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November 18, 2021

David Forte
Washington State Office of the Insurance Commissioner
302 Sid Snyder Ave., SW
Olympia, WA 98504
Via E-mail to: Rulescoordinator@oic.wa.gov

Re: R 2021-07 Temporary Prohibition on Use of Credit History on some Personal Lines

Dear Mr. Forte:

My name is Nancy Watkins, and I am a Principal and Consulting Actuary with Milliman, Inc. (Milliman). I¹ have been retained by the National Association of Mutual Insurance Companies (NAMIC) to offer comments on disruptions in credit reporting, for use in connection with a permanent regulation noticed by the Washington Insurance Commissioner (the Commissioner).

I submitted a letter for the rulemaking record on July 30, 2021. Attached to that letter as Appendix A was written testimony on the basics of ratemaking and credit-based insurance scores (CBIS) provided in an affidavit dated June 14, 2021, "Declaration of Nancy Watkins in Support of Petitioner Intervenor National Association of Mutual Insurance Companies' Motion for Summary Judgement."

The purpose of this letter is to provide attachments from Appendix A and update two references from my prior testimony. To the extent it may be considered necessary in light of the October 5, 2021 date on the Notice of Hearing, I reincorporate and refile my previously submitted comments to ensure they are considered as part of the rulemaking record.

Attachments

In the June 14, 2021 declaration, I referenced relevant Actuarial Standards of Practice (ASOPs) and Statements of Principles (SOPs) promulgated by the Actuarial Standards Board (ASB), American Academy of Actuaries (AAA) and Casualty Actuarial Society (CAS), along with references to the links containing these documents. For completeness of the rulemaking record, I have attached the following ASOPs and SOPs to this letter:

- ASOP 1: *Introductory Actuarial Standard of Practice*

¹ Throughout this report, references to "I", "me" or "my" are intended to include Milliman employees working under my direction to assist in this assignment, including internal peer reviewers. The opinions stated in this letter are my opinions.

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Mr. David Forte

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- *ASOP 12: Risk Classification (for All Practice Areas)*
- *ASOP 17: Expert Testimony by Actuaries*
- *ASOP 23: Data Quality*
- *ASOP 25: Credibility Procedures*
- *ASOP 56: Modeling*
- *CAS Statement of Principles Regarding Property & Casualty Insurance Ratemaking*

Updates

In my declaration, I noted that the CAS SOPs had been rescinded in December 2020. I would like to reflect in the rulemaking record that the CAS Board of Directors voted in May 2021 to reinstate the CAS SOPs for reference for U.S.-regulated ratemaking.

Also, in my June 14, 2021 testimony I noted that CBIS are correlated with age, such that older policyholders tend to have better scores indicative of lower risk. One predictable consequence of implementing the Office of the Insurance Commissions (OIC) emergency order would be that lower-risk policyholders with better CBIS would experience rate increases and be negatively impacted. For auto, this would more likely include seniors who have better driving experience and file fewer claims relative to younger policyholders.

Another predictable consequence would be that higher-risk policyholders correlated to poorer CBIS would get rate decreases, so that classes of policyholders who have been demonstrated to file more claims are likely to benefit from the order. The probable benefits accruing to high-risk policyholders would generally have more to do with their CBIS and experience before the pandemic than anything that happened during the pandemic, since the CARES Act largely prevented a disruption of CBIS that might otherwise have occurred.

Conclusion

I appreciate the opportunity to provide information to the WA OIC on this very important issue. Please contact me by phone at 415-394-3733 or email Nancy.watkins@milliman.com if you have questions.

Sincerely,



Nancy Watkins, FCAS, MAAA
Principal and Consulting Actuary

Attachments



ACTUARIAL STANDARDS BOARD

Actuarial Standard of Practice No. 1

Introductory Actuarial Standard of Practice

Developed by the
General Committee of the
Actuarial Standards Board

Adopted by the
Actuarial Standards Board
March 2013

Doc. No. 170

Note: *Nonguaranteed Charges or Benefits for Life Insurance Policies or Annuity Contracts*, which was formerly known as ASOP No. 1, has been renumbered as ASOP No. 2 effective on March 21, 2013. *Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88*, which was formerly labeled ASOP No. 2, was repealed on March 14, 2011 and does not apply to actuarial communications issued after that date.

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March 2013

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

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice No. 1

This document contains the final version of a revision of the Introduction to ASOPs, now titled ASOP No. 1, *Introductory Actuarial Standard of Practice*.

Background

This Introductory ASOP is a revision of the *Introduction to the Actuarial Standards of Practice*. The Introduction was adopted in 2004 to replace a Preface to the standards that was adopted in 1989. The Introduction was intended to offer actuaries guidance on the ASB's operations, the content and format of standards, and the ASB's intent with respect to certain terms that appear frequently in the text of the standards themselves.

The Introduction was updated in October 2008 to make clear that the ASB, in promulgating ASOPs, seeks to define an appropriate level of practice (rather than simply codifying current practices), to remove references to "prescribed statements of actuarial opinion" in light of revisions made to the *Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States* and to conform the provisions on deviations from the ASOPs to the deviation provisions of ASOP No. 41, *Actuarial Communications*, in accordance with the ASB's project to standardize the "deviation" provisions in all ASOPs. The ASB received a number of comments on the Introduction at the time of this 2008 revision and concluded that further review would be appropriate. The revision is a result of that review.

In addition, to reinforce that the Introductory ASOP contains guidance, it has been numbered as ASOP No. 1. The previous ASOP No. 1, *Nonguaranteed Charges or Benefits for Life Insurance Policies and Annuity Contracts*, has been renumbered as ASOP No. 2. The previous ASOP No. 2, *Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88*, was repealed in March 2011. The sole reference to ASOP No. 1, which appears in ASOP No. 24, *Compliance with the NAIC Life Insurance Illustrations Model Regulation*, has been updated to reflect this change.

Exposure Draft

The exposure draft of this ASOP was approved for exposure in December 2011 with a comment deadline of May 31, 2012. Thirteen comment letters were received and considered in making clarifications that were reflected in this final ASOP. For a summary of the issues contained in

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these comment letters, please see appendix 2. In general, the suggestions helped improve the clarity of the standard but did not result in substantive changes to the standard.

Key Changes

Many comments were received with respect to the terms “must,” “should,” and “should consider.” Some commentators objected to the concept that failure to comply with a “should” statement constitutes a deviation from the guidance in the ASOP and hence triggers disclosures. These commentators indicated that failure to follow a “should” statement had not previously been understood to be a deviation requiring disclosure, so that ASOPs were in effect being retroactively changed. Other commentators indicated the distinction between the two terms “must” and “should” was not clear.

To assist in reviewing these and other comments, the General Committee analyzed the use of the terms “should,” “should consider,” and “must” in the various ASOPs. The General Committee concluded that the use of these terms in this ASOP No. 1 would not retroactively change the intended meaning of the terms as used in the various ASOPs, and so the Introductory ASOP reaffirms that a failure to follow a “should” statement constitutes a deviation from the guidance.

In order to better contrast and clarify the meaning of “must” vs. “should,” the definitions have been combined into a single “must/should” discussion that defines each term and highlights the distinction between the terms.

The General Committee concluded that a definition of “should consider” is not needed. The terms “must” and “should” are generally followed by an action (for example, “disclose” or “document”). When the term “should consider” is used, the action required to be performed (or to be disclosed as a deviation if not performed) is to consider something. Thus, there is no need to separately define “should consider.” The revised ASOP makes clear that if the actuary considers something the ASOP indicates he or she should consider, but determines that the item being considered is inappropriate or impractical, the actuary has complied with the guidance and there is no deviation to be disclosed.

The final version of this Introductory ASOP contains several other clarifications but none are considered substantial. Notable changes are the addition of a definition of “deviation” and clarifying changes to the definitions of a number of other items, largely as a result of comments received.

The ASB thanks everyone who took the time to contribute comments and suggestions on the exposure draft.

The ASB voted in March 2013 to adopt this standard.

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General Committee of the ASB

Michael S. Abroe, Chairperson

Maria M. Sarli, Vice-Chairperson

Albert J. Beer

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Paul Braithwaite

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Thomas D. Snook

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Patrick J. Grannan

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James F. Verlautz

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.

INTRODUCTORY ACTUARIAL STANDARD OF PRACTICE

Section 1. Overview

The Actuarial Standards Board (ASB) promulgates actuarial standards of practice (ASOPs) for use by actuaries when rendering actuarial services in the United States. The ASB is vested by the U.S.-based actuarial organizations¹ with the responsibility for promulgating ASOPs for actuaries rendering actuarial services in the United States. Each of these organizations requires its members, through its *Code of Professional Conduct*² (Code), to satisfy applicable ASOPs when rendering actuarial services in the United States.

This Introductory ASOP sets forth principles that have been broadly applicable to the work of the ASB since its inception, and carries the same weight and authority as other ASOPs. Any Actuarial Compliance Guidelines promulgated or republished by the ASB that have not been repealed or superseded carry the same weight as ASOPs.

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. The ASB promulgates ASOPs through a notice and comment process described in the *ASB Procedures Manual*. The ASB has exclusive authority in the United States to determine whether an ASOP is needed in a particular actuarial practice area, to promulgate ASOPs, and to amend or repeal ASOPs. The ASB is the final authority for determining the content of ASOPs.

ASOPs are binding on members of the U.S.-based actuarial organizations when rendering actuarial services in the U.S. While these ASOPs are binding, they are not the only considerations that affect an actuary's work. Other considerations may include legal and regulatory requirements, professional requirements promulgated by employers or actuarial organizations, evolving actuarial practice, and the actuary's own professional judgment informed by the nature of the engagement. The ASOPs provide a basic framework that is intended to accommodate these additional considerations.

This introductory standard is effective for all actuarial services performed on or after June 1, 2013.

¹ The American Academy of Actuaries (Academy), the American Society of Pension Professionals and Actuaries, the Casualty Actuarial Society, the Conference of Consulting Actuaries, and the Society of Actuaries.

² These organizations adopted the *Code of Professional Conduct* effective January 1, 2001.

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Section 2. Definitions, Discussions, and Related Guidance

Each ASOP includes a list of definitions of certain terms used within it. With the exception of this Introductory ASOP, those terms are defined only for use in that particular ASOP, and the definitions can and do differ among ASOPs, reflecting different uses of language in various segments of the profession. Definitions and discussions included in this Introductory ASOP are intended to apply to all other ASOPs if the term is used in such ASOPs, unless the ASOP includes a specific definition of the term.

ASOPs frequently use terms that, while not defined within them, are integral to an informed reading of the ASOPs. Where terms are not defined or discussed within the ASOPs, the actuary is expected to interpret a term in a straight-forward manner, consistent with the common usage of the term. If an actuary has any questions about the meaning of a specific term, the actuary should consult the Actuarial Board for Counseling and Discipline (ABCD) for guidance.

Following are some common terms used in the ASOPs:

2.1 Terms of Construction

- a. *Must/Should*—The words “must” and “should” are used to provide guidance in the ASOPs. “Must” as used in the ASOPs means that the ASB does not anticipate that the actuary will have any reasonable alternative but to follow a particular course of action. In contrast, the word “should” indicates what is normally the appropriate practice for an actuary to follow when rendering actuarial services. Situations may arise where the actuary applies professional judgment and concludes that complying with this practice would be inappropriate, given the nature and purpose of the assignment and the principal’s needs, or that under the circumstances it would not be reasonable or practical to follow the practice.

Failure to follow a course of action denoted by either the term “must” or “should” constitutes a deviation from the guidance of the ASOP. In either event, the actuary is directed to ASOP No. 41, *Actuarial Communications*.

The terms “must” and “should” are generally followed by a verb or phrase denoting action(s), such as “disclose,” “document,” “consider,” or “take into account.” For example, the phrase “should consider” is often used to suggest potential courses of action. If, after consideration, in the actuary’s professional judgment an action is not appropriate, the action is not required and failure to take this action is not a deviation from the guidance in the standard.

- b. *May*—“May” as used in the ASOPs means that the course of action described is one that would be considered reasonable and appropriate in many circumstances. “May” in ASOPs is often used when providing examples (for example, factors the actuary may consider; methods that may be appropriate). It is not intended to indicate that a course of action is reasonable and appropriate in all circumstances, nor to imply that alternative courses of action are impermissible.

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- 2.2 *Actuarial Services*—Professional services provided to a principal by an individual acting in the capacity of an actuary. Such services include the rendering of advice, recommendations, findings or opinions based on actuarial considerations.
- 2.3 *Actuarial Soundness*—The phrase “actuarial soundness” has different meanings in different contexts and might be dictated or imposed by an outside entity. In rendering actuarial services, if the actuary identifies the process or result as “actuarially sound,” the actuary should define the meaning of “actuarially sound” in that context.
- 2.4 *Deviation*—The act of departing from the guidance of an ASOP.
- 2.5 *Known*—ASOPs frequently refer to circumstances, factors, practices of the principal, or other items that are known to the actuary. In many cases, the actuary must rely upon the principal and others acting on the principal’s behalf to supply relevant information. Unless an ASOP clearly indicates otherwise, “known” means that the actuary had actual knowledge of the item in question at the time the actuary rendered actuarial services.
- 2.6 *Materiality*—“Materiality” is a consideration in many aspects of the actuary’s work. An item or a combination of related items is material if its omission or misstatement could influence a decision of an intended user. When evaluating materiality, the actuary should consider the purposes of the actuary’s work and how the actuary anticipates it will be used by intended users. The actuary should evaluate materiality of the various aspects of the task using professional judgment and any applicable law (statutes, regulations, and other legally binding authority), standard, or guideline. In some circumstances, materiality will be determined by an external user, such as an auditor, based on information not known to the actuary. The guidance in ASOPs need not be applied to immaterial items.
- 2.7 *Practical or Practicable*—ASOPs frequently call upon actuaries to undertake certain inquiries, perform certain analytical tests, or make disclosures if it is “practical” or “practicable” to do so. These terms are intended to suggest that all possible steps need not always be taken to complete an assignment. A professional assignment frequently requires the actuary to adopt a course of action that is likely to yield an appropriate result without being unnecessarily time-consuming, elaborate, or costly relative to the principal’s needs. Thus, it is appropriate for the actuary, exercising professional judgment, to decide that the circumstances surrounding a particular assignment are such that it would not be necessary to undertake a particular task. (Note: ASOPs commonly use “practical” and “practicable” interchangeably.)
- 2.8 *Principal*—A client or employer of the actuary.
- 2.9 *Professional Judgment*—Actuaries bring to their assignments not only highly specialized training, but also the broader knowledge and understanding that come from experience. For example, the ASOPs frequently call upon actuaries to apply both training and

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experience to their professional assignments, recognizing that reasonable differences may arise when actuaries project the effect of uncertain events.

- 2.10 *Reasonable*—In many instances, the ASOPs call for the actuary to take “reasonable” steps, make “reasonable” inquiries, select “reasonable” assumptions or methods, or otherwise exercise professional judgment to produce a “reasonable” result when rendering actuarial services. The intent is to call upon the actuary to exercise the level of care and diligence that, in the actuary’s professional judgment, is necessary to complete the assignment in an appropriate manner.

Because actuarial practice commonly involves the estimation of uncertain events, there will often be a range of reasonable methods and assumptions, and two actuaries could follow a particular ASOP, both using reasonable methods and assumptions, and reach different but reasonable results.

- 2.11 *Reliance*—Actuaries frequently rely upon others for information and professional judgments that are pertinent to an assignment. Similarly, actuaries often rely upon others to perform some component of an actuarial analysis. Accordingly, some ASOPs permit the actuary to rely in good faith upon such individuals, subject to appropriate disclosure of such reliance, if required by applicable ASOPs (for example, ASOP Nos. 23, *Data Quality*, and 41).
- 2.12 *Significance/Significant*—Significance can have different meanings. A result may be deemed to be statistically significant if it is determined that the probability that the result was produced by random chance is small. An event may be described as significant if the likelihood of its occurrence is more than remote. In addition, a result may be significant because it is of consequence. Other uses may be encountered in actuarial practice. The actuary should exercise care in interpreting or using these words.

Section 3. Purpose and Format of Actuarial Standards of Practice

- 3.1 The Purpose of ASOPs—ASOPs identify what should be considered, done, documented, and disclosed when rendering actuarial services.
- 3.1.1 The ASB promulgates standards for appropriate actuarial practice. In the course of developing or revising an ASOP, the ASB seeks the input of the actuarial profession and other interested parties. This process of exposure is intended to seek input on the effect that the proposed ASOP would have on the level of practice.
- 3.1.2 The ASOPs are not intended to shift the burden of proof or the burden of production during litigation, and deviation from one or more provisions of an ASOP should not, in and of itself, be presumed to be malpractice. ASOPs are intended for use by actuaries who are qualified to make use of them by virtue of having the necessary education and experience to understand and apply them (see Precept 2, Qualification Standards, of the Code). Other individuals should

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consider obtaining the advice of a qualified actuary before making use of, or otherwise relying upon, ASOPs.

- 3.1.3 The ASOPs are intended to provide guidance for dealing with commonly encountered situations. Actuaries in professional practice may also have to handle new or non-routine situations not anticipated by the ASOPs. In all situations, the actuary should exercise professional judgment in rendering actuarial services.
- 3.1.4 The ASOPs are principles-based and do not attempt to dictate every step and decision in an actuarial assignment. Generally, ASOPs are not narrowly prescriptive and neither dictate a single approach nor mandate a particular outcome. Rather, ASOPs provide the actuary with an analytical framework for exercising professional judgment, and identify factors that the actuary typically should consider when rendering a particular type of actuarial service. The ASOPs allow for the actuary to use professional judgment when selecting methods and assumptions, conducting an analysis, and reaching a conclusion, and recognize that actuaries can reasonably reach different conclusions when faced with the same facts.
- 3.1.5 There are situations where applicable law (statutes, regulations, and other legally binding authority) may require the actuary to deviate from the guidance of an ASOP. Where requirements of law conflict with the guidance of an ASOP, the requirements of law shall govern. The ASOPs provide guidance on this and other situations where the actuary deviates from the guidance of an ASOP (see section 4.5).
- 3.1.6 Unlike the ASOPs, which are binding upon actuaries, other actuarial literature provides information that an actuary may choose, but is not required, to consider when rendering actuarial services. For example, practice notes published by the Academy describe various methods actuaries may use, but do not establish standards of practice and are not binding upon actuaries. Similarly, research papers, learned treatises, study notes, actuarial textbooks, journal articles, and presentations at actuarial meetings can be informative, keeping the actuary abreast of developments as actuarial science evolves, but do not establish binding requirements upon the actuary.
- 3.1.7 Each ASOP has a specified effective date. Prior to that date, exposure drafts of the ASOP, and the ASOP itself from the date of its publication to its effective date, form part of the literature of the actuarial profession; actuaries may look to them at their discretion for advisory guidance. An ASOP is not binding until the effective date of the ASOP. Unless specified otherwise, in the case of a revision to an existing ASOP, the existing ASOP is binding until the effective date of the revised ASOP.

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- 3.2 The Format of ASOPs—Each ASOP document includes (1) a transmittal memorandum, (2) the ASOP itself, and (3) one or more supporting appendices.³ The transmittal memorandum and the appendices are not part of the ASOP and are nonbinding, but may be useful to the actuary in interpreting the standard.

Section 4. Compliance with ASOPs

- 4.1 ASOPs are binding upon actuaries. Failure to comply with an applicable ASOP results in a breach of the Code. Such breaches subject the actuary to the profession's counseling and discipline processes.
- 4.2 Actuaries should take a good faith approach in complying with ASOPs, exercising good judgment and professional integrity. It is not appropriate for users of ASOPs to make a strained interpretation of the provisions of an ASOP.
- 4.3 Actuaries should comply with those ASOPs that are applicable to the task at hand. However, not all ASOPs will apply. An ASOP should not be interpreted as having applicability beyond its stated scope and purpose. Actuaries are responsible for determining which ASOPs apply to the task at hand. If no ASOPs specific to the task are applicable, the actuary may, but is not required to, consider the guidance in related ASOPs. Most, but not all, ASOPs are task-specific, dealing with particular kinds of actuarial services. A few ASOPs, however, deal more broadly with particular aspects of many types of actuarial services (such as ASOP Nos. 23 and 41, and this Introductory ASOP).
- 4.4 When an actuary believes that multiple ASOPs have conflicting provisions when applied to a specific situation and none provide explicit guidance concerning which governs, the actuary should apply professional judgment and may wish to contact the ABCD for confidential guidance on appropriate practice.
- 4.5 The ASOPs make specific provision for those situations where the actuary is required to or deems it appropriate to deviate from one or more provisions of an ASOP. It is not a breach of an ASOP to deviate from one or more of its provisions if the actuary does so in the manner described in the ASOP, including making the disclosures related to the deviation as required in such ASOP and in ASOP No. 41.

³ With respect to how the ASOP document is organized, the current ASOP format differs from that of some earlier ASOPs, but all ASOP documents contain similar content, as described in the appendix 1 to this *Introductory ASOP*.

Appendix 1

Background and Additional Information

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

Clarification of Language

As the ASB revises ASOPs, it strives to improve clarity and consistency in language. For example, the 2010 update to ASOP No. 41, *Actuarial Communications*, included changes in definitions to be more consistent with those found in the *Code of Professional Conduct* (Code) and in the recently revised Qualification Standards, and also incorporated language to help create consistency in the treatment of deviation language within all ASOPs. Similarly, in this Introductory ASOP, a number of definitions and discussions of terms used in many of the ASOPs have been added and, where the terms added also appear in the Code, they have been made consistent. In addition, an effort has been made to replace undefined terms or phrases with phrases that include terms that are defined, discussed, or used in the Code.

Role and Scope of ASOPs

The Introductory ASOP has been revised to clarify the role and scope of ASOPs. While ASOPs are binding on actuaries rendering actuarial services in the U.S., the Introductory ASOP now more directly acknowledges that actuaries are subject to a range of requirements and considerations that may affect how they do their work. These include legal and regulatory requirements, their employer's peer review or other quality assurance processes and policies, continuing education requirements, the Code, and the actuary's own professional and ethical standards. Because the ASOPs are not overly prescriptive and allow for disclosed deviations, the ASOP framework is designed to accommodate the actuary's judgment in providing high-quality actuarial services and acting with integrity. The Academy's Council on Professionalism publishes advisory Applicability Guidelines to assist actuaries in identifying the ASOPs that may be relevant.

Development of ASOPs

Proposals for developing new ASOPs and revising existing ones come from a variety of sources, such as individual actuaries, actuarial firms, professional committees, the ABCD, the ASB committees, and the ASB itself. If it accepts a proposal, the ASB assigns it to the appropriate committee or task force to begin the project.

The process of developing a new ASOP or revising an existing ASOP usually begins with the identification of practices that the ASB believes are appropriate to the proper performance of a

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particular type of actuarial service. After reviewing the current range of practices, the ASB determines whether it is appropriate under the circumstances to develop a new or revise an existing ASOP to reflect emerging issues in actuarial practice, recent advancements in actuarial science, or for other reasons.

Organization of ASOPs

The ASB strives to organize all ASOPs in a similar fashion to the extent feasible. The ASOP document includes a transmittal memorandum, the ASOP itself, and appendices. The transmittal memorandum provides brief background information and a description of the key issues related to the development or revision of the ASOP. The appendices (1) provide additional background and historical issues, (2) describe current or alternative practices, and (3) summarize the major issues raised in the exposure process and their disposition by the drafting committee. Additional appendices may also contain supporting documents, bibliographies, or illustrative examples.

Each ASOP contains four sections. Except for this Introductory ASOP, the sections are organized as follows:

- The first section summarizes the scope, cross references, and effective date of the ASOP.
- The second section defines or discusses certain terms used within the ASOP.
- The third section provides an analysis of issues and recommended practices.
- The fourth section addresses communications and disclosures.

The scope identifies the intended application of the ASOP to the work of the actuary. In some instances, the actuary serves as an advisor to a principal and does not actually make decisions or take actions on the principal's behalf. In those instances, the ASOP may indicate in its scope to what extent the ASOP addresses the actuary's role in advising the principal. However, the ASOPs are not intended to make the actuary responsible if the principal acts contrary to the actuary's advice.

The Analysis of Issues and Recommended Practices section is organized into major topics or issues, or major tasks involved in rendering actuarial services within the ASOP's scope. Emphasis is placed on providing the actuary with an appropriate analytical framework for completing an assignment that is within the scope of the ASOP.

Communications or disclosures pertinent to the subject of the ASOP and applicable limitations are identified in the Communications and Disclosures section and in ASOP No. 41. Where appropriate, reference may be made to applicable provisions of the Code. This section also includes a description of what an actuary should do when, in the actuary's professional judgment, a deviation from the guidance in the ASOP is deemed to be appropriate.

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Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of the Introductory ASOP was issued in December 2011 with a comment deadline of May 31, 2012. Thirteen comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The General Committee of the Actuarial Standards Board carefully considered all comments received, and the ASB reviewed (and modified, where appropriate) the changes proposed by the General Committee.

Summarized below are the significant issues and questions contained in the comment letters and the responses.

The term “reviewers” in appendix 2 includes the General Committee and the ASB. Also, unless otherwise noted, the section numbers and titles used in appendix 2 refer to those in the exposure draft.

GENERAL COMMENTS	
Comment	A number of commentators indicated that the Introductory ASOP needs a number (for example, ASOP No. 0 or ASOP No. 1) so that actuaries understand that it is an ASOP that contains guidance.
Response	The reviewers agree and numbered the Introductory ASOP as ASOP No. 1. The previous ASOP No. 1, <i>Nonguaranteed Charges or Benefits for Life Insurance Policies and Annuity Contracts</i> , has been renumbered as No. 2, since ASOP No. 2, <i>Recommendations for Actuarial Communications Related to Statements of Financial Accounting Standards Nos. 87 and 88</i> , was repealed in March 2011.
Comment	One commentator suggested moving the general deviation language from ASOP No. 41, <i>Actuarial Communications</i> , to the Introductory ASOP, and having ASOP No. 41 deal only with deviations related to communication of results.
Response	The reviewers believe ASOP No. 41 is an appropriate vehicle for guidance on communicating deviation from any ASOP, because ASOP No. 41 applies to actuaries issuing actuarial communications within any practice area. As a result, no change was made.

