



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 23**

Data Quality

Revised Edition

**Developed by the
General Committee of the
Actuarial Standards Board and
Applies to All Practice Areas**

**Adopted by the
Actuarial Standards Board
December 2004
Updated for Deviation Language Effective May 1, 2011**

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

Background

The ASB originally adopted ASOP No. 23, *Data Quality* (Doc. No. 044), in 1993. The previous ASOP was prepared by the Data Quality Task Force of the Specialty Committee of the ASB. The General Committee has prepared this revision of ASOP No. 23 to be consistent with the current ASOP format, to reflect current, generally accepted practice with respect to data quality, and to provide guidance concerning other information relevant to the use of data.

Exposure Draft

The exposure draft of this ASOP was approved for exposure in October 2003 with a comment deadline of March 31, 2004. Twenty-eight 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 General Committee's responses are provided in appendix 2.

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

1. Section 1.2, Scope, has been clarified to indicate that if this standard establishes requirements in addition to those imposed by law, the actuary should satisfy the requirements of both the standard and the law.
2. When data are supplied by others, section 3.3 clarifies that the actuary should follow the guidance of section 3.5, Review of Data, before relying on such data. This means that the actuary should review the data for reasonableness and consistency unless, in the actuary's professional judgment, such a review is not necessary or not practical.

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3. Similarly, section 3.4, Reliance on Other Information Relevant to the Use of Data, allows reliance on such information, but now does so “unless it is or becomes apparent to the actuary during the time of the assignment that the information contains material errors or is otherwise unreliable.”
4. The standard clarifies that section 3.5, Review of Data, applies whether the actuary prepared the data or received the data from a third party. The section also suggests that, in doing the review of the data, the actuary attempt to determine the definition of each data element used in the analysis. A definition of “review” has been added to section 2, pointing out that this is an informal examination of the obvious characteristics of the data.
5. The sentence that appeared in the previous ASOP No. 23 but was removed from the exposure draft of this revision, which stated that the actuary is not expected to “develop additional data compilations solely for the purpose of searching for questionable or inconsistent data,” was reinserted in section 3.6, Limitation of the Actuary’s Responsibility.
6. Section (c) of 3.7, Use of Data, was expanded to apply to results that are highly uncertain, in addition to those that have a material bias. Appropriate disclosure is required in section 4.1 if the actuary decides to complete the assignment in such circumstances.
7. The committee clarified section 3.8 by explicitly requiring the actuary to document any material defects in the data, in keeping with the requirements of ASOP No. 41, *Actuarial Communications*.

The General Committee thanks everyone who took the time to contribute comments on the exposure draft.

The ASB voted in December 2004 to adopt this standard.

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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 give guidance to the actuary in the following:
- a. selecting the data that underlie the actuarial work product;
 - b. relying on data supplied by others;
 - c. reviewing data;
 - d. using data; and
 - e. making appropriate disclosures with regard to data quality.
- 1.2 **Scope**—This standard applies to actuaries when providing professional actuarial services in all practice areas. 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.
- This standard does not require the actuary to audit 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 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 May 1, 2005. In all cases, this standard will be effective for any actuarial work product commenced on or after July 1,

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2006.

Section 2. Definitions

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

- 2.1 **Appropriate Data**—For purposes of data quality, data are appropriate if they are suitable for the intended purpose of an analysis and relevant to the system or process being analyzed.
- 2.2 **Audit**—To conduct a formal and systematic examination of a set of data for the purpose of testing its accuracy, using techniques commonly employed by audit professionals.
- 2.3 **Comprehensive Data**—For purposes of data quality, data obtained from inventory or sampling methods are comprehensive if they contain sufficient data elements or records needed for the analysis.
- 2.4 **Data**—For purposes of this standard, the term refers to numerical, census, or classification information and not to general or qualitative information. Assumptions are not data, but data are commonly used in the development of actuarial assumptions.
- 2.5 **Data Element**—An item of information, such as date of birth or risk classification.
- 2.6 **Practical**—Realistic in approach during the time of the assignment, given the purpose and nature of the assignment and any constraints, including cost and time considerations.
- 2.7 **Review**—An informal examination of the obvious characteristics of the selected data to determine if such data appear reasonable and consistent for purposes of the assignment. A review is not an audit of data.

