

Embedding Data Reliability Evidence-based Decision-making

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Thomas Jefferson said, “Information is the currency of democracy.” The work of the accountability community¹ supports information for decision-making, well-designed internal controls, comprehensive, transparent financial reporting, and strong oversight. Generational leaps in technology and the massive volume of data that can now be reached and analyzed through intelligent systems are game changers, leading to stronger evidenced-based decision-making. Data is one of the most valuable government assets when it is 1) timely, relevant and reliable, 2) can be extracted, correlated, integrated and analyzed, and 3) has been validated as credible.

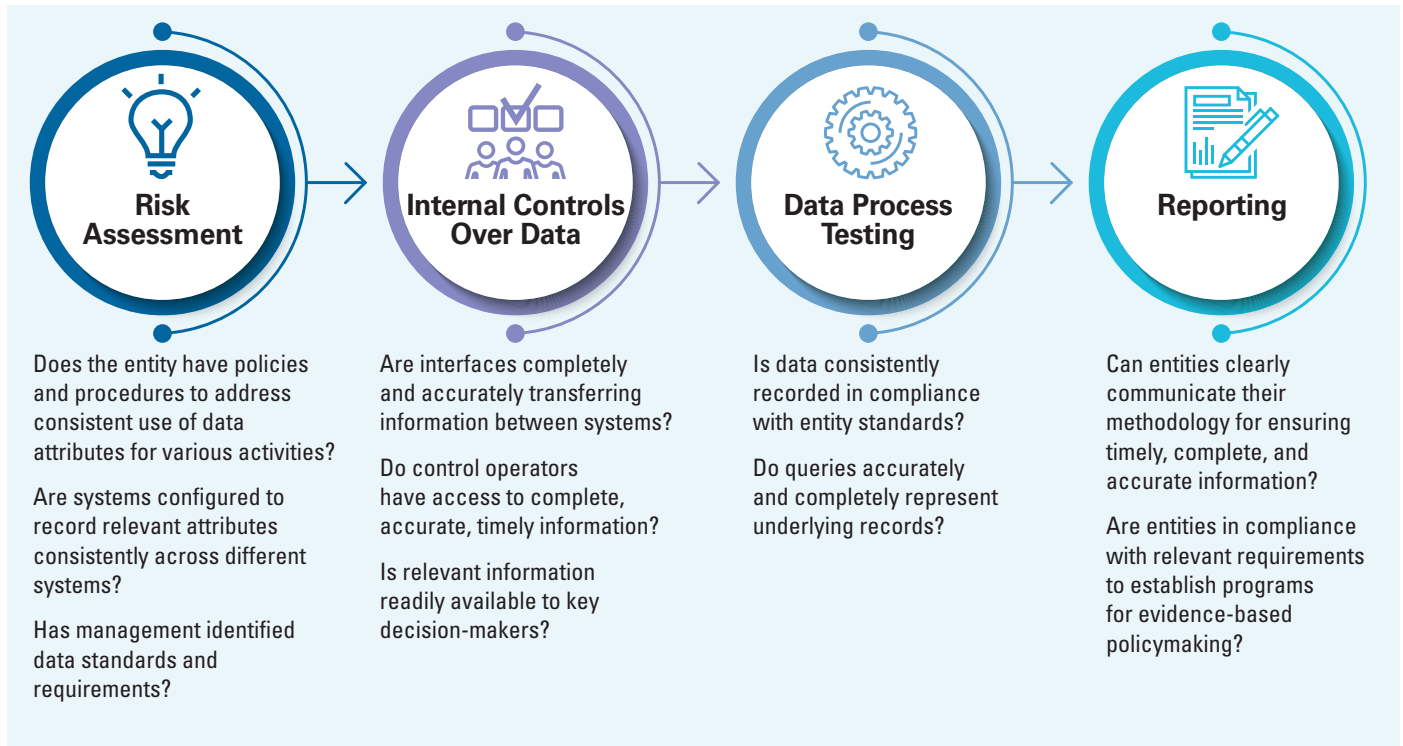
The Foundations of Evidence-Based Policymaking Act of 2018 (Evidence Act)² “mandates a systematic rethinking of government data management to better facilitate access for evidence-building activities.”³ It is based on the premise that “despite previous efforts, federal agencies often lack the data and evidence necessary to make critical decisions about program operations, policy, and regulations, and to gain visibility into the impact of resource allocation on achieving program objectives.”⁴

