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Congressional Addressees

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DATA GOVERNANCE

Agencies Made Progress in Establishing Governance, but Need to Address Key Milestones

Accessible Version

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Abbreviations

CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CAP	Cross Agency Priority
CDO	Chief Data Officer
CFO Act	Chief Financial Officers Act of 1990
CIO	Chief Information Officer
IG	Inspector General
COVID-19	Coronavirus Disease 2019
DATA Act	Digital Accountability and Transparency Act
DAWG	DATA Act Working Group
Evidence Act	Foundations for Evidence-based Policymaking Act of 2018
FFATA	Federal Funding Accountability and Transparency Act of 2006
OIG	Office of Inspector General
OPEN Government Data Act	Open, Public, Electronic and Necessary Government Data Act
OMB	Office of Management and Budget
PRAC	Pandemic Response Accountability Committee
Q4 FY2018	fourth quarter of fiscal year 2018
USDA	U.S. Department of Agriculture
Commerce	U.S. Department of Commerce
HUD	U.S. Department of Housing and Urban Development
NSF	National Science Foundation
SAO	Senior Accountable Official
2020 Action Plan	Federal Data Strategy 2020 Action Plan

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

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Congressional addressees:

Congress and federal agencies need data of sufficient quality to determine whether programs are achieving their intended results and to set priorities for national objectives. A strong data governance framework is essential for data quality. Data governance is the framework or structure for ensuring that an agency's data assets are transparent, accessible, and of sufficient quality to support its mission, improve the efficiency and effectiveness of agency operations, and provide useful information to the public. Implementing an effective data governance framework—comprised of various activities, including the authorities, roles, responsibilities, organizational structures, processes, policies, standards, and resources needed to ensure data are of sufficient quality—requires participation and commitment from agency staff and officials that generate, analyze and use the data to make decisions.

Effective data governance can increase the availability and improve the quality of federal data assets. This is particularly important as agencies leverage federal data to monitor and measure their responses to the Coronavirus Disease 2019 pandemic (COVID-19).

Congress and the administration have taken several steps to establish data governance at federal agencies. The Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act) created a framework for federal evidence-building activities.[1] Further, title II of the Evidence Act—the Open, Public, Electronic and Necessary Government Data Act (OPEN Government Data Act)—requires the head of each agency to designate a nonpolitical appointee as the agency Chief Data Officer (CDO) and assigns the CDO responsibility for implementing data governance.[2]

The *Leveraging Data as a Strategic Asset* cross-agency priority (CAP) Goal in the 2019 President's Management Agenda provides additional support for government-wide data governance efforts and established the development of the Federal Data Strategy and related action plan. Further, lessons learned from the implementation of the Digital

[1]Pub. L. No. 115-435, 132 Stat. 5529 (2019).

[2]Evidence Act, title II, § 202(e), 132 Stat. at 5541–5542, *codified at* 44 U.S.C. § 3520.

Accountability and Transparency Act of 2014 (DATA Act)—intended to improve the transparency and quality of federal spending data—continue to contribute to the development of government-wide data governance for spending data.[3]

The DATA Act includes a provision for us to report on the quality of spending data.[4] The OPEN Government Data Act contains a provision for us to evaluate whether the CDO Council improved the use of evidence and program evaluation.[5] This report examines: (1) selected agencies' efforts to establish data governance consistent with the *Federal Data Strategy 2020 Action Plan* (2020 Action Plan), (2) the extent to which agency data quality plans for spending data reported under the DATA Act were consistent with Office of Management and Budget (OMB) guidance, (3) the extent to which the CDO Council followed leading collaboration practices, and (4) what key questions can help agency CDOs facilitate the successful implementation of data governance.

To address these objectives, we selected four agencies that represent a range of experiences with data governance, including whether agencies had a designated CDO before and after the enactment of the OPEN Government Data Act, and the quality of the spending data reported pursuant to the DATA Act, among other factors.[6] We selected the: (1) Department of Agriculture (USDA), (2) Department of Commerce (Commerce), (3) Department of Housing and Urban Development (HUD), and (4) National Science Foundation (NSF).

To assess the extent to which selected agencies met data governance milestones in the 2020 Action Plan, we compared individual agencies' efforts to address milestones including: establishing a data governance

[3]DATA Act, Pub. L. No. 113-101, 128 Stat. 1146 (2014). The DATA Act amended the Federal Funding Accountability and Transparency Act of 2006 (FFATA). Pub. L. No. 109-282, 120 Stat. 1186 (2006), *codified* at 31 U.S.C. § 6101 note.

[4]FFATA, § 6(b).

[5]44 U.S.C. § 3520(e)(1).

[6]In selecting agencies, we also considered: (1) Inspector General reports on the quality of spending data as required under the DATA Act to include agencies that had both higher quality data and moderate- to lower- quality data; (2) the size of the agency measured as a percentage of total outlays for the federal government in fiscal year 2019 to include both agencies that had total outlays valued at more than and less than one percent of the total federal outlays in fiscal year 2019; and (3) whether the agency is a statistical agency to include both statistical and nonstatistical agencies.

body, selecting a data maturity model, and performing a staff data literacy skills assessment in 2020.[7] We also reviewed agency documents and interviewed the CDOs from our selected agencies.

To assess the extent to which agency data quality plans for spending data reported under the DATA Act were consistent with OMB guidance, we reviewed agency data quality plans for spending data and related documents and interviewed Senior Accountable Officials from the four selected agencies. To assess data quality plans and related documents at the selected agencies, we compared the plans to the requirements in OMB guidance.[8]

To assess the extent to which the activities of the CDO Council aligned with our collaboration practices, we compared the activities of the CDO Council to collaboration practices identified in our prior work: (1) identifying and monitoring outcomes and accountability; (2) bridging organizational culture; (3) sustaining and defining leadership; (4) clarifying roles and responsibilities; (5) including relevant participants; (6) identifying resources; and (7) documenting collaboration through written guidance and agreements.[9]

To examine key questions that could facilitate CDOs' success, we interviewed federal CDOs from our selected agencies, officials from external organizations (including state and city CDOs and officials from academia and industry with expertise in data governance and data management), and reviewed related documentation from these organizations.

We conducted this performance audit from December 2019 to December 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to

[7]We excluded *Action 1: Identify Data Needs to Answer Priority Agency Questions, Action 5: Identify Priority Data Assets for Agency Open Data Plans,* and *Action 6: Publish and Update Data Inventories* because they do not include actions to establish a data governance framework. For more information on federal data inventories, see GAO, *OPEN DATA: Agencies Need Guidance to Establish Comprehensive Data Inventories; Information on Their Progress is Limited*, GAO-21-29 (Washington, D.C.: Oct. 8, 2020).

[8]Office of Management and Budget, *Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk*, OMB Memorandum M-18-16 (Washington, D.C.: June 6, 2018).

[9]GAO, *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms,* GAO-12-1022 (Washington, D.C.: Sept. 27, 2012).

obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Appendix I provides additional detail on the scope and methodology.

Background

The Importance of Data Governance for Improving Data Quality and Transparency

Effective data governance helps agencies maintain and improve the quality and transparency of federal government data. Our prior work examining the quality of federal spending data made available to the public under the DATA Act identified the need for a data governance structure to ensure the integrity of data standards over time.[10] We recommended that OMB establish a governance structure consistent with key data governance practices. These practices include delineating clear roles and responsibilities for decision-making and accountability and developing policies and procedures for enforcing the consistent use of data standards across the federal government.[11]

OMB has now established a governance structure within the broader context of the CAP goals established under the 2018 President's Management Agenda (PMA). According to OMB staff, in implementing the PMA and statutory requirements, OMB leveraged and refined existing governance structures to the extent possible. Lessons learned from the implementation of this data governance structure have broader government-wide implications as agencies begin implementing the

[10]For additional information see GAO, *DATA Act: OMB Needs to Formalize Data Governance for Reporting Federal Spending.* GAO-19-284 (Washington, D.C.: Mar. 22, 2019); and *DATA Act: Progress Made in Initial Implementation but Challenges Must Be Addressed as Efforts Proceed*, GAO-15-752T (Washington, D.C.: July 29, 2015).

