2017 Guaranteed Issue Mortality Tables Report

American Academy of Actuaries' Life Experience Committee and Society of Actuaries' Preferred Mortality Oversight Group's Guaranteed Issue/Simplified Issue/Preneed Working Group "Joint Committee"

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1. Data Selection

1.1 Description of Underwriting

A data call was issued on March 11, 2011 for guaranteed issue (GI), simplified issue and Preneed mortality data for observation years 2005 to 2009. Preneed business written on a guaranteed issue basis was included in the Preneed study and not in this guaranteed issue study. However, for ages under 50 and over 90, where GI data was sparse, Preneed mortality patterns were used to extend GI rates. Excluding duration 1, Preneed and GI exhibited somewhat comparable levels of mortality.

The Preneed mortality study and table development were prepared concurrent with the GI study by the Preneed Subgroup with data collected over an identical exposure period. The full report and rates for the Preneed study can be found under 'Individual Mortality' at:

- https://www.soa.org/Research/Experience-Study/ind-life/default.aspx.

For purposes of this study, a guaranteed issue (GI) policy was defined as a policy or certificate where the applicant must be accepted for coverage if the applicant is eligible and the premium is paid. Exceptions for not allowing coverage including ineligibility due to issue age ranges or lack of membership in the eligible group (e.g., association group) will not disqualify the policy or certificate from being considered guaranteed. If any of the following risk selection criteria are required, then the coverage should not be considered guaranteed issue:

- Actively at work requirement.
- Acceptance based on any health related questions or information.
- Waiving of underwriting requirements based on minimum participation thresholds, such as for worksite marketing.

1.2 Background

The SOA hired MIB to compile the data collected for the guaranteed issue study. MIB performed numerous syntax and validation checks and worked with SOA staff to ensure that company confidentiality was protected in the production of any data views that were provided to the Joint American Academy of Actuaries Life Experience Committee and Society of Actuaries Preferred Mortality Oversight Group (POG) for the development of the mortality tables.

The SOA's confidentiality guidelines state that any data released for analysis should not have any one company dominating the experience data. To meet this guideline, some companies' data submissions had to be scaled down. The guidelines also state that any potential subset or extract of the data should contain multiple companies' experience in order to prevent the identification of any one company's experience.

Because the guaranteed issue business is not homogenous in terms of the combination of factors (i.e., distribution channel, distribution method, premium payment method, etc.) that were collected to describe the business, the data released to the POG was very limited in terms of the number of factors that could be analyzed in combination. For example, the factors of distribution channel and distribution method could not be provided in the same view of the data because at least one of the combinations of

distribution channel and distribution method resulted in a data cell with only one or two companies' experience.

1.3 Analysis of Data, including Limitations

The study included data from 15 companies. The mortality ratio based on the 2008 Valuation Basic Table for Limited Underwriting ("VBTLU") Ultimate Table was 172.7% based on units and 166.4% by count, and the average size was 7.252 units.

For purposes of this study, one unit of coverage was defined as $1,000 of ultimate face amount. In the case of modified death benefits, which were very common for the policies in this study, a reduced death benefit, often equal to 110% of premiums, was provided during the first two policy years.

Throughout this report, the terms non-tobacco and tobacco are used interchangeably with nonsmoker and smoker, respectively. The terms unismoke and composite are used interchangeably to describe the risk class that is not differentiated between smoker and nonsmoker risks. Initial analysis determined there were clear differences in the mortality results based on smoking status (nonsmoker, smoker or unismoke). Mortality ratios were calculated based on the VBTLU Ultimate Table, whose rates vary by gender and smoking status. The results were as follows:

- 84.3% for nonsmoker risks
- 77.9% for smoker risks
- 181.4% for unismoke risks

Due to the constraints on the data made available to the committee, as described above, other business characteristics could not be analyzed directly when further split by smoking status. Rather, analysis was done based on units, which could be used for all business characteristics. Ninety-nine percent of unismoke data was for amounts below 25 units while 83% of data coded as smoker distinct was for amounts of 25 units and above. Using amount as the basis for splitting the data, it was found that:

By distribution channel:

- Below 25 units: 96% direct marketing
- 25 units and higher: 96% independent agents/brokers

By death benefit pattern,

- Below 25 units: 98% modified death benefit (having an initial limited death benefit for a number of years before reaching the ultimate amount)
- 25 units and higher: 4% modified death benefit

Due to the substantial differences in the mortality levels of the data based on smoker status, and the differences in product characteristics seen when splitting the business based on face amount, it was decided that the development of a guaranteed issue mortality table would exclude all data coded as non-smoker or smoker. As a result of this decision, the study was heavily concentrated toward business with the risk characteristics noted below. Therefore, the results of this study may not be applicable to business with other characteristics.

- Amounts under 25 units, which had an average face amount of 6.554 units;
- Sold through direct marketing; and
- A modified death benefit in the first two policy years.

1.4 Data Included in Study

The following table shows totals for data collected, the smoker distinct data excluded and the resulting unismoke only data used in the study:

	Guaranteed Issue data				Average Mortality Rate	
	Death Count	Death Units	Exposure Count	Exposure Units	By Count	By Amount
Data Collected	216,868	1,397,847	4,868,865	35,308,560	0.04454	0.03959
Data Excluded	2,447	58,230	110,943	4,126,970	0.02206	0.01411
Data Included	214,422	1,339,617	4,757,922	31,181,590	0.04507	0.04296
Included/Collected	98.9%	95.8%	97.7%	88.3%	101.2%	108.5%

2. Unloaded Mortality Table

2.1 Extent of Credible Data

The study included over 214,000 deaths. 99.5% of the exposure by units was for issue ages 45-84. The data was sparse for issue ages below 50 and attained ages above 90.

2.2 Select Period and Other

Using the ungraduated experience data on an attained age basis as the basis for expected mortality, mortality ratios were examined by duration. A declining mortality ratio by duration, indicating anti-selection, was found, as shown below:

Duration	Deaths in units	Mortality ratio
1	171,232	114.5%
2	133,850	104.1%
3	125,393	102.7%
4	116,756	99.0%
5	98,376	97.8%
6	85,407	96.7%
7	76,886	96.9%
8	71,013	97.2%
9	65,312	96.7%
10	60,549	96.6%
11-15	243,096	95.8%
16-20	87,230	94.6%
21 & above	4,518	117.2%
Total	1,339,617	100.0%

The pattern of anti-selection is observable, but not pronounced after the first year. After the first five years of consistent decreases, mortality ratios continue to decline very slightly but with year-by-year oscillations, therefore a five-year select period was chosen for purposes of developing a select and ultimate ("S&U") experience table. An ultimate-only experience table was created using the ultimate rates from the S&U experience table, which were based on experience in durations six and later.

All data was submitted on a sex-distinct basis, with 63.5% by unit on female lives. Separate tables were developed for males and females.

The tables were developed on an age last birthday ("ALB") basis.

2.3 Graduation Choices Made

Three separate graduations were performed, all based on units of death and units of exposure. Select mortality for durations 1-5 was graduated for issue ages 50 to 85. Ultimate mortality (durations 6 and above combined by attained age) was graduated for attained ages 50 to 90. Aggregate mortality for all durations combined was graduated for ages 30 to 95.

For all graduations, Whitaker-Henderson ("W-H") graduation was performed using the following parameters:

1. Order was set equal to 4, indicating that 4th order polynomials were to be used to fit the data and
2. the parameter "h," which adjusts the relative level of smoothness vs. fit, was set equal to 1000, which gave more emphasis to smoothness.

Exposure was used as the weights for the graduation, thereby ensuring that the graduated rates would reproduce total units of death benefits.

For the select rates, both males and females, issue ages 60 to 85, the rates from the graduation were subjected to the adjustments described below in the monotonicity checks section.

For the attained age rates for ages 58 to 90, the rates from the graduation were subjected to the adjustments described below in the adjustments for older ages and the monotonicity checks sections.

2.4 Adjustments to Graduated Results

One limitation of the W-H graduation method is that it tends to break down where data is sparse. This was observed at the ends of the data points. The W-H graduation produced wide swings in the select factors at the younger end of the ages graduated (i.e., issue ages 50 to 59), as well as at younger end of the attained age rates (i.e., attained ages 50 to 57). As such, the GI Subgroup determined further adjustments were required at these ages. There was a small but similar effect at the older issue ages (80 to 85), but much less pronounced, so no adjustment was made there.

2.4.1 Adjustments for Ages 50 to 59

For males, issue ages 50-59, durations 1 to 5, due to the fluctuations in the select factors noted above, the graduated results were replaced with flat multiples (select factors) of the original attained age rates. The multiple in duration 1 was 112.2%, which was the average of the duration 1 multiple for issue ages 60 to 64. The multiples for durations 2-5 were as follows:

2	107.1%
3	102.1
4	99.9
5	95.9

These were set to provide a uniform runoff of the select factors, replacing the fluctuations in the original graduation.

For male attained ages 50 to 57, a multiple of the aggregate rate (87% to 88%, varying slightly by age) was used to replace the graduated attained age rate.

For female issue ages 50 to 59, durations 1 to 5, the results of the graduation were replaced with smoothed select factors. These were not level as for males, but instead followed the pattern of the graduated results and served to dampen the range of the select factors before adjustment.

For female attained ages 50 to 57, the same multiple of the aggregate rates used for males was applied to the female aggregate rates to replace the female graduated attained age rates.

2.4.2 Adjustments for Ages 0 to 49

Select ratios for GI issue age 50 S&U rates to the Preneed ultimate rates for the same attained ages were calculated for females and males. Assuming that the same pattern of select rates applied to younger ages, GI S&U rates for issue ages 0 to 49 were obtained by multiplying Preneed ultimate rates for the corresponding attained age by the select ratios shown in the following table:

Select Ratios of GI Select and Ultimate Rates to Preneed Ultimate Rates

	Issue Age 50					Attained
Duration:	1	2	3	4	5	Age 55
Female ratios:	188.5%	178.9%	171.6%	165.1%	158.1%	138.1%
Male ratios:	214.4%	199.0%	184.8%	179.9%	172.7%	157.1%

2.4.3 Adjustments for Ages 90-96

Because of the similarity of GI and Preneed rates at the oldest ages, the GI Subgroup graded from the oldest credible GI rate, starting at attained age 90, to the oldest credible Preneed mortality rate at attained age 96. This was accomplished through the following steps:

- The ratio of the graduated GI attained age 90 mortality rate to the corresponding Preneed attained age 90 mortality rate was calculated for both females and males. The female ratio at age 90 was 98.38% and the male ratio was 107.95%.
- These ratios were linearly graded to 100% over six years, from attained age 90 to 96.
- The resulting ratios were applied to Preneed rates for attained ages 90 to 96 to produce GI rates for attained ages 90 to 96.