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Section 3. Analysis of Issues and Recommended Practices

- 3.1 Overview—Data that are completely accurate, appropriate, and comprehensive are frequently not available. The actuary should use available data that, in the actuary’s professional judgment, allow the actuary to perform the desired analysis. However, if material data limitations are known to the actuary, the actuary should disclose those limitations and their implications. The following sections discuss such considerations in more detail.
- 3.2 Selection of Data—In undertaking an analysis, the actuary should consider what data to use. The actuary should consider the scope of the assignment and the intended use of the analysis being performed in order to determine the nature of the data needed and the number of alternative data 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 with due consideration of the following:
 1. appropriateness for the intended purpose of the analysis, including whether the data are sufficiently current;
 2. reasonableness and comprehensiveness of the necessary data elements, with particular attention to internal and external consistency;
 3. any known, material limitations of the data;
 4. the cost and feasibility of obtaining alternative data, including the ability to obtain the information in a reasonable time frame;
 5. the benefit to be gained from an alternative data set or data source as balanced against its availability and the time and cost to collect and compile it; and
 6. sampling methods, if used to collect the data.
- 3.3 Reliance on Data Supplied by Others—In most situations, the data are provided to the actuary by others. The accuracy and comprehensiveness 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 section 3.5. In doing so, the actuary should disclose such reliance in an appropriate actuarial communication.

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- 3.4 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 comprehensiveness of such information are the responsibility of those who supply such information. The actuary may rely on such information supplied by another, unless it is or becomes apparent to the actuary during the time of the assignment that the information contains material errors or is otherwise unreliable. The actuary should disclose reliance on information provided by another in an appropriate actuarial communication.
- 3.5 Review of Data—A review of data may not always reveal existing defects. Nevertheless, whether the actuary prepared the data or received the data from others, the actuary should review the data for reasonableness and consistency, 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 extent of any checking, verification, or auditing that has already been performed on the data, the purpose and nature of the assignment, and relevant constraints.

When determining the nature and extent of such a review, the actuary should consider the following:

- a. Data Definitions—The actuary should make a reasonable effort to determine the definition of each data element used in the analysis, as described in section 3.2.
- b. Identify Questionable Data Values—The actuary should review the data used directly in the actuary’s analysis for the purpose of identifying data values that are materially questionable or relationships that are materially inconsistent. If the actuary believes questionable or inconsistent data values could have a material effect on the analysis, the actuary should consider further steps, when practical, to improve the quality of the data.
- c. Review of Prior Data—If similar work has been previously performed for the same or recent periods, the actuary should consider reviewing the current data for consistency with the data used in the prior analysis. If the actuary does not have the prior data, the actuary should consider requesting the prior data.

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 done such a review and should disclose any resulting limitation on the use of the actuarial work product.

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- 3.6 Limitation of the Actuary's Responsibility—The actuary is not required to do any of the following:
- a. determine whether data or other information supplied by others are falsified or intentionally misleading;
 - b. develop additional data compilations solely for the purpose of searching for questionable or inconsistent data; or
 - c. audit the data.
- 3.7 Use of Data—Because data that are completely accurate, appropriate, and comprehensive are frequently not available, the actuary should make a professional judgment about which of the following is applicable:
- a. the data are of sufficient 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. 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 material bias, the actuary may choose to complete the assignment, but should disclose the potential existence of the uncertainty or bias, and, if reasonably determinable, their nature and potential magnitude;
 - d. if the actuary believes that the data are likely to contain material defects, the actuary should determine, if practical, the nature and extent of any checking, verification, or auditing that may have been performed on the data. Then, if, in the actuary's professional 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 analysis, then the actuary should obtain different data or decline to complete the assignment.
- 3.8 Documentation—The actuary should comply with the requirements of ASOP No. 41, *Actuarial Communications*, regarding the preparation and retention of the documentation. In addition, the actuary's documentation should include the following:

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- a. the process the actuary followed to evaluate the data, including the review or consideration of prior data;
- b. a description of any material defects the actuary believes are in the data;
- c. a description of any adjustments or modifications made to the data, other than routine corrections made by reference to source documents, including the rationale for any such adjustments or modifications; and
- d. any other documentation necessary to comply with the disclosure requirements of section 4.1.

Section 4. Communications and Disclosures

4.1 **Communication and Disclosure**—When issuing communications under this standard, the actuary should comply with ASOP No. 41. In addition, the actuary should disclose the following items:

- a. the source(s) of the data;
- b. whether the actuary reviewed the data and, if not, any resulting limitations on the use of the actuarial work product;
- c. the extent of the actuary's reliance on data and other information relevant to the use of data supplied by others;
- d. any material judgmental adjustments or assumptions that the actuary applied to the data, or are known by the actuary to have been applied to the data, to allow the actuary to perform the analysis;
- e. any limitations on the use of the actuarial work product due to uncertainty about the quality of the data;
- f. any unresolved concerns the actuary may have about the data that could have a material effect on the actuarial work product;
- g. (1) the existence of results that are highly uncertain or have a potentially material bias of which the actuary is aware due to the quality of the data; and (2) the nature and potential magnitude of such uncertainty or bias, if they can be reasonably determined;
- h. 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

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authority);

- i. 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
- j. 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.

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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 field of practice and training in actuarial theory, which together enable the actuary to 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 fully 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.

Persons or organizations responsible for generating, collecting, or publishing data may apply 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 uses, from limited distribution within an organization to public exposure.

Important aspects of data utilization include documentation and disclosure of (1) the sources of data; (2) review of data; (3) material biases resulting from data used by the actuary; (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 Committee Responses

The exposure draft of this revision of ASOP No. 23, *Data Quality*, was issued in October 2003 with a comment deadline of March 31, 2004. Twenty-eight 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 carefully considered all comments received. Summarized below are the significant issues and questions contained in the comment letters and the committee’s responses. Unless otherwise noted, the section numbers and titles used below refer to those in the exposure draft.

GENERAL COMMENTS	
Several commentators suggested various editorial changes in addition to those addressed specifically below. The committee implemented such suggestions if they enhanced clarity and did not alter the intent of the section.	
In the transmittal memorandum of the exposure draft, the committee asked readers to comment on whether the exposure draft clarified the previous standard. Most commentators believed that the revisions did clarify the standard, and others had suggestions that are addressed in the following responses.	
Comment	One commentator suggested that the standard should address issues concerning how results vary when using data with different time horizons.
Response	The committee believed that issue was more about credibility than data quality and made no change in the standard.
Comment	A commentator believed that the standard should also provide guidance on privacy, confidentiality, and distribution of the actuarial report.
Response	The committee believed such issues were beyond the scope of this standard. ASOP No. 41, <i>Actuarial Communications</i> , provides guidance with respect to actuarial reports.
Comment	One commentator recommended expanding the title of the standard to add “Actuaries’ Responsibilities in Selecting, Reviewing, and Using Data.”
Response	The committee believed that this was unnecessary, because section 1.1, Purpose, identifies the specific professional services discussed in the standard.
Comment	A commentator suggested that, since it is common for actuaries to extract their own data for use in their analyses, the standard should more clearly indicate the actuary’s responsibility to review data that the actuary has independently created.
Response	The committee agreed and revised section 3.5, Review of Data, in response.
Comment	One commentator thought that the actuary should be required to disclose and resolve material differences between prior and current period data.
Response	The committee believed that the actuary should be satisfied that the current data are appropriate and should disclose other concerns related to data quality in accordance with section 4.1(g) (now 4.1(f)). The reconciliation of data from one period to the next is beyond the scope of this standard.