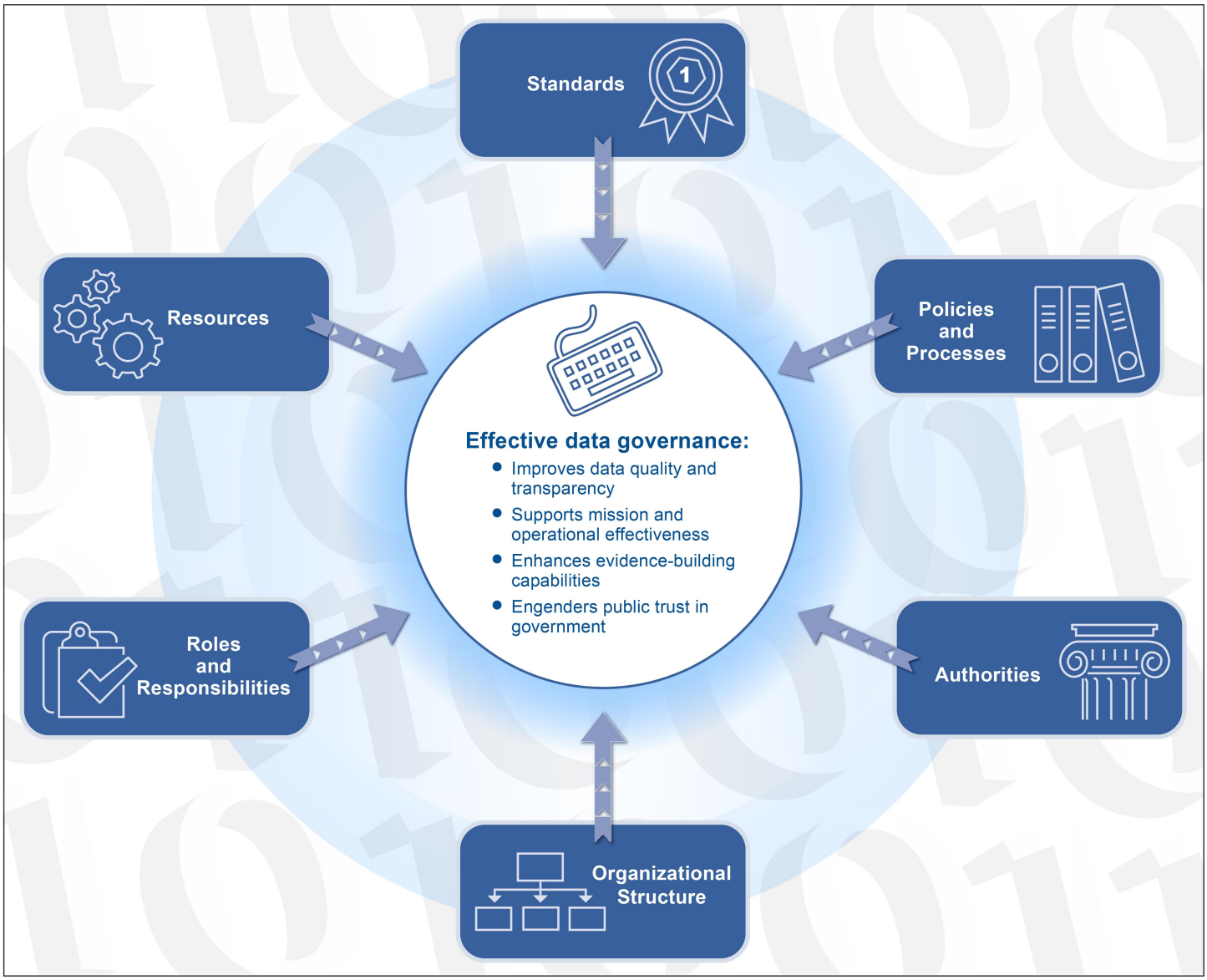
[11]Our prior work identified five key practices for data governance including (1) developing and approving data standards; (2) managing, controlling, monitoring, and enforcing consistent application of data standards; (3) making decisions about changes to existing data standards and resolving conflicts related to the application of data standards; (4) obtaining input from stakeholders and involving them in key decisions, as appropriate; and (5) delineating roles and responsibilities for decision-making and accountability, including roles and responsibilities for stakeholder input on key decisions.

requirements of the OPEN Government Data Act, including designating CDOs with responsibilities for data governance.

Data governance is the framework or structure for ensuring that an agency's data assets are transparent, accessible, and of sufficient quality to support its mission, improve the efficiency and effectiveness of agency operations, and provide useful information to the public. Data governance activities include: the authorities, roles, responsibilities, organizational structures, policies, processes, standards, and resources for the definition, stewardship, production, security and use of data (see figure 1).[12]

[12]To develop this definition, we synthesized our prior work, OMB guidance, and relevant literature and interviewed knowledgeable officials from federal agencies, state and city CDOs, and officials from academia and industry.

Figure 1: Data Governance Framework



Sources: GAO analysis of GAO, OMB, and non-federal reports. | GAO-21-152

Data governance is different from data management. Governance refers to the roles, responsibilities, policies, and procedures for making decisions to ensure effective data management, while data management involves implementing those decisions.

A data governance framework is critical in ensuring that data are of a sufficient quality for their intended use by providing the structure for processes and procedures to identify and appropriately respond to data quality issues in a timely manner. A data governance framework includes processes to help increase collaboration throughout the agency along the data's life cycle by clarifying roles and responsibilities and increasing communication and data literacy among staff.

For example, one data governance activity—establishing data standards—contributes to data quality by ensuring that data are collected and reported in a consistent and comparable manner. For spending data reported under the DATA Act, we previously found that a data governance structure, if properly implemented, would greatly increase the likelihood that the data made available to the public will be accurate.[13] Use of an effective data governance framework provides agencies the opportunity to leverage their data to improve performance and outcomes. For example, there is potential to combine and analyze large amounts of varied data across agencies with data analytics to facilitate decision-making, while maintaining appropriate security controls of personally identifiable, sensitive, and classified information.[14]

Actions to Formalize Data Governance at Federal Agencies

Congress and the administration have taken several steps to establish data governance at federal agencies.

- Title II of the Evidence Act, the OPEN Government Data Act, requires each agency to designate a nonpolitical appointee as the agency CDO and outlines the CDO's functions or responsibilities. Several of these are related to data governance including life cycle data

[13]GAO, *DATA ACT: Quality of Data Submissions Has Improved but Further Action Is Needed to Disclose Known Data Limitations*, GAO-20-75 (Washington, D.C.: Nov. 8, 2019).

[14]Data analytics include a variety of techniques to analyze and interpret data to facilitate decision making and may be used to identify patterns or trends, determine whether problems are widespread and systemic in nature, and evaluate program performance and outcomes. For more information about data analytics programs that can address the challenge of fraud and improper payments in the federal government, see GAO, Highlights of a Forum: Data Analytics to Address Fraud and Improper Payments, GAO-17-339SP (Washington, D.C.: Mar. 31, 2017).

management and engagement with agency employees, the public, and contractors in using public data assets, among others.[15]

- The OPEN Government Data Act also created the CDO Council to be responsible for establishing government-wide best practices for the use, protection, dissemination, and generation of data, among other responsibilities.[16]
- In July 2019, OMB issued the first of four guidance documents to agencies on the implementation of the Evidence Act. This guidance provided information on the required qualifications and responsibilities of the CDO at federal agencies, among other information.[17]
- In addition to the Evidence Act implementation guidance, and pursuant to the CAP goal, *Leveraging Data as a Strategic Asset*, OMB issued the *Federal Data Strategy* in 2019, which contained 10 operating principles on how the federal government can leverage the

[15]44 U.S.C. § 3520(c)(1)-(4).The OPEN Government Data Act states that the CDO shall be responsible for responsibilities in 14 functions, including: (1) lifecycle data management; (2) coordinating with any agency official responsible for using, protecting, disseminating, and generating data; (3) managing data assets, including: standardization of data format, sharing of data assets, and publication of data assets; (4) consulting with any statistical official of the agency; (5) carrying out the requirements under the Paperwork Reduction Act; (6) ensuring that agency data conforms with data management best practices; (7) engaging agency employees, the public, and contractors in using public data assets and encouraging collaborative approaches on improving data use; (8) supporting the Performance Improvement Officer; (9) supporting the Evaluation Officer of the agency; (10) reviewing the impact of the infrastructure of the agency on data asset accessibility and coordinating with the Chief Information Officer of the agency to improve such infrastructure to reduce barriers that inhibit data asset accessibility; (11) ensuring that the agency maximizes the use of data in the agency, including for the production of evidence, cybersecurity, and the improvement of agency operations; (12) identifying points of contact for roles and responsibilities related to open data use and implementation; (13) serving as the agency liaison to other agencies and OMB on the best way to use existing agency data for statistical purposes; and (14) complying with any regulation and guidance issued on the acquisition and maintenance of any required certification and training. For more information, see appendix II.

[16]44 U.S.C. § 3520A.

[17]Office of Management and Budget, *Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance,* OMB Memorandum M-19-23 (Washington, D.C.: July 10, 2019). OMB issued phase 4 guidance in March 2020*: Phase 4 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Program Evaluation Standards and Practices*, OMB Memorandum M-20-12 (Washington, D.C.: Mar. 10, 2020). As of November 2020, OMB had not issued guidance phases 2 and 3 on open data access and management and on data access for statistical purposes.

use of data to deliver on its mission to better serve the public.[18] In December 2019, the Federal Data Strategy team issued the *Federal Data Strategy 2020 Action Plan* (2020 Action Plan) to operationalize the Federal Data Strategy.