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SECTION 1: OVERVIEW	
Comment	Some commentators believed that the sentence “Each of these organizations requires its members, through its <i>Code of Professional Conduct</i> ⁴ (Code), to observe ASOPs when rendering actuarial services in the United States,” contradicts the Code because it is incomplete (i.e. the sentence doesn’t mention that actuaries must also under the Code satisfy standards of practice in a non-U.S. jurisdiction where they render services).
Response	The reviewers disagree and made no change. The reviewers believe the statement is accurate as written, and is not inaccurate merely because it does not also describe Code requirements that relate to actuarial standards of practice that exist in other jurisdictions in which the actuary may render actuarial services.
Comment	One commentator suggested revising the sentence “Each of these organizations requires its members, through its Code ⁵ , to observe ASOPs when rendering actuarial services in the United States,” to match the wording in the Code by replacing “observe” with “satisfy applicable.”
Response	The reviewers made the suggested change but note that the Code uses both terms in the discussion of this topic.
Comment	One commentator indicated that the sentence “The ASOPs provide a basic framework that will typically accommodate these additional considerations.” should be revised to read “The ASOPs provide a basic framework that should accommodate these additional considerations.”
Response	The reviewers agree and made the following change: “The ASOPs provide a basic framework that is intended to accommodate these additional considerations.”
SECTION 2: DEFINITIONS, DISCUSSIONS, AND RELATED GUIDANCE	
Comment	One commentator suggested that the definition of Deviation (“The act of departing from the guidance of an ASOP.”) in ASOP No. 41 also be included here.
Response	The reviewers agree and added the definition.
Section 2.1, Terms of Construction	
Comment	One commentator asked whether the Committee meant “under ordinary circumstances” rather than “under the circumstances” in “ <i>Must</i> —“Must” as used in the ASOPs means that, under the circumstances, the actuary has no reasonable alternative but to follow a particular course of action.”
Response	The reviewers disagree that “under ordinary circumstances” was intended, but note that changes made to the section should eliminate potential confusion.

⁴ These organizations adopted the *Code of Professional Conduct* effective January 1, 2001.

⁵ These organizations adopted the *Code of Professional Conduct* effective January 1, 2001.

ASOP No. 1—March 2013

Comment	<p>Many comments were received with respect to the terms “must,” “should,” and “should consider,” as follows:</p> <ul style="list-style-type: none">• Commentators indicated that, because failure to follow a “must” or a “should” statement both constitute a deviation requiring disclosure, the distinction between the two terms was not clear.• Commentators objected to the concept that failure to comply with a “should” statement constitutes a deviation that must be disclosed under ASOP No. 41. These commentators indicated that failure to follow a “should” statement had not previously been understood to be a deviation requiring disclosure, so that ASOPs were in effect being retroactively changed, and actuaries should be afforded an opportunity to comment on the use of the word should in the various ASOPs in that light.• A commentator questioned whether a definition of “should consider” was needed.• A commentator requested that the ASOP specifically indicate that it does not create a duty to document actions considered but not taken and the reasons therefor.
Response	<p>To assist in reviewing the comments, the reviewers analyzed the use of the terms “should,” “should consider,” and “must” in the various ASOPs, and reached the following conclusions:</p> <ul style="list-style-type: none">• In order to better contrast the meaning of “must” versus “should,” the definitions have been combined into a single “Must/Should” discussion that defines each term and highlights the distinction between the terms.• The Introductory ASOP reaffirms that a failure to follow a “should” statement constitutes a deviation.• The reviewers agree that a definition of “should consider” is not needed. The terms “must” and “should” are generally followed by an action (for example, “disclose” or “document”). When the term “should consider” is used, the action to be performed (or to be disclosed as a deviation if not performed) is to consider something. Thus, there is no need to separately define “should consider.” The revised ASOP makes clear that if the actuary considers something the ASOP indicates he or she should consider, but determines that the item being considered is inappropriate or impractical, the actuary has complied with the guidance and there is no deviation to be disclosed.• Because the ASOP does not indicate that actions considered but not taken (and the reasons therefor) must be disclosed, the reviewers do not believe it is necessary for the ASOP to indicate that they need not be disclosed. Thus, no changes have been made in response to this comment.

ASOP No. 1—March 2013

Comment	A commentator requested that a statement “Failure to follow the course of action which follows ‘may’ does not constitute a deviation” be added.
Response	Because the ASOP does not suggest that failure to follow the course of action that follows “may” constitutes a deviation, the reviewers do not believe it is necessary for the ASOP to indicate that it would not be a deviation. Therefore, no change was made in response to this comment.
Section 2.2, Actuarial Services	
Comment	A commentator indicated that “actuarial services” is defined in ASOP No. 41 and questioned whether the definition should be in two ASOPs. In addition, a commentator suggested a small change in the definition in the Introductory ASOP to match the definition in the Code (i.e., change “on” to “upon” in “Such services include the rendering of advice, recommendations, findings or opinions based on actuarial considerations.”). Other commentators suggested adding “but are not limited to” after “Such services include” in the sentence above.
Response	<p>Because the term actuarial services is applicable to all ASOPs and used in nearly all of them, the reviewers decided that including the definition in the Introductory ASOP is appropriate. The reviewers also made the indicated change (i.e. “on” to “upon”) to match the definition in the Code (which also appears in ASOP No. 41).</p> <p>The reviewers decided not to add “but are not limited to” to the definition. The revised definition matches the definition in the Code. In addition, the reviewers believe the list of services in the definition to be illustrative rather than comprehensive.</p>
Section 2.3, Actuarial Soundness	
Comment	A commentator suggested that a statement be added indicating that “actuarial soundness” is not an actuarial concept, but is a concept imposed by outside entities. In addition, another commentator requested that the ASOP indicate that the term “actuarial soundness” only needs to be defined once in an actuarial communication. A third commentator indicated that in property and casualty ratemaking the term “actuarial soundness” is well defined by the Casualty Actuarial Society’s ratemaking principles, and should not need to be defined in an actuarial communication.
Response	The reviewers agree that the concept of actuarial soundness might be imposed by an outside entity and added a statement to that effect. However, the reviewers do not believe it is necessary to explicitly state that actuarial soundness need not be defined multiple times in a single actuarial communication, and no change has been made in this regard. With respect to the third comment, no change was made. The reviewers note that ASOP No. 41 already provides that an actuarial communication can direct the reader to information provided in other documents and thus an actuary can direct the reader to the “actuarial soundness” definition intended.

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Section 2.4, Known	
Comment	One commentator indicated that the third sentence in this discussion, which reads “The actuary cannot reasonably be expected to act based on information that was not provided” could be interpreted to excuse an actuary from making reasonable inquiries to try to obtain information.
Response	The reviewers do not believe the sentence added anything to the discussion and deleted the sentence. This should avoid the potential misinterpretation.
Section 2.5, Materiality	
Comment	There were a number of comments on this section: <ul style="list-style-type: none">• A commentator suggested that the ASOP not define material since “materiality” standards are normally imposed by others, and where they aren’t there isn’t a difference between significance and materiality. The commentator suggested using the materiality definition to define significant instead.• A commentator indicated that the statement “The provisions of ASOPs need not be applied to immaterial items” was somewhat circular, because an actuary would need to apply the ASOP to determine that an item is immaterial and that the ASOP allows it to be disregarded.• A commentator indicated that information should be required to be disclosed to allow others to make an assessment of the reasonability of the decision to exclude items as immaterial.
Response	The reviewers note that the words “material” and “materiality” are used in a number of ASOPs and, therefore, retaining the discussion is appropriate. The reviewers disagree with the other two comments.
Section 2.6, Practical or Practicable	
Comment	One commentator wanted to add the statement “No ASOP requires the actuary to perform a task that in the actuary’s professional judgment is impractical based on the needs of and contractual relationship with the principal.” Another commentator wanted the terms “practical” and “reasonable” and the difference between them clarified further.
Response	The reviewers consider the proposed statement overly broad and note that deviation from the guidance in an ASOP is permitted when appropriate, with disclosure in accordance with ASOP No. 41. Therefore, no changes were made in response to the first comment. In general, the reviewers believe that the term “practical” applies to a process while “reasonable” applies to a result, and changes were made in the discussion of “reasonable” to make that clear.

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Section 2.8, Professional Judgment	
Comment	A commentator suggested that the phrase “recognizing that reasonable differences may arise when actuaries project the effect of uncertain events” in this discussion also belonged in the discussion of reasonable.
Response	The reviewers agree and added the sentence “Because actuarial practice commonly involves the estimation of uncertain events, there will often be a range of reasonable methods and assumptions, and two actuaries could follow a particular ASOP, both using reasonable methods and assumptions, and reach different but reasonable results” to the discussion of reasonable.
Section 2.9, Reasonable	
Comment	A commentator felt that the discussion should focus on “the act of reasoning or reaching conclusions based on supported evidence, logical argument and actuarial judgment,” which the commentator believes would better parallel the usage in other ASOPs. Another commentator suggested avoiding the use of the stem “reason” or “reasonable” in the discussion.
Response	The reviewers do not agree. As mentioned above, the reviewers believe that the discussion of reasonable should focus on producing a reasonable result, and the discussion was modified to accomplish this by adding to the discussion “to produce a ‘reasonable’ result when rendering actuarial services.”
Section 2.11, Significance/Significant	
Comment	There were several comments on this discussion, primarily indicating that there was not a clear distinction between the terms material and significant.
Response	The reviewers note that there are several different common uses of the word significant, and different usages are used in different ASOPs. Section 2.11 was intended as a discussion of the various ways in which the term is used, rather than a definition. The discussion was expanded to include an additional common usage (“An event may be described as significant if the likelihood of its occurrence is more than remote.”). With the changes to the wording for both “materiality” and “significance/significant,” the reviewers believe there is a clearer distinction between the two terms.

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<u>SECTION 3. PURPOSE AND FORMAT OF ACTUARIAL STANDARDS OF PRACTICE</u>	
Comment	A commentator indicated that the placement of this section within the body of the Introductory ASOP is inconsistent with the Introductory ASOP itself being an ASOP, because there is nothing in this section that an actuary must understand or do. The commentator suggested moving this section to the appendix or another document.
Response	The reviewers note that the Introductory ASOP is unique and can have a different structure from the other ASOPs. The reviewers decided to leave this within the body of the Introductory ASOP to ensure it received appropriate visibility.
Section 3.1.2	
Comment	A commentator believed the term “production in litigation” should have been “results in litigation” in the sentence “ASOPs are not intended to shift the burden of proof or production in litigation, and failure to satisfy one or more provisions of an ASOP should not, in and of itself, be presumed to be malpractice.”
Response	The reviewers changed the wording to clarify that a deviation from a standard should not result in the presumption of malpractice.
Comment	A commentator believed that the sentence “Other individuals should consider obtaining the advice of a qualified actuary before making use of, or otherwise relying upon, ASOPs” should be replaced with “ASOPs should not be used or relied upon by those who are not actuaries.”
Response	The reviewers disagree and made no change.
Section 3.1.4	
Comment	A commentator wanted to add “generally” before “not narrowly prescriptive,” and “typically” before “neither dictate” in the following sentence “The ASOPs are not narrowly prescriptive and neither dictate a single approach nor mandate a particular outcome.” Another commentator noted that some sections of ASOPs are prescriptive.
Response	The reviewers agree that adding “generally” to the sentence is appropriate and made the change but do not believe the addition of “typically” would enhance the understanding.

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Comment	A commentator suggested that the sentence “For example, because actuarial practice commonly involves the measurement of uncertain events, there will often be a range of reasonable assumptions, and two actuaries could follow a particular ASOP, both using reasonable methods and assumptions, and reach different but reasonable results” be moved into the discussion of reasonable.
Response	The reviewers agree and moved the sentence (with minor wording changes).
Section 3.1.5	
Comment	A commentator thought that this point (that an actuary may deviate from an ASOP to comply with applicable statutes, regulations or other binding authority) was better explained in other ASOPs and that the language should be modified.
Response	The reviewers believe the language is clear and consistent with the Code, and therefore made no change.
Section 3.1.6	
Comment	A commentator suggested that the word “might” be changed to “may” in the sentence “Unlike the ASOPs, which are binding upon actuaries, other actuarial literature provides information that an actuary might choose, but is not required, to consider when rendering actuarial services.”
Response	The reviewers agree and made the change.
Section 3.1.7	
Comment	A commentator suggested this section be revised to indicate that early adoption of the revised Introductory ASOP is permitted.
Response	The reviewers believe that there is nothing in this revised Introductory ASOP that would result in noncompliance with the current Introduction to the ASOPs. Therefore, no change was made.
SECTION 4: COMPLIANCE WITH ASOPS	
Section 4.1	
Comment	A commentator found this confusing, saying that you can deviate from an ASOP if you disclose the deviation, so failure to comply with an ASOP is not a breach of the Code. Another commentator suggested adding information to further clarify that deviations, with appropriate disclosures, are permitted.
Response	The reviewers note that the deviation from the guidance in an ASOP and disclosing the deviation is not a failure to comply with the ASOP, as discussed in section 4.5. Accordingly, no substantive changes were made in response to these comments, although the second sentence in this section was simplified.
Comment	Some commentators believe this section belongs in the appendix, not the body of the ASOP, because it doesn’t tell the actuary to do anything.
Response	Failure to comply with the ASOPs results in a breach of the Code. The reviewers believe this is an important point that belongs in the body of the Introductory ASOP. Therefore, no change was made.

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Comment	A commentator suggested adding “may” before “subject the actuary” in the sentence “Such breaches subject the actuary to the profession’s counseling and discipline processes.”
Response	The reviewers note that a breach subjects the actuary to ABCD processes, even though it may not result in ABCD action. Therefore, no changes were made.
Section 4.2	
Comment	A commentator believes that the sentence “It is not appropriate for users of ASOPs to make a strained interpretation of the provisions of an ASOP “ is not needed because the point is covered by the first sentence, and also indicated that an undefined term like “strained” should not be used.
Response	The reviewers believe the second sentence differs from the first and decided against deleting it.
Section 4.3	
Comment	A commentator suggested that the word “relevant” be replaced with “applicable” in the sentence “Actuaries should comply with those ASOPs that are relevant to the task at hand; not all ASOPs will apply.” because the Code doesn’t use the word “relevant,” it uses “applicable.”
Response	The reviewers agree with replacing “relevant” with “applicable” and made that change.
Comment	A commentator suggested that the following sentence be deleted: “An ASOP should not be interpreted as having applicability beyond its stated scope and purpose” because the commentator believes it discourages an actuary from looking at ASOPs applicable to similar issues when there is no ASOP directly applicable, which the commentator believes to be a good practice that should not be discouraged.
Response	The reviewers believe that clearly defined applicability is important and does not discourage other uses. Therefore, the sentence was not deleted.
Comment	A commentator questioned whether the actuary has unfettered discretion to come to a conclusion about which ASOPs apply, even though the ASOPs may seem to suggest otherwise, and whether the actuary’s determination was open to challenge.
Response	The reviewers do not agree that the section suggests that the actuary has unfettered discretion and, therefore, made no change.
APPENDIX 1: BACKGROUND AND ADDITIONAL INFORMATION	
Role and Scope of ASOPs	
Comment	A commentator objected to the use of the phrase “to better define” in the first sentence.
Response	The reviewers agree and replaced the phrase “to better define” with “to clarify” in the first sentence.

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Comment	<p>A commentator indicated that the sentence below belongs in the body of the ASOP, not in appendix 1, because the commentator believes it is requiring the actuary to do something.</p> <p style="padding-left: 40px;">“Because the ASOPs are not overly prescriptive, and allow for disclosed deviations, the ASOP framework is designed to accommodate the actuary’s providing high quality actuarial services and acting with integrity, taking all appropriate considerations into account.”</p>
Response	<p>The reviewers do not believe this sentence adds any guidance and, therefore, made no change.</p>



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 12**

Risk Classification (for All Practice Areas)

Revised Edition

**Developed by the
Task Force to Revise ASOP No. 12 of the
General Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
December 2005
Updated for Deviation Language Effective May 1, 2011**

(Doc. No. 132)

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December 2005

TO: Members of the American Academy of Actuaries and Other Persons Interested in Risk Classification (for All Practice Areas)

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 12

This booklet contains the final version of a revision of ASOP No. 12, now titled *Risk Classification (for All Practice Areas)*.

Background

In 1989, the Actuarial Standards Board adopted the original ASOP No. 12, then titled *Concerning Risk Classification*. The original ASOP No. 12 was developed as the need for more formal guidance on risk classification increased as the selection process became more complex and more subject to public scrutiny. In light of the evolution in practice since then, as well as the adoption of a new format for standards, the ASB believed it was appropriate to revise this standard in order to reflect current generally accepted actuarial practice.

Exposure Draft

The exposure draft of this ASOP was approved for exposure in September 2004 with a comment deadline of March 15, 2005. Twenty-two comment letters were received and considered in developing the final standard. A summary of the substantive issues contained in the exposure draft comment letters and the responses are provided in appendix 2.

The most significant changes from the exposure draft were as follows:

1. The task force clarified language relating to the interaction of applicable law and this standard.
2. The task force revised the definition of “adverse selection.”
3. The task force reworded the definition of “financial or personal security system” and included examples.
4. The words “equitable” and “fair” were added in section 3.2.1 but defined in a very limited context that is applicable only to rates.

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5. With respect to the operation of the standard, the task force added language that clarifies that this standard in all respects applies only to professional services with respect to designing, reviewing, or changing risk classification systems.
6. Sections 4.1 and 4.2 were combined into a new section 4.1, Communications and Disclosures, which was revised for clarity. The placement of communication requirements throughout the proposed standard was examined, and a sentence regarding disclosure was removed from section 3.3.3 and incorporated into section 4.1. A similar change was made by adding a new sentence in section 4.1 to correspond to the guidance in section 3.4.1.

In addition, the disclosure requirement in section 4 for the actuary to consider providing quantitative analyses was removed and replaced by a new section 3.4.4, which guides the actuary to consider performing such analyses, depending on the purpose, nature, and scope of the assignment.

The task force thanks everyone who took the time to contribute comments on the exposure draft.

The ASB voted in December 2005 to adopt this standard.

Task Force to Revise ASOP No. 12

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ACTUARIAL STANDARD OF PRACTICE NO. 12

RISK CLASSIFICATION (FOR ALL PRACTICE AREAS)

STANDARD OF PRACTICE

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

- 1.1 Purpose—This actuarial standard of practice (ASOP) provides guidance to actuaries when performing professional services with respect to designing, reviewing, or changing risk classification systems.
- 1.2 Scope—This standard applies to all actuaries when performing professional services with respect to designing, reviewing, or changing risk classification systems used in connection with financial or personal security systems, as defined in section 2.4, regarding the classification of individuals or entities into groups intended to reflect the relative likelihood of expected outcomes. Such professional services may include expert testimony, regulatory activities, legislative activities, or statements concerning public policy, to the extent these activities involve designing, reviewing, or changing a risk classification system used in connection with a specific financial or personal security system.

Throughout this standard, any reference to performing professional services with respect to designing, reviewing, or changing a risk classification system also includes giving advice with respect to that risk classification system.

Risk classification can affect and be affected by many actuarial activities, such as the setting of rates, contributions, reserves, benefits, dividends, or experience refunds; the analysis or projection of quantitative or qualitative experience or results; underwriting actions; and developing assumptions, for example, for pension valuations or optional forms of benefits. This standard applies to actuaries when performing such activities to the extent such activities directly or indirectly involve designing, reviewing, or changing a risk classification system. This standard also applies to actuaries when performing such activities to the extent that such activities directly or indirectly are likely to have a material effect, in the actuary's professional judgment, on the intended purpose or expected outcome of the risk classification system.

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

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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 for any professional service commenced on or after May 1, 2006.

Section 2. Definitions

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

- 2.1 Advice—An actuary’s communication or other work product in oral, written, or electronic form setting forth the actuary’s professional opinion or recommendations concerning work that falls within the scope of this standard.
- 2.2 Adverse Selection—Actions taken by one party using risk characteristics or other information known to or suspected by that party that cause a financial disadvantage to the financial or personal security system (*sometimes referred to as antiselection*).
- 2.3 Credibility—A measure of the predictive value in a given application that the actuary attaches to a particular body of data (predictive is used here in the statistical sense and not in the sense of predicting the future).
- 2.4 Financial or Personal Security System—A private or governmental entity or program that is intended to mitigate the impact of unfavorable outcomes of contingent events. Examples of financial or personal security systems include auto insurance, homeowners insurance, life insurance, and pension plans, where the mitigation primarily takes the form of financial payments; prepaid health plans and continuing care retirement communities, where the mitigation primarily takes the form of direct service to the individual; and other systems, where the mitigation may be a combination of financial payments and direct services.
- 2.5 Homogeneity—The degree to which the expected outcomes within a risk class have comparable value.
- 2.6 Practical—Realistic in approach, given the purpose, nature, and scope of the assignment and any constraints, including cost and time considerations.
- 2.7 Risk(s)—Individuals or entities covered by financial or personal security systems.
- 2.8 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.
- 2.9 Risk Class—A set of risks grouped together under a risk classification system.

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- 2.10 Risk Classification System—A system used to assign risks to groups based upon the expected cost or benefit of the coverage or services provided.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Introduction—This section provides guidance for actuaries when performing professional services with respect to designing, reviewing, or changing a risk classification system. Approaches to risk classification can vary significantly and it is appropriate for the actuary to exercise considerable professional judgment when providing such services, including making appropriate use of statistical tools. Sections 3 and 4 are intended to provide guidance to assist the actuary in exercising professional judgment when applying various acceptable approaches.

- 3.2 Considerations in the Selection of Risk Characteristics—Risk characteristics are important structural components of a risk classification system. When selecting which risk characteristics to use in a risk classification system, the actuary should consider the following:

- 3.2.1 Relationship of Risk Characteristics and Expected Outcomes—The actuary should select risk characteristics that are related to expected outcomes. A relationship between a risk characteristic and an expected outcome, such as cost, is demonstrated if it can be shown that the variation in actual or reasonably anticipated experience correlates to the risk characteristic. In demonstrating a relationship, the actuary may use relevant information from any reliable source, including statistical or other mathematical analysis of available data. The actuary may also use clinical experience and expert opinion.

Rates within a risk classification system would be considered equitable if differences in rates reflect material differences in expected cost for risk characteristics. In the context of rates, the word *fair* is often used in place of the word *equitable*.

The actuary should consider the interdependence of risk characteristics. To the extent the actuary expects the interdependence to have a material impact on the operation of the risk classification system, the actuary should make appropriate adjustments.

Sometimes it is appropriate for the actuary to make inferences without specific demonstration. For example, it might not be necessary to demonstrate that persons with seriously impaired, uncorrected vision would represent higher risks as operators of motor vehicles.

- 3.2.2 Causality—While the actuary should select risk characteristics that are related to expected outcomes, it is not necessary for the actuary to establish a cause and

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effect relationship between the risk characteristic and expected outcome in order to use a specific risk characteristic.

- 3.2.3 Objectivity—The actuary should select risk characteristics that are capable of being objectively determined. A risk characteristic is objectively determinable if it is based on readily verifiable observable facts that cannot be easily manipulated. For example, a risk classification of “blindness” is not objective, whereas a risk classification of “vision corrected to no better than 20/100” is objective.
- 3.2.4 Practicality—The actuary’s selection of a risk characteristic should reflect the tradeoffs between practical and other relevant considerations. Practical considerations that may be relevant include, but are not limited to, the cost, time, and effort needed to evaluate the risk characteristic, the ongoing cost of administration, the acceptability of the usage of the characteristic, and the potential usage of different characteristics that would produce equivalent results.
- 3.2.5 Applicable Law—The actuary should consider whether compliance with applicable law creates significant limitations on the choice of risk characteristics.
- 3.2.6 Industry Practices—When selecting risk characteristics, the actuary should consider usual and customary risk classification practices for the type of financial or personal security system under consideration.
- 3.2.7 Business Practices—When selecting risk characteristics, the actuary should consider limitations created by business practices related to the financial or personal security system as known to the actuary and consider whether such limitations are likely to have a significant impact on the risk classification system.
- 3.3 Considerations in Establishing Risk Classes—A risk classification system assigns each risk to a risk class based on the results of measuring or observing its risk characteristics. When establishing risk classes for a financial or personal security system, the actuary should consider and document any known significant choices or judgments made, whether by the actuary or by others, with respect to the following:
- 3.3.1 Intended Use—The actuary should select a risk classification system that is appropriate for the intended use. Different sets of risk classes may be appropriate for different purposes. For example, when setting reserves for an insurance coverage, the actuary may choose to subdivide or combine some of the risk classes used as a basis for rates.

