

State: District of Columbia **Filing Company:** Minnesota Life Insurance Company
TOI/Sub-TOI: H02I Individual Health - Accident Only/H02I.000 Health - Accident Only
Product Name: Individual Accidental Death and Injury Insurance
Project Name/Number: Individual Accidental Death and Injury/

Filing at a Glance

Company: Minnesota Life Insurance Company
Product Name: Individual Accidental Death and Injury Insurance
State: District of Columbia
TOI: H02I Individual Health - Accident Only
Sub-TOI: H02I.000 Health - Accident Only
Filing Type: Rate
Date Submitted: 07/02/2014
SERFF Tr Num: MNNL-129618153
SERFF Status: Pending Industry Response
State Tr Num:
State Status:
Co Tr Num: SFIG JAB-2461
Implementation: On Approval
Date Requested:
Author(s): Jeanine Berfeldt, Monica Ramstad, Steve Halverson, Teresa Guindon
Reviewer(s): Darniece Shirley (primary), Alula Selassie, John Morgan
Disposition Date:
Disposition Status:
Implementation Date:
State Filing Description:

State: District of Columbia **Filing Company:** Minnesota Life Insurance Company
TOI/Sub-TOI: H021 Individual Health - Accident Only/H021.000 Health - Accident Only
Product Name: Individual Accidental Death and Injury Insurance
Project Name/Number: Individual Accidental Death and Injury/

General Information

Project Name: Individual Accidental Death and Injury	Status of Filing in Domicile: Not Filed
Project Number:	Date Approved in Domicile:
Requested Filing Mode: Review & Approval	Domicile Status Comments:
Explanation for Combination/Other:	Market Type: Individual
Submission Type: New Submission	Individual Market Type:
Overall Rate Impact:	Filing Status Changed: 08/06/2014
	State Status Changed:
Deemer Date:	Created By: Jeanine Berfeldt
Submitted By: Jeanine Berfeldt	Corresponding Filing Tracking Number: JAB-2461

Filing Description:

Attached for your review and approval is the corresponding rate filing for individual accident only insurance policy filing MNNL-129613906, which has been filed concurrently for review in the District of Columbia.

Please contact me if you have any questions or concerns. Thank you.

Sincerely,

Jeanine A. Berfeldt
Product Compliance Analyst

Company and Contact

Filing Contact Information

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Filing Company Information

Minnesota Life Insurance Company	CoCode: 66168	State of Domicile: Minnesota
400 Robert Street North	Group Code: 869	Company Type: Life Insurance
Law Department	Group Name:	State ID Number:
St. Paul, MN 55101-2098	FEIN Number: 41-0417830	
(651) 665-3500 ext. [Phone]		

Filing Fees

Fee Required? No
 Retaliatory? No
 Fee Explanation:

SERFF Tracking #:

MNNL-129618153

State Tracking #:

Company Tracking #:

SFIG JAB-2461

State: District of Columbia

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Rate Information

Rate data applies to filing.

Filing Method: Initial

Rate Change Type: Neutral

Overall Percentage of Last Rate Revision: %

Effective Date of Last Rate Revision:

Filing Method of Last Filing:

Company Rate Information

Company Name:	Overall % Indicated Change:	Overall % Rate Impact:	Written Premium Change for this Program:	Number of Policy Holders Affected for this Program:	Written Premium for this Program:	Maximum % Change (where req'd):	Minimum % Change (where req'd):
Minnesota Life Insurance Company	0.000%	0.000%	\$0	0	\$0	0.000%	0.000%

SERFF Tracking #:

MNNL-129618153

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Company Tracking #:

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Rate/Rule Schedule

Item No.	Schedule Item Status	Document Name	Affected Form Numbers (Separated with commas)	Rate Action	Rate Action Information	Attachments
1		Rate Manual		New		Rate Manual - Standard_DC.pdf,

Appendix A: Development of Claim Costs

Accidental Death Benefit:

Assumptions:

Accidental death rates are derived from the 1996 ADB table published by Jay Jaffe (FSA, MAAA) in Transactions of the Society of Actuaries 1997-1998 Reports.

40% of insureds are expected to elect single coverage only; 60% will elect family coverage. Policyholders with children who elect family coverage are expected to have, on average, 1.73 dependent children. The ages of dependent children are assumed to be uniformly distributed between 0 and 25, and mortality applied to dependents reflects this distribution.

Lapse rates are 20% in the first policy year and 15% each year thereafter.

All-cause mortality is a 50%/50% Male/Female blend of the 2001 CSO table.

The discount rate is 3%.

The projection period is 20 years.

There are four options of family coverage that can be offered. The benefit percentages for each package are as follows:

Percent Coverage	Spouse Only	Spouse with Dependent/s		Dependent Children Only
		Spouse %	Dependent %	
Family Package #1	60%	50%	25%	25%
Family Package #2	60%	60%	25%	25%
Family Package #3	100%	100%	25%	25%
Family Package #4	75%	50%	25%	25%

Development of the Base Claim Cost

The following net single premiums (NSP) per \$1,000 of accidental death benefit, annuity factors, and monthly claim costs by age resulted from the application of the above assumptions:

Single coverage:

<u>Issue Age</u>	<u>NSP</u>	<u>Annual Annuity Factor*</u>	<u>Monthly Claim Cost</u>	<u>Distribution</u>
27	1.5082	4.8408	0.0260	4%
32	1.4677	4.8357	0.0253	5%
37	1.4059	4.8247	0.0243	5%
42	1.3478	4.8051	0.0234	8%
47	1.3317	4.7728	0.0233	10%
52	1.3672	4.7204	0.0241	15%
57	1.4863	4.6394	0.0267	17%
62	1.7601	4.5215	0.0324	17%
67	2.3649	4.3519	0.0453	11%
72	3.4889	4.1005	0.0709	6%
77	5.1845	3.7468	0.1153	2%
82	7.4024	3.2841	0.1878	0%
87	9.5978	2.7629	0.2895	0%

* See Appendix C for a sample calculation of NSP and the annuity factor for a given issue age.

Assuming the age distribution presented above, the blended monthly claim cost per \$1,000 of base accidental death coverage for a single insured is \$0.0329.

Family Coverage:

Similar calculations were done for family coverage using 3 different scenarios and then weighting those scenarios to get an overall monthly claim cost:

<u>Family Package #1</u>	<u>Monthly Claim Cost</u>	<u>Distribution</u>
Spouse Only (60%)	0.0532	35%
Spouse & Children (50%; 25%)	0.0604	45%
Children Only (25%)	0.0391	20%

Assuming the distribution presented above, the blended monthly claim cost per \$1,000 of base accidental death coverage for family package #1 is \$0.0536.

<u>Family Package #2</u>	<u>Monthly Claim Cost</u>	<u>Distribution</u>
Spouse Only (60%)	0.0532	35%
Spouse & Children (60%; 25%)	0.0636	45%
Children Only (25%)	0.0391	20%

Assuming the distribution presented above, the blended monthly claim cost per \$1,000 of base accidental death coverage for family package #2 is \$0.0551.

<u>Family Package #3</u>	<u>Monthly Claim Cost</u>	<u>Distribution</u>
Spouse Only (100%)	0.0661	35%
Spouse & Children (100%; 25%)	0.0765	45%
Children Only (25%)	0.0391	20%

Assuming the distribution presented above, the blended monthly claim cost per \$1,000 of base accidental death coverage for family package #3 is \$0.0654.

<u>Family Package #4</u>	<u>Monthly Claim Cost</u>	<u>Distribution*</u>
Spouse Only (75%)	0.0581	70%
Spouse & Children (50%; 25%)	0.0604	25%
Children Only (25%)	0.0391	5%

* Has a different distribution because this package will be marketed to older populations where dependent children are less frequent.

Assuming the distribution presented above, the blended monthly claim cost per \$1,000 of base accidental death coverage for family package #4 is \$0.0577.

Benefit Restrictions:

Benefit restriction options include various benefit reduction schedules, each of which may be combined with an eligibility age cap. These only adjust the benefit amounts at certain times and therefore factors were found to adjust the base claim cost to account for the addition of certain combinations of these restrictions. The factors for each combination are included below with the reduction schedules describing the percentage of the base benefit remaining at each indicated age. There are two tables for standard and capped eligibility.

Standard Eligibility (18+)						
Coverage Type	No Reduction	50% @ Age 70	50% @ Age 70 25% @ Age 75	50% @ Age 70 25% @ Age 75 0% @ Age 80	50% @ Age 70 0% @ Age 80	0% @ Age 80
Single	N/A	0.8212	0.7663	0.7561	0.7936	0.9419
Family Package #1	N/A	0.8416	0.7929	0.7840	0.8174	0.9491
Family Package #2	N/A	0.8410	0.7921	0.7832	0.8166	0.9489
Family Package #3	N/A	0.8373	0.7873	0.7781	0.8124	0.9477
Family Package #4	N/A	0.8296	0.7772	0.7677	0.8035	0.9453

Capped Eligibility (18-69)						
Coverage Type	No Reduction	50% @ Age 70	50% @ Age 70 25% @ Age 75	50% @ Age 70 25% @ Age 75 0% @ Age 80	50% @ Age 70 0% @ Age 80	0% @ Age 80
Single	0.8719	0.7848	0.7664	0.7652	0.7780	0.8552
Family Package #1	0.8836	0.8086	0.7929	0.7918	0.8029	0.8695
Family Package #2	0.8831	0.8079	0.7920	0.7910	0.8021	0.8689
Family Package #3	0.8804	0.8034	0.7872	0.7861	0.7974	0.8658
Family Package #4	0.8750	0.7943	0.7774	0.7763	0.7882	0.8598

These factors are multiplied to the corresponding base claim cost for each coverage type.

Anti-Inflation Benefit:

An anti-inflation benefit can be added to the accidental death benefit to increase the benefit amount by 5% of the base benefit every 2 years up to a maximum of 125% of the base benefit.

This only adjusts the benefit amounts at certain times and therefore, factors were found to adjust the base claim cost to account for the addition of this benefit increase. Those factors are listed below.

Standard Eligibility (18+)						
Coverage Type	No Reduction	50% @ Age 70	50% @ Age 70 25% @ Age 75	50% @ Age 70 25% @ Age 75 0% @ Age 80	50% @ Age 70 0% @ Age 80	0% @ Age 80
Single	1.0981	1.0883	1.0829	1.0781	1.0799	1.0847
Family Package #1	1.0972	1.0888	1.0843	1.0803	1.0816	1.0854
Family Package #2	1.0972	1.0888	1.0843	1.0802	1.0816	1.0854
Family Package #3	1.0974	1.0888	1.0841	1.0799	1.0813	1.0853
Family Package #4	1.0974	1.0884	1.0834	1.0790	1.0805	1.0848

Capped Eligibility (18-69)						
Coverage Type	No Reduction	50% @ Age 70	50% @ Age 70 25% @ Age 75	50% @ Age 70 25% @ Age 75 0% @ Age 80	50% @ Age 70 0% @ Age 80	0% @ Age 80
Single	1.0970	1.0862	1.0825	1.0811	1.0837	1.0927
Family Package #1	1.0962	1.0871	1.0841	1.0829	1.0850	1.0926
Family Package #2	1.0962	1.0871	1.0840	1.0829	1.0850	1.0926
Family Package #3	1.0963	1.0870	1.0838	1.0826	1.0848	1.0927
Family Package #4	1.0964	1.0865	1.0831	1.0819	1.0842	1.0925

These factors are multiplied to the corresponding base claim, as adjusted for any included benefit restrictions.

