

Life and Health Actuarial Task Force Amendment Proposal Form*

1. Identify yourself, your affiliation and a very brief description (title) of the issue.

Dave Neve, chairperson, American Academy of Actuaries Life Reserves Work Group.
Simplified approach for determining prudent estimate mortality assumption for VM-20.

2. Identify the document, including the date if the document is “released for comment,” and the location in the document where the amendment is proposed:

VM-20: Requirements for Principle-based Reserves for Life Products, Draft dated 10/6/2011, Section 9C

3. Show what changes are needed by providing a red-line version of the original verbiage with deletions and identify the verbiage to be deleted, inserted or changed by providing a red-line (turn on “track changes” in Word®) version of the verbiage. (You may do this through an attachment.)

See attached document, which is a marked up version of the earlier LRWG proposal submitted to LAFT at the NAIC Spring National Meeting in New Orleans.

4. State the reason for the proposed amendment? (You may do this through an attachment.)

This reflects the comments and suggested changes discussed during recent LATF VM-20 calls, which include:

1. Changing the definition of the number of claims by duration that is used to determine the length of the sufficient data period. It is now based on the aggregate number of claims in the experience study, not the number of claims per exposure year.
2. Defining the number of claims that determine the length of the sufficient date period to be 50 claims.
3. Changing the range of the number of permitted exposure years in the company mortality study from 3-10 years to 3-7 years.
4. Defining two sets of prescribed mortality margin percentages. The first to apply to the company experience mortality rates that vary by the level of credibility, and the second to the applicable industry basic tables.

The recommended margin percentages for the company experience rates that vary by credibility were developed referencing the 1998 paper “A Credibility Approach to Mortality Risk” by Hardy and Panjer that was based on Canadian data. This same approach could be followed using the same U.S. industry data used to create the 2014 VBT tables to make it more relevant to PBR in the United States. The basic approach uses the idea that the standard error is related to $1/Z$ where Z is the credibility level. The factors to determine the percentages by credibility came from relating the standard error estimates in table 1 on page 277 of the paper to 1 divided by the credibility level. As stated in the paper, the results are consistent with the Canadian margins of 3.75-15 divided by life expectancy but the incidence by duration is different. (Note that the range that the paper came up with for margins was from 4% to 12% and the credibility ranged from .94 to .29.) Our recommendation is definitely consistent with this range. This is a rough, preliminary estimate, and we recommend that a more thorough analysis be done to update these factors as part of the development of the 2014 VBT tables before VM-20 becomes effective.

The recommended margin percentages for the applicable industry basic tables were developed using an analysis of the degree of company variation around the mean of company contributors to the 2008 VBT work. These recommended margins will be reevaluated along with the construction of the 2014 VBT.

5. The blending of company experience rates with the applicable industry table will now be done **after margins** have been added, rather than adding margins **after blending**. This is because separate margins are applied to the company experience rates and to the applicable industry basic table.
6. Changing the age at which the company experience must grade to the industry table from age 95 to age 100.

This is justified by the fact that with the recent submissions of data to the SOA there is ample evidence that some companies have sufficient data at these ages to develop mortality rates based on insured data.

The margin section was moved before the description of the grading process, since the margins are now applied to the company experience rates and the applicable industry table before grading is done. Also, the process to determine the level of credibility was moved to a new separate subsection (new subsection 9.C.4), since the level of credibility is now being used in two places (to determine the margins for company experience rates, and to determine the length of the grading period). It didn't make sense to leave this credibility section buried in the section that described the grading process.

* This form is not intended for minor corrections, such as formatting, grammar, cross-references or spelling. Those types of changes do not require action by the entire group and may be submitted via letter or email to the NAIC staff support person for the NAIC group where the document originated.

NAIC Staff Comments:

Dates: Received	Reviewed by Staff	Distributed	Considered
Notes:			