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- 3.3.2 Actuarial Considerations—When establishing risk classes, the actuary should consider the following, which are often interrelated:
- a. Adverse Selection—If the variation in expected outcomes within a risk class is too great, adverse selection is likely to occur. To the extent practical, the actuary should establish risk classes such that each has sufficient homogeneity with respect to expected outcomes to satisfy the purpose for which the risk classification system is intended.
 - b. Credibility—It is desirable that risk classes in a risk classification system be large enough to allow credible statistical inferences regarding expected outcomes. When the available data are not sufficient for this purpose, the actuary should balance considerations of predictability with considerations of homogeneity. The actuary should use professional judgment in achieving this balance.
 - c. Practicality—The actuary should use professional judgment in balancing the potentially conflicting objectives of accuracy and efficiency, as well as in minimizing the potential effects of adverse selection. The cost, time, and effort needed to assign risks to appropriate risk classes will increase with the number of risk classes.
- 3.3.3 Other Considerations—When establishing risk classes, the actuary should (a) comply with applicable law; (b) consider industry practices for that type of financial or personal security system as known to the actuary; and (c) consider limitations created by business practices of the financial or personal security system as known to the actuary.
- 3.3.4 Reasonableness of Results—When establishing risk classes, the actuary should consider the reasonableness of the results that proceed from the intended use of the risk classes (for example, the consistency of the patterns of rates, values, or factors among risk classes).
- 3.4 Testing the Risk Classification System—Upon the establishment of the risk classification system and upon subsequent review, the actuary should, if appropriate, test the long-term viability of the financial or personal security system. When performing such tests subsequent to the establishment of the risk classification system, the actuary should evaluate emerging experience and determine whether there is any significant need for change.
- 3.4.1 Effect of Adverse Selection—Adverse selection can potentially threaten the long-term viability of a financial or personal security system. The actuary should assess the potential effects of adverse selection that may result or have resulted from the design or implementation of the risk classification system. Whenever the effects of adverse selection are expected to be material, the actuary should, when

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practical, estimate the potential impact and recommend appropriate measures to mitigate the impact.

- 3.4.2 Risk Classes Used for Testing—The actuary should consider using a different set of risk classes for testing long-term viability than was used as the basis for determining the assigned values if this is likely to improve the meaningfulness of the tests. For example, if a risk classification system is gender-neutral, the actuary might separate the classes based on gender when performing a test of long-term viability.
- 3.4.3 Effect of Changes—If the risk classification system has changed, or if business or industry practices have changed, the actuary should consider testing the effects of such changes in accordance with the guidance of this standard.
- 3.4.4 Quantitative Analyses—Depending on the purpose, nature, and scope of the assignment, the actuary should consider performing quantitative analyses of the impact of the following to the extent they are generally known and reasonably available to the actuary:
- a. significant limitations due to compliance with applicable law;
 - b. significant departures from industry practices;
 - c. significant limitations created by business practices of the financial or personal security system;
 - d. any changes in the risk classes or the assigned values based upon the actuary's determination that experience indicates a significant need for a change; and
 - e. any expected material effects of adverse selection.
- 3.5 Reliance on Data or Other Information Supplied by Others—When relying on data or other information supplied by others, the actuary should refer to ASOP No. 23, *Data Quality*, for guidance.
- 3.6 Documentation—The actuary should document the assumptions and methodologies used in designing, reviewing, or changing a risk classification system in compliance with the requirements of ASOP No. 41, *Actuarial Communications*. The actuary should also prepare and retain documentation to demonstrate compliance with the disclosure requirements of section 4.1.

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Section 4. Communications and Disclosures

- 4.1 Communications and Disclosures—When issuing actuarial communications under this standard, the actuary should comply with ASOP Nos. 23 and 41. In addition, the actuarial communications should disclose any known significant impact resulting from the following to the extent they are generally known and reasonably available to the actuary:
- a. significant limitations due to compliance with applicable law;
 - b. significant departures from industry practices;
 - c. significant limitations created by business practices related to the financial or personal security system;
 - d. a determination by the actuary that experience indicates a significant need for change, such as changes in the risk classes or the assigned values; and
 - e. expected material effects of adverse selection;
 - f. the disclosure in ASOP No. 41, section 4.2, if any material assumption or method was prescribed by applicable law (statutes, regulations, and other legally binding authority);
 - g. 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
 - h. 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.

The actuarial communications should also disclose any recommendations developed by the actuary to mitigate the potential impact of adverse selection.

Appendix 1

Background and Current Practices

Note: The following appendix is provided for informational purposes but is not part of the standard of practice.

Background

Risk classification has been a fundamental part of actuarial practice since the beginning of the profession. The financial distress and inequity that can result from ignoring the impact of differences in risk characteristics was dramatically illustrated by the failure of the nineteenth-century assessment societies, where life insurance was provided at rates that disregarded age. Failure to adhere to actuarial principles regarding risk classification for voluntary coverages can result in underutilization of the financial or personal security system by, and thus lack of coverage for, lower risk individuals, and can result in coverage at insufficient rates for higher risk individuals, which threatens the viability of the entire system.

Adverse selection may result from the design of the classification system, or may be the result of externally mandated constraints on risk classification. Classes that are overly broad may produce unexpected changes in the distribution of risk characteristics. For example, if an insurer chooses not to screen for a specific risk characteristic, or a jurisdiction precludes screening for that characteristic, this may result in individuals with the characteristic applying for coverage in greater numbers and/or amounts, leading to increased overall costs.

Risk classification is generally used to treat participants with similar risk characteristics in a consistent manner, to permit economic incentives to operate and thereby encourage widespread availability of coverage, and to protect the soundness of the system.

The following actuarial literature provides additional background and context with respect to risk classification:

1. In 1957, the Society of Actuaries published *Selection of Risks* by Pearce Shepherd and Andrew Webster, which educated several generations of actuaries and is still a useful reference.
2. In 1980, the American Academy of Actuaries published the *Risk Classification Statement of Principles*, which has enjoyed widespread acceptance in the actuarial profession. At the time of this revision of ASOP No. 12, the American Academy of Actuaries was developing a white paper regarding risk classification principles.
3. In 1992, the Committee on Actuarial Principles of the Society of Actuaries published “Principles of Actuarial Science,” which discusses risk classification in the context of the principles on which actuarial science is based.

Current Practices

Over the years, a multitude of risk classification systems have been designed, put into use, and modified as a result of experience. Advances in medical science, economics, and other disciplines, as well as in actuarial science itself, are likely to result in continued evolution of these systems. While future developments cannot be foreseen with accuracy, practicing actuaries can take reasonable steps to keep abreast of emerging and current practices. These practices may vary significantly by area of practice. For example, the risk classes for voluntary life insurance may be subdivided to reflect the applicant's state of health, smoking habits, and occupation, while these factors are usually not considered in pension systems.

Innovations in risk classification systems may engender considerable controversy. The potential use of genetic tests to classify risks for life and health insurance is a current example. In some cases, such controversy results in legislation or regulation. The use of postal codes, for example, has been outlawed for some types of coverage. For the most part, however, the legal test for risk classification has remained unchanged for several decades; risk classification is allowed so long as it is "based on sound actuarial principles" and "related to actual or reasonably anticipated experience."

Risk classification issues in some instances may pose a dilemma for an actuary working in the public policy arena when political considerations support a system that contradicts to some degree practices called for in this ASOP. Also, when designing, reviewing, or changing a risk classification system, actuaries may perform professional services related to a designated set of specific assumptions that place certain restraints on the risk classification system.

In such situations, it is important for those requesting such professional services to have the benefit of professional actuarial advice.

This ASOP is not intended to prevent the actuary from performing professional services in the situations described above. In such situations, the communication and disclosure guidance in section 4.1 will be particularly pertinent, and current section 4.1(e), which requires disclosure of any known significant impact resulting from expected material effects of adverse deviation, may well apply. Section 4.1(a), which relates to applicable law, and section 4.1(b), which relates to industry practices, may also be pertinent.

Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of this revision of ASOP No. 12, *Risk Classification for All Practice Areas*, was issued in September 2004 with a comment deadline of March 15, 2005. Twenty-two comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The task force carefully considered all comments received. Summarized below are the significant issues and questions contained in the comment letters and the responses, which may have resulted from ASB, General Committee, or task force discussion. Unless otherwise noted, the section numbers and titles used below refer to those in the exposure draft.

GENERAL COMMENTS	
Comment	Several commentators suggested various editorial changes in addition to those addressed specifically below.
Response	The task force implemented such suggestions if they enhanced clarity and did not alter the intent of the section.
Comment	One commentator noted that the ASOP should deal with the ability of an insured to misrepresent or manipulate its classification.
Response	The task force believed that the considerations raised by the commentator are adequately addressed by sections 3.2.3 and 3.2.4.
Comment	One commentator thought that a section on public and social policy considerations should be added to the standard.
Response	The task force believed that social and public policy considerations, while essential aspects of the way the public views the profession, did not belong in an ASOP dealing with the actuarial aspects of risk classification.
Comment	One commentator questioned whether the ASOP would apply to company selection criteria (tiering criteria) and schedule-rating criteria that may be part of a rating scheme.
Response	The task force believes that the ASOP applies to the extent the selection or schedule rating criteria, used by a company as part of the risk classification system, creates the potential for adverse selection.
Comment	One commentator believed that the ASOP could conflict with proposed state legislation to ban credit as a rating variable and suggested adding an additional consideration in section 3 that the actuary should select risk characteristics in order to avoid controversy or lawsuits.
Response	The task force believes it has addressed issues regarding applicable law, industry practices, business practices, and testing the risk classification system under various scenarios.
Comment	In the transmittal memorandum of the exposure draft, the task force asked whether the key changes from the previous standard were appropriate.
Response	Several commentators responded that the changes were appropriate and some suggested additional changes that are discussed in this appendix.

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Comment	One commentator expressed concern regarding the expansion of scope and the implications in actuarial work that would be otherwise unrelated to risk classification and the expansion of scope to the public policy arena in general.
Response	The task force has added modified wording in the standard to clarify that in all cases the standard applies only in respect to design, reviewing, or changing risk classification systems related to financial or personal security systems.
Comment	Two commentators believed that the revised standard should discuss the purposes of risk classification similar to the discussion in the previous standard. One commentator noted the discussion about encouraging “widespread availability of coverage” in particular.
Response	The task force retained a brief discussion of the purposes of risk classification in appendix 1 but did not believe it was appropriate for the ASOP to provide additional education about the purposes of risk classification. The task force noted that a white paper on risk classification that could contain such material is being developed.
Comment	Several commentators noted that the previous ASOP No. 12 had been very useful in court proceedings and recommended that the task force retain some of the wording in section 5 of the previous ASOP. One commentator suggested strengthening the revised standard so that actuarial testimony would be given greater weight by the courts in interpreting rate standards. Another commentator suggested strengthening the ASOP by adding an explicit statement that one objective during the development and use of risk classification systems is to minimize adverse selection.
Response	The task force reviewed the revised standard with these concerns in mind but concluded that the revised standard represents current generally accepted practice and provides an appropriate level of guidance. The task force considered the specific suggestions with respect to additional wording and incorporated some of the wording regarding adverse selection from the old section 5.5 into appendix 1.
Comment	In the transmittal memorandum of the exposure draft, the task force asked whether it was appropriate for the ASOP not to use the terms “equitable” and “fair.” Two commentators believed that the ASOP should use or define these concepts because they have been used in court proceedings, but the majority of commentators believed that it was appropriate not to define them and that the standard adequately addressed these concepts.
Response	The task force agreed that the ASOP should not define subjective qualities such as “equitable” and “fair.” As the result of ASB deliberation on this issue, language was added to section 3.2.1 to discuss what was meant by the terms “equitable” and “fair.” These terms are intended to apply to a risk classification system only to the extent the risk classification system applies to rates. As such, a formal definition was not added. Court decisions notwithstanding, there is no general agreement as to what characterizes “equitable” classification systems or “fair” discrimination. The task force also considered the possibility that further discussions about such issues might become part of the proposed white paper on risk classification that the American Academy of Actuaries is developing.
Comment	One commentator questioned why the standard offered separate guidance for “risk characteristics” (section 3.2) and “risk classes” (section 3.3). Another commentator believed there should be greater differentiation between the concepts of “risk characteristic” and “risk classification.”
Response	The task force believed that the ASOP uses these terms appropriately and made no change.
Comment	One commentator thought that section 3.3.2 should include guidance on appropriately matching the risk with the outcome when establishing a risk class.
Response	The task force believed that section 3.2.1 addressed this comment and noted that section 3.3.2(a) requires sufficient homogeneity with respect to outcomes.

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Section 1.2, Scope	
Comment	In the transmittal memorandum of the exposure draft, the task force asked whether it was appropriate to include the actuary’s advice within the scope of the standard. Several commentators agreed that including guidance on actuarial advice was appropriate. One commentator believed that the disclosure requirements in section 4 could be burdensome to an actuary who has provided brief oral advice.
Response	The task force kept actuarial advice within the scope of the standard and intended that the disclosure requirements in section 4 should apply to any actuarial advice that falls within the scope of the standard.
Comment	One commentator questioned what was meant by “legislative activities” as an example of a professional service.
Response	The task force intended that “legislative activities” could include drafting legislation, for example.
Comment	Several commentators questioned the meaning of “personal security system.” One commentator questioned whether the definition of “financial or personal security system” would exclude share-based payment systems from the scope of the standard. The commentator recommended that the standard be revised to include such systems.
Response	The task force intended that the ASOP should apply if share-based payment systems or stock options were part of a financial or personal security system, as defined in the section 2.5. If such plans were not part of a financial or personal security system, the ASOP would not apply. The task force chose not to expand the scope to include such plans in all situations but did clarify the definition of “financial or personal security system.”
SECTION 2. DEFINITIONS	
Comment	One commentator suggested that a definition of experience be included, citing the definition of “experience” in the previous ASOP (old section 2.5), which includes the wording, “Experience may include estimates where data are incomplete or insufficient.”
Response	The task force agreed that experience may include estimates where data are incomplete or insufficient but did not believe that the old definition was necessary in the revised ASOP.
Comment	One commentator suggested that a definition of “reasonable” be included.
Response	The task force disagreed and did not add a definition of “reasonable.”
Section 2.1, Advice	
Comment	One commentator suggested that “other work product” was not needed, since the standard already listed “an actuary’s oral, written, or electronic communication.”
Response	The task force revised the language to clarify that “communication or other work product” was intended.
Comment	One commentator believed that a definition for “advice” is not needed.
Response	The task force disagreed and retained the definition of advice.
Section 2.2, Adverse Selection	
Comment	In the transmittal memorandum of the exposure draft, the task force asked if the definition of “adverse selection” was appropriate or whether an alternative definition (included in the transmittal letter) would be preferable. Many commentators responded, some agreeing with the original, some with the alternative, and some suggested other wording. The other wording was most often to change the phrase, “take financial advantage of.”
Response	The task force believed that some of the reasoning on the part of the commentators who preferred the current version did not accurately describe adverse selection. The task force ultimately decided to use the alternative definition in the standard and believed that it better addressed some commentators’ concerns that the other definition could have a negative connotation with respect to motivation.

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Comment	One commentator suggested that “antiselection” is synonymous with adverse selection and that should be made clear in the definition.
Response	The task force agreed and added that reference.
Section 2.4, Credibility (now 2.3)	
Comment	Two commentators believed that within the definition of “credibility” the language concerning “predictive” was confusing.
Response	The task force retained the definition as it is used in several other ASOPs.
Section 2.5, Financial or Personal Security System (now 2.4)	
Comment	Several commentators questioned the meaning of “personal security system.”
Response	The task force clarified the definition.
Comment	One commentator suggested that “impact” be modified to read “financial impact.”
Response	The task force disagreed and revised the definition of “financial and security systems” to delineate the impacts.
Section 2.6, Homogeneity (now 2.5)	
Comment	One commentator believed the definition of “homogeneity” needed revisions to include the concept of grouping similar risks. Another commentator found the definition unclear.
Response	The task force believes that the current definition is appropriate for this ASOP.
Section 2.7, Practical (now 2.6)	
Comment	One commentator believed the definition of “practical” was much too broad and needed to be more actuarial in nature. Alternatively, the commentator suggested dropping it and relying on section 3.2.4.
Response	The task force believed the definition was appropriate and made no change. Section 3.2.4 addresses actuarial practice with respect to practicality. While “practical” is used there and in other places, it is always modified by its context.
Section 2.8, Risk(s) (now 2.7)	
Comment	One commentator suggested that the definition of risks as individuals or entities seemed too limiting and noted that covered risks can also include pieces of property or events.
Response	The task force disagreed, believing that “entity” could encompass property and events.
Comment	One commentator suggested that a unit of risk be defined at the basic unit of risk.
Response	The task force disagreed and made no change.
Section 2.9, Risk Characteristics (now 2.8)	
Comment	One commentator suggested defining risk characteristics as “measurable or observable factors or characteristics, each of which is measured by grouping similar risks into risk classes.”
Response	The task force disagreed and made no change.
Section 2.11, Risk Classification System (now 2.10)	
Comment	One commentator believes the definition of “risk classification system” is circular since “classify” is used in the definition.
Response	The task force agreed and revised the wording.
Comment	One commentator recommended that the term “risks” be changed to “similar risks” in this definition just as in the old definition of risk classification that used the phrase “grouping risks with similar risk characteristics.”
Response	The task force disagreed and made no change.
Comment	One commentator suggested replacing “groups” with “classes.”
Response	The task force disagreed and made no change.

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SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.2.1, Relationship of Risk Characteristics and Expected Outcomes	
Comment	One commentator expressed concern with the standard’s differentiation between the section’s quantitative and subjective factors.
Response	The task force did not intend to be prescriptive as to how to quantify the ratings scheme and believed that the ASOP was sufficiently specific. The ASOP does not address rate adequacy. Selection is the focus, not quantification.
Comment	One commentator believed that “clinical” was not an appropriate adjective to describe the experience an actuary is allowed to use.
Response	The task force intentionally used the term “clinical.”
Comment	One commentator believed that if the classification cannot be measured by actual insurance data, then it is not really a risk classification system.
Response	The task force disagreed and made no change.
Comment	One commentator suggested that the three points addressing why risk classification is generally used be moved to background information.
Response	The task force agreed that such educational language was more appropriate in an appendix than in the body of the ASOP and has moved it.
Comment	One commentator believed that it may be difficult to deal with the process and procedures involved with considering the interdependence of risk characteristics and their potential impact on the operation of the risk classification system.
Response	The task force did not change the language to address this comment but notes that section 3.2.4 addresses considerations regarding practicality.
Section 3.2.2, Causality	
Comment	A number of commentators expressed concern with establishing a cause-and-effect relationship while others thought the standard did not go far enough in this regard.
Response	The task force agreed that, where there is a demonstrable cause-and-effect relationship between a risk characteristic and the expected outcome, it is appropriate for the actuary to include such a demonstration. However, the task force recognized that there can be significant relationships between risk characteristics and expected outcomes where a cause-and-effect relationship cannot be demonstrated.
Section 3.2.4, Practicality	
Comment	Two commentators suggested the use of examples of practical considerations.
Response	The task force revised the section to indicate that the language shows examples of practical considerations.
Comment	One commentator suggested that “theoretical,” as used in section 3.2.4, be defined.
Response	The task force replaced “theoretical” with “other relevant.”
Section 3.2.5, Applicable Law	
Comment	One commentator thought that the proposed language in this section was much too broad.
Response	The task force disagreed with the comment and made no change.

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Section 3.3, Considerations in Establishing Risk Classes	
Comment	One commentator expressed concern that the documentation requirements for these considerations represented an increase from the previous version.
Response	The task force thought the documentation requirements were appropriate and necessary and made no change.
Section 3.3.1, Intended Use	
Comment	One commentator noted that stratifying data sets in loss reserving is different from risk classification, which is done to price risks, and believed that loss reserving permits more flexibility. The commentator stated that the definition of a risk classification system does not apply to loss reserving.
Response	The task force agreed with the first concepts but disagreed with the final sentence and therefore made no change.
Section 3.3.2, Actuarial Considerations	
Comment	With respect to section 3.3.2(a), one commentator suggested replacing the word “for” in the first line with “within” for clarification.
Response	The task force agreed and made the suggested change.
Comment	With respect to section 3.3.2(b), two commentators questioned what was intended by the use of the term “large enough.”
Response	The task force believed the language was sufficiently clear and made no change.
Comment	One commentator pointed out that there are often classes that, individually, have associated experience with low statistical credibility and believed that alternatives to credibility should be included in section 3.3.2(b).
Response	While the task force agreed that there are situations in which actuarially sound classification plans will have individual classes where the experience has low statistical credibility, the task force believed that credibility is a desirable characteristic of risk classes within a risk classification system and that no expansion to include alternatives was necessary.
Comment	One commentator suggested replacing “statistical predictions” with “predictions” in section 3.3.2(b) to avoid the implication that underlying statistics were required. Another commentator suggested that the term “predictions” needed explanation.
Response	The task force agreed with these comments and replaced “predictions” with “inferences” and edited the language to improve its clarity.
Comment	One commentator suggested that the last sentence of section 3.3.2(b), while accurate, was irrelevant.
Response	The task force agreed and eliminated the sentence.
Comment	With respect to section 3.3.2(c), one commentator suggested the need for definitions of “accuracy” and “efficiency.”
Response	The task force believed that the existing language regarding the actuary’s professional judgment was sufficient in determining the meaning of “accuracy” and “efficiency” and did not add a definition of either word.

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Comment	Several commentators suggested that section 3.3.2(d) be eliminated. A number of those commentators also pointed out that the language was both inconsistent with current actuarial practice and inappropriate as an implied requirement.
Response	The task force agreed and deleted the section.
Section 3.3.3, Other Considerations	
Comment	Several commentators pointed out that the last sentence of the section was unclear and might inadvertently require a degree of testing and determination that was not intended.
Response	The task force deleted the last sentence of the section. In addition, section 4.1, Communications and Disclosures, was clarified as to what disclosures are appropriate.
Section 3.3.4, Reasonableness of Results	
Comment	One commentator found the parenthetical wording confusing.
Response	The task force believed the examples were appropriate and made no change.
Comment	One commentator found this section ambiguous in the context of establishing risk classes. Another commentator suggested that a cost-based definition of reasonable be added or that the section be deleted entirely.
Response	The task force retained the section but clarified the wording by mentioning the intended use of the risk classes. The task force did not believe additional clarification of “reasonableness” was necessary because reasonableness is a subjective concept that may depend on the actuary’s professional judgment. The task force also notes that the <i>Introduction to the Actuarial Standards of Practice</i> discusses this concept in further detail.
Section 3.4, Testing the Risk Classification System	
Comment	One commentator indicated that it may be preferable to substitute the word “or” for “and” on the second line so that the sentence reads, “Upon establishment of the risk classification system or upon subsequent review. ...”
Response	The task force did not agree and believed the word “and” was appropriate because testing should be carried out both upon establishment and upon subsequent review.
Comment	One commentator wanted to substitute “continuing” for “long-term” viability in the second line. The commentator believed that the usual issue is the current and near-future viability of a system, not its long-term prognosis. Also, another commentator said that the requirement to “test long-term viability” is new and questioned its meaning.
Response	The task force considered alternative wording but ultimately decided that the existing wording best reflected that the actuary should check the risk classification system for viability both in the short-term and in the long-term.

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Comment	One commentator believed that testing the system is set out as something the actuary should do, if appropriate, rather than as something the actuary should consider. The commentator believed that the paragraph implied a duty to test in some situations, without describing explicitly what those situations would be (i.e., when testing would be “appropriate”). The commentator suspected that the situations described in sections 3.4.1–3.4.3 were the kind of situations that the task force had in mind as situations where long-term testing would be “appropriate.” However, as currently written, the commentator thought that a stronger duty could be implied. The commentator suggested that section 3.4 itself should read, “...the actuary should consider testing the long-term viability of the risk classification system. ...”
Response	The task force believed that the existing wording conveyed the concept that the actuary considers whether testing is appropriate and made no change.
Section 3.5, Reliance on Data Supplied by Others (now Reliance on Data or Other Information Supplied by Others)	
Comment	One commentator believed that the provision for reliance on data supplied by others was not needed in this ASOP because ASOP No. 23, <i>Data Quality</i> , addresses this.
Response	This task force agreed and revised the section to refer to ASOP No. 23, using wording consistent with other recently adopted ASOPs and exposure drafts.
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1, Communications (now Communications and Disclosures)	
Comment	One commentator suggested changing the phrase “when issuing actuarial communications under this standard” to “when issuing actuarial communications that include elements of actuarial work within the scope of this standard.”
Response	The task force retained the original language to be consistent with other ASOPs.
Section 4.2, Disclosures (now 4.1, Communications and Disclosures)	
Comment	One commentator stated that some of the disclosures, notably section 4.2(a) and 4.2(c) (now 4.1(a) and 4.1(c)), are impractical, since they might require the actuary to begin with the universe and then disclose everything that is not utilized. The commentator suggested replacing these disclosure requirements with a communication that defends the choice of risk classification system and notes in that defense how compliance with applicable law and business practices affected the selection, rather than describing all the alternatives that would have been available in the absence of such constraints.
Response	The task force did not agree that the requirement to disclose significant limitations required a discussion of all alternatives that would have been available in the absence of legal or business constraints. The task force noted that the listed disclosures proceed from considerations required in section 3 and modified the wording of the disclosure requirements to be more consistent with that section, including revising the lead-in sentence to require disclosure of the significant impact of such considerations.
Comment	One commentator stated that the disclosure issue is heightened by the expansion of scope into the public policy arena and stated that excessive disclosure requirements may weaken the actuary’s ability to influence the discussion of public policy.
Response	The task force disagreed with the comment and noted that, while the scope of the standard now includes regulatory activities, legislative activities, and statements regarding public policy, the scope does so only in the context of the performance of professional services.