Sources:

- 1996 ADB Table Report by Jaffe
- 2001 CSO Task Force Report by the American Academy of Actuaries

Accidental Dismemberment Benefit:

Assumptions:

Amputations consist only of those with ICD-9 codes for traumatic amputation.

10% of loss of hearing cases are attributable to accidents.

4% of loss of sight cases are attributable to accidents.

3% of loss of speech cases are attributable to accidents.

Claim Cost for Single Coverage:

The assumptions listed above produce the following claim costs per 100,000 population by affliction:

<u>Accidental Loss of:</u>	<u>Claim Cost</u>
Sight in Both Eyes	1.00349
Sight in One Eye	0.91779
Both Feet	0.01984
One Foot	0.32399
Both Hands	0.00426
One Hand	0.20663
Hearing in Both Ears	0.61697
Hearing in One Ear	0.08696
Speech	1.63626

The claim cost per \$1,000 of maximum dismemberment benefit shall be the sum of the products of the incidence rate for each affliction and its respective scheduled percentage of the dismemberment benefit divided by 100.

For example, the following schedule produces an annual claim cost of \$0.0290 per \$1,000 of dismemberment benefit:

<u>Accidental Loss of:</u>	<u>% of scheduled dismemberment benefit payable</u>
Sight in Both Eyes	100%
Sight in One Eye	50%
Both Feet	100%
One Foot	50%
Both Hands	100%
One Hand	50%
Hearing in Both Ears	50%
Hearing in One Ear	25%
Speech	50%

Claim Cost for Family Coverage:

To calculate family coverage, the single claim cost is multiplied by the expected possible number of benefits payable for each coverage type, as shown by the following table:

<u>Family Package 1</u>	<u>Possible Benefits</u>	<u>Distribution</u>	<u>Package Factor</u>
Spouse Only	1.600	35%	1.716
Spouse & Dependents	1.933	45%	
Dependents Only	1.433	20%	
<u>Family Package 2</u>			
Spouse Only	1.600	35%	1.761
Spouse & Dependents	2.033	45%	
Dependents Only	1.433	20%	
<u>Family Package 3</u>			
Spouse Only	2.000	35%	2.081
Spouse & Dependents	2.433	45%	
Dependents Only	1.433	20%	
<u>Family Package 4*</u>			
Spouse Only	1.750	70%	1.842
Spouse & Dependents	2.183	25%	
Dependents Only	1.433	5%	

* Package 4 has a different distribution since it will be marketed to older populations where dependent children will be less common.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

HCUPNet

<http://hcupnet.ahrq.gov/>

Accident Hospital Indemnity Benefit

The following age-banded incidence rates per 1,000 census and average lengths of stay for first-listed diagnosis, ICD-9-CM codes 800-999, are from the CDC's "National Hospital Discharge Survey: 2007 Summary" Number 29 (October 2010):

	<u>Incidence rate</u>	<u>Average length of hospital stay</u>	<u>Assumed Distribution of Primary Insureds</u>
Under 15:	3.12	4.2	0%
15-44:	6.36	4.4	25%
45-64:	10.04	5.7	60%
Over 65:	29.08	5.8	15%

Weighted average incidence rate per 1,000 census: 11.98
 Weighted average length of stay: 5.4

The incidence rate is loaded an additional 10% to account for experience from long-term stay hospitals (excluded from the published survey), instances when the first-listed diagnosis is non-accidental but accidental injury played some role in the subsequent hospitalization, the reduced impact of monthly benefit maximums on spousal benefits under family coverage, and claims related to dependent children under family coverage.

The loaded incidence rate for accidental hospitalization as a percentage of the AD incidence rate* is:
 $11.98 \times 1.10 \div 0.394 = 3343.6\%$

* The annual accidental death rate is from Injury Facts, 2013 edition.

For pricing purposes, we assume the following distribution by number of days confined**:

0-3	52%
4-7	20%
8-12	13%
13-17	9%
18-22	5%
23 or more	1%

** This distribution produces a weighted average number of days confined equal to 5.4 days per incident:
 $= 1 \times 52\% + 5 \times 20\% + 10 \times 13\% + 15 \times 9\% + 20 \times 5\% + 25 \times 1\%$

For a benefit of 1% of the insured's base amount of AD coverage and no waiting period, the monthly benefit amount per \$1,000 base coverage is expected to be:

$$= \$10 \times (52\% \times 1 + 20\% \times 5 + 13\% \times 10 + 9\% \times 15 + 5\% \times 20 + 1\% \times 25) \div 30 = \$1.81$$

= 0.181% of the benefit payable for accidental death.

For a benefit of 1% of the insured's base amount of AD&D coverage and a three-day waiting period, the monthly benefit amount per \$1,000 base coverage is expected to be:

$$= \$10 \times (52\% \times 0 + 20\% \times 5 + 13\% \times 10 + 9\% \times 15 + 5\% \times 20 + 1\% \times 25) \div 30 = \$1.63$$

$$= 0.163\% \text{ of the benefit payable for accidental death.}$$

For a benefit of 1% of the insured's base amount of AD&D coverage and a seven-day waiting period, the monthly benefit amount per \$1,000 base coverage is expected to be:

$$= \$10 \times (52\% \times 0 + 20\% \times 0 + 13\% \times 10 + 9\% \times 15 + 5\% \times 20 + 1\% \times 25) \div 30 = \$1.30$$

$$= 0.130\% \text{ of the benefit payable for accidental death.}$$

With no monthly benefit maximum imposed, the rate load for the Accident Hospital Benefit with a seven-day waiting period is equal to the loaded incidence rate as a percentage of the annual accidental death incidence rate times the expected annual payout as a percentage of the base AD coverage = $3343.6\% \times 0.130\% = 4.35\%$

Impact of monthly benefit maximum:

Given the estimated distribution of amounts of insurance for the base contributory coverage below, the maximum number of days per month that the hospitalization benefit would be payable for a given amount of insurance is calculated and used to adjust the expected monthly benefit amount payable as a percentage of the base contributory coverage. For example, for a monthly benefit amount of 4% with a maximum of \$2,000 and a seven-day waiting period, the expected monthly benefit amount for a single insured is calculated as follows:

(A) Amount of base AD coverage	(B) % of inforce population	(C) 4% of base AD coverage	(D) Max days per month covered given \$2,000 mo. benefit maximum	(E) Expected monthly payout given incurral	(F) (E) ÷ (A)
50,000	40%	\$2,000	30.0	\$260.00	0.52%
75,000	15%	\$3,000	20.0	\$385.00	0.51%
100,000	20%	\$4,000	15.0	\$473.33	0.47%
125,000	15%	\$5,000	12.0	\$516.67	0.41%
175,000	5%	\$7,000	8.6	\$560.00	0.32%
200,000	5%	\$8,000	7.5	\$560.00	0.28%

The expected monthly payout for each inforce cell given incurral was calculated as follows:

$$= \{72\% \times 0 + 13\% \times [\text{Minimum}(\text{column D}, 10) \div 30] + 9\% \times [\text{Minimum}(\text{column D}, 15) \div 30] + 5\% \times [\text{Minimum}(\text{column D}, 20) \div 30] + 1\% \times [\text{Minimum}(\text{column D}, 25) \div 30]\} \times \text{column C}$$

The weighted monthly benefit amount as a percentage of base AD coverage is 0.47% for a monthly hospitalization benefit of 4% of base coverage with a maximum of \$2,000.

This is in contrast to the 0.52% (= 4 x 0.130%) expected payout with no maximum imposed.

The rate load for the Accident Hospitalization Benefit is calculated as follows:

= (loaded incidence rate as a percentage of AD incidence) x (expected benefit amount payable for the applicable waiting period, adjusted for the impact of the monthly benefit maximum, as a % of base contributory coverage)

The rate load, rounded up to the nearest 0.25%, for various monthly benefit amounts (as a percentage of base contributory AD coverage), benefit maximums, and waiting periods is given in the tables below:

0-day Waiting Period

		Monthly Benefit Amount (as a percentage of base AD coverage)				
		1%	2%	3%	4%	5%
Maximum	\$1,000	6.25%	11.50%	15.50%	18.50%	20.75%
	\$1,500	6.25%	12.00%	17.00%	21.25%	24.75%
	\$2,000	6.25%	12.25%	17.75%	22.75%	27.00%
	\$2,500	6.25%	12.25%	18.00%	23.50%	28.25%
	\$3,000	6.25%	12.25%	18.25%	23.75%	29.00%
	\$5,000	6.25%	12.25%	18.25%	24.25%	30.25%

3-day Waiting Period

		Monthly Benefit Amount (as a percentage of base AD coverage)				
		1%	2%	3%	4%	5%
Maximum	\$1,000	5.50%	10.25%	13.75%	16.25%	17.75%
	\$1,500	5.50%	10.75%	15.25%	19.00%	21.75%
	\$2,000	5.50%	11.00%	16.00%	20.25%	24.00%
	\$2,500	5.50%	11.00%	16.25%	21.00%	25.50%
	\$3,000	5.50%	11.00%	16.50%	21.50%	26.25%
	\$5,000	5.50%	11.00%	16.50%	22.00%	27.25%

7-day Waiting Period

		Monthly Benefit Amount (as a percentage of base AD coverage)				
		1%	2%	3%	4%	5%
Maximum	\$1,000	4.50%	8.00%	10.50%	11.75%	12.50%
	\$1,500	4.50%	8.50%	12.00%	14.50%	16.25%
	\$2,000	4.50%	8.75%	12.75%	16.00%	18.50%
	\$2,500	4.50%	8.75%	13.00%	16.75%	19.75%
	\$3,000	4.50%	8.75%	13.00%	17.00%	20.50%
	\$5,000	4.50%	8.75%	13.25%	17.50%	21.75%

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

CDC's "National Hospital Discharge Survey: 2007 Summary" Number 29 (October 2010)

<http://www.cdc.gov/nchs/data/nhsr/nhsr029.pdf>

National Safety Council's "Injury Facts", 2013 Edition

Adaptive Home & Vehicle Benefit:

Assumptions:

This benefit has a 50% utilization rate among those who would qualify for the total and permanent disability.

For the dismemberment clause of this benefit, there is a 50% utilization rate among those who would qualify for the accidental dismemberment benefit.

Claim Cost:

To develop the monthly claim cost per \$1,000, we multiply the utilization rate by the monthly claim cost for total and permanent disability for a lump-sum benefit (benefit period = 1) with a 12 month elimination period.

<u>Coverage Type</u>	TPD <u>claim cost</u>	Utilization <u>Rate</u>	<u>claim cost</u>
Single	0.0067	50%	0.0034
Family Package #1	0.0108	50%	0.0054
Family Package #2	0.0111	50%	0.0055
Family Package #3	0.0133	50%	0.0066
Family Package #4	0.0116	50%	0.0058

<u>Dismemberment Clause</u>	Dismemberment <u>claim cost</u>	Utilization <u>Rate</u>	<u>claim cost</u>
Single	0.0482	50%	0.0241

To calculate family coverage for the dismemberment clause, the single claim cost is multiplied by the expected possible number of benefits payable for each coverage type, which can be found in the Accidental Dismemberment Benefit section of this memorandum.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

1985 CIDA (Disability incidence and termination tables)

HCUPNet

<http://hcupnet.ahrq.gov/>

Common Accident Benefit

Assumptions:

According to the National Highway Traffic Safety Administration, the average annual number of motor vehicle accidents with a fatality in the vehicle, from 2008-2012:

Only one fatality in the vehicle	24,632
At least one other fatality in vehicle	<u>1,884</u>
Total number of accidents with at least one fatality in the vehicle	26,516

We assume drivers between the ages of 0 and 24 would not qualify for this benefit.