The 2020 Action Plan includes a set of 20 concrete and measurable actions that agencies are either required or encouraged to take during their first year of implementing the *Federal Data Strategy*, including steps that are responsive to the requirements of the OPEN Government Data Act and related OMB guidance, and other applicable statutes.[19] Six actions are designated for individual agencies, three of which are related to establishing data governance. Specifically, the 2020 Action Plan directs agencies to:

- constitute a diverse data governance body
- assess data and related infrastructure maturity, and
- identify opportunities to increase staff data skills.

- In addition to applicable statutes and guidance for establishing data governance, OMB issued guidance directing agencies to develop data quality plans for the quality of spending data—including its timeliness, completeness, and accuracy—reported under the DATA Act.[20] The guidance aligns data governance activities with our *Standards for Internal Control in the Federal Government* and describes agency management's responsibility for reporting quality data.[21]

[18]Office of Management and Budget, *Memorandum for the Heads of the Executive Departments and Agencies: Federal Data Strategy – A Framework for Consistency,* M-19-18 (Washington, D.C.: June 2019). For more information, see: https://strategy.data.gov/.

[19]Federal Data Strategy Development Team, *President's Management Agenda: Federal Data Strategy 2020 Action Plan* (Washington, D.C.: December 2019). The 2020 Action Plan incorporates requirements of the Evidence Act, the Geospatial Data Act of 2018, and Executive Order 13859 on Maintaining American Leadership in Artificial Intelligence. Pub. L. No. 115-435, 132 Stat. 5529 (2019); Pub. L. No. 115-254, 132 Stat. 3186 (2018); 84 Fed. Reg. 3967 (Feb. 11, 2019). The laws incorporated in the 2020 Action Plan vary in scope and applicability. For example, certain statutory provisions only apply to agencies listed in the Chief Financial Officer Act of 1990 (CFO Act agencies). 31 U.S.C. § 901(b). All of the selected agencies in our study are CFO Act agencies. Where not required by statute, the 2020 Action Plan encourages agencies to complete its actions.

[20]OMB M-18-16.

[21]GAO, *Standards for Internal Control in the Federal Government*, GAO-14-704G (Washington, D.C.: Sept. 10, 2014).

See appendix II for more information on these data governance requirements for federal agencies.

GAO Has Previously Reported on Data Governance for Spending Data

Since the DATA Act's enactment in 2014, we have issued a series of reports and made recommendations based on our ongoing monitoring of DATA Act implementation by OMB and the Department of the Treasury (Treasury).[22] For example, in November 2019, we reported on the quality of the federal spending data made available to the public pursuant to the DATA Act.[23] We found overall improvement in data quality compared to our prior review of the data, but also identified persistent challenges related to how agencies interpret and apply data standards—including the standard for reporting—that could be addressed by establishing a governance structure for ensuring the integrity of these standards over time. We also identified known data limitations that were not fully disclosed on USAspending.gov.[24] Accordingly, we recommended Treasury disclose known data limitations. Treasury agreed with our recommendations, however, they are not yet fully implemented.

Agencies Made Overall Progress in Establishing Data Governance, but Missed Key Milestones in the Federal Data Strategy 2020 Action Plan

As required under the OPEN Government Data Act, the four agencies selected for our review—USDA, Commerce, HUD, and NSF—made progress in establishing data governance by meeting some data governance milestones in the 2020 Action Plan. All four agencies designated CDOs to lead their respective agencies' data governance

[22]See appendix VI for a list of our related reports.

[23]GAO, *DATA Act: Quality of Data Submissions Has Improved but Further Action Is Needed to Disclose Known Data Limitations*, GAO-20-75. (Washington, D.C.: Nov. 8, 2019).

[24]FFATA requires federal agencies to report spending data to USAspending.gov, a public-facing website. FFATA, § 2(b), (c).

efforts.[25] USDA and NSF designated non-political appointees as their agency-wide CDOs. Commerce designated its Patent and Trademark Office's Chief Data Strategist as interim CDO. HUD designated its Chief Technology Officer to serve as interim CDO. According to HUD officials, HUD subsequently selected a permanent CDO who is expected to start in December 2020. In addition, the four selected agencies also published information about their CDOs and three of the four agencies—USDA, Commerce, and NSF—published data governance charters on their websites as required.

However, the selected agencies missed key data governance milestones specified in the 2020 Action plan, including steps to assess the maturity of their data practices and steps intended to enhance staff data literacy skills. For example, Commerce and HUD had not assessed the maturity of their data and related infrastructure by September 30, 2020 as required in the 2020 Action Plan. While all four agencies in our review reported that they are identifying opportunities to increase staff data skills, only one agency, NSF, completed a data literacy assessment. Completing these actions is important for formalizing agency data governance and helping agencies ensure the quality of their data.

Three Selected Agencies Constituted Data Governance Bodies, but Need to Complete Related Activities

USDA, Commerce, and NSF published information about their data governance bodies on their websites, including information on how their data governance bodies received their authority and information about staff dedicated to support their data governance bodies (see figure 2).[26]

[25]According to the CDO Council, as of October 2020, 77 federal agencies have appointed a CDO.

[26]For the purpose of our review, we assessed the extent to which agencies complied with or met the mandatory or recommended milestones. For example, all agencies are directed to publish agency data governance materials on their web pages under Action 2, but are encouraged to adopt all other milestones. For more information, see 2020 Action Plan at https://strategy.data.gov/assets/docs/2020-federal-data-strategy-action-plan.pdf.

Figure 2: Selected Agency Status in Establishing a Governance Body

Federal Data Strategy 2020 Action Plan

Action	Milestone	Target date	USDA	Commerce	HUD	NSF
Constitute a Diverse Governance Body (DGB)	Publish agency data governance materials (membership, charter, meeting cadence) on [agency] .gov/data web page	January 31, 2020*	Complete	Complete	Milestone missed; expected by March 2021	Complete
	Document how DGB receives its authority	September 30, 2020	Complete	Complete	Milestone missed; expected by March 2021	Complete
	Dedicate staff to support DGB	October 31, 2020	Complete	Complete	Milestone missed; expected by March 2021	Complete

**Required*

Source: GAO analysis of agency documents. | GAO-21-152

Constitute a Diverse Data Governance Body

- Directs all federal agencies to publish information about their data governance body on their websites, including its membership and charter, by January 31, 2020.
- Encourages all federal agencies to document how the data governance body receives its authority by September 30, 2020 and dedicate staff to support it by October 31, 2020.
- Encourages all federal agencies to implement quarterly activities, in any order, such as putting in place an agency-wide data strategy or road map by November 2020.

Source: 2020 Action Plan | GAO-21-152

The 2020 Action plan also encourages agencies to undertake actions related to data governance, including developing such things as a data strategy or roadmap, a plan for capital planning for enterprise data assets and infrastructure, and a master data management program. The USDA and NSF data governance boards have completed some of these activities. For example, USDA developed a department-wide data strategy and identified challenges and corresponding corrective actions to address its limited use of advanced analytics, and the lack of available staff trained to leverage data and analytics tools.

In support of its agency-wide data strategy, USDA also designated Assistant Chief Data Officers (Assistant CDOs) across its 19 components to develop mission area data governance strategies and facilitate data sharing and break down data silos throughout the agency. USDA officials said they are identifying areas where visualization and data-driven decision making can be incorporated into their data governance planning, and that their Assistant CDOs are leading working groups that can further identify opportunities to increase the use of data analytics and data visualization across the agency.

Further, NSF established a data road map to implement agency actions including specific timelines and roles and responsibilities for completing

each action outlined in the 2020 Action Plan. A NSF official also said that the agency has developed a plan for capital planning for enterprise data assets and infrastructure, as encouraged under the 2020 Action Plan, for its two main enterprise systems.

The agency data governance body manages agency data assets, and can assist the CDO with establishing policy, procedures, and roles for developing, overseeing, and coordinating data management policy, as well as prioritizing data resource allocations to answer key questions and meet stakeholder needs.[27]

While HUD published the names of its CDO, Evaluation Officer, and Statistical Official, it did not make information about the charter or membership of its data governance body available on its website, as required in the 2020 Action Plan. HUD officials said that efforts to address these milestones were on hold until the new CDO is hired, which is anticipated by the end of December 2020. Nevertheless, the current absence of a charter and membership can (1) adversely affect the CDO's ability to use the data governance body as a forum for key leaders and stakeholders to come together for feedback and collaboration, and (2) delay the process of subsequent data governance activities from being implemented on time.