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Comment	One commentator suggested deleting section 4.2(a) (now 4.1(a)), which requires disclosure of significant limitations due to compliance with applicable law, noting that other ASOPs have tended not to include this requirement except where the limitations seriously distort the work product.
Response	The task force disagreed with this comment, noting that significant limitations on the choice of risk characteristics are likely to distort the risk classification system and therefore should be disclosed.
Comment	Several commentators expressed opinions regarding the requirement that the actuary should disclose whether quantitative analyses were performed relative to items being disclosed. One commentator expressed strong objection to this requirement, asserting that the requirement would be counter-productive and would reduce the number of quantitative analyses being done. Another commentator agreed and noted that the disclosure issue was heightened by the expansion of scope to the public policy arena, where an advocacy position may be taken. A third commentator objected to the requirement to disclose that quantitative analyses were <i>not</i> done but suggested requiring that any analyses that were done be summarized. A fourth commentator suggested exempting certain of the required disclosures from the requirement to consider quantification. A fifth commentator pointed out that, while the actuary was required to disclose whether quantitative analyses were performed, the actuary was only required to consider providing the results of those analyses in the disclosure.
Response	The disclosure requirement for the actuary to consider providing quantitative analyses of the impact of the items being disclosed was removed, and instead similar wording was added as a new section 3.4.4, Quantitative Analyses, which guides the actuary to consider performing such analyses, depending on the purpose, nature, and scope of the assignment.
Comment	In the transmittal letter for the exposure draft in request for comment #6, the task force asked whether there were any situations in which the requirement in section 4.2(c) (now 4.1(c)) to disclose any significant limitations created by business practices of the financial or personal security system would not be appropriate. Two comments were received, both agreeing with the appropriateness of the requirement.
Response	The task force retained the requirement.
Comment	Two commentators suggested substituting “indicates” for “creates” in section 4.2(d) (now 4.1(d)).
Response	The task force agreed, changed the wording as suggested, and made other revisions for clarity.
Comment	In the transmittal letter for the exposure draft in request for comment #7, the task force asked whether the requirement in 4.2(e) (now 4.1(e)) to disclose the effects of adverse selection was appropriate. Three commentators addressed this request for comment, and all agreed the requirement was appropriate. However, one commentator suggested that there be no requirement to quantify the impact.
Response	The task force retained the requirement in what is now 4.1(e) and also removed the requirement to consider providing quantitative analyses. Additionally, the task force deleted section 4.2(f) after determining that it was already covered by ASOP No. 41, Actuarial Communications, to which section 4.1 refers.
APPENDIX (now Appendix 1)	
Comment	One commentator expressed concern with the citing of the textbook <i>Selection of Risks</i> by Shepherd and Webster.
Response	The task force believed that citing the Shepherd and Webster book was appropriate but added a new lead-in sentence to the citation to indicate that the references cited provide additional background and context with respect to risk classification.



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 17**

Expert Testimony by Actuaries

Revised Edition

**Developed by the
ASOP No. 17 Task Force of the
General Committee of the
Actuarial Standards Board**

**Adopted by the
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June 2018

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in Expert Testimony by Actuaries

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 17

This document contains the revision of ASOP No. 17, *Expert Testimony by Actuaries*.

History of the Standard

The ASB originally adopted ASOP No. 17, *Expert Testimony by Actuaries*, in 1991. Since that time, actuarial practice in this area has evolved. Under the direction of the ASB, the Expert Witness Task Force revised ASOP No. 17 in 2002 to be consistent with the then current ASOP format and to reflect current practices in the area of expert testimony. ASOP No. 17 was further updated for deviation language, effective May 1, 2011. In 2015, the ASB concluded that this ASOP should be revised to reflect applicable law and regulation.

Exposure Draft

The exposure draft was issued in April 2017 with a comment deadline of June 30, 2017. Eleven comment letters were received and considered in making changes that are reflected in this final ASOP. For a summary of issues contained in these comment letters, please see appendix 2.

Notable Changes from the Exposure Draft

Changes made to the exposure draft include the following:

1. Section 1.2, Scope, was reworded to provide additional guidance regarding the circumstances under which the standard applies.
2. The definition of expert in section 2.4 was clarified.
3. Section 3.2, Reliance Upon Attorney or Other Representative of the Principal, was clarified.
4. Section 3.8, Hypothetical Questions, was clarified.

The ASB thanks everyone who took the time to contribute comments and suggestions on the exposure draft.

The ASB voted in June 2018 to adopt this standard.

ASOP No. 17—Doc. No. 192

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The Actuarial Standards Board (ASB) sets standards for appropriate actuarial practice in the United States through the development and promulgation of Actuarial Standards of Practice (ASOPs). These ASOPs describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.

ACTUARIAL STANDARD OF PRACTICE NO. 17

EXPERT TESTIMONY BY ACTUARIES

STANDARD OF PRACTICE

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

- 1.1 Purpose—This actuarial standard of practice (ASOP) provides guidance to actuaries providing **expert testimony**.
- 1.2 Scope—This standard applies to actuaries who are qualified as **experts** under the evidentiary rules applicable in a forum when they provide **testimony** in court hearings, dispute resolutions, depositions, rate hearings, legislative hearings, or other similar proceedings.

This standard does not apply to an individual whose **testimony** and qualification as an **expert** are unrelated to the individual's education, training, experience, or employment as an actuary.

This standard supplements the *Code of Professional Conduct* (Code) and is intended to provide specific guidance with respect to the actuary providing **expert testimony**. Reference should also be made to other actuarial standards of practice concerned with the actuarial substance of the assignment.

Nothing in this standard is intended to discourage reasonable differences of actuarial opinion, or to inhibit innovation in advancing the practice of actuarial science. Further, this standard is not intended to restrain the selection of **actuarial assumptions** or **actuarial methods**, the communication of actuarial opinions, or the relationship between the actuary and a **principal**. Nothing in this standard is intended to prevent the actuary from challenging the application or a particular interpretation of existing precedent, law, or regulation where such application or interpretation would, in the opinion of the actuary, be inconsistent with otherwise appropriate actuarial practice.

Nothing in this standard is intended to require any communication or action that is inconsistent with the rules of evidence or procedure of any court or other judicial body, legislative forum, administrative forum, arbitral forum, or other forum in which the actuary testifies. To the extent that the standard is inconsistent with the evidentiary and procedural rules applicable in the forum in which the actuary offers **expert testimony**, the actuary should follow the forum's rules of evidence and procedure and any other applicable rules in the forum.

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 for all **expert testimony** provided by the actuary on or after December 1, 2018.

Section 2. Definitions

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

- 2.1 Actuarial Assumption—The value of a parameter or other actuarial choice having an impact on an estimate of a future cost or other actuarial item under evaluation.
- 2.2 Actuarial Method—A procedure by which **data** or assumptions are analyzed or utilized for the purpose of estimating a future cost or other actuarial item.
- 2.3 Data—Numerical, census, or classification information, or information derived mathematically from such items, but not general or qualitative information. **Actuarial assumptions** are not **data**, but **data** are commonly used in the development of **actuarial assumptions**.
- 2.4 Expert—One who is qualified under the evidentiary rules applicable in the forum to testify as an expert, whether explicitly or by acceptance of the actuary's **testimony**. An actuary who has been engaged to testify, or permitted to testify, with the expectation that the actuary will ultimately qualify as an expert is treated as an **expert** for purposes of this standard, even if the actuary does not testify or is later determined not to qualify as an expert.
- 2.5 Principal—Subject to the rules of evidence and procedure and any other rules applicable in the forum, the client or employer of the actuary with regard to the **expert testimony**, depending on the facts and circumstances surrounding the engagement.
- 2.6 Testimony—Communication of opinions or findings presented in the capacity of an expert witness at trial, in hearing or dispute resolution, in deposition, by declaration or affidavit or by any other means through which **testimony** may be received. Such **testimony** may be oral or written.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—An actuary providing **expert testimony** performs an important service to the forum, the finder of fact in the forum, and the public by providing information that can be critical to resolution of disputes. This may include explaining complex technical concepts so they can be understood by the audience to whom the **testimony** is directed. Actuaries may

differ in their conclusions even when applying reasonable **actuarial assumptions** and appropriate **actuarial methods**, and a mere difference of opinion between actuaries does not suggest that an actuary has failed to meet professional standards. However, an actuary providing **expert testimony** should, subject to the rules of evidence and procedure and any other rules applicable in the forum, comply with the requirements of the Code.

- 3.2 Reliance Upon Attorney or Other Representative of the Principal—An **expert** will ordinarily work closely with the attorney or other representative of the **principal**. An actuary serving as an **expert** may reasonably rely upon the advice, information, or instruction provided by an attorney or other representative of the **principal** concerning the meaning and requirements of the rules of evidence or procedure and any other rules applicable in the forum. An actuary relying on such advice, information, or instruction is not in violation of this standard for having complied with the advice or instruction, or used the information, even if a judge, arbitrator, hearing examiner, or other authority of the forum charged with ruling on procedural, evidentiary, or other matters subsequently determines that the advice, information, or instruction is inconsistent with or violates the rules of evidence, procedure, or any other rules applicable in the forum.
- 3.3 Review and Compliance—In offering **expert testimony**, the actuary should comply with all rules of evidence and procedure and any other rules applicable in the forum. In addition, the actuary should review and comply with any applicable actuarial standards of practice, the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States, and the Code.
- 3.4 Conflict with Laws and Regulations—If the actuary believes that a relevant law or regulation contains a material conflict with appropriate actuarial practices, the actuary should disclose the conflict, subject to the requirements of the forum, including without limitation all rules of evidence and procedure.
- 3.5 Conflict of Interest—The actuary should be aware of the possibility of conflict of interest, and should address any real or apparent conflict of interest in accordance with Precept 7 of the Code.
- 3.6 Advocacy—In those circumstances where it is consistent with the rules of evidence and procedure, and any other rules applicable in the forum, an actuary may act as an advocate for a **principal** when giving **expert testimony**. Acting as an advocate does not relieve the actuary of the responsibility to comply with the Code, and to use reasonable **actuarial assumptions** and appropriate **actuarial methods** (unless using **actuarial assumptions** or **actuarial methods** prescribed by law or selected by others that may not be reasonable and appropriate, and so disclosing in accordance with section 3.7).
- 3.7 Actuarial Assumptions or Actuarial Methods Prescribed by Law or Selected by Others—If the actuary performs calculations using **actuarial assumptions** or **actuarial methods** prescribed by law or selected by others, the actuary should disclose, subject to the rules of the forum, and to the extent material and relevant, whether the results are consistent with the actuary's own **expert** opinion.

- 3.8 Hypothetical Questions—The actuary may be asked to answer hypothetical questions. Hypothetical questions may fairly reflect facts in evidence, may include only a part of the facts in evidence, or may include **actuarial assumptions** the actuary believes to be unreasonable. If permitted by the rules of evidence and procedure and any other rules applicable in the forum, and by the rulings of a judge or other official charged with overseeing the forum, the actuary may refuse to answer hypothetical questions based upon what the actuary believes in good faith to be unreasonable **actuarial assumptions**.
- 3.9 Testifying Concerning Other Relevant Testimony—Subject to the rules of evidence and procedure of the forum, when the actuary provides **expert testimony** concerning other relevant testimony, including opposing testimony, the actuary should testify objectively, focusing on the reasonableness of the other testimony and not solely on whether it agrees or disagrees with the actuary’s own opinion.
- 3.10 Cross Examination—During cross-examinations, subject to the rules of the forum, the actuary is not required to volunteer information that is not fairly encompassed within the scope of the question.
- 3.11 Consistency with Prior Statements—When giving **expert testimony**, the actuary should be mindful of statements the actuary may have made on the same subject. If the actuary employs different **actuarial assumptions** or **actuarial methods** in the current situation, the actuary should be prepared to explain why.
- 3.12 Discovery of Error—If, after giving **expert testimony**, the actuary discovers that a material error was made, the actuary should make appropriate disclosure of the error to the forum or to the **principal** or the **principal’s** representative as soon as practicable. Any such disclosure should be made in accordance with the rules of evidence and procedure and any other rules applicable in the forum.
- 3.13 Limitation of Expert Testimony—The actuary should present **expert testimony** in a manner appropriate to the nature of the forum and consistent with the rules of evidence and procedure and any other rules applicable in the forum. If any constraints are imposed or expected to be imposed on the actuary’s ability to comply with the Code or other professional standards, the actuary should consider whether it is appropriate to serve or continue to serve as an **expert**.

Section 4. Communications and Disclosures

- 4.1 Written Testimony—When providing **expert testimony** in writing, the actuary should provide **testimony** in accordance with the rules of evidence and procedure and any other rules applicable in the forum and describe the scope of the assignment, including any limitations or constraints. The written **testimony** should, to the extent appropriate to the forum and intended audience, include descriptions and sources of the **data**, **actuarial assumptions**, and **actuarial methods** used in the analysis.

- 4.2 Oral Testimony—When providing **expert testimony** orally, the actuary should provide oral **testimony** in accordance with the rules of the forum and in a manner appropriate to the intended audience. In addition, the actuary should, to the extent practicable and subject to the rules of evidence and procedure and any other rules applicable in the forum, be prepared to provide documentation supporting the oral **testimony**.
- 4.3 Communication and Disclosure—When providing **expert testimony**, the actuary should comply with ASOP No. 41, *Actuarial Communications*, and, in addition, disclose the following items, as applicable, and as permitted by the rules of evidence and procedure and any other rules applicable in the forum, and to the extent material to the **testimony**:
- a. material conflicts between laws and regulations and appropriate actuarial practices, as described in section 3.4;
 - b. if the actuary performed calculations using **actuarial assumptions** or **actuarial methods** prescribed by law or selected by others, whether the results are consistent with the actuary’s own **expert** opinion, as described in section 3.7; and
 - c. any material errors discovered after giving **expert testimony**, as described in section 3.12.
- 4.4 Additional Disclosures—The actuary should also include the following, as applicable, in an actuarial communication:
- a. the disclosure in ASOP No. 41, 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 1

Background and Current Practices

Note: The following appendix is provided for informational purposes, but is not part of the standard of practice.

Background

Since the standard was first adopted, actuaries have become increasingly active as expert witnesses, appearing in a greater variety of venues and addressing an expanding range of topics. As actuaries have become more knowledgeable about providing expert testimony, the need for educational material has lessened to some degree.

Current Practices

Actuaries may be called upon to give expert testimony concerning a broad range of issues. These include, without limitation, matters such as the following:

- a. actuarial present values of retirement or other benefits;
- b. actuarial values incident to a divorce;
- c. adequacy or appropriateness of reserves, premium rates, pricing or underwriting procedures, or provision for administrative costs;
- d. cost impact of claims-made or claims-paid financing;
- e. cost impact of risk classification systems, tort liability decisions, or legislative/regulatory proposals;
- f. actuarial reviews of provider reimbursement amounts, provider network adequacy, provider comparison studies, provider quality reviews, and contractual provisions for various health care services;
- g. lost earnings of a decedent or injured person and the actuarial present value of such lost earnings;
- h. malpractice of an actuary;
- i. actuarial equivalency or other technical provisions in the design or administration of defined benefit pension plans;
- j. faulty design, administration or communication of amendments to defined benefit pension plans;

- k. financial impact on a defined benefit plan of alternative interpretations of, or amendments to, disputed plan provisions;
- l. relationships between risk and return on investments;
- m. value of an insurance company or other entity; and
- n. withdrawal liability assessments under multiemployer benefit plans.

Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of this revision of ASOP No. 17, *Expert Testimony by Actuaries*, was issued in April 2017 with a comment deadline of June 30, 2017. Eleven comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The Task Force carefully considered all comments received, and the General Committee and ASB reviewed (and modified, where appropriate) the proposed changes.

Summarized below are the significant issues and questions contained in the comment letters and the responses to each.

The term “reviewers” includes the Task Force, General Committee, and the ASB. Unless otherwise noted, the section numbers and titles used below refer to those in the exposure draft.

GENERAL COMMENTS	
Comment	One commentator noted only that the proposed revisions improve the ASOP. Several commentators had generally favorable comments about the proposed revisions, while providing specific suggestions for certain sections, as outlined below.
Response	One commentator suggested that the ASOP include a reference to Actuarial Board for Counseling and Discipline (ABCD) guidance. The reviewers disagree and note ABCD guidance is readily available and not included in ASOPs. Therefore, the reviewers made no change.
Comment	One commentator suggested that the proposed ASOP was repetitious in stating that the rules of the forum must be followed, and stated that the ASOP should explain why so much legal terminology is used in the ASOP.
Response	The reviewers concluded that, given the nature of the ASOP as dealing with proceedings that are usually legal in nature, the use of legal terminology is appropriate. Therefore, the reviewers made no change.
Comment	One commentator had numerous suggestions for ways in which the ASOP could provide specific advice to actuaries who serve as expert witnesses.
Response	The reviewers note that ASOPs are principles-based and do not attempt to be prescriptive, as discussed in ASOP No. 1, <i>Introductory Actuarial Standard of Practice</i> , section 3.1.4. Therefore, the reviewers made no change.
Comment	One commentator requested that the ASOP address the issue of actuaries testifying that other actuaries (hired by a different party to a dispute) have violated ASOPs in their testimony. The commentator suggested that the ASOP address the proper way of interpreting ASOPs and further suggested that it is improper for an actuary to testify that another actuary has violated an ASOP.
Response	The reviewers believe that the ASOP should not limit the ability of an actuary to testify regarding compliance with the ASOPs. Therefore, the reviewers made no change.

SECTION 1. PURPOSE, SCOPE, CROSS-REFERENCES, AND EFFECTIVE DATE	
Section 1.2, Scope	
Comment	One commentator stated that the scope is clear and appropriate. Another commentator was appreciative of the statement that the standard is not intended to inhibit innovation in advancing the practice of actuarial science.
Comment	One commentator suggested that the first sentence of scope be expanded to include the examples in the definition of testimony, so that it would be clear to a reader who did not have access to the electronic hyperlink.
Response	The reviewers note that the standard format relies on reference to the definitions in section 2 and made no change.
Comment	One commentator stated that it is unclear whether legislative hearings are included, noting that some are adversarial.
Response	The reviewers note that the term “adversarial” was a source of confusion, and modified the scope to avoid the use of that term and to clarify that legislative hearings and similar proceedings are included.
Comment	One commentator stated that rate hearings should not be included in the scope because they should be covered by other standards.
Response	The reviewers disagree and made no change in response to this comment.
Comment	One commentator, referring to the fact that the proposed ASOP did not cover non-actuarial testimony by individuals who happen to also be actuaries, stated that users of such testimony would need some way to understand that the ASOP is not applicable. The commentator suggested that the actuary should so state in his or her written testimony, or be precluded from using initials showing membership in an actuarial organization.
Response	The reviewers disagree and note that the standard cannot prescribe disclosures in cases where the standard does not apply. Therefore, the reviewers made no change in response to this comment.
Section 1.4, Effective Date	
Comment	Three commentators expressed the view that an effective date of four months after adoption is reasonable. Several commentators were concerned that the effective date of four months after adoption of the standard would have an adverse impact on expert witness engagements that were initiated before the date of adoption but not completed as of the effective date. Another commentator suggested the effective date should be 12 months after adoption, with voluntary early adoption.
Response	The reviewers do not believe an effective date occurring in the middle of an engagement would cause any problems, and made no change.
Comment	One commentator stated that the effective date is reasonable but should be clarified to specify which version of the ASOP controls when an engagement started before the effective date and is ongoing after the effective date.
Response	The reviewers believe the effective date is clear and made no change.
SECTION 2. DEFINITIONS	
Section 2.2, Actuarial Method	
Comment	One commentator suggested that “A procedure by which data are analyzed...” should be modified to say “A procedure by which data or assumptions are analyzed...”
Response	The reviewers agree and added “or assumptions” to the definition.

Section 2.3, Data	
Comment	One commentator noted that the definition of “data” was inconsistent with the definition in other ASOPs.
Response	The reviewers agree and modified the definition to be consistent with other ASOPs.
Section 2.4, Expert	
Comment	One commentator stated that the standard should remind actuaries that the term “expert” may include an employee of one of the parties to the controversy.
Response	The reviewers believe that the guidance is clear and made no change in response to this comment.
Comment	One commentator stated that the definition of “expert” is self-referential.
Response	The reviewers note that certain uses of the term “expert” within the definition of “expert” refer to the “evidentiary rules applicable in the forum.” For clarity, these uses of the term were not bolded.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Overview	
Comment	One commentator questioned the statement in the proposed ASOP that an actuary should act with honesty, integrity and competence. The commentator suggested that the ASOP also refer to the purpose of upholding the reputation of the actuarial profession.
Response	The reviewers believe that it is not necessary or desirable to restate the Precepts of the <i>Code of Professional Conduct</i> (Code) in an ASOP. Therefore, the reviewers simplified the language to not duplicate concepts covered by the Code.
Section 3.2, Reliance Upon Attorney or Other Representative of the Principal	
Comment	Several commentators objected to the statement that an actuary is “not responsible” for following the advice or instructions of an attorney or representative of the principal.
Response	The reviewers clarified section 3.2 by substituting “not in violation of this standard” for “not responsible.”
Comment	One commentator noted that the actuary may rely on the principal’s attorney or representative but not on the principal, and asked if this was intended.
Response	The reviewers note this was intentional and made no change.
Comment	One commentator requested guidance on how an actuary should resolve the conflict if a judge or arbitrator decides that the attorney’s advice is contrary to the rules of the forum.
Response	The reviewers believe that the ASOP should not address specific questions relating to the rules of the forum, to which the actuary will be subject regardless of the ASOP. Therefore, the reviewers made no change.

Section 3.6, Advocacy	
Comment	One commentator noted that the rules for advocacy vary by country and suggested that the fact that ASOPs apply only to U.S. practice should be noted in the transmittal memorandum, the standard, or the appendix.
Response	The reviewers note that ASOP No. 1, section 1, addresses this issue. Therefore, the reviewers made no change.
Comment	One commentator suggested that it may be appropriate to define the word “advocate.”
Response	The reviewers disagree and believe that defining “advocate” is not necessary because the ASOP applies when the actuary is providing expert testimony, regardless of whether the actuary is acting as an advocate. Therefore, the reviewers made no change.
Comment	One commentator requested that the phrase “may act as an advocate” be changed to “may or may not act as an advocate.”
Response	The reviewers believe the language is clear and made no change.
Comment	One commentator requested that the phrase “in the actuary’s professional judgement” be inserted between “that” and “may” in the parenthetical phrase.
Response	The reviewers believe the parenthetical phrase is clear and made no change.
Section 3.7, Actuarial Assumptions or Actuarial Methods Prescribed by Law or Selected by Others	
Comment	One commentator suggested that additional text be added to clarify that an actuary is not in violation of the standard if the actuary is unable to make the disclosure required by section 3.7.
Response	The reviewers believe the language is clear and made no change.
Section 3.8, Hypothetical Questions	
Comment	One commentator suggested that section 3.8 should be expanded to include unreasonable assumptions that are not actuarial assumptions, in addition to unreasonable actuarial assumptions.
Response	The reviewers disagree and made no change.
Comment	One commentator suggested that an actuary should not have to answer any hypothetical questions.
Response	The reviewers disagree and note that hypothetical questions may be a valid part of testimony. Therefore, the reviewers made no change.
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.4, Additional Disclosures	
Comment	One commentator suggested that in certain circumstances, it may be difficult for an actuary to provide the disclosure required by section 4.4 of ASOP No. 41, <i>Actuarial Communications</i> , relating to material deviations from an ASOP. The commentator also requested that the ASOP provide examples of how a witness could comply with this requirement.
Response	In light of the guidance in the ASOP that an actuary is not required to deviate from the rules of the forum, the reviewers believe that the requirements of this section are not more difficult than other situations in which section 4.4 of ASOP No. 41 would apply. Therefore, the reviewers made no change.



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 23**

Revised Edition

Data Quality

**Developed by the
Data Quality Task Force of the
General Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
December 2016**

Doc. No. 185

ASOP No. 23—Doc. No. 185

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December 2016

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

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 23

This document contains the final version of a revision of ASOP No. 23, *Data Quality*.

Background

The ASB originally adopted ASOP No. 23, *Data Quality*, in 1993. That ASOP was prepared by the Data Quality Task Force of the Specialty Committee of the ASB. The ASB revised ASOP No. 23 in 2004 to be consistent with the then-current ASOP format, to reflect then-current, generally accepted practice with respect to data quality, and to provide guidance concerning other information relevant to the use of data. ASOP No. 23 was further updated for deviation language, effective May 1, 2011.

In 2014, the ASB concluded that this ASOP should be revised to update language to keep pace with practice changes (for example, increasing use of non-traditional data sources for predictive models, and legislatively mandated data submissions). This revision is the result of that review.

Exposure Draft

The exposure draft was released in November 2015 with a comment deadline of February 29, 2016. Twenty-two comment letters were received. The task force considered all comments received and made appropriate changes where needed. For a summary of the substantive issues contained in the comment letters on the exposure draft and the responses, please see appendix 2.

Key Changes

No significant changes have been made, but the wording has been clarified in a number of sections, including the following:

1. Section 1.2 (Scope) has been modified to clarify that if an actuary prepares data, or is responsible for the preparation of data, that the actuary believes will be used by other actuaries in providing actuarial services, the actuary should apply the relevant portions of this standard as though the actuary were planning to use the data, taking into account the preparing actuary's understanding of the assignment for which the data will be used.
2. The defined term "comprehensive" has been replaced with the defined term "sufficient" (with the same definition), because that term fits more naturally with the definition.

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3. The definition of “data” has been changed to clarify that it includes information derived mathematically from data.
4. Section 3.2(b)(3) has been revised to clarify that, in selecting data, the actuary should consider whether the data are reasonable given external data and information only to the extent the external data and information are relevant, readily available, and known to the actuary.
5. Section 3.3 has been modified to clarify that if an actuary performs a review of data, the actuary should consider comparing the current data to data used in the prior analysis, if similar work has been previously performed for the same or recent periods, but only if such consistency can reasonably be expected.
6. Section 3.4(c) has been modified to indicate that, rather than adjusting data to compensate for data deficiencies, an actuary may adjust the results of the analysis (for example, by increasing the range of reasonable estimates).
7. Section 3.4(e) has been modified to clarify that an actuary may, with the consent of the principal, complete any parts of an assignment for which the actuary determines the data are suitable, even though the data may be inadequate to complete the full assignment.
8. Section 3.7 has been added to remind actuaries that confidential information should be handled consistent with Precept 9 of the *Code of Professional Conduct*.

The General Committee would like to thank former committee members Jeremy J. Brown, Charles F. Cook, John C. Lloyd, Cande J. Olsen, and Lance J. Weiss for their contribution to the development of this ASOP.

The ASB voted in December 2016 to adopt this standard.