Of the people over the age of 24, we assume 25% of them will be traveling with spouses and therefore qualify for the common accident benefit.

According to the National Highway Traffic Safety Administration, in 2012, 55% of those who died in an automobile accident where there were multiple deaths in the vehicle were over the age of 24.

Single Claim Cost:

Using the assumptions from above, we developed the single claim cost as follows:

Assumed number of claims eligible for the common accident benefit	=	1,884 * 25% * 55%
	=	259
US population aged 25 and over (in thousands)	=	208,826
Annual rate of common accident deaths per 1,000 persons over age 24	=	0.00124

Therefore, the monthly claim cost per \$1,000 of benefit is 0.00010.

Claim Cost Family Coverage:

This benefit is only payable once per policy, so the single claim cost can be used for family coverage as well.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

- US Department of Transportation
- National Highway Traffic Safety Administration
- Traffic Safety Facts Annual Report (2008-2012)
<http://www-nrd.nhtsa.dot.gov/cats/listpublications.aspx?Id=E&ShowBy=DocType>
- Fatality Analysis Reporting System (FARS)
<http://www-fars.nhtsa.dot.gov/Main/index.aspx>

Common Carrier Benefit

Assumptions:

According to the Department of Transportation website, the average annual number of transportation deaths, from 2002-2011:

Passenger Automobiles	16,535
Vans, SUVs, Pickup Trucks	11,641
Bus	42
Railroad	7
Airlines	53
Subway	61
Light rail	22
Total	<u>28,361</u>

100% of bus, railroad, airline, subway and light rail deaths would qualify for this benefit.

0.50% of passenger automobiles, vans, SUVs, and pickup truck deaths would qualify for this benefit.

The US population between the ages of 18 and 70 is 200,474,781.

Single Claim Cost:

Using the assumptions above, we calculated the number of accidental deaths that would qualify for this benefit:

$$\text{Number of accidents that qualify for this benefit: } 42 + 7 + 53 + 61 + 22 + 0.50\% \times (16,535 + 11,641) = 326$$

Then, this number was converted to a percentage of the total number of accidental transportation deaths:

$$\text{As a percentage of transportation deaths: } 326 \div 28,361 = 1.15\%$$

This was multiplied to the number of transportation deaths in 2011 to calculate the expected number of qualifying deaths in 2011. Dividing this by the population between the ages of 18 and 70, an annual claim cost per 1,000 population was derived.

Number of transportation deaths in 2011:	34,360
Assumed number of common carrier deaths in 2011:	395
Annual Rate per 1,000 population between the ages of 18 and 70:	0.00197

Claim Cost Family Coverage:

To calculate family coverage, the single claim cost is multiplied by the expected possible number of benefits payable for each coverage type, which can be found in the Accidental Dismemberment Benefit section of this memorandum.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

United States Department of Transportation website

http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/national_transportation_statistics/html/table_02_04.html

United States Census Bureau

https://www.census.gov/compendia/statab/cats/population/estimates_and_projections_by_age_sex_raceethnicity.html

Dependent Benefit

Assumptions:

For insureds choosing single coverage, we assume 25% will have, on average, 1.73 dependent children.

For insureds opting for family coverage with children there will be, on average, 1.73 dependent children.

Methodology:

For family coverage, the factor for spouse coverage percentage is calculated as follows:

$$\frac{100\% + (\text{Spouse Coverage \%})}{2}$$

The Dependent Benefit factors are calculated as follows:

	<u>Single</u>	Family Spouse at <u>100%</u>	Family Spouse at <u>60%</u>	Family Spouse at <u>50%</u>	Family <u>No Spouse</u>
Number of dependents per insured - factor	0.43	1.73	1.73	1.73	1.73
Spouse coverage percentage factor	NA	100%	80%	75%	50%

Benefit	Factor	Distribution	Package Factor
Family Package 1			
Spouse only (60%)	N/A	35%	0.758
Spouse & children (50%/25%)	1.30	45%	
Children only (25%)	0.87	20%	
Family Package 2			
Spouse only (60%)	N/A	35%	0.797
Spouse & children (60%/25%)	1.39	45%	
Children only (25%)	0.87	20%	
Family Package 3			
Spouse only (100%)	N/A	35%	0.953
Spouse & children (100%/25%)	1.73	45%	
Children only (25%)	0.87	20%	
Family Package 4			
Spouse only (75%)	N/A	70%	0.368
Spouse & children (50%/25%)	1.30	25%	
Children only (25%)	0.87	5%	

* Package 4 has a different distribution because it will only be marketed to older populations where dependent children are less common.

The Single factor above is applied to the Base Single AD rate/\$1,000 to yield the monthly rate per \$1,000 of benefit for the Single coverage for the Dependent Benefit product.

The Family factors above are applied to the associated package's Base Family AD rate/\$1,000 to yield the monthly rate per \$1,000 of benefit for Family coverages for the Dependent Benefit product.

An additional rate can be added for benefit amounts payable when there are no dependents for the Dependent Benefit.

	<u>Single</u>	<u>Family Package 1-2</u>	<u>Family Package 3</u>	<u>Family Package 4</u>
Percentage of claims ineligible for Dependent benefit	75%	35%	35%	70%
Spouse coverage percentage factor	NA	80%	100%	88%
Factor to apply to Base AD rate/\$1,000	0.750	0.280	0.350	0.613

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

Population Reference Bureau

<http://www.prb.org/Publications/Reports/2012/us-household-change.aspx>

U.S. Census Bureau, Current Population Survey, 2013

<https://www.census.gov/hhes/www/poverty/publications/index.html>

CDC National Vital Statistics Report, Volume 62, Number 1

http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_01.pdf

Dependent Child Care Benefit

Assumptions:

For insureds choosing single coverage, we assume 25% will have, on average, 1.73 dependent children.

For insureds opting for family coverage with children there will be, on average, 1.73 dependent children.

The utilization rate for this benefit is 30%.

Children's ages are evenly distributed from 0 to 24.

Given that benefits are not payable after age 13, we assume that

Children aged 0 - 8 will use 5 years of the benefit.

Children aged 9 will use 4 years of the benefit.

Children aged 10 will use 3 years of the benefit.

Children aged 11 will use 2 years of the benefit.

Children aged 12 will use 1 year of the benefit.

Methodology:

Discounting at 3%, the annuity factor for this benefit per child is:

- = 0.5200 if the benefit is payable for up to 1 year after the date of death.
- = 0.9860 if the benefit is payable for up to 2 years after the date of death.
- = 1.4008 if the benefit is payable for up to 3 years after the date of death.
- = 1.7668 if the benefit is payable for up to 4 years after the date of death.
- = 2.0867 if the benefit is payable for up to 5 years after the date of death.

Sample calculation of annuity factor for benefit payable up to 4 years after the date of death:

$$\begin{aligned} & [(10/25) \times (4 \text{ year annuity-due at } 3\%) + (1/25) \times (3 \text{ year annuity-due at } 3\%) \\ & + (1/25) \times (2 \text{ year annuity-due at } 3\%) + (1/25) \times (1 \text{ year annuity-due at } 3\%)] \\ & = 1.7668 \end{aligned}$$

For family coverage, the factor for spouse coverage percentage is calculated as follows:

$$\frac{100\% + (\text{Spouse Coverage } \%) }{2}$$

The spouse coverage factor does not apply to single coverage, so a factor value of 1.00 is used in the formula below.

Claim Cost:

The monthly claim cost per \$1,000 of annual benefit equals:

$$\begin{aligned} & (\text{number of eligible dependents}) \times (\text{annuity factor}) \times (\text{utilization rate}) \\ & \quad \times (\text{spouse coverage percentage factor}) \\ & \quad \times (\text{Base Single or Family AD claim cost}) \end{aligned}$$

An additional rate can be added for benefit amounts payable when there are no eligible dependent children for the Dependent Child Care Benefit.

	<u>Single</u>	<u>Family</u> <u>Package 1-2</u>	<u>Family</u> <u>Package 3</u>	<u>Family</u> <u>Package 4</u>
Percentage of claims ineligible for Child Care benefit	87%	66%	66%	84%
Spouse coverage percentage factor	NA	80%	100%	88%
Factor to apply to Base AD rate/\$1,000	0.870	0.530	0.662	0.739

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

Population Reference Bureau

<http://www.prb.org/Publications/Reports/2012/us-household-change.aspx>

U.S. Census Bureau, Current Population Survey, 2013

<https://www.census.gov/hhes/www/poverty/publications/index.html>

CDC National Vital Statistics Report, Volume 62, Number 1

http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_01.pdf

Disappearance & Exposure Benefit

Assumptions:

Due to the anticipated rarity of incidence for this benefit, the premium rate is assumed to be 0.25% of the base accidental death claim cost.

Claim Cost:

<u>Coverage Type</u>	<u>Base AD Claim Cost</u>	<u>Dis & Exp Claim Cost</u>
Single	0.03293	0.00008
Family Package #1	0.05364	0.00013
Family Package #2	0.05508	0.00014
Family Package #3	0.06539	0.00016
Family Package #4	0.05770	0.00014

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Education and Spouse Education Benefits

Assumptions:

For single insureds we assume 30% will have a spouse.

For single insureds, we assume 25% will have, on average, 1.73 dependent children.

For insureds opting for family coverage with children we assume there will be, on average, 1.73 dependent children.

For family packages 1-3, we assume that 80% of insureds with family coverage will have a spouse (35% with spouse and no dependent children, 45% with spouse and dependent children).

For family package 4, we assume that 95% of insureds with family coverage will have a spouse (70% with spouse and no dependent children, 25% with spouse and dependent children).

Children's ages are evenly distributed from 0 to 24.

Children aged 17-19 will use up to 4 years of the benefit.

Children aged 20-21 will use up to 3 years of the benefit.

Children aged 22 will use up to 2 years of the benefit.

Children aged 23-24 will use 1 year of the benefit.

The utilization rate for dependent children is 80%.

The utilization rate for a spouse is 25%.

Methodology:

Discounting at 3%, the annuity factor for this benefit per child is:

- = 0.3200 if the benefit is payable for up to 1 year after the date of death.
- = 0.5530 if the benefit is payable for up to 2 years after the date of death.
- = 0.7415 if the benefit is payable for up to 3 years after the date of death.
- = 0.8513 if the benefit is payable for up to 4 years after the date of death.

Sample calculation of annuity factor for benefit payable up to 4 years after the date of death:

$$\begin{aligned} & [(3/25) \times (4 \text{ year annuity-due at } 3\%) + (2/25) \times (3 \text{ year annuity-due at } 3\%) \\ & + (1/25) \times (2 \text{ year annuity-due at } 3\%) + (2/25) \times (1 \text{ year annuity-due at } 3\%)] \\ & = 0.8513 \end{aligned}$$

For family coverage, the factor for spouse coverage percentage is calculated as follows:

$$\frac{100\% + (\text{Spouse Coverage } \%) }{2}$$

The spouse coverage factor does not apply to single coverage, so a factor value of 1.00 is used in the formula below.

