



ACTUARIAL STANDARDS BOARD

• EXPOSURE DRAFT •

**Proposed Revision of
Actuarial Standard of
Practice No. 25**

Credibility Procedures

**Comment Deadline:
December 31, 2012**

**Developed by the
Credibility Task Force of the
Actuarial Standards Board**

**Approved for Exposure by the
Actuarial Standards Board
September 2012**

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September 2012

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in Credibility Procedures

FROM: Actuarial Standards Board (ASB)

SUBJ: Proposed Revision of Actuarial Standard of Practice (ASOP) No. 25

This document is an exposure draft of a revision of ASOP No. 25 now titled, *Credibility Procedures*.

Please review this exposure draft and give the ASB the benefit of your comments and suggestions. Each written response and each response sent by e-mail to the address below will be acknowledged, and all responses will receive appropriate consideration by the drafting committee in preparing the final document for approval by the ASB.

The ASB accepts comments by either electronic or conventional mail. The preferred form is e-mail, as it eases the task of grouping comments by section. However, please feel free to use either form. If you wish to use e-mail, please send a message to comments@actuary.org. You may include your comments either in the body of the message or as an attachment prepared in any commonly used word processing format. Please do not password-protect any attachments. Include the phrase “ASB COMMENTS” in the subject line of your message. Please note: Any message not containing this exact phrase in the subject line will be deleted by our system’s spam filter.

If you wish to use conventional mail, please send comments to the following address:

ASOP No. 25 Revision
Actuarial Standards Board
1850 M Street, NW, Suite 300
Washington, DC 20036

The ASB posts all signed comments received to its website to facilitate transparency and dialogue. Anonymous comments will not be considered by the ASB nor posted to the website. The comments will not be edited, amended, or truncated in any way. Comments will be posted in the order that they are received. Comments will be removed when final action on a proposed standard is taken. The ASB website is a public website and all comments will be available to the general public. The ASB disclaims any responsibility for the content of the comments, which are solely the responsibility of those who submit them.

Deadline for receipt of responses in the ASB office: **December 31, 2012**

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Background

The purpose of this standard of practice is to provide guidance to actuaries in the selection of a credibility procedure and the assignments of credibility values to sets of data. This standard is applicable to all practice areas.

The original standard, adopted in 1996, was a product of the Health Committee and the Casualty Committee of the ASB. The scope of the standard was limited to accident and health, group term life, and property/casualty coverages.

In 2011, the ASB asked the Life Committee to consider whether the scope of ASOP No. 25 should be expanded to incorporate additional practice areas. The Life Committee agreed that the scope of the ASOP could be expanded. The Board asked that a multi-discipline task force be formed under the direction of the General Committee to begin drafting an exposure draft. A task force was then created that included actuaries from the life, health, pension, and property/casualty practice areas.

Key Changes

This revision of ASOP No. 25 contains the following key changes:

1. The scope section was broadened to include all actuarial services, regardless of the practice area.
2. Throughout the document, “related experience” was replaced with “relevant experience.”
3. In section 3.1, a paragraph was added indicating when credibility procedures are not required.
4. In section 3.2, the original wording, “give consideration to the need to balance responsiveness and stability” was replaced with “are intended to result in blended data that reflect current emerging experience without being unduly influenced by statistical variation.”

Request for Comments

The ASB would appreciate comments on the proposed changes and would like to draw the readers’ attention to the following areas in particular:

1. Does the standard provide the actuary the appropriate analytical framework for exercising professional judgment in regards to credibility under the expanded scope?
2. Is the language in the standard appropriate given that the scope was broadened to actuarial services in all practice areas?

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3. Is the standard sufficiently broad to encompass Bayesian methodologies? If not, how would you change the standard?

The ASB reviewed the draft at the September 2012 board meeting and approved its exposure.

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Credibility Task Force

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The ASB establishes and improves standards of actuarial practice. These ASOPs identify what the actuary should consider, document, and disclose when performing an actuarial assignment. The ASB's goal is to set standards for appropriate practice for the U.S.