2.5 Extension for Ages 97-120

GI rates for attained ages 97 and higher were calculated using a multi-step process that linked the progression of mortality rates to that for the 2015 VBT table that underlies the 2017 Commissioners Standard Ordinary ("CSO") table:

- The GI mortality rate at age 96 was based on the 2015 Preneed age 96 rate, as described in the previous section.
- The GI mortality rate for age 110 was set equal to 0.5, which is the maximum mortality rate achieved by the 2015 VBT table, starting at age 112. It was assumed that GI lives would reach the highest mortality rate of 0.5000 two years earlier than fully underwritten lives.
- The annual increases in mortality rates for the 2015 VBT Composite table were calculated for ages 97 to 110.
- The annual increase in GI mortality rates was set equal to the 2015 VBT annual increase for the same age, minus a constant X.
- X was solved for to reproduce the GI mortality rate at age 96.

2.6 Interpolation and Slope Checks

Rates were graduated by individual issue ages 50 to 85, so there was no need for interpolation. Similarly, rates for issue ages 0-49, attained ages 5-54 and attained ages 91+ were all calculated as ratios to Preneed rates, so no interpolation was needed.

By graduating all ages, some very small ups and downs in rates were introduced. These were eliminated by making very minor adjustments.

The slopes of the adjusted rates were checked by issue age, duration and attained age. Rates monotonically increased with increasing age except at the young ages where rates monotonically decreased from attained age 0 to 32.

Because of the anti-select nature of the rates, male rates monotonically decreased with increasing duration for male issue ages 0 to 63, except that the ultimate rate was larger than the duration 5 rate for male issue ages 58 to 63. For male issue ages 64 to 69, rates decreased by duration for one or more years and then increased by duration, due to the effect of aging outweighing the wearing off of anti-selection. For male issue ages 70 and higher, rates monotonically increased with increasing duration.

For females, the pattern was much the same, but starting at younger issue ages: Female issue age 54 was the last to have rates that monotonically decreased with increasing duration. Female issue age 62 was the first to have rates that monotonically increased with increasing duration.

2.7 Mortality Improvement

The table below shows the overall mortality ratio for each study year. The last study year, 2009, had a considerable increase in units exposed due to the addition of a large block of new and in force business by one contributor. When experience from that block was removed, the resulting 2009 mortality ratio was higher than the average mortality ratio for 2005-2008. In the view of the subgroup, the trend over the four remaining homogenous years, 2005-2008, did not show a pattern of mortality improvement large enough to project ongoing improvement from the period of the study to the publication date of the final table. Therefore, no generational mortality improvement was incorporated from the mid-point of the exposure period to the start date of the table, 2017.

Study year	No. of deaths	A/E using Basic GI S&U Table
2005	40,996	102.2%
2006	40,501	99.8%
2007	39,950	99.3%
2008	40,568	101.8%
2009	51,633	98.5%

2.8 2017 Basic GI ALB Mortality Tables

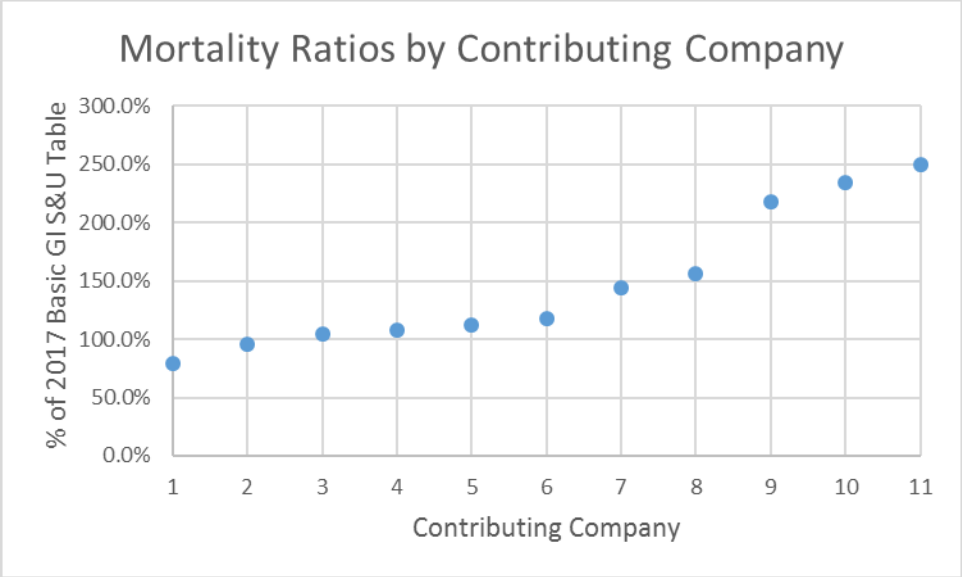
The 2017 Basic GI Composite S&U ALB mortality tables for males and females were developed on a five-year select and ultimate basis. Separate 2017 Basic GI Composite Ultimate ALB mortality tables for males and females were created from the ultimate rates of the S&U tables. The 2017 Basic GI Composite S&U ALB mortality tables are shown in Appendices A (Male) and B (Female). The 2017 Basic GI Composite Ultimate ALB mortality tables are shown in Appendix C.

3. Loaded Mortality Table

3.1 Actual to Expected ("A/E") experience coverage analysis

Preliminary input from the National Association of Insurance Commissioners Life Actuarial Task Force (NAIC LATF) regarding the level of loading was to target a load such that the resulting mortality covered 70% to 80% of the contributing companies' underlying experience. The experience analysis was rerun using the 2017 Basic GI tables as the expected bases. The resulting A/E ratios were ranked from lowest to highest to determine the loading level required to obtain various coverage levels determined by the percentage of contributing companies whose actual experience was less than the loaded mortality rates.

The scatter diagram below shows the mortality ratios as a percentage of the 2017 Basic GI S&U ALB mortality table. The A/E ratios varied significantly by contributing company, ranging from 79.0% to 250.1%. The three highest ratios were from companies that, combined, contributed less than 0.3% of the total exposure. Mortality ratios as a percentage of the 2017 Basic GI Ultimate ALB mortality table (not shown) were generally about 4% higher.



3.2 Coverage for Various Loadings

The approximate load and resulting coverage is shown in the table below. To meet the NAIC LATF's initial request of a load to result in 70% to 80% coverage, the load would have needed to be in excess of 50%. The GI Subgroup determined that this load was excessive, especially given that the three companies with the highest mortality contributed less than 0.3% of the total study exposure. The GI Subgroup then tested the impact of a loading similar to that in the newly released 2017 CSO. This loading varied by attained age and gender, with an average loading of approximately 17%. This load resulted in a coverage level of 55% (6 of 11) of the contributing companies' experience but 98.8% of the contributed exposure. The final loading is consistent with the 2017 CSO loading structure and level.

Approximate Coverage Percent of Contributing Companies	Percentage of the 2017 Basic GI S&U Table to Achieve Coverage Percent	Exposure Covered by Count
55%	17%	98.9%
64%	45%	99.5%
73%	57%	99.8%
82%	118%	99.9%

3.3 Valuation and Nonforfeiture Recommendations

The 2017 Basic GI Ultimate ALB table with 2017 CSO loading (i.e., the 2017 Loaded GI Ultimate ALB table) was recommended for valuation purposes for the following reasons:

- The resulting model office reserves were more conservative than those from the 2017 Basic GI S&U ALB table with 2017 CSO loading (i.e., the 2017 GI Loaded S&U ALB table).
- It reflected mortality levels in line with GI mortality experience, while 2017 CSO mortality was far lower than GI mortality experience.
- The present value of reserve increases are similar to those produced by the 2017 CSO table.

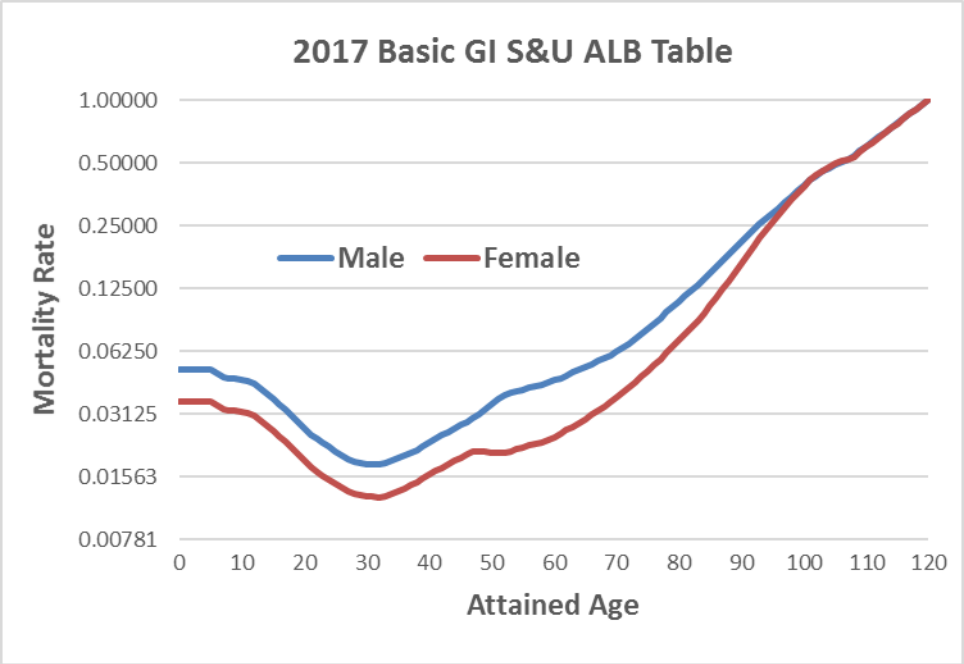
3.4 Final Loading

The 2017 Loaded GI Ultimate ALB and age-nearest-birthday ("ANB") tables were created by applying 2017 CSO Loading factors in the following manner:

- When mortality ratios to the 2017 Basic GI S&U ALB table were analyzed by observation year, a 5-year (2005 to 2009) least squares fit yielded an annual improvement rate of 0.5%. However, the 4-year (2006 to 2009) result yielded an annual improvement rate of 0.1%. Therefore, no mortality improvement was recommended or applied.
- The 2017 Basic GI Ultimate ALB table was converted to ANB to create the 2017 Basic GI Ultimate ANB table using the following formula:
  - $_{ANB}q_t = (_{ALB}q_{x-1} + (1-_{ALB}q_{x-1})*_{ALB}q_x) / (2 - _{ALB}q_{x-1})$.
  - This formula is analogous to the formula shown below for converting ANB rates to ALB rates: Both formulas were derived by assuming a uniform distribution of deaths.
- 2017 CSO Loading factors, which are ANB only, were applied to the 2017 Basic GI Ultimate ANB table to create the 2017 Loaded GI Ultimate ANB table, subject to the results being no less than the 2017 CSO Ultimate ANB table, thereby grading mortality rates to 1.0 by age 120.
- The 2017 Loaded GI Ultimate ANB table was converted to ALB to create the 2017 Loaded GI Ultimate ALB table, subject to the results being no less than the 2017 CSO Ultimate ALB table, thereby grading mortality rates to 1.0 by age 120.
  - The following formula was used to create ALB rates for both the 2017 GI Ultimate table and the 2017 CSO table: $_{ALB}q_x = (_{ANB}q_x + (1-_{ANB}q_x)*_{ANB}q_{x+1}) / (2 - _{ANB}q_x)$.
- 2017 CSO Ultimate rates superseded 2017 Loaded GI Ultimate rates for male ages 108 to 120 and female ages 109 to 120, for ANB and ALB.

The Loaded and Basic (unloaded), ALB and ANB ultimate tables, mentioned above, can be found in Appendix C.

The following graph illustrates the 2017 Loaded GI Ultimate ALB rates:



3.5 Additional Monotonicity Checks

The monotonicity checks were rerun for the 2017 Loaded GI Ultimate table with the following results: Rates were flat from age 0 to age 10 and then monotonically decreased to age 32, after which rates monotonically increased to age 120, with a minor exception for female ages 47 to 53. As this was in line with expectations, no further adjustments were made.

3.6 Loaded Gender-Blended Mortality Tables

The GI Subgroup developed gender-blended tables for the loaded version of the table only. The following approach was used to develop the gender-blended loaded mortality rates from the gender-specific loaded mortality rates:

- Gender-blended rates for Y% male and (100 – Y)% female were calculated as a simple weighted average of male and female rates.
- The gender-blended rate for age x was set equal to the male rate for age x times Y% plus the female rate for age x times (100 – Y)%, i.e., ${}_{GB}q_x = Y\% * {}_{male}q_x + (100 - Y)\% * {}_{female}q_x$.

The following gender-blended versions of the 2017 Loaded GI Ultimate ALB and ANB tables were developed. Loaded ALB tables are shown in Appendix D and loaded ANB tables can be found in Appendix E.

- 100% Male, 0% Female (i.e., Male)
- 80% Male, 20% Female
- 60% Male, 40% Female
- 50% Male, 50% Female
- 40% Male, 60% Female

- 20% Male, 80% Female
- 0% Male, 100% Female (i.e., Female)

3.7 Model Office Reserves and Graph

The GI Subgroup constructed a model office which was used to compare reserves based on four tables:

- 2001 CSO Ultimate;
- 2017 CSO Ultimate;
- 2017 GI Ultimate, and
- 2017 GI Select and Ultimate (S&U)

The GI tables have much higher mortality than the CSO tables, so net premiums will be higher. When using mean reserves as a basis for comparison, the effect of the increase in net premiums is overstated since there is a corresponding increase in the offsetting deferred premium asset for non-annual mode business that is not reflected. Accordingly, reserves were compared both on a mean reserve basis and using mid-terminal reserves plus unearned net premium. Results using mid-terminal reserves plus unearned premiums are equivalent to mean reserves offset by the deferred premium asset.

Reserves were projected for 45 years using a single year of issue with a distribution by issue age group and sex from the study data, persistency from the study as developed by LIMRA, and reserves determined using the 2017 Loaded GI Composite Ultimate ALB table, the 2017 Loaded GI S&U Composite ALB table, the 2001 CSO Ultimate ALB table and the 2017 CSO Ultimate ALB table.

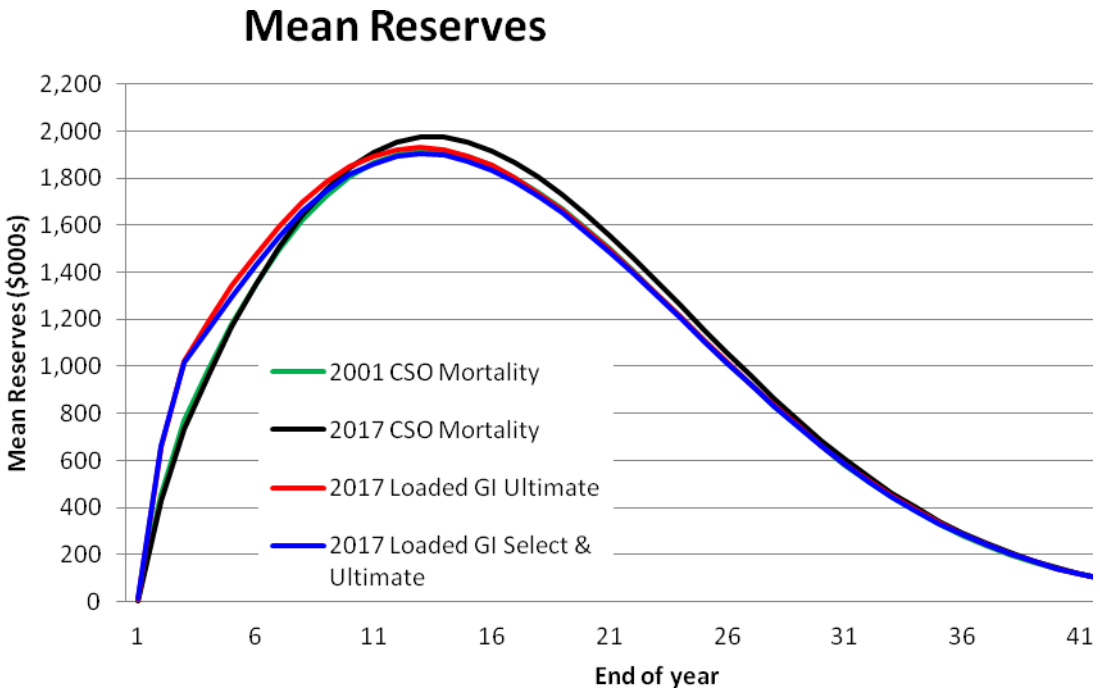
The results for mean reserves were:

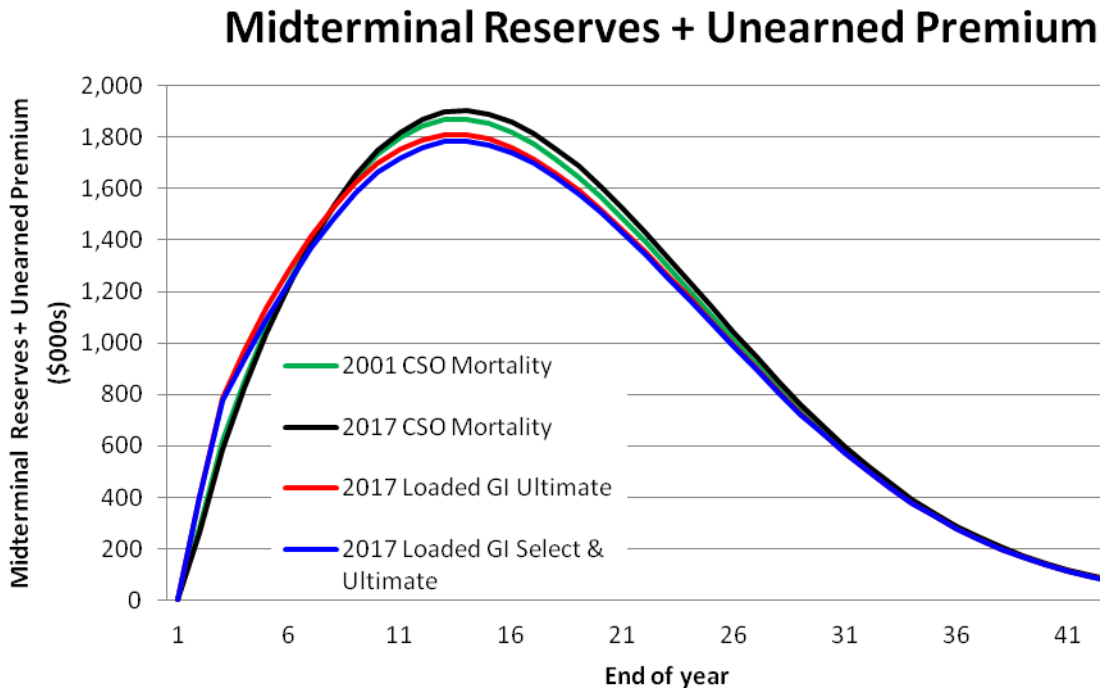
- The 2017 Loaded GI Ultimate table produced the highest mean reserves through duration 10.
- The 2017 Loaded GI S&U table produced the second highest mean reserves through duration 10.
- After duration 10, the 2017 CSO produced the highest reserves; the 2001 CSO and two GI tables all had similar reserve levels.

Using mid-terminal reserves plus unearned premiums with a distribution of business by premium mode consistent with the submitted data, the results were:

- The 2017 Loaded GI Ultimate table produced the highest mid-terminal reserves through year 7 and the 2017 Loaded GI S&U table was also higher than the 2001 CSO and 2017 CSO.
- The 2017 CSO Ultimate table produced the highest mid-terminal reserves thereafter, slightly exceeding reserves on the 2001 CSO, with reserves using the 2017 CSO ranging from 4% to 6% higher than reserves on the 2017 Loaded GI Ultimate table.

The following graphs show comparisons of mean reserves and mid-terminal reserves with unearned premiums.