The accountability community plays a vital role in building and providing evidence to manage the cost and performance of government. Higher-quality, integrated performance and financial information is essential to calibrate spending with program results and to produce effective, cost-efficient outcomes. Long-term fiscal realities, competing national priorities, public dissatisfaction with government performance and loss of trust demand changes in program design and execution.⁵ Credible information is required to assess alternatives and inform decisions on program and operational changes and to provide accountability and transparency.

The Evidence Act Provides the Framework

The Evidence Act establishes a comprehensive, integrated approach to building evidence and carves pathways to help agencies get there. Federal agencies must develop evidence-building plans that identify policy questions and the evidence needed to address them. They are required to assess various aspects of

Figure 1. Data Quality Dimensions – Key Questions



their evidence-building activities, including coverage, quality and capacity. The Evidence Act also establishes agency evaluation officers, chief data officers (CDOs), and senior statistical officers.

The Biden Administration issued the following statement of commitment to the principles of the Evidence Act, enacted during the Trump Administration:

“The Administration is committed to building and using evidence to improve policy, program, budget, operational, and management decision-making. Our vision for effective and efficient government includes ensuring accountability for results, having the necessary analytical tools to measure outcomes and impacts, identifying and investing in effective practices, and transforming data into evidence that informs action. With stronger evidence, we can learn from and improve programs to better serve the American people.”⁶

In related guidance,⁷ the Office of Management and Budget (OMB) concluded, “To achieve our nation’s

great promise, relying on high-quality, credible evidence must become the core of how we operate. Agencies must make evidence-based decisions guided by the best available information...”⁸ The OMB memorandum (M-21-27) provides an approach to marshaling and using facts discovered through rigorous, systematic analysis of high-quality information derived from diverse methods and viewpoints. While OMB allows for agency flexibility, data analysis must be governed by the principles of scientific integrity, as it is not a mere compliance exercise. M-21-27 states, “Underlying all of the methodological approaches outlined here are the data collected and used in federal evidence-building activities. Ensuring that those data are reliable, high-quality, and fit for their intended purpose is essential to restoring trust in government.”⁹

Data Reliability

Data reliability is the completeness, accuracy, consistency and integrity of data captured, processed and stored in internal and external databases,

data clouds, and other data storage locations, including data managed by third-parties. Decision-makers need reasonable assurance that evidence, whether from performance, financial or scientific data, is credible in order to use it. Differing missions and data sources may necessitate different approaches to testing reliability, but a common denominator is professional rigor that follows generally accepted standards.

As shown in **Figure 1**, data reliability risks can be managed through four data quality dimensions: assessment, internal controls, process testing, and reporting. Depending on what is measured, the science behind data integrity can be challenging. Deconstructing the process reveals the introduction of risks to data reliability in each step and highlights actions to mitigate or eliminate data reliability issues that could undermine the decision-making process. While a variety of ways to analyze data reliability exist, these key questions can focus the effort.

From these questions, initial actions must be applied in each quality dimension. For example:

Risk Assessment

- Review policies and procedures to address consistency of relevant data attributes. Since data attributes do not carry the same level of importance, identify the ones that are crucial to decision-making.
- Inspect information system configuration and interfaces for compliance with policy requirements to record relevant attributes consistently across different systems.
- Confirm that the data integrity process identifies data standards, inventories, and dictionaries and that it meets regulations, supports data throughout its lifecycle, and enforces internal data standards.
- Identify data sources, alignment, and gaps to make sure information is available and avoid having to fill (or not fill) gaps after the fact. Data sources include entities that administer federal funds, such as state and local governments and contractors, because data risk assessment does not end when these funds are disbursed by federal agencies.
- Develop a risk matrix for the use of information that has not been validated, is of dubious reliability, or is known to be unreliable or inconsistent.
- Remember that data risk assessment is a continuous process, integral to enterprise risk management.