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Section 9. Assumptions

C. Mortality Assumptions

1. Procedure for Setting Prudent Estimate Mortality Assumptions

- a. The company shall determine mortality segments for the purpose of determining separate prudent estimate mortality assumptions for groups of policies that the company expects will have different mortality experience than other groups of policies (such as male vs. female, smoker vs. non-smoker, preferred vs. super-preferred vs. residual, etc.).
- b. For each mortality segment, the company shall establish prudent estimate mortality assumptions using the following procedure:
 - i. Determine the company experience mortality rates as provided in subsection 9.C.2. If company experience data is limited or not available, the company can use an applicable industry mortality table in lieu of company experience as provided in subsection 9.C.3.
 - ii. If the company determines company experience mortality rates as provided in subsection 9.C.2., then use the procedure described in subsection 9.C.3 to determine the applicable industry table for each mortality segment to grade company experience to the industry table.
 - iii. Determine the level of credibility of the underlying company experience as provided in subsection 9.C.4.
 - iv. Determine the prescribed mortality margins as provided in subsection 9.C.5. Separate mortality margins are determined for company experience mortality rates and for the applicable industry basic tables.
 - v. Use the procedure described in subsection 9.C.64 to determine the prudent estimate ~~anticipated experience~~ assumptions.
 - ~~iv. Determine the mortality margin as provided in subsection 9.C.5~~
 - ~~v. Set the prudent estimate mortality assumption equal to the anticipated experience assumptions increased by the margin determined in subsection 9.C.5.~~

2. Determination of Company Experience Mortality Rates

- a. For each mortality segment, the company shall determine company experience mortality rates derived from company experience data. If company experience data is not available or limited, the company can choose to use an applicable industry mortality table in lieu of its own company experience, as provided in subsection 9.C.3.
- b. Company experience data shall be based on experience in the following order of priority from the following sources:
 - i. Actual company experience for book of business within the mortality segment.
 - ii. Experience from other books of business within the company with similar underwriting.
 - iii. Experience data from other sources, if available and appropriate such as actual experience data of one or more mortality pools in which the policies participate under the term of a reinsurance agreement. Data from other sources is appropriate if the source has

underwriting and expected mortality experience characteristics that are similar to policies in the mortality segment.

- c. The company experience mortality rates shall not be lower than the mortality rates the company expects to emerge which the company can justify, and which are disclosed in the PBR Actuarial Report.
- d. When determining the company experience mortality rates for each mortality segment, the company can base the mortality on more aggregate experience and use other techniques to further sub-divide the aggregate class into various sub-classes or mortality segments (e.g., start with aggregate non-smoker then use the conservation of total deaths principle, normalization or other approach to divide the aggregate mortality into super preferred, preferred and residual standard non-smoker class assumptions). In doing so, company must ensure that when the mortality segments are weighted together, the total number of expected claims is not less than the company experience data for the aggregate class.
- e. The company shall review, and update as needed, the company experience data described in subsection 9.C.2.b, whether based on actual experience or data from other sources, at least every three years. If updated experience becomes available prior to the end of three years since the last review or update, which alters the company's expected mortality for the mortality segments in a significant manner and such impact is expected to continue into the future, the company shall reflect the changes implied by the updated data in the current year.
 - i. The company experience data for each mortality segment shall include the most recent experience study and shall include the in force and claim data pertaining to the study period for all policies currently in the mortality segment or that would have been in the mortality segment at any time during the period over which experience is being evaluated.
 - ii. The period of time used for the experience study data should be at least three exposure years and should not exceed seventen exposure years.
- f. The company may remove from the company experience data any policies for which the experience is reflected through adjustments to the prudent estimate anticipated experience assumptions as provided under subsection 9.C.64.e below, including policies insuring impaired lives and those for which there is a reasonable expectation, due to conditions such as changes in premiums or other policy provisions, that policyholder behavior will lead to mortality results that vary significantly from those that would otherwise be expected.
- g. The company may adjust the company experience rates for each mortality segment to reflect the expected incremental change due to the adoption of risk selection and underwriting practices different from those underlying the company experience data identified above, provided that:
 - i. The adjustments are supported by published medical or clinical studies or other published studies which correlate a specific risk selection criteria to mortality or longevity experience (for example, criterion and correlations determined through predictive analytics); and
 - ii. The rationale and support for the use of the study and for the adjustments are disclosed in the PBR Actuarial Report.

Guidance Note: It is anticipated that the adjustment described in 9.C.2.g will rarely be made. Since these adjustments are expected to be rare, and since it is difficult to anticipate the nature of these adjustments, the commissioner may wish to determine the level of documentation or analysis that is required to allow such adjustments. The NAIC may want to consider whether approval by a centralized examination office would be an acceptable alternative to approval by the commissioner.

- h. Mortality improvement shall not be incorporated beyond the valuation date. However, historical mortality improvement from the central point of the underlying company experience data to the valuation date may be incorporated.
3. Determination of Applicable Industry Basic Tables
- a. The industry basic table shall be based on the 2008 VBT table, including the Primary, Limited Underwriting and RR Table forms. The industry table used should be based on the table form that most appropriately reflects the risk characteristics of the respective mortality segment.

