population;
- The Expected tables used in deriving the Exposure figures in this report reflect the number of illnesses found in each insurance policy included in this study, as well as any limitations with regard to age or payment amount for each covered illness;
- The Expected tables reflect general population incidence rates trended to January 1, 2008;
- The number of illnesses covered by a typical CI policy has increased since early 2000 and, in addition, the definitions used in insurance contracts may have changed during the study period and thereafter (e.g., heart attack, Parkinson's disease).

Methods

The exposures and claims presented in this study are for only those policies that satisfied the scope of the study, i.e., those with policy anniversary dates in any of the policy years 2003–2004 through 2010–2011. The following data were excluded:

- Any policies issued for people under the age of 20;
- Policies with a substandard rating;
- Policies that “accelerate” a life insurance benefit upon diagnosis of a covered critical illness;
- Group and creditor insurance policies; and
- Claims for unknown causes.

Policies with unknown smoking status were included with the non-smokers. As they represented only 0.02% of all policies, we considered this adjustment immaterial.

The Exposure was calculated using the “Actuarial” method. For example, in the first of the four sets of five-year tables, we measured exposure years as the time for which the policy was exposed from the 2003–2004 anniversary date to the 2007–2008 anniversary date. The number of exposure years per policy could be as high as five; if the policy were not issued until after the 2003–2004 policy year or if it terminated prior to the 2007–2008 anniversary date, the number of exposure years would be less than five. The total number of exposure years for each five-year table is therefore greater than the number of policies.

The exposed dollar amounts were calculated similarly by multiplying the face amount of the policy by the number of exposure years for that policy.

The incidence rates used were classified by attained age and sex for each covered illness. The expected number of claims is the sum (over all covered illnesses for each policy) of the product of exposure for that year and the incidence for the attained age in that year. These sums are then summed over all policies and years. (Attained age was calculated on an age-nearest-birthday basis in all cases except when the birth date was missing and the policy was issued on an age last basis. In that case, the age was calculated as the age at issue plus duration. Then the expected claim morbidity rate was calculated as the mean of the morbidity rates at the calculated age and the rate at the next higher age.)

The expected claim dollar amounts were calculated similarly but rather than multiplying by face value, they were multiplied by the amount that would be paid for a claim under each separate illness to account for partial claims on non-life-threatening conditions (NLTCs).

The table columns entitled S.D. provide estimates of the standard deviation of the ratios of actual to expected numbers of claims. These numbers measure the degree of confidence in the ratios. The formula used to calculate the standard deviations is:

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

Differences in Methodologies Between the First and Second Studies

In the first study, which covered policy anniversaries 2002 to 2007, we eliminated claims and exposures for the NLTCs (see the table series C4 in this report for a description of these conditions) if they did not provide 100% of the benefit amount covered; we included claims with unknown causes. In this study, covering policy anniversaries 2003 to 2011, we include all claim causes (except nine claims with unknown causes not previously eliminated for other reasons, e.g., substandard status), but at their proportional values. For example, if a cause is covered at 10% of face value, we include its expected claim at 10%.

We also changed from using the “Exact” method for calculating exposures to the “Actuarial” method in which a full year of exposure is credited in the year of the claim.

The following table indicates the effects of these changes when applied to the 2002–2007 results (i.e., the first CIA Critical Illness Insurance Morbidity Experience study published in February 2013):

	Ratio A/E			Actual Claims		Exposures		Expected Claims	
	# %	S.D.	\$ %	#	\$	#	\$	#	\$
1	52.8	1.2	57.7	1,823	161,186,223	817,768	70,848,745,820	3,452	279,127,578
2	51.7	1.2	56.3	1,819	161,320,223	817,768	70,848,745,820	3,515	286,673,066
3	-2.08%	0.00%	-2.43%	-0.22%	0.08%	0.00%	0.00%	1.83%	2.70%
4	51.6	1.2	56.1	1,819	161,320,223	818,623	70,925,012,356	3,523	287,349,582
5	-0.19%	0.00%	-0.36%	0.00%	0.00%	0.10%	0.11%	0.23%	0.24%
6	-2.27%	0.00%	-2.77%	-0.22%	0.08%	0.10%	0.11%	2.06%	2.95%

Note:

- Line 1 shows the Total line from table 1.1 in the 2002–2007 study;
- Line 2 shows what the Total line would have been if we had incorporated the above changes of adding non-life-threatening conditions and removing unknown conditions from the 2002–2007 data;
- Line 3 shows the relative percent difference between the two methods;
- Line 4 shows what the Total line would have been if we had incorporated the changes in line 2 above and the use of the actuarial method instead of the exact method;
- Line 5 shows the additional relative percent difference; and
- Line 6 shows the overall relative percent difference between the methods used in the 2002–2007 study and the current study.

Confidentiality

This project produces summary tables of which the granularity is subject to constraints to protect the confidentiality of the participating companies. The rule is that, for any cell that is published, there must be at least four companies contributing data to that cell, and no company may provide more than 55% of the experience in that cell (measured using exposure count).

A “cell” is a row in a summary table, for example, a combination of an attained age, a smoking status, and a sex. If the number of exposures for that row in the table satisfies the two conditions of the above rule, the data are accepted as is; if the rule is not satisfied, then groupings for one of the variables are combined and the corresponding data are aggregated. The process is repeated until the resulting row satisfies the two constraints. The summary tables included here obey the confidentiality rule.

Other Details Regarding the 2003–2011 Study

- Two claims were identified as litigated and included in the study at their stated face amount. This is by no means a reflection of litigation activity in the Canadian market, but more likely the result of incomplete reporting by participating companies. We believe other claims may have gone through or may be in litigation, but were not identified as such by the participants.
- Ninety of the 369,429 unique policy number records in this study (0.02%) had a smoking code of “unknown”. These were included with “non-smokers” experience.
- 7,436 (1.65%) policies were reported as conversions or plan changes. A perfect use of the data would have been to reflect the actual conversion on a point-in-scale basis, but due to data limitations, 47.4% of the 7,436 policies in question were treated as new policies.
- Policies with exclusions were considered standard policies. The expectation is that the number of policies with exclusions is relatively small, and the impact of the exclusion on each policy carrying an exclusion is also small.
- Due to rounding, occasionally the expected number of claims is 0, even though the expected \$ amount is greater than 0.

Company Participation

Table C1. The 10 companies that participated in the 2003–2011 study

Canada Life Assurance
Co-operators Life Insurance
Desjardins Financial Security
Great-West Life Assurance
Humania Assurance
Industrial Alliance
Manulife Financial
RBC Life Insurance
SSQ Financial Group
Sun Life Financial

Company Experience Ratio Variability

In the following tables, Percentage Departure represents the deviation of the company-specific A/E ratio (based on amounts) from the overall table 1.1 A/E results found in the appendix to this document. For example, one company had an A/E ratio of 60.4%, which was 105.78% of the overall table 1.1 A/E (57.1%). This company, along with two others, contributed \$92,949,388 or 44.37% to this study’s actual claims.

Table C2a. Company experience ratio variability (2003–2008)

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
Within 5%	2	\$83,383,521	39.80%
5%–10%	3	\$92,949,388	44.37%
Greater than 10%	5	\$33,150,806	15.83%
Total	10	\$209,483,715	100.00%

Table C2b. Company experience ratio variability (2004–2009)

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
Within 5%	3	\$163,746,119	65.36%
5%–10%	3	\$62,895,417	25.11%
Greater than 10%	4	\$23,867,089	9.53%
Total	10	\$250,508,625	100.00%

Table C2c. Company experience ratio variability (2005–2010)

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
Within 5%	3	\$112,456,001	39.34%
5%–10%	3	\$138,781,850	48.54%
Greater than 10%	4	\$34,660,314	12.12%
Total	10	\$285,898,165	100.00%

Table C2d. Company experience ratio variability (2006–2011)

Percentage Departure	Number of Companies	Actual Claims	Percentage of Claims
Within 5%	3	\$141,293,625	43.93%
5%–10%	3	\$162,203,595	50.44%
Greater than 10%	4	\$18,104,245	5.63%
Total	10	\$321,601,465	100.00%

As expected, for companies with fewer exposures, the estimation of A/E has more statistical variation and this variation contributes to the tendency of those results to be farther away from the average experience.

Results

The following tables are included in the appendix to this document and provide the full set of results of the 2003–2011 morbidity study. They 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.

- **Table 1** Total experience by groups of duration, issue ages, attained ages, and sex;
- **Table 2** Table 1 classified by smoking habits;
- **Table 3** Table 1 classified by smoking habits and policy face amount;
- **Table 4** Total experience by illness, smoking habits, and sex;
- **Table 5** Heart attack experience by smoking habits and sex;
- **Table 6** Life-threatening cancer experience by smoking habits and sex;
- **Table 7** Stroke experience by smoking habits and sex;
- **Table 8** Total experience by return of premium type;
- **Table 9** Total experience by policy year;
- **Table 10** Total experience by underwriting type; and
- **Table 11** Total experience by issue year.

The appendix includes tables for the following policy years:

- 2003–2004 through 2007–2008;
- 2004–2005 through 2008–2009;
- 2005–2006 through 2009–2010;
- 2006–2007 through 2010–2011; and
- 2003–2004 through 2010–2011.

Summary results are provided in tables C3 to C7 below. They provide overall results as well as more detailed A/E ratios, claims, and exposure information, in total and for each gender and smoking status. The tables summarize experience data by:

- Claim and exposure information: table C3;
- Face amount band and illness grouping: tables C4a-C4i;
- Duration (overall and for three key illnesses): tables C5a-C5i;
- Type of underwriting and policy/issue year: tables C6a-C6c; and
- Return of premium feature: tables C7a-C7i.

Following each section of tables are key observations on the results.

The groups of illnesses used in tables C4a to C4i are:

- Cancer: Life-Threatening Cancer, Benign Brain Tumor, Aplastic Anaemia^a;
- Cardio: Heart Attack, Coronary Artery Bypass, Aortic Surgery, Stroke, Heart Valve Replacement;
- Organ: Kidney/Renal Failure, Major/Vital Organ Failure/Transplant;
- Neuro: Multiple Sclerosis, Parkinson's, Alzheimer's, ALS/Motor Neuron Disease;
- Accident/Infectious: Blindness, Coma, Deafness, Loss of Limbs/Dismemberment, Loss of Speech, Occupational HIV Infection, Paralysis, Severe Burns, Bacterial Meningitis;
- LOIE: Loss of Independent Existence; and
- Non-life-threatening: Early Prostate Cancer (Stage T1a and T1b), Ductal Breast Cancer, Shallow/Stage 1 Malignant Melanoma/Skin Cancer, Coronary Angioplasty, West Nile Virus, Lyme Disease, *Escherichia coli* Infection.