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SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.2, Scope	
Comment	One commentator objected to not requiring the actuary to audit the data, while several others supported the statement in the standard that audits are not required.
Response	The committee believed that the actuary should generally be required to review, but not audit the data, and left this scope limitation unchanged.
Comment	Several commentators recognized that the actuary must comply with law, regulation, or other binding authority, but disagreed that the actuary should disclose such a conflict.
Response	The committee disagreed and retained the disclosure requirement, consistent with other standards. In response to another comment, the committee also added a sentence clarifying that the actuary must comply with both the standard and the law when the standard has more extensive requirements than the law. Finally, the wording of this section was modified to clarify that the standard applied only to professional “actuarial” services.
Section 1.4, Effective Date	
Comment	A commentator pointed out that it is common in some practice areas to use a significant amount of data collected in prior years and then perform the current analysis after the latest data have been added to the database or using relevant current data. The commentator believed that the prior data should be subject only to requirements in effect when the data were originally collected and not be subject to any new requirements in the standard.
Response	The committee discussed this point and made no change to this section, because it believed that other sections of the standard gave sufficient guidance to the actuary regarding the extent to which the actuary should review the data, including consideration of practicality and materiality.
SECTION 2. DEFINITIONS	
Some commentators suggested adding definitions of other terms. In most cases, the committee did not believe that was necessary. However, it did add a definition of “review,” as suggested by one commentator, to clarify that a review is less formal than an audit and does not verify the accuracy of data, but merely consists of observing its obvious characteristics and abnormalities.	
Section 2.1, Appropriate (now Appropriate Data)	
Comment	Several commentators suggested adding the word “data” to the title of this section.
Response	The committee agreed and added “data” here and in the title of section 2.3.
Comment	One commentator suggested deleting the phrase “relevant to the system or process being analyzed.”
Response	The committee thought the existing language was necessary and sufficiently clear and made no change.
Section 2.2, Audit	
Comment	Some editorial suggestions were made to improve the definition.
Response	The committee adopted some of the suggestions, adding “for the purpose of testing its accuracy” and removing “or review,” because that latter term is now defined and differentiated from an audit.
Section 2.3, Comprehensive (now Comprehensive Data)	
Comment	A commentator recommended that “sufficient data elements” be used in this definition in place of “each data element.”
Response	The committee agreed that this was more appropriate wording and made the change.
Comment	One commentator suggested adding a discussion of inventory or sampling methods.
Response	The committee did not see the need for such a discussion.

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Section 2.4, Data	
Comment	A commentator pointed out that actuaries often use data contained in reports prepared by other professionals and suggested that such data be covered by this definition.
Response	The committee made no change to this definition, because sections 3.3 and 3.4 address reliance on data and other information supplied by others.
Comment	One commentator suggested expanding the definition to indicate that sometimes assumptions are used to develop certain data elements.
Response	The committee did not believe such an expansion was necessary. The use of assumptions to perform such analyses is referenced in section 3.7(c).
Section 2.6, Practical	
Comment	A number of comments were received on the inclusion of the defined term “practical” in response to the committee’s request in the transmittal letter of the exposure draft. Some commentators thought the definition was unnecessary, and some offered suggestions for further improvement.
Response	Because the concept of practicality is an important consideration in this standard in aiding an actuary to make professional judgments regarding selection of data, and whether and to what extent to review the data, among other things, the committee strongly believed that a definition of this term should be included.
Comment	One commentator pointed out that use of hindsight would be inappropriate in determining what was practical.
Response	The committee agreed and added “during the time of the assignment” to the definition.
Comment	One commentator wanted to add guidance on considerations for evaluating materiality.
Response	The committee believed that materiality is a subjective concept that depends on the actuary’s professional judgment, and that it was beyond the scope of this standard to define or provide guidance on materiality.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Overview	
Comment	One commentator pointed out that some assignments do, in fact, require perfect data, and that the standard should recognize this.
Response	The committee disagreed that the standard should be written to address specific situations that would require more diligent treatment. Sections 3.2 and 3.5 state that consideration should be given to the purpose and nature of the assignment.
Section 3.2, Selection of Data	
Comment	One commentator wanted to clarify the language relating to “review.”
Response	The committee decided to delete reference to “review” in this section as it is thoroughly covered in section 3.5.

