



AMERICAN ACADEMY *of* ACTUARIES

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May 15, 2019

Modeling (Fourth Exposure)  
Actuarial Standards Board  
1850 M Street NW, Suite 300  
Washington, DC 20036

**Re: Proposed Actuarial Standard of Practice (ASOP) on Modeling**

To Whom It May Concern:

On behalf of the Health Practice Council of the American Academy of Actuaries,<sup>1</sup> I would like to offer comments in response to the Actuarial Standards Board's (ASB) fourth exposure draft of a proposed actuarial standard of practice (ASOP) titled *Modeling*.

1.2 Scope

The first sentence in the fifth paragraph seems unnecessary. We suggest eliminating that sentence and beginning the paragraph with the current third sentence.

2.1 Assumptions

We question whether assumptions are always input to a model. Are there not some models that incorporate assumptions into the model operations or methodology?

2.4 Input

We suggest adding the following sentence after the current sentence: "Input may include assumptions, data, and parameters."

2.11 Overfitting

We suggest a more appropriate statement would substitute the words "may decrease" for the current word "decrease." This seems more appropriate because 3.14 uses the words "should consider."

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<sup>1</sup> The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

### 3.1.3 Understanding the Model

Shouldn't the actuary also understand the appropriate use of the model?

### 3.1.4 Model Structure

Under item d., we question why only overfitting is considered.

One example from an actuarial text, "Healthcare Risk Adjustment and Predictive Modeling," Ian Duncan (2011), describes several characteristics used to assess the quality of a model, including:

1. **Parsimony**—*A model should introduce as few variables as are necessary to produce the desired effects.*
2. **Identifiability**—*If there are more dependent variable than independent equations, then identification issues will result, including bias and more than one set of parameter estimates.*
3. **Goodness of Fit**—*A model is judged to be good if variations in the outcomes variable are explained to a high degree by the explanatory variables.  $R^2$  and other statistics are used to measure goodness of fit.*
4. **Theoretical Consistency**—*The model's results should be consistent with the analyst's a priori knowledge of the relationship between variables.*
5. **Predictive Power**—*The model should predict well when it is applied to data that was not used in building the model.*

Overfitting is just one of many types of error that would result in deteriorating a model's predictive power. We don't see why it was called out specifically, and worry that calling out one issue minimizes the importance of others.

Additionally, it may make sense to move the topic of overfitting or data selection from 3.1.4.d. to 3.1.5 (as these topics are not explicitly covered in ASOP No. 23, *Data Quality*).

General question:

Where does the proposed ASOP address items such as whether the model considers or reflects the latest changes in regulatory environment or other system characteristics?

#### 3.1.6.d. Consistency

We suggest changing the phrase "...possibility of an inconsistency..." to "...potential of an inconsistency..."

#### 3.1.6.e. Assumptions of Input in Current Model Run

We agree with this as written, and ask that there be added (perhaps in another paragraph) that the model itself (not just the input) should be evaluated.

### 3.3 Reliance on Models Developed by Others

We believe that a new sentence should be added after the listing: “The actuary should continually evaluate model results in light of emerging experience to determine that the model is still appropriate for its intended purpose.”

### 3.5.3 Review by Another Professional

We question when it would be appropriate to not obtain such a review and suggest that the word “may” be replaced by “should” or removing the sentence altogether.

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We would welcome the opportunity to speak with you in more detail and answer any questions you have regarding these comments. If you have any questions or would like to discuss further, please contact David Linn, the Academy’s senior health policy analyst, at 202-223-8196 or [linn@actuary.org](mailto:linn@actuary.org).

Sincerely,

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Vice President, Health Practice Council  
American Academy of Actuaries