Table C3. Summary Information**A. Overall**

	2003–2008		2004–2009		2005–2010		2006–2011	
	Claims	Exposures	Claims	Exposures	Claims	Exposures	Claims	Exposures
Number	2,382	1,024,712	2,898	1,182,960	3,350	1,328,799	3,761	1,469,600
Amount (\$,000)	209,484	88,468,390	250,509	102,952,835	285,898	116,444,324	321,601	129,441,008
Average	\$87,944	\$86,335	\$86,442	\$87,030	\$85,343	\$87,631	\$85,510	\$88,079

B. Male

	2003–2008		2004–2009		2005–2010		2006–2011	
	Claims	Exposures	Claims	Exposures	Claims	Exposures	Claims	Exposures
Number	1,196	502,589	1,446	578,484	1,653	647,542	1,857	712,997
Amount (\$,000)	117,012	48,681,262	138,898	56,566,551	158,924	63,881,065	177,739	70,879,720
Average	\$97,836	\$96,861	\$96,057	\$97,784	\$96,143	\$98,652	\$95,713	\$99,411

^a Aplastic Anaemia was not addressed as part of the 2008 CANCI study. For the purpose of this study, a best estimate annual incidence rate of 0.005/1000 was used for this condition.

C. Female

	2003–2008		2004–2009		2005–2010		2006–2011	
	Claims	Exposures	Claims	Exposures	Claims	Exposures	Claims	Exposures
Number	1,185	522,123	1,452	604,475	1,698	681,257	1,903	756,603
Amount (\$,000)	92,472	39,787,128	111,610	46,386,284	126,974	52,563,258	143,862	58,561,289
Average	\$78,035	\$76,203	\$76,867	\$76,738	\$74,779	\$77,156	\$75,598	\$77,400

General observations on the results shown in the tables above:

1. According to the CIA educational note on [Setting Expected Mortality Assumption in CGAAP Life Insurance Valuation](#), in order to be considered as credible to some degree, a study of this kind requires 2,000–3,000 claims. According to the same theory, full credibility is obtained when considering the overall results of the two most recent periods and the complete study period 2003–2011 (4,866 claims). Credibility is reduced as the experience is broken down into various sub-categories.
2. For each period shown above, the average face amount of policies is very close to the average claim amount (within 4%). We can also observe a slight decrease in average claim amount over time, and a slight increase in the average face amount insured, bringing the average claim below the average face amount insured.
3. While more women than men owned CI policies (by count), men tended to purchase higher amounts and experienced overall higher average claim rates.

Table C4a. Comparison of ratios (A/E) by number. Overall experience

Population—Overall	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Total Experience	52.7	53.7	53.4	52.4	51.9	0.7
Face Amount < \$50,000	44.8	47.8	50.0	50.8	47.7	1.3
Face Amount \$50,000–\$99,999	52.9	53.3	52.0	51.0	52.1	1.3
Face Amount \$100,000–\$249,999	58.3	58.4	57.0	53.9	54.2	1.3
Face Amount \$250,000 and over	59.9	59.1	56.9	58.8	58.6	3.4
Cancer Group	65.7	67.9	67.9	66.2	65.2	1.1
Cardio Group	37.9	38.1	37.4	38.0	37.9	1.2
Organ Group	7.5	8.0	9.4	9.2	9.1	1.7
Neuro Group	30.9	29.6	31.8	29.5	28.8	2.0
Accident/Infectious	52.2	52.2	44.3	47.6	45.7	6.4
LOIE	0.0	0.0	5.9	9.4	8.2	5.8
Non-life-threatening	93.3	51.0	21.6	15.4	42.2	8.7
Total Smoker Experience	78.8	78.9	78.3	77.8	77.4	3.2
Face Amount < \$50,000	71.2	72.2	74.5	76.3	72.8	4.5
Face Amount \$50,000–\$99,999	87.3	85.5	80.5	79.7	83.1	6.1
Face Amount \$100,000–\$249,999	84.1	84.4	83.6	77.7	79.4	7.0
Face Amount \$250,000 and over	80.8	86.0	81.6	84.7	82.0	21.2
Cancer Group	85.2	86.1	84.9	82.5	83.1	4.4
Cardio Group	89.4	89.5	86.8	89.1	88.2	6.3
Organ Group	6.3	5.5	5.0	13.9	13.4	6.7
Neuro Group	42.8	39.6	51.6	48.8	44.0	8.3
Accident/Infectious	49.3	43.7	39.7	36.7	35.3	17.6
LOIE	0.0	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	45.9	42.3	22.6	24.1	27.6	27.0
Total Non-smoker Experience	50.3	51.4	51.2	50.2	49.6	0.8
Face Amount < \$50,000	40.5	43.8	46.2	47.0	43.8	1.4
Face Amount \$50,000–\$99,999	49.9	50.5	49.6	48.7	49.5	1.4
Face Amount \$100,000–\$249,999	56.9	57.0	55.6	52.7	52.9	1.3
Face Amount \$250,000 and over	59.1	58.0	56.0	57.9	57.7	3.4
Cancer Group	63.9	66.3	66.4	64.8	63.6	1.1
Cardio Group	33.1	33.5	33.0	33.6	33.5	1.2
Organ Group	7.6	8.3	9.8	8.7	8.6	1.7
Neuro Group	29.7	28.6	30.0	27.8	27.4	2.0
Accident/Infectious	52.6	53.3	44.8	48.8	46.9	6.8
LOIE	0.0	0.0	6.5	10.3	9.0	6.4
Non-life-threatening	96.9	51.6	21.5	14.7	43.2	9.1

Table C4b. Comparison of ratios (A/E) by number. Male experience

Population—Male	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Total Experience	51.2	51.8	50.8	49.9	49.8	1.0
Face Amount < \$50,000	44.3	45.2	46.8	47.8	45.4	1.9
Face Amount \$50,000–\$99,999	50.2	52.4	51.3	51.6	51.8	1.9
Face Amount \$100,000–\$249,999	56.8	55.3	52.2	48.4	50.0	1.7
Face Amount \$250,000 and over	52.2	54.6	55.9	56.6	56.0	3.9
Cancer Group	65.7	67.3	66.8	64.7	64.2	1.7
Cardio Group	40.6	41.2	40.0	40.8	40.7	1.4
Organ Group	10.1	11.3	12.9	12.9	12.2	2.5
Neuro Group	37.7	35.0	36.8	32.7	31.7	3.2
Accident/Infectious	47.8	46.6	41.0	43.2	41.9	8.2
LOIE	0.0	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	135.7	73.2	24.1	14.4	55.6	12.8
Total Smoker Experience	79.5	81.4	78.7	77.9	78.2	4.3
Face Amount < \$50,000	75.6	76.7	74.7	71.4	72.2	6.4
Face Amount \$50,000–\$99,999	73.6	78.6	74.5	79.9	79.2	8.0
Face Amount \$100,000–\$249,999	94.3	93.8	89.7	85.9	87.1	9.3
Face Amount \$250,000 and over	76.7	75.7	85.5	82.5	78.5	23.7
Cancer Group	76.3	79.2	74.9	71.7	74.6	6.3
Cardio Group	95.6	98.0	93.5	95.8	94.3	7.5
Organ Group	9.5	8.4	7.6	14.1	15.3	8.8
Neuro Group	61.9	59.0	78.2	70.3	62.9	14.8
Accident/Infectious	77.7	69.1	63.1	58.4	55.9	28.0
LOIE	0.0	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	61.5	50.7	23.4	23.2	30.6	35.4
Total Non-smoker Experience	48.4	48.9	48.2	47.3	47.2	1.0
Face Amount < \$50,000	39.0	40.0	42.2	44.1	41.0	2.0
Face Amount \$50,000–\$99,999	47.8	49.8	49.1	49.1	49.2	1.9
Face Amount \$100,000–\$249,999	54.4	52.9	49.9	46.2	47.8	1.7
Face Amount \$250,000 and over	51.2	53.8	54.8	55.6	55.1	3.9
Cancer Group	64.7	66.2	66.1	64.1	63.2	1.8
Cardio Group	35.2	35.9	35.1	35.9	35.8	1.4
Organ Group	10.2	11.6	13.5	12.8	11.9	2.6
Neuro Group	35.0	32.5	32.7	29.1	28.6	3.2
Accident/Infectious	43.6	43.5	38.2	41.3	40.1	8.5
LOIE	0.0	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	141.7	75.1	24.2	13.7	57.6	13.5

Table C4c. Comparison of ratios (A/E) by number. Female experience

Population—Female	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Total Experience	54.4	55.8	56.2	55.1	54.2	1.1
Face Amount < \$50,000	45.3	49.9	52.7	53.3	49.7	1.8
Face Amount \$50,000–\$99,999	55.6	54.1	52.6	50.4	52.4	1.9
Face Amount \$100,000–\$249,999	60.2	62.3	63.1	60.8	59.6	2.0
Face Amount \$250,000 and over	81.3	71.4	59.6	64.7	65.9	7.0
Cancer Group	65.7	68.3	68.6	67.2	65.9	1.4
Cardio Group	30.5	29.3	30.1	30.4	30.0	2.0
Organ Group	3.3	2.8	3.7	3.2	4.1	1.8
Neuro Group	26.0	25.7	28.2	27.2	26.7	2.5
Accident/Infectious	58.0	59.5	48.4	53.1	50.4	10.1
LOIE	0.0	0.0	11.8	18.7	16.3	11.6
Non-life-threatening	29.8	16.8	17.7	16.8	21.0	9.8
Total Smoker Experience	77.9	76.1	77.9	77.7	76.5	4.7
Face Amount < \$50,000	67.2	68.1	74.3	80.9	73.3	6.2
Face Amount \$50,000–\$99,999	104.4	94.1	88.0	79.4	87.9	9.4
Face Amount \$100,000–\$249,999	66.6	68.5	73.0	63.6	66.1	10.6
Face Amount \$250,000 and over	93.4	118.2	69.2	92.2	93.7	46.8
Cancer Group	91.9	91.3	92.4	90.9	89.5	6.0
Cardio Group	69.1	62.0	65.5	68.1	68.6	11.4
Organ Group	0.0	0.0	0.0	13.6	9.9	9.9
Neuro Group	27.5	23.9	29.9	31.0	28.5	9.0
Accident/Infectious	0.0	0.0	0.0	0.0	0.0	0.0
LOIE	0.0	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	19.1	27.6	21.2	25.8	22.2	16.0
Total Non-smoker Experience	52.2	54.1	54.4	53.2	52.3	1.1
Face Amount < \$50,000	41.8	47.1	49.5	49.4	46.2	1.9
Face Amount \$50,000–\$99,999	51.9	51.2	50.1	48.4	49.9	1.9
Face Amount \$100,000–\$249,999	59.9	62.0	62.7	60.7	59.3	2.1
Face Amount \$250,000 and over	80.9	69.7	59.3	63.9	65.0	7.0
Cancer Group	63.3	66.3	66.6	65.3	63.9	1.5
Cardio Group	27.3	26.7	27.3	27.5	26.9	2.0
Organ Group	3.6	3.0	4.0	2.4	3.6	1.8
Neuro Group	25.9	25.8	28.0	26.9	26.5	2.6
Accident/Infectious	63.9	65.3	52.9	57.7	55.1	11.0
LOIE	0.0	0.0	12.8	20.2	17.7	12.5
Non-life-threatening	30.6	16.0	17.4	16.2	20.9	10.1