Appendix A. 2017 Basic Guaranteed Issue, Select and Ultimate, Composite Male Mortality Table, ALB

	Duration:					Ultimate	Attained
Issue Age	1	2	3	4	5	6+	Age
0	0.05694	0.05284	0.04908	0.04778	0.04586	0.04172	5
1	0.05694	0.05284	0.04908	0.04778	0.04586	0.04027	6
2	0.05694	0.05284	0.04908	0.04778	0.04426	0.03809	7
3	0.05694	0.05284	0.04908	0.04612	0.04187	0.03756	8
4	0.05694	0.05284	0.04737	0.04363	0.04129	0.03754	9
5	0.05694	0.05099	0.04481	0.04302	0.04127	0.03724	10
6	0.05496	0.04824	0.04419	0.04300	0.04093	0.03702	11
7	0.05199	0.04757	0.04417	0.04265	0.04070	0.03544	12
8	0.05127	0.04755	0.04381	0.04240	0.03896	0.03364	13
9	0.05124	0.04716	0.04356	0.04059	0.03698	0.03185	14
10	0.05082	0.04689	0.04170	0.03853	0.03501	0.03011	15
11	0.05053	0.04488	0.03958	0.03647	0.03310	0.02841	16
12	0.04837	0.04261	0.03747	0.03448	0.03123	0.02671	17
13	0.04592	0.04033	0.03542	0.03254	0.02936	0.02501	18
14	0.04347	0.03813	0.03342	0.03059	0.02749	0.02331	19
15	0.04109	0.03598	0.03142	0.02864	0.02562	0.02161	20
16	0.03877	0.03382	0.02942	0.02669	0.02375	0.02003	21
17	0.03645	0.03167	0.02742	0.02474	0.02202	0.01927	22
18	0.03413	0.02952	0.02542	0.02294	0.02118	0.01850	23
19	0.03181	0.02736	0.02357	0.02207	0.02033	0.01773	24
20	0.02949	0.02537	0.02267	0.02119	0.01949	0.01696	25
21	0.02734	0.02440	0.02176	0.02031	0.01865	0.01619	26
22	0.02629	0.02343	0.02086	0.01943	0.01780	0.01543	27
23	0.02525	0.02245	0.01996	0.01855	0.01696	0.01505	28
24	0.02420	0.02148	0.01905	0.01767	0.01654	0.01493	29
25	0.02315	0.02051	0.01815	0.01723	0.01641	0.01481	30
26	0.02210	0.01954	0.01770	0.01709	0.01627	0.01468	31
27	0.02105	0.01905	0.01756	0.01696	0.01614	0.01456	32
28	0.02054	0.01890	0.01742	0.01682	0.01601	0.01486	33
29	0.02037	0.01875	0.01728	0.01668	0.01633	0.01533	34
30	0.02021	0.01860	0.01713	0.01702	0.01685	0.01579	35
31	0.02004	0.01844	0.01748	0.01755	0.01736	0.01626	36
32	0.01988	0.01882	0.01803	0.01809	0.01788	0.01673	37
33	0.02028	0.01941	0.01858	0.01863	0.01839	0.01742	38
34	0.02092	0.02000	0.01913	0.01916	0.01915	0.01818	39
35	0.02156	0.02060	0.01968	0.01995	0.01998	0.01893	40
36	0.02220	0.02119	0.02049	0.02082	0.02081	0.01969	41
37	0.02284	0.02206	0.02138	0.02169	0.02165	0.02045	42
38	0.02377	0.02302	0.02228	0.02256	0.02248	0.02127	43
39	0.02481	0.02398	0.02317	0.02342	0.02339	0.02212	44
40	0.02584	0.02494	0.02406	0.02436	0.02432	0.02297	45
41	0.02688	0.02590	0.02503	0.02533	0.02525	0.02381	46
42	0.02791	0.02694	0.02602	0.02630	0.02618	0.02466	47
43	0.02903	0.02801	0.02702	0.02728	0.02711	0.02604	48
44	0.03019	0.02909	0.02802	0.02825	0.02862	0.02757	49
45	0.03135	0.03016	0.02901	0.02982	0.03031	0.02911	50
46	0.03250	0.03123	0.03063	0.03158	0.03200	0.03065	51
47	0.03366	0.03298	0.03244	0.03334	0.03369	0.03218	52
48	0.03554	0.03492	0.03425	0.03510	0.03538	0.03307	53
49	0.03763	0.03687	0.03605	0.03686	0.03635	0.03371	54
50	0.03973	0.03881	0.03787	0.03786	0.03706	0.03436	55
51	0.04066	0.03971	0.03869	0.03863	0.03772	0.03492	56
52	0.04160	0.04058	0.03946	0.03932	0.03831	0.03552	57
53	0.04251	0.04139	0.04017	0.03994	0.03884	0.03634	58
54	0.04337	0.04213	0.04080	0.04049	0.03934	0.03716	59
55	0.04414	0.04280	0.04136	0.04101	0.03983	0.03809	60
56	0.04484	0.04339	0.04189	0.04152	0.04035	0.03914	61
57	0.04545	0.04394	0.04241	0.04206	0.04092	0.04032	62
58	0.04604	0.04449	0.04296	0.04266	0.04158	0.04160	63
59	0.04661	0.04507	0.04358	0.04325	0.04236	0.04296	64
60	0.04828	0.04526	0.04415	0.04335	0.04309	0.04440	65

Appendix A. 2017 Basic Guaranteed Issue, Select and Ultimate, Composite Male Mortality Table, ALB (continued)

	Duration:					Ultimate	Attained
Issue Age	1	2	3	4	5	6+	Age
61	0.04831	0.04538	0.04487	0.04414	0.04359	0.04589	66
62	0.04860	0.04572	0.04553	0.04502	0.04430	0.04744	67
63	0.04877	0.04636	0.04621	0.04600	0.04542	0.04910	68
64	0.04969	0.04740	0.04709	0.04706	0.04722	0.05092	69
65	0.05101	0.04888	0.04825	0.04885	0.04935	0.05295	70
66	0.05266	0.05078	0.04990	0.05096	0.05213	0.05527	71
67	0.05459	0.05308	0.05206	0.05352	0.05529	0.05794	72
68	0.05677	0.05570	0.05472	0.05648	0.05871	0.06099	73
69	0.05917	0.05857	0.05780	0.05973	0.06230	0.06446	74
70	0.06174	0.06158	0.06121	0.06320	0.06602	0.06835	75
71	0.06439	0.06464	0.06477	0.06684	0.06987	0.07262	76
72	0.06703	0.06768	0.06837	0.07062	0.07393	0.07726	77
73	0.06968	0.07067	0.07196	0.07461	0.07830	0.08224	78
74	0.07245	0.07369	0.07561	0.07885	0.08304	0.08754	79
75	0.07546	0.07685	0.07942	0.08340	0.08816	0.09318	80
76	0.07877	0.08031	0.08353	0.08828	0.09362	0.09916	81
77	0.08245	0.08426	0.08808	0.09349	0.09933	0.10553	82
78	0.08665	0.08891	0.09320	0.09905	0.10523	0.11235	83
79	0.09162	0.09446	0.09902	0.10501	0.11127	0.11970	84
80	0.09769	0.10103	0.10560	0.11138	0.11741	0.12771	85
81	0.10509	0.10864	0.11292	0.11814	0.12363	0.13650	86
82	0.11396	0.11724	0.12093	0.12527	0.12990	0.14626	87
83	0.12434	0.12674	0.12949	0.13270	0.13620	0.15714	88
84	0.13620	0.13703	0.13848	0.14034	0.14249	0.16935	89
85	0.14952	0.14800	0.14779	0.14811	0.14873	0.18308	90
						0.19641	91
						0.21006	92
						0.22390	93
						0.23779	94
						0.25162	95
						0.26524	96
						0.28363	97
						0.30354	98
						0.32449	99
						0.34598	100
						0.36757	101
						0.38881	102
						0.40927	103
						0.42856	104
						0.44630	105
						0.46213	106
						0.47572	107
						0.48675	108
						0.49493	109
						0.50000	110
						0.50000	111
						0.50000	112
						0.50000	113
						0.50000	114
						0.50000	115
						0.50000	116
						0.50000	117
						0.50000	118
						0.50000	119
						0.50000	120

Appendix B. 2017 Basic Guaranteed Issue, Select and Ultimate, Composite Female Mortality Table, ALB