[27]M-19-23 directed agencies to establish data governance bodies chaired by CDOs by September 30, 2019, with participation from relevant senior-level staff in agency business units, data functions, and financial management and responsibilities to be shared among multiple parties. At a minimum, M-19-23 states that the data governance body is to include membership from the CDO, Evaluation Officer, and Statistical Official. *A Playbook in Support of the Federal Data Strategy* further states that agencies must identify the expectations and responsibilities of each role in data governance, and communicate with agency stakeholders about the various roles and authorities, among other things. The playbook provides that a data governance body can include membership from senior officials such as the Chief Acquisition Officer, Chief Financial Officer, Chief Freedom of Information Act Officer, Chief Information Officer, Chief Information Security Officer, General Counsel, Performance Improvement Officer, Senior Agency Official for Geospatial Information, Senior Agency Official for Privacy, and Senior Agency Official for Records Management or their designees. For more information, see: OMB, *A Playbook in Support of the Federal Data Strategy. Getting Started on Prioritizing Data Governance & Assessing Maturity* (Washington, D.C.: July 2020).

Assess Data and Related Infrastructure Maturity

- Directs all federal agencies to select a maturity model to assess the maturity of the agency's data and related infrastructure by July 31, 2020.
- Specifies that the maturity model used to conduct the maturity assessment should be chosen by the data governance body, and encourages the agency CDO to conduct and document the outcomes of the initial maturity assessment by September 30, 2020.

Source: 2020 Action Plan | GAO-21-152

Three Selected Agencies Have Data Maturity Models, but Only Two Assessed Their Models

USDA, Commerce, and NSF selected a model to assess the maturity of their data and related infrastructure and USDA and NSF completed an initial maturity assessment (see figure 3).[28]

Figure 3: Selected Agency Status in Assessing Data Maturity

Federal Data Strategy 2020 Action Plan

Action	Milestone	Target date	USDA	Commerce	HUD	NSF
Assess Data and Related Infrastructure Maturity	Select an operational maturity assessment model for data and data infrastructure	July 31, 2020*	Complete	Complete	Milestone missed; expected by March 2021	Complete
	Conduct and document the outcome of the initial data maturity assessment	September 30, 2020	Complete	Milestone missed; expected late 2020	Milestone missed; expected by June 2021	Complete

**Required*

Source: GAO analysis of agency documents. | GAO-21-152

[28] *A Playbook in Support of the Federal Data Strategy* states that the data governance body, in consultation with agency stakeholders, should choose, adapt, or create the data maturity assessment model that is aligned with its current capacity and can measure the agency's current success while identifying areas for improvement. For more information, see: OMB, *A Playbook in Support of the Federal Data Strategy. Getting Started on Prioritizing Data Governance & Assessing Maturity* (Washington, D.C.: July 2020).

Benefits of Data Maturity Assessments Identified by State and City CDOs

State and city CDOs in our review said that maturity assessments can be used to identify operational challenges and data needs, better allocate organizational resources, and establish a baseline to measure and demonstrate progress in data governance over time.

Source: State and city CDOs | GAO-21-152

The initial data maturity assessment at USDA identified strengths the agency can leverage and challenges that remain.[29] For example, USDA found that some agency components have data governance subject matter experts and well-trained data staff who can support department-wide data management initiatives and programs. However, USDA officials told us that they identified gaps in leadership for data issues across the 19 components. According to USDA officials, these issues prevent USDA from having a holistic view of its data and supporting infrastructure. To address this gap, USDA officials told us that they created eight new Assistant CDO positions at the mission area level to lead data governance activities and contribute to agency-wide data governance initiatives.

NSF created its own five-part data maturity assessment model and has conducted and documented the outcome of this initial data maturity assessment. A NSF official told us that the maturity assessment also included an initial assessment of current staff data literacy skills, which identified the need for additional training to enhance existing data skills.

The Federal Data Strategy team's playbook on data governance, *A Playbook in Support of the Federal Data Strategy, Getting Started on Prioritizing Data Governance and Assessing Maturity*, identifies a maturity assessment as a key tool for analyzing data governance including, agency policies, procedures, and operations related to data and data infrastructure, data management, data culture, data systems and tools, data analytics, staff skills and capacity, resource capacity, and compliance with law and policy. A maturity assessment is also a useful tool in evaluating agency progress against documented best practices to determine gaps and identify areas for improvement.

Commerce and HUD did not fully complete the milestones for assessing data and related infrastructure maturity. Commerce officials said that each of the agency's bureaus have selected their own data maturity model based on their mission and organizational needs and completed their assessments. According to these officials, as of November 2020,

[29]The 2020 Action Plan also specified that the maturity model should be chosen by the data governance body established under Action 2. USDA analyzed its 19 components across eight mission areas for the maturity assessment. The findings of this assessment can be found in *USDA DMM Assessment Report, USDA Data Analytics Center of Excellence* (August 31, 2019).

Commerce has aggregated the bureau assessments into an agency-wide assessment, which is in the process of being reviewed internally.

HUD had not selected a data maturity model nor conducted an initial assessment of data maturity, as directed in the 2020 Action Plan. HUD officials told us that it would not finalize the selection of an operational maturity assessment model nor start the initial data maturity assessment until after the agency designated a permanent CDO. Once the CDO is in place, they will select a maturity assessment model that meets the needs and mission of the agency.

The results of a maturity assessment can also inform key data governance and management processes and offer a starting point for prioritizing time and resources to improve the management of an agency's data. Commerce and HUD have not yet fully analyzed agency progress against documented best practices to assess how they can improve data governance. Without a timely maturity assessment, agencies' full understanding of areas that require attention will be delayed, including developing their data strategies and identifying current levels of staff data skills.

Identify Opportunities to Increase Staff Data Skills

- Directs the agencies to identify opportunities to increase staff data skills by performing an assessment of current staff data literacy and data skills by July 31, 2020.
- Directs agencies to complete an analysis to identify any data skills gaps to develop a performance plan to close identified gaps by December 31, 2020.

Source: 2020 Action Plan | GAO-21-152

Selected Agencies Have Not Taken Steps to Identify Opportunities to Increase Staff Data Skills

All four agencies in our review missed 2020 Action Plan milestones intended to enhance staff data literacy skills. Although NSF completed an assessment of its current staff data literacy and data skills, the other three agencies in our review did not complete this step. In addition, all four agencies missed the milestone for conducting a gap analysis between current skills and the data skills the agency requires (see figure 4).[30] Staff literacy skills include, for example, working with databases used to collect and store agency data, and analyzing data with statistical software and techniques to communicate results in reports, graphics or dashboards.

[30]Action 4 of the 2020 Action Plan builds on OMB guidance directing federal agencies to develop a capacity assessment under *Learning Agendas*, M-19-23. Action 4 can also serve as an input to the capacity assessment required by the Evidence Act. 5 U.S.C. § 313(d). Action 4 states that the capacity assessments may be further leveraged by agencies to identify critical skills, assess their staff capacities for those skills, identify any gaps, and take actions to ensure that their federal workforces are well-prepared to support evidence-building activities. The *Federal Data Strategy, Improving Agency Data Skills Playbook* states that data literacy is the ability to read, write and communicate data in context. This includes an understanding of data sources and constructs, analytical methods and techniques applied, and the ability to describe the use case, the application, and the resulting value of data. Increasing data literacy can help ensure that the federal workforce is prepared to implement data governance policies and use federal data assets. For more information, see OMB, *President's Management Agenda, Federal Data Strategy, Improving Agency Data Skills Playbook* (May 2020).

Figure 4: Selected Agency Status in Increasing Staff Data Skills

Federal Data Strategy 2020 Action Plan

Action	Milestone	Target date	USDA	Commerce	HUD	NSF
Identify Opportunities to Increase Staff Data Skills	Perform an assessment of current staff data literacy and data skills	July 31, 2020*	Milestone missed; expected by September 2021	Milestone missed; expected late 2020	Milestone missed; expected by June 2021	Complete
	Conduct a gap analysis between the current staff's skills and the skills the agency requires	September 30, 2020*	Milestone missed; expected by September 2021	Milestone missed; no expected date provided	Milestone missed; expected by September 2021	Milestone missed; expected by September 2021

** Required*

Source: GAO analysis of agency documents. | GAO-21-152

NSF completed an initial assessment of staff data literacy skills as part of its data maturity assessment and developed a manual to help identify different levels of data literacy skills within the agency. NSF officials said they plan to create training curricula based on identified needs.[31] A NSF official also told us that the agency is using the results of this assessment to identify opportunities to formalize data training and tailor curricula to individual skill sets.

Officials from all four agencies reported that they are taking steps to identify critical data skills needed for the agency, including evaluating their overall data literacy and capacity and assessing staff capacity for those data skills by conducting capacity assessment training sessions, outlining various skills levels in training curricula, or creating surveys for managers.