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Comment	One commentator believed that section 3.2(b)(5) should be eliminated or at least restricted to alternate data sources reasonably known to the actuary.
Response	The committee believed this guidance is important and, in view of the comment, carefully considered the wording again and revised the wording to clarify that the actuary is provided adequate leeway to consider the benefits of seeking alternative data sources versus the effort necessary to get them.
Comment	One commentator suggested that the terms “data sets” and “data sources” should be consistent here and in section 3.2(b)(5).
Response	The committee agreed and made changes to accomplish this.
Comment	One commentator believed “subject to the limitations presented by the actuary’s reliance on others...” should be added to clarify how this section relates to sections 3.3 and 3.4.
Response	The committee believed that the guidance for selection of data should not depend on whether or not the actuary needs to rely on others to supply the data and did not believe such an addition was necessary or appropriate.
Comment	One commentator suggested deleting “relative availability” and adding “time and” in front of the word “cost” in section 3.2(b)(5).
Response	The committee did drop “relative” and did add “time and.”
Section 3.3, Reliance on Data Supplied by Others	
Comment	One commentator supported the concept of what was labeled “blind reliance.” A couple of commentators were uncertain as to whether the implication of such reliance was appropriate and consistent with sections 3.1 or 3.5. Several others commented that such reliance was inappropriate.
Response	After much discussion and careful consideration, the committee ultimately agreed that additional clarity was needed. Accordingly, the committee added the phrase “subject to the guidance in section 3.5,” and that section provides that the actuary should review the data for reasonableness and consistency unless, in the actuary’s professional judgment, it is not practical or not necessary to do so.
Section 3.4, Reliance on Other Information Relevant to the Use of Data	
Comment	Two commentators were uncomfortable with the implication of absolute reliance in this section, believing that it could conflict with the guidance in other sections of the ASOP by setting a different standard.
Response	The committee believed a lower standard was appropriate but agreed that the actuary should not proceed with the analysis based on information that is known by the actuary to be suspect. Accordingly, the committee added the phrase “unless it is or becomes apparent to the actuary during the time of the assignment that the information contains material errors or is otherwise unreliable.”
Comment	Two commentators thought that “or summaries of such documents” should be specifically added to the list.
Response	Because the list provides examples only, the committee believed that this added language was not needed.
Section 3.5, Review of Data	
Comment	Several commentators questioned the meaning of the word “appropriate.”
Response	The committee deleted the word “appropriate” where it might be confusing.
Comment	Several commentators questioned whether it was always necessary to review prior data and suggested adding the word “consider” in section 3.5(a) regarding review of prior data.
Response	The committee agreed and incorporated this wording change in what is now section 3.5(c).