	Duration:					Ultimate	Attained
Issue Age	1	2	3	4	5	6+	Age
0	0.03989	0.03786	0.03630	0.03494	0.03344	0.02922	5
1	0.03989	0.03786	0.03630	0.03494	0.03344	0.02821	6
2	0.03989	0.03786	0.03630	0.03494	0.03229	0.02668	7
3	0.03989	0.03786	0.03630	0.03373	0.03054	0.02632	8
4	0.03989	0.03786	0.03505	0.03190	0.03013	0.02630	9
5	0.03989	0.03655	0.03314	0.03147	0.03011	0.02608	10
6	0.03851	0.03457	0.03270	0.03145	0.02986	0.02593	11
7	0.03642	0.03410	0.03268	0.03119	0.02968	0.02482	12
8	0.03593	0.03408	0.03241	0.03101	0.02842	0.02356	13
9	0.03591	0.03380	0.03222	0.02969	0.02698	0.02231	14
10	0.03561	0.03360	0.03084	0.02818	0.02554	0.02109	15
11	0.03540	0.03217	0.02928	0.02668	0.02414	0.01990	16
12	0.03389	0.03054	0.02772	0.02522	0.02278	0.01871	17
13	0.03217	0.02890	0.02620	0.02380	0.02141	0.01752	18
14	0.03045	0.02733	0.02472	0.02237	0.02005	0.01632	19
15	0.02879	0.02578	0.02324	0.02095	0.01869	0.01513	20
16	0.02717	0.02424	0.02176	0.01952	0.01732	0.01403	21
17	0.02554	0.02270	0.02028	0.01810	0.01606	0.01349	22
18	0.02391	0.02115	0.01880	0.01678	0.01545	0.01296	23
19	0.02229	0.01961	0.01744	0.01614	0.01483	0.01242	24
20	0.02066	0.01818	0.01677	0.01549	0.01422	0.01188	25
21	0.01916	0.01749	0.01610	0.01485	0.01360	0.01134	26
22	0.01842	0.01679	0.01543	0.01421	0.01298	0.01080	27
23	0.01769	0.01609	0.01476	0.01356	0.01237	0.01054	28
24	0.01695	0.01540	0.01409	0.01292	0.01206	0.01045	29
25	0.01622	0.01470	0.01343	0.01260	0.01197	0.01037	30
26	0.01549	0.01400	0.01309	0.01250	0.01187	0.01029	31
27	0.01475	0.01366	0.01299	0.01240	0.01177	0.01020	32
28	0.01439	0.01355	0.01288	0.01230	0.01168	0.01041	33
29	0.01427	0.01344	0.01278	0.01220	0.01191	0.01074	34
30	0.01416	0.01333	0.01267	0.01245	0.01229	0.01106	35
31	0.01404	0.01322	0.01293	0.01284	0.01266	0.01139	36
32	0.01393	0.01349	0.01334	0.01323	0.01304	0.01172	37
33	0.01421	0.01391	0.01375	0.01362	0.01342	0.01220	38
34	0.01466	0.01434	0.01415	0.01401	0.01396	0.01273	39
35	0.01510	0.01476	0.01456	0.01459	0.01457	0.01326	40
36	0.01555	0.01519	0.01516	0.01522	0.01518	0.01379	41
37	0.01600	0.01581	0.01582	0.01586	0.01579	0.01433	42
38	0.01666	0.01650	0.01648	0.01650	0.01640	0.01490	43
39	0.01738	0.01719	0.01714	0.01713	0.01706	0.01549	44
40	0.01811	0.01787	0.01780	0.01782	0.01774	0.01609	45
41	0.01883	0.01856	0.01851	0.01853	0.01842	0.01668	46
42	0.01956	0.01931	0.01925	0.01924	0.01909	0.01680	47
43	0.02034	0.02008	0.01999	0.01995	0.01924	0.01693	48
44	0.02115	0.02085	0.02073	0.02010	0.01938	0.01706	49
45	0.02196	0.02161	0.02088	0.02025	0.01953	0.01716	50
46	0.02277	0.02184	0.02090	0.02040	0.01964	0.01719	51
47	0.02299	0.02186	0.02102	0.02052	0.01967	0.01727	52
48	0.02301	0.02194	0.02104	0.02055	0.01977	0.01731	53
49	0.02309	0.02198	0.02120	0.02063	0.01982	0.01769	54
50	0.02314	0.02210	0.02121	0.02066	0.02025	0.01822	55
51	0.02329	0.02218	0.02135	0.02070	0.02043	0.01847	56
52	0.02335	0.02227	0.02146	0.02082	0.02071	0.01883	57
53	0.02346	0.02238	0.02149	0.02110	0.02104	0.01923	58
54	0.02358	0.02243	0.02151	0.02144	0.02142	0.01979	59
55	0.02364	0.02248	0.02184	0.02183	0.02185	0.02044	60
56	0.02366	0.02284	0.02224	0.02227	0.02232	0.02119	61
57	0.02404	0.02326	0.02268	0.02275	0.02284	0.02203	62
58	0.02448	0.02372	0.02317	0.02328	0.02342	0.02295	63
59	0.02497	0.02423	0.02371	0.02386	0.02406	0.02394	64
60	0.02537	0.02534	0.02548	0.02555	0.02567	0.02502	65

Appendix B. 2017 Basic Guaranteed Issue, Select and Ultimate, Composite Female Mortality Table, ALB (continued)

	Duration:					Ultimate	Attained
Issue Age	1	2	3	4	5	6+	Age
61	0.02541	0.02557	0.02583	0.02597	0.02622	0.02618	66
62	0.02569	0.02588	0.02624	0.02652	0.02693	0.02743	67
63	0.02620	0.02637	0.02682	0.02731	0.02791	0.02879	68
64	0.02690	0.02712	0.02769	0.02842	0.02925	0.03027	69
65	0.02777	0.02816	0.02893	0.02987	0.03095	0.03190	70
66	0.02882	0.02951	0.03053	0.03164	0.03293	0.03370	71
67	0.03010	0.03114	0.03244	0.03366	0.03512	0.03568	72
68	0.03169	0.03302	0.03456	0.03587	0.03746	0.03787	73
69	0.03360	0.03510	0.03683	0.03823	0.03993	0.04028	74
70	0.03581	0.03732	0.03918	0.04068	0.04258	0.04292	75
71	0.03816	0.03958	0.04158	0.04322	0.04541	0.04580	76
72	0.04050	0.04187	0.04402	0.04588	0.04844	0.04893	77
73	0.04277	0.04421	0.04655	0.04875	0.05166	0.05233	78
74	0.04503	0.04667	0.04926	0.05189	0.05513	0.05605	79
75	0.04744	0.04937	0.05225	0.05537	0.05887	0.06014	80
76	0.05018	0.05243	0.05558	0.05919	0.06296	0.06468	81
77	0.05344	0.05598	0.05936	0.06340	0.06744	0.06976	82
78	0.05737	0.06018	0.06367	0.06803	0.07236	0.07547	83
79	0.06210	0.06513	0.06865	0.07316	0.07776	0.08193	84
80	0.06763	0.07087	0.07439	0.07889	0.08368	0.08925	85
81	0.07388	0.07739	0.08093	0.08532	0.09018	0.09756	86
82	0.08069	0.08456	0.08827	0.09252	0.09733	0.10699	87
83	0.08786	0.09226	0.09635	0.10054	0.10521	0.11765	88
84	0.09517	0.10032	0.10510	0.10944	0.11389	0.12968	89
85	0.10239	0.10862	0.11443	0.11924	0.12347	0.14322	90
						0.15840	91
						0.17460	92
						0.19175	93
						0.20968	94
						0.22824	95
						0.24727	96
						0.27005	97
						0.29400	98
						0.31857	99
						0.34319	100
						0.36738	101
						0.39069	102
						0.41266	103
						0.43292	104
						0.45110	105
						0.46685	106
						0.47988	107
						0.48991	108
						0.49669	109
						0.50000	110
						0.50000	111
						0.50000	112
						0.50000	113
						0.50000	114
						0.50000	115
						0.50000	116
						0.50000	117
						0.50000	118
						0.50000	119
						0.50000	120

	Basic, ALB		Basic, ANB		Loaded, ANB		Loaded, ALB	
	Male	Female	Male	Female	Male	Female	Male	Female
Att. Age	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
0	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05132	0.03594
1	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05132	0.03594
2	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05132	0.03594
3	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05132	0.03594
4	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05132	0.03594
5	0.04172	0.02922	0.04172	0.02922	0.05132	0.03594	0.05089	0.03564
6	0.04027	0.02821	0.04101	0.02872	0.05044	0.03532	0.04936	0.03456
7	0.03809	0.02668	0.03920	0.02745	0.04822	0.03377	0.04740	0.03319
8	0.03756	0.02632	0.03783	0.02650	0.04653	0.03259	0.04637	0.03248
9	0.03754	0.02630	0.03755	0.02631	0.04619	0.03236	0.04610	0.03229
10	0.03724	0.02608	0.03739	0.02619	0.04599	0.03222	0.04584	0.03211
11	0.03702	0.02593	0.03713	0.02601	0.04567	0.03199	0.04514	0.03161
12	0.03544	0.02482	0.03625	0.02538	0.04458	0.03122	0.04357	0.03051
13	0.03364	0.02356	0.03456	0.02420	0.04251	0.02977	0.04143	0.02901
14	0.03185	0.02231	0.03276	0.02294	0.04030	0.02822	0.03923	0.02747
15	0.03011	0.02109	0.03099	0.02170	0.03812	0.02670	0.03708	0.02597
16	0.02841	0.01990	0.02927	0.02050	0.03600	0.02521	0.03498	0.02449
17	0.02671	0.01871	0.02757	0.01931	0.03391	0.02375	0.03288	0.02303
18	0.02501	0.01752	0.02587	0.01812	0.03182	0.02228	0.03079	0.02156
19	0.02331	0.01632	0.02417	0.01693	0.02973	0.02082	0.02870	0.02009
20	0.02161	0.01513	0.02247	0.01573	0.02763	0.01935	0.02663	0.01865
21	0.02003	0.01403	0.02083	0.01459	0.02560	0.01793	0.02488	0.01742
22	0.01927	0.01349	0.01965	0.01377	0.02413	0.01690	0.02366	0.01657
23	0.01850	0.01296	0.01889	0.01323	0.02317	0.01623	0.02270	0.01589
24	0.01773	0.01242	0.01812	0.01269	0.02221	0.01556	0.02174	0.01522
25	0.01696	0.01188	0.01735	0.01215	0.02125	0.01488	0.02078	0.01455
26	0.01619	0.01134	0.01658	0.01161	0.02029	0.01421	0.01982	0.01388
27	0.01543	0.01080	0.01581	0.01108	0.01934	0.01354	0.01898	0.01329
28	0.01505	0.01054	0.01524	0.01067	0.01862	0.01304	0.01846	0.01293
29	0.01493	0.01045	0.01499	0.01050	0.01829	0.01281	0.01821	0.01276
30	0.01481	0.01037	0.01487	0.01041	0.01813	0.01270	0.01805	0.01264
31	0.01468	0.01029	0.01475	0.01033	0.01797	0.01259	0.01789	0.01253
32	0.01456	0.01020	0.01462	0.01024	0.01781	0.01247	0.01785	0.01250
33	0.01486	0.01041	0.01471	0.01030	0.01790	0.01254	0.01812	0.01269
34	0.01533	0.01074	0.01509	0.01057	0.01835	0.01285	0.01862	0.01304
35	0.01579	0.01106	0.01556	0.01090	0.01890	0.01324	0.01917	0.01343
36	0.01626	0.01139	0.01603	0.01123	0.01945	0.01362	0.01972	0.01382
37	0.01673	0.01172	0.01650	0.01155	0.02000	0.01401	0.02034	0.01425
38	0.01742	0.01220	0.01707	0.01196	0.02068	0.01449	0.02111	0.01478
39	0.01818	0.01273	0.01779	0.01246	0.02154	0.01509	0.02198	0.01540
40	0.01893	0.01326	0.01855	0.01299	0.02244	0.01572	0.02288	0.01603
41	0.01969	0.01379	0.01931	0.01353	0.02334	0.01635	0.02378	0.01666
42	0.02045	0.01433	0.02007	0.01406	0.02423	0.01697	0.02469	0.01730
43	0.02127	0.01490	0.02086	0.01461	0.02516	0.01763	0.02565	0.01797
44	0.02212	0.01549	0.02169	0.01519	0.02615	0.01832	0.02664	0.01866
45	0.02297	0.01609	0.02254	0.01579	0.02715	0.01901	0.02764	0.01936
46	0.02381	0.01668	0.02339	0.01638	0.02814	0.01971	0.02863	0.01992
47	0.02466	0.01680	0.02423	0.01674	0.02914	0.02013	0.02978	0.02020
48	0.02604	0.01693	0.02534	0.01687	0.03044	0.02026	0.03129	0.02033
49	0.02757	0.01706	0.02680	0.01699	0.03216	0.02040	0.03306	0.02046
50	0.02911	0.01716	0.02833	0.01711	0.03398	0.02052	0.03487	0.02055
51	0.03065	0.01719	0.02987	0.01717	0.03579	0.02058	0.03667	0.02060
52	0.03218	0.01727	0.03140	0.01723	0.03759	0.02063	0.03829	0.02066
53	0.03307	0.01731	0.03262	0.01729	0.03901	0.02069	0.03945	0.02080
54	0.03371	0.01769	0.03338	0.01750	0.03990	0.02091	0.04026	0.02117
55	0.03436	0.01822	0.03403	0.01795	0.04064	0.02144	0.04097	0.02166
56	0.03492	0.01847	0.03464	0.01834	0.04132	0.02189	0.04164	0.02206
57	0.03552	0.01883	0.03521	0.01865	0.04198	0.02223	0.04237	0.02244
58	0.03634	0.01923	0.03592	0.01903	0.04279	0.02266	0.04324	0.02294
59	0.03716	0.01979	0.03674	0.01951	0.04372	0.02321	0.04421	0.02356
60	0.03809	0.02044	0.03762	0.02011	0.04473	0.02391	0.04528	0.02431