For example, USDA officials told us that it has been using data dashboards to identify opportunities to increase staff data literacy skills. In 2018, USDA introduced a dashboard containing information on finance

[31]NSF provided a breakdown of skill levels and relevant capabilities needed for its implementation of training on data analytics. The identified skill levels range from Data Novice, a category for individuals who have yet to have training, a need, or an opportunity to regularly interact with data and data-driven analyses using NSF Data assets, to Data Champion, a category for individuals with expertise in machine learning, artificial intelligence, statistics, and mathematics.

and human resource data skills. In 2019, USDA expanded this effort across all eight mission areas by providing data dashboards focused on data analytics. USDA officials told us that it completed 500 training sessions to more than 7,000 employees on how to create and use a data dashboard.

However, USDA, Commerce, and HUD have not performed an assessment of current staff data literacy and data skills. Further, none of the four agencies conducted a gap analysis between the current skills of the staff and the skills the agency requires to better prioritize the agency's needs and identify approaches to fill those needs, as required in the 2020 Action Plan.

Agencies had different reasons for missing these milestones. For example, UDSA officials said that the agency initially addressed obvious gaps, such as the gaps identified in senior leadership, and is now developing a tool for a more comprehensive assessment of staff skills. Commerce officials said they aggregated bureau-level assessments of staff data literacy and data skills into an agency-wide assessment and conducted a gap analysis, which were being reviewed internally as of November 2020. HUD officials told us that they developed a management survey as part of its capacity assessment and plan to use the results of this assessment to meet the required milestones under this action to identify opportunities to increase staff data skills. Without an assessment of current staff data literacy, agencies will be not be able to identify which critical data skills are needed nor prioritize training resources to enhance the required skills.

Selected Agencies' Data Quality Plans for Spending Data Were Largely Consistent with OMB Guidance

The selected agencies' data quality plans were largely consistent with June 2018 OMB guidance that included 11 elements for agencies to include in the data quality plans for their spending data.[32] USDA and NSF

[32]Office of Management and Budget, *Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk*, OMB Memorandum M-18-16 (Washington, D.C.: June 6, 2018). See Appendix II for more information on OMB's directions to agencies for their data quality plans.

addressed all of the components of the data quality plans and Commerce and HUD addressed ten of the 11 components as shown in figure 5.

Figure 5: Office of Management and Budget Data Quality Plan Directions and Selected Agencies' Internal Controls over Reporting

Office of Management and Budget (OMB) Data Quality Plan Directions in OMB-M-18-16	USDA	Commerce	HUD	NSF
Organizational structure	✓	✓	✓	✓
Key processes providing internal controls for spending reporting	✓	✓	✓	✓
Management's responsibility to supply quality data to meet the reporting objectives for the Digital Accountability and Transparency Act (DATA Act) in accordance with OMB Circular No. A-123	✓	✓	✓	✓
Testing plan and identification of high-risk reported data, including specific data the agency determines to be high risk that are explicitly referenced by the DATA Act	✓	✓	✓	✓
Confirmation that these data are linked through the inclusion of the award identifier in the agency's financial system	✓	✓	✓	✓
Data reported with plain English award descriptions	✓	✗	✗	✓
Actions taken to manage identified risks	✓	✓	✓	✓
Agency management should utilize its risk profiles and apply the concepts of risk appetite and risk tolerance provided in OMB Circular A-123 when making assessments of risk to identify whether internal controls is an appropriate response*	✓	✓	✓	✓
Management has responsibility for determining the materiality of internal control activities*	✓	✓	✓	✓
Whether these materiality thresholds align with the level of control activities needed to provide reasonable assurances*	✓	✓	✓	✓
Should leverage existing processes for identifying and assessing risks and reporting objectives as well as existing regulatory requirements over data quality for defined areas, such as procurement and procurement-related data*	✓	✓	✓	✓

*The additional requirements in OMB guidance that OMB indicates should be leveraged to manage the risks to reporting data.

✓ Complete - Agency included or directly referenced required information in their data quality plan

✗ Incomplete - Agency did not include required information in their data quality plans

Source: GAO analysis of select agencies' implementation of OMB guidance M-18-16. | GAO-21-152

USDA, Commerce, HUD, and NSF documented management's responsibility for ensuring data quality to meet the reporting objectives in the DATA Act in their respective data quality plans. Each agency

delineated roles and responsibilities for governance over DATA Act reporting in their DATA Act data quality plans. For example, NSF's DATA Act governance structure consists of the DATA Act Working Group (DAWG) under the leadership of the agency's Senior Accountable Official for DATA Act reporting. Among other responsibilities, the DAWG ensures that DATA Act reporting objectives are clearly communicated throughout NSF and develops mitigation strategies to address new risks to data quality.

The four agencies in our review also documented key processes for providing internal controls over spending data to help ensure data quality. For example, Commerce instituted a governance process to verify and validate the quality of data entered into its contracting systems through a series of regular data error reports to identify and correct potential errors. Agency officials said that data quality plans were a useful tool and the data governance activities documented in the data quality plans contributed to improvements in the quality of the data agencies submitted to USAspending.gov for DATA Act reporting as reflected in assessments by their Inspectors General.

Two agencies in our review took steps to document procedures for reporting award descriptions in plain English and consistent with the standard definition established under the DATA Act.[33] NSF referenced guidance and manuals that provide direction to report award descriptions in plain language in its data quality plans. USDA issued a DATA Act Data Quality Framework as a supplement to its data quality plan in October 2020, which included directions to USDA component agencies to establish a review process to ensure that award descriptions are consistent with the standard definition, and do not include acronyms, technical terminology, or agency-specific terms that are unclear to the public.

However, Commerce and HUD did not include documentation of significant milestones and major decisions pertaining to reporting awards using plain English. They also did not document that they have controls in place to ensure that the award description is reported consistent with the established standard, as directed in OMB guidance.

[33]The government-wide data standard for the *Award Description* data element is defined as a brief description of the purpose of an award.

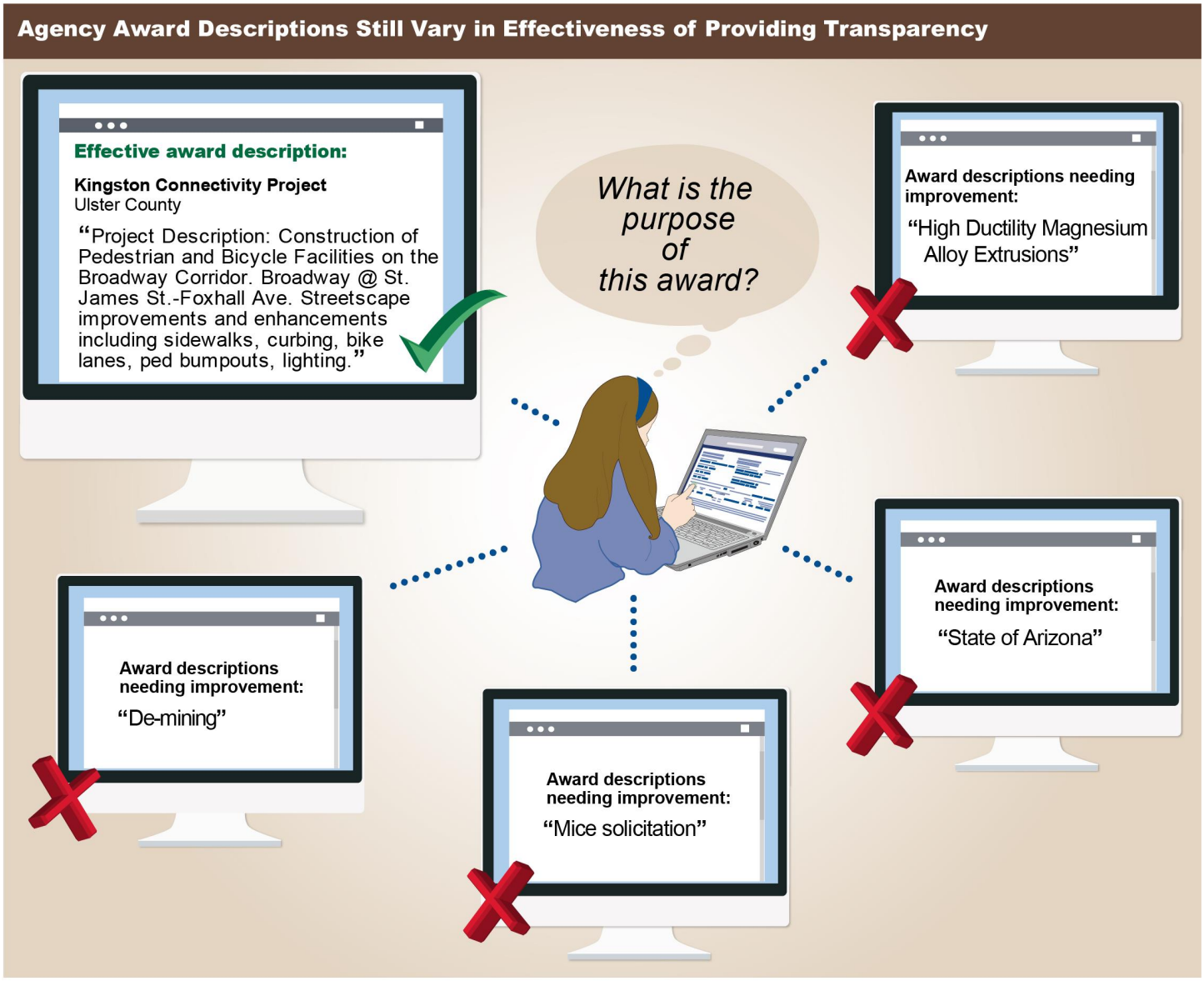
Commerce and HUD provided different reasons for why they did not include this information in their data quality plans. Commerce officials said they follow government-wide procurement guidance related to award description. While Commerce officials provided evidence regarding compliance with government-wide guidance for contract award descriptions and modifications, they did not provide documentation to indicate that controls are in place to ensure that the information shown for the financial assistance award descriptions is consistent with OMB guidance. HUD officials said that the agency is in compliance with the Plain Writing Act of 2010, but did not provide documentation of controls to ensure that information HUD uses for the *Award Description* element complies with the Plain Writing Act of 2010 and is consistent with the DATA Act standard.[34]

