



# Guide to Audit Data Analytics





# Guide to Audit Data Analytics

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# Preface

## Notice to Readers

*AICPA Guide to Audit Data Analytics* has been developed by the AICPA Audit Data Analytics Working Group to provide an introduction and overview of data analytic techniques to assist financial statement auditors in applying such techniques in performing their audit engagements.

This publication is an *other auditing publication* as defined in AU-C section 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance With Generally Accepted Auditing Standards* (AICPA, *Professional Standards*). Other auditing publications have no authoritative status; however, they may help the auditor understand and apply generally accepted auditing standards.

In applying the auditing guidance included in an other auditing publication, the auditor should, using professional judgment, assess the relevance and appropriateness of such guidance to the circumstances of the audit. The auditing guidance in this document has been reviewed by the AICPA Audit and Attest Standards staff and published by the AICPA and is presumed to be appropriate. This document has not been approved, disapproved, or otherwise acted on by a senior technical committee of the AICPA.

## Potential Benefits of Increased Use of ADAs

Audit data analytics (ADA or ADAs) are defined as "...the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit."<sup>1</sup>

In short, ADAs are techniques that can be used to perform various audit procedures, including elements of risk assessment, tests of controls, substantive procedures (that is, tests of details or substantive analytical procedures), or concluding audit procedures. ADAs and analytical procedures are interrelated, but not all ADAs are analytical procedures. Analytical procedures required by generally accepted auditing standards (GAAS) are addressed in AU-C section 520, *Analytical Procedures* (AICPA, *Professional Standards*), and in AICPA Audit Guide *Analytical Procedures*. (Note that Audit Guide *Analytical Procedures* is an *interpretive publication* as defined in AU-C section 200 and is authoritative.) However, GAAS does not require or reference the application of ADAs.

A key objective of this publication is to introduce auditors who are not familiar with ADAs to basic concepts underlying their use and provide examples of how they might be used in practice. Future editions of this publication, or other guidance, will likely be published to reflect ongoing developments in the use of data analytics in financial statement audits.

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<sup>1</sup> Byrnes, Paul; Criste, Tom; Stewart, Trevor; and Vasarhelyi, Miklos. "Reimagining Auditing in a Wired World." Accessed April 30, 2017, [www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/whitepaper\\_blue\\_sky\\_scenario-pinkbook.pdf](http://www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/whitepaper_blue_sky_scenario-pinkbook.pdf).

Audits of the financial statements of entities of all types and sizes are now being performed in an environment where there is pervasive use of information technology. In this context, increased use of ADAs is likely to be important to maintaining and enhancing the relevance and value of the financial statement audit. Benefits of making more use of ADAs include the following:

- *Improved understanding of an entity's operations and associated risks, including the risk of fraud.* The use of ADAs can help auditors obtain a deeper understanding of the entity under audit. A better understanding of the entity can help the auditor identify either previously unidentified risks or areas where the risk is higher than initially assessed, thereby enabling the auditor to better focus the audit procedures accordingly. Through a better understanding of an entity's operations, the auditor is also better equipped to identify where or how fraud may be perpetrated.
- *Increased potential for detecting material misstatements.* Auditors often use sampling for tests of controls and substantive procedures. ADAs may be used to efficiently and effectively examine aspects of 100 percent of items in a population of relevant data at various levels of aggregation. This may enable auditors to reduce the use of sampling and thereby more effectively manage sampling risk (that is, the risk that the auditor's conclusion based on a sample may be different from the conclusion if the entire population were subjected to the same audit procedure).<sup>2</sup> In addition, use of ADAs, in some cases, may enable the auditor to more effectively and efficiently consider various aspects of the reliability of data. However, sampling would still remain as a useful audit technique in many circumstances.
- *Improved communications with those charged with governance of audited entities.* As a result of the matters noted in the preceding bullet points, an auditor's use of ADAs may provide a greater breadth and depth of useful insights into matters of concern to those charged with governance.<sup>3</sup> When using ADAs, auditors often may be able to more efficiently and effectively describe matters identified by the audit, for example, by using graphics developed in performing the ADAs. Discussions with those charged with governance can then focus more productively on the reasons why certain matters occurred and the possible implications for control, financial reporting, or governance processes.