Appendix C. 2017 Guaranteed Issue Composite Ultimate Mortality Tables (continued)

	Basic, ALB		Basic, ANB		Loaded, ANB		Loaded, ALB	
Att. Age	Male Rate	Female Rate	Male Rate	Female Rate	Male Rate	Female Rate	Male Rate	Female Rate
61	0.03914	0.02119	0.03860	0.02081	0.04586	0.02472	0.04649	0.02518
62	0.04032	0.02203	0.03972	0.02161	0.04714	0.02564	0.04783	0.02615
63	0.04160	0.02295	0.04095	0.02248	0.04856	0.02667	0.04930	0.02721
64	0.04296	0.02394	0.04227	0.02344	0.05008	0.02777	0.05087	0.02836
65	0.04440	0.02502	0.04366	0.02447	0.05169	0.02897	0.05251	0.02961
66	0.04589	0.02618	0.04513	0.02559	0.05338	0.03027	0.05423	0.03096
67	0.04744	0.02743	0.04665	0.02680	0.05513	0.03167	0.05602	0.03241
68	0.04910	0.02879	0.04825	0.02810	0.05697	0.03318	0.05794	0.03399
69	0.05092	0.03027	0.04999	0.02952	0.05897	0.03483	0.06005	0.03571
70	0.05295	0.03190	0.05191	0.03107	0.06119	0.03663	0.06240	0.03760
71	0.05527	0.03370	0.05408	0.03279	0.06369	0.03861	0.06508	0.03968
72	0.05794	0.03568	0.05657	0.03467	0.06656	0.04080	0.06815	0.04198
73	0.06099	0.03787	0.05942	0.03676	0.06986	0.04321	0.07167	0.04451
74	0.06446	0.04028	0.06267	0.03905	0.07362	0.04587	0.07566	0.04730
75	0.06835	0.04292	0.06634	0.04157	0.07786	0.04879	0.08012	0.05035
76	0.07262	0.04580	0.07041	0.04433	0.08256	0.05198	0.08502	0.05367
77	0.07726	0.04893	0.07485	0.04733	0.08770	0.05545	0.09034	0.05728
78	0.08224	0.05233	0.07965	0.05059	0.09323	0.05922	0.09605	0.06120
79	0.08754	0.05605	0.08478	0.05414	0.09915	0.06332	0.10213	0.06549
80	0.09318	0.06014	0.09023	0.05804	0.10543	0.06782	0.10858	0.07021
81	0.09916	0.06468	0.09602	0.06234	0.11211	0.07278	0.11544	0.07544
82	0.10553	0.06976	0.10218	0.06714	0.11919	0.07831	0.12272	0.08128
83	0.11235	0.07547	0.10875	0.07251	0.12674	0.08451	0.13052	0.08784
84	0.11970	0.08193	0.11581	0.07857	0.13484	0.09149	0.13891	0.09525
85	0.12771	0.08925	0.12345	0.08543	0.14362	0.09939	0.14804	0.10363
86	0.13650	0.09756	0.13181	0.09321	0.15320	0.10834	0.15805	0.11313
87	0.14626	0.10699	0.14102	0.10203	0.16377	0.11849	0.16912	0.12387
88	0.15714	0.11765	0.15127	0.11202	0.17552	0.12998	0.18145	0.13600
89	0.16935	0.12968	0.16272	0.12329	0.18864	0.14293	0.19524	0.14965
90	0.18308	0.14322	0.17558	0.13598	0.20337	0.15750	0.21021	0.16497
91	0.19641	0.15840	0.18907	0.15022	0.21880	0.17384	0.22552	0.18192
92	0.21006	0.17460	0.20249	0.16580	0.23412	0.19170	0.24088	0.20017
93	0.22390	0.19175	0.21617	0.18235	0.24971	0.21065	0.25644	0.21943
94	0.23779	0.20968	0.22997	0.19976	0.26542	0.23056	0.27206	0.23955
95	0.25162	0.22824	0.24377	0.21788	0.28110	0.25124	0.28758	0.26034
96	0.26524	0.24727	0.25745	0.23653	0.29660	0.27251	0.30390	0.28235
97	0.28363	0.27005	0.27303	0.25705	0.31427	0.29589	0.32301	0.30676
98	0.30354	0.29400	0.29194	0.28015	0.33574	0.32219	0.34489	0.33322
99	0.32449	0.31857	0.31214	0.30417	0.35865	0.34949	0.36796	0.36040
100	0.34598	0.34319	0.33315	0.32854	0.38246	0.37717	0.39085	0.38688
101	0.36757	0.36738	0.35452	0.35278	0.40444	0.40246	0.41250	0.41153
102	0.38881	0.39069	0.37580	0.37641	0.42602	0.42672	0.43357	0.43501
103	0.40927	0.41266	0.39657	0.39901	0.44673	0.44947	0.45363	0.45686
104	0.42856	0.43292	0.41643	0.42016	0.46611	0.47029	0.47226	0.47669
105	0.44630	0.45110	0.43501	0.43950	0.48378	0.48878	0.48909	0.49413
106	0.46213	0.46685	0.45194	0.45668	0.49937	0.50461	0.50376	0.50887
107	0.47572	0.47988	0.46689	0.47138	0.51253	0.51747	0.51846	0.52060
108	0.48675	0.48991	0.47952	0.48331	0.53061	0.52710	0.53981	0.53589
109	0.49493	0.49669	0.48953	0.49220	0.55939	0.55448	0.56867	0.56389
110	0.50000	0.50000	0.49663	0.49780	0.58972	0.58502	0.59903	0.59447
111	0.50000	0.50000	0.50000	0.50000	0.62170	0.61724	0.63096	0.62665
112	0.50000	0.50000	0.50000	0.50000	0.65542	0.65123	0.66453	0.66051
113	0.50000	0.50000	0.50000	0.50000	0.69096	0.68710	0.69981	0.69612
114	0.50000	0.50000	0.50000	0.50000	0.72843	0.72494	0.73687	0.73355
115	0.50000	0.50000	0.50000	0.50000	0.76794	0.76487	0.77578	0.77289
116	0.50000	0.50000	0.50000	0.50000	0.80958	0.80699	0.81660	0.81418
117	0.50000	0.50000	0.50000	0.50000	0.85348	0.85143	0.85940	0.85750
118	0.50000	0.50000	0.50000	0.50000	0.89977	0.89833	0.90421	0.90290
119	0.50000	0.50000	0.50000	0.50000	0.94856	0.94780	0.95108	0.95039
120	0.50000	0.50000	0.50000	0.50000	1.00000	1.00000	1.00000	1.00000

Appendix D. 2017 Loaded Guaranteed Issue Composite, Ultimate, Gender Blended Mortality Tables, ALB