ACTUARIAL STANDARD OF PRACTICE NO. 25

CREDIBILITY PROCEDURES

STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date

1.1 Purpose—The purpose of this actuarial standard of practice (ASOP) is to provide guidance to actuaries in selecting credibility procedures and the application of those procedures to sets of data.

1.2 Scope—This standard of practice is applicable to all types of actuarial services involving credibility procedures.

If the actuary departs from the guidance set forth in this standard in order to comply with applicable law (statutes, regulations, and other legally binding authority), or for any other reason the actuary deems appropriate, the actuary should refer to section 4.

1.3 Cross References—When this standard refers to the provisions of other documents, the reference includes the referenced documents as they may be amended or restated in the future, and any successor to them, by whatever name called. If any amended or restated document differs materially from the originally referenced document, the actuary should consider the guidance in this standard to the extent it is applicable and appropriate.

1.4 Effective Date—This standard will be effective with respect to work involving credibility procedures performed on or after four months following adoption by the Actuarial Standards Board.

Section 2. Definitions

The definitions below are defined for use in this actuarial standard of practice.

2.1 Credibility—A measure of the predictive value in a given application that the actuary attaches to a particular set of data (*predictive* is used here in the statistical sense and not in the sense of predicting the future).

2.2 Full Credibility—The level at which the subject experience is assigned full predictive value based on a selected confidence interval.

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- 2.3 Relevant Experience—Sets of data that, in the actuary’s judgment, are predictive of the parameter under study (such as loss ratios, claims, mortality, payment patterns, persistency, or expenses). Relevant experience includes data external to the subject experience.
- 2.4 Risk Characteristics—Measurable or observable factors or characteristics that are used to assign each risk to one of the risk classes of a risk classification system.
- 2.5 Subject Experience—A specific set of data drawn from the experience of the population under consideration used for the purpose of predicting the parameter under study.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Purpose and Use of Credibility Procedures—The purpose of using credibility procedures is to improve the estimate of expected values. Credibility procedures are used to determine when the subject experience has full credibility. If not, credibility procedures are used to blend information from subject experience with relevant experience. Credibility procedures may be used in assumption setting for valuation and modeling, pricing/ratemaking and prospective experience rating, and may be used for other purposes.

In making a determination of when to use credibility procedures, the actuary may decide that it is appropriate to either give full or zero credibility to subject experience.

- 3.2 Selection of Credibility Methodologies—The actuary should be familiar with and consider various credibility methodologies. The methods selected may be different for different practice areas and applications. Additional review may be necessary to satisfy applicable law.

The actuary should select credibility methodologies that accomplish the following:

- a. are expected to produce reasonable results;
 - b. are appropriate for the intended use and purpose;
 - c. are unbiased with respect to the results in any material way;
 - d. are practical to implement; and
 - e. are intended to result in blended data that reflect current experience without being unduly influenced by statistical variation.
- 3.3 Selection of Relevant Experience—The actuary should use care in selecting the relevant experience that is to be blended with the subject experience. Such relevant experience should have population characteristics, coverage characteristics, frequency, severity, or

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other determinable risk characteristics that the actuary expects to be similar to the subject experience. If the proposed relevant experience does not and cannot be adjusted to meet such criteria, it should not be used. The actuary should apply credibility methodologies that appropriately consider the characteristics of both the subject experience and the relevant experience.

The actuary should consider the extent to which subject experience is included in relevant experience. If subject experience data is a material part of relevant experience, the use of that relevant experience may not be appropriate.

- 3.4 Actuarial Judgment—The actuary should exercise professional judgment when using any credibility procedure. The use of credibility procedures is not always a precise mathematical process.
- 3.5 Homogeneity of Data—In carrying out credibility procedures, the actuary should consider the homogeneity of both the subject experience and the relevant experience. Within each set of experience, there may be segments that are not representative of the experience set as a whole. Predictability can sometimes be enhanced by separate treatment of these segments.

