

## 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, chair, American Academy of Actuaries Life Reserves Work Group  
Clarify VM-20 mortality assumption requirements.

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:

Section 9.C. of 10/16/10 VM-20 Exposure Draft

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.

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

To clarify the mortality assumption requirements, particularly:

1. The purpose and definition of “credibility segment” and “mortality segment.”
2. The purpose, definition and use of the “Credibility Factor.”
3. The process to blend company experience with an Industry Basic Table.

\* 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
<b>Notes:</b>			

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## Section 9. Assumptions

### C. Mortality Assumptions

#### 1. Procedure for Setting Prudent Estimate Mortality Assumptions

- a. The company shall determine credibility segments for the purpose of determining which policies will qualify for the simplified method described in subsection 9.C.1.e. The determination of each credibility segment shall be subject to the following:
  - i. Each credibility segment shall consist of policies with similar underwriting methods, such as guaranteed issue, or fully underwritten policies, and mortality experience characteristics.
  - ~~ii.~~ The company may group policies with different plans of insurance into the same credibility segment, if the underwriting method is and mortality experience characteristics are similar for all the policies.

**Guidance Note:** It is anticipated that most companies will define a credibility segment to be a block of policies with similar underwriting rules, such as guaranteed issue, or regularly underwritten policies.

- ~~iii.~~ The company may remove from the credibility segments any policies for which the experience is reflected through adjustments to the prudent estimate mortality rate assumptions under Paragraph f 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.
- b. The company shall determine mortality segments for the purpose of determining separate prudent estimate mortality assumptions for groups of credibility adjusted experience rates and prudent estimate mortality tables by grouping policies within each credibility segment that the company expects will have similar underwriting methods and mortality experience.

**Guidance Note:** It is anticipated that companies will define a separate mortality segment for each different mortality class within a credibility segment. For example, within a credibility segment consisting of all fully underwritten permanent policies, es such as the company might define a separate mortality segment for each combination of male or female, preferred versus or standard, and smoker or versus non-smoker, etc, thus defining eight mortality segments within one credibility segment.

- c. The company shall determine a the credibility data set for each credibility segment. The credibility data set is subject to the following:
  - i. The company shall review the mortality experience of each credibility segment described in subparagraph i and ii above at least once every three years and update as needed.
  - ii. The credibility data set for each credibility segment shall include the most recent three year study as defined in subparagraph i and shall include the in force and claim data pertaining to the study period for all policies currently in the credibility segment or that would have been in the credibility segment at any time during the period over which experience is being evaluated.
  - iii. The period of time used for data should be at least three years and should not exceed ten years.

- iv. The company shall use actual mortality experience directly applicable to the credibility segment, when available.
  - v. The company may use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the credibility segment have underwriting methods ~~and mortality experience characteristics~~ similar to those of the policies in the pool and the aggregate pool data are available to the company.
- d. If the number of deaths within the credibility data set for a credibility segment is at least 30, the company shall establish mortality assumptions for each mortality segment within the credibility segment using experience mortality rates, blended with industry experience as appropriate. The company should use the following procedure:
- i. Select a credibility procedure that meets the following requirements:
    - 1) The credibility procedure is based on a statistical method consistent with accepted actuarial practice.
    - 2) The credibility procedure must be able to:
      - a) ~~blend describes the method by which~~ the company experience data ~~of for~~ a mortality segment with and appropriate industry basic table, based on the credibility of the underlying experience data, and
      - b) determine an aggregate Credibility Factor for the credibility segment as a whole.

~~experience are used to produce credibility adjusted experience rates subject to the following:~~

      - 1) ~~The credibility procedure shall be based on a statistical method consistent with accepted actuarial practice; and~~
      - 3) As the credibility in the experience data set for a mortality segment or for a cell or group of call included in a mortality segment increases, the credibility adjusted experience rates produced by the credibility procedure shall approach the actual experience rates.
  - ii. Use the procedure described in subsection 9.C.2 to determine which of the industry basic tables shall serve as the applicable industry table for that mortality segment required by the selected credibility procedure.
  - iii. Determine the experience mortality rates for each mortality segment as described in subsection 9.C.3.
  - iv. ~~Apply the selected credibility procedure to~~ Determine the credibility adjusted experience rates; as ~~described provided~~ in subsection 9.C.4.3.
  - v. Determine ~~a the~~ Credibility Factor for the credibility segment using the credibility procedure described in subsection 9.C.1.d.i., representing the aggregate level of credibility of the credibility segment as a whole. This Credibility Factor shall be used in conjunction with the method described in subsection 9.C.5 to determine the margin for each mortality segment within the credibility segment.
  - vi. Using the Credibility Factor calculated in subsection 9.C.1.d.v., ~~Determine~~ the margin for each mortality ~~credibility~~ segment as provided in subsection 9.C.4. ~~below using the Credibility Factor determined in subsection 9.C.1.d.v.~~

- vii. Set the prudent estimate mortality assumption [for each mortality segment](#) equal to the credibility adjusted experience rates increased by the margin determined in subsection 9.C.1.d.vi.