Internal Controls Over Data

- Test financial and non-financial interfaces for complete and accurate transfer of information between systems.
- Validate control operators' access to complete, accurate, timely information.
- Validate decision-makers' queries for relevant information.

Data Process Testing

- Utilize data and analytics to determine whether data is consistently recorded in compliance with entity standards.

HELPFUL GUIDANCE TO ASSESS DATA RELIABILITY

Many guides and tools from the research, audit, and program evaluation communities are available to validate data reliability. Developed from an audit and evaluation perspective, *Assessing Data Reliability*¹⁰ by the U.S. Government Accountability Office could be used to assess data quality in the context of the Evidence Act. For example, when the objective is to evaluate program performance, the evidence (data) should be relevant, complete and accurate. The guide covers seven topics:

1. Understanding data reliability.
2. Deciding whether a data reliability assessment is necessary.
3. Determining the extent of the assessment.
4. Steps for collecting information when assessing data reliability.
5. Making the data reliability determination.
6. Including appropriate language in the report.
7. Additional considerations.



It also includes appendices on assessing the reliability of data from statistical agencies, examples of data tests, and sample language for reporting on data reliability.

- Validate queries to determine whether they accurately and completely represent underlying records.
- Check for duplicative or redundant data.

Reporting

- Submit clear, well-written data quality reports to explain the methodology and results.
- Report on performance and compliance with relevant requirements.
- Develop and implement corrective actions to address root causes of data quality shortfalls.

The Value of Data Reliability

Data reliability is central to open government initiatives, such as USAspending.gov, to grant citizens access to information. Reliable open data supports accountability and transparency, essential to regaining public trust in government. According to the Pew Research Center, 66% of Americans “harbor hope that open data will improve government accountability.”¹¹

Data reliability was crucial to the Pandemic Response Accountability Committee (PRAC), established at the outset of COVID-19 and led by the federal inspectors general (IGs) to oversee and provide transparency for what became \$5.2 trillion in relief spending. PRAC commissioned a study to “understand whether, and if so, to what extent, the existing publicly available award-level data is sufficiently comprehensive to provide transparency” over federal COVID-19 spending. USAspending.gov was among the data sources included in the study, which found “publicly available information existed to satisfy a substantial portion of ... transparency requirements.”¹² However, the study identified 16 key gaps, categorized as impacting completeness, accuracy or timeliness, and provided specifics to address them. The study also offered five observations about data quality that may affect transparency and provided specific actions and alternatives to address data gaps. This type of comprehensive analysis to understand data gaps is essential in managing data reliability.

GOOD REPORTS DEPEND ON RELIABLE DATA

AGA's Certificate of Excellence in Accountability Reporting (CEAR) program independently evaluates agency performance and accountability reports (PARs) and agency financial reports (AFRs) against criteria that represents excellence. A leading practice is the inclusion of performance information. When reports are robust and well supported, the public gains a snapshot of what agencies have achieved with public resources. The financial statements, which are integral to the PARs and AFRs, undergo audit procedures responsive to risks of material misstatement to help the auditor form an opinion on the financial statements based on an evaluation of the audit evidence obtained, including evidence on comparative financial statements or information. However, the performance information found outside principal financial statements and disclosures is not audited. Providing reasonable assurance through the Evidence Act could not only increase reliance on performance



information in evidence-based decision-making but also increase the value of PARs, AFRs and other agency performance reporting as accountability mechanisms for the public.

Data Reliability in Audits

In government, reliable data provides the evidence for audit findings and recommendations under *Government Auditing Standards* (GAGAS)¹³ in a financial statement audit or a performance audit, such as a program evaluation. For audits of agency financial statements or narrower agreed-upon procedures to assess selected financial information, determinations of data reliability result from examining and testing management's relevant assertions (e.g., accuracy, completeness and validity) to express an opinion on whether the preparation of the statements, in all material respects, were in accordance with generally accepted accounting principles.¹⁴