We previously reported that the *Award Description* data element is particularly important to achieving the transparency goals envisioned by the DATA Act because it provides information about federal spending to the public. We found that agencies reported values for *Award Description* that were significantly inconsistent with agency sources and with the established standard for reporting this data element.[35] More recently, the Council of Inspectors General on Integrity and Efficiency's Pandemic Response Accountability Committee reported on examples of award descriptions that need improvement for COVID-19 spending, as shown in figure 6.

[34]The Plain Writing Act of 2010 requires federal agencies to write all new publications, forms, and publicly distributed documents in a clear, concise, well organized manner. Pub. L. No. 111-274, 124 Stat. 2861 (2010).

[35]Based on our testing of a representative sample of Q4 FY2018 transactions, we estimated that the *Award Description* data element was inconsistent with agency source records or contained information that was inconsistent with the established standard in 24 to 35 percent of awards in quarter 4 fiscal year 2018. For more information see: GAO-20-75.

Figure 6: Agency Award Descriptions Are Inconsistent with Established Standards



Sources: GAO review of award description examples shared by the Pandemic Response Accountability Committee to the Office of Management and Budget (OMB) and shared via an OMB Controller Alert. | GAO-21-152

Without plain English descriptions, the USAspending.gov end user may not have a clear understanding of the purpose of awards. Documenting milestones and significant decisions for reporting in plain English provides assurance that controls have been implemented so that award descriptions meet the standard. Without documenting controls in their

data quality plans, agencies fail to meet OMB guidance for reporting award descriptions, and fail to fully achieve the transparency envisioned by the DATA Act.

Officials from USDA, Commerce, HUD, and NSF said they are in various stages of reviewing and updating their data quality plans as directed by OMB guidance.[36] Commerce issued an updated plan in June 2020 and NSF issued an updated plan in September 2020. USDA supplemented its data quality plan with its Data Quality Framework to establish standards for USDA component agencies to develop their own DATA Act data quality frameworks in October 2020. HUD reported delays in reviewing and updating its 2020 plans in response to shifting resources and priorities related to COVID-19-related reporting. HUD officials said they plan to issue their updated plan in February 2021. Updating data quality plans helps ensure that agencies document their controls for reporting award description as well as agency actions to mitigate risks to spending data in response to reporting requirement changes or data limitations identified in audits.[37]

The CDO Council Largely Followed Leading Collaboration Practices

In addition to leading data efforts at their agencies, the OPEN Government Data Act requires CDOs to serve as members of the government-wide CDO Council to establish government-wide best

[36]Agencies are directed to review and assess their data quality plans annually for three years or until the agency determines that there are sufficient controls in place to achieve its reporting objectives. For agencies with spending related to implementing the CARES Act, OMB directed agencies to maintain their data quality plans until they expend all of their COVID-19 related funding. See OMB M-20-21.

[37]The CARES Act requires federal agencies to timely report on the use of covered funds. Pub. L. No. 116-136, §15011, 134 Stat. 281, 540–542 (2020). In April 2020, OMB issued guidance, OMB M-20-21, to explain how agencies can meet CARES Act reporting requirements by making some modifications to the existing framework for reporting pursuant to the DATA Act. We previously reported that Offices of Inspectors General (OIG) issued reports on the quality of their agencies' data submissions for the first quarter of fiscal year 2019, as mandated by the DATA Act. OIGs found that the quality of agency reported data varied. OIGs reported control deficiencies related to system limitations, quality control procedures, data from external systems, and other issues and made recommendations for agencies to help improve data quality. See GAO*, DATA ACT: OIGs Reported That Quality of Agency-Submitted Data Varied, and Most Recommended Improvements*, GAO-20-540 (Washington, D.C.: July 9, 2020).

practices for the use, protection, dissemination, and generation of data as well as identifying ways in which agencies can improve on the production of evidence for use in policymaking.[38] As illustrated in table 1, efforts to establish the organizational structure of the CDO Council followed six of the seven leading collaboration practices identified in our prior work and partially followed one of the practices.[39] While the CDO Council identified goals for the 2020 calendar year, it has not yet identified procedures to track and monitor progress in meeting those goals.

[38]The OPEN Government Data Act also requires the CDO Council to promote and encourage data sharing agreements between agencies, consult with the public, engage with private users of government data and other stakeholders on how to improve access to data assets of the federal government, and identify and evaluate new technology solutions for improving the collection and use of data. 44 U.S.C. § 3520A(b), (c)(1).

[39]See GAO, *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms,* GAO-12-1011 (Washington, D.C.: Sept. 27, 2012).

Table 1: Assessment of Chief Data Officer (CDO) Council's Activities Against Leading Collaboration Practices

Collaboration Practice	Council Activities	Summary of Findings
Identifying and Monitoring Outcomes and Accountability Short and long-term outcomes are clearly defined and there is a way to track and monitor progress	Partially followed	CDO Council Charter lists three long-term goals, and additional short-term goals were identified during a Strategic Planning session. However, the Council has not yet developed mechanisms, such as performance measures, to monitor its progress toward its short-term goals.
Bridging Organizational Cultures Agencies have agreed on common terminology and definitions	Followed	The Council includes representation from small agencies and Chief Financial Officer Act agencies in the Executive Committee and implemented the Small Agency Working Group. Additionally, Council leadership said the Council plans to leverage common terminology from OMB as guidance becomes clearer.
Identifying, Sustaining, and Defining Leadership A leadership model is identified for the collaborative effort.	Followed	The CDO Council has a Chair and Vice Chair, who serve for two year terms, and the charter includes an Executive Committee.
Clarifying Roles and Responsibilities Clarity can come from agencies working together to define and agree on their respective roles and responsibilities.	Followed	Council leadership, Executive Committee, member, and ex-officio membership roles and responsibilities are defined in the Council Charter.
Including Relevant Participants All relevant participants have been included	Followed	The Council currently includes 77 agency CDOs and Council leadership believes all current agency CDOs are included and participate.
Identifying Resources Identify the funding, staffing, human, and information technology, resources needed to sustain the collaborative effort.	Followed	The Council is supported by General Services Administration staff and the Council membership had opportunities to propose projects and submit them to the OMB Director for consideration.
Documenting Collaboration through Written Guidance and Agreements Key aspects of collaborative activities are documented, and routinely monitored and updated	Followed	The Council adopted a charter to document key aspects of its activities and adopted charters for its working groups that include the groups' purpose and goals. The Council also adopted its bylaws in October 2020.

Source: GAO analysis of CDO Council documents and testimony | GAO-21-152

Note: Follows – Indicates the Chief Data Officer Council activities follow this collaborative practice

Partially Follows – Indicates the Chief Data Officer Council activities partially follows this collaborative practice.

We found that the CDO Council has taken a number of steps that are consistent with leading collaboration practices:

- **Identifying and Monitoring Outcomes and Accountability:** The OPEN Government Data Act requires the CDO Council to submit to congressional committees and the Director of OMB a forthcoming

biennial report on the work of the Council.[40] In addition, the CDO Council Charter currently lists three long-term goals. These goals are to: (1) meet statutory requirements, including the required report to Congress; (2) be a community of learning by broadly identifying best practices and resources to facilitate the implementation of the Evidence Act; and (3) provide leadership on the delivery of the Federal Data Strategy Action Plan. As illustrated in the text box below, the Council also established a series of short-term goals and related objectives.