## Recognition

The AICPA gratefully acknowledges the following members of the AICPA Audit Data Analytics Task Force and others who reviewed or otherwise contributed to the development of this publication.

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<sup>2</sup> This definition of *sampling risk* is set out in paragraph .05 of AU-C section 530, *Audit Sampling* (AICPA, *Professional Standards*).

<sup>3</sup> Paragraph .16 of AU-C section 260, *The Auditor's Communication With Those Charged With Governance* (AICPA, *Professional Standards*), requires the auditor to communicate with those charged with governance regarding specific matters and, as well, "other matters, if any arising from the audit that, in the auditor's professional judgment, are significant to the oversight of the financial reporting process."

## Audit Data Analytics Working Group (2015–2017)

Brian P. Collins, *Chair*

Efrim Boritz

Eric E. Cohen

Evan DeFord

Nicole Deschamps

Brian Foster

Katie Greehan

Jason Guthrie

Kristine Hasenstab

Daniel Hevia

Qi Liu

Kevin Macfee

Brian Miller

Nicole Oberst

Trevor Stewart

Miklos A. Vasarhelyi

Brian Wolohan

Michael Yates

Juli-ann Gorgi, *Observer*

Kaylynn Pippo, *Observer*

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### AICPA Staff

Charles E. Landes

*Vice President*

*Professional Standards Team*

Amy Pawlicki

*Vice President*

*Assurance and Advisory Innovation*

Ami Beers

*Director*

*Assurance & Advisory Services—Corporate Reporting*

Ahava Goldman

*Associate Director*

*Audit & Attest Standards*

Dorothy McQuilken

*Senior Manager*

*Audit Data Analytics & ERM*

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process and provides timely and relevant news, guidance, and examples supporting the financial reporting process. Another important focus of the Financial Reporting Center is keeping those in public practice up to date on issues pertaining to preparation, compilation, review, audit, attestation, assurance, and advisory engagements. Certain content on the AICPA's websites referenced in this publication may be restricted to AICPA members only.

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# Chapter 1

## Introduction



Scan this QR code with your phone to learn more about audit data analytics and some of the projects that the Association is working on in this area. Free QR code readers are available in your phone's app store.

### Objectives of This Guide

**1.01** This guide is intended to do the following:

- Assist auditors in applying audit data analytics (ADAs) in performing audit engagements.
  - ADAs are *"the science and art of discovering and analyzing patterns, identifying anomalies, and extracting other useful information in data underlying or related to the subject matter of an audit through analysis, modeling, and visualization for the purpose of planning or performing the audit."*<sup>1</sup>
  - For the purposes of this guide, "an ADA" or "ADAs" are data analytic techniques that can be used to perform risk assessment, tests of controls, substantive procedures (that is, tests of details or substantive analytical procedures), or concluding audit procedures.

The profession needs to transition to increased use of ADAs to provide an opportunity to enhance audit quality, in particular, to respond to a business environment characterized by pervasive use of IT, increased availability of large amounts of data, and increased use of IT-based data analytic tools and techniques by audited entities of all types and sizes.

**1.02** Specific objectives of this guide include the following:

- Make auditors aware of how various ADAs may be efficiently and effectively used in each phase of a financial statement audit

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<sup>1</sup> Byrnes, Paul; Criste, Tom; Stewart, Trevor; and Vasarhelyi, Miklos. "Reimagining Auditing in a Wired World." Accessed April 30, 2017, [www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/whitepaper\\_blue\\_sky\\_scenario-pinkbook.pdf](http://www.aicpa.org/interestareas/frc/assuranceadvisoryservices/downloadabledocuments/whitepaper_blue_sky_scenario-pinkbook.pdf).

performed in accordance with generally accepted auditing standards (GAAS)

- Helping auditors identify and address matters that they may encounter in deciding whether and, if so, how to use ADAs

## Structure, Form, and Content of This Guide

**1.03** This chapter provides an overview of topics related to planning and performing ADAs. Subsequent chapters provide more detail on some of these topics as well as examples to illustrate the application of concepts described in this chapter.