For performance audits, data reliability can be derived from a scientifically valid survey or by testing agency performance information. Under program evaluations, auditors answer questions related to audit objectives (e.g., is the program reaching its intended recipients, having the expected impact, or being managed effectively and efficiently?)¹⁵ GAGAS recognize "auditors may use GAGAS in conjunction with professional standards issued by other authoritative bodies," such as the American Evaluation Association's *Guiding Principles for Evaluators*.¹⁶

Auditors, evaluators, investigators and other professionals, such as

management analysts and consultants who provide management studies or oversight requiring data analysis, often use a four-step process to evaluate data reliability:

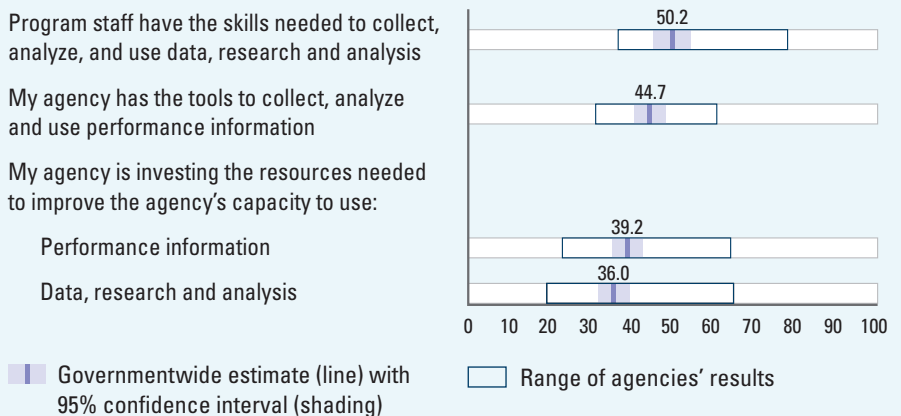
1. Planning identifies the objectives, defines the scope, and determines the methodology. Starting with an understanding of how stakeholders will use the data, evaluators (used here to encompass all groups cited above) identify risks to data quality and determine a response

to address them, whether eliminating, mitigating or accepting the risks.

2. Data collection from various sources incurs risk. Evaluators consider how and from where data was acquired, and they look at data formats, data transfer or interface controls, and data corruption. Data often originates from decentralized federated databases; less often it comes from centralized data repositories.

Figure 2. Federal Managers Reporting Presence of Selected Aspects of Evidence-building Capacity, with the Range of Agencies' Responses