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Comment	One commentator believed that a new section on the time period of the data should be added.
Response	The committee believed this was sufficiently covered in section 3.2(b)(1).
Comment	Two commentators were unclear if this section applied to data received from others.
Response	The committee clarified that it does apply and that the actuary should review for reasonableness and consistency “unless, in the actuary’s professional judgment, such review is not necessary or not practical.”
Comment	One commentator suggested adding a new consideration: “Data Definitions—The actuary should make a reasonable effort to determine the definition of each data element provided.”
Response	The committee agreed and added what is now section 3.5(a).
Comment	One commentator interpreted section 3.5(b) as requiring a datum-by-datum review and a datum-by-datum correction process, thereby precluding any type of sampling procedure.
Response	The committee disagreed with this interpretation. Section 3.2 specifically allows for sampling procedures. Based on the definition of “review,” the committee believed guidance for the actuary to look for obvious errors or inconsistencies that may materially affect the analysis was appropriate.
Section 3.6, Limitation of the Actuary’s Responsibility	
Comment	Several commentators responded to a question requesting comments about whether it was appropriate to delete the following language from section 5.3(a) of the previous ASOP No. 23: “The actuary is not required to develop additional data compilations solely for the purpose of searching for questionable or inconsistent data.” While a couple of commentators believed the deletion was appropriate, most believed that the language should be put back into the revision.
Response	The committee agreed with the majority and reinserted what is now section 3.6(b).
Comment	Several comments suggested eliminating the word “intentionally” inaccurate.
Response	The committee disagreed and left this wording, because just removing the word “intentionally” would weaken the standard by implying that the actuary is relieved of any responsibility for inaccurate data, whether intentional or not. However, after lengthy discussions the committee revised the section by amending the wording of what is now section 3.6(a), in addition to reinserting section 3.6(b).
Section 3.7, Use of Data	
Comment	One commentator suggested clarifying section (d) to apply when material defects are likely, not just possibilities.
Response	The committee agreed and added the words “are likely to” to this subsection.
Comment	One commentator suggested changing the word “should” to “must,” eliminating the words “when practical,” and specifying that this disclosure should be in the summary level presentation of the results.
Response	The committee disagreed and left the wording as is.
Comment	Two commentators suggested changing the wording in the opening paragraph to clarify that data are rarely completely accurate, appropriate, and comprehensive.
Response	The committee agreed and changed the wording in the opening paragraph.

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Comment	One commentator suggested that section 3.7 could be viewed to be in conflict with section 4.1, Disclosure.
Response	The committee disagreed that there would be a conflict. If the actuary believes there is a material defect in the data, the actuary can still perform the assignment and make the disclosures in section 4.1.
Comment	One commentator suggested removing the words “if practical” from section (d).
Response	The committee disagreed and left this wording.
Comment	One commentator suggested defining a process for what to do if material defects have been found or are known to exist in the data.
Response	The committee prepared this section to provide guidance to the actuary in discriminating between different types of situations. The committee believed that sections (d) and (e) provided adequate guidance in this respect.
Comment	One commentator suggested removing the first sentence of this section since all items in this section are based on the premise that the actuary is aware of data deficiencies.
Response	The committee revised the first paragraph of section 3.7 to clarify that the actuary should decide which of the circumstances in sections (a)–(e) apply, even if the actuary is not necessarily aware of material defects in the data.
Comment	One commentator suggested removing the first sentence from section (d).
Response	The committee disagreed and left the first sentence.
Comment	One commentator suggested that this section provides only two alternatives for inadequate data.
Response	The committee disagrees and refers the commentator to the four alternatives contained in sections (b)–(e). The committee also added a consideration in section (c) to address results that may be highly uncertain.
Section 3.8, Documentation	
Comment	One commentator suggested adding a section requiring a description of any material defects the actuary believes are in the data and the review conducted by the actuary on this data.
Response	The committee agreed in respect of material defects and added appropriate wording to section 3.8(b).
Comment	Two commentators suggested eliminating the first sentence since it was confusing.
Response	The committee agreed with this commentator and eliminated the first sentence of this section.
Comment	One commentator suggested changing the wording of section (b) by replacing it with “whether the actuary reviewed the data as contemplated by section 3.5 and, if so, the scope of the review.”
Response	The committee agreed that additional clarity was needed and revised the entire section 3.8.
Comment	One commentator suggested changing the wording of section (c) by inserting the words “if reasonably estimable, the” before “effect.”
Response	The committee agreed that this language could be too burdensome and revised the language in section (c).