Guidance Note: Paragraph 9.C.3.a. will need to be revised every time the industry table is updated.

- b. A modified industry basic table is permitted in a limited number of situations where an industry basic table does not appropriately reflect the expected mortality experience, such as joint life mortality, simplified underwriting, substandard or rated lives. In cases other than modification of the table to reflect joint life mortality, the modification must not result in mortality rates lower than those in the industry table without approval by the Commissioner.
- c. The company may apply the underwriting criteria scoring procedure described in Subparagraph d below to determine:
 - i. The industry basic table that can serve as the industry experience rates when company experience data is limited or not available.
 - ii. The applicable industry basic table for grading company experience mortality to industry experience mortality using the grading method described in subsection 9.C.64.b.iiiv.
- d. The underwriting criteria scoring procedure is the algorithm described in pages 8 to 27 of the Interim 2007 Report of the Society of Actuaries and American Academy of Actuaries Joint Preferred Mortality Project and embedded in the Underwriting Criteria Score Calculator which is maintained on the Society of Actuaries web site, <http://www.soa.org/research/individual-life/2008-score-calc.aspx>.
 - i. In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for a particular mortality segment, the company shall take into account factors that are not recognized in the underwriting scoring algorithm but which are applicable to policies that are issued in that mortality segment.

Guidance Note: Examples of such factors include the number of underwriting exceptions that are made, the quality and experience level of the underwriters, and characteristics of the distribution system. For example, if a company deviates from its preferred criteria on a regular basis, then it needs to take that into consideration since the underwriting criteria scoring procedure is not designed to quantify that risk.
 - ii. In using the underwriting criteria scoring procedure to determine the appropriate industry basic table for policies that are issued subject to simplified underwriting and policies that are issued without underwriting, the company shall take into account factors not recognized in the underwriting scoring algorithm but which are applicable to such policies.
 - iii. In taking into account factors that are not recognized in the underwriting scoring algorithm, a company may, to the extent it can justify, adjust the industry basic tables up or down two tables from that determined by application of the underwriting criteria scoring procedures. Further adjustments to reflect risk characteristics not captured within the underwriting criteria scoring tool may be allowed upon approval by the Commissioner.
- e. As an alternative to the Underwriting Criteria Scoring Tool, the company may use other actuarially sound methods to determine the applicable basic tables related to subdivisions of

mortality segments. The company shall document the analysis performed to demonstrate the applicability of the chosen method and resulting choice in tables and reasons why the results using the Underwriting Criteria Scoring Tool may not be suitable.

Guidance Note: For example, the company may determine a more all inclusive basic table as a table appropriate for the whole mortality segment (appropriately modified by the removal of classified lives, term conversions or any other legitimately excludable class) and then subdivide that segment using actuarially sound methods including but not limited to the UCS

- f. If no industry basic table appropriately reflects the risk characteristics of the mortality segment, the company may use any well-established industry table that is based on the experience of policies having the appropriate risk characteristics in lieu of an industry basic table.

Guidance Note: Subsection 9.C.3.f above is intended to provide flexibility needed to handle products based on group-type mortality, etc., for which there might not be an industry basic table.

- g. Mortality improvement shall not be incorporated beyond the valuation date. However, historical mortality improvement from the date of the industry basic table (e.g., 2008 for the 2008 VBT) to the valuation date may be incorporated using the improvement factors for the applicable industry table as determined by [the SOA] and published [name location where published].

Guidance Note: The improvement factors for the industry mortality table will be determined by the SOA.

Guidance Note: The start date for the improvement factors to be applied to the industry basic tables differs from that used for determining company experience mortality rates as described in Subsection 9.C.2.h as the industry basic tables have already been improved from the mid-point of the exposure period of the data underlying the table to the start date of the table, e.g., the 2008 VBT has already been improved from the mid-point of the underlying data supporting the table to 2008.

d. Credibility of Company Experience

- a. Determine an aggregate level of credibility over the entire exposure sufficient data period ~~(the sufficient data period is defined in Subsection 9.C.4.a.ii. above)~~, using a methodology to determine the level of credibility that follows common actuarial practice as published in actuarial literature (for example but not limited to the Limited Fluctuation Method or Panjer method).
- b. Credibility may be determined at either the mortality segment level or -at a more aggregate level if the mortality for the sub-classes (mortality segments) was determined using an aggregate level of mortality experience.
- c. A single level of credibility shall be determined over the entire exposure sufficient data period, rather than for each duration within the exposure sufficient data period. This overall level of credibility will be used to:
 - i. Determine the prescribed margin for company experience mortality rates.
 - ii. Determine the grading period (shown in column (1) in table in Subsection 9.C.64.iii) for grading company experience mortality rates into the applicable industry basic table.