Estimated Percentages Reporting to a "Great" or "Very Great" Extent

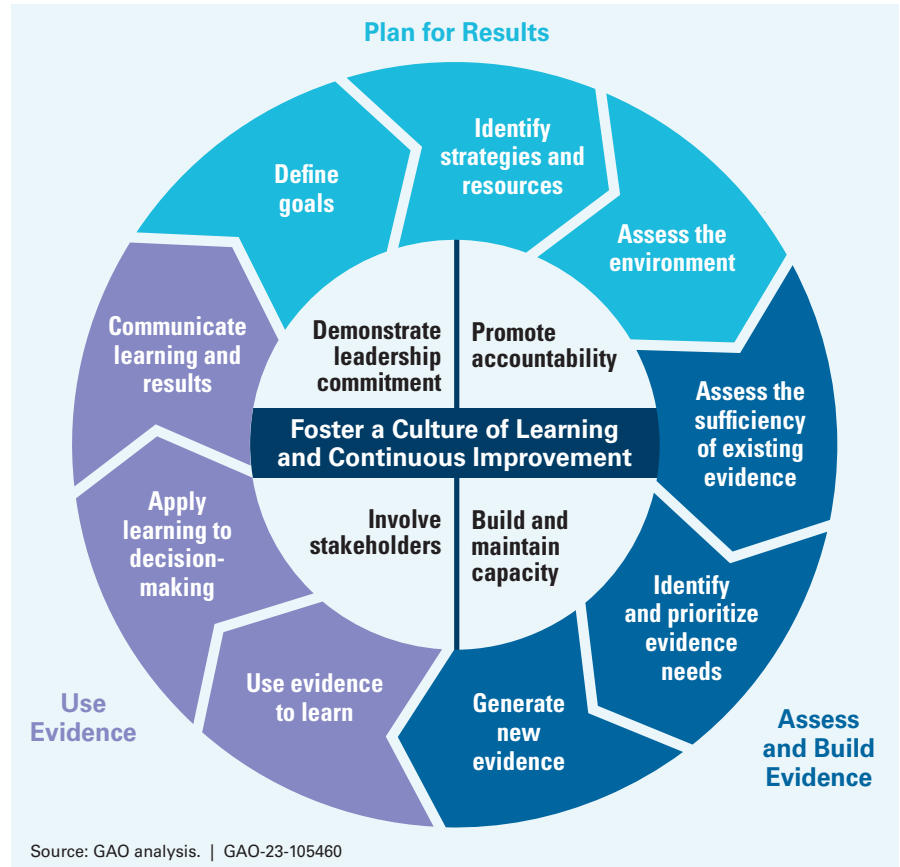


Source: GAO analysis of survey results. | GAO-21-536

3. Data analysis to check for accuracy, completeness, and validity may include tests, such as data profiling, data validation, and data reconciliation, to understand content and relationships. Evaluators compare actual data to rules and expectations for the information and, through analysis, check for undocumented relationships and dependencies in the data, implied rules, and redundant and contradictory data.

4. Reporting on the results of the evaluation, including any new findings or issues for improvement, or any issues remaining from prior periods, leads to recommendations. To add value, they must be actionable and address root causes of problems. When root causes are not apparent, evaluators may suggest options or recommend more analysis. Also, findings must differentiate high-risk data quality issues from lower-risk items to help organizations prioritize corrective actions. Follow-up and reevaluation must be continual.

Figure 3. Practices to Help Effectively Implement Federal Evidence-building and Performance-management Activities



Building Capacity

Transformation must be sustained through targeted investments in enhanced technology, tools, and specialized skills; for example, data modeling, data extraction and cleansing, cost accounting, and various data science disciplines. By adopting leading practices and through cross-agency initiatives and innovation centers, accountability professionals can help identify and prioritize capacity issues affecting multiple agencies. In a 2020 survey by the Government Accountability Office (GAO),¹⁷ 95% of federal managers reported having at least one type of evidence for their programs, with about half to two-thirds using evidence in various decision-making activities, such as allocating resources. Only about one third to one half of survey respondents reported the presence of different aspects of capacity (e.g., having staff with relevant skills) to a “great” or “very great” extent. As shown in **Figure 2**, in disaggregating results, GAO found capacity varied

widely across agencies and types of evidence.

Finding “mixed progress in developing relevant, high quality evidence, using it in decision-making, and ensuring sufficient capacity to undertake those activities,” in July 2023, GAO issued *Evidence-Based Policy Making: Practices to Help Manage and Assess the Results of Federal Efforts*.¹⁸ As shown in **Figure 3**, 13 practices promote four interrelated management areas: 1) plan for results, 2) assess and build evidence, 3) use evidence, and 4) foster a culture of learning and continuous improvement, which includes demonstrated leadership, accountability, capacity, and stakeholder involvement. The guide identifies and distills key practices and actions in about 200 related GAO reports issued since 1996, refined as appropriate according to input from cognizant officials at 24 major federal agencies and OMB.

The DATA Foundation explored “various funding models to ensure the

intent of the Evidence Act is realized”¹⁹ and concluded government leaders must provide resources for evidence-based policymaking to succeed. Their report made six recommendations:

1. Agencies should articulate funding and resource needs to OMB and congressional appropriators.
2. OMB should use the annual budget passback²⁰ to prioritize agency actions on the Evidence Act.
3. Congress and the executive branch should allocate sufficient direct appropriations for data and evidence initiatives.
4. OMB should propose new, flexible funding mechanisms to support Evidence Act implementation.
5. Agencies should maximize existing set-aside authorities and other funding flexibility.
6. Information on data and evidence spending should be centrally collected and made publicly available.