Table C4d. Comparison of ratios (A/E) by amount. Overall experience

Population—Overall	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Total Experience	57.1	56.8	55.3	53.9	54.2
Face Amount < \$50,000	46.8	49.6	50.9	51.9	48.9
Face Amount \$50,000–\$99,999	52.8	53.3	51.8	50.9	52.0
Face Amount \$100,000–\$249,999	58.2	58.2	57.0	53.9	54.3
Face Amount \$250,000 and over	62.3	59.4	56.1	57.1	57.6
Cancer Group	73.3	72.9	71.3	70.2	69.7
Cardio Group	37.2	36.8	35.4	34.1	35.1
Organ Group	6.4	5.6	7.7	7.3	7.2
Neuro Group	42.0	45.1	46.3	41.3	41.6
Accident/Infectious	52.4	62.6	51.3	63.7	59.0
LOIE	0.0	0.0	13.7	38.4	33.3
Non-life-threatening	108.6	54.2	23.7	15.9	47.9
Total Smoker Experience	84.2	84.7	81.0	79.1	80.4
Face Amount < \$50,000	77.0	77.5	78.1	81.2	76.8
Face Amount \$50,000–\$99,999	86.5	87.3	82.0	81.3	83.4
Face Amount \$100,000–\$249,999	84.7	85.5	84.3	79.6	81.8
Face Amount \$250,000 and over	87.1	86.0	73.0	71.5	74.8
Cancer Group	96.0	96.5	88.9	83.0	86.5
Cardio Group	83.7	85.5	83.7	88.3	88.4
Organ Group	5.1	2.2	2.0	6.3	7.3
Neuro Group	56.3	56.8	70.5	70.0	62.0
Accident/Infectious	78.6	69.1	62.4	47.7	48.6
LOIE	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	34.8	26.8	16.7	20.1	20.0
Total Non-smoker Experience	55.3	55.0	53.7	52.5	52.6
Face Amount < \$50,000	42.3	45.7	47.2	48.0	45.0
Face Amount \$50,000–\$99,999	49.9	50.4	49.3	48.5	49.4
Face Amount \$100,000–\$249,999	56.8	56.8	55.7	52.7	53.0
Face Amount \$250,000 and over	61.4	58.4	55.5	56.6	56.9
Cancer Group	71.9	71.4	70.3	69.4	68.7
Cardio Group	34.3	33.9	32.5	31.0	31.9
Organ Group	6.5	5.8	8.1	7.3	7.2
Neuro Group	41.1	44.3	44.7	39.5	40.3
Accident/Infectious	50.1	62.1	50.4	65.0	59.8
LOIE	0.0	0.0	14.6	40.9	35.5
Non-life-threatening	112.5	55.7	24.0	15.7	49.3

Table C4e. Comparison of ratios (A/E) by amount. Male experience

Population—Male	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Total Experience	54.4	53.6	52.2	50.6	51.4
Face Amount < \$50,000	48.0	48.6	49.0	49.4	47.2
Face Amount \$50,000–\$99,999	49.8	51.8	50.6	50.9	51.1
Face Amount \$100,000–\$249,999	57.3	55.1	52.2	48.6	50.4
Face Amount \$250,000 and over	54.1	53.5	53.8	53.5	54.0
Cancer Group	71.3	70.2	69.8	68.8	68.7
Cardio Group	39.6	39.3	37.4	36.2	37.2
Organ Group	7.2	7.0	10.0	9.2	8.4
Neuro Group	57.6	59.1	58.1	46.2	48.9
Accident/Infectious	50.4	59.2	47.4	62.6	58.5
LOIE	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	151.9	71.3	25.7	15.1	62.1
Total Smoker Experience	83.2	84.2	82.1	80.5	80.5
Face Amount < \$50,000	88.6	89.6	84.3	78.7	80.4
Face Amount \$50,000–\$99,999	71.4	79.2	75.0	80.2	78.7
Face Amount \$100,000–\$249,999	94.2	92.9	88.4	86.4	88.3
Face Amount \$250,000 and over	68.8	65.6	75.2	68.8	65.0
Cancer Group	85.1	87.8	84.6	77.2	78.3
Cardio Group	90.1	91.7	88.3	93.3	94.1
Organ Group	7.1	3.1	2.8	3.6	6.3
Neuro Group	86.5	80.8	94.9	94.3	81.5
Accident/Infectious	112.8	99.3	89.8	68.6	69.8
LOIE	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	43.3	31.1	18.1	20.7	21.8
Total Non-smoker Experience	52.5	51.7	50.4	48.7	49.6
Face Amount < \$50,000	41.8	42.3	43.8	45.2	42.3
Face Amount \$50,000–\$99,999	47.6	49.2	48.3	48.2	48.5
Face Amount \$100,000–\$249,999	55.0	52.8	50.1	46.5	48.2
Face Amount \$250,000 and over	53.6	53.1	53.1	53.0	53.6
Cancer Group	70.4	69.1	68.8	68.3	68.1
Cardio Group	36.3	36.1	34.4	32.9	33.8
Organ Group	7.2	7.3	10.5	9.6	8.5
Neuro Group	55.5	57.5	55.6	43.0	46.7
Accident/Infectious	44.3	55.4	43.6	62.0	57.4
LOIE	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	158.0	73.6	26.1	14.7	64.3

Table C4f. Comparison of ratios (A/E) by amount. Female experience

Population—Female	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Total Experience	60.8	61.2	59.6	58.7	58.2
Face Amount < \$50,000	45.7	50.6	52.6	54.0	50.3
Face Amount \$50,000–\$99,999	55.9	54.7	53.0	50.9	52.9
Face Amount \$100,000–\$249,999	59.5	62.3	63.4	60.9	59.6
Face Amount \$250,000 and over	88.5	77.8	63.0	68.1	68.6
Cancer Group	75.1	75.3	72.8	71.4	70.6
Cardio Group	27.8	27.0	27.3	26.0	26.8
Organ Group	4.8	2.7	3.0	3.1	4.8
Neuro Group	27.5	31.9	34.9	36.6	34.6
Accident/Infectious	55.9	68.4	57.7	65.6	59.8
LOIE	0.0	0.0	33.9	94.4	82.1
Non-life-threatening	25.8	20.5	19.6	17.7	19.2
Total Smoker Experience	85.6	85.4	79.3	77.0	80.1
Face Amount < \$50,000	66.3	66.2	72.4	83.7	73.3
Face Amount \$50,000–\$99,999	105.7	97.5	90.9	82.7	89.4
Face Amount \$100,000–\$249,999	68.2	72.6	76.9	67.4	70.3
Face Amount \$250,000 and over	148.2	155.5	65.2	81.6	110.1
Cancer Group	106.5	104.9	93.2	89.0	94.6
Cardio Group	55.0	57.8	63.5	66.2	62.8
Organ Group	0.0	0.0	0.0	13.4	9.7
Neuro Group	25.1	31.3	44.1	43.2	40.9
Accident/Infectious	0.0	0.0	0.0	0.0	0.0
LOIE	0.0	0.0	0.0	0.0	0.0
Non-life-threatening	16.8	17.2	13.4	18.8	16.0
Total Non-smoker Experience	59.3	59.8	58.5	57.7	56.9
Face Amount < \$50,000	42.8	48.4	50.0	50.3	47.3
Face Amount \$50,000–\$99,999	52.1	51.6	50.3	48.7	50.3
Face Amount \$100,000–\$249,999	59.1	61.8	62.8	60.6	59.1
Face Amount \$250,000 and over	86.4	75.1	63.0	67.7	67.3
Cancer Group	73.2	73.6	71.6	70.5	69.3
Cardio Group	26.3	25.4	25.4	24.0	24.9
Organ Group	5.2	2.8	3.2	2.6	4.5
Neuro Group	27.6	32.0	34.4	36.2	34.2
Accident/Infectious	59.8	72.9	61.4	69.6	63.7
LOIE	0.0	0.0	35.8	99.5	86.7
Non-life-threatening	26.3	20.7	19.9	17.6	19.3

**Table C4g. Comparison of ratios (A/E) by number and amount.
Overall experience for policy years 2003–2004 through 2010–2011**

Population—Overall	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Total Experience	4,866	1,989,909	51.9	418,783,394	173,847,671,706	54.2
Face Amount < \$50,000	1,292	466,319	47.7	30,529,739	10,844,227,465	48.9
Face Amount \$50,000–\$99,999	1,526	612,627	52.1	81,936,685	33,268,733,228	52.0
Face Amount \$100,000–\$249,999	1,750	803,529	54.2	201,129,454	91,759,500,226	54.3
Face Amount \$250,000 and over	298	107,434	58.6	105,187,516	37,975,210,788	57.6
Cancer Group	3,514	1,988,861	65.2	299,504,026	173,837,017,856	69.7
Cardio Group	1,030	1,988,861	37.9	83,181,259	173,837,017,856	35.1
Organ Group	29	1,955,135	9.1	2,039,477	171,481,260,933	7.2
Neuro Group	216	1,954,990	28.8	25,276,632	171,470,625,455	41.6
Accident/Infectious	51	1,959,242	45.7	5,710,000	171,752,266,562	59.0
LOIE	2	435,511	8.2	700,000	37,187,381,558	33.3
Non-life-threatening	24	1,071,021	42.2	2,429,500	19,194,161,140	47.9
Total Smoker Experience	593	208,280	77.4	35,148,898	13,089,779,665	80.4
Face Amount < \$50,000	265	82,454	72.8	5,802,914	1,767,732,103	76.8
Face Amount \$50,000–\$99,999	186	65,740	83.1	10,001,019	3,552,853,154	83.4
Face Amount \$100,000–\$249,999	127	55,173	79.4	14,644,965	6,118,995,781	81.8
Face Amount \$250,000 and over	15	4,913	82.0	4,700,000	1,650,198,628	74.8
Cancer Group	362	208,154	83.1	20,690,120	13,088,542,105	86.5
Cardio Group	194	208,154	88.2	11,656,278	13,088,542,105	88.4
Organ Group	4	203,970	13.4	135,000	12,876,150,924	7.3
Neuro Group	28	203,962	44.0	2,267,250	12,875,830,924	62.0
Accident/Infectious	4	204,517	35.3	350,000	12,909,770,324	48.6
LOIE	0	42,144	—	0	2,611,578,026	—
Non-life-threatening	1	93,978	27.6	50,250	1,120,605,801	20.0
Total Non-smoker Experience	4,273	1,781,629	49.6	383,691,996	160,757,892,041	52.6
Face Amount < \$50,000	1,027	383,865	43.8	24,726,825	9,076,495,362	45.0
Face Amount \$50,000–\$99,999	1,340	546,887	49.5	71,935,666	29,715,880,074	49.4
Face Amount \$100,000–\$249,999	1,623	748,357	52.9	186,484,489	85,640,504,445	53.0
Face Amount \$250,000 and over	283	102,521	57.7	100,487,516	36,325,012,160	56.9
Cancer Group	3,152	1,780,706	63.6	278,813,906	160,748,475,751	68.7
Cardio Group	836	1,780,706	33.5	71,524,981	160,748,475,751	31.9
Organ Group	25	1,751,165	8.6	1,904,477	158,605,110,009	7.2
Neuro Group	188	1,751,028	27.4	23,009,382	158,594,794,531	40.3
Accident/Infectious	47	1,754,725	46.9	5,360,000	158,842,496,238	59.8
LOIE	2	393,367	9.0	700,000	34,575,803,532	35.5
Non-life-threatening	23	977,043	43.2	2,379,250	18,073,555,340	49.3

**Table C4h. Comparison of ratios (A/E) by number and amount.
Male experience for policy years 2003–2004 through 2010–2011**