Male %:	100%	80%	60%	50%	40%	20%	0%
Female %:	0%	20%	40%	50%	60%	80%	100%
Att. Age	Rate	Rate	Rate	Rate	Rate	Rate	Rate
0	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
1	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
2	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
3	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
4	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
5	0.05089	0.04784	0.04479	0.04326	0.04174	0.03869	0.03564
6	0.04936	0.04640	0.04344	0.04196	0.04048	0.03752	0.03456
7	0.04740	0.04456	0.04171	0.04029	0.03887	0.03603	0.03319
8	0.04637	0.04359	0.04081	0.03942	0.03803	0.03526	0.03248
9	0.04610	0.04333	0.04057	0.03919	0.03781	0.03505	0.03229
10	0.04584	0.04309	0.04034	0.03897	0.03760	0.03485	0.03211
11	0.04514	0.04243	0.03973	0.03838	0.03702	0.03432	0.03161
12	0.04357	0.04096	0.03834	0.03704	0.03573	0.03312	0.03051
13	0.04143	0.03894	0.03646	0.03522	0.03397	0.03149	0.02901
14	0.03923	0.03688	0.03453	0.03335	0.03217	0.02982	0.02747
15	0.03708	0.03486	0.03264	0.03152	0.03041	0.02819	0.02597
16	0.03498	0.03288	0.03078	0.02973	0.02869	0.02659	0.02449
17	0.03288	0.03091	0.02894	0.02795	0.02697	0.02500	0.02303
18	0.03079	0.02894	0.02710	0.02617	0.02525	0.02341	0.02156
19	0.02870	0.02697	0.02525	0.02439	0.02353	0.02181	0.02009
20	0.02663	0.02503	0.02344	0.02264	0.02184	0.02024	0.01865
21	0.02488	0.02338	0.02189	0.02115	0.02040	0.01891	0.01742
22	0.02366	0.02224	0.02082	0.02011	0.01940	0.01799	0.01657
23	0.02270	0.02134	0.01998	0.01930	0.01862	0.01726	0.01589
24	0.02174	0.02043	0.01913	0.01848	0.01783	0.01653	0.01522
25	0.02078	0.01953	0.01829	0.01766	0.01704	0.01580	0.01455
26	0.01982	0.01863	0.01744	0.01685	0.01626	0.01507	0.01388
27	0.01898	0.01784	0.01671	0.01614	0.01557	0.01443	0.01329
28	0.01846	0.01735	0.01625	0.01569	0.01514	0.01403	0.01293
29	0.01821	0.01712	0.01603	0.01549	0.01494	0.01385	0.01276
30	0.01805	0.01697	0.01589	0.01535	0.01481	0.01373	0.01264
31	0.01789	0.01682	0.01575	0.01521	0.01467	0.01360	0.01253
32	0.01785	0.01678	0.01571	0.01518	0.01464	0.01357	0.01250
33	0.01812	0.01703	0.01595	0.01541	0.01486	0.01378	0.01269
34	0.01862	0.01750	0.01639	0.01583	0.01527	0.01416	0.01304
35	0.01917	0.01802	0.01687	0.01630	0.01573	0.01458	0.01343
36	0.01972	0.01854	0.01736	0.01677	0.01618	0.01500	0.01382
37	0.02034	0.01912	0.01790	0.01729	0.01668	0.01547	0.01425
38	0.02111	0.01984	0.01858	0.01795	0.01731	0.01605	0.01478
39	0.02198	0.02067	0.01935	0.01869	0.01803	0.01672	0.01540
40	0.02288	0.02151	0.02014	0.01946	0.01877	0.01740	0.01603
41	0.02378	0.02236	0.02093	0.02022	0.01951	0.01808	0.01666
42	0.02469	0.02321	0.02174	0.02100	0.02026	0.01878	0.01730
43	0.02565	0.02411	0.02258	0.02181	0.02104	0.01950	0.01797
44	0.02664	0.02504	0.02345	0.02265	0.02185	0.02026	0.01866
45	0.02764	0.02598	0.02433	0.02350	0.02267	0.02102	0.01936
46	0.02863	0.02689	0.02515	0.02428	0.02340	0.02166	0.01992
47	0.02978	0.02786	0.02595	0.02499	0.02403	0.02211	0.02020
48	0.03129	0.02910	0.02691	0.02581	0.02471	0.02252	0.02033
49	0.03306	0.03054	0.02802	0.02676	0.02550	0.02298	0.02046
50	0.03487	0.03200	0.02914	0.02771	0.02627	0.02341	0.02055
51	0.03667	0.03346	0.03024	0.02864	0.02703	0.02382	0.02060
52	0.03829	0.03476	0.03124	0.02947	0.02771	0.02418	0.02066
53	0.03945	0.03572	0.03199	0.03012	0.02826	0.02453	0.02080
54	0.04026	0.03644	0.03263	0.03072	0.02881	0.02499	0.02117
55	0.04097	0.03711	0.03325	0.03132	0.02938	0.02552	0.02166
56	0.04164	0.03773	0.03381	0.03185	0.02989	0.02597	0.02206
57	0.04237	0.03839	0.03440	0.03241	0.03042	0.02643	0.02244
58	0.04324	0.03918	0.03512	0.03309	0.03106	0.02700	0.02294
59	0.04421	0.04008	0.03595	0.03389	0.03182	0.02769	0.02356
60	0.04528	0.04109	0.03689	0.03480	0.03270	0.02851	0.02431

Appendix D. 2017 Loaded Guaranteed Issue Composite, Ultimate, Gender Blended Mortality Tables, ALB (continued)

Male %:	100%	80%	60%	50%	40%	20%	0%
Female %:	0%	20%	40%	50%	60%	80%	100%
Att. Age	Rate	Rate	Rate	Rate	Rate	Rate	Rate
61	0.04649	0.04223	0.03796	0.03583	0.03370	0.02944	0.02518
62	0.04783	0.04350	0.03916	0.03699	0.03482	0.03049	0.02615
63	0.04930	0.04488	0.04047	0.03826	0.03605	0.03163	0.02721
64	0.05087	0.04637	0.04187	0.03962	0.03737	0.03287	0.02836
65	0.05251	0.04793	0.04335	0.04106	0.03877	0.03419	0.02961
66	0.05423	0.04958	0.04492	0.04259	0.04027	0.03561	0.03096
67	0.05602	0.05130	0.04658	0.04422	0.04186	0.03714	0.03241
68	0.05794	0.05315	0.04836	0.04597	0.04357	0.03878	0.03399
69	0.06005	0.05518	0.05031	0.04788	0.04544	0.04058	0.03571
70	0.06240	0.05744	0.05248	0.05000	0.04752	0.04256	0.03760
71	0.06508	0.06000	0.05492	0.05238	0.04984	0.04476	0.03968
72	0.06815	0.06292	0.05768	0.05507	0.05245	0.04722	0.04198
73	0.07167	0.06624	0.06081	0.05809	0.05538	0.04994	0.04451
74	0.07566	0.06998	0.06431	0.06148	0.05864	0.05297	0.04730
75	0.08012	0.07416	0.06821	0.06523	0.06225	0.05630	0.05035
76	0.08502	0.07875	0.07248	0.06934	0.06621	0.05994	0.05367
77	0.09034	0.08373	0.07711	0.07381	0.07050	0.06389	0.05728
78	0.09605	0.08908	0.08211	0.07863	0.07514	0.06817	0.06120
79	0.10213	0.09480	0.08747	0.08381	0.08015	0.07282	0.06549
80	0.10858	0.10091	0.09323	0.08940	0.08556	0.07789	0.07021
81	0.11544	0.10744	0.09944	0.09544	0.09144	0.08344	0.07544
82	0.12272	0.11444	0.10615	0.10200	0.09786	0.08957	0.08128
83	0.13052	0.12198	0.11345	0.10918	0.10491	0.09638	0.08784
84	0.13891	0.13018	0.12145	0.11708	0.11272	0.10398	0.09525
85	0.14804	0.13916	0.13028	0.12584	0.12140	0.11251	0.10363
86	0.15805	0.14907	0.14008	0.13559	0.13110	0.12211	0.11313
87	0.16912	0.16007	0.15102	0.14650	0.14197	0.13292	0.12387
88	0.18145	0.17236	0.16327	0.15873	0.15418	0.14509	0.13600
89	0.19524	0.18612	0.17700	0.17244	0.16789	0.15877	0.14965
90	0.21021	0.20116	0.19211	0.18759	0.18307	0.17402	0.16497
91	0.22552	0.21680	0.20808	0.20372	0.19936	0.19064	0.18192
92	0.24088	0.23274	0.22460	0.22053	0.21646	0.20831	0.20017
93	0.25644	0.24904	0.24164	0.23794	0.23424	0.22683	0.21943
94	0.27206	0.26556	0.25906	0.25580	0.25255	0.24605	0.23955
95	0.28758	0.28214	0.27669	0.27396	0.27124	0.26579	0.26034
96	0.30390	0.29959	0.29528	0.29313	0.29097	0.28666	0.28235
97	0.32301	0.31976	0.31651	0.31488	0.31326	0.31001	0.30676
98	0.34489	0.34255	0.34022	0.33905	0.33789	0.33555	0.33322
99	0.36796	0.36644	0.36493	0.36418	0.36342	0.36191	0.36040
100	0.39085	0.39006	0.38926	0.38886	0.38847	0.38767	0.38688
101	0.41250	0.41230	0.41211	0.41201	0.41192	0.41173	0.41153
102	0.43357	0.43386	0.43415	0.43429	0.43443	0.43472	0.43501
103	0.45363	0.45428	0.45492	0.45525	0.45557	0.45622	0.45686
104	0.47226	0.47315	0.47403	0.47448	0.47492	0.47580	0.47669
105	0.48909	0.49010	0.49111	0.49161	0.49212	0.49312	0.49413
106	0.50376	0.50478	0.50580	0.50632	0.50683	0.50785	0.50887
107	0.51846	0.51889	0.51932	0.51953	0.51975	0.52017	0.52060
108	0.53981	0.53903	0.53824	0.53785	0.53746	0.53667	0.53589
109	0.56867	0.56771	0.56676	0.56628	0.56580	0.56485	0.56389
110	0.59903	0.59812	0.59721	0.59675	0.59629	0.59538	0.59447
111	0.63096	0.63010	0.62924	0.62881	0.62837	0.62751	0.62665
112	0.66453	0.66373	0.66292	0.66252	0.66212	0.66131	0.66051
113	0.69981	0.69907	0.69833	0.69797	0.69760	0.69686	0.69612
114	0.73687	0.73621	0.73554	0.73521	0.73488	0.73422	0.73355
115	0.77578	0.77520	0.77463	0.77434	0.77405	0.77347	0.77289
116	0.81660	0.81612	0.81563	0.81539	0.81515	0.81466	0.81418
117	0.85940	0.85902	0.85864	0.85845	0.85826	0.85788	0.85750
118	0.90421	0.90395	0.90369	0.90356	0.90342	0.90316	0.90290
119	0.95108	0.95094	0.95080	0.95074	0.95067	0.95053	0.95039
120	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Appendix E. 2017 Loaded Guaranteed Issue Composite, Ultimate, Gender Blended Mortality Tables, ANB