**1.04** In addition to matters related to the objectives, structure, format, and content of the guide, this chapter provides an overview of the following:

- Relationships among analytical procedures, computer-assisted audit techniques (CAATs) and ADAs
- The importance of specifying and documenting the purpose and nature of the procedure being performed
- An overview of key matters underlying the selection and performance of ADAs, including
  - use of graphics and tables (visualization),
  - access and preparing data to enable their use for purposes of the ADA,
  - relevance and reliability of data,
  - addressing circumstances in which an ADA identifies items, including a large number of items, for further consideration, and
  - documenting the results of an ADA

**1.05** Chapters 2–4 describe aspects of a suggested five-step process that an auditor might use for planning, performing, and evaluating the results of an ADA performed in various phases of an audit.

**1.06** Chapter 2 discusses the use of ADAs in performing risk assessment procedures. There is also a brief discussion of the use of ADAs in helping the auditor form an overall conclusion. Appendix A provides the following examples:

- Example 2-1—Non-Statistical Trend Analysis of Sales Revenue
- Example 2-2—Preliminary General Ledger Account Balance Analysis
- Example 2-3—Analysis of Customer Accounts Receivable Churn
- Example 2-4—Quantity and Pricing Analysis of Sales Revenue
- Example 2-5—Process Mining—Revenue Process From Sales Order to Sales Invoice

**1.07** Chapter 3 discusses the use of ADAs in the performance of substantive analytical procedures in accordance with AU-C section 520, *Analytical Procedures*. Appendix B provides two examples:

- Example 3-1—Non-Statistical Predictive Model for Rental Revenue

- Example 3-2—Regression Analysis of Revenue From Sales of Steam

**1.08** Chapter 4 discusses the potential use of ADAs in tests of details. Appendix C provides two examples:

- Example 4-1—Cash Receipt to Sales Invoice Matching Procedure
- Example 4-2—Three-Way Match of Sales Invoices, Shipping Documents, and a Master Price List

**1.09** This guide does not discuss the use of ADAs in performing tests of controls. Before guidance can be developed, more information is needed. Auditors are encouraged to explore these matters further.

**1.10** In addition to the appendixes discussed previously, appendix D, "Matters to Consider Regarding the Reliability of Data," provides guidance with respect to the important topic of data reliability in the context of performing data analytic techniques.

**1.11** QC section 10, *A Firm's System of Quality Control* (AICPA, *Professional Standards*), sets out the firm's responsibilities to establish and maintain its system of quality control for audit engagements and to establish policies and procedures designed to provide it with reasonable assurance that the firm and its personnel comply with relevant ethical requirements, including those pertaining to independence and so on. Certain aspects regarding the use of ADAs may need to be addressed by a firm's quality control policies and procedures, such as the assignment of engagement teams with appropriate competencies and the use of appropriate tools and software. Discussion of these matters is beyond the scope of this guide.

## Considerations Regarding Examples in This Guide and Other Matters

**1.12** This guide provides numerous examples that illustrate the use of ADAs in a financial statement audit. To avoid misinterpreting the application of examples, it is important to consider the following caveats:

- This guide is an *other auditing publication* as defined in AU-C section 200, *Overall Objectives of the Independent Auditor and the Conduct of an Audit in Accordance with Generally Accepted Auditing Standards*, and discusses how an auditor might apply ADAs in the performance of an audit and does not result in any requirements beyond those included in GAAS. For example, this guide cannot require the auditor to perform a procedure when such performance is not required by GAAS.
- No auditor decision described in an example, or any percentage or amount used in an example, is meant to have general applicability. Auditors in circumstances similar to those noted in the examples often might come to different conclusions and make different decisions based on the specific facts and circumstances and use of their own professional judgment.

**1.13** This guide also makes references to the "year under audit" and "year end." The guidance would also apply to audits of financial statements covering different periods.