Claim Cost:

The claim cost per \$1,000 of annual benefit equals:

$$\begin{aligned} & (\text{expected number of eligible dependents}) \times (\text{annuity factor}) \\ & \times (\text{utilization rate}) \times (\text{spouse coverage percentage factor}) \\ & \times (\text{Base Single or Family AD claim cost}) \end{aligned}$$

Additional Benefit:

An additional rate can be added for benefit amounts payable when there are no dependent children eligible for the education benefit.

	<u>Single</u>	<u>Family Packages 1-2</u>	<u>Family Package 3</u>	<u>Family Package 4</u>
Percentage of claims with no eligible children	92%	79%	79%	90%
Spouse coverage percentage factor	NA	80%	100%	88%
Factor to apply to Base AD rate/\$1,000	0.920	0.634	0.792	0.791

* Since 75% of all single insureds are assumed to have no dependent children and 17/25ths of the 25% of dependent children of single insureds do not qualify for the benefit by virtue of their age, $75\% + (17/25) \times 25\% = 92.0\%$ of single claimants qualify for the lump-sum benefit instead. Amongst insureds with family coverage, similar calculations were performed using the appropriate assumption of percent with no dependent children (35% for packages 1-3 and 70% for package 4).

The factors above are applied to the appropriate Base Single or Family AD rate/\$1,000 to yield the monthly rate per \$1,000 of benefit for the no dependent children feature of the Education Benefit.

An additional rate can be added for benefit amounts payable when there is no spouse eligible for the spouse education benefit.

	<u>Single</u>	<u>Family Packages 1-3</u>	<u>Family Package 4</u>
Percentage of claims with no spouse	70%	20%	5%
Spouse coverage percentage factor	NA	50%	50%
Factor to apply to Base AD rate/\$1,000	0.700	0.100	0.025

The factors above are applied to the appropriate Base Single or Family AD rate/\$1,000 to yield the monthly rate per \$1,000 of benefit for the no spouse feature of the Spouse Education Benefit.

The Education and Spouse Education benefits are provided together, so an additional rate can be added for benefit amounts payable when there are no eligible children or spouse. The additional rate is calculated as follows:

	<u>Single</u>	<u>Family Packages 1-3</u>	<u>Family Package 4</u>
Percentage of claims with no spouse or eligible children	64%	14%	3%
Spouse coverage percentage factor	NA	50%	50%
Factor to apply to Base AD rate/\$1,000	0.644	0.068	0.017

The factors above are applied to the appropriate Base Single or Family AD rate/\$1,000 to yield the monthly rate per \$1,000 of benefit for the no dependent children feature of the Education Benefit.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

U.S. Census Bureau

http://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb11-ff15.html

Population Reference Bureau

<http://www.prb.org/Publications/Reports/2012/us-household-change.aspx>

U.S. Census Bureau, Current Population Survey, 2013

<https://www.census.gov/hhes/www/poverty/publications/index.html>

CDC National Vital Statistics Report, Volume 62, Number 1

http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_01.pdf

Bureau of Labor Statistics

<http://www.bls.gov/news.release/hsgec.nr0.htm>

Grief Counseling Benefit

Assumptions:

We assume that utilization will increase as the maximum allowed per benefit session per family increases, because the remaining amount that the dependents will have to pay will decrease. The utilization table is as follows:

Benefit	Utilization Rate
\$50	25.0%
\$75	31.0%
\$100	38.0%
\$125	44.0%
\$150	50.0%

We assume the following reduction factors for counseling at less than the full number of sessions:

Benefit	Maximum Number of Sessions					
	10	13	20	26	39	52
\$50	90%	81%	61%	49%	34%	27%
\$75	90%	81%	61%	49%	34%	27%
\$100	90%	81%	61%	49%	34%	26%
\$125	85%	77%	57%	46%	32%	24%
\$150	80%	72%	54%	43%	30%	23%

Methodology:

The maximum payout for each combination of benefit amount and number of sessions were developed and are listed in the following table:

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	\$500	\$650	\$1,000	\$1,300	\$1,950	\$2,600
\$75	\$750	\$975	\$1,500	\$1,950	\$2,925	\$3,900
\$100	\$1,000	\$1,300	\$2,000	\$2,600	\$3,900	\$5,200
\$125	\$1,250	\$1,625	\$2,500	\$3,250	\$4,875	\$6,500
\$150	\$1,500	\$1,950	\$3,000	\$3,900	\$5,850	\$7,800

To develop the claim cost, the following formula was used to combine all the separate pieces derived above:

$$\text{Claim Cost} = (\text{utilization rate}) \times (\text{maximum payout}) \times (\text{reduction factors}) \times (\text{Base Single or Family AD claim cost})$$

The base single AD claim cost is used for single coverage only. The base family AD claim cost for each associated package should be used.

Coverage Type	AD Claim Cost
Single	0.03293
Family Package #1	0.05364
Family Package #2	0.05508
Family Package #3	0.06539
Family Package #4	0.05770

Claim Costs:

The following tables show the possible claim costs for this benefit. Each table is for a different coverage type and contains all the possibilities of benefit amount and number of sessions payable

Single Coverage

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	0.00370	0.00433	0.00500	0.00520	0.00546	0.00583
\$75	0.00689	0.00806	0.00930	0.00967	0.01016	0.01070
\$100	0.01126	0.01318	0.01520	0.01581	0.01660	0.01682
\$125	0.01539	0.01801	0.02078	0.02161	0.02269	0.02300
\$150	0.01976	0.02312	0.02667	0.02774	0.02913	0.02951

Family Package #1

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	0.00603	0.00706	0.00815	0.00847	0.00890	0.00949
\$75	0.01122	0.01313	0.01515	0.01576	0.01655	0.01743
\$100	0.01834	0.02146	0.02476	0.02575	0.02704	0.02740
\$125	0.02507	0.02934	0.03385	0.03520	0.03696	0.03746
\$150	0.03218	0.03765	0.04344	0.04518	0.04744	0.04807

Family Package #2

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	0.00620	0.00725	0.00837	0.00870	0.00914	0.00974
\$75	0.01153	0.01349	0.01556	0.01618	0.01699	0.01790
\$100	0.01884	0.02204	0.02543	0.02645	0.02777	0.02814
\$125	0.02575	0.03013	0.03476	0.03616	0.03796	0.03847
\$150	0.03305	0.03867	0.04462	0.04640	0.04872	0.04937

Family Package #3

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	0.00736	0.00861	0.00993	0.01033	0.01084	0.01157
\$75	0.01368	0.01601	0.01847	0.01921	0.02017	0.02125
\$100	0.02236	0.02616	0.03019	0.03140	0.03297	0.03341
\$125	0.03057	0.03576	0.04127	0.04292	0.04506	0.04566
\$150	0.03923	0.04590	0.05296	0.05508	0.05784	0.05861

Family Package #4

Benefit	Number of Sessions					
	10	13	20	26	39	52
\$50	0.00649	0.00759	0.00876	0.00911	0.00957	0.01021
\$75	0.01207	0.01413	0.01630	0.01695	0.01780	0.01875
\$100	0.01973	0.02309	0.02664	0.02771	0.02909	0.02948
\$125	0.02698	0.03156	0.03642	0.03787	0.03977	0.04030
\$150	0.03462	0.04051	0.04674	0.04861	0.05104	0.05172

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Motor Vehicle Benefit

Assumptions:

According to the National Highway Traffic Safety Administration website:

The rate of motor vehicle traffic deaths per 1,000 census in 2011 was 0.104

Seat belt use reduces the risk of fatal injury by 45%.

Seat belt and airbag use reduces the risk of fatal injury by 61%.

The national safety belt use average in 2012 was 86%.

Vehicles with properly installed airbags account for 90% of all vehicles.

According to "Traffic Safety Facts 2011", the National Highway Traffic Safety Administration states that 31% of fatal crashes involved alcohol and, of these, 66% resulted in the death of intoxicated drivers.

Single Claim Cost:

Using the assumptions listed above, a fatality rate for people wearing a seatbelt in a motor-vehicle was developed. The fatality rate of those who are belted and in a car with an air bag is $1 - 61\% = 39\%$ of the fatality rate of those who are unbelted. The fatality rate of those who are belted only is $1 - 45\% = 55\%$ of the fatality rate of those who are unbelted. The ratio of belted drivers to unbelted drivers is about 6 to 1 ($86\% \div 14\%$). We can develop an annual rate per 1,000 population by combining these statistics in the following formula:

$$0.104 = y + (86\% \div 14\%) \times (10\% \times 55\% + 90\% \times 39\%) \times (y)$$

where y = the number per 1,000 census of traffic fatalities who were unbelted = 0.0298.

The traffic fatality rate for those who are belted is:

$$(86\% \div 14\%) \times (10\% \times 55\% + 90\% \times 39\%) \times .0298 = 0.0743 \text{ per 1,000 census}$$

This rate includes intoxicated drivers who are excluded from receiving this benefit. To back these deaths out, we calculated the percent of motor vehicle deaths that are an intoxicated driver:

$$\text{Discount factor to back out the deaths of intoxicated drivers} = 100\% - (31\% \times 66\%) = 79.5\%$$

Multiplying this to the annual rate per 1,000 population, we get the annual rate per 1,000 population who would qualify for this benefit.

$$0.0743 \times 79.5\% = 0.059115 \text{ per 1,000 population}$$

This results in a monthly claim cost of \$0.004926 per \$1,000 of benefit.

Claim Cost for Family Coverage:

To calculate family coverage, the single claim cost is multiplied by the expected possible number of benefits payable for each family package, which can be found in the Accidental Dismemberment Benefit section of this memorandum.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

- CDC: Injury Prevention & Control - Motor Vehicle Safety
<http://www.cdc.gov/motorvehiclesafety/seatbeltbrief/>
- CDC: FastStats - Accidents or Unintentional Injuries
<http://www.cdc.gov/nchs/fastats/acc-inj.htm>
- US Department of transportation
National Highway Traffic Safety Administration
Traffic Safety Facts Annual Report 2011
<http://www-nrd.nhtsa.dot.gov/Pubs/811754AR.pdf>
- Traffic Safety Facts Research Note, November 2012
<http://www-nrd.nhtsa.dot.gov/Pubs/811691.pdf>
- National Highway Traffic Safety Administration Report, September 2009
<http://www-nrd.nhtsa.dot.gov/Pubs/811102.pdf>
- Fatality Analysis Reporting System (FARS)
<http://www-fars.nhtsa.dot.gov/Main/index.aspx>

Pedestrian Benefit

(i) The National Highway Traffic Safety Administration's "Traffic Safety Facts 2011" reports that the pedestrian fatality rate was 0.0142 per 1,000 census in 2011.

(ii) We assume that 70% of these fatalities occur while the pedestrian is not walking in a location where they have the right-of-way.

Thus the annual incidence rate of eligible Pedestrian Benefit claims is:

$$0.0142 \times (1 - 70\%) = 0.0043 \text{ per 1,000 population}$$

This results in a monthly claim cost of \$0.00036 per \$1,000 of benefit.

An additional claim cost applies if the hospitalization portion of the pedestrian benefit is included.

(i) The National Highway Traffic Safety Administration's "Traffic Safety Facts 2011" reports that the pedestrian injury rate was 0.22 per 1,000 census in 2011.

Thus the annual incidence rate of eligible Pedestrian Benefit claims is:

$$0.22 \times (1 - 70\%) = 0.0660 \text{ per 1,000 population}$$

(ii) According to the CDC, National Hospital Discharge Survey: 2010 Table, the average length of hospital confinement is 4.8 days.