ASOP No. 23—Doc. No. 185

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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. 23

DATA QUALITY

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 the actuary when performing actuarial services involving **data**.
- 1.2 Scope—This ASOP provides guidance to actuaries when selecting **data**, performing a **review** of **data**, using **data**, or relying on **data** supplied by others, in performing actuarial services. The ASOP also applies to actuaries who are selecting or preparing **data**, or are responsible for the selection or preparation of **data**, that the actuary believes will be used by other actuaries in performing actuarial services, or when making appropriate disclosures with regard to **data** quality. Other actuarial standards of practice may contain additional considerations related to **data** quality that are applicable to particular areas of practice or types of actuarial assignment.

If an actuary prepares **data**, or is responsible for the preparation of **data**, to be used by other actuaries in performing actuarial services, the actuary should apply the relevant portions of this standard as though the actuary were planning to use the **data**, taking into account the preparing actuary's understanding of the assignment for which the **data** will be used.

This standard does not apply to the generation of a wholly hypothetical **data** set.

This standard does not require the actuary to perform an **audit** of the **data**.

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

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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 for any actuarial work product for which **data** were provided to or developed by the actuary on or after April 30, 2017.

Section 2. Definitions

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

- 2.1 Appropriate Data—**Data** suitable for the intended purpose of an analysis and relevant to the system or process being analyzed.
- 2.2 Audit—A formal and systematic examination of **data** for the purpose of testing its accuracy and completeness.
- 2.3 Data—Numerical, census, or classification information, or information derived mathematically from such items, but not general or qualitative information. Assumptions are not **data**, but **data** are commonly used in the development of actuarial assumptions.
- 2.4 Data Element—An item of information, such as date of birth or risk classification.
- 2.5 Review—An examination of the obvious characteristics of **data** to determine if such **data** appear reasonable and consistent for purposes of the assignment. A **review** is not as detailed as an **audit** of **data**.
- 2.6 Sufficient—Containing enough **data elements** or records for the analysis.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—**Appropriate data** that are accurate and complete may not be available. The actuary should use available **data** that, in the actuary's professional judgment, allow the actuary to perform the desired analysis. However, if significant **data** limitations are known to the actuary, the actuary should disclose those limitations and their implications in accordance with section 4.1(b). The following sections discuss such considerations in more detail.
- 3.2 Selection of Data—In undertaking an analysis, the actuary should determine what **data** to use. The actuary should take into account the scope of the assignment and the intended use of the analysis being performed to determine the nature of the **data** needed and the number of alternative **data**

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sets or **data** sources, if any, to be considered. The actuary should do the following:

- a. consider the **data elements** that are desired and possible alternative **data elements**; and
- b. select the **data** for the analysis with consideration of the following:
 1. whether the **data** constitute **appropriate data**, including whether the **data** are sufficiently current;
 2. whether the **data** are reasonable with particular attention to internal consistency;
 3. whether the **data** are reasonable given relevant external information that is readily available and known to the actuary;
 4. the degree to which the **data** are **sufficient**;
 5. any known significant limitations of the **data**;
 6. the availability of additional or alternative **data** and the benefit to be gained from such additional or alternative **data**, balanced against how practical it is to collect and compile such additional or alternative **data**; and
 7. sampling methods, if used to collect the **data**.

- 3.3 **Review of Data**—A **review** of **data** may not always reveal defects. Nevertheless, the actuary should perform a **review**, unless, in the actuary’s professional judgment, such **review** is not necessary or not practical. In exercising such professional judgment, the actuary should take into account the purpose and nature of the assignment, any relevant constraints, and the extent of any known checking, verification, or **audit** of the **data** that has already been performed.

If, in the actuary’s professional judgment, it is not appropriate to perform a **review** of the **data**, the actuary should disclose that the actuary has not performed such a **review**, the reason the actuary has not performed such a **review**, and any resulting limitations on the use of the actuarial work product, in accordance with section 4.1(c).

If the actuary performs a **review**, the actuary should do the following:

- a. make a reasonable effort to determine the definition of each **data element** used in the

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analysis; and

- b. make a reasonable effort to identify **data** values that are questionable or relationships that are significantly inconsistent. If the actuary believes questionable or inconsistent **data** values could have a significant effect on the analysis, the actuary should consider taking further steps, when practical, to improve the quality of the **data**. The actuary should disclose in summary form any unresolved questionable **data** values that the actuary believes could have a significant effect on the analysis, in accordance with section 4.1(d). The actuary also should disclose any significant steps the actuary has taken to improve the **data**, in accordance with section 4.1(e).

If the actuary performs a **review**, the actuary should also consider comparing current **data** with the **data** used in the prior analysis for consistency, if similar work has been previously performed for the same or recent periods and if such consistency can reasonably be expected. If the actuary does not have the prior **data**, the actuary should consider requesting the prior **data**.

3.4 Use of Data—Because **appropriate data** that are accurate and complete may not be available, the actuary should make a professional judgment about which of the following are applicable:

- a. the **data** are of acceptable quality to perform the analysis;
- b. the **data** require enhancement before the analysis can be performed, and it is practical to obtain additional or corrected **data** that will allow the analysis to be performed;
- c. judgmental adjustments or assumptions can be applied to the **data** that allow the actuary to perform the analysis. Any judgmental adjustments to **data** or assumptions should be disclosed in accordance with section 4.1(f). If the actuary judges that the use of the **data**, even with adjustments and assumptions applied, may cause the results to be highly uncertain or contain a significant bias, the actuary may choose to complete the assignment but should disclose the potential existence of the uncertainty or bias, and, if reasonably determinable, the nature and potential magnitude of such uncertainty or bias, in accordance with section 4.1(g). Alternatively, the actuary may compensate for the **data** deficiencies by adjusting the results, such as by increasing the range of reasonable estimates, and disclose the adjustments, in accordance with section 4.1(f);
- d. if the actuary believes that the **data** are likely to contain significant defects, the actuary should determine, if practical, the nature and extent of any checking, verification, or **audit** of the **data** that has been performed. Then, if, in the actuary's professional

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judgment, a more extensive **review** is needed, the actuary should arrange for such a **review** prior to completing the assignment; or

- e. if, in the actuary's professional judgment, the **data** are so inadequate that the **data** cannot be used to satisfy the purpose of the assignment, then the actuary should 1) obtain different **data**, 2) complete, with the consent of the principal, any parts of the assignment for which the actuary determines the **data** are suitable, or 3) decline to complete the assignment. However, if the actuary is required by a regulator or other governmental authority to use **data** that the actuary considers unsuitable for use in the actuary's analysis, the actuary may use the **data** subject to the disclosure requirements of section 4.

3.5 Reliance on Data Supplied by Others—In most situations, the **data** are provided to the actuary by others. The accuracy and completeness of **data** supplied by others are the responsibility of those who supply the **data**. The actuary may rely on **data** supplied by others, subject to the guidance in sections 3.3 and 3.4. The actuary should disclose reliance on **data** supplied by others in an appropriate actuarial communication, in accordance with section 4.1(h).

3.6 Reliance on Other Information Relevant to the Use of Data—In many situations, the actuary is provided with other information relevant to the appropriate use of **data**, such as contract provisions, plan documents, and reinsurance treaties. The validity and completeness of such information are the responsibility of those who supply such information. The actuary may rely on such information supplied by others, unless it is or becomes apparent to the actuary in the course of the assignment that the information is unsuitable for use in the actuary's analysis. The actuary should disclose reliance on such information supplied by others in an appropriate actuarial communication, in accordance with section 4.1(h).

If the actuary believes the information is unsuitable, or inconsistencies between the information and the **data** suggest that the information may be unsuitable, the actuary should make a professional judgment about whether to use the information. The actuary should consider disclosing when such relevant information that has been provided is not used.

If the information suggests that the **data** may be unsuitable, the actuary should make a professional judgment about whether to use the **data** based on the considerations described in sections 3.4 and 3.5.

3.7 Confidentiality—The actuary should be aware that **data** may contain confidential information. Such confidential information should be handled consistent with Precept 9 of the *Code of Professional Conduct*.

3.8 Limitation of the Actuary's Responsibility—The actuary is not required to do any of the

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following:

- a. determine whether **data** or other information supplied by others are falsified or intentionally misleading;
- b. compile additional **data** solely for the purpose of searching for questionable or inconsistent **data**; or
- c. perform an **audit** of the **data**.

Section 4. Communications and Disclosures

4.1 **Communication and Disclosure**—Any actuarial communication prepared to communicate the results of work subject to this standard should comply with the requirements of ASOP No. 41, *Actuarial Communications*. An actuarial communication can comply with some or all of the specific requirements of this section by making reference to information contained in other actuarial communications available to the intended users (as defined in ASOP No. 41), such as an annual actuarial valuation report. Such communication should contain the following disclosures when relevant and material:

- a. the source(s) of the **data**;
- b. any limitations on the use of the actuarial work product due to uncertainty about the quality of the **data** or other information relevant to the use of the **data**, as discussed in section 3.1;
- c. whether the actuary performed a **review** of the **data** and, if not, the reason for not reviewing the **data** and any resulting limitations on the use of the actuarial work product, as discussed in section 3.3;
- d. in summary form, unresolved concerns the actuary may have about questionable **data** values that are relevant to the use of the **data** and could have a significant effect on the actuarial work product, as discussed in section 3.3(b);
- e. in summary form, discussions of any significant steps the actuary has taken to improve the **data** due to identifying questionable **data** values or relationships, as discussed in section 3.3(b);
- f. in summary form, significant judgmental adjustments or assumptions that the actuary

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applied to the **data** or to the results, or are known by the actuary to have been applied to the **data**, to allow the actuary to perform the analysis, as discussed in section 3.4(c);

- g. the existence of results that are highly uncertain or have a potentially significant bias of which the actuary is aware due to the quality of the **data** or other information relevant to the use of the **data**, and the nature and potential magnitude of such uncertainty or bias, if they can be reasonably determined, as discussed in section 3.4(c);
- h. the extent of the actuary's reliance on **data** and other information relevant to the use of the **data** supplied by others, as discussed in sections 3.5 and 3.6;
- i. the disclosure in ASOP No. 41, section 4.2, if any material assumption or method was prescribed by applicable law (statutes, regulations, and other legally binding authority);
- j. 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
- k. 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 1

Background and Current Practices

Note: The following appendix is provided for informational purposes, but is not part of the standard of practice.

Background

An actuarial analysis is based upon an analysis of data, along with practical knowledge of the area of practice and training in actuarial theory, which together enable the actuary to perform and interpret the results of calculations. Throughout the analytic process, data play an important role. The accuracy and validity of the actuarial analysis are dependent on, among other things, the quality of the data used. Hence, an actuarial standard of practice concerning data quality is appropriate.

Data frequently contain errors, are not complete, and are not precisely appropriate for the intended analysis. Actuaries deal with these limitations, the majority of which are non-critical. However, actuaries are often called upon to perform actuarial services in situations where data limitations may be critical. Actuaries use professional judgment when determining whether and how to refine data or make modifications within the analysis.

Current Practices

Actuaries use informed judgment to determine what kinds of data are appropriate for a particular analysis. It is important that the data used are relevant to the system or process being analyzed.

Data have played an increasingly important role in actuarial practice in recent years. In addition to the traditional uses of data that have been in place for many years, actuaries and their principals have been using broader sources of data more recently to support improved business decisions. This has included more sophisticated data analytics to improve functions such as claims processes, underwriting, pricing, loss control, distribution management, and customer service. In addition, there has been expansion of use of sophisticated models for a wide range of purposes, and those models are heavily reliant on the data inputs. Because of their analytical skills, actuaries have been deeply involved in these advancements, including assessing the quality and sufficiency of data for use in various applications.

Persons or organizations responsible for generating, collecting, or publishing data may apply

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different standards of quality assurance, ranging from straightforward compilation of figures to extensive verification. Actuaries, in turn, deal with the question of the quality of data underlying their work products in a variety of ways and with varying levels of review or checking.

Actuaries are called upon to provide analyses for a broad range of audiences, from limited distribution within an organization to public exposure.

Important aspects of data use include documentation and disclosure of 1) the sources of data, 2) review of data, 3) significant biases resulting from data, 4) adjustments or corrections made to the data, and 5) the extent of reliance on data supplied by others. Typically, actuaries do not audit data.

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Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of this revision of ASOP No. 23, *Data Quality*, was issued in November 2015 with a comment deadline of February 29, 2016. Twenty-two comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The Task Force carefully considered all comments received, and the General Committee and ASB reviewed (and modified, where appropriate) the proposed changes.

Summarized below are the significant issues and questions contained in the comment letters and the responses to each.

The term “reviewers” includes the Task Force, General Committee, and the ASB. Unless otherwise noted, the section numbers and titles used below refer to those in the exposure draft.

TRANSMITTAL MEMORANDUM	
Question 1: Does this proposed revision provide appropriate guidance for an actuary preparing data for another actuary’s use (for example, legislatively-mandated data submissions)?	
Comment	Most commentators who addressed the question felt the proposed revision provided appropriate guidance.
Comment	One commentator believed the ASOP should address the duty of care owed and the alignment of data with the data request.
Response	The reviewers believe these topics are adequately covered in the <i>Code of Professional Conduct</i> , and in sections 1.2 and 3.2 of this ASOP, and made no change.
Comment	Several commentators believed the ASOP should clarify whether it applies to an actuary preparing data for use by another actuary working in the same firm.
Response	The reviewers note that section 1.2 indicates that the standard applies when an actuary “prepares data or is responsible for the preparation of data to be used by other actuaries in performing actuarial services,” and provides no exception for actuaries working within the same firm, and made no change.
Question 2: Does this proposed revision provide appropriate guidance for working with nontraditional data sources (for example, predictive models)?	
Comment	Most commentators who addressed the question felt the proposed revision provided appropriate guidance.
Comment	One commentator suggested clarifying the extent to which derived data are included under this ASOP.
Response	The reviewers agree that some derived data is subject to this ASOP and clarified the definition of “data.”

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Question 3: Considering the guidance in section 3.6, which discusses the quality of other information relevant to data, is the title of the standard “Data Quality” appropriate?	
Comment	Most commentators who addressed the question felt that the standard was appropriately titled.
GENERAL COMMENTS	
Comment	Several commentators questioned the intent behind the replacement of the word “material” in the existing ASOP with the word “significant” in the revision.
Response	Where a change was made from “material” to “significant”, the reviewers believe that the use of the word “significant” is appropriate and consistent with its definition in ASOP No. 1, <i>Introductory Actuarial Standard of Practice</i> .
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.1, Purpose	
Comment	One commentator suggested that this section be clarified to indicate that it applies to the performance of any of the activities described.
Response	The reviewers agree and modified the language.
Comment	Several commentators suggested that section 1.1(e) be clarified to apply only to situations in which an actuary is performing an actuarial service by preparing data for use by other actuaries in an actuarial work product.
Response	The reviewers disagree with the suggested change. Sections 1.1 and 1.2 have been reorganized and reworded to be clearer, and section 1.2 now provides that “If an actuary prepares data, or is responsible for the preparation of data, to be used by other actuaries in performing actuarial services, the actuary should apply the relevant portions of this standard as though the actuary were planning to use the data, taking into account the preparing actuary’s understanding of the assignment for which the data will be used.”
Comment	One commentator believed items (a)-(e) are not clear and would benefit from additional definitions or examples.
Response	Sections 1.1 and 1.2 have been reorganized and reworded to be clearer. The reviewers do not believe examples are needed.
Section 1.2, Scope	
Comment	One commentator suggested that the ASOP should apply to actuaries who assume responsibility for preparing data as well as to those who prepare the data.
Response	The reviewers agree and modified the language.
Comment	One commentator suggested that the term “wholly hypothetical data set” needed to be defined or better described.
Response	The reviewers believe the term is clear and made no change.
Comment	One commentator suggested deleting the sentence “This standard does not require the actuary to perform an audit of the data” because it is duplicative with section 3.8.
Response	The reviewers believe this sentence is helpful in understanding the scope and made no change.

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SECTION 2. DEFINITIONS	
Comment	One commentator suggested adding definitions for “reliable data” and “authoritative data,” and retaining the definition of “practical” from the existing ASOP.
Response	The reviewers disagree with adding the definitions and note that the term “practical” is defined in ASOP No. 1. Therefore, the reviewers made no change.
Comment	One commentator requested that a definition for “information” be added.
Response	The reviewers believe the term is used with its general meaning and does not require a definition. Therefore, the reviewers made no change.
Section 2.2, Audit	
Comment	Two commentators suggested that the definition specify that an audit of data should only be performed by a professional auditor.
Response	The reviewers note that the term “audit” has a specific definition in the ASOP that does not correspond with the term under U.S. GAAP and other accounting standards, and therefore made no change.
Section 2.3, Comprehensive (now section 2.6, Sufficient)	
Comment	Two commentators stated that the terms “comprehensive” and “complete” were not sufficiently distinguished from one another.
Response	The reviewers agree and changed “comprehensive” to “sufficient.”
Section 2.4, Data (now section 2.3)	
Comment	Two commentators felt that “qualitative information” should be included rather than excluded from the definition of “data.”
Response	The reviewers disagree and made no change.
Section 2.6, Review (now section 2.5)	
Comment	Two commentators suggested that the definition of “review” be expanded to include both formal and informal examinations of data, and that it be clarified that a review is not as detailed as an audit.
Response	The reviewers agree and removed the word “informal” from the definition, and added language to indicate that a review is not as detailed as an audit.
Comment	One commentator suggested that the meaning of the phrase “obvious characteristics” was not clear.
Response	The reviewers disagree and made no change.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Comment	One commentator suggested adding a provision mandating compliance with applicable data confidentiality laws and regulations.
Response	The reviewers agree and added new section 3.7, Confidentiality, to address this comment.
Section 3.1, Overview	
Comment	Two commentators suggested that the standard address availability of data (e.g., proprietary data) in terms of practicality and the reasonableness of the effort required to obtain it.
Response	The reviewers clarified the language in section 3.2(b)(6).

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Section 3.2, Selection of Data	
Comment	One commentator requested that the phrase “sampling methods” be defined.
Response	The reviewers believe the meaning of the term is clear and made no change.
Comment	One commentator suggested that the word “desired” be replaced with “necessary for the scope of the assignment” because the commentator felt that “desired” seemed too vague and implied subjective preference rather than professional judgement. Another commentator suggested replacing “desired” with “needed” to distinguish between “the most desirable elements” and others that might be suitable.
Response	The reviewers believe that identifying data elements as “necessary” or “needed” for the assignment would be inconsistent with the guidance in section 3.2(a) that the actuary should consider “possible alternative data elements”, and made no change.
Comment	One commentator suggested replacing the first occurrence of “should consider” with “should determine” and the second occurrence with “should take into account.”
Response	The reviewers agree with the suggested wording changes and made the changes.
Comment	One commentator suggested that the meaning of “external consistency” in section 3.2(b) be clarified.
Response	The reviewers agree, removed the reference to “external consistency” from section 3.2(b), and added section 3.2(b)(3) to clarify.
Section 3.3, Review of Data	
Comment	One commentator suggested replacing the word “reason” with “justification” because the commentator believed that the word “justification” indicated a higher level of professionalism was involved in providing a justification.
Response	The reviewers believe that the word “reason” appropriately describes the intended disclosure and therefore made no change.
Comment	One commentator suggested that the standard allow “reasonableness” of the data to be established by reference to the results of using the data, rather than through a review of the data.
Response	The reviewers believe that the data should be evaluated for reasonableness, rather than only requiring that the results be reasonable, and made no change.
Comment	One commentator felt the actuary should be required to request prior data for similar work performed in earlier periods and perform a comparison. Another commentator felt an actuary should be required to perform a comparison with prior data if it is readily available, while other commentators felt the standard should not require a comparison with prior data where it is not relevant.
Response	The reviewers believe that consistency with prior data need only be considered when such consistency can reasonably be expected and changed the wording of section 3.3. The reviewers also note that section 3.3 indicates that the actuary should consider “comparing current data with the data used in the prior analysis for consistency,” and “should consider requesting the prior data,” but do not believe that the standard should be more prescriptive.
Comment	Two commentators felt that data provided by highly credible sources should not require a review.
Response	The reviewers believe this is appropriately covered by the current language in section 3.3, and made no change.

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Comment	One commentator asked whether impracticality was legitimate grounds for not performing a review.
Response	The reviewers believe that this is appropriately covered in section 3.3, including required disclosure in such situations, and made no change.
Comment	One commentator indicated that the last paragraph in this section is redundant and could be deleted.
Response	The reviewers disagree and made no change.
Comment	One commentator suggested that the standard refer to “external control totals.”
Response	The reviewers believe that level of specificity is unnecessary and made no change.
Comment	One commentator suggested that several instances of “should consider” are inconsistent with ASOP No. 1.
Response	The reviewers agree and modified the language.
Comment	One commentator suggested that this section also refer to the selection of data (not just to the preparation of data).
Response	The reviewers modified the language by deleting the reference to “preparation of data.”
Comment	One commentator felt that the review of the data should be performed by someone other than the actuary who selected or prepared the data.
Response	The reviewers do not believe that the guidance should prohibit the actuary who prepares the data from also reviewing the data, and made no change.
Comment	One commentator suggested that the actuary performing the data review must assess whether data are adequate for the purpose of the assignment.
Response	The reviewers believe the modified language in section 3.2 addresses this issue.
Comment	One commentator suggested clarifying section 3.3(b) by inserting “taking” before “further steps” (to read “the actuary should consider taking further steps, when practical, to improve the quality of the data”) and “the actuary has” between “steps” and “taken” (to read “The actuary also should disclose any significant steps the actuary has taken to improve the data”).
Response	The reviewers agree and modified the language.
Comment	One commentator suggested clarifying the responsibilities of the actuary who does not know what steps have been taken to improve the quality of the data.
Response	The reviewers note that sections 4.1(e) and 4.1(f) only require the actuary to disclose steps taken that the actuary knows about, and made no change.
Comment	One commentator felt that this section states that the actuary should review the data in determining whether a review is needed, which seems circular.
Response	The reviewers disagree that the section was circular, but modified the language to clarify.
Section 3.4, Use of Data	
Comment	One commentator suggested that the standard allow for the adjustment of results, rather than the adjustment of data, to compensate for deficiencies in the data.
Response	The reviewers agree and added a sentence to section 3.4(c).

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Comment	Two commentators suggested that completion of part of an assignment be permitted where the data were suitable for that portion of the assignment.
Response	The reviewers agree and modified the language in section 3.4(e).
Section 3.5, Reliance on Data Supplied by Others	
Comment	One commentator felt the standard should encourage positive assurance, and discourage negative assurance and blind reliance.
Response	The reviewers believe that the reference in this section to the requirements in sections 3.3 and 3.4 addresses this concern, and made no change.
Section 3.6, Reliance on Other Information Relevant to the Use of Data	
Comment	One commentator requested that the term “unsuitable” be defined and that the actuary be required to disclose mandated use of unsuitable data.
Response	The reviewers believe the meaning of the term “unsuitable” is clear. The reviewers agree that the actuary should be required to disclose mandated use of unsuitable data, and removed the language from section 3.5 and added it to section 3.4(e) to address this concern.
Comment	One commentator asked if contract provisions, plan documents, reinsurance treaties, etc. should be included in “data” rather than in the separate category of information.
Response	The reviewers believe the definition of data is appropriate as stated and made no change.
Comment	One commentator suggested that this section is redundant and could be deleted.
Response	The reviewers disagree and made no change.
Section 3.7 (now section 3.8), Limitations of the Actuary’s Responsibility	
Comment	One commentator suggested that the nature and extent of the “additional data compilations” referred to here be clarified.
Response	The reviewers agree and clarified the language in section 3.8(b).
Section 3.8, Documentation	
Comment	Several commentators questioned the need for this section and its consistency with other parts of this standard.
Response	The reviewers agree and deleted this section.
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1, Communication and Disclosure	
Comment	One commentator suggested requiring disclosure of “specific outlier data points or data elements whose exclusion (inclusion) could result in materially different conclusions.”
Response	The reviewers disagree that this level of specificity is needed and made no change.
Comment	One commentator suggested changing section 4.1(b) to require disclosure of “the nature of the data review performed by the actuary” and to require disclosure of all adjustments to data, not just the significant ones.
Response	The reviewers disagree and made no change.
Comment	One commentator suggested changing section 4.1(d) to clarify the meaning of “in summary form.”
Response	The reviewers do not believe that additional specificity is needed and made no change.

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Comment	One commentator suggested changing “significant effect” to “impact” in section 4.1(f).
Response	The reviewers disagree and made no change in what is now section 4.1(d).
Comment	Two commentators suggested that the disclosure items need not be included in every actuarial communication. Another commentator requested clarification regarding what “issuing communications” means, and where disclosures in sections 3.3, 3.4, and 3.5 should be made. One commentator suggested incorporating the distinction between actuarial communications and actuarial report under ASOP No. 41, and clarifying which parts of ASOP No. 41 apply to each.
Response	The reviewers modified the beginning of this section to indicate that “An actuarial communication can comply with some or all of the specific requirements of this section by making reference to information contained in other actuarial communications available to the intended users.”, consistent with ASOP No. 41, <i>Actuarial Communications</i> . The reviewers do not believe additional explanation of the requirements of ASOP No. 41 should be added to this standard.
Comment	Several commentators suggested the sections that are now 4.1(i)-(k) are redundant with ASOP No. 41 and could be deleted.
Response	The reviewers note that the disclosure language in (i)-(k) is standard in all ASOPs and made no change.
Comment	One commentator suggested making this section consistent with section 3.3 by restoring the previously deleted wording “and any resulting limitations on the use of the actuarial work product.”
Response	The reviewers agree and made the change in what is now section 4.1(c).
Comment	One commentator questioned why “material” was changed to “significant” in some sections of 4.1 but not in (i), (j) and (k).
Response	The reviewers note that the disclosure language in (i)-(k) is standard in all ASOPs and made no change.
Comment	One commentator requested clarification regarding gathering data not related to actuarial services or communications, and another asked whether it was intended that this section apply ASOP No. 41 requirements even where an actuarial opinion is not the end product.
Response	The reviewers revised section 1.2 to clarify that the standard applies only when data is to be used in performing actuarial services to address this issue.