In order to determine mortality expectations for the mortality experience of subsets of a credibility segment that were recently subdivided into smaller classes, mortality for the new classes could be determined by using the actual experience from the credibility segment prior to being subdivided and reclassifying policies based on the new criteria used for more recent issues.

Other actuarially sound methods of determining credibility blended mortality expectations are also acceptable.

**Guidance Note:** Based on a Limited Fluctuation Method calculation which sets the standard for full credibility as being within 3% of the true value with 90% probability, assuming a Poisson distribution for the number of deaths and assuming no variation in net amount at risk, the number of deaths required for 10% credibility is 30 and for 20% credibility it is 120. Because the purpose of the credibility criterion is to provide a simple test that would improve the efficiency of the principles-based valuation process by exempting small blocks of business, it may be appropriate to determine the level of deaths that is consistent with this goal by, for example, surveying small companies.

- e. If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall use the following simplified method to determine [the](#) prudent estimate assumption for [each mortality segment within](#) the credibility segment:
  - i. Determine the [anticipated experience mortality assumption for each mortality segment by selecting the](#) applicable industry basic table using the underwriting scoring procedure described in subsection 9.C.2, or by other actuarially sound methods.
  - ii. Set the Credibility Factor for the credibility segment equal to zero.

**Guidance Note:** [The Credibility Factor is determined for the credibility segment as a whole and is then used in determining the margin for each mortality segment within the credibility segment. Thus, if the simplified method is applicable the Credibility Factor will be zero for each mortality segment.](#)

- iii. Determine the margin as provided in subsection 9.C.4.
  - iv. Set the prudent estimate mortality equal to the applicable industry basic table determined in Subparagraph 9.C.1e.i, increased by the margin determined in [subsection 9.C.4subparagraph e.iii above](#).
- f. Adjust the prudent estimate 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 accepted actuarial practice, including the use of dynamic adjustments to base mortality.

## 2. Determination of Applicable Industry Basic Tables

- a. The company may apply the underwriting criteria scoring procedure described in Subparagraph b below to determine:

- i. The industry basic table that can serve as the industry table under the selected credibility procedure for mortality segments within those credibility segments that do not qualify for the simplified method to determine the credibility adjusted experience rates prudent estimate mortality assumptions as described in subsection 9.C.1.d above.
  - ii. The applicable industry basic table for mortality segments within those credibility segments that qualify for the simplified method to determine the anticipated experience prudent estimate mortality assumptions as described in subsection 9.C.1.e above.
- b. 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 adjust the industry basic tables up or down 2 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.

**Drafting Note:** Should the number of tables that could be adjusted equal 2 in subparagraph iii?

- c. 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 credibility 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

- d. 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.2.de 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.

- e. The industry basic table shall be the based on the 2008 VBT table.

3. Determination of Company Experience Mortality Rates (only applicable if the number of deaths within the credibility segment is at least 30).

~~a. For each mortality segment, the company shall determine experience mortality rates based on the experience data set defined in subsection 9.C.3.b.~~

~~b. If the number of deaths within the credibility data set for a credibility segment is less than 30, the company shall set the mortality experience rates equal to the applicable industry table determined in subsection 9.C.1.e.i.~~

~~c. If the number of deaths within the credibility data set for a credibility segment is at least 30~~

~~a. T~~he company shall determine the experience data set used to determine experience mortality rates for each mortality segment as follows:

i. The experience data set shall include, at a minimum, the portion of the credibility data set defined in subsection 9.C.1.c for the class of business.

ii. The company may use actual experience data of one or more mortality pools in which the policies participate under the terms of a reinsurance agreement, provided that the policies in the mortality credibility segment have ~~underwriting and~~ mortality experience characteristics similar to those of the policies in the pool and the aggregate pool data are available to the company.

iii. If actual experience data is not available or has limited credibility, the company may include in the experience data set data from other sources if available and appropriate. Data from other sources is appropriate if the source has underwriting and mortality experience characteristics that are similar to policies in the mortality credibility segment.

iv. The company shall review, and update as needed, the experience mortality described in subsections 9.C.3.c.i, 9.C.3.c.ii and 9.C.3.c.iii, whether based on actual experience or data from other sources, at least every five years; however, whenever updated experience data becomes available, the company shall reflect changes implied by the updated data to the extent such changes are significant and are expected to continue into the future. More frequent updates should result in lower margins under in subsection 9.C.4.

bd. The company may adjust the mortality 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 experience data identified above, provided that:

i. The adjustments are supported by published medical or clinical studies; 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 such adjustments to experience 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 preferable to approval by the commissioner.