Thus the monthly claim cost for the hospitalization portion of the Pedestrian Benefit is:

$$0.06600 \times 4.8 \div 12 = \$0.02640 \text{ per } \$1,000 \text{ of benefit.}$$

Claim Cost for Family Coverage:

To calculate family coverage, the single claim cost is multiplied by the expected possible number of benefits payable for each family package, which can be found in the Accidental Dismemberment Benefit section of this memorandum.

Benefit Restrictions:

The same factors used for the benefit restrictions for the accidental death benefit can be used for this benefit.

Anti-Inflation Benefit:

The same factors used for the anti-inflation benefit for the accidental death benefit can be used for this benefit.

Sources:

US Department of transportation

National Highway Traffic Safety Administration

Traffic Safety Facts Annual Report 2011

<http://www-nrd.nhtsa.dot.gov/Pubs/811754AR.pdf>

CDC: FastStats - Hospital Utilization

<http://www.cdc.gov/nchs/fastats/hospital.htm>

Return of Premium Benefit

Methodology:

The benefit is priced identical to the accidental death benefit only using a different mortality to adjust for non-accidental death benefits instead of an accidental death benefit.

This benefit is priced per \$1 of monthly premium instead of per \$1,000 benefit.

Claim Costs:

The following claim costs per \$1 of monthly premium show the different possibilities for amount of premium returned. Since this benefit is only applicable in the event of the primary insured's non-accidental death, the same

Premium Returned	Claim Cost
5 Years	0.04505
All Paid	0.07586

Benefit Restrictions:

Benefit restrictions do not apply to this benefit.

Anti-Inflation Benefit:

Anti-inflation does not apply to this benefit.

Sources:

1996 ADB Table Report by Jaffe

2001 CSO Task Force Report by the American Academy of Actuaries

Total & Permanent Disability Benefit

Assumptions:

Incidence and continuance rates were derived from the 1985 CIDA.

Methodology:

The first step was to lay out the timing of the disability payments made for each combination of benefit period and elimination period. For example, someone with a 180 day Retroactive elimination period and a 12 month benefit period would get 7 payments with the first being the accumulated value of the first 6 benefits at day 180 from the date of disability and the remaining 6 benefits being paid at the end of each subsequent month.

Then incidence rates and continuance rates were used to create claim costs out of the benefit patterns that were just created. This was done for different issue ages, genders, and classes (as described in the 1985 CIDA). These claim costs were then blended to create an overall claim cost for each combination of elimination period and benefit period.

Claim Costs:

The following claim costs per \$100 monthly benefit are broken up by elimination period, benefit period, and coverage type. All pricing requires the accident that caused the disability to occur before the insured turns age 60.

180 Day Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	0.01327	0.07960	0.13079	0.19374	0.33078	0.44795
Family Package #1	0.02166	0.12996	0.21256	0.31161	0.52219	0.70102
Family Package #2	0.02226	0.13358	0.21850	0.32039	0.53719	0.72135
Family Package #3	0.02655	0.15929	0.26070	0.38285	0.64383	0.86589
Family Package #4	0.02306	0.13835	0.22691	0.33468	0.56687	0.76471

180 Day Non-Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	0.01108	0.05118	0.08532	0.14057	0.27050	0.38382
Family Package #1	0.01803	0.08260	0.13662	0.22261	0.42173	0.59469
Family Package #2	0.01853	0.08492	0.14049	0.22898	0.43399	0.61210
Family Package #3	0.02210	0.10141	0.16796	0.27424	0.52117	0.73594
Family Package #4	0.01923	0.08855	0.14714	0.24128	0.46116	0.65247

1 Year Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	0.00675	0.04049	0.08097	0.14385	0.28074	0.39779
Family Package #1	0.01078	0.06470	0.12940	0.22833	0.43869	0.61733
Family Package #2	0.01109	0.06653	0.13307	0.23484	0.45141	0.63537
Family Package #3	0.01326	0.07956	0.15912	0.28113	0.54183	0.76365
Family Package #4	0.01163	0.06977	0.13954	0.24719	0.47913	0.67675

1 Year Non-Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	0.00635	0.03409	0.06288	0.11382	0.23770	0.34723
Family Package #1	0.01011	0.05396	0.09893	0.17768	0.36719	0.53440
Family Package #2	0.01040	0.05551	0.10178	0.18283	0.37796	0.55016
Family Package #3	0.01244	0.06648	0.12201	0.21947	0.45459	0.66224
Family Package #4	0.01093	0.05852	0.10765	0.19419	0.40364	0.58857

Benefit Restrictions:

The accident causing disability must occur prior to age 60 and the max amount of time to lapse between the elimination period and the end of the benefit period is less than 10 years. Available benefit restrictions and terminations begin at the earliest age of 70 so they will have no impact on this benefit.

Anti-Inflation Benefit:

Factors have been developed for the effect of including the anti-inflation benefit on the above claim cost. Use the following factors to adjust the claim cost per \$1 of premium when the anti-inflation benefit applies to this benefit.

180 Day Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	1.07482	1.07482	1.07486	1.07497	1.07519	1.07530
Family Package #1	1.07431	1.07431	1.07436	1.07449	1.07477	1.07492
Family Package #2	1.07432	1.07432	1.07437	1.07451	1.07478	1.07493
Family Package #3	1.07441	1.07441	1.07446	1.07459	1.07485	1.07499
Family Package #4	1.07459	1.07459	1.07464	1.07476	1.07501	1.07514

180 Day Non-Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	1.07485	1.07492	1.07500	1.07513	1.07532	1.07542
Family Package #1	1.07435	1.07444	1.07454	1.07470	1.07495	1.07507
Family Package #2	1.07436	1.07446	1.07455	1.07471	1.07496	1.07508
Family Package #3	1.07444	1.07454	1.07463	1.07478	1.07503	1.07514
Family Package #4	1.07463	1.07471	1.07480	1.07494	1.07517	1.07527

1 Year Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	1.07542	1.07542	1.07542	1.07549	1.07570	1.07580
Family Package #1	1.07495	1.07495	1.07495	1.07504	1.07530	1.07543
Family Package #2	1.07496	1.07496	1.07496	1.07506	1.07531	1.07544
Family Package #3	1.07504	1.07504	1.07504	1.07513	1.07538	1.07550
Family Package #4	1.07521	1.07521	1.07521	1.07530	1.07553	1.07564

1 Year Non-Retroactive Elimination Period

Coverage Type	Benefit Period					
	1 Month	6 Months	12 Months	24 Months	60 Months	100 Months
Single	1.07545	1.07552	1.07559	1.07569	1.07584	1.07591
Family Package #1	1.07498	1.07508	1.07517	1.07530	1.07549	1.07558
Family Package #2	1.07500	1.07509	1.07518	1.07531	1.07550	1.07559
Family Package #3	1.07508	1.07516	1.07525	1.07538	1.07556	1.07565
Family Package #4	1.07524	1.07533	1.07541	1.07552	1.07569	1.07577

Sources:

1985 CIDA

Waiver of Premium Benefit

Methodology:

The pricing for this benefit follows the pricing for the total and permanent disability benefit.

This benefit is priced per \$1 of monthly premium instead of per \$100 monthly benefit.

Claim Costs:

Since the benefit amount given in the pricing is one one-hundredth of that given in the total and permanent disability benefit, the claim costs are also one one-hundredth of the claim costs for that benefit. This benefit is only applicable to the primary insured, so regardless of single or family coverage, the single claim cost should be used.

Benefit Restrictions:

Benefit restrictions do not apply to this benefit.

Anti-Inflation Benefit:

Anti-inflation does not apply to this benefit.

Sources:

1985 CIDA

**Appendix B:
Premium "No Cost" Development**

As stated previously in this memorandum, this product can be offered with a "no cost" period of one to three months. The development of these incentive benefits was done by converting the process used to price the accidental death benefit to account for reduced premium payments in the first months of a policy. This benefit was developed to increase the expected loss ratio on a product and not be used as its own benefit. An example of the development of this benefit is shown below.

"No Cost" Example:

For this example, the base benefit will be a \$200,000 accidental death benefit. The premium charged will be \$100 per month for single coverage. The claim cost, present value of premium, present value of claims, and loss ratio are listed below:

	Claim Cost	Present Value of Premium	Present Value of Claims	Loss Ratio
Male	8.39687	\$821.74	\$448.54	54.6%
Female	4.75189	\$835.84	\$258.59	30.9%
Blended*	6.57438	\$828.79	\$353.57	42.7%

*Blended at 50% Male / 50% Female

For this example, the insured will pay no premium for the first three months. The premium charged will be \$100 per month for single coverage after the no cost period. Lapse rates are assumed to be 5% during the no cost period. A total of 40% will lapse before or at the end of the no cost period before the insured would have to start paying premium. The claim cost, present value of premium, present value of claims, and loss ratio are listed below:

	Claim Cost	Present Value of Premium	Present Value of Claims	Loss Ratio
Male	8.39687	\$497.64	\$294.35	59.1%
Female	4.75189	\$506.66	\$169.35	33.4%
Blended*	6.57438	\$502.15	\$231.85	46.2%

*Blended at 50% Male / 50% Female

Comparing the loss ratios from the base coverage and the coverage with the "no cost period," we derive the increase in loss ratio due to the "no cost period" of no premium for the first three months. This "no cost period" increases the loss ratio by 8.2% as seen below:

$$\text{Increase in loss ratio} = \frac{46.2\%}{42.7\%} - 1 = 8.2\%$$

This same process is done for all combinations of benefits to calculate the increase in loss ratio due to the different "no cost" periods.

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Appendix C:

Sample calculation of NSP, annuity factor, and monthly claim cost for a single insured, age 52 at issue.

Policy Month (t)	Age of insured (x)	$q^{(ad)}$	$q^{(nad)}$	Lapse $q^{(w)}$	$q^{(ad)}$	l_x	PV claim cost per \$1,000 ins
1	52	0.000023	0.000322	0.018423	0.000023	1.000000	0.022924
2	52	0.000023	0.000322	0.018423	0.000023	0.981238	0.022868
3	52	0.000023	0.000322	0.018423	0.000023	0.962828	0.022812
4	52	0.000023	0.000322	0.018423	0.000023	0.944764	0.022755
5	52	0.000023	0.000322	0.018423	0.000023	0.927038	0.022699
6	52	0.000023	0.000322	0.018423	0.000023	0.909645	0.022644
7	52	0.000023	0.000322	0.018423	0.000023	0.892578	0.022588
8	52	0.000023	0.000322	0.018423	0.000023	0.875832	0.022532
9	52	0.000023	0.000322	0.018423	0.000023	0.859400	0.022477
10	52	0.000023	0.000322	0.018423	0.000023	0.843276	0.022422
11	52	0.000023	0.000322	0.018423	0.000023	0.827454	0.022366
12	52	0.000023	0.000322	0.018423	0.000023	0.811929	0.022311
13	53	0.000023	0.000358	0.013452	0.000023	0.796696	0.022392
14	53	0.000023	0.000358	0.013452	0.000023	0.785679	0.022337
15	53	0.000023	0.000358	0.013452	0.000023	0.774815	0.022282
16	53	0.000023	0.000358	0.013452	0.000023	0.764101	0.022227
17	53	0.000023	0.000358	0.013452	0.000023	0.753535	0.022173
18	53	0.000023	0.000358	0.013452	0.000023	0.743115	0.022118
19	53	0.000023	0.000358	0.013452	0.000023	0.732839	0.022064
20	53	0.000023	0.000358	0.013452	0.000023	0.722705	0.022009
21	53	0.000023	0.000358	0.013452	0.000023	0.712712	0.021955
22	53	0.000023	0.000358	0.013452	0.000023	0.702856	0.021901
23	53	0.000023	0.000358	0.013452	0.000023	0.693137	0.021847
24	53	0.000023	0.000358	0.013452	0.000023	0.683553	0.021794
25	54	0.000023	0.000400	0.013452	0.000023	0.674100	0.021818
26	54	0.000023	0.000400	0.013452	0.000023	0.664751	0.021764
27	54	0.000023	0.000400	0.013452	0.000023	0.655531	0.021710
28	54	0.000023	0.000400	0.013452	0.000023	0.646440	0.021657
29	54	0.000023	0.000400	0.013452	0.000023	0.637474	0.021604
30	54	0.000023	0.000400	0.013452	0.000023	0.628633	0.021550
31	54	0.000023	0.000400	0.013452	0.000023	0.619914	0.021497
32	54	0.000023	0.000400	0.013452	0.000023	0.611316	0.021445
33	54	0.000023	0.000400	0.013452	0.000023	0.602838	0.021392
34	54	0.000023	0.000400	0.013452	0.000023	0.594477	0.021339
35	54	0.000023	0.000400	0.013452	0.000023	0.586232	0.021287
36	54	0.000023	0.000400	0.013452	0.000023	0.578101	0.021234