ACTUARIAL STANDARDS BOARD

**Actuarial Standard of
Practice No. 25**

Credibility Procedures

Revised Edition

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

**Adopted by the
Actuarial Standards Board
December 2013**

Doc. No. 174

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December 2013

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: Actuarial Standard of Practice (ASOP) No. 25

This document is the final version of a revision of ASOP No. 25 now titled, *Credibility Procedures*.

Background

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.

First Exposure Draft

The first exposure draft of this revised ASOP was issued in September 2012 with a comment deadline of December 31, 2012. The Credibility Task Force carefully considered the 20 comment letters received and made changes to the language in several sections in response. The most significant change from the first exposure draft was the revision of section 1.2, Scope, to clarify in what situations the standard applies. In addition, the purpose and use of credibility procedures was clarified, in particular regarding the continued need for professional judgment.

Second Exposure Draft

The second exposure draft of this ASOP was issued in June 2013, with a comment deadline of September 30, 2013. Nine comment letters were received. The Task Force carefully considered all comments received and made clarifying changes to the language in several sections. For a summary of the substantive issues contained in the second exposure draft comment letters and the task force's responses, please see appendix 2. In addition, the task force made a clarifying change to the wording of the scope section to keep it appropriately focused. There were no major changes from the second exposure draft.

ASOP No. 25—December 2013

The ASB thanks everyone who took the time to contribute comments on the exposure drafts.

The ASB voted in December 2013 to adopt this standard.

ASOP No. 25—December 2013

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 when performing professional services with respect to selecting or developing **credibility procedures** and the application of those procedures to sets of data.
- 1.2 Scope—This standard applies to actuaries when performing actuarial services involving **credibility procedures** in the following situations:
- a. when the actuary is required by applicable law (statutes, regulations, and other legally binding authority) to evaluate **credibility**;
 - b. when the actuary chooses to evaluate the **credibility** of **subject experience**, or states in any related actuarial communication that **credibility** has been evaluated in accordance with this ASOP;
 - c. when the actuary is blending **subject experience** with other experience; or
 - d. when the actuary represents the data being used as statistically or mathematically credible.

If the actuary determines that the guidance in this standard conflicts with ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, ASOP No. 35 will govern.

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.

ASOP No. 25—December 2013

- 1.4 Effective Date—This standard will be effective for any professional services with respect to **credibility procedures** performed on or after May 1, 2014.

Section 2. Definitions

The terms 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 Credibility Procedure—A process that involves the following:
- a. the evaluation of **subject experience** for potential use in setting assumptions without reference to other data; or
 - b. the identification of **relevant experience** and the selection and implementation of a method for blending the **relevant experience** with the **subject experience**.
- 2.3 Full Credibility—The level at which the **subject experience** is assigned full predictive value, often based on a selected confidence interval.
- 2.4 Relevant Experience—Sets of data, that include data other than the **subject experience**, that, in the actuary’s judgment, are predictive of the parameter under study (including but not limited to loss ratios, claims, mortality, payment patterns, persistency, or expenses). **Relevant experience** may include **subject experience** as a subset.
- 2.5 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**.
- 2.6 Risk Classification System—A system used to assign risks to groups based upon the expected cost or benefit of the coverage or services provided.
- 2.7 Subject Experience—A specific set of data drawn from the experience under consideration 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—**Credibility procedures** covered by this standard are used for two purposes: 1) to evaluate **subject experience** for potential use in setting assumptions without reference to other data; and 2) to improve the estimate of the parameter under study. **Credibility procedures** may be used for tasks such as pricing, ratemaking, prospective experience rating, and reserving.

- 3.2 Selection or Development of Credibility Procedure—The actuary should use an appropriate **credibility procedure** when determining if the **subject experience** has **full credibility** or when blending the **subject experience** with the **relevant experience**. The procedure selected or developed may be different for different practice areas and applications. Additional review may be necessary to satisfy applicable law.

In selecting or developing a **credibility procedure**, the actuary should consider the following criteria:

- a. whether the procedure is expected to produce reasonable results;
- b. whether the procedure is appropriate for the intended use and purpose; and
- c. whether the procedure is practical to implement when taking into consideration both the cost and benefit of employing a procedure.

The actuary should apply **credibility procedures** that appropriately consider the characteristics of both the **subject experience** and the **relevant experience**. The actuary should consider the predictive value of more recent experience as compared to experience from earlier time periods.

- 3.3 Selection of Relevant Experience—The actuary should exercise professional judgment and use care in selecting and using **relevant experience**. Such **relevant experience** should have characteristics similar to the **subject experience**. Characteristics to consider include items such as demographics, coverages, frequency, severity, or other determinable **risk characteristics** that the actuary expects to be similar to the **subject experience**. If the proposed **relevant experience** does not meet and cannot be adjusted to meet such criteria, it should not be used.

The actuary should consider the extent to which **subject experience** is included in **relevant experience**. If **subject experience** is a material part of **relevant experience**, the actuary should use professional judgment in deciding whether and how to use that **relevant experience**.

In some instances, no **relevant experience** is available to the actuary. In this situation, the actuary should use professional judgment, considering available **subject experience**, in setting an estimate of the parameter under study.

- 3.4 Professional Judgment—The actuary should use professional judgment when selecting, developing, or using a **credibility procedure**. The use of **credibility procedures** is not always a precise mathematical process. For example, in some situations, an acceptable procedure for blending the **subject experience** with the **relevant experience** may be based on the actuary assigning full, partial, or zero **credibility** to the **subject experience** without using a rigorous mathematical model.

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- 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. The predictive value can sometimes be enhanced by separate treatment of these segments. The actuary should also consider the balance between the homogeneity of the data and the size of the data set.

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 1

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 was, “How Extensive a Payroll Exposure Is Necessary to Give a Dependable Pure Premium,” by Albert H. Mowbray (see 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

A variety of approaches are used in credibility procedures. In some cases, the approach is based on judgment; in other cases, mathematical models are used. Some selected mathematical credibility procedures are discussed below.

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, partial 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.

Emerging Practice Involving Statistical Models

More recent advancements in the application of credibility theory incorporate credibility estimation into generalized linear models or other multivariate modeling techniques. The most typical forms of these models are often referred to in literature as generalized linear mixed models, hierarchical models, and mixed-effects models. In such models, credibility can be estimated based on the statistical significance of parameter estimates, model performance on a holdout data set, or the consistency of either of these measures over time.

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.

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Appendix 2

Comments on the Second Exposure Draft and Responses

The second exposure draft of ASOP No. 25, *Credibility Procedures*, was issued in June 2013 with a comment deadline of September 30, 2013. Nine comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The Credibility Task Force and the General Committee of the Actuarial Standards Board carefully considered all comments received, and the General Committee and ASB reviewed (and modified, where appropriate) the changes proposed by the Task Force.

Summarized below are the significant issues and questions contained in the comment letters and the responses.

The term “reviewers” in appendix 2 includes the Task Force, General Committee, and the ASB. Also, unless otherwise noted, the section numbers and titles used in appendix 2 refer to those in the exposure draft.

GENERAL COMMENTS	
Comment	One commentator stated that the ASOP does not discuss instances when applicable law requires the actuary to depart from the guidance of the ASOP.
Response	The reviewers made no change and refer the commentator to the last paragraph of section 1.2 and section 4.1(a) as well as ASOP No. 41, <i>Actuarial Communications</i> .
Comment	One commentator suggested that the ASOP should contain more specific discussion on how to consider different data sources, how to assign predictive value and reliance, and other guidance.
Response	The reviewers made no change and note ASOPs are intended to give general guidance rather than specific “how to” instructions.
Comment	One commentator suggested that wording be added to require a disclosure when the credibility of data has not been evaluated.
Response	The reviewers made no change, as they believe this would broaden the ASOP to mean that actuaries always need to consider the use of credibility procedures when the intent of section 1.2 is to limit the applicability of the ASOP to certain situations. Note: ASOP No. 23, <i>Data Quality</i> , provides guidance on selection of data.

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SECTION 2. DEFINITIONS	
Section 2.3, Full Credibility	
Comment	One commentator suggested specifying that “[a]t full credibility, the relevant experience is assigned no predictive value beyond what is already provided by subject experience.”
Response	The reviewers believe section 2.3 is sufficiently clear and made no change.
Comment	One commentator suggested that there should be a requirement that when the term “fully credible” is used, it should “be appropriately modified by describing the error tolerance and confidence level which was used to test for full credibility.”
Response	The reviewers believe the definition is sufficiently clear and made no change.
Section 2.4, Relevant Experience	
Comment	One commentator suggested defining the phrase “parameter under study.”
Response	The reviewers do not believe it is necessary to define this term.
Section 2.5, Risk Characteristics	
Comment	One commentator suggested changes to the definition.
Response	The reviewers believe that the definition is appropriate and also consistent with ASOP No. 12, <i>Risk Classification</i> , section 2.8, and, therefore, made no change.
Section 2.6, Risk Classification System	
Comment	Two commentators suggested changes to the definition.
Response	The reviewers note that the definition is appropriate and also consistent with ASOP No. 12, section 2.10 and, therefore, made no change.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Purpose and Use of Credibility Procedures	
Comment	One commentator suggested adding more guidance about the use of subject and relevant experience.
Response	The reviewers believe that section 3.3 provides appropriate guidance.
Comment	Two commentators point out that “valuation” is a life insurance term and suggest adding “reserving” to the list.
Response	The reviewers note that the list is not intended to be all inclusive, but note that “reserving” is likely to be correctly interpreted by all. Therefore, the reviewers are replacing the word valuation with reserving.
Comment	One commentator suggested substituting a new term for “expected value” in section 3.1, since the term is undefined and unused in the definition section.
Response	The reviewers agree and replaced the term with wording that is consistent with wording used in the definition section.

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Section 3.2, Selection of Credibility Procedure	
Comment	One commentator suggests replacing “when blending” with “when blending or grading.” Another commentator suggests moving to “when combining.”
Response	The reviewers disagree and made no change as they believe that grading is the result of blending with factors that vary by duration.
Comment	One commentator believes the wording should be expanded to address predictive modeling.
Response	The reviewers disagree and made no change. The reviewers note that this standard addresses traditional credibility theory. While predictive modeling is addressed in the appendix, it is not explicitly referenced in the standard. To the extent traditional credibility theory per the scope of this standard is used as part of predictive modeling analysis, it is up to the actuary to determine if such work is covered by the standard.
Comment	One commentator suggests a cross reference to section 4.1(a) in regards to when methodology is prescribed by law.
Response	The reviewers note that the scope section includes a reference to section 4 for the case where methodology is prescribed by law, and made no change.
Comment	One commentator suggests moving “the actuary should consider the predictive value of more recent experience” to section 3.3.
Response	The reviewers made no change and note that this guidance applies to both subject experience and relevant experience.
Comment	One commentator suggested adding a sentence describing possible alternatives to credibility procedures, which may include statistical modeling approaches.
Response	The reviewers made no change and note that descriptions of various approaches are in appendix 1.
Section 3.3, Selection of Relevant Experience	
Comment	One commentator suggests adding underwriting to the list of considerations.
Response	The reviewers believe that underwriting is implicitly included in the category of “other determinable risk characteristics” and made no change.
Comment	One commentator questions how predictive modeling fits into the discussion.
Response	The reviewers note that predictive modeling is not explicitly addressed by this standard. However, to the extent credibility procedures within the scope of this standard are used as part of predictive modeling, the standard applies.
Comment	One commentator suggests that relevant experience be required to be fully credible.
Response	The reviewers disagree and note that fully credible experience does not always exist.
Comment	Many commentators addressed the appropriateness of the second paragraph in section 3.3.
Response	The reviewers believe that the consideration is an important one, but have removed specific guidance other than to note that professional judgment is called for.

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Comment	One commentator suggested defining the word “material,” which appeared in front of the phrase “part of relevant experience.”
Response	The term “materiality” is discussed in ASOP No. 1, section 2.6, and therefore the term was not added to the definitions section in this standard.
Comment	One commentator suggested that wording should be added to “direct the actuary to assess the degree to which the relevant experience is predictive.”
Response	The reviewers disagree and made no change, and refer the commentator to section 3.4.
Section 3.4, Professional Judgment	
Comment	One commentator suggests removing the reference to zero credibility here and from the standard entirely.
Response	The reviewers disagree and note that the scope statement specifically includes certain cases of zero credibility.
Section 3.5, Homogeneity of Data	
Comment	One commentator suggests that additional wording be added to address the balance between the size of the data set and the homogeneity of the data.
Response	The reviewers agree and made the change.
APPENDIX 1	
Comment	One commentator objected to the use of the phrase “greatest accuracy credibility,” suggesting that it was not appropriate language and may sound grandiose to statisticians.
Response	The reviewers made no change to the terminology “greatest accuracy credibility” as this is the primary name given to the credibility approach that is also referred to as the Bühlmann approach (in multiple sections of the American Academy of Actuaries’ July 2008 Credibility Practice Note).
Comment	One commentator recommended changing the title “Emerging Practice Involving Generalized Linear Models” to “Emerging Practice Involving Statistical Models.”
Response	The reviewers agree and made the change.



ACTUARIAL STANDARDS BOARD

Actuarial Standard of Practice No. 56

Modeling

**Developed by the
Modeling Task Force of the
General Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
December 2019**

Doc. No. 195

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December 2019

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

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 56

This document contains ASOP No. 56, *Modeling*.

History of the Standard

The ASB first began work on a standard for modeling in the late 1990s. Motivated primarily to address the role catastrophe modeling of earthquakes and hurricanes played in casualty ratemaking, this work was focused on the use of specialized models where actuaries would have to rely on a model that was developed by professionals other than actuaries. As a result of this work, ASOP No. 38, *Using Models Outside the Actuary's Area of Expertise*, was approved by the ASB in June of 2000 with the scope of the standard limited to the Property/Casualty area of practice. Historically, ASOP No. 38 had been the only ASOP that specifically addressed modeling.

Recently, the number and importance of modeling applications in actuarial science have increased, with the results of actuarial models sometimes being reflected in financial statements.

Recognizing this trend, the ASB asked the Life Committee in 2010 to begin work on an ASOP focused on modeling. The Life Committee formed a task force to address this issue and, in February of 2012, a discussion draft titled *Modeling in Life Insurance and Annuities* was released and nineteen comment letters were received. The transmittal letter also mentioned that the scope might be expanded to all practice areas and asked for comments on this idea.

Based upon the feedback received, and numerous other discussions on the topic of modeling, in December of 2012 the ASB created two multi-disciplinary task forces under the direction of the General Committee: i) a general Modeling Task Force, charged with developing an ASOP to address modeling applications in all practice areas, and ii) a Catastrophe Modeling Task Force to consider expanding ASOP No. 38 to all practice areas while focusing exclusively on using catastrophe models. The membership of these task forces has experience in all actuarial practice areas, including enterprise risk management.

First Exposure Draft

The first exposure draft was released in June 2013 with a comment deadline of September 30, 2013. Forty-eight comment letters were received and considered in making changes that were reflected in the second exposure draft.

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Second Exposure Draft

A second exposure draft was released in November 2014 with a comment deadline of March 1, 2015. Thirty-seven comment letters were received and considered in making changes that were reflected in the third exposure draft.

Third Exposure Draft

A third exposure draft was released in June 2016 with a comment deadline of October 31, 2016. Twenty-eight comment letters were received and considered in making changes that were reflected in the fourth exposure draft.

Fourth Exposure Draft

A fourth exposure draft was released in December 2018 with a comment deadline of May 15, 2019. Twenty-six comment letters were received and considered in making changes that were reflected in this final ASOP. For a summary of the issues contained in these comment letters, please see appendix 2.

Notable Changes from the Fourth Exposure Draft

Notable changes made to the fourth exposure draft are summarized below. Additional changes were made to improve readability, clarity, or consistency.

1. Section 3.1.6(b), Margins, was deleted because it did not provide sufficiently clear guidance. While margins are appropriately used, or even required, for certain intended purposes, margins are inappropriate and not used for other intended purposes.
2. “Hold-out data” in predictive modeling was defined and added to the list of items that may be included in the model output validation in section 3.6.2(b).
3. The term “parameter” was eliminated from section 3 of the ASOP, referencing it only within the definition of “assumption” because the two terms often are synonymous and the guidance often was identical.

As a next step, the ASB will review the previously approved but pending ASOP No. 38, *Catastrophe Modeling (for All Practice Areas)*, for any changes necessitated by this ASOP and take appropriate action.

The ASB thanks everyone who took the time to contribute comments and suggestions on the exposure drafts.

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The ASB also thanks former task force member Aaron R. Weindling for his assistance during the earlier drafting of this standard.

The ASB voted in December 2019 to adopt this standard.

ASOP No. 56—Doc. No. 195

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The Actuarial Standards Board (ASB) sets standards for appropriate actuarial practice in the United States through the development and promulgation of Actuarial Standards of Practice (ASOPs). These ASOPs describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.

ACTUARIAL STANDARD OF PRACTICE NO. 56

MODELING

STANDARD OF PRACTICE

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

- 1.1 Purpose—This actuarial standard of practice (ASOP or standard) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating **models**.
- 1.2 Scope—This standard applies to actuaries in any practice area when performing actuarial services with respect to designing, developing, selecting, modifying, or using all types of **models**. For example, an actuary using a **model** developed by others in which the actuary is responsible for the **model output** is subject to this standard.

If the actuary's actuarial services involve reviewing or evaluating **models**, the reviewing or evaluating actuary should be reasonably satisfied that the actuarial services were performed in accordance with this standard. The reviewing or evaluating actuary should apply the guidance in this standard to the extent practicable within the scope of the actuary's assignment.

The guidance in this ASOP applies to the actuary when, in the actuary's professional judgment, reliance by the **intended user** on the **model output** has a material effect for the **intended user**. This judgment should be made within the context of the use of the **model output** and the needs of the **intended user**, based on facts known by the actuary at the time the actuarial services are performed. For example, actuarial services performed in relation to pension plan contribution and cost projection **models**, insurance pricing **models**, predictive **models**, reserving **models**, and insurance company financial planning **models** may require application of the guidance in this ASOP. In assessing materiality, the actuary should be guided by ASOP No. 1, *Introductory Actuarial Standard of Practice*, section 2.6.

The guidance in this ASOP does not apply to the actuary when performing services with respect to individual pension benefit calculations and nondiscrimination testing, as described in section 1.2 of ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*.

This standard only applies to the extent of the actuary's responsibilities. The actuary's responsibilities may extend to performing actuarial services related to an entire **model** or to only a small portion of a **model**.

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Other ASOPs may provide guidance for actuarial services that involve **models**. If the actuary determines that the guidance from another ASOP conflicts with the guidance of this ASOP, the guidance of the other ASOP will govern.

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

- 1.3 Cross References—When this ASOP 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 ASOP to the extent it is applicable and appropriate.
- 1.4 Effective Date—This ASOP is effective for work performed on or after October 1, 2020.

Section 2. Definitions

The terms below are defined for use in this actuarial standard of practice and appear in bold throughout the ASOP.

- 2.1 Assumption—A type of explicit **input** to a **model** that is derived from **data**, represents possibilities based on professional judgment, or may be prescribed by law or by others. When derived from **data**, an **assumption** may be statistical, financial, economic, mathematical, or scientific in nature, and may be described as a **parameter**.
- 2.2 Data—Facts or information that are either direct **input** to a **model** or inform the selection of **input**. **Data** may be collected from sources such as records, experience, experiments, surveys, observations, benefit plan or policy provisions, or **output** from other **models**.
- 2.3 Governance and Controls—The application of a set of procedures and an organizational structure designed to reduce the risk that the **model output** is not reliably calculated or not utilized as intended.
- 2.4 Hold-out Data—A subset of **data** that is withheld intentionally when developing a predictive **model** so that the **model** may be validated later with **data** that were not used to develop the **model**.
- 2.5 Input—**Data** or **assumptions** used in a **model** to produce **output**.
- 2.6 Intended Purpose—The goal or question, whether generalized or specific, addressed by the **model** within the context of the assignment.

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- 2.7 Intended User—Any person whom the actuary identifies as able to rely on the **model output**.
- 2.8 Model—A simplified representation of relationships among real world variables, entities, or events using statistical, financial, economic, mathematical, non-quantitative, or scientific concepts and equations. A **model** consists of three components: an information **input** component, which delivers **data** and **assumptions** to the **model**; a processing component, which transforms **input** into **output**; and a results component, which translates the **output** into useful business information.
- 2.9 Model Risk—The risk of adverse consequences resulting from reliance on a **model** that does not adequately represent that which is being modeled, or the risk of misuse or misinterpretation.
- 2.10 Model Run—The process of transforming a particular set of **input** to a particular set of **output** in a **model**. A **model run** could include the whole transformation process or part of the process, as applicable.
- 2.11 Output—The results of a **model** including, but not limited to, point estimates, likely or possible ranges, **data** or **assumptions** (as **input** for other **models**), behavioral expectations, or qualitative criteria on which decisions could be made.
- 2.12 Overfitting—A situation where a **model** fits the **data** used to develop the **model** so closely that prediction accuracy materially decreases when the **model** is applied to different **data**.
- 2.13 Parameter—A type of statistical, financial, economic, mathematical, or scientific value that is used as **input** to certain types of **models**. Examples of **parameters** include expected values in probability distributions and coefficients of formula variables. Some types of **models**, such as predictive or statistical **models**, produce estimates of **parameters** as **output**, which may be used as **input** to other **models**.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Model Meeting the Intended Purpose—The actuary should understand the **model's intended purpose**.
- 3.1.1 Designing, Developing, or Modifying the Model—When the actuary designs, develops, or modifies the **model**, the actuary should confirm, in the actuary's professional judgment, that the capability of the **model** is consistent with the **intended purpose**. Items the actuary should consider, if applicable, include but are not limited to the following:
- a. the level of detail built into a **model**;

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- b. the dependencies recognized; and
 - c. the **model's** ability to identify possible volatility of **output**, such as volatility around expected values.
- 3.1.2 Selecting, Reviewing, or Evaluating the Model—When selecting, reviewing, or evaluating the **model**, the actuary should confirm that, in the actuary's professional judgment, the **model** reasonably meets the **intended purpose**.
- 3.1.3 Using the Model—When using the **model**, the actuary should make reasonable efforts to confirm that the model structure, **data**, **assumptions**, **governance and controls**, and **model** testing and **output** validation are consistent with the **intended purpose**.
- 3.1.4 Model Structure—The actuary should assess whether the structure of the **model** (including judgments reflected in the **model**) is appropriate for the **intended purpose**. The actuary should consider the following, as applicable, for a particular **model**:
- a. which provisions and risks specific to a business segment, contract, or plan, if any, or interactions more broadly, are material and appropriate to reflect in the **model**;
 - b. whether the form of the **model** is appropriate, such as a projection **model** (deterministic or stochastic), statistical **model**, or predictive **model**;
 - c. whether the use of the **model** dictates a particular level of detail, for example, whether grouping **inputs** will produce reasonable **output**, or whether a certain level of detail in the **output** is needed to meet the **intended purpose**;
 - d. whether there is a material risk of the **model overfitting** the **data**; and
 - e. whether the **model** appropriately represents options, if any, that could be reasonably expected to have a material effect on the **output** of the **model**. Examples include call options on fixed income assets, policyholder surrender options, and early retirement options.
- 3.1.5 Data—The actuary should use, or confirm use of, **data** appropriate for the **model's intended purpose** and should refer, as applicable, to ASOP No. 23, *Data Quality*, when selecting, reviewing, or evaluating **data** used in the **model**, either directly or as the basis for deriving, estimating, or testing **assumptions** used in the **model**.
- 3.1.6 Assumptions Used As Input—For **models** that use **assumptions** as **input**, the actuary should use, or confirm use of, **assumptions** that are appropriate given the

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model's intended purpose. The following guidance applies for **models** that use **assumptions** as **input**:

- a. Setting Assumptions—When setting **assumptions** for which the actuary is taking responsibility, the actuary should consider using the following **data** or information:
 1. actual experience properly modified to reflect the circumstances being modeled, to the extent actual experience is available, relevant, and sufficiently reliable;
 2. other relevant and sufficiently reliable experience, such as industry experience that is properly modified to reflect the circumstances being modeled, if actual experience is not available or relevant, or is not sufficiently reliable;
 3. future expectations or estimates, including those derived from market **data**, when available and appropriate; and
 4. other relevant sources of **data** or information.
- b. Range of Assumptions—The actuary may consider using a range of **assumptions** and, if so, whether the number of **model runs** analyzed reflects a set of conditions consistent with the **intended purpose**.
- c. Consistency—Where appropriate, the actuary should use, or confirm use of, **assumptions** for the **model** that are reasonably consistent with one another for a given **model run**.

If the actuary is aware of material inconsistencies among **assumptions** used by the actuary in the **model**, the actuary should disclose the inconsistencies and known reasons for the inconsistencies. In the case of **assumptions** prescribed by applicable law, the actuary's disclosure may be limited to identifying the possibility of an inconsistency with other **assumptions**.

- d. Appropriateness of Input in Current Model Run—Where practical and appropriate, the actuary reusing an existing **model** should evaluate whether **input** unchanged from a prior **model run** is still appropriate for use in the current **model run**. For example, **models** used in financial reporting may offer opportunities to compare **assumptions** to emerging experience in the aggregate.
- e. Reasonable Model in the Aggregate—The actuary should assess the reasonability of the **model output** when determining whether the **assumptions** are reasonable in the aggregate. While **assumptions** might

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appear to be reasonable individually, conservatism or optimism in multiple **assumptions** may result in unreasonable **output**.