Section 4. Communications and Disclosures

- 4.1 Disclosure—Whenever appropriate in the actuary’s professional judgment, the actuary should disclose the credibility procedures used and any material changes from prior credibility procedures. The actuary should also include the following, as applicable, in an actuarial communication:
- a. the disclosure in ASOP No. 41, *Actuarial Communications*, section 4.2, if any material assumption or method was prescribed by applicable law (statutes, regulations, and other legally binding authority);
 - b. the disclosure in ASOP No. 41, section 4.3, if the actuary states reliance on other sources and thereby disclaims responsibility for any material assumption or method selected by a party other than the actuary; and
 - c. the disclosure in ASOP No. 41, section 4.4, if, in the actuary’s professional judgment, the actuary has otherwise deviated materially from the guidance of this ASOP.

Appendix

Background

Note: This appendix is provided for informational purposes and is not part of the standard of practice.

Historical Development

The concept of credibility has been a fundamental part of actuarial practice since the beginning of the profession. Applications of credibility procedures have recognized the traditional concerns regarding the proper balance between responsiveness and stability. Early discussions of credibility tended to focus on estimating mean claim frequency using classical and empirical credibility procedures. The earliest recorded paper on this subject, “How Extensive a Payroll Exposure Is Necessary to Give a Dependable Pure Premium,” was published by Albert H. Mowbray in Volume I of the *Proceedings of the Casualty Actuarial and Statistical Society* (published by the Casualty Actuarial Society in 1914). Later writers have developed formulas for the credibility of claim severity and for the credibility of total losses including Bayesian credibility procedures. Credibility concepts have also been used in other actuarial work.

Current Practices

Classical Credibility Procedures

Classical credibility procedures make assumptions as to the form of the underlying probability distribution. From this probability distribution function, the appropriate number of claims, amount of premium, or other measure of volume is calculated such that the probability that the subject loss experience is within a specified percentage (r) of the expected value is equal to a specified parameter (p). This measure of volume is the full credibility standard.

One such approach that assumes that claims follow a Normal distribution is Limited Fluctuation Credibility. In this approach, the credibility assigned to the subject experience is based on the square root of the ratio of actual claims to the full credibility standard.

Empirical Credibility Procedures

Empirical credibility procedures measure the statistical relationships of the subject experience to its mean and to comparable experience of prior experience periods, without reference to the underlying distribution.

Bayesian Credibility Procedures

Bayesian analysis procedures merge prior distributions representing the statistical information of the relevant experience with the statistical information of the subject experience to produce posterior distributions that reflect both. Bayesian credibility procedures provide a least squares approximation to the mean of the a posteriori distribution that would result from a Bayesian analysis.

One example of the application of Bayesian credibility is Greatest Accuracy Credibility, which is also referred to as linear Bayesian credibility or Bühlmann credibility. In Greatest Accuracy Credibility, partial credibility is assigned to the subject experience using formulas of the form $n/(n+k)$, where n is the volume of subject experience and k is a parameter that may be derived from variances in the subject and relevant experience.

Credibility Bases

The most commonly used bases for determining credibility are numbers or amounts of claims, losses, premiums, and exposures.

Credibility Procedures for Ratemaking/Pricing

The sample size used for full credibility sometimes is based on the variance of an assumed underlying probability distribution. If using an assumed frequency distribution, the actuary usually adjusts the required sample size to recognize variation in claim size or other factors.

Credibility Procedures for Prospective Experience Rating

Prospective experience rating formulas assign credibility to actual experience of a single risk or a group of risks (the subject experience). In some instances, the subject experience may be subdivided into different components, for example, primary and excess losses, with different credibility levels appropriate for each piece.

More Information

Expanded discussion of the use of credibility procedures by actuaries setting assumptions can be found in various publications of the American Academy of Actuaries, the Society of Actuaries, the Casualty Actuarial Society, and other similar actuarial professional organizations.