37	55	0.000024	0.000447	0.013452	0.000023	0.570083	0.021333
38	55	0.000024	0.000447	0.013452	0.000023	0.562150	0.021280
39	55	0.000024	0.000447	0.013452	0.000023	0.554327	0.021228
40	55	0.000024	0.000447	0.013452	0.000023	0.546612	0.021176
41	55	0.000024	0.000447	0.013452	0.000023	0.539005	0.021124
42	55	0.000024	0.000447	0.013452	0.000023	0.531504	0.021072
43	55	0.000024	0.000447	0.013452	0.000023	0.524108	0.021020
44	55	0.000024	0.000447	0.013452	0.000023	0.516814	0.020968
45	55	0.000024	0.000447	0.013452	0.000023	0.509622	0.020917
46	55	0.000024	0.000447	0.013452	0.000023	0.502530	0.020865
47	55	0.000024	0.000447	0.013452	0.000023	0.495536	0.020814
48	55	0.000024	0.000447	0.013452	0.000023	0.488640	0.020763
49	56	0.000024	0.000499	0.013452	0.000024	0.481840	0.020931
50	56	0.000024	0.000499	0.013452	0.000024	0.475110	0.020880
51	56	0.000024	0.000499	0.013452	0.000024	0.468474	0.020828
52	56	0.000024	0.000499	0.013452	0.000024	0.461930	0.020777
53	56	0.000024	0.000499	0.013452	0.000024	0.455478	0.020726
54	56	0.000024	0.000499	0.013452	0.000024	0.449116	0.020675
55	56	0.000024	0.000499	0.013452	0.000024	0.442843	0.020624
56	56	0.000024	0.000499	0.013452	0.000024	0.436658	0.020574
57	56	0.000024	0.000499	0.013452	0.000024	0.430559	0.020523
58	56	0.000024	0.000499	0.013452	0.000024	0.424545	0.020472
59	56	0.000024	0.000499	0.013452	0.000024	0.418615	0.020422
60	56	0.000024	0.000499	0.013452	0.000024	0.412768	0.020372
61	57	0.000024	0.000554	0.013452	0.000024	0.407002	0.020535
62	57	0.000024	0.000554	0.013452	0.000024	0.401295	0.020485
63	57	0.000024	0.000554	0.013452	0.000024	0.395668	0.020434
64	57	0.000024	0.000554	0.013452	0.000024	0.390120	0.020384
65	57	0.000024	0.000554	0.013452	0.000024	0.384650	0.020334
66	57	0.000024	0.000554	0.013452	0.000024	0.379256	0.020284
67	57	0.000024	0.000554	0.013452	0.000024	0.373938	0.020234
68	57	0.000024	0.000554	0.013452	0.000024	0.368695	0.020184
69	57	0.000024	0.000554	0.013452	0.000024	0.363525	0.020134
70	57	0.000024	0.000554	0.013452	0.000024	0.358427	0.020085
71	57	0.000024	0.000554	0.013452	0.000024	0.353401	0.020035
72	57	0.000024	0.000554	0.013452	0.000024	0.348446	0.019986
73	58	0.000024	0.000606	0.013452	0.000024	0.343560	0.020213
74	58	0.000024	0.000606	0.013452	0.000024	0.338725	0.020164
75	58	0.000024	0.000606	0.013452	0.000024	0.333958	0.020114
76	58	0.000024	0.000606	0.013452	0.000024	0.329258	0.020065
77	58	0.000024	0.000606	0.013452	0.000024	0.324624	0.020015
78	58	0.000024	0.000606	0.013452	0.000024	0.320055	0.019966
79	58	0.000024	0.000606	0.013452	0.000024	0.315551	0.019917
80	58	0.000024	0.000606	0.013452	0.000024	0.311110	0.019868
81	58	0.000024	0.000606	0.013452	0.000024	0.306732	0.019819
82	58	0.000024	0.000606	0.013452	0.000024	0.302415	0.019770
83	58	0.000024	0.000606	0.013452	0.000024	0.298159	0.019722
84	58	0.000024	0.000606	0.013452	0.000024	0.293963	0.019673

85	59	0.000025	0.000660	0.013452	0.000025	0.289826	0.019960
86	59	0.000025	0.000660	0.013452	0.000025	0.285731	0.019911
87	59	0.000025	0.000660	0.013452	0.000025	0.281694	0.019862
88	59	0.000025	0.000660	0.013452	0.000025	0.277714	0.019813
89	59	0.000025	0.000660	0.013452	0.000025	0.273791	0.019764
90	59	0.000025	0.000660	0.013452	0.000025	0.269923	0.019716
91	59	0.000025	0.000660	0.013452	0.000025	0.266109	0.019667
92	59	0.000025	0.000660	0.013452	0.000025	0.262350	0.019619
93	59	0.000025	0.000660	0.013452	0.000025	0.258644	0.019571
94	59	0.000025	0.000660	0.013452	0.000025	0.254989	0.019523
95	59	0.000025	0.000660	0.013452	0.000025	0.251387	0.019475
96	59	0.000025	0.000660	0.013452	0.000025	0.247835	0.019427
97	60	0.000025	0.000722	0.013452	0.000025	0.244334	0.019377
98	60	0.000025	0.000722	0.013452	0.000025	0.240867	0.019328
99	60	0.000025	0.000722	0.013452	0.000025	0.237449	0.019279
100	60	0.000025	0.000722	0.013452	0.000025	0.234080	0.019230
101	60	0.000025	0.000722	0.013452	0.000025	0.230759	0.019181
102	60	0.000025	0.000722	0.013452	0.000025	0.227484	0.019132
103	60	0.000025	0.000722	0.013452	0.000025	0.224256	0.019083
104	60	0.000025	0.000722	0.013452	0.000025	0.221074	0.019034
105	60	0.000025	0.000722	0.013452	0.000025	0.217937	0.018985
106	60	0.000025	0.000722	0.013452	0.000025	0.214845	0.018936
107	60	0.000025	0.000722	0.013452	0.000025	0.211796	0.018887
108	60	0.000025	0.000722	0.013452	0.000025	0.208791	0.018838
109	61	0.000026	0.000795	0.013452	0.000026	0.205828	0.018789
110	61	0.000026	0.000795	0.013452	0.000026	0.202893	0.018740
111	61	0.000026	0.000795	0.013452	0.000026	0.199999	0.018691
112	61	0.000026	0.000795	0.013452	0.000026	0.197147	0.018642
113	61	0.000026	0.000795	0.013452	0.000026	0.194335	0.018593
114	61	0.000026	0.000795	0.013452	0.000026	0.191563	0.018544
115	61	0.000026	0.000795	0.013452	0.000026	0.188831	0.018495
116	61	0.000026	0.000795	0.013452	0.000026	0.186138	0.018446
117	61	0.000026	0.000795	0.013452	0.000026	0.183483	0.018397
118	61	0.000026	0.000795	0.013452	0.000026	0.180867	0.018348
119	61	0.000026	0.000795	0.013452	0.000026	0.178287	0.018299
120	61	0.000026	0.000795	0.013452	0.000026	0.175744	0.018250
121	62	0.000026	0.000880	0.013452	0.000026	0.173238	0.018201
122	62	0.000026	0.000880	0.013452	0.000026	0.170753	0.018152
123	62	0.000026	0.000880	0.013452	0.000026	0.168303	0.018103
124	62	0.000026	0.000880	0.013452	0.000026	0.165889	0.018054
125	62	0.000026	0.000880	0.013452	0.000026	0.163509	0.018005
126	62	0.000026	0.000880	0.013452	0.000026	0.161163	0.017956
127	62	0.000026	0.000880	0.013452	0.000026	0.158851	0.017907
128	62	0.000026	0.000880	0.013452	0.000026	0.156572	0.017858
129	62	0.000026	0.000880	0.013452	0.000026	0.154326	0.017809
130	62	0.000026	0.000880	0.013452	0.000026	0.152112	0.017760
131	62	0.000026	0.000880	0.013452	0.000026	0.149930	0.017711
132	62	0.000026	0.000880	0.013452	0.000026	0.147779	0.017662