CDO Council Short-term Goals and Objectives

Goal 1: Develop a vibrant learning community to ensure that CDOs have the resources to lead data-driven change

- Objective: Host monthly information sharing sessions to exchange and develop best practices on Federal Data Strategy individual agency actions
- Objective: Develop resources to enable CDOs to deliver value

Goal 2: Demonstrate the Strategic Value of the CDO Council

- Objective: Identify and solve cross-cutting data challenges
- Objective: Create CDO Council engagement & communications plan

Goal 3: Develop Efficient and Effective Operating Model for the CDO Council

- Objective: Develop CDO Council bylaws to define decision-making and operational processes
- Objective: Develop templates and standard practices for working groups, committees, and information sharing sessions
- Objective: Develop communications protocols for the Council's internal communications

Goal 4: Create a Strategic Roadmap for the Federal Data Strategy in coordination with the Federal Data Strategy Team

- Objective: Develop a repeatable process for the CDO Council to provide input on proposed federal data policies
- Objective: Provide strategic input to the Advisory Committee on Evidence Building
- Objective: Create strategic priorities for the Council in fiscal year 2021

Source: CDO Council | GAO-21-152

[40] 44 U.S.C. § 3520A(d).

However, as of December 2020, the Council has not yet developed mechanisms, such as performance measures, to monitor its progress toward its short-term goals.

- **Bridging Organizational Cultures:** The CDO Council includes Chief Financial Officers (CFO) Act agencies and other small agencies. The Council members represent diverse organizational cultures and missions. Council leadership said the Council works to be responsive
- to a variety of agency cultures and missions through member communications that include informal discussions and working groups, developing operating procedures and bylaws for Council operations, including representatives from both CFO Act and non-CFO Act agencies, and by adopting common terminology based on the shared goals of the Federal Data Strategy and related OMB guidance.
- **Identifying, Sustaining, and Defining Leadership:** The CDO Council selected a Chair and a Vice-Chair. The CDO Council Charter also states that the Council shall have an Executive Committee comprised of the Chair and Vice-Chair, the Administrator for the Office of eGovernment, Administrator for the Office of Information and Regulatory Affairs, Working Group Chairs, and representatives for CFO Act agencies and small agencies.
- **Clarifying Roles and responsibilities:** The Council Charter records the responsibilities for the Council's key roles including its leadership, Executive Committee, membership, and ex-officio members. The CDO Council also established working groups to advance its work in specific areas, including working groups on operations, COVID-19, data skills, and small agencies.
- **Including Relevant Participants:** The current Council roster includes 24 CFO Act and 53 non-CFO Act Agencies. The OPEN Government Data Act states that the CDO of each agency shall serve as a member of the Council.[41] Council leadership's understanding is that, as of September 2020, all agency CDOs are included on the Council. Additionally, the Council charter identifies relevant stakeholders, such as other Evidence Act officials and Chief Information Officer Council representatives, to participate on the Council.
- **Identifying Resources:** Council leadership said that the Council receives support from the General Services Administration's Executive Councils Team in the Office of Shared Solutions and

CDO Council Working Groups

As of September 2020, the CDO Council established four working groups, including:

1. Operations Working Group created to help organize the structure of the Council and develop a council charter. Its scope also includes establishing procedures for effective and efficient operations.
2. COVID-19 Working Group created in direct response to the pandemic. Its objectives are to: create broad awareness of existing interagency data working groups and goals; establish additional teams to collaborate and share data or resources to answer agency questions; and create a common COVID-19 data resource library for answering agency questions and sharing data.
3. Data Skills Working Group established to help agencies develop effective data skills improvement strategies.
4. The Small Agency Working Group established to represent the needs and perspectives of small agencies.

Source: CDO Council. | GAO-21-152

[41] 44 U.S.C. § 3520A(c)(1).

Performance Improvement. Officials also said the Council had opportunities to propose projects and receive funding from resources made available for government-wide councils. Council leadership officials said that CDO Council Working Groups leverage member agency data resources where appropriate.

- **Documenting Collaboration through Written Guidance and Agreements:** The Council is documenting its collaboration through the CDO Council charter, which it adopted in June 2020, and through charters for its working groups. In October 2020, the Council also adopted its bylaws. Council leadership said it plans to review its documents annually to determine where updates may be needed.

We previously found that collaborative mechanisms, such as interagency councils, can more effectively collaborate if they follow certain leading practices.[42] For example, when collaborative groups develop mechanisms to track and monitor progress, these actions can facilitate their success in meeting their goals. Council officials said the group plans to develop additional mechanisms to track and monitor progress toward established short- and long-term goals, including its biennial progress report to Congress. As the Council continues to mature these mechanisms, it will be important to document and use them to report on the Council's progress in meeting their goals in their biennial report to Congress.

The CDO Council, if operating effectively as an interagency collaborative mechanism by following key collaboration practices, can support agency CDOs in successfully implementing their requirements in the OPEN Government Data Act and the Federal Data Strategy. The Council could provide a forum for cross-agency collaboration on leveraging related data sets to address issues of national importance, such as agencies' responses to the COVID-19 pandemic. With the CDO Council set to sunset in 2025, it will be important for the Council to document its progress in mechanisms—such as the biennial report to Congress—for monitoring progress to ensure that it effectively meets its mandate.[43]

[42]GAO-12-1022.

[43]The OPEN Government Data Act states that the CDO Council will sunset two years after we complete an evaluation of the Council, which is due to Congress by 2023. 44 U.S.C. § 3520A(e)(2).

Addressing Key Questions Can Help CDOs Successfully Implement Data Governance

In addition to requiring federal agencies to designate a CDO, the OPEN Government Data Act establishes 14 functions of the CDO, several of which are related to data governance.[44] Officials familiar with the CDO role from academia, state and local governments, and the private sector reported that successful data governance implementation requires a culture change. Such a culture change can result in a shared understanding of the importance of using data as a strategic asset to achieve the mission and improve operations. Our interviews with these officials and review of their organizations' related documents resulted in key questions for federal CDOs to consider to successfully implement data governance (see figure 7).[45]

[44]Pub. L. No. 115-435, § 202(e), 132 Stat. at 5541–5542, *codified at* 44 U.S.C. § 3520(c).

[45]For the purpose of this report, we are defining several officials as more than five; some officials as three to five; and few officials as one or two.

Figure 7: Key Questions for a Chief Data Officer to Consider to Facilitate Successful Implementation of Data Governance

Source: GAO analysis of GAO and nonfederal reports, and OMB guidance documents. | GAO-21-152

Learning Agendas Are a Tool for CDOs in Identifying and Understanding Agency-wide Priorities:

OMB M-19-23 directs agency Evaluation Officers (EO) to develop learning agendas to define and prioritize relevant questions for the agency's priorities and identify strategies for building evidence to answer them. Learning Agendas should include a list of data the agency intends to collect, use, or acquire to facilitate the use of evidence in policy making. OMB implementing guidance directs the Evaluation Officer and other key stakeholders, including the CDO, to coordinate evidence-building activities across the agency. For instance, in the development

process, the CDO can identify the data that are required to answer a priority question that may already exist, or develop new ones based on coordination with key stakeholders.

Source: OMB M-19-23 and GSA Evidence Act Toolkit | GAO-21-152

1. How can the CDO ensure data governance strategies answer the agency's priority mission questions?

Federal agency CDOs should identify and leverage existing data assets or create new data governance strategies that can help address their respective agencies' missions and top priorities and solve their most important challenges, according to several of the selected officials we interviewed. Several state and city CDOs and officials from academia and industry we spoke with also said that an agency's top priorities may vary based on its size and composition, and that the missions, needs, and levels of data maturity of the agency's components may vary significantly. These officials added that in order to address agency-wide questions and meet agency stakeholder needs, a CDO should develop an agency-wide data governance plan or strategy that has clear goals and expectations for how to use the data to address agency priorities. The 2020 Action Plan also directs agencies to identify data needed to answer priority questions in agency learning agendas, as directed in OMB guidance.[46]

Several state and city CDOs and officials from academia and industry we spoke with also recommended that CDOs identify key players that own, control, and use data assets. These individuals also stated that agency-wide stakeholder engagement to align agency resources and prioritize efforts is critical in determining what data are needed to answer the agency's priority questions.

They explained that by collaborating with agency leadership, program and mission support managers, and the key players that generate and use the agency's data assets, the CDO can gain a holistic view of the needs and challenges at the agency and can provide targeted actions to show demonstrated progress early in the process.

For example, one city CDO we spoke with said he was able to identify the lack of a standard definition for a unit of housing as the root cause of a known data quality issue by consulting with key city-wide stakeholders across five departments. This city CDO stated that to identify the data to answer his city's high priority questions, he needed to engage these stakeholders to understand the source of the problem and institute new

[46]OMB M-19-23 directs the Evaluation Officers to develop Interim Learning Agendas to identify and set priorities for evidence-building by September 2020. For more information on Learning Agendas, see GAO, *Evidence-Based Policymaking: Selected Agencies Coordinate Activities, but Could Enhance Collaboration*, GAO-20-119 (Washington, D.C.: Dec. 4, 2019).

definitions for data collection and mechanisms to monitor its quality over time.