- 3.2 Understanding the Model—When expressing an opinion on or communicating results of the **model**, the actuary should understand the following:
- a. important aspects of the **model** being used, including but not limited to, basic operations, important dependencies, and major sensitivities;
 - b. known weaknesses in **assumptions** used as **input**, known weaknesses in methods or other known limitations of the **model** that have material implications; and
 - c. limitations of **data** or information, time constraints, or other practical considerations that could materially impact the **model's** ability to meet its **intended purpose**.
- 3.3 Reliance on Data or Other Information Supplied by Others—When relying on **data** or other information supplied by others, the actuary should refer to ASOP No. 23 and ASOP No. 41, *Actuarial Communications*, for guidance.
- 3.4 Reliance on Models Developed by Others—If the actuary relies on a **model** designed, developed, or modified by others, such as a vendor or colleague, and the actuary has a limited ability either to obtain information about the **model** or to understand the underlying workings of the **model**, the actuary should disclose the extent of such reliance. In addition, the actuary should make a reasonable attempt to have a basic understanding of the **model**, including the following, as appropriate:
- a. the designer's or developer's original **intended purpose** for the **model**;
 - b. the general operation of the **model**;
 - c. major sensitivities and dependencies within the **model**; and
 - d. key strengths and limitations of the **model**.

When relying on **models** developed by others, the actuary should make practical efforts to comply with other applicable sections of this standard.

- 3.5 Reliance on Experts—The actuary may rely on experts in the fields of knowledge used in the development of the **model**. In determining the appropriate level of reliance, the actuary may consider the following:
- a. whether the individual or individuals upon whom the actuary is relying are experts in the applicable field;

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- b. the extent to which the **model** has been reviewed or validated by experts in the applicable field, including known material differences of opinion among experts concerning aspects of the **model** that could be material to the actuary's use of the **model**;
- c. whether there are industry or regulatory standards that apply to the **model** or to the testing or validation of the **model**, and whether the **model** has been certified as having met such standards; and
- d. whether the science underlying the expertise is likely to produce useful **models** for the **intended purpose**.

When relying on experts, the actuary should disclose the extent of such reliance.

3.6 Evaluation and Mitigation of Model Risk—The actuary should evaluate **model risk** and, if appropriate, take reasonable steps to mitigate **model risk**. The type and degree of **model risk** mitigation that is reasonable and appropriate may depend on the following:

- a. the **model's intended purpose**;
- b. the nature and complexity of the **model**;
- c. the operating environment and **governance and controls** related to the **model**;
- d. whether there have been changes to the **model** or its operating environment; and
- e. the balance between the cost of the mitigation efforts and the reduction in potential **model risk**.

3.6.1 Model Testing—For a **model run** or set of **model runs** generated at one time or over time that is to be relied upon by the **intended user**, the actuary should perform sufficient testing to ensure that the **model** reasonably represents that which is intended to be modeled. **Model** testing may include the following:

- a. reconciling relevant **input** values to the relevant system, study, or other source of information, addressing and documenting the differences appearing in the reconciliation, if material;
- b. checking formulas, logic, and table references;
- c. running tests of variations on key **assumptions** used as **input** to test that changes in the **output** are consistent with expectations given the changes in the **input** (i.e., sensitivity testing); and

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- d. reconciling the **output** of a **model run** to prior **model runs**, given changes in **data**, **assumptions**, formulas, or other aspects of the **model** since the prior **model run**.

3.6.2 **Model Output Validation**—The actuary should validate that the **model output** reasonably represents that which is being modeled. Depending on the **intended purpose**, **model output** validation may include the following:

- a. testing, where applicable, preliminary **model output** against historical actual results to verify that modeled **output** would bear a reasonable relationship to actual results over a given time period if **input** to the **model** were set to be consistent with the conditions prevailing during such period;
- b. evaluating whether the **model** applied to **hold-out data** produces **model output** that is reasonably consistent with **model output** developed without the **hold-out data**, as may be used for predictive **models**;
- c. performing statistical or analytical tests on **model output** to assess their reasonableness;
- d. running tests of variations on key **assumptions** to test that changes in the **output** are consistent with the expectations given the changes in the **input**; and
- e. comparing **model output** to those of an alternative **model(s)**, where appropriate.

3.6.3 **Review by Another Professional**—The actuary may consider obtaining a review by another qualified professional, depending upon the nature and complexity of the **model**.

3.6.4 **Reasonable Governance and Controls**—The actuary should use, or, if appropriate, may rely on others to use, reasonable **governance and controls** to mitigate **model risk**.

3.6.5 **Mitigating Misuse and Misinterpretation**—The actuary should refer to the guidance in ASOP No. 41, in particular sections 3.4.1 and 3.7, to mitigate possible misuse and misinterpretation of the **model**.

3.7 **Documentation**—The actuary should consider preparing and retaining documentation to support compliance with the requirements of section 3 and the disclosure requirements of section 4. If preparing documentation, the actuary should prepare such documentation in a form such that another actuary qualified in the same practice area could assess the reasonableness of the actuary’s work. The degree of such documentation should be based on the professional judgment of the actuary and may vary with the complexity and purpose

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of the actuarial services. In addition, the actuary should refer to ASOP No. 41, section 3.8, for guidance related to the retention of file material other than that which is to be disclosed under section 4.

Section 4. Communications and Disclosures

- 4.1 Required Disclosures in an Actuarial Report—When issuing an actuarial report under this standard, the actuary should refer to ASOP Nos. 23 and 41. In addition, the actuary should disclose the following in such actuarial reports:
- a. the **intended purpose** of the **model**, as discussed in section 3.1;
 - b. material inconsistencies, if any, among **assumptions**, and known reasons for such inconsistencies, as discussed in section 3.1.6(c);
 - c. unreasonable **output** resulting from the aggregation of **assumptions**, if material, as discussed in section 3.1.6(e);
 - d. material limitations and known weaknesses, as discussed in section 3.2;
 - e. extent of reliance on **models** developed by others, if any, as discussed in section 3.4; and
 - f. extent of reliance on experts, if any, as discussed in section 3.5.
- 4.2 Additional Disclosures in an Actuarial Report—The actuary should include the following, as applicable, in an actuarial report:
- a. the disclosure in ASOP No. 41, section 4.2, if any material **assumption** or method was prescribed by applicable law;
 - 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.
- 4.3 Confidential Information—Nothing in this ASOP is intended to require the actuary to disclose confidential information.

Appendix 1

Background and Current Practices

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

Background

Actuaries frequently use models to analyze uncertain outcomes, with every discipline relying on a broad range of modeling applications, ranging from simple spreadsheets to complex capital models. Actuaries have used models for a variety of purposes including to help explain a system, to study the effects of different parts of a system, to predict the behavior of a system, to predict the behavior of people, to derive estimates, or to inform decisions. The importance of modeling in actuarial science has continued to increase, with results of models sometimes being reflected in financial statements.

A model is only an approximation of reality, however, and not reality itself. Therefore, even a model that is prudently developed and carefully used does not eliminate inherent uncertainty and variability, and actual results may differ, sometimes significantly, from outcomes suggested by the model.

Current Practices

Actuaries use many types of models, ranging from projection models to statistical models and predictive models. Some models evolve through a life cycle consisting of: (1) a specification phase, (2) an implementation phase, and (3) a production phase, which consists of one or more model runs. Other models evolve through a life cycle of: (1) a specification phase, (2) an iterative, assumptions estimation phase, and (3) an output evaluation, validation, and selection phase. For other models, combinations of functionally similar phases may exist.

Appropriate model governance and controls are important when using models. Examples of model governance and controls include the following:

- limitations on access to use and modify the model (that is, restricting access to model input, model programming code and calculations, and model output);
- confirmation that model output is reproducible upon rerun (if the model allows for such reproducibility);
- implementing a model change management process;
- specification, documentation, and programming standards for the model;

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- procedures for secure back-up of the media storing the programming code and data;
- appropriate staff training or cross-training for continuity of use and mitigation of key-person risk;
- plans for periodic consideration of the organization’s continued ability to access and maintain the model, including data, software, staff, hardware, and any vendor relationships; and
- plans for periodic review of the assumptions, functionality, and methodology.

Appendix 2

Comments on the Fourth Exposure Draft and Responses

The fourth exposure draft titled *Modeling* was approved by the ASB in December 2018 with a comment deadline of May 15, 2019. Twenty-six comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The Task Force and General Committee carefully considered all comments received, and the ASB reviewed (and modified, where appropriate) the changes proposed by the General Committee.

Summarized below are the significant issues and questions contained in the comment letters and the responses to each. Minor wording or punctuation changes that were suggested but not significant are not reflected in the appendix, although they may have been adopted.

The term “reviewers” includes the Task Force, General Committee, and the ASB. Unless otherwise noted, the section numbers and titles used below refer to those in the fourth exposure draft, which are then cross referenced with those in the final ASOP.

GENERAL COMMENTS	
Comment	One commentator suggested that the uses of “any” when in the context of what an actuary should do or should consider, and other similar references, may be onerous to actuaries in practice, and recommended their elimination.
Response	The reviewers agree and made the change.
Comment	One commentator suggested retaining a definition of “simple model” conceptually similar to what was included in the third exposure, with the suggested enhancement of modifying “transparent and can be predicted” to “transparent or can be predicted” to improve its usefulness and clarity.
Response	The reviewers note the concept of “simple model” has been previously addressed and made no change.
Comment	One commentator suggested that the standard include a definition of and guidance for ongoing model performance monitoring.
Response	While the reviewers agree with the concept of ongoing performance monitoring within a formalized model risk management program, the reviewers disagree with the suggestion for this ASOP and therefore did not make the change.
SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.1, Purpose	
Comment	One commentator suggested that sections 1.1, Purpose, and 1.2, Scope, should include explicit reference to mitigating model risk since it is a key area of focus on the modeling process and there is an explicit section of the ASOP exposure draft dedicated to this practice.
Response	The reviewers believe the guidance is appropriate and therefore made no change.

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Section 1.2, Scope	
Comment	One commentator suggested that “responsible” should be replaced by “accountable” since it implies ownership – and the use of this term is more consistent with that used in the insurance industry to indicate appropriate ownership.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator recommended the use of the words “rely” and “reliance” be clarified as the terms are rather subtle given that some users of models consider the use of a model as reliance even when it is the user’s own model.
Response	The reviewers believe the guidance is appropriate and therefore made no change.
Comment	One commentator suggested that the standard be applied only to financial reporting models and perhaps enterprise risk models.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that the guidance for an actuary reviewing or evaluating models is not clear as to whether it is the model itself that is being reviewed or evaluated (which is what the text seems to literally suggest), or whether it is the use of the model that is being reviewed.
Response	The reviewers clarified the guidance.
Comment	One commentator disagreed with the exclusion of the concept of a “simple model” from the fourth exposure draft and recommended that the scope explicitly exclude simple calculations.
Response	The reviewers disagree with the suggestion and, therefore, did not make the change. The reviewers refer the commentator to section 1.2, Scope, including the definition of “model,” when considering the applicability of the guidance in the ASOP.
Comment	One commentator suggested certain references to “use” might be confusing, in particular: 1) When the actuary’s “use” of a model is not for the purpose of reviewing the model itself but only for the purpose of reviewing or using the output. In this instance, the standard should explicitly state that the actuary should not be charged with applying this standard, and 2) in the second paragraph that states the reviewing or evaluating actuary should “use the guidance in this standard to the extent practicable within the scope of the actuary’s assignment” and in third paragraph that appears to use “rely” and “use” interchangeably.
Response	The reviewers agree with the potential confusion that might arise with the word “use” in the second and third paragraphs, and replaced these two references to “use” in section 1.2, Scope to improve clarity. However, the reviewers believe the guidance in the second paragraph is appropriate and therefore made no change in response to that part of the comment.
Comment	Two commentators suggested that the first sentence in the fifth paragraph seems unnecessary and suggested eliminating that sentence. One commentator also suggested beginning the paragraph with the current third sentence.
Response	The reviewers agree and made the change.

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Comment	One commentator thought the example, “For example, actuarial services performed in relation to pension plan contribution and cost projection models...may require application of the guidance in this ASOP” was confusing.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 1.4, Effective Date	
Comment	Once commentator believes that the effective date language needs to be more descriptive because as written, it leaves many questions related to when the model was run, selected, developed, or when model results were communicated.
Response	The reviewers note that ASOPs apply to the actuary performing the actuarial services, and the effective date applies to “work performed [by the actuary] on or after....” Therefore, the reviewers made no change in response to this comment.
SECTION 2. DEFINITIONS	
Comment	One commentator suggested adding definitions for “testing,” “validation,” and “limitations.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.1, Assumption	
Comment	One commentator suggested that the definition of section 2.1, Assumption, be changed to note that an assumption can be produced as output from another model. Alternatively, the definitions of data and parameter in sections 2.2 and 2.12, respectively, could be changed to remove any reference to these items being produced from other models.
Response	The reviewers agree, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator question whether assumptions are always input into a model versus incorporated into the model operations or methodology.
Response	In an effort to improve clarity and in response to this comment, the reviewers revised the definition of “assumption” to “a type of explicit input...” thus differentiating between explicit and implicit assumptions.
Section 2.2, Data	
Comment	One commentator requested examples of data that can be input to a model in the same way that examples of parameters are provided in that section since data are often refreshed with each model run while parameters and assumptions often remain unchanged from one run to the next.
Response	While the reviewers did not make the specific recommended edit, the reviewers made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested that the drafted definition is too vague and general with respect to the kinds of data the ASOP addresses and suggested the definition be limited to quantitative or numerical data.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.3, Governance and Controls	
Comment	One commentator suggested that a more descriptive definition would be “The application of a set of procedures and an organizational structure designed so that intended users can have confidence that the model output is reliably calculated and utilized as intended.”
Response	The reviewers clarified the language.

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Comment	One commentator suggested defining “governance” and “controls” separately since they have different meaning.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.4, Input (now section 2.5)	
Comment	One commentator suggested the definition of input is very broad, and that input to a model can be in the form of 1) assumptions, 2) data, or 3) parameters. While each term is defined separately later in the document, the user must glean that they are not overlapping elements of input.
Response	The reviewers agree, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested adding the following sentence after the current sentence: “Input may include assumptions, data, and parameters.”
Response	The reviewers agree in part, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Section 2.5, Intended Purpose (now section 2.6)	
Comment	One commentator suggested clarifying whether a model can have more than one intended purpose, perhaps treating each intended purpose as a separate model, even where they have a common processing component. This approach will reinforce the need to assess the appropriateness of a combination of specific processing components, data, assumptions, parameters and output for each intended purpose.
Response	The reviewers believe the guidance is appropriate and therefore made no change.
Comment	One commentator understood the definition for all roles other than when the actuary is the model developer and suggested that there should be a consideration of other purposes to be efficient with modeling efforts and less siloed in approach.
Response	The reviewers disagree and therefore made no change.
Section 2.6, Intended User (now section 2.7)	
Comment	Three commentators suggested replacing “actuarial findings” with “model’s output” (which is defined in this ASOP while “findings” are not).
Response	The reviewers agree and made the change.
Comment	One commentator suggested replacing the word “actuarial findings” with “output of an actuarial model.”
Response	The reviewers agree in part and replaced “actuarial findings” with “model output.”
Comment	One commentator noted the definition is too broad as it describes an actuary as “able” to rely, and suggested alternatives of “likely” or “expected.”
Response	The reviewers disagree and therefore made no change.
Comment	One commentator suggested that, while the definition is identical to that contained within ASOP No. 41, <i>Actuarial Communications</i> , the use of “able” and “identifies” in the definition may cause confusion, and suggested the alternative “Any person whom the actuary has indicated is permitted to rely on the actuarial findings.”
Response	The reviewers disagree and therefore made no change.
Section 2.7, Model (now section 2.8)	
Comment	One commentator sought feedback regarding the definition of “model” in the context of several examples.
Response	The reviewers note that the ASOPs are principle-based and believe the current language covers these issues at the appropriate level of detail. Therefore, no change was made in response to this comment.

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Comment	One commentator suggested adding the caveat from the background section of appendix 1 to the definition of a “model” to emphasize that a model is not bad or inaccurate just because a model did not match actual experience, namely: “A model is only an approximation of reality, not the reality itself, and the differences between the model and actual experience, by themselves, do not indicate a flawed model or noncompliance with standards.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that the definition of a “model” is very broad and recommended defining the “processing component” to enable differentiation between simple calculations and a “model.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested removing the reference to “simplified” as it seems unnecessarily restrictive.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that the definition is too broad as it could be interpreted to include any actuarial service other than individual benefit calculations and recommended that the definition should also describe what is not a model, such as nondiscrimination testing.
Response	The reviewers believe the definition of “model” is appropriate but note that section 1.2 was modified to exclude nondiscrimination testing.
Comment	One commentator suggested that the definition be changed to include “contractual” as a type of input and suggested adding “actuarial” to the list. In addition, the commentator suggesting adding a new definition for “system” as referenced in the definition.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested separating the “results component” from the model definition because the use of “results” in section 2.10, Output, appears to be inconsistent with the “results component” as described in this definition and the definition of output allows that such output could be used as input to other models.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested changing “to predict the behavior of a system, or to derive estimates and guide decisions” to “to predict the behavior of a system, to derive estimates of a system, or to guide decisions,” because the former could imply “guiding decisions” and “deriving estimates” should always be considered together.
Response	The reviewers note that the last sentence in the definition was removed.
Comment	One commentator suggested that the definition and section 1.2, Scope, were unclear, and thus it was difficult to evaluate the remainder of the exposure draft.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Comment	One commentator suggested the definition was unclear as to what types of models were addressed by the ASOP, and recommended that the ASOP specifically refer to quantitative or numerical models with respect to data, parameters, input and output, and that the scope of the “models” covered by the ASOP should be limited to quantitative models (for example, estimates) or perhaps other types of models based directly on quantitative values and explicitly exclude algorithmic decision making and other forms of artificial intelligence.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.8, Model Risk (now section 2.9)	
Comment	One commentator suggested that the definition include specific guidance on the use of the term, namely that “model risk” is not intended to include the likelihood that actual results of most all models will often differ, perhaps materially, from that produced by the Model’s output, and recommended that, at a minimum, the sentence from the second paragraph (if not, the entire paragraph) in the “Background” section of this ASOP be made an integral part of the ASOP: “Even a model that is prudently developed and carefully used does not eliminate inherent uncertainty and variability, and actual experience may differ, sometimes significantly, from the estimates derived from the model results,” ideally, within this definition. As an alternative, the ASOP could add an additional definition for “model outcome risk.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggesting adding the consequence of model risk to the definition, namely that “Model risk can lead to financial loss, poor business and strategic decision making, or damage to ... reputation.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested rewording for better clarity as follows: “The risk of adverse consequences resulting from reliance on a model that does not adequately represent that which is being modeled or the risk of misuse or misinterpretation.”
Response	The reviewers agree and made the change in response to this comment.
Section 2.9, Model Run (now section 2.10)	
Comment	Two commentators sought clarification on what a model run constitutes, with one commentator recommending calling the collection of all simulations for a stochastic model as one model run to improve clarity.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggesting replacing “selection of input” with “set of input.”
Response	The reviewers agree and made the change.
Section 2.10, Output (now section 2.11)	
Comment	One commentator suggested that the four possible uses of output (i.e., point estimates, ranges, parameters for other models, or qualitative criteria for making decisions) fail to capture the use of a model for explaining a system or predicting its behavior.
Response	The reviewers agree and added “behavioral expectations” to the definition.

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Comment	One commentator noted that section 2.10, Output, only mentions parameters as output that might be used as input to other models, while different sections of the proposed ASOP also mention data and assumptions as possible model outputs that can be used as input to other models.
Response	The reviewers agree, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested eliminating “qualitative criteria on which decisions could be made,” which is vague and may include unintended application of the ASOP.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.11, Overfitting (now section 2.12)	
Comment	Three commentators suggested adding “materially” to the phrase “prediction accuracy decreased” to allow for the actuary to determine whether that decrease is large enough to cause concern.
Response	The reviewers agree and made the change.
Comment	One commentator suggested that including “may decrease” in place of “decrease” seems more appropriate since the guidance in section 3.14 uses the words “should consider.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested including a definition of underfitting as well as adding more descriptive examples for both overfitting and underfitting.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 2.12, Parameter (now section 2.13)	
Comment	One commentator suggested that to further distinguish parameter from data, it would be helpful to state, “Parameters often consist of product features that are used to configure a model for specific blocks of business. Unlike data, they typically remain constant from run to run, unless the model’s scope is expanded to include new products.”
Response	While the reviewers did not make the specific recommended edit, the reviewers made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator recommended further differentiating between a parameter used as an input to a model and that used as output from a model (for example, “input parameter” and “output parameter”).
Response	While the reviewers did not make the specific recommended edit, the reviewers made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested adding the phrase “that is not data or assumptions” after “contractual input” in the first sentence.
Response	The reviewers removed the reference to the term “contractual” within the definition of “parameter,” and revised the definitions of “assumptions,” “input,” and “output” to improve clarity.
Comment	One commentator shared an analysis of the definitions and use of the terms “parameter,” “assumptions,” “input” and “output,” and stated that it is not clear how “parameters” are distinguishable from other “assumptions” or “data.”
Response	The reviewers agree, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.