133	63	0.000027	0.000972	0.013452	0.000027	0.145659	0.019195
134	63	0.000027	0.000972	0.013452	0.000027	0.143556	0.019147
135	63	0.000027	0.000972	0.013452	0.000027	0.141483	0.019100
136	63	0.000027	0.000972	0.013452	0.000027	0.139441	0.019053
137	63	0.000027	0.000972	0.013452	0.000027	0.137427	0.019006
138	63	0.000027	0.000972	0.013452	0.000027	0.135443	0.018960
139	63	0.000027	0.000972	0.013452	0.000027	0.133488	0.018913
140	63	0.000027	0.000972	0.013452	0.000027	0.131561	0.018866
141	63	0.000027	0.000972	0.013452	0.000027	0.129661	0.018820
142	63	0.000027	0.000972	0.013452	0.000027	0.127789	0.018774
143	63	0.000027	0.000972	0.013452	0.000027	0.125944	0.018728
144	63	0.000027	0.000972	0.013452	0.000027	0.124126	0.018681
145	64	0.000027	0.001071	0.013452	0.000027	0.122334	0.019098
146	64	0.000027	0.001071	0.013452	0.000027	0.120556	0.019051
147	64	0.000027	0.001071	0.013452	0.000027	0.118803	0.019004
148	64	0.000027	0.001071	0.013452	0.000027	0.117076	0.018958
149	64	0.000027	0.001071	0.013452	0.000027	0.115375	0.018911
150	64	0.000027	0.001071	0.013452	0.000027	0.113698	0.018865
151	64	0.000027	0.001071	0.013452	0.000027	0.112045	0.018818
152	64	0.000027	0.001071	0.013452	0.000027	0.110416	0.018772
153	64	0.000027	0.001071	0.013452	0.000027	0.108811	0.018726
154	64	0.000027	0.001071	0.013452	0.000027	0.107230	0.018680
155	64	0.000027	0.001071	0.013452	0.000027	0.105671	0.018634
156	64	0.000027	0.001071	0.013452	0.000027	0.104135	0.018588
157	65	0.000028	0.001175	0.013452	0.000028	0.102622	0.019104
158	65	0.000028	0.001175	0.013452	0.000028	0.101119	0.019057
159	65	0.000028	0.001175	0.013452	0.000028	0.099639	0.019010
160	65	0.000028	0.001175	0.013452	0.000028	0.098180	0.018963
161	65	0.000028	0.001175	0.013452	0.000028	0.096743	0.018917
162	65	0.000028	0.001175	0.013452	0.000028	0.095327	0.018870
163	65	0.000028	0.001175	0.013452	0.000028	0.093931	0.018824
164	65	0.000028	0.001175	0.013452	0.000028	0.092556	0.018777
165	65	0.000028	0.001175	0.013452	0.000028	0.091201	0.018731
166	65	0.000028	0.001175	0.013452	0.000028	0.089866	0.018685
167	65	0.000028	0.001175	0.013452	0.000028	0.088550	0.018639
168	65	0.000028	0.001175	0.013452	0.000028	0.087254	0.018593
169	66	0.000029	0.001284	0.013452	0.000029	0.085977	0.019311
170	66	0.000029	0.001284	0.013452	0.000029	0.084709	0.019264
171	66	0.000029	0.001284	0.013452	0.000029	0.083459	0.019216
172	66	0.000029	0.001284	0.013452	0.000029	0.082229	0.019169
173	66	0.000029	0.001284	0.013452	0.000029	0.081016	0.019122
174	66	0.000029	0.001284	0.013452	0.000029	0.079821	0.019075
175	66	0.000029	0.001284	0.013452	0.000029	0.078644	0.019028
176	66	0.000029	0.001284	0.013452	0.000029	0.077484	0.018981
177	66	0.000029	0.001284	0.013452	0.000029	0.076342	0.018935
178	66	0.000029	0.001284	0.013452	0.000029	0.075216	0.018888
179	66	0.000029	0.001284	0.013452	0.000029	0.074106	0.018842
180	66	0.000029	0.001284	0.013452	0.000029	0.073014	0.018795

181	67	0.000031	0.001396	0.013452	0.000031	0.071937	0.019729
182	67	0.000031	0.001396	0.013452	0.000031	0.070868	0.019681
183	67	0.000031	0.001396	0.013452	0.000031	0.069815	0.019632
184	67	0.000031	0.001396	0.013452	0.000031	0.068777	0.019584
185	67	0.000031	0.001396	0.013452	0.000031	0.067755	0.019536
186	67	0.000031	0.001396	0.013452	0.000031	0.066749	0.019488
187	67	0.000031	0.001396	0.013452	0.000031	0.065757	0.019440
188	67	0.000031	0.001396	0.013452	0.000031	0.064780	0.019392
189	67	0.000031	0.001396	0.013452	0.000031	0.063817	0.019344
190	67	0.000031	0.001396	0.013452	0.000031	0.062869	0.019297
191	67	0.000031	0.001396	0.013452	0.000031	0.061934	0.019249
192	67	0.000031	0.001396	0.013452	0.000031	0.061014	0.019202
193	68	0.000033	0.001519	0.013452	0.000033	0.060107	0.020364
194	68	0.000033	0.001519	0.013452	0.000033	0.059207	0.020313
195	68	0.000033	0.001519	0.013452	0.000033	0.058320	0.020263
196	68	0.000033	0.001519	0.013452	0.000033	0.057446	0.020214
197	68	0.000033	0.001519	0.013452	0.000033	0.056585	0.020164
198	68	0.000033	0.001519	0.013452	0.000033	0.055738	0.020114
199	68	0.000033	0.001519	0.013452	0.000033	0.054902	0.020065
200	68	0.000033	0.001519	0.013452	0.000033	0.054080	0.020015
201	68	0.000033	0.001519	0.013452	0.000033	0.053270	0.019966
202	68	0.000033	0.001519	0.013452	0.000033	0.052472	0.019917
203	68	0.000033	0.001519	0.013452	0.000033	0.051685	0.019868
204	68	0.000033	0.001519	0.013452	0.000033	0.050911	0.019819
205	69	0.000035	0.001647	0.013452	0.000035	0.050148	0.021244
206	69	0.000035	0.001647	0.013452	0.000035	0.049390	0.021192
207	69	0.000035	0.001647	0.013452	0.000035	0.048644	0.021140
208	69	0.000035	0.001647	0.013452	0.000035	0.047909	0.021088
209	69	0.000035	0.001647	0.013452	0.000035	0.047185	0.021036
210	69	0.000035	0.001647	0.013452	0.000035	0.046472	0.020984
211	69	0.000035	0.001647	0.013452	0.000035	0.045770	0.020932
212	69	0.000035	0.001647	0.013452	0.000035	0.045078	0.020881
213	69	0.000035	0.001647	0.013452	0.000035	0.044397	0.020829
214	69	0.000035	0.001647	0.013452	0.000035	0.043726	0.020778
215	69	0.000035	0.001647	0.013452	0.000035	0.043065	0.020727
216	69	0.000035	0.001647	0.013452	0.000035	0.042414	0.020676
217	70	0.000038	0.001796	0.013452	0.000038	0.041773	0.022347
218	70	0.000038	0.001796	0.013452	0.000038	0.041136	0.022292
219	70	0.000038	0.001796	0.013452	0.000038	0.040508	0.022237
220	70	0.000038	0.001796	0.013452	0.000038	0.039890	0.022182
221	70	0.000038	0.001796	0.013452	0.000038	0.039281	0.022128
222	70	0.000038	0.001796	0.013452	0.000038	0.038682	0.022073
223	70	0.000038	0.001796	0.013452	0.000038	0.038091	0.022019
224	70	0.000038	0.001796	0.013452	0.000038	0.037510	0.021965
225	70	0.000038	0.001796	0.013452	0.000038	0.036938	0.021911
226	70	0.000038	0.001796	0.013452	0.000038	0.036374	0.021857
227	70	0.000038	0.001796	0.013452	0.000038	0.035819	0.021803
228	70	0.000038	0.001796	0.013452	0.000038	0.035272	0.021749

229	71	0.000042	0.001964	0.013452	0.000041	0.034734	0.023626
230	71	0.000042	0.001964	0.013452	0.000041	0.034198	0.023568
231	71	0.000042	0.001964	0.013452	0.000041	0.033670	0.023510
232	71	0.000042	0.001964	0.013452	0.000041	0.033151	0.023452
233	71	0.000042	0.001964	0.013452	0.000041	0.032639	0.023394
234	71	0.000042	0.001964	0.013452	0.000041	0.032135	0.023337
235	71	0.000042	0.001964	0.013452	0.000041	0.031639	0.023279
236	71	0.000042	0.001964	0.013452	0.000041	0.031151	0.023222
237	71	0.000042	0.001964	0.013452	0.000041	0.030671	0.023165
238	71	0.000042	0.001964	0.013452	0.000041	0.030197	0.023108
239	71	0.000042	0.001964	0.013452	0.000041	0.029731	0.023051
240	71	0.000042	0.001964	0.013452	0.000041	0.029272	0.022994

$q^{(ad)}$, accidental death mortality, is pulled from the 1996 ADB Table.

$q^{(nad)}$, non-accidental death mortality, all-cause mortality, derived from 50% Male / 50% Female blend of the 2001 CSO Table minus the accidental death mortality ($q^{(ad)}$) shown above.

$$q^{(ad)} = q^{(ad)} * [1 - \frac{1}{2} * (q^{(w)} + q^{(nad)}) + \frac{1}{3} * q^{(w)} * q^{(nad)}]$$

$$l_t = l_{t-1} * [1 - q^{(ad)}_{t-1}] * [1 - q^{(w)}_{t-1}] * [1 - q^{(nad)}_{t-1}]$$

$$v = 1 \div (1.03^{1/12})$$

PV claim cost per \$1,000 of insurance for policy month t:

$$= q^{(ad)}_{x+t-1} * \text{Benefit Amount} * v^{t/12 - 1/24}$$

NSP = $\sum \{(\text{PV claim cost per } \$1,000 \text{ of insurance at time } t) * l_{x+t-1}\}$ for t = 1 to 180

$$= 1.36720$$

$$\text{annuity factor} = \sum (l_{x+t-1} * v^{t-1}) = 4.72045$$

$$\text{monthly claim cost} = \text{NSP} \div \text{Annuity Factor} \div 12 = 0.02414$$

State: District of Columbia **Filing Company:** Minnesota Life Insurance Company
TOI/Sub-TOI: H021 Individual Health - Accident Only/H021.000 Health - Accident Only
Product Name: Individual Accidental Death and Injury Insurance
Project Name/Number: Individual Accidental Death and Injury/

Supporting Document Schedules

Satisfied - Item:	Cover Letter All Filings
Comments:	
Attachment(s):	jab-2417 DC Cover Letter.pdf
Item Status:	
Status Date:	

Bypassed - Item:	Certificate of Authority to File
Bypass Reason:	Not applicable to this filing.
Attachment(s):	
Item Status:	
Status Date:	

Satisfied - Item:	Actuarial Memorandum
Comments:	
Attachment(s):	Actuarial Memo - Standard_DC.pdf
Item Status:	
Status Date:	

Satisfied - Item:	Actuarial Justification
Comments:	See #15 of attached actuarial memorandum.
Attachment(s):	
Item Status:	
Status Date:	

Bypassed - Item:	District of Columbia and Countrywide Loss Ratio Analysis (P&C)
Bypass Reason:	Not applicable to this filing.
Attachment(s):	
Item Status:	
Status Date:	

Bypassed - Item:	District of Columbia and Countrywide Experience for the Last 5 Years (P&C)
Bypass Reason:	Not applicable to this filing.
Attachment(s):	
Item Status:	
Status Date:	

SERFF Tracking #:

MNNL-129618153

State Tracking #:

Company Tracking #:

SFIG JAB-2461

State: District of Columbia

Filing Company: Minnesota Life Insurance Company

TOI/Sub-TOI: H021 Individual Health - Accident Only/H021.000 Health - Accident Only

Product Name: Individual Accidental Death and Injury Insurance

Project Name/Number: Individual Accidental Death and Injury/

Bypassed - Item:	Actuarial Memorandum and Certifications
Bypass Reason:	Not applicable to this filing.
Attachment(s):	
Item Status:	
Status Date:	

Bypassed - Item:	Unified Rate Review Template
Bypass Reason:	Not applicable to this filing.
Attachment(s):	
Item Status:	
Status Date:	

NAIC #: 66168
Group #: 869

RE: Minnesota Life Filing No. JAB-2417

14-50856 Individual Accidental Death and Injury Insurance Policy
14-50857 Individual Accidental Death and Injury Insurance Benefit Schedule
14-50859 Accidental Death and Injury Insurance Request Form (Escrow/EFT/Direct Bill)
14-50860 Accidental Death and Injury Insurance Request Form (Escrow/EFT/Direct Bill/Payment Card/Other)
14-50861 Accidental Death and Injury Insurance Request Form (Upsell)

Copies of the above-referenced forms are attached for your review and approval. These forms are new and do not replace any previously approved forms. We respectfully request expedited review of these forms by your Department. We have identified October 1, 2014 as our desired market implementation date.

14-50856 is an individual accidental death and injury insurance policy, providing single or family coverage for death, disability or hospital confinement caused by an accidental injury.

The program will be marketed to members of the general public, either directly or through a variety of affinity groups ("Program Sponsors").