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Comment	One commentator suggested adding words to this section similar to those in the disclosure section pertaining to a description of the insufficiencies or issues with the data that may have an impact on the results.
Response	The committee revised section 3.8, adding sections (b) and (d) to deal with this issue.
Comment	One commentator suggested that this section is not needed as long as the disclosure section exists.
Response	The committee believed there is a need for this section, because this section applies to the work papers of the actuary and not the disclosure that goes along with a work product. In addition, some items that should be documented need not be disclosed.
Comment	Numerous commentators suggested changes to section (b).
Response	The committee agreed with these commentators and reworded section (b) with consequential changes to section (a).
SECTION 4. COMMUNICATIONS AND DISCLOSURES	
Section 4.1, Disclosure	
Comment	One commentator suggested that the standard does not appear to require disclosure of the actuary's unresolved concerns, particularly in the case of an actuarial opinion, regarding data that could have a material effect on the actuarial work product.
Response	Section (g) (now (f)) requires the actuary to disclose any unresolved concerns the actuary may have about the data. That disclosure is required in an appropriate actuarial communication, regardless of whether it is an actuarial opinion.
Comment	One commentator suggested adding the words "to the principal" after "following items" to clarify to whom the disclosure is to be made and also wanted to add the words "if other than the principal" to item (a).
Response	The committee did not concur with this commentator.
Comment	Several commentators believed that section (b) was unclear or unnecessary.
Response	The committee deleted section (b).
Comment	One commentator suggested changing the wording in section (c) (now (b)) to reflect the fact that the standard seems to mandate that actuaries almost always review data. Another commentator believed that section (c) (now (b)) should read, "the extent of the actuary's review of the data" rather than "whether the actuary reviewed the data."
Response	The committee very carefully considered this issue and revised what is now section (b) to require, where no review was performed, disclosure of any resulting limitations on the use of the actuarial work product.
Comment	Two commentators suggested adding "material" before "judgmental adjustments" in section (e) (now section (d)).
Response	The committee agreed and made this change.

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Comment	One commentator believed that section (f) (now (e)) would be clearer if it ended after the phrase “work product.”
Response	The committee revised the language to omit reference to “not sufficiently reviewed,” thereby including situations where the actuary did not review the data as well as situations where the actuary did review the data but is uncertain about the data.
Comment	One commentator believed that section (g) (now (f)) was unnecessary because it was covered by section (h) (now (g)). The commentator believed it was burdensome for the actuary to disclose concerns that would not have a material effect.
Response	The committee disagreed and believed that both sections are needed to fully describe required disclosure because they cover different situations. However, the committee did agree that only “unresolved concerns the actuary may have about the data that could have a material effect...” are required to be disclosed, and the wording of these two sections incorporates the word “material” to support this.
Comment	One commentator believed that section (g) (now (f)) could conflict with section 3.7, which does not contain an option for producing a work product with adequate disclosure if there is a material effect in the data.
Response	The committee did not believe there was a conflict, but revised section 3.7(c) to clarify that the actuary may produce a work product even if the data (after judgmental adjustments or assumptions have been applied) may produce results that “are highly uncertain or contain a material bias” as long as this is disclosed.
APPENDIX (now Appendix 1)	
Current Practices	
Comment	One commentator suggested inserting the words “important aspects of data utilization include such” in the last paragraph of this section as well as deleting the words “of such items” after the word “disclosure” in this same section. The commentator also suggested deleting the word “the” after “reliance on” and deleting the words “are important aspects of utilization of data” in the last paragraph of this section.
Response	The committee agreed with the general thrust of these comments and made appropriate changes.
Comment	One commentator suggested removing the words “complete and independent verification of the data” in the second paragraph of this section. The commentator went on to suggest that actuaries deal with the quality of data in a variety of ways and “with varying levels of review or checking.”
Response	The committee agreed with this commentator and changed the wording as suggested.