5. Prescribed Mortality Margins

- a. Separate prescribed margins will be added to company experience mortality rates, and to the applicable industry basic tables. The mortality margin shall be in the form of a prescribed percentage increase applied to each mortality rate.

- b. The prescribed margin percentages for the company experience mortality rates will vary by attained age and by the level of credibility of the underlying company experience, based on the level of credibility determined in subsection 9.C.4. The percentages are as follows:

<u>att age</u>	<u>Credibility Level</u>				
	<u>0-19%</u>	<u>20-39%</u>	<u>40-59%</u>	<u>60-79%</u>	<u>80-100%</u>
<u><45</u>	<u>21%</u>	<u>13.7%</u>	<u>8.4%</u>	<u>6.3%</u>	<u>5.3%</u>
<u>46-47</u>	<u>20%</u>	<u>13.0%</u>	<u>8.0%</u>	<u>6.0%</u>	<u>5.0%</u>
<u>48-49</u>	<u>19%</u>	<u>12.4%</u>	<u>7.6%</u>	<u>5.7%</u>	<u>4.8%</u>
<u>50-51</u>	<u>18%</u>	<u>11.7%</u>	<u>7.2%</u>	<u>5.4%</u>	<u>4.5%</u>
<u>52-53</u>	<u>17%</u>	<u>11.1%</u>	<u>6.8%</u>	<u>5.1%</u>	<u>4.3%</u>
<u>54-55</u>	<u>16%</u>	<u>10.4%</u>	<u>6.4%</u>	<u>4.8%</u>	<u>4.0%</u>
<u>56-57</u>	<u>15%</u>	<u>9.8%</u>	<u>6.0%</u>	<u>4.5%</u>	<u>3.8%</u>
<u>58-59</u>	<u>14%</u>	<u>9.1%</u>	<u>5.6%</u>	<u>4.2%</u>	<u>3.5%</u>
<u>60-61</u>	<u>13%</u>	<u>8.5%</u>	<u>5.2%</u>	<u>3.9%</u>	<u>3.3%</u>
<u>62-63</u>	<u>12%</u>	<u>7.8%</u>	<u>4.8%</u>	<u>3.6%</u>	<u>3.0%</u>
<u>64-68</u>	<u>11%</u>	<u>7.2%</u>	<u>4.4%</u>	<u>3.3%</u>	<u>2.8%</u>
<u>69-76</u>	<u>10%</u>	<u>6.5%</u>	<u>4.0%</u>	<u>3.0%</u>	<u>2.5%</u>
<u>77+</u>	<u>9%</u>	<u>5.9%</u>	<u>3.6%</u>	<u>2.7%</u>	<u>2.3%</u>

- c. The prescribed margin percentages for the applicable industry basic tables will vary by attained age and are as follows:

<u>att age</u>	
<u><45</u>	<u>21%</u>
<u>46-47</u>	<u>20%</u>
<u>48-49</u>	<u>19%</u>
<u>50-51</u>	<u>18%</u>
<u>52-53</u>	<u>17%</u>
<u>54-55</u>	<u>16%</u>
<u>56-57</u>	<u>15%</u>
<u>58-59</u>	<u>14%</u>
<u>60-61</u>	<u>13%</u>
<u>62-63</u>	<u>12%</u>
<u>64-68</u>	<u>11%</u>
<u>69-76</u>	<u>10%</u>
<u>77+</u>	<u>9%</u>

~~**Drafting Note:** The margin percentages need to be determined.~~

- d. The prescribed margin percentages shall be increased, as appropriate, to reflect the level of uncertainty related to situations, including but not limited to, the following:
- i. The reliability of the company's experience studies is low due to imprecise methodology, length of time since the data was updated or other reasons.
 - ii. The longer the time since the experience data was updated.

- iii. The underwriting or risk selection risk criteria associated with the mortality segment have changed since the experience on which the company experience mortality rates are based was collected.
- iv. The data underlying the company experience mortality rates lack homogeneity.
- v. Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.
- vi. Changes to the company's marketing or administrative practices or market forces expose the policies to the risk of anti-selection.

Guidance Note: For example, the secondary market for life insurance policies

- vii. Underwriting is less effective than expected.