The accidental death benefit is the base benefit. The policy also provides for a number of optional benefits that may be included or excluded depending on marketing or program sponsor needs. One of the optional benefits is a return of premium benefit if the insured dies and no accidental death benefit is payable under the policy.

The program may be offered as contributory coverage (premiums paid by the insured), or non-contributory coverage (premiums paid by a program sponsor), or a combination of both.

The maximum amount of insurance under this policy is \$10,000,000. Benefit reductions may be added to the accidental death benefit to decrease the benefit amount by certain percentages as the insured reaches certain ages. These reduction ages and percentages can vary as shown in the attached actuarial memorandum.

14-50857 is the Benefit Schedule that will be issued with policy 14-50856.

14-50859 and 14-50860 are the applications which will be completed to apply for coverage. The applications will either be mailed for completion as part of direct response campaigns, or made available for completion on-line through a secured Minnesota Life enrollment site. There is no agent involved, so enrollment will be completed by the applicant directly on Minnesota Life's secured platform.

14-50861 is the form used to provide existing insureds with an opportunity to increase the amount of their existing coverage.

Several premium payment options are available under this program including (1) escrow; (2) EFT (electronic funds transfer); (2) payment card (which includes credit and debit cards); (3) direct billing; (4) any other payment method that may become available in the future.

Variable language has been marked with brackets. Memorandums of Variable Material are attached to the Supporting Documentation tab explaining all variability requested.

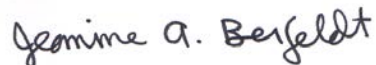
Attached is the required Actuarial Memorandum for this insurance program.

In addition, attached to the Supporting Documentation tab is a narrative exhibit of our e-signature and e-delivery consent process and a companion e-enrollment flow exhibit. This exhibit reflects our current process and changes may be made to this process in the future.

The format of the attached forms may vary depending on marketing and client needs, e.g. paper size, electronic distribution, etc. Minnesota Life Insurance Company also reserves the right to change the color, font, sequential order and layout of the attached forms. These formatting variations will not affect the readability requirements and standards of applicable state law.

I look forward to your approval for use of these forms in the District of Columbia. Thank you for your attention to this filing.

Sincerely,

A handwritten signature in black ink that reads "Jeanine A. Berfeldt". The signature is written in a cursive style with a loop at the end of the last name.

Jeanine A. Berfeldt
Product Compliance Analyst
Tel: 651-665-4460
Fax: 651-665-5424
Email: jeanine.berfeldt@securian.com

Actuarial Memorandum

1. Scope and Purpose

This memorandum is intended to provide actuarial information in support of premium rates for Policy 14-50856.8 underwritten by Minnesota Life Insurance Company.

2. Benefit Description

14-50856.8 provides a variety of benefits. Benefits are structured to provide 24-hour coverage, subject to other conditions as listed on the Benefit Schedule. A summary of the benefits is included here. Additional detail on the benefits can be found in the above captioned policy.

Accidental Death: Benefits are provided for an insured person's accidental death resulting from an injury, subject to conditions and limitations shown in the policy form.

Accidental Dismemberment: Benefits are provided for an insured person's accidental dismemberment resulting from an injury, subject to conditions and limitations shown in the policy form. A percentage of the maximum amount is paid for a given injury, with the percentages for a list of injury types indicated in the policy form.

Accident Hospital Indemnity: If an insured person is confined to a hospital due to an accident, a benefit amount accruing daily, as shown in the Benefit Schedule, will be payable monthly, after a specified waiting period and subject to conditions and limitations shown in the policy form.

Adaptive Home and Vehicle Benefit: If an insured person's home and/or private motor vehicle require modifications to accommodate a dismemberment and/or total and permanent disability resulting from an injury, we will pay a benefit equal to the amount shown on the Benefit Schedule, subject to conditions and limitations shown in the policy form.

Anti-Inflation Benefit: The maximum amounts shown on the Benefit Schedule will be increased for benefits for which the Anti-Inflation Benefit applies. The Benefit Schedule will list the benefits to which the Anti-Inflation Benefit applies, the percentage of the increase, and the period of time for which the increases continue. Each increase will be based on the initial benefit amount.

Common Accident Benefit: If both an insured and the insured's spouse die from injuries resulting from a common accident, we will pay a benefit as shown in the insured's Benefit Schedule.

Common Carrier Benefit: If an insured person dies as a direct result of an injury involving a collision, crash or sinking of a common carrier while riding as a fare-paying passenger, we will pay a benefit in the amount shown on the Benefit Schedule.

Dependent Benefit: If an insured or an insured spouse dies as a result of an injury, we will pay a benefit to the beneficiary, in the amount shown on the Benefit Schedule, for each dependent child. In addition, the Benefit Schedule may include a benefit amount to be payable if there are no dependent children.

Dependent Child Care Benefit: If an insured or an insured spouse dies as a result of an injury, we will pay a monthly benefit for child care expenses for surviving qualified dependent children, subject to conditions and limitations shown in the policy form.

Disappearance or Exposure Benefit: If an insured person's body has not been found after one year from the date the conveyance in which the insured person was traveling disappeared, exploded, sank, became stranded, made a forced landing or was wrecked, it shall be presumed, subject to all other terms of the policy and any concerns of fraud or foul play, that the insured person has died as a result of an injury. Such accidental death shall be considered a covered loss under the terms of the policy, subject to conditions and limitations shown in the policy form. Also, unavoidable exposure to the elements resulting in the Insured Person's injury or death will be considered a covered loss for the purpose of determining benefits payable under the policy.

Education Benefit: If an insured or an insured spouse dies as a result of an injury, we will pay an education benefit for the surviving spouse and/or each qualifying dependent child, subject to conditions and limitations shown in the policy form. In addition, the Benefit Schedule may include a benefit amount to be payable if there are no eligible dependent children and/or spouse.

Grief Counseling Benefit: If an insured or an insured spouse sustains an injury resulting in death and is survived by a spouse or domestic partner, and/or dependent children, we will pay a benefit for counseling services received by the spouse or domestic partner, and/or dependent children within 1 year of the accidental death. Upon our receipt of proof of payment for such counseling sessions, we will pay the amount shown on the Benefit Schedule per counseling session, limited to the maximum number of sessions shown on the Benefit Schedule for spouse or domestic partner, and all dependent children combined.

Motor Vehicle Benefit: If an insured person sustains an injury resulting in death while driving or riding in a private passenger vehicle and while wearing a seatbelt at the time of loss, we will pay a benefit equal to the amount shown in the Benefit Schedule, subject to conditions and limitations shown in the policy form.

Pedestrian Benefit: If an insured person sustains an injury while a pedestrian with right-of-way resulting in a hospital stay and/or death, we will pay a daily hospital benefit and/or an additional lump sum death benefit equal to the amount shown in the Benefit Schedule, subject to conditions and limitations shown in the policy form.

Return of Premium: The return of premium benefit will be payable when we receive satisfactory proof that the primary insured has died and no benefit is payable under this policy as a result of the death. The amount of the return of premium benefit will be the sum total of either all monthly premiums paid under the policy, or the monthly premiums paid for a specified number of years prior to death.

Total and Permanent Accidental Disability Benefit: Upon receipt of proof satisfactory to us that an insured person has sustained a total and permanent accidental disability, prior to a specified age, as a result of an injury, and the total and permanent accidental disability has existed continuously for at least a specified number of months, a monthly and/or lump sum benefit amount, as shown in the Benefit Schedule, will be payable, subject to conditions and limitations shown in the policy form.

Waiver of Premium Benefit: If, while under a specified age, and as a result of an injury, the primary insured becomes totally and permanently accidentally disabled and the total and permanent accidental disability has existed continuously for a waiting period lasting a specified number of months, insurance will be continued in force without payment of premium during the uninterrupted continuance of the total and permanent accidental disability, subject to conditions and limitations shown in the policy form.

3. Renewability Clause

The program sponsor, the policyholder or Minnesota Life may discontinue coverage with 31 days written notice. For each policy in a class, Minnesota Life may prospectively change the premium rates on any premium due date, but no more than once in each policy year.

4. Applicability

This memorandum applies to premium rates for the Policy 14-50856.8 underwritten by Minnesota Life.

5. Mortality and Morbidity

Assumptions for mortality and morbidity were developed using government statistics, industry studies, and other sources of information, including but not limited to the following:

1996 ADB Table Report by Jay Jaffe
2001 CSO Table from the AAA's CSO Task Force Report
1985 CIDA Table
HCUPNet
National Safety Council - Injury Facts
Center for Disease Control - National Center for Health Statistics -
National Vital Statistics Reports
US Department of Transportation - National Highway Traffic Safety Administration

The expected claim costs given in this memorandum were derived for the general population and are shown in Appendix A. The product will be marketed through program sponsors whose members may have common characteristics (e.g., occupation, geographic area, avocations, etc.) which would result in higher or lower expected claims costs than the general population. For members of such program sponsors, their expected claims costs will be discounted or loaded accordingly.

6. Marketing Method

This policy will be sold primarily via direct response, point-of-sale, and online marketing.

7. Expenses

Expenses, which include commissions, will vary depending on the distribution channel, services being performed, and program sponsor characteristics. Where appropriate, we will provide an expense charge discount, if the program sponsor is of a certain size or performs certain duties (e.g., premium billing and collection) that result in greater efficiencies than our standard service and expense charges contemplate.

8. Underwriting

There is no medical underwriting of policyholders.

9. Premium Clauses

In general, first premiums will be due on the first of the month after coverage is effective, and subsequent premiums will be payable on the premium due date. However, the product may be marketed with a one to three month “no cost” period, after which premiums will be payable on the premium due date. An illustration of this can be found in Appendix B.

10. Issue Age Range

The minimum issue age is 18. Our policy forms allow for variance in including a maximum issue age. Our policy forms also allow for variance in including restrictions that cause benefits to reduce or end at certain ages.

11. Premium Modalization Rules

Unless we have agreed to some other premium payment procedure, premiums are paid monthly. Quarterly payments equal three times the monthly rate, while annual premiums are twelve times the monthly rate.

12. Claim Liability and Reserves

Reserves and liabilities will be established in conformity with state laws and appropriate accounting principles, using prescribed mortality and morbidity tables.

13. Anticipated Loss Ratio

The anticipated loss ratio is calculated by taking 100% less the expected expenses as a percent of premium after any expense loads or discounts are applied.

14. Premium Rates

Premium rates will be calculated by adding together each of the separate claim costs for the benefits included in the policy, adjusted for any discounts or loads, as noted above, and dividing by the anticipated loss ratio. The general population claims costs for each benefit are provided as Appendix A of this memorandum. The formula below shows the calculation of the premium rates for a given class of insureds.

$$\text{Premium Rate} = \frac{A \times (1 \pm B)}{1 - [C \times (1 \pm D) + E \times (1 \pm F) + G + H + I]}$$

A = General population claim cost

B = Adjusted percentage for claims expectation based on member characteristics

C = Base servicing expense charge

D = Discount of expense charge based on program sponsor size

E = Marketing cost allowance

F = Adjustment factor for marketing cost based on marketing method

G = Distribution allowance

H = Expected premium tax percentage

I = Profit charge

15. Actuarial Certification

I hereby certify that the actuarial assumptions used to derive the premium rates are reasonable. Based on such assumptions, the policy premiums appear reasonable and self-supporting.



Mark Frie, ASA, MAAA

June 16, 2014

Date