Population—Male	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Total Experience	2,419	968,734	49.8	233,727,927	95,353,414,005	51.4
Face Amount < \$50,000	564	196,838	45.4	13,489,824	4,558,934,476	47.2
Face Amount \$50,000–\$99,999	746	280,053	51.8	39,754,512	15,307,335,298	51.1
Face Amount \$100,000–\$249,999	901	417,827	50.0	105,583,575	48,366,798,122	50.4
Face Amount \$250,000 and over	208	74,015	56.0	74,852,516	27,120,346,110	54.0
Cancer Group	1,436	968,149	64.2	141,814,759	95,346,821,705	68.7
Cardio Group	814	968,149	40.7	70,138,292	95,346,821,705	37.2
Organ Group	24	950,271	12.2	1,609,477	93,979,624,170	8.4
Neuro Group	100	950,211	31.7	14,532,799	93,974,950,152	48.9
Accident/Infectious	26	952,505	41.9	3,525,000	94,132,347,575	58.5
LOIE	0	207,435	0.0	0	20,714,416,832	0.0
Non-life-threatening	19	527,493	55.6	2,107,600	10,502,358,254	62.1
Total Smoker Experience	324	115,193	78.2	21,523,304	8,077,511,530	80.5
Face Amount < \$50,000	126	39,395	72.2	2,948,619	853,989,656	80.4
Face Amount \$50,000–\$99,999	99	36,931	79.2	5,275,600	2,005,611,872	78.7
Face Amount \$100,000–\$249,999	88	35,117	87.1	10,099,085	3,929,951,082	88.3
Face Amount \$250,000 and over	11	3,750	78.5	3,200,000	1,287,958,920	65.0
Cancer Group	140	115,111	74.6	9,367,654	8,076,769,733	78.3
Cardio Group	158	115,111	94.3	10,135,150	8,076,769,733	94.1
Organ Group	3	112,734	15.3	85,000	7,951,075,274	6.3
Neuro Group	18	112,734	62.9	1,547,250	7,951,075,274	81.5
Accident/Infectious	4	113,090	55.9	350,000	7,972,891,103	69.8
LOIE	0	23,702	—	0	1,676,297,082	—
Non-life-threatening	1	53,599	30.6	38,250	690,320,973	21.8
Total Non-smoker Experience	2,095	853,541	47.2	212,204,623	87,275,902,476	49.6
Face Amount < \$50,000	438	157,442	41.0	10,541,205	3,704,944,821	42.3
Face Amount \$50,000–\$99,999	647	243,122	49.2	34,478,912	13,301,723,426	48.5
Face Amount \$100,000–\$249,999	813	382,711	47.8	95,484,490	44,436,847,040	48.2
Face Amount \$250,000 and over	197	70,265	55.1	71,652,516	25,832,387,189	53.6
Cancer Group	1,296	853,038	63.2	132,447,105	87,270,051,972	68.1
Cardio Group	656	853,038	35.8	60,003,142	87,270,051,972	33.8
Organ Group	21	837,537	11.9	1,524,477	86,028,548,896	8.5
Neuro Group	82	837,478	28.6	12,985,549	86,023,874,878	46.7
Accident/Infectious	22	839,415	40.1	3,175,000	86,159,456,472	57.4
LOIE	0	183,733	—	0	19,038,119,750	—
Non-life-threatening	18	473,894	57.6	2,069,350	9,812,037,281	64.3

**Table C4i. Comparison of ratios (A/E) by number and amount.
Female experience for policy years 2003–2004 through 2010–2011***

Population—Female	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Total Experience	2,447	1,021,175	54.2	185,112,967	78,494,257,701	58.2
Face Amount < \$50,000	728	269,481	49.7	17,039,915	6,285,292,989	49.7
Face Amount \$50,000–\$99,999	780	332,573	52.4	42,182,173	17,961,397,930	52.9
Face Amount \$100,000–\$249,999	849	385,702	59.6	95,545,879	43,392,702,104	59.6
Face Amount \$250,000 and over	89	33,419	65.9	30,335,000	10,854,864,678	68.6
Cancer Group	2,078	1,020,712	65.9	157,689,267	78,490,196,151	70.6
Cardio Group	216	1,020,712	30.0	13,042,967	78,490,196,151	26.8
Organ Group	5	1,004,864	4.1	430,000	77,501,636,764	4.8
Neuro Group	116	1,004,778	26.7	10,743,833	77,495,675,303	34.6
Accident/Infectious	25	1,006,737	50.4	2,185,000	77,619,918,987	59.8
LOIE	2	228,076	16.3	700,000	16,472,964,726	82.1
Non-life-threatening	5	543,528	21.0	321,900	8,691,802,886	19.2
Total Smoker Experience	269	93,087	76.5	13,625,594	5,012,268,135	80.1
Face Amount < \$50,000	139	43,059	73.3	2,854,295	913,742,448	73.3
Face Amount \$50,000–\$99,999	87	28,809	87.9	4,725,419	1,547,241,281	89.4
Face Amount \$100,000–\$249,999	39	20,056	66.1	4,545,880	2,189,044,699	70.3
Face Amount \$250,000 and over	4	1,163	93.7	1,500,000	362,239,707	110.1
Cancer Group	222	93,043	89.5	11,322,466	5,011,772,372	94.6
Cardio Group	36	93,043	68.6	1,521,128	5,011,772,372	62.8
Organ Group	1	91,236	9.9	50,000	4,925,075,650	9.7
Neuro Group	10	91,228	28.5	720,000	4,924,755,650	40.9
Accident/Infectious	0	91,426	0.0	0	4,936,879,221	0.0
LOIE	0		—	0		—
Non-life-threatening	0	40,380	22.2	12,000	430,284,828	16.0
Total Non-smoker Experience	2,177	928,088	52.3	171,487,373	73,481,989,566	56.9
Face Amount < \$50,000	589	226,423	46.2	14,185,620	5,371,550,541	47.3
Face Amount \$50,000–\$99,999	693	303,765	49.9	37,456,754	16,414,156,648	50.3
Face Amount \$100,000–\$249,999	810	365,646	59.3	90,999,999	41,203,657,405	59.1
Face Amount \$250,000 and over	85	32,255	65.0	28,835,000	10,492,624,971	67.3
Cancer Group	1,856	927,668	63.9	146,366,801	73,478,423,779	69.3
Cardio Group	180	927,668	26.9	11,521,839	73,478,423,779	24.9
Organ Group	4	913,628	3.6	380,000	72,576,561,114	4.5
Neuro Group	106	913,550	26.5	10,023,833	72,570,919,653	34.2
Accident/Infectious	25	915,310	55.1	2,185,000	72,683,039,766	63.7
LOIE	2	209,635	17.7	700,000	15,537,683,782	86.7
Non-life-threatening	4	503,149	20.9	309,900	8,261,518,059	19.3

* Some of the results cannot be presented due to confidentiality rules (shaded cells above).

Observations on the results shown in tables C4a-C4i:

1. The Expected tables do not reflect the impact of underwriting and, as such, overall A/E are expected to be below 100%.
2. Looking at the entire study period, the overall A/E figures of 51.9% (by number) and 54.2% (by amount) are reflective of a majority of policies in this study that are still in early policy durations.
3. The overall result by amount is higher than by count, which is consistent with some possible anti-selection by face amount. However, the figures appear to be converging over time. This, combined with the average claim amount below the average face amount in more recent study periods, could be an indication of reduced anti-selection by insured face amount compared to earlier study periods.
4. Smokers experience higher incidence rates than non-smokers (both sets of A/E ratios are based on expected unismoke tables). For men, smokers experience about 66%/62% (by number/by amount) more claims than their non-smoking counterparts, while the difference is only about 46%/41% (by number/by amount) for women. The widest gap can be seen on Cardio conditions.
5. The results by face amount band appear counterintuitive compared to what is normally seen on mortality experience. It could be an early indication of anti-selection on policies with larger face amounts. Another possible explanation is that CI riders with small face amounts are sold on preferred or large face amount life insurance policies, resulting in the CI rider benefiting from additional underwriting information. We can, however, see the results coming closer together as we study periods over time with generally higher A/E at the lower face amount bands, and slightly lower A/E at higher face amount bands.
6. When comparing A/E ratios by illness group, please keep in mind that the study looks mainly at early duration claims (initial seven to 10 years since issue) where one would expect the greatest impact of selection. Nonetheless, some observations can be made:
 - Cancer claims, the group with the largest number of claims (3,514 of 4,866), have the highest A/E ratio (65.2%) by number. This indicates that higher-risk individuals may be more difficult to identify during the underwriting process.
 - Cardio claims, on the other hand, have among the lowest A/E ratios (37.9% by number based on 1,030 claims), indicating that cardiovascular conditions are easier to underwrite. The next largest number of claims is for neurological conditions, which also have a low A/E ratio (28.8% by number based on 216 claims), indicating some success in underwriting such risks. However, the A/E ratio by amount (41.6%) is substantially higher than the A/E ratio of 28.8% by number. This may indicate some selection against insurance companies.
 - For Accident/Infectious Diseases and LOIE groups, there is a similar marked increase in the A/E ratios by amount compared to by number. This may warrant some further investigation, with Accident causes separated from Infectious Diseases. Accident causes are expected to be random and not as easily screened through underwriting.

- For Organ claims, a very low A/E can be expected, as the medical information available at the time of underwriting would be very useful in reducing the risk exposure to short-term claims.
- Results for NLTCs are high in early study periods due to the lack of data credibility.

Figures C1a to C1d show the average face values for seven claim conditions. Male and female sample sizes are shown in parentheses. Error bars show ± 2 standard deviations. “Average” is the average face value for all seven claim conditions combined.