6. Process to Determine ~~Prudent Estimate Anticipated Experience~~ Assumptions.

- a. If applicable industry basic tables are used in lieu of company experience, the prudent estimate ~~anticipated experience~~ assumptions for each mortality segment shall equal the respective mortality rates in the applicable industry mortality tables as provided in subsection 9.C.3. plus the ~~prescribed margin as provided in subsection 9.C.5.c~~
- b. If the company determines company experience mortality rates, the prudent estimate ~~anticipated experience~~ assumptions will be determined as follows:
 - i. For each mortality segment, use the company experience mortality rates (as defined in Subsection 9.C.2) for policy durations in which there exists sufficient company experience data (as defined below in paragraph ii.) plus the prescribed margin as provided in subsection 9.C.5.b
 - ii. The company shall determine the sufficient data period by identifying the last policy duration at which sufficient company experience data exists (using all the sources defined in Subsection 9.C.2.b). This period ends at the last policy duration which has ~~a minimum of 50[X] or more claims per year of exposure period~~ (e.g., ~~no duration beyond this point has 50 claims or more if the exposure period is 5 years, the last policy duration at which the total # claims is greater than X times 5~~). The sufficient data period may be determined at a more aggregate level than the mortality segment if the company based its mortality on aggregate experience and then used a methodology to sub-divide the aggregate class into various sub-classes or mortality segments.

Drafting Guidance Note: ~~Need to determine the number of claims for this purpose. The objective idea is to use last duration at which there are 50[X] or more claims per year; not the first duration in which there are less than 50[X] claims per year. Alternatively, could use amount of exposure or possibly the level of credibility rather than number of claims.~~

- iii. Beginning in the policy duration at which sufficient company experience data no longer exists, use the guidelines in the table below to linearly grade from the company experience mortality rates with margins to 100% of the applicable industry table with margins (the determination of the applicable industry table is described in Section 9.C.3). Grading must begin and end no later than the policy durations shown in the table below, based on the level of credibility of the data, as provided in subsection 9.C.4, over the entire sufficient data period.

- A. The number of years for data to be considered sufficient is equal to the length of ~~the sufficient~~ the sufficient data period (defined in paragraph ii. above) but no greater than the number of years in column (2).
- B. Grading must begin no later than the number of years in column (3) after the duration when sufficient data no longer exists (as defined in paragraph (A) above).
- C. Grading to 100% of the industry table must be completed no later than the number of years in column (4) after the duration when sufficient data no longer exists (as defined in paragraph (A) above).

(1)	(2)	(3)	(4)
Credibility of company data over sufficient data period	Maximum # of years for data to be considered sufficient	Maximum # of years in which to begin grading after sufficient data no longer exists	Maximum # of years in which the assumption must grade to 100% of an applicable industry table (from the duration where sufficient data no longer exists)
0-19%	10	2	10
20-39%	20	4	15
40-59%	30	6	18
60-79%	40	8	20
80-100%	50	10	25

- iv. Notwithstanding the guidelines in paragraph ~~iii~~ iv. above, the company must grade into 100% of the applicable industry table mortality with margins by the later of attained age ~~{10095}~~ or 15 years after policy underwriting.
- c. Smoothing may be utilized within each mortality segment to ensure that an appropriate relationship exists by attained age within each mortality segment.
- d. The company may adjust the resulting mortality rates within each mortality segment to ensure the resulting prudent estimate anticipated assumptions produce a reasonable relationship with assumptions in other mortality segments that reflects the underwriting class or risk class of each mortality segment. Such adjustments must be done in a manner that does not result in a material change in total expected claims for all mortality segments in the aggregate.
- e. Adjust the prudent estimate anticipated experience mortality assumptions to reflect differences associated with impaired lives, and differences due to policyholder behavior if there is a reasonable expectation that due to conditions such as changes in premiums or other policy provisions, policyholder behavior will lead to mortality results that vary from the mortality results that would otherwise be expected.
 - i. The adjustment for impaired lives shall follow established actuarial practice, including the use of mortality adjustments determined from clinical and other data.
 - ii. The adjustment for policyholder behavior shall follow common actuarial practice, including the use of dynamic adjustments to base mortality

- f. [Anticipated experience assumptions shall be determined by removing the prescribed margin from the prudent estimate assumption determined above.](#) The resulting anticipated experience assumptions must be no lower than the mortality rates that are actually expected to emerge and that the company can justify. The company must disclose this conclusion in the PBR Actuarial Report.