2. What are the CDO's key objectives with regard to data governance?

Once a CDO has an understanding of their agency's mission, priorities, and key data needs, they should define their objectives and key responsibilities to address such needs, according to several of the selected officials we interviewed. Some officials from academia and industry cautioned that there is a risk that CDOs may be unsuccessful in meeting their objectives if they take on too many roles and responsibilities at once because they may be unable to demonstrate measurable progress in any one area. In addition, these officials, as well as state and city CDOs, said a lack of clarity in the required roles and responsibilities of the CDO from leadership, and a lack of support from agency stakeholders on the goals and objectives of the CDO, can be reasons for turnover in the CDO position.

Some officials from academia and industry and a state CDO also said that CDOs need to clearly define their primary roles and responsibilities and set key objectives based on agency priorities to be successful. For example, a state CDO stated that he understood from the outset that his primary objective as a CDO in solving high-priority problems for his state would require data from multiple agencies with different processes, privacy restrictions, and data sharing agreements and systems. The datasets within his purview include data from multiple state agencies ranging from health data (which includes personally identifiable information) to data used for law enforcement purposes. He prioritized data sharing and facilitated discussions among leadership and state-wide stakeholders as his key responsibility. As a result, he was able to demonstrate progress by identifying common areas of focus, and worked with these stakeholders to leverage existing enterprise tools to aggregate and analyze datasets.

According to several state and city CDOs and officials from academia and industry, a CDO also needs to establish close working relationships with relevant agency stakeholders to distinguish and collaborate on agency-wide data governance objectives. For example, several state and city CDOs and officials from academia and industry said that a CDO needs to coordinate closely with the Chief Information Officer (CIO) in carrying out data governance activities, but this close coordination can also result in

confusion between the two roles and be a barrier to a CDO implementing his or her primary objectives.

These experts highlighted key differences between the roles of CDOs and CIOs. Some officials from academia and industry said that a CIO's traditional role has been to manage the technology infrastructure and provide enterprise system controls to store the data assets. Selected officials said that a CDO's role is primarily focused on managing how the data assets will be used and establishing the data governance framework to ensure data quality. A CDO coordinates within the agency across different departments and leaders to understand data issues, facilitate data sharing, and provide value to business functions by creating policies and practices to build data's long-term value. According to two state and city CDOs we interviewed, a CDO may also work with a Chief Privacy Officer or relevant stakeholders if the data contain personally identifiable information or other sensitive data. While A CDO may set appropriate policies and procedures for using the data, a CIO ensures that technology secures the data.[47]

State and city CDOs also suggested it is important for the CDO to both define his or her role separately from the CIO and work closely with the CIO to ensure their efforts complement each other. For instance, a state CDO told us that when a CDO and CIO collaborate, they can build data governance processes, such as built-in system checks, to address data quality issues in the requirements for new information technology (IT) system procurements.

3. How Can the CDO Communicate the Value of Data Governance?

In addition to identifying priority datasets and the CDO's primary responsibilities and objectives, CDOs need to provide a clear vision and promote the value of data governance across the agency, according to several of the selected officials we interviewed. Several state and city CDOs and officials from academia and industry whom we spoke with said one of the key challenges for a CDO in leading a data-driven culture is communicating the benefits of data governance because these benefits

[47]Our previous body of work examining the role of federal chief information officers identified 35 key responsibilities for managing IT required under federal laws and guidance. For example, see: GAO, *Federal Chief Information Officers: Critical Actions Needed to Address Shortcomings and Challenges in Implementing Responsibilities,* GAO-18-93, (Washington, D.C.: Aug. 2, 2018).

are not immediately visible. For example, some state and city CDOs and officials from academia and industry told us that if agency staff do not understand the relevance of data to their work, it is difficult for them to see how adopting key data governance activities, such as shared data definitions and standards, can help them meet their goals.

Key Ways to Foster a Data Stewardship Culture:

- Increasing awareness: People have to understand the potential of data for use and view it as a key asset and priority.
- Facilitating engagement: People have to engage with data on a regular basis so that it is accessed and used appropriately.
- Promoting inspiration: People have to be inspired by what the community can do with data.
- Empowerment: People need equal access to tools and capabilities.

Source: GAO analysis of Interviews with State CDOs | GAO-21-152

Several state and city CDOs also reported that data governance outcomes are not always immediately apparent, but that starting with near term projects, identifying demonstrable ways to measure progress, and holding staff accountable for generating and maintaining high quality data can help demonstrate the value of data governance. USDA, for example, adopted an agency-wide data analytics dashboard program using its human resources data to show every employee how administrative data can be leveraged as an asset so they are accessible and easy to use. USDA officials said that when everyone was able to see the usefulness of this project, it was easier to gain buy-in from leadership and garner support for data governance activities from the workforce.

According to several state and city CDOs, CDOs should also leverage data stewards—employees who create and manage data, data analysts who conduct analytics with the data, and decision-makers who use the data to evaluate programs and set priorities—to implement data governance. Several state and city CDOs and officials from academia and industry also reported that data quality is dependent on how well data stewards and other data owners enter, create, and use the data in their daily work.

These officials said one of the CDO's most important roles is helping data stewards understand their contribution to overall data quality. In addition, the CDOs and officials from academia and industry told us that as data quality increases and the use of data becomes more prevalent in the organization, leadership will be more convinced to invest in activities that facilitate data sharing and increase data literacy across the agency, creating a momentum that drives data-driven cultural transformation. To accomplish this important data governance activity, CDOs should focus on building a data stewardship culture. See the text box on how one state CDO identified four key ways a CDO can foster a data stewardship culture.

Conclusions

Congress and the administration have taken action to facilitate the implementation of data governance at federal agencies to ensure the quality of data made available to the public. Although selected agencies have made substantial progress in establishing specific aspects of a data governance framework, they missed some milestones to address important activities related to their data governance bodies, data maturity frameworks, and staff data skill assessments.

Agencies largely met OMB requirements for documenting quality controls in their data quality plans specific to spending data. The inclusion of information to ensure that the purpose of awards is in plain language and consistent with standard definitions in agency data quality plans would help agencies fully meet the transparency requirements of the DATA Act and continue to facilitate efforts to more effectively track federal spending.

The recently-established CDO Council has a key role in assisting newly appointed CDOs and addressing these and other projects with government-wide significance, such as the government's response to COVID-19. The Council has already demonstrated the use of a number of leading collaboration practices in its organizational structure. As the Council's work continues to evolve, it would also benefit from continuing to establish and report on mechanisms to measure progress in meeting its goals to promote best practices for federal agencies' data governance.

Recommendations for Executive Action

We are making one recommendation to USDA:

> The Secretary of the Department of Agriculture should direct the Chief Data Officer to perform an assessment of current staff data literacy and data skills, conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps. (Recommendation 1)

We are making three recommendations to Commerce:

> The Secretary of the Department of Commerce should direct the Chief Data Officer to aggregate bureau-level assessments to conduct and

document the outcome of an initial data maturity assessment. (Recommendation 2)

The Secretary of the Department of Commerce should direct the Chief Data Officer to aggregate bureau-level assessments and analyses to assess current staff data literacy and data skills and to conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps. (Recommendation 3)

The Secretary of the Department of Commerce should direct the Chief Financial Officer to develop and include a description of the controls for the *Award Description* data element, specifically the agency's significant milestones and major decisions pertaining to the use of plain English descriptions for describing the purpose of its awards, in the next data quality plan update. (Recommendation 4)

We are making four recommendations to HUD:

The Secretary of the Department of Housing and Urban Development should direct the Chief Data Officer to publish all data governance materials on its web page, including the data governance body membership, charter, and the cadence of its meetings. (Recommendation 5)

The Secretary of the Department of Housing and Urban Development should direct the Chief Data Officer to select an operational maturity assessment model for data and data-related infrastructure and conduct and document the outcome of an initial data maturity assessment. (Recommendation 6)

The Secretary of the Department of Housing and Urban Development should direct the Chief Data Officer to assess current staff data literacy and data skills, conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps. (Recommendation 7)

The Secretary of the Department of Housing and Urban Development should direct the Chief Financial Officer to develop and include a description of the controls for the *Award Description* data element—specifically the agency's significant milestones and major decisions pertaining to the use of plain English descriptions for describing the purpose of its awards—in the next data quality plan update. (Recommendation 8)

We are making one recommendation to NSF:

- The Director of the National Science Foundation should direct the Chief Data Officer to conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps. (Recommendation 9)

We are making one recommendation to the CDO Council:

- The CDO Council Chair, in coordination with the Council, should develop additional mechanisms, such as performance measures, to monitor and report on progress toward meeting its short- and long-term goals. (Recommendation 10)

Agency Comments

We provided a draft of this report to the Departments of Agriculture, Commerce, and Housing and Urban Development, the Office of Management and Budget, the National Science