Figure C1a. Average face values for seven claim conditions for 2003–2008

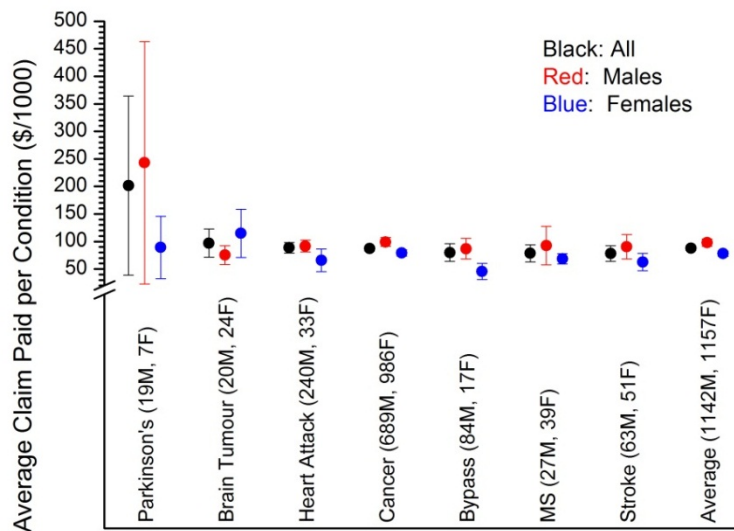


Figure C1b. Average face values for seven claim conditions for 2004–2009

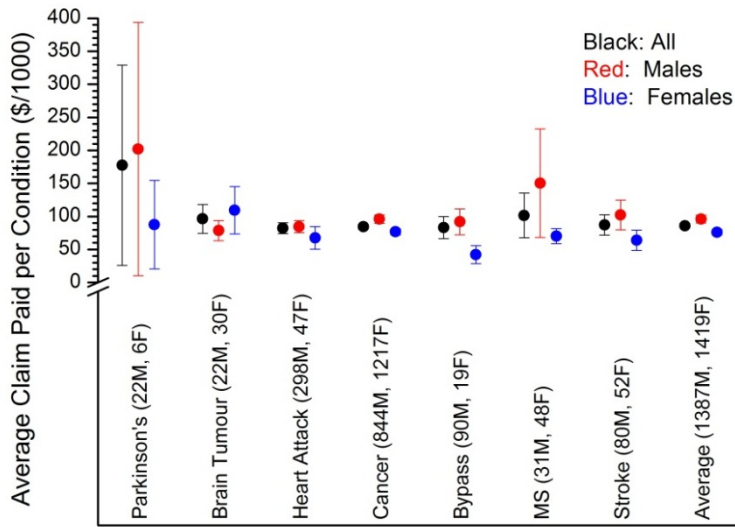


Figure C1c. Average face values for seven claim conditions for 2005–2010

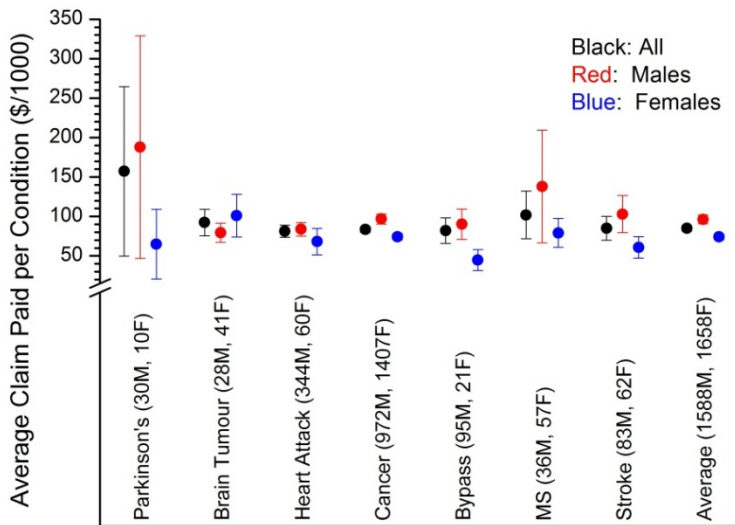
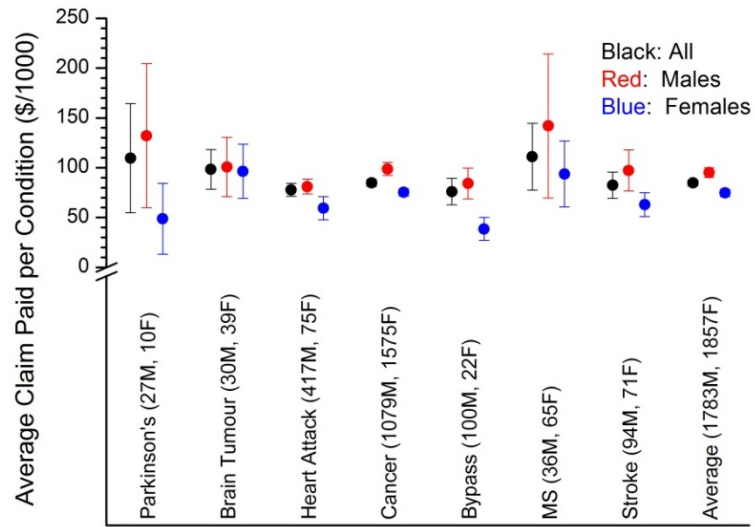


Figure C1d. Average face values for seven claim conditions for 2006–2011



Observation on figures C1a to C1d:

1. Parkinson's and Multiple Sclerosis (MS) stand out as having higher than average claim amounts. This is in line with observation 6 found in the table C4 series.

Table C5a. Comparison of ratios (A/E) by number for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Overall Experience

Population—Overall	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Duration 1	28.5	28.8	27.3	26.6	27.3	1.5
Duration 2	50.1	49.6	48.9	49.2	49.0	2.0
Duration 3	56.9	56.3	55.4	53.2	55.1	2.2
Duration 4	59.5	59.6	56.5	53.5	56.5	2.2
Duration 5	57.7	57.4	56.6	56.3	55.7	2.3
Duration 6	61.4	58.7	59.6	56.3	56.4	2.4
Duration 7	63.2	61.1	61.2	59.2	60.4	2.7
Duration 8	61.4	59.2	53.9	51.5	53.0	2.8
Duration 9	65.1	61.5	56.7	54.3	54.9	3.4
Duration 10+	71.0	74.5	66.4	61.8	61.2	3.1
Duration 1—Heart Attack	33.7	38.6	39.1	40.9	37.4	4.7
Duration 2—Heart Attack	27.9	30.3	31.2	39.0	31.1	4.2
Duration 3—Heart Attack	41.4	40.0	44.2	43.2	39.9	4.7
Duration 4—Heart Attack	39.7	42.0	40.5	44.5	44.8	5.0
Duration 5—Heart Attack	37.2	42.4	40.8	44.6	41.5	5.0
Duration 6—Heart Attack	57.2	53.0	50.7	51.5	50.9	5.7
Duration 7+—Heart Attack	40.4	41.8	41.5	43.7	44.0	3.2
Duration 1—LT Cancer	34.1	33.4	31.1	29.8	31.6	2.2
Duration 2—LT Cancer	65.8	65.1	65.6	64.9	64.9	3.1
Duration 3—LT Cancer	70.8	72.4	70.4	68.5	69.7	3.3
Duration 4—LT Cancer	74.4	74.8	70.4	66.4	70.0	3.3
Duration 5—LT Cancer	74.1	72.6	73.1	71.7	70.5	3.4
Duration 6—LT Cancer	71.0	71.8	73.8	70.9	69.4	3.6
Duration 7+—LT Cancer	78.2	80.4	75.8	72.2	72.7	2.2
Duration 1—Stroke	21.8	20.9	20.0	18.0	20.7	5.2
Duration 2—Stroke	44.1	45.0	28.9	28.5	37.0	6.9
Duration 3—Stroke	27.1	26.1	32.3	30.1	30.3	6.2
Duration 4—Stroke	44.6	48.2	48.3	45.6	45.6	7.7
Duration 5—Stroke	28.6	36.4	35.4	32.4	34.1	6.8
Duration 6—Stroke	42.8	29.8	32.9	28.7	29.6	6.6
Duration 7+—Stroke	51.3	39.1	34.2	38.0	40.4	4.6

Table C5b. Comparison of ratios (A/E) by number for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Male Experience

Population—Male	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Duration 1	26.6	27.8	27.0	27.5	26.9	2.2
Duration 2	51.5	49.6	47.9	46.4	47.9	2.9
Duration 3	54.9	54.0	51.9	48.7	52.1	3.0
Duration 4	55.2	56.7	55.6	49.6	53.6	3.0
Duration 5	54.7	53.6	52.5	54.3	53.2	3.1
Duration 6	61.9	55.7	52.0	48.6	50.2	3.1
Duration 7	55.5	56.2	54.7	55.2	55.3	3.5
Duration 8	55.6	51.8	49.0	49.6	50.8	3.7
Duration 9	68.7	65.3	61.7	56.8	57.7	4.7
Duration 10+	73.4	75.3	65.4	60.4	59.8	4.0
Duration 1—Heart Attack	38.3	45.6	46.0	49.8	42.9	5.7
Duration 2—Heart Attack	32.1	36.3	38.5	46.1	35.6	5.1
Duration 3—Heart Attack	44.4	42.9	49.3	47.5	44.4	5.7
Duration 4—Heart Attack	47.5	47.9	46.2	49.2	50.7	6.2
Duration 5—Heart Attack	41.7	44.4	42.8	48.1	45.4	6.0
Duration 6—Heart Attack	69.3	58.7	53.9	55.8	56.4	6.9
Duration 7+—Heart Attack	48.8	50.4	47.3	49.4	49.9	3.9
Duration 1—LT Cancer	27.5	28.0	27.8	29.2	27.7	3.4
Duration 2—LT Cancer	76.4	70.7	67.6	62.7	68.6	5.2
Duration 3—LT Cancer	70.2	71.0	65.4	62.3	66.3	5.1
Duration 4—LT Cancer	70.6	73.6	74.1	63.5	68.4	5.2
Duration 5—LT Cancer	74.1	73.2	73.6	74.6	71.2	5.4
Duration 6—LT Cancer	64.9	65.1	64.7	61.1	59.2	5.0
Duration 7+—LT Cancer	75.4	77.8	73.8	71.4	71.5	3.2
Duration 1—Stroke	28.0	22.3	19.8	12.2	20.8	6.9
Duration 2—Stroke	36.8	37.7	18.2	15.5	29.1	8.1
Duration 3—Stroke	30.0	32.3	36.3	31.6	35.1	8.8
Duration 4—Stroke	32.7	47.7	43.1	47.3	42.5	9.8
Duration 5—Stroke	35.2	38.1	36.4	35.1	37.3	9.3
Duration 6—Stroke	41.9	29.5	29.7	23.1	27.7	8.3
Duration 7+—Stroke	41.3	44.1	37.4	40.2	39.4	5.9

Table C5c. Comparison of ratios (A/E) by number for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Female Experience

Population—Female	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Duration 1	30.3	29.7	27.7	25.7	27.7	2.1
Duration 2	48.7	49.5	49.9	51.8	50.1	2.9
Duration 3	59.0	58.6	58.9	57.8	58.2	3.1
Duration 4	64.1	62.7	57.3	57.6	59.5	3.3
Duration 5	61.1	61.4	61.0	58.4	58.3	3.4
Duration 6	60.8	62.1	67.9	64.8	63.2	3.7
Duration 7	72.6	66.8	68.7	63.8	66.2	4.1
Duration 8	69.3	68.4	59.8	53.8	55.6	4.2
Duration 9	59.6	56.3	50.5	51.4	51.5	4.9
Duration 10+	67.2	73.4	67.8	63.7	63.3	4.9
Duration 1—Heart Attack	18.8	16.0	16.9	12.8	19.6	6.9
Duration 2—Heart Attack	14.3	10.9	7.7	16.4	16.6	6.3
Duration 3—Heart Attack	31.9	30.9	27.9	29.6	25.5	7.7
Duration 4—Heart Attack	15.3	23.5	22.7	29.7	26.0	7.8
Duration 5—Heart Attack	23.3	36.0	34.7	33.6	29.3	8.5
Duration 6—Heart Attack	19.2	35.2	40.8	38.6	34.1	9.5
Duration 7+—Heart Attack	13.0	14.7	23.9	26.5	26.1	4.9
Duration 1—LT Cancer	38.1	36.7	33.1	30.1	34.0	2.9
Duration 2—LT Cancer	59.0	61.6	64.4	66.3	62.6	3.9
Duration 3—LT Cancer	71.2	73.3	73.7	72.4	72.0	4.3
Duration 4—LT Cancer	77.1	75.7	67.9	68.2	71.1	4.4
Duration 5—LT Cancer	74.1	72.2	72.7	69.8	69.9	4.5
Duration 6—LT Cancer	75.7	76.9	80.5	78.1	76.9	4.9
Duration 7+—LT Cancer	80.8	82.7	77.5	73.0	73.7	3.0
Duration 1—Stroke	13.7	19.2	20.1	25.2	20.6	7.8
Duration 2—Stroke	54.1	54.8	43.1	45.2	47.3	11.8
Duration 3—Stroke	23.0	17.7	26.9	28.2	23.8	8.4
Duration 4—Stroke	61.2	48.8	55.5	43.3	49.8	12.5
Duration 5—Stroke	19.0	34.1	34.0	28.6	29.6	9.9
Duration 6—Stroke	44.3	30.3	37.3	36.5	32.4	10.8
Duration 7+—Stroke	67.6	31.1	29.4	34.6	42.0	7.4