Final Thoughts

Envision an environment in which program and operational managers, supported by evaluation officers, CDOs and senior statistical officers, and partnered with finance, budget, IT, audit, evaluation and investigation professionals, lean into data to capture high-quality information to support evidence-based decisions. They could collaborate to:

- Meet the needs of underserved Americans.
- Invest in health care.
- Provide effective and efficient emergency responses.
- Make cost-effective purchasing decisions.
- Protect the nation at home and abroad.

In this environment, common definitions and vocabulary would articulate current and future data needs. The workforce would be trained

in evidence-building to facilitate dialogue and build awareness of data quality dimensions. By standardizing processes to target facts that will improve performance and to drive effectiveness and efficiency in getting to the right answer, government programs and operations would become less complex and less costly. Americans could rest assured of receiving credible information they could trust and levels of accountability and transparency they should expect and deserve. ■

Endnotes

1. The accountability community encompasses a wide range of disciplines, including accountants, budgeteers, program, financial and cost analysts, auditors, evaluators, data scientists, actuaries and information technology professionals.
2. Public Law (P.L.) 115-435, 132 Stat. 5529, Jan. 14, 2019.
3. OMB. Memorandum (M)-19-23, *Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance*, July 10, 2019.

4. Ibid.
5. Lewis, Andrew, Marlon Perry, Meghan Cadigan and Jeffrey Steinhoff. "Restoring Trust in Government," *Journal of Government Financial Management*, Summer 2023.
6. OMB. "Evidence and Evaluation," <https://www.whitehouse.gov/omb/information-for-agencies/evidence-and-evaluation/>
7. *Evidence-Based Policymaking: Learning Agendas and Annual Evaluation Plans* (Memorandum (M)-21-27).
8. OMB M-21-27, issued on June 30, 2021, reaffirms and expands on previous OMB guidance on Learning Agendas and Annual Evaluation Plans, including 1) OMB M-19-23, *Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance*, July 10, 2019; 2) OMB M-20-12, *Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices*, March 10, 2020; 3) and OMB Circular A-11, *Preparation, Submission, and Execution of the Budget*, Aug. 15, 2022.
9. Ibid.
10. GAO. *Assessing Data Reliability*, GAO-20-283G, December 2019.
11. Horrigan, John and Lee Rainie. "Americans' Views on Open Government Data," Pew Research Center, April 21, 2015.

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12. MITRE. "Transparency in Pandemic-Related Federal Spending: Report of Alignment and Gaps," 99-D-00005, PRAC-20-A-0002, 2020; <https://www.pandemicoversight.gov/media/file/transparency-pandemic-related-federal-spending-full-report>

13. GAO. *Government Auditing Standards (GAGAS)*, 2018 Revision, Technical Update April; <https://www.gao.gov/assets/gao-21-368g.pdf>

14. AICPA (aicpa.org). *Financial Statement Auditing Standards, AU-C Section 700, Forming an Opinion and Reporting on Financial Statements*, 2021. GAGAS Standards for Financial Audits (Chapter 6, section 6.01) incorporate the AICPA Auditing Standards by reference.

15. GAGAS includes additional examples of performance audit objectives that require reliable information as evidence.

16. GAGAS also recognizes 1) *The Program Evaluation Standards*, Joint Committee on Standards for Education Evaluation; 2) *Standards for Educational and Psychological Testing*, American Psychological Association; 3) *IT Standards, Guidelines, and Tools and Techniques for Audit and Assurance and Control Professionals*, Information Systems Audit and Control Association; 4) *International Standards for the Professional Practice of Internal Auditing*, Institute of Internal Auditors; and 5) *International Standards of Supreme Audit Institutions*, International Organization of Supreme Audit Institutions.

17. GAO. "Evidence-Based Policymaking: Survey Data Identify Opportunities to Strengthen Capacity across Federal Agencies," GAO-21-536, July 27, 2021.

18. GAO-23-105460, July 12, 2023.

19. Fatherree, Kira and Nicholas Hart. *Funding the Evidence Act: Options for Allocating Resources to Address Emerging Data and Evidence Needs in the Federal Government*, DATA Foundation white paper, Nov. 19, 2019.

20. Budget passback is the process by which OMB decides whether to increase, decrease or maintain budget totals requested by an agency.



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