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Comment	One commentator observed that the definition of parameter appeared to be a subset of assumptions and recommended considering language to highlight that assumptions/methods may be used to develop the parameters used in the model.
Response	The reviewers agree in part, made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested adjusting the definition to restrict it to quantitative values.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Model Meeting the Intended Purpose	
Comment	One commentator noted that actuaries will often “repurpose” models for different intended purposes and suggested that the ASOP explicitly require the actuary developing, selecting, or evaluating the model to identify and document the specific purposes or ranges of parameters/inputs, etc., for which the model is valid/applicable and require actuaries to identify what aspects of the model would need to be adjusted to eliminate model limitations. The commentator also suggested that actuaries developing models should anticipate modeling changes that will develop in the near future to avoid having rigid models.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.1.1, Designing, Developing, or Modifying the Model	
Comment	One commentator suggested that this section should speak directly to modeling choices. Where the design of a model includes significant modeling choices (for example, simplifications, approximations), the actuary should understand the rationale and/or justification for the choices made. Where an actuary is responsible for designing, developing, or modifying a model, the actuary should consider whether developmental testing is needed to assess the appropriateness of significant modeling choices.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted that the meaning of “dependencies recognized” is not clear and requires additional explanation.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted that it may not be clear what the actuary is looking for in terms of “consistency with the intended purpose” when discussing the volatility of the expected values and that it’s not clear what “dependencies” are, in particular whether the term is referencing the dependencies among models or consistency of the model with its data, assumptions & parameters (A&P), and methods. In addition, the commentator suggested that a definition of dependencies would be helpful.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing the phrase “include but are not limited to” with “for example” since such a replacement would reduce the chance of misinterpretation of the guidance in terms of what the actuary is obliged to do.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Section 3.1.2, Selecting, Using, Reviewing, or Evaluating the Model (now titled, Selecting, Reviewing, or Evaluating the Model). Note: Changes to old section 3.1.2 have been incorporated into new section 3.1.3, Using the Model, as referenced below.	
Comment	One commentator noted that the initial input as well as revisions to input need to be consistent with the intended purpose, and therefore recommended removing the words “any revisions to.”
Response	The reviewers agree and made the change, which appears in new section 3.1.3.
Comment	One commentator noted general agreement, with the exception of “governance and controls,” which in many situations will be set at a firm-wide level and are not available for an actuary’s review (for instance, when an actuary uses its firm’s actuarial valuation software). Further, although the commentator agrees that governance and controls may affect the actuary’s ability to rely on the model, the commentator does not believe these factors would affect the model’s inherent consistency with its intended purpose, and suggested the ASOP should contain a separate section describing what an actuary should consider with respect to governance and controls for models.
Response	The reviewers believe the guidance, which now appears in new section 3.1.3, is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted confusion with the use of “output are consistent with the intended purpose,” and that the use of “consistent” might result in confusion between sections 3.1.1 and 3.1.2. Further, the commentator suggested the word “validation” should be replaced with “testing” given that the term “validation” is a very particular word for many companies and usually corresponds to Independent Model Validation.
Response	The reviewers believe the guidance, which now appears in new section 3.1.3, is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing “confirm the model reasonably meets the intended purpose ...” with “review that the model is reasonable with respect to meeting the intended purpose ...” In addition, the commentator suggested replacing “to ensure that any revisions to the input and ... are consistent with the intended purpose.” with “to consider whether the revisions to the input and ... are consistent with the intended purpose.”
Response	The reviewers clarified the guidance.
Comment	One commentator suggested replacing the word “ensure” with “validate” and sought an example for what “the standard require(s) with respect to the determination of reasonability.”
Response	The reviewers clarified the guidance and replaced the word “ensure” with “use or confirm” in new section 3.1.3.
Section 3.1.3, Understanding the Model (now section 3.2)	
Comment	One commentator suggested replacing “results of the model,” with “output” as defined in section 2, requested clarification of “methods” in paragraph b, and suggested removing “time constraints” in paragraph c.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to these comments.
Comment	One commentator asked whether the actuary should also understand the appropriate use of the model.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator did not think this paragraph should be limited to when the actuary is expressing an opinion on or communicating results of the model and suggested “rewording would be helpful here.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Comment	One commentator expressed uncertainty regarding the meaning of “dependencies,” and questioned whether “methods” meant the model “methodology” or whether it meant the methods used to develop the A&P.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing section 3.1.3 with the following: “When providing actuarial services which depend significantly on the use of one or more models, the actuary should understand the important aspects of each model being used, such as: a. basic operation of the model, significant dependencies and sensitivities among variables or parameters, input and output, in the model; b. significant known limitations with respect to assumptions and parameters used as input, with respect to the data, information or methods used to build, calibrate, test or validate the model, or with respect to other considerations known to pose material implications when using the model or interpreting model output; and c. significant limitations with respect to a material impact affecting the ability of the model to meet its intended purpose due to other practical considerations, such as data issues, incomplete information, time constraints, etc.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.1.4, Model Structure	
Comment	One commentator recommended removing the examples in 3.1.4(e), suggesting that they are not “useful or necessary.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that this section should clarify when the actuary should make this assessment, such as when designing, developing, modifying, selecting, using, reviewing, or evaluating a model, or only when doing some of those actions. In addition, the commentator requested further clarification on the meaning of “judgments reflected in the model” and recommended the removal of “the structure of” from the stem as it would not change the guidance and could prevent confusion/misinterpretation.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator questioned why only overfitting is considered, and suggested consideration of parsimony, identifiability, goodness of fit, theoretical consistency and predictive power given that overfitting is just one of many types of error that would result in deteriorating a model’s predictive power.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested including definitions for “projection model,” “statistical model,” and “predictive model.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing the current statement “whether the model is overfitting the data” with “whether the model is overfitting or underfitting the data” to fully capture the bias/variance tradeoff instead of focusing solely on overfitting.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Comment	One commentator suggested using “structure” instead of “form” for consistency with the title of 3.1.4, Model Structure.
Response	The reviewers disagree and therefore made no change.
Comment	One commentator suggested replacing should “consider” in section 3.1.4 with “evaluate and document,” and suggested adding wording that requires actuary to indicate how, if at all, modeling of these provisions, risks and interactions are simplified and therefore appropriate only in certain situations.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested adding the word “product” to the list in section 3.1.4(a), adding “or type” after “whether the form” to better reflect the reference to projection, statistical, predictive models, and whether “model requirements” may be necessary in section 3.1.4(c).
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested rewording of section 3.1.4, subsections a, d, e as follows: “(a) whether there are specific provisions and risks reflected in the model which are material and appropriate to the use of the model, for example, differences by business segment, contract or plan; (d) whether there is a significant and material risk of overfitting the model with the available data; (e) whether the model appropriately reflects the existence of significant options or features, which may apply, that could be reasonably expected to have a material effect on the output of the model. Examples include call options on fixed income assets, policyholder surrender options, and early retirement options.”
Response	The reviewers clarified the language regarding overfitting the model but made no change in response to the other comments.
Section 3.1.5, Data	
Comment	One commentator suggested that the actuary should consider what transformations of input data and assumptions, if any, are required and how these affect results.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.1.6, Assumptions and Parameters Used As Input (now section 3.1.6, Assumptions Used As Input)	
Comment	One commentator believes that it is “unnecessary, confusing and burdensome to include assumptions setting guidance in this standard, given the Assumptions ASOP currently under development, and given the many other ASOPs that provide assumption setting guidance for certain activities.”
Response	The reviewers believe the guidance is appropriate and therefore made no change related to this comment. This ASOP may not reference another ASOP that continues to be within the exposure process.
Comment	One commentator suggested adding “As” to the beginning of the stem of section 3.1.6, to read, “As for models that use assumptions and parameters as input....” In addition, the commentator noted that assumption setting and parameterization of assumptions should be mentioned separately for clarity as they are different activities and imply different risks.
Response	While the reviewers did not make the specific recommended edit, the reviewers made changes to the definitions of “assumption,” “parameter,” “input,” and “output,” and removed references to “parameter” within section 3 of the ASOP to improve clarity.
Comment	One commentator suggested the addition of an example of a model that does not use assumptions or parameters as input.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Section 3.1.6(a), Setting Assumptions and Parameters (now section 3.1.6[a], Setting Assumptions)	
Comment	One commentator stated that it should be a criterion that the actuary document assumptions appropriately or ensure that assumptions provided by others are documented as such.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested referring to ASOP No. 25, <i>Credibility Procedures</i> , when discussing using actual experience to the extent it is “relevant and sufficiently reliable” within section 3.1.6(a)(1).
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested adding a fifth line item to section 3.1.6(a), namely “prescribed assumptions set by law” and “prescribed assumptions set by another party” (as used in ASOP No. 27, <i>Selection of Economic Assumptions for Measuring Pension Obligations</i> , and ASOP No. 35, <i>Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations</i>) (for example, accounting assumptions), and assumptions developed with the opinion of experts. In addition, the commentator does not believe that the actuary should be required to assess whether assumptions that include prescribed assumptions set by law or prescribed assumptions set by another party are reasonable in the aggregate.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested changing the title of section 3.1.6(a) from “Setting Assumptions and Parameters” to “Setting Assumptions or Parameters” because the former could imply both are required, and adding reasonableness of individual assumptions or parameters that could have a material impact on model results to section 3.1.6(a) since reasonableness in aggregate is mentioned in 3.1.6(f).
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggesting rewording section 3.1.6(a)(1) to be “actual experience adjusted to current conditions where applicable, to the extent that adjustments to the data are considered to be available, relevant, and sufficiently reliable;” and requested a definition of “market data.”
Response	While the reviewers did not make the specific changes suggested, the reviewers replaced “It” with “actual experience” in section 3.1.6(a), Setting Assumptions, to improve clarity.
Section 3.1.6(b), Margins	
Comment	Several comments were received on the guidance or necessity of section 3.1.6(b), Margins.
Response	In response, the reviewers removed section 3.1.6(b), Margins.
Section 3.1.6(c), Range of Assumptions and Parameters (now Section 3.1.6[b], Range of Assumptions)	
Comment	One commentator suggested that it is not clear what is meant by a range of assumptions and parameters in section 3.1.6(c) and offered a number of alternative of the meaning of the phrase.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator questioned why the number of model runs was relevant to the range of assumptions and parameters.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Section 3.1.6(d), Consistency (now section 3.1.6[c], Consistency)	
Comment	One commentator suggested changing the phrase "...possibility of an inconsistency..." to "...potential of an inconsistency..."
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that just requiring the actuary to "use or confirm use" is very weak guidance, and that the standard should use "not unreasonably inconsistent" in order to indicate that consistency in this context is subject to considerable judgment.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.1.6(e), Appropriateness of Input in Current Model Run (now section 3.1.6[d], Appropriateness of Input in Current Model Run)	
Comment	One commentator stated agreement with 3.1.6(e), and suggested the addition, perhaps in a separate paragraph, that the model itself (not just the input) should be evaluated.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested clarifying the following "... reusing an existing model..." given that the term "reusing" can also be interpreted as using an existing model for a different purpose while the intention here seems to be around using a model with updated data.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.1.6(f) Reasonable Model in the Aggregate (now section 3.1.6[e] Reasonable Model in the Aggregate)	
Comment	One commentator suggested that it would be helpful to provide an example of a situation where assumptions which are reasonable individually can produce output which is unreasonable in the aggregate, and recommended adding guidance around appropriate potential actions if the actuary determines this to be the case.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted that the determination on the reasonability of a model in the aggregate as well as the assumptions and parameters in the aggregate would typically involve examining the reasonability of the output of the model in making such a determination, and suggested articulating the importance of considering the reasonability of the output in making the determination of the reasonability of the model in the aggregate as well as the reasonability of the parameters and assumptions in the aggregate.
Response	The reviewers agree and added "the reasonability of the model output when determining" after "assess."
Comment	One commentator suggested rewording section 3.1.6(f) as follows: "The actuary should assess whether the assumptions and parameters are reasonable in the aggregate. The actuary should consider those assumptions and parameters which might appear to be reasonable individually, but would produce unreasonable output, due to conservatism or optimism in multiple assumptions and parameters."
Response	The reviewers agree and made changes similar to those suggested to improve clarity.
Section 3.2, Reliance on Data or Other Information Supplied by Others (now section 3.3, Reliance on Data or Other Information Supplied by Others)	
Comment	One commentator suggested adding the title of ASOP No. 23 consistent with the title of ASOP No. 41.
Response	The reviewers note that the ASOP follows an approved style guide. Since the title of ASOP No. 23, <i>Data Quality</i> , had been previously mentioned, no further reference is required for subsequent mentions.

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Section 3.3, Reliance on Models Developed by Others (now section 3.4, Reliance on Models Developed by Others)	
Comment	One commentator suggested that the actuary also consider the experience and qualifications of the colleague/vendor.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that to the extent the actuary relies on testing performed by others, the actuary should also make a reasonable attempt to understand testing that has been performed on the model, i.e., implementation testing as well as any developmental testing. In addition, the commentator suggested that actuary who relies on a model built by a vendor or other developer is still responsible for ensuring the model is appropriate given its intended purpose and that results of any ongoing performance monitoring processes should be added to the list items to examine and understand.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that this section would lead to a tremendous amount of additional, unnecessary work, and potential litigation risk if the work is not performed, such as when relying upon centralized valuation systems implemented and tested by others.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested removing the last sentence in the section as it is somewhat ambiguous and could leave open to interpretation which sections of the standard are applicable, and that the detailed sub-bullets 3.3(a)-(d) seem sufficient.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted that it isn't clear whether the intent is that the actuary should disclose reliance if they can do neither, or if they can do one but not the other, and that it is not clear whether "a limited ability ... to understand the underlying workings of the model" would include a situation where the actuary cannot review programming but can understand what the model is intended to produce and can verify reasonableness and recommended clarification.
Response	The reviewers agree with the suggestion that the actuary may have a limited ability to either "obtain information about the model or to understand the underlying workings of the model" or both. The reviewers added "either" to improve clarity. Otherwise, the reviewers believe the guidance is appropriate and made no further change.
Comment	One commentator recommended that a new sentence 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."
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator objected to permitting actuaries to rely upon models which they do not fully understand and feels this violates Precept 1 of the <i>Code of Professional Conduct</i> and diminishes our profession.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Section 3.4, Reliance on Experts (now section 3.5, Reliance on Experts)	
Comment	One commentator expressed no significant concerns with section 3.4, however noted that it will become cumbersome, confusing, and misleading in certain circumstances when the expert is employed by the same firm as the actuary. As a result, the commentator recommended that the requirement to disclose the extent of any reliance be limited to situations where the experts were not employed by the actuarial firm issuing the report.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested removing the last sentence, “The actuary should disclose the extent of any such reliance,” because section 4.1(f) already lists the disclosure requirement for 3.4.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.5, Mitigation of Model Risk (now section 3.6, Evaluation and Mitigation of Model Risk)	
Comment	One commentator recommended including a statement that model materiality is an important consideration in actions the actuary should take to mitigate model risk. The more material the impacts of a model can have on the company financial statements, capital positions, or management action, the more actions the actuary should take to mitigate the model risk.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator stated that the actuary should use judgment when assessing mitigation efforts as compared to model risk, and that the level of model risk mitigation should be commensurate with the perceived or actual level of risk associated with the use of the model.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator believes that “evaluate” implies a quantitative process and recommended replacing “evaluate” with a term such as “understand.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested changing the title of section 3.5 from “Mitigation of Model Risk” to “Evaluation and Mitigation of Model Risk” given the guidance.
Response	The reviewers agree and made the change.
Comment	One commentator suggested changing 3.5(d) to read “whether there have been any changes to the model or its operating environment” for consistency.
Response	The reviewers agree and made the change.
Comment	One commentator recommended the inclusion of guidance related to when and how often the actuary should an actuary evaluate model risk.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing 3.5(d) with the following: “(d) whether there have been significant changes to the model or to the underlying environment, conditions, experience, or process for which the model was designed; and”
Response	While the reviewers did not make the specific changes suggested, the reviewers replaced “modeling” with “operating” environment to improve clarity.

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Section 3.5.1, Model Testing (now section 3.6.1, Model Testing)	
Comment	One commentator suggested that section 3.5.1, Model Testing, should include reference to sensitivity testing given that it is an important part of model testing.
Response	The reviewers agree and added “running tests of variation on key assumptions used as input to test that changes in the output are consistent with expectations given the changes in the input (sensitivity testing).”
Comment	One commentator suggested that it should be clearer that “reconciling,” means that the values are input correctly in to the model or modeling software, and not just that the input data before it is loaded in to the model reconciles to the source data given that if someone reconciles that initial data before it is loaded in to a model reconciles with the admin system, but then loads it in to the model incorrectly, it is a source of model risk.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that section 3.5.1(b) deserves more attention as this is often the most time-consuming element of model testing and recommended stating that the actuary should consider what the major modeling methodology choices and simplifications are, as well as determine the best way to appropriately test formulas.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested adding in a new section 3.5.1(c): “Performing sample runs of individual model points to validate application of model logic and inputs” and shifting the existing 3.5.1(c) to 3.5.1(d).
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator sought clarification on how the actuary's responsibility for testing the model would differ between a “model run” and a “set of model runs generated at one time or over time.” In addition, the commentator suggested moving “data” to appear before “input,” and changing the definition of “model” to reference “formula” instead of “processing component” given that the term is more intuitive.
Response	The reviewers agreed with moving the reference to “data” to be before “assumptions” but did not make other changes in response to this comment.
Comment	One commentator suggested renaming these sections 3.5.1 and 3.5.2 to “model integrity testing” and “model output validation.”
Response	The reviewers agree that section 3.5.2, Model Validation, should be renamed to Model Output Validation, but did not change the title of section 3.5.1.
Comment	One commentator sought clarification on the determination of materiality in section 3.5.1(a), and on the difference between testing and validation.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator noted that sections 3.5.1 (a)-(c) could be considered model controls and governance, and not necessarily model testing.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Section 3.5.2, Model Validation (now section 3.6.2, Model Output Validation)	
Comment	One commentator sought clarification on the term “Model Validation,” and how the use of term in the ASOP differs from the use of that same term under SR 11-7: Guidance on Model Risk Management.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that section 3.5.2 should include and reference the concept of an “effective challenge,” and that the intensity and effort of the challenge should be commensurate with the risk and materiality of the model.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested adding an additional item under 3.5.2 related to predictive models, namely, “For predictive models, testing should include running the developed model against a hold-out dataset, not used to develop the model, to verify that modeled output would bear a reasonable relationship to actual results from the hold-out data.” In addition, the commentator suggested adding a definition of “hold-out data” such as: “Hold-out data – typically a random subset of the data being modeled. Hold-out data is not used to create the model itself, but rather, used to validate that the model that was built is truly predictive when applied to a previously unseen set of data.”
Response	The reviewers agree that changes were appropriate and modified the language in this section and added a definition of “hold-out data.”
Comment	One commentator suggested changing “The actuary should take appropriate steps to validate” to “The actuary should validate” for greater clarity.
Response	The reviewers agree and made the change.
Comment	One commentator suggested that section 3.5.2 be called Model Testing, given that Validation has a specific connotation to many companies that is not meant by what is being described.
Response	The reviewers modified the title of section 3.5.2 from Model Validation to Model Output Validation.
Section 3.5.3, Review by Another Professional (now section 3.6.3, Review by Another Professional)	
Comment	One commentator recommended striking section 3.5.3 since actuaries can always consider having another professional review their work and the section provides no guidance and is not needed.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator questioned when it would be appropriate to not obtain such a review and suggested that the word “may” be replaced by “should” or removing the sentence altogether.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing section 3.5.3 with the following: The actuary may consider obtaining a review by a second, qualified professional. Use of another review would increase depending upon the nature and complexity of the model as well as with the materiality of the intended use(s).”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Section 3.5.5, Mitigating Misuse and Misinterpretation (now section 3.6.5, Mitigating Misuse and Misinterpretation)	
Comment	One commentator suggested that section 3.5.5 is already handled in the stem of 3.5 and recommended that this section be removed.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Comment	One commentator noted the reference in section 3.5.5 to sections 3.4.1 in ASOP No. 41 but noted there is no section 3.4.1 in ASOP No. 41.
Response	The reviewers note that section 3.4.1 in ASOP No. 41 is titled “Uncertainty or Risk.”
Comment	One commentator suggested mentioning the headings/titles of the section in other ASOPs in addition to the section numbers when they are being used as reference in case that the section numbers got changed in another ASOP for any reason.
Response	The reviewers note the standard follows an approved style guide and made no change in response to this comment.
Section 3.6, Documentation (now section 3.7, Documentation)	
Comment	One commentator suggested that the section should be more specific about what to document, with documentation best practices including the documentation of inputs, calculations – including key methodology choices (including simplifications and approximations), outputs, intended purpose, use limitations, and ongoing performance monitoring processes, model testing (including any developmental testing) and validation.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	Three commentators suggested strengthening the guidance by replacing “should consider” with “should.”
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested that the provision that the documentation could allow that another actuary qualified in the same practice area “assume the assignment if necessary” could be onerous in many cases and recommended that the ASOP should not expand upon general documentation requirements as the provision in the draft ASOP - that “another actuary qualified in the same practice area could assess the reasonableness of the actuary’s work”- is sufficient.
Response	The reviewers agree and deleted “or could assume the assignment if necessary.”
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1, Required Disclosures in an Actuarial Report	
Comment	One commentator recommended changing the section name to “Disclosures in an Actuarial Report” since the use of “required” in the title is confusing given the guidance that the actuary “should disclose,” and recommended adding any unreasonable, unexplained variances from recent ongoing performance monitoring processes (addressed in a recommended new section 3.5.6) should be added to the list of items that should be disclosed.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator suggested replacing 4.1(d) with “d. unreasonable output resulting from the aggregation of assumptions and parameters used as input, if material, as discussed in section 3.1.6(f).”
Response	The reviewers agree with the concept and modified the language accordingly.
Comment	One commentator recommended changing “material limitations” to “material limitations, important aspects and weaknesses” to ensure disclosures cover all related items discussed in section 3.1.3.
Response	The reviewers agree in part and added “and known weaknesses” after “material limitations.”
Comment	One commentator suggested adding a clarification as to whether the “experts” in section 4.1(f) refer to outside experts or both outside and in-house experts.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.

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Comment	One commentator noted that not all items in section 3.3 are covered by the disclosures in section 4.1, namely key methods and A&P and model testing (sensitivities).
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator recommended that it be made clear that the ASOP does not require an actuarial report with respect to the models used by the actuary.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.
Comment	One commentator proposed removing section 4.2 as section 4.1 already requires compliance with the disclosure standards of ASOP No. 41.
Response	The reviewers believe the guidance is appropriate and therefore made no change in response to this comment.



Statement of Principles Regarding Property and Casualty Insurance Ratemaking

(Adopted by the Board of Directors of the CAS May 1988)

The purpose of this Statement is to identify and describe principles applicable to the determination and review of property and casualty insurance rates. The principles in this Statement are limited to that portion of the ratemaking process involving the estimation of costs associated with the transfer of risk. This Statement consists of four parts:

I. DEFINITIONS

II. PRINCIPLES

III. CONSIDERATIONS

IV. CONCLUSION

The principles contained in this Statement provide the foundation for the development of actuarial procedures and standards of practice. It is important that proper actuarial procedures be employed to derive rates that protect the insurance system's financial soundness and promote equity and availability for insurance consumers.

Although this Statement addresses property and casualty insurance ratemaking, the principles contained in this Statement apply to other risk transfer mechanisms.

I. DEFINITIONS

Ratemaking is the process of establishing rates used in insurance or other risk transfer mechanisms. This process involves a number of considerations including marketing goals, competition and legal restrictions to the extent they affect the estimation of future costs associated with the transfer of risk. This Statement is limited to principles applicable to the estimation of these costs. Such costs include claims, claim settlement expenses, operational and administrative expenses, and the cost of capital. Summary descriptions of these costs are as

26 follows:

- 27 – *Incurred losses* are the cost of claims insured.
- 28 – *Allocated loss adjustment expenses* are claims settlement costs directly assignable to specific
- 29 claims.
- 30 – *Unallocated loss adjustment expenses* are all costs associated with the claim settlement function
- 31 not directly assignable to specific claims.
- 32 – *Commission and brokerage expenses* are compensation to agents and brokers.
- 33 – *Other acquisition expenses* are all costs, except commission and brokerage, associated with the
- 34 acquisition of business.
- 35 – *Taxes, licenses and fees* are all taxes and miscellaneous fees except federal income taxes.
- 36 – *Policyholder dividends* are a non-guaranteed return of premium charged to operations as an
- 37 expense.
- 38 – *General administrative expenses* are all other operational and administrative costs.
- 39 – *The underwriting profit and contingency provisions* are the amounts that, when considered with
- 40 net investment and other income, provide an appropriate total after-tax return.

41 **II. PRINCIPLES**

42 Ratemaking is prospective because the property and casualty insurance rate must be developed
43 prior to the transfer of risk.

44 **Principle 1:** A rate is an estimate of the expected value of future costs.

45 Ratemaking should provide for all costs so that the insurance system is financially sound.

46 **Principle 2:** A rate provides for all costs associated with the transfer of risk.

47 Ratemaking should provide for the costs of an individual risk transfer so that equity among
48 insureds is maintained. When the experience of an individual risk does not provide a credible basis
49 for estimating these costs, it is appropriate to consider the aggregate experience of similar risks.

50 A rate estimated from such experience is an estimate of the costs of the risk transfer for each
51 individual in the class.

52 **Principle 3:** A rate provides for the costs associated with an individual risk transfer.
53 Ratemaking produces cost estimates that are actuarially sound if the estimation is based on
54 Principles 1, 2, and 3. Such rates comply with four criteria commonly used by actuaries: reasonable,
55 not excessive, not inadequate, and not unfairly discriminatory.

56 **Principle 4:** A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an
57 actuarially sound estimate of the expected value of all future costs associated with an individual
58 risk transfer.

59 **III. CONSIDERATIONS**

60 A number of ratemaking methodologies have been established by precedent or common usage
61 within the actuarial profession. Since it is desirable to encourage experimentation and innovation
62 in ratemaking, the actuary need not be completely bound by these precedents. Regardless
63 of the ratemaking methodology utilized, the material assumptions should be documented and
64 available for disclosure. While no ratemaking methodology is appropriate in all cases, a number
65 of considerations commonly apply. Some of these considerations are listed below with summary
66 descriptions. These considerations are intended to provide a foundation for the development of
67 actuarial procedures and standards of practice.

68 **Exposure Unit** – The determination of an appropriate exposure unit or premium basis is essential. It
69 is desirable that the exposure unit vary with the hazard and be practical and verifiable.

70 **Data** – Historical premium, exposure, loss and expense experience is usually the starting point of
71 ratemaking. This experience is relevant if it provides a basis for developing a reasonable indication
72 of the future. Other relevant data may supplement historical experience. These other data may
73 be external to the company or to the insurance industry and may indicate the general direction of
74 trends in insurance claim costs, claim frequencies, expenses and premiums.

75 **Organization of Data** – There are several acceptable methods of organizing data including
76 calendar year, accident year, report year and policy year. Each presents certain advantages and
77 disadvantages; but, if handled properly, each may be used to produce rates. Data availability, clarity,

- 78 simplicity, and the nature of the insurance coverage affect the choice.
- 79 Homogeneity – Ratemaking accuracy often is improved by subdividing experience into groups
80 exhibiting similar characteristics. For a heterogeneous product, consideration should be given
81 to segregating the experience into more homogeneous groupings. Additionally, subdividing or
82 combining the data so as to minimize the distorting effects of operational or procedural changes
83 should be fully explored.
- 84 Credibility – *Credibility* is a measure of the predictive value that the actuary attaches to a particular
85 body of data. Credibility is increased by making groupings more homogeneous or by increasing the
86 size of the group analyzed. A group should be large enough to be statistically reliable. Obtaining
87 homogeneous groupings requires refinement and partitioning of the data. There is a point at which
88 partitioning divides data into groups too small to provide credible patterns. Each situation requires
89 balancing homogeneity and the volume of data.
- 90 Loss Development – When incurred losses and loss adjustment expenses are estimated, the
91 development of each should be considered. The determination of the expected loss development
92 is subject to the principles set forth in the Casualty Actuarial Society's *Statement of Principles*
93 *Regarding Property and Casualty Loss and Loss Adjustment Expense Reserves*.
- 94 Trends – Consideration should be given to past and prospective changes in claim costs, claim
95 frequencies, exposures, expenses and premiums.
- 96 Catastrophes – Consideration should be given to the impact of catastrophes on the experience
97 and procedures should be developed to include an allowance for the catastrophe exposure in the
98 rate.
- 99 Policy Provisions – Consideration should be given to the effect of salvage and subrogation,
100 coinsurance, coverage limits, deductibles, coordination of benefits, second injury fund recoveries
101 and other policy provisions.
- 102 Mix of Business – Consideration should be given to distributional changes in deductibles, coverage
103 limitations or type of risks that may affect the frequency or severity of claims.

104 Reinsurance – Consideration should be given to the effect of reinsurance arrangements.
105 Operational Changes – Consideration should be given to operational changes such as changes in
106 the underwriting process, claim handling, case reserving and marketing practices that affect the
107 continuity of the experience.
108 Other Influences – The impact of external influences on the expected future experience should be
109 considered. Considerations include the judicial environment, regulatory and legislative changes,
110 guaranty funds, economic variable, and residual market mechanisms including subsidies of residual
111 market rate deficiencies.
112 Classification Plans – A properly defined classification plan enables the development of actuarially
113 sound rates.
114 Individual Risk Rating – When an individual risk’s experience is sufficiently credible, the premium for
115 that risk should be modified to reflect the individual experience. Consideration should be given to
116 the impact of individual risk rating plans on the overall experience.
117 Risk – The rate should include a charge for the risk of random variation from the expected costs.
118 This risk charge should be reflected in the determination of the appropriate total return consistent
119 with the cost of capital and, therefore, influences the underwriting profit provision. The rate should
120 also include a charge for any systematic variation of the estimated costs from the expected costs.
121 This charge should be reflected in the determination of the contingency provision.
122 Investment and Other Income – The contribution of net investment and other income should be
123 considered.
124 Actuarial Judgment – Informed actuarial judgments can be used effectively in ratemaking. Such
125 judgments may be applied throughout the ratemaking process and should be documented and
126 available for disclosure.

127 **IV. CONCLUSION**

128 The actuary, by applying the ratemaking principles in this Statement, will derive an estimation of the
129 future costs associated with the transfer of risk. Other business considerations are also a part of

(Rescinded by the Board of Directors of the CAS December 2020)
(Reinstated by the Board of Directors of the CAS May 2021, for reference for U.S.-regulated ratemaking)

130 ratemaking. By interacting with professionals from various fields including underwriting, marketing,
131 law, claims, and finance, the actuary has a key role in the ratemaking process.