Table C5d. Comparison of ratios (A/E) by amount for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Overall Experience

Population—Overall	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Duration 1	32.3	30.2	27.5	27.5	29.0
Duration 2	51.1	49.1	49.0	51.8	50.7
Duration 3	67.6	66.7	63.3	55.9	60.4
Duration 4	64.8	64.3	58.9	55.4	59.4
Duration 5	60.4	56.5	57.4	57.4	58.2
Duration 6	64.7	61.4	61.5	59.3	59.1
Duration 7	64.0	59.4	60.0	59.4	61.1
Duration 8	60.6	66.8	59.4	55.0	55.3
Duration 9	64.6	59.9	56.3	54.0	54.5
Duration 10+	77.3	79.2	63.8	60.4	60.4
Duration 1—Heart Attack	41.1	42.5	42.8	39.8	39.2
Duration 2—Heart Attack	22.1	24.0	29.9	33.2	26.1
Duration 3—Heart Attack	46.7	42.2	43.2	42.4	40.2
Duration 4—Heart Attack	38.7	37.2	32.6	32.8	40.0
Duration 5—Heart Attack	30.6	34.1	36.9	40.1	37.4
Duration 6—Heart Attack	59.8	48.9	46.7	43.3	45.7
Duration 7+—Heart Attack	42.3	40.5	36.8	38.1	38.5
Duration 1—LT Cancer	40.9	37.2	32.6	31.8	35.1
Duration 2—LT Cancer	72.8	68.4	67.6	72.5	71.5
Duration 3—LT Cancer	82.6	82.9	77.9	73.4	74.7
Duration 4—LT Cancer	81.3	79.8	72.8	69.5	74.6
Duration 5—LT Cancer	81.7	75.3	78.0	76.4	76.7
Duration 6—LT Cancer	80.9	78.9	78.4	76.5	73.9
Duration 7+—LT Cancer	78.9	81.9	77.1	74.1	74.7
Duration 1—Stroke	16.9	16.4	15.9	15.8	16.0
Duration 2—Stroke	33.5	34.0	25.9	21.9	29.9
Duration 3—Stroke	39.0	39.3	45.1	34.7	38.8
Duration 4—Stroke	46.6	59.0	54.4	53.3	50.6
Duration 5—Stroke	25.8	29.9	29.1	27.7	30.4
Duration 6—Stroke	37.7	27.9	28.3	26.1	28.1
Duration 7+—Stroke	44.1	46.1	35.6	37.3	38.3

Table C5e. Comparison of ratios (A/E) by amount for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Male Experience

Population—Male	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Duration 1	30.2	28.6	26.4	28.1	28.0
Duration 2	50.5	46.0	47.5	51.4	50.4
Duration 3	69.6	65.2	60.3	47.4	57.1
Duration 4	58.9	62.0	58.7	51.5	55.3
Duration 5	52.8	47.1	50.7	51.6	52.8
Duration 6	62.0	56.4	52.0	48.0	49.4
Duration 7	56.7	54.2	54.4	57.8	58.1
Duration 8	48.8	61.8	57.3	53.8	53.6
Duration 9	66.7	63.4	62.0	57.8	58.6
Duration 10+	77.9	80.0	60.7	58.0	58.3
Duration 1—Heart Attack	42.7	44.4	44.6	46.7	42.0
Duration 2—Heart Attack	25.5	28.4	35.8	38.4	29.8
Duration 3—Heart Attack	50.9	46.3	48.7	47.0	44.4
Duration 4—Heart Attack	43.8	40.4	35.8	35.7	44.8
Duration 5—Heart Attack	33.4	33.2	37.5	41.6	39.6
Duration 6—Heart Attack	69.4	53.8	47.0	44.0	48.0
Duration 7+—Heart Attack	48.5	45.6	39.6	41.4	41.9
Duration 1—LT Cancer	37.1	34.2	30.2	31.1	32.2
Duration 2—LT Cancer	82.6	68.0	67.9	77.1	79.1
Duration 3—LT Cancer	88.3	85.5	76.9	66.5	73.3
Duration 4—LT Cancer	73.4	78.7	76.7	65.1	69.5
Duration 5—LT Cancer	75.2	67.6	75.0	75.1	74.8
Duration 6—LT Cancer	71.8	68.3	68.8	66.3	62.5
Duration 7+—LT Cancer	71.7	80.0	76.3	75.1	75.3
Duration 1—Stroke	20.8	18.8	17.7	13.2	15.9
Duration 2—Stroke	29.8	29.7	19.2	12.1	25.5
Duration 3—Stroke	38.6	40.9	46.0	29.0	37.6
Duration 4—Stroke	43.4	66.2	56.9	60.7	52.3
Duration 5—Stroke	24.6	25.8	25.6	30.6	30.0
Duration 6—Stroke	40.5	30.8	27.9	24.1	29.1
Duration 7+—Stroke	40.3	56.5	44.4	41.2	40.2

Table C5f. Comparison of ratios (A/E) by amount for durations 1 to 10+ and for durations 1 to 7+ for three illnesses. Female Experience

Population—Female	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Duration 1	35.1	32.3	29.0	26.7	30.3
Duration 2	51.9	53.1	50.9	52.2	51.0
Duration 3	64.8	68.7	67.4	67.1	64.9
Duration 4	73.1	67.4	59.2	60.8	65.0
Duration 5	71.4	70.0	67.0	65.5	66.0
Duration 6	68.9	68.9	75.4	75.6	73.4
Duration 7	75.7	67.5	68.5	61.9	65.5
Duration 8	81.3	74.9	62.8	56.8	57.8
Duration 9	60.4	53.5	46.6	47.7	47.8
Duration 10+	76.2	77.6	69.6	64.6	64.1
Duration 1—Heart Attack	34.0	34.1	34.3	8.1	26.7
Duration 2—Heart Attack	6.6	3.9	2.6	9.8	8.8
Duration 3—Heart Attack	27.5	23.6	18.5	21.3	21.1
Duration 4—Heart Attack	16.1	22.8	18.3	19.8	18.7
Duration 5—Heart Attack	18.4	38.1	34.5	33.8	27.5
Duration 6—Heart Attack	17.6	27.7	45.5	40.5	35.6
Duration 7+—Heart Attack	14.1	18.1	24.7	24.4	23.9
Duration 1—LT Cancer	44.0	39.6	34.4	32.4	37.4
Duration 2—LT Cancer	64.7	68.8	67.3	68.8	65.4
Duration 3—LT Cancer	77.6	80.7	78.8	79.2	75.8
Duration 4—LT Cancer	88.4	80.7	69.4	73.3	79.1
Duration 5—LT Cancer	88.0	82.3	80.8	77.5	78.4
Duration 6—LT Cancer	90.1	89.2	87.5	86.0	84.7
Duration 7+—LT Cancer	87.4	84.2	78.0	73.0	74.1
Duration 1—Stroke	10.0	12.2	12.7	20.1	16.2
Duration 2—Stroke	40.2	41.8	37.9	39.3	37.9
Duration 3—Stroke	39.8	36.4	43.4	45.1	41.0
Duration 4—Stroke	52.5	45.3	49.5	39.5	47.3
Duration 5—Stroke	28.1	37.8	35.7	22.2	31.1
Duration 6—Stroke	32.2	22.2	29.0	29.7	26.2
Duration 7+—Stroke	52.4	24.2	17.5	29.4	34.4

**Table C5g. Comparison of ratios (A/E) by number and amount.
Overall experience for policy years 2003–2004 through 2010–2011**

Population—Overall	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Duration 1	324	368,976	27.3	27,686,711	31,616,644,977	29.0
Duration 2	581	328,814	49.0	48,842,292	28,437,871,728	50.7
Duration 3	650	291,349	55.1	58,271,242	25,414,506,499	60.4
Duration 4	640	249,001	56.5	55,165,422	21,827,468,412	59.4
Duration 5	597	211,431	55.7	51,212,800	18,560,738,633	58.2
Duration 6	551	173,444	56.4	47,758,382	15,304,870,198	59.1
Duration 7	517	136,936	60.4	43,365,712	12,095,942,099	61.1
Duration 8	359	98,182	53.0	31,158,545	8,669,504,234	55.3
Duration 9	263	62,988	54.9	21,800,496	5,571,057,855	54.5
Duration 10+	385	68,788	61.2	33,521,792	6,349,067,072	60.4
Duration 1—Heart Attack	64	368,565	37.4	5,823,500	31,612,462,367	39.2
Duration 2—Heart Attack	55	328,532	31.1	4,021,250	28,435,062,572	26.1
Duration 3—Heart Attack	72	291,156	39.9	6,356,302	25,412,756,541	40.2
Duration 4—Heart Attack	79	248,913	44.8	6,199,303	21,826,552,438	40.0
Duration 5—Heart Attack	70	211,397	41.5	5,542,247	18,560,295,611	37.4
Duration 6—Heart Attack	79	173,422	50.9	6,290,771	15,304,577,068	45.7
Duration 7+—Heart Attack	190	366,874	44.0	14,987,418	32,685,311,259	38.5
Duration 1—LT Cancer	206	368,565	31.6	17,659,361	31,612,462,367	35.1
Duration 2—LT Cancer	425	328,532	64.9	36,550,526	28,435,062,572	71.5
Duration 3—LT Cancer	457	291,156	69.7	38,431,593	25,412,756,541	74.7
Duration 4—LT Cancer	442	248,913	70.0	37,196,006	21,826,552,438	74.6
Duration 5—LT Cancer	422	211,397	70.5	36,395,803	18,560,295,611	76.7
Duration 6—LT Cancer	380	173,422	69.4	32,377,030	15,304,577,068	73.9
Duration 7+—LT Cancer	1,096	366,874	72.7	92,628,761	32,685,311,259	74.7
Duration 1—Stroke	16	368,565	20.7	1,014,000	31,612,462,367	16.0
Duration 2—Stroke	29	328,532	37.0	1,938,189	28,435,062,572	29.9
Duration 3—Stroke	24	291,156	30.3	2,545,000	25,412,756,541	38.8
Duration 4—Stroke	35	248,913	45.6	3,224,000	21,826,552,438	50.6
Duration 5—Stroke	25	211,397	34.1	1,850,700	18,560,295,611	30.4
Duration 6—Stroke	20	173,422	29.6	1,587,491	15,304,577,068	28.1
Duration 7+—Stroke	77	366,874	40.4	6,200,813	32,685,311,259	38.3

**Table C5h. Comparison of ratios (A/E) by number and amount.
Male experience for policy years 2003–2004 through 2010–2011**

Population—Male	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Duration 1	154	177,478	26.9	14,829,250	17,169,582,802	28.0
Duration 2	280	158,957	47.9	27,468,894	15,499,796,039	50.4
Duration 3	309	141,515	52.1	31,605,689	13,910,712,543	57.1
Duration 4	311	121,433	53.6	29,882,235	11,971,640,744	55.3
Duration 5	296	103,223	53.2	27,285,776	10,175,863,462	52.8
Duration 6	258	84,741	50.2	23,770,468	8,419,262,793	49.4
Duration 7	252	66,975	55.3	24,900,014	6,678,198,675	58.1
Duration 8	187	48,305	50.8	18,528,162	4,822,414,742	53.6
Duration 9	153	31,222	57.7	14,557,800	3,108,905,306	58.6
Duration 10+	218	34,885	59.8	20,852,139	3,597,036,900	58.3
Duration 1—Heart Attack	56	177,245	42.9	5,113,500	17,166,856,692	42.0
Duration 2—Heart Attack	48	158,803	35.6	3,776,250	15,498,019,400	29.8
Duration 3—Heart Attack	61	141,413	44.4	5,752,302	13,909,716,574	44.4
Duration 4—Heart Attack	68	121,383	50.7	5,668,000	11,971,107,699	44.8
Duration 5—Heart Attack	58	103,204	45.4	4,785,720	10,175,632,924	39.6
Duration 6—Heart Attack	66	84,727	56.4	5,371,643	8,419,092,793	48.0
Duration 7+—Heart Attack	162	181,374	49.9	13,205,652	18,206,395,623	41.9
Duration 1—LT Cancer	67	177,245	27.7	7,105,000	17,166,856,692	32.2
Duration 2—LT Cancer	172	158,803	68.6	18,147,059	15,498,019,400	79.1
Duration 3—LT Cancer	171	141,413	66.3	17,324,140	13,909,716,574	73.3
Duration 4—LT Cancer	175	121,383	68.4	16,254,492	11,971,107,699	69.5
Duration 5—LT Cancer	177	103,204	71.2	16,959,597	10,175,632,924	74.8
Duration 6—LT Cancer	138	84,727	59.2	13,414,485	8,419,092,793	62.5
Duration 7+—LT Cancer	496	181,374	71.5	48,905,213	18,206,395,623	75.3
Duration 1—Stroke	9	177,245	20.8	640,000	17,166,856,692	15.9
Duration 2—Stroke	13	158,803	29.1	1,060,000	15,498,019,400	25.5
Duration 3—Stroke	16	141,413	35.1	1,600,000	13,909,716,574	37.6
Duration 4—Stroke	19	121,383	42.5	2,179,000	11,971,107,699	52.3
Duration 5—Stroke	16	103,204	37.3	1,200,700	10,175,632,924	30.0
Duration 6—Stroke	11	84,727	27.7	1,085,000	8,419,092,793	29.1
Duration 7+—Stroke	45	181,374	39.4	4,369,000	18,206,395,623	40.2

**Table C5i. Comparison of ratios (A/E) by number and amount.
Female experience for policy years 2003–2004 through 2010–2011**

Population—Female	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Duration 1	170	191,498	27.7	12,857,461	14,447,062,175	30.3
Duration 2	301	169,857	50.1	21,373,398	12,938,075,689	51.0
Duration 3	341	149,834	58.2	26,665,553	11,503,793,956	64.9
Duration 4	329	127,568	59.5	25,283,187	9,855,827,668	65.0
Duration 5	300	108,208	58.3	23,927,024	8,384,875,171	66.0
Duration 6	292	88,703	63.2	23,987,914	6,885,607,405	73.4
Duration 7	264	69,960	66.2	18,465,698	5,417,743,423	65.5
Duration 8	172	49,877	55.6	12,630,383	3,847,089,492	57.8
Duration 9	110	31,766	51.5	7,242,696	2,462,152,549	47.8
Duration 10+	167	33,903	63.3	12,669,653	2,752,030,172	64.1
Duration 1—Heart Attack	8	191,320	19.6	710,000	14,445,605,675	26.7
Duration 2—Heart Attack	7	169,729	16.6	245,000	12,937,043,172	8.8
Duration 3—Heart Attack	11	149,743	25.5	604,000	11,503,039,966	21.1
Duration 4—Heart Attack	11	127,530	26.0	531,303	9,855,444,739	18.7
Duration 5—Heart Attack	12	108,193	29.3	756,527	8,384,662,687	27.5
Duration 6—Heart Attack	13	88,695	34.1	919,128	6,885,484,275	35.6
Duration 7+—Heart Attack	28	185,500	26.1	1,781,766	14,478,915,636	23.9
Duration 1—LT Cancer	139	191,320	34.0	10,554,361	14,445,605,675	37.4
Duration 2—LT Cancer	253	169,729	62.6	18,403,467	12,937,043,172	65.4
Duration 3—LT Cancer	286	149,743	72.0	21,107,453	11,503,039,966	75.8
Duration 4—LT Cancer	267	127,530	71.1	20,941,514	9,855,444,739	79.1
Duration 5—LT Cancer	245	108,193	69.9	19,436,206	8,384,662,687	78.4
Duration 6—LT Cancer	242	88,695	76.9	18,962,545	6,885,484,275	84.7
Duration 7+—LT Cancer	600	185,500	73.7	43,723,548	14,478,915,636	74.1
Duration 1—Stroke	7	191,320	20.6	374,000	14,445,605,675	16.2
Duration 2—Stroke	16	169,729	47.3	878,189	12,937,043,172	37.9
Duration 3—Stroke	8	149,743	23.8	945,000	11,503,039,966	41.0
Duration 4—Stroke	16	127,530	49.8	1,045,000	9,855,444,739	47.3
Duration 5—Stroke	9	108,193	29.6	650,000	8,384,662,687	31.1
Duration 6—Stroke	9	88,695	32.4	502,491	6,885,484,275	26.2
Duration 7+—Stroke	32	185,500	42.0	1,831,813	14,478,915,636	34.4

Observations on the results shown in tables C5a to C5i:

1. The general upward trend in A/E ratios by increasing duration reflects the impact of underwriting selection.
2. Note that the relatively low Duration 1 A/E ratios for the Life-Threatening (LT) Cancer group is a combination of the 90-day Moratorium Period found on Canadian CI contracts (now referred to in the “exclusions” section of the Canadian Life and Health Insurance Association CI Benchmark Definitions) as well as effective underwriting. The impact of the Moratorium Period on cancer incidence rates can last beyond the 90-day period as an insured exhibiting any signs or symptoms or having had medical consultations will not be able to claim for cancer in the future under their CI contract. No explicit adjustment was made to the 2008 CANCI to reflect the Moratorium Period.
3. The selection period on the LT Cancer group appears quite short, especially in comparison to conditions found under the Cardio group. This is likely reflective of the insurers’ abilities to evaluate higher-risk individuals during the underwriting selection process.

Table C6a. Comparison of ratios (A/E) by number and amount for medical underwriting, policy year, and issue year. Overall Experience for 2003–2004 through 2010–2011

Population—Overall	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Paramedical	680	223,255	45.4	66,854,573	24,597,121,644	50.5
Medical	393	147,656	52.0	39,647,821	13,728,788,681	56.8
Non-medical	1300	785,571	52.7	77,927,915	51,896,607,588	55.0
Policy Year 2003–2004	272	135,726	49.2	24,392,547	11,472,537,059	55.3
Policy Year 2004–2005	379	175,632	51.7	33,409,514	14,942,007,240	56.8
Policy Year 2005–2006	454	208,950	50.1	39,379,868	17,992,119,002	53.6
Policy Year 2006–2007	607	239,005	56.4	55,079,901	20,719,905,965	62.7
Policy Year 2007–2008	670	265,397	53.7	57,221,885	23,341,820,552	55.7
Policy Year 2008–2009	788	293,975	55.1	65,417,457	25,956,982,231	55.2
Policy Year 2009–2010	832	321,471	51.6	68,799,054	28,433,495,842	51.0
Policy Year 2010–2011	864	349,751	47.7	75,083,168	30,988,803,816	49.2
Issue Year 1996	39	6,910	64.4	3,970,000	726,219,668	62.7
Issue Year 1997	89	13,493	69.4	8,400,000	1,335,503,661	69.6
Issue Year 1998	126	21,212	69.1	10,873,583	2,096,208,970	63.8
Issue Year 1999	175	39,560	57.5	16,742,921	3,619,935,490	64.5
Issue Year 2000	283	71,042	58.0	23,174,312	6,237,719,966	58.0
Issue Year 2001	607	171,947	59.3	51,609,113	14,926,759,936	62.1
Issue Year 2002	714	236,876	56.6	59,423,250	19,900,380,863	59.3
Issue Year 2003	795	314,948	52.3	67,849,229	26,920,092,156	55.4
Issue Year 2004	687	297,231	51.3	59,203,249	25,850,289,203	53.7
Issue Year 2005	477	229,703	49.6	43,667,051	20,413,775,558	54.3
Issue Year 2006	342	188,509	46.4	29,207,125	16,558,034,004	48.6
Issue Year 2007	234	143,271	44.2	19,813,858	13,056,237,986	43.9
Issue Year 2008	176	121,574	42.9	13,084,639	10,713,326,523	38.1
Issue Year 2009	84	86,684	30.0	7,894,064	7,447,303,273	34.2
Issue Year 2010	32	46,405	22.2	2,871,000	3,970,904,778	24.3

Table C6b. Comparison of ratios (A/E) by number and amount for medical underwriting, policy year, and issue year. Male Experience for 2003–2004 through 2010–2011

Population—Male	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Paramedical	369	115,389	44.8	42,175,585	14,891,721,772	50.8
Medical	199	68,164	52.5	21,854,085	7,671,406,998	51.3
Non-medical	557	367,242	49.5	35,553,113	25,895,071,775	51.5
Policy Year 2003–2004	142	66,988	49.7	14,366,902	6,351,907,146	55.8
Policy Year 2004–2005	191	86,190	50.6	18,577,893	8,219,583,650	54.1
Policy Year 2005–2006	228	102,559	48.8	22,996,510	9,902,203,705	53.5
Policy Year 2006–2007	309	117,144	55.4	31,245,783	11,380,118,562	60.6
Policy Year 2007–2008	326	129,707	50.3	29,824,928	12,827,449,228	49.4
Policy Year 2008–2009	391	142,884	52.8	36,253,193	14,237,195,708	51.9
Policy Year 2009–2010	398	155,248	47.5	38,603,287	15,534,097,988	48.5
Policy Year 2010–2011	433	168,014	46.0	41,811,931	16,900,858,018	46.3
Issue Year 1996	22	3,614	60.3	2,445,000	424,414,555	58.4
Issue Year 1997	60	7,301	75.9	6,085,000	810,479,686	74.3
Issue Year 1998	71	11,281	63.8	6,963,583	1,241,985,604	60.9
Issue Year 1999	98	20,287	56.2	9,865,000	2,057,704,140	60.0
Issue Year 2000	153	35,589	56.7	12,898,389	3,462,536,129	52.9
Issue Year 2001	297	83,976	55.1	29,637,315	8,265,849,037	59.3
Issue Year 2002	382	115,976	57.4	35,323,954	10,933,408,584	59.4
Issue Year 2003	378	152,548	48.5	37,138,976	14,764,069,973	51.9
Issue Year 2004	317	143,593	46.8	31,316,589	13,976,635,263	49.2
Issue Year 2005	232	112,732	47.2	24,324,660	11,183,291,612	52.2
Issue Year 2006	174	92,313	47.2	14,121,603	9,025,162,811	41.5
Issue Year 2007	104	69,408	39.7	9,837,858	7,213,938,758	38.4
Issue Year 2008	79	57,635	40.3	6,879,000	5,817,775,769	35.6
Issue Year 2009	33	40,531	25.3	4,512,500	3,977,926,562	35.3
Issue Year 2010	15	21,603	22.3	1,631,000	2,148,037,289	25.1

Table C6c. Comparison of ratios (A/E) by number and amount for medical underwriting, policy year, and issue year. Female Experience for 2003–2004 through 2010–2011^b

Population—Female	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Paramedical	311	107,866	46.0	24,678,988	9,705,399,871	50.0
Medical						
Non-medical	742	418,329	55.5	42,374,802	26,001,535,813	58.3
Policy Year 2003–2004	130	68,739	48.6	10,025,645	5,120,629,913	54.7
Policy Year 2004–2005	188	89,442	52.9	14,831,621	6,722,423,590	60.5
Policy Year 2005–2006	225	106,391	51.5	16,383,358	8,089,915,297	53.9
Policy Year 2006–2007	298	121,861	57.3	23,834,118	9,339,787,403	65.6
Policy Year 2007–2008	344	135,690	57.3	27,396,957	10,514,371,324	64.6
Policy Year 2008–2009	397	151,091	57.7	29,164,264	11,719,786,523	59.9
Policy Year 2009–2010	434	166,224	55.9	30,195,767	12,899,397,853	54.7
Policy Year 2010–2011	431	181,738	49.4	33,271,237	14,087,945,798	53.4
Issue Year 1996	17	3,296	70.7	1,525,000	301,805,113	71.2
Issue Year 1997	29	6,192	58.9	2,315,000	525,023,975	59.7
Issue Year 1998	55	9,930	77.5	3,910,000	854,223,366	69.8
Issue Year 1999	77	19,273	59.2	6,877,921	1,562,231,350	72.2
Issue Year 2000	130	35,453	59.7	10,275,923	2,775,183,837	65.9
Issue Year 2001	310	87,971	64.0	21,971,798	6,660,910,900	66.3
Issue Year 2002	332	120,900	55.8	24,099,296	8,966,972,279	59.2
Issue Year 2003	416	162,401	56.4	30,710,253	12,156,022,183	60.3
Issue Year 2004	370	153,638	56.0	27,886,660	11,873,653,940	59.9
Issue Year 2005	246	116,971	52.1	19,342,391	9,230,483,946	57.3
Issue Year 2006	168	96,195	45.7	15,085,522	7,532,871,193	58.0
Issue Year 2007	131	73,864	48.7	9,976,000	5,842,299,227	51.2
Issue Year 2008	96	63,939	45.4	6,205,639	4,895,550,754	41.2
Issue Year 2009	50	46,153	34.3	3,381,564	3,469,376,711	32.9
Issue Year 2010	17	24,802	22.2	1,240,000	1,822,867,489	23.4

^b Some of the results cannot be presented due to confidentiality rules (shaded cells). These tables are not included in the appendix.

Observations on the results shown in tables C6a to C6c:

1. It should be noted that the data by Medical underwriting may not be fully reliable, as some companies indicated some data quality issues in identifying this characteristic.
2. There is a general decrease in A/E by Issue Year, likely due to a higher concentration of earlier policy durations in more recent policy issues, reflecting more significantly the selection effect present on new policies.

Table C7a. Comparison of ratios (A/E) by number for Return of Premium. Overall Experience^c

Population—Overall	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Return of Premium on Surrender	47.9	53.0	50.8	49.4	49.2	1.6
Return of Premium on Expiry75/100	50.3	54.3	54.4	54.5	54.5	2.9
Return of Premium only on death	53.9	53.7	53.7	53.1	52.7	1.1
No Return of Premium		55.6	55.4	52.1	52.0	2.0
Total Experience	52.7	53.7	53.4	52.4	51.9	0.7

Table C7b. Comparison of ratios (A/E) by number for Return of Premium. Male Experience^c

Population—Male	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Return of Premium on Surrender	39.0	46.4	45.4	43.6	43.3	2.2
Return of Premium on Expiry75/100	33.9	37.4	42.1	46.0	46.0	3.6
Return of Premium only on death	54.7	55.1	53.9	53.4	53.0	1.5
No Return of Premium		50.8	49.5	48.8	48.3	2.6
Total Experience	51.2	51.8	50.8	49.9	49.8	1.0

Table C7c. Comparison of ratios (A/E) by number for Return of Premium. Female Experience^c

Population—Female	A/E by number					S.D.
	2003–08	2004–09	2005–10	2006–11	2003–11	2003–11
Return of Premium on Surrender	56.6	59.3	56.1	55.1	55.0	2.4
Return of Premium on Expiry75/100	69.7	74.7	69.3	65.0	64.8	4.7
Return of Premium only on death		52.1	53.5	52.7	52.5	1.6
No Return of Premium		60.5	61.5	55.5	55.8	2.9
Total Experience	54.4	55.8	56.2	55.1	54.2	1.1

^c As some of the results cannot be presented due to confidentiality rules (shaded cells), the tables for the study period 2003–08 are not included in the appendix.

Table C7d. Comparison of ratios (A/E) by amount for Return of Premium. Overall Experience^d

Population—Overall	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Return of Premium on Surrender	51.3	50.9	48.3	48.7	48.4
Return of Premium on Expiry75/100	45.3	55.1	53.9	52.6	52.5
Return of Premium only on death	57.3	56.7	57.5	56.7	55.7
No Return of Premium		61.2	57.2	51.3	53.8
Total Experience	57.1	56.8	55.3	53.9	54.2

Table C7e. Comparison of ratios (A/E) by amount for Return of Premium. Male Experience^d

Population—Male	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Return of Premium on Surrender	44.1	45.8	44.2	44.0	43.7
Return of Premium on Expiry75/100	32.7	41.3	42.6	43.9	44.0
Return of Premium only on death	55.6	55.5	56.3	55.2	54.5
No Return of Premium		58.3	52.8	47.6	51.9
Total Experience	54.4	53.6	52.2	50.6	51.4

Table C7f. Comparison of ratios (A/E) by amount for Return of Premium. Female Experience^d

Population—Female	A/E by amount				
	2003–08	2004–09	2005–10	2006–11	2003–11
Return of Premium on Surrender	61.0	57.7	53.9	55.1	54.8
Return of Premium on Expiry75/100	65.5	77.6	72.5	67.0	66.7
Return of Premium only on death		58.5	59.3	59.0	57.6
No Return of Premium		65.2	63.3	56.6	56.3
Total Experience	60.8	61.2	59.6	58.7	58.2

Table C7g. Comparison of ratios (A/E) by number and amount for Return of Premium. Overall Experience for 2003–2004 through 2010–2011

Population—Overall	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Return of Premium on Surrender	895	418,657	49.2	82,663,209	40,999,237,249	48.4
Return of Premium on Expiry75/100	348	137,538	54.5	33,260,250	13,596,874,747	52.5
Return of Premium only on death	2247	744,050	52.7	187,630,758	65,241,379,846	55.7
No Return of Premium	707	368,107	52.0	49,713,407	25,953,440,422	53.8
Total Experience*	4,866	1,989,909	51.9	418,783,394	173,847,671,706	54.2

^d As some of the results cannot be presented due to confidentiality rules (shaded cells), the tables for the study period 2003–08 are not included in the appendix.

**Table C7h. Comparison of ratios (A/E) by number and amount for Return of Premium.
Male Experience for 2003–2004 through 2010–2011**

Population—Male	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Return of Premium on Surrender	389	198,185	43.3	43,058,819	22,422,418,083	43.7
Return of Premium on Expiry75/100	161	69,644	46.0	17,389,500	7,697,701,456	44.0
Return of Premium only on death	1202	365,058	53.0	108,174,207	35,389,274,016	54.5
No Return of Premium	333	180,003	48.3	27,874,757	14,201,589,989	51.9
Total Experience*	2,419	968,734	49.8	233,727,927	95,353,414,005	51.4

**Table C7i. Comparison of ratios (A/E) by number and amount for Return of Premium.
Female Experience for 2003–2004 through 2010–2011**

Population—Female	A/E by number			A/E by amount		
	Claims	Exposures	A/E	Claims \$	Exposures \$	A/E
Return of Premium on Surrender	506	220,471	55.0	39,604,390	18,576,819,167	54.8
Return of Premium on Expiry75/100	187	67,894	64.8	15,870,750	5,899,173,291	66.7
Return of Premium only on Death	1044	378,992	52.5	79,456,551	29,852,105,830	57.6
No Return of Premium	374	188,104	55.8	21,838,650	11,751,850,434	56.3
Total Experience*	2,447	1,021,175	54.2	185,112,967	78,494,257,701	58.2

* See observation #4.

Observations on the results shown in tables C7a to C7i:

1. An applicant can purchase one or more Return of Premium (ROP) options. In order to provide credible results in mutually exclusive categories, the ROP experience was split according to what is likely to be the dominant factor influencing policyholder behaviour. For example, an insured having purchased coverage for both “ROP on Surrender” and “ROP on Death” is more likely to behave like someone having purchased only the “ROP on Surrender” coverage (i.e., the dominant factor influencing policyholder behaviour). The following summary provides a breakdown of the various combinations used in separating the experience:

Return of Premium on Surrender = ROP on Surrender + ROP on Expiry75/100 + ROP on Death;
 ROP on Surrender + ROP on Expiry75/100;
 ROP on Surrender + ROP on Death;
 ROP on Surrender only.

Return of Premium on Expiry75/100 = ROP on Expiry75/100 + ROP on Death;
 ROP on Expiry75/100 only.

Return of Premium only on Death = ROP on Death only.

No Return of Premium = No ROP option selected.

2. Although credibility is not optimal, we observe better experience on policies with ROP on Surrender options for males; however, the results on females exhibit contradicting patterns.
3. These results do not offer a full picture of the market practices. For example, instead of a Return of Premium on Expiry100, some companies pay the face amount of CI at attained age 100; while not a true return of premium, a benefit is still paid. As we did not have the benefit of this information in all cases, such policies were not included in the “Return of Premium on Expiry75/100” category.
4. In tables C7g, C7h, and C7i, the sums of claims and exposures are less than the numbers of claims and exposures for “Total Experience”. There are two reasons for this. As some of the data used in this study were obtained from the data submission of the previous study, some of the records did not provide the appropriate breakdown of ROP options listed above while others used the “Unknown” code. The sum of claims in table C7g, however, still accounts for 86% of the total number of claims.
5. The data show that ROP on Surrender have very similar results by amount and by count. However, the No ROP and ROP on Death-only blocks show generally higher results by amount rather than by count. Although not fully credible, it is consistent with the idea that if applicants are anti-selecting against the insurance company, they are less likely to purchase the ROP on Surrender rider that pays only when the insured remains claims-free.

This report was approved by the Individual Living Benefits Experience Subcommittee of the CIA Research Committee.

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