4. Process to Blend Company Experience and Industry Basic Table Experience Rates to determine credibility adjusted experience rates (only applicable if -

~~a. If the number of deaths within the credibility data set for a credibility segment is at least 30),:~~

~~a. T~~he company shall determine credibility adjusted experience rates for each mortality segment using:

- i. ~~The~~ the credibility procedure selected in accordance with subsection 9.C.1.d.i. ~~above~~
  - ii. The company experience mortality rates determined in accordance with subsection 9.C.3.
  - iii. The industry basic table or appropriate weighted average of industry basic tables determined in subsection 9.C.2 for the mortality segment or the mortality segments to which the mortality experience cell or cells belong.
- b. ~~The company shall use, in conjunction with the credibility method, the industry basic table or appropriate weighted average of industry basic tables determined in subsection 9.C.2 for the mortality segment or the mortality segments to which the mortality experience cell or cells belong. The credibility adjusted experience rates are the anticipated experience mortality assumptions.~~
  - c. If company experience mortality rates by age and duration only exist for some of the mortality experience cells within a mortality segment, the company shall determine the remainder of the table by grading into an industry mortality table or a modified industry mortality table where the modification is based on the credible experience in the earlier policy years. Such grading must be reasonable and consistent with accepted actuarial practice and shall take into account the level of partial credibility, the trend in actual to expected ratios, the shape and level of the resulting mortality rates, and the reasons for differences in mortality results relative to industry mortality rates such as differences in underwriting, market and other factors.
  - d. The company may reflect mortality improvement only up to the projection start date based on applicable published industry-wide experience in the credibility adjusted experience rates. Any adjustment made shall be for the period from the experience weighted average date underlying the company experience used in the credibility process to the projection start date.

**Drafting Note:** Because mortality improvement beyond the projection start date is not allowed to be reflected in the prudent estimate assumption, then the lack of using mortality improvement is an implicit margin, and should be reated as a margin for the stochastic exclusion ratio test in Section 6.B. and should be included in the disclosure of the total margin (in addition to the explicit margin for mortality defined in Section 9.B).

5. Determination of Mortality Margin

- a. The mortality margin shall be in the form of a percentage increase applied to the Anticipated Experience Assumption.
- b. A mortality margin shall be included for Random Fluctuation Risk and Company Variation Risk.
  - i. Random Fluctuation Risk covers deviations in the mortality experience resulting from periodic variations of the experience from the mean (i.e., random fluctuation from the expected results of credible component of a company's mortality). The margin for random fluctuation risk shall:
    - 1) take into consideration the sophistication of the method used to estimate credibility and the number of years experience modeled, i.e. using the number of claims to determine credibility might or fewer years to measure variation in experience from year to year indicate the need for a greater margin than using a more robust statistical approach or less years to measure variability;
    - 2) be no less than 1% and no greater than 10%; and
    - 3) vary by the size of the credibility factor whereby mortality segments with a lower credibility factor have a load at the higher end of the permitted range.

- ii. Company variation risk covers deviations from a selected industry mortality due to differences in underwriting practices and the demographics of the underlying insured lives. The margin for company variation risk shall:
  - 1) be set to zero for credibility segments in which the credibility factor is 1.00;
  - 2) for credibility segments where the credibility factor is less than 1.00, be equal to the percentages in the American Academy of Actuaries' Mortality Margin Table in Appendix 3.
- c. Within each mortality segment, the mortality margin shall be set equal to the Credibility Factor as determined in subsection 9.C.1.d.4 or subsection 9.C.1.e.ii times the margin for random fluctuation risk determined in Subparagraph 9.C.5.b.i plus (1 - the Credibility Factor) times the margin for company variation risk determined in subsection 9.C.5.b.ii.
- d. This margin 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. The longer the time since the experience data was updated, the larger the margin.
  - ii. The underwriting or risk selection risk criteria associated with the mortality segment have changed since the experience on which the credibility adjusted experience rates are based was collected.
  - iii. The data underlying the credibility adjusted experience rates lack homogeneity.
  - iv. Unfavorable environmental or health developments are unfolding and are expected to have a material and sustained impact on the insured population.
  - v. 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

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- vi. Underwriting is less effective than expected.
- vii. Errors occur.