Male %:	100%	80%	60%	50%	40%	20%	0%
Female %:	0%	20%	40%	50%	60%	80%	100%
Att. Age	Rate	Rate	Rate	Rate	Rate	Rate	Rate
0	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
1	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
2	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
3	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
4	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
5	0.05132	0.04824	0.04516	0.04363	0.04209	0.03901	0.03594
6	0.05044	0.04742	0.04439	0.04288	0.04137	0.03835	0.03532
7	0.04822	0.04533	0.04244	0.04099	0.03955	0.03666	0.03377
8	0.04653	0.04375	0.04096	0.03956	0.03817	0.03538	0.03259
9	0.04619	0.04343	0.04066	0.03928	0.03789	0.03513	0.03236
10	0.04599	0.04324	0.04048	0.03911	0.03773	0.03497	0.03222
11	0.04567	0.04294	0.04020	0.03883	0.03746	0.03473	0.03199
12	0.04458	0.04191	0.03924	0.03790	0.03657	0.03389	0.03122
13	0.04251	0.03996	0.03741	0.03614	0.03486	0.03232	0.02977
14	0.04030	0.03788	0.03547	0.03426	0.03305	0.03064	0.02822
15	0.03812	0.03584	0.03355	0.03241	0.03127	0.02898	0.02670
16	0.03600	0.03385	0.03169	0.03061	0.02953	0.02737	0.02521
17	0.03391	0.03188	0.02985	0.02883	0.02781	0.02578	0.02375
18	0.03182	0.02991	0.02800	0.02705	0.02610	0.02419	0.02228
19	0.02973	0.02794	0.02616	0.02527	0.02438	0.02260	0.02082
20	0.02763	0.02598	0.02432	0.02349	0.02266	0.02101	0.01935
21	0.02560	0.02406	0.02253	0.02176	0.02100	0.01946	0.01793
22	0.02413	0.02269	0.02124	0.02052	0.01980	0.01835	0.01690
23	0.02317	0.02178	0.02039	0.01970	0.01901	0.01762	0.01623
24	0.02221	0.02088	0.01955	0.01888	0.01822	0.01689	0.01556
25	0.02125	0.01998	0.01870	0.01807	0.01743	0.01616	0.01488
26	0.02029	0.01908	0.01786	0.01725	0.01665	0.01543	0.01421
27	0.01934	0.01818	0.01702	0.01644	0.01586	0.01470	0.01354
28	0.01862	0.01750	0.01639	0.01583	0.01527	0.01416	0.01304
29	0.01829	0.01720	0.01610	0.01555	0.01501	0.01391	0.01281
30	0.01813	0.01705	0.01596	0.01542	0.01487	0.01379	0.01270
31	0.01797	0.01689	0.01582	0.01528	0.01474	0.01366	0.01259
32	0.01781	0.01674	0.01567	0.01514	0.01461	0.01354	0.01247
33	0.01790	0.01683	0.01575	0.01522	0.01468	0.01361	0.01254
34	0.01835	0.01725	0.01615	0.01560	0.01505	0.01395	0.01285
35	0.01890	0.01777	0.01663	0.01607	0.01550	0.01437	0.01324
36	0.01945	0.01829	0.01712	0.01654	0.01595	0.01479	0.01362
37	0.02000	0.01880	0.01761	0.01701	0.01641	0.01521	0.01401
38	0.02068	0.01944	0.01820	0.01758	0.01697	0.01573	0.01449
39	0.02154	0.02025	0.01896	0.01831	0.01767	0.01638	0.01509
40	0.02244	0.02109	0.01975	0.01908	0.01841	0.01706	0.01572
41	0.02334	0.02194	0.02054	0.01984	0.01914	0.01774	0.01635
42	0.02423	0.02278	0.02133	0.02060	0.01988	0.01843	0.01697
43	0.02516	0.02366	0.02215	0.02140	0.02064	0.01913	0.01763
44	0.02615	0.02458	0.02302	0.02223	0.02145	0.01988	0.01832
45	0.02715	0.02552	0.02389	0.02308	0.02227	0.02064	0.01901
46	0.02814	0.02646	0.02477	0.02393	0.02308	0.02140	0.01971
47	0.02914	0.02733	0.02553	0.02463	0.02373	0.02193	0.02013
48	0.03044	0.02841	0.02637	0.02535	0.02434	0.02230	0.02026
49	0.03216	0.02981	0.02746	0.02628	0.02510	0.02275	0.02040
50	0.03398	0.03128	0.02859	0.02725	0.02590	0.02321	0.02052
51	0.03579	0.03274	0.02970	0.02818	0.02666	0.02362	0.02058
52	0.03759	0.03420	0.03081	0.02911	0.02741	0.02402	0.02063
53	0.03901	0.03535	0.03168	0.02985	0.02802	0.02435	0.02069
54	0.03990	0.03610	0.03231	0.03041	0.02851	0.02471	0.02091
55	0.04064	0.03680	0.03296	0.03104	0.02912	0.02528	0.02144
56	0.04132	0.03744	0.03355	0.03160	0.02966	0.02577	0.02189
57	0.04198	0.03803	0.03408	0.03210	0.03013	0.02618	0.02223
58	0.04279	0.03876	0.03474	0.03272	0.03071	0.02669	0.02266
59	0.04372	0.03962	0.03552	0.03347	0.03142	0.02732	0.02321
60	0.04473	0.04056	0.03640	0.03432	0.03224	0.02808	0.02391

Appendix E. 2017 Loaded Guaranteed Issue Composite, Ultimate, Gender Blended Mortality Tables, ANB (continued)

Male %:	100%	80%	60%	50%	40%	20%	0%
Female %:	0%	20%	40%	50%	60%	80%	100%
Att. Age	Rate	Rate	Rate	Rate	Rate	Rate	Rate
61	0.04586	0.04163	0.03741	0.03529	0.03318	0.02895	0.02472
62	0.04714	0.04284	0.03854	0.03639	0.03424	0.02994	0.02564
63	0.04856	0.04418	0.03980	0.03761	0.03542	0.03104	0.02667
64	0.05008	0.04562	0.04116	0.03893	0.03670	0.03223	0.02777
65	0.05169	0.04715	0.04261	0.04033	0.03806	0.03352	0.02897
66	0.05338	0.04876	0.04414	0.04183	0.03952	0.03489	0.03027
67	0.05513	0.05044	0.04574	0.04340	0.04105	0.03636	0.03167
68	0.05697	0.05221	0.04746	0.04508	0.04270	0.03794	0.03318
69	0.05897	0.05414	0.04931	0.04690	0.04449	0.03966	0.03483
70	0.06119	0.05628	0.05136	0.04891	0.04645	0.04154	0.03663
71	0.06369	0.05867	0.05366	0.05115	0.04864	0.04363	0.03861
72	0.06656	0.06141	0.05626	0.05368	0.05110	0.04595	0.04080
73	0.06986	0.06453	0.05920	0.05654	0.05387	0.04854	0.04321
74	0.07362	0.06807	0.06252	0.05974	0.05697	0.05142	0.04587
75	0.07786	0.07205	0.06623	0.06332	0.06042	0.05460	0.04879
76	0.08256	0.07645	0.07033	0.06727	0.06421	0.05810	0.05198
77	0.08770	0.08125	0.07480	0.07157	0.06835	0.06190	0.05545
78	0.09323	0.08643	0.07963	0.07622	0.07282	0.06602	0.05922
79	0.09915	0.09198	0.08482	0.08123	0.07765	0.07048	0.06332
80	0.10543	0.09791	0.09039	0.08662	0.08286	0.07534	0.06782
81	0.11211	0.10424	0.09638	0.09244	0.08851	0.08065	0.07278
82	0.11919	0.11101	0.10284	0.09875	0.09466	0.08649	0.07831
83	0.12674	0.11829	0.10985	0.10562	0.10140	0.09295	0.08451
84	0.13484	0.12617	0.11750	0.11317	0.10883	0.10016	0.09149
85	0.14362	0.13477	0.12593	0.12151	0.11708	0.10824	0.09939
86	0.15320	0.14423	0.13526	0.13077	0.12629	0.11732	0.10834
87	0.16377	0.15472	0.14566	0.14113	0.13661	0.12755	0.11849
88	0.17552	0.16641	0.15730	0.15275	0.14819	0.13908	0.12998
89	0.18864	0.17950	0.17036	0.16578	0.16121	0.15207	0.14293
90	0.20337	0.19419	0.18502	0.18043	0.17585	0.16667	0.15750
91	0.21880	0.20981	0.20082	0.19632	0.19183	0.18284	0.17384
92	0.23412	0.22564	0.21715	0.21291	0.20867	0.20019	0.19170
93	0.24971	0.24190	0.23409	0.23018	0.22627	0.21846	0.21065
94	0.26542	0.25845	0.25147	0.24799	0.24450	0.23753	0.23056
95	0.28110	0.27513	0.26915	0.26617	0.26318	0.25721	0.25124
96	0.29660	0.29179	0.28697	0.28456	0.28215	0.27733	0.27251
97	0.31427	0.31060	0.30692	0.30508	0.30324	0.29956	0.29589
98	0.33574	0.33303	0.33032	0.32897	0.32761	0.32490	0.32219
99	0.35865	0.35682	0.35499	0.35407	0.35316	0.35133	0.34949
100	0.38246	0.38140	0.38034	0.37981	0.37929	0.37823	0.37717
101	0.40444	0.40404	0.40365	0.40345	0.40325	0.40286	0.40246
102	0.42602	0.42616	0.42630	0.42637	0.42644	0.42658	0.42672
103	0.44673	0.44728	0.44783	0.44810	0.44837	0.44892	0.44947
104	0.46611	0.46695	0.46778	0.46820	0.46862	0.46945	0.47029
105	0.48378	0.48478	0.48578	0.48628	0.48678	0.48778	0.48878
106	0.49937	0.50042	0.50147	0.50199	0.50251	0.50356	0.50461
107	0.51253	0.51352	0.51451	0.51500	0.51550	0.51648	0.51747
108	0.53061	0.52991	0.52921	0.52885	0.52850	0.52780	0.52710
109	0.55939	0.55841	0.55743	0.55694	0.55644	0.55546	0.55448
110	0.58972	0.58878	0.58784	0.58737	0.58690	0.58596	0.58502
111	0.62170	0.62081	0.61992	0.61947	0.61902	0.61813	0.61724
112	0.65542	0.65458	0.65374	0.65333	0.65291	0.65207	0.65123
113	0.69096	0.69019	0.68942	0.68903	0.68864	0.68787	0.68710
114	0.72843	0.72773	0.72703	0.72669	0.72634	0.72564	0.72494
115	0.76794	0.76733	0.76671	0.76641	0.76610	0.76548	0.76487
116	0.80958	0.80906	0.80854	0.80829	0.80803	0.80751	0.80699
117	0.85348	0.85307	0.85266	0.85246	0.85225	0.85184	0.85143
118	0.89977	0.89948	0.89919	0.89905	0.89891	0.89862	0.89833
119	0.94856	0.94841	0.94826	0.94818	0.94810	0.94795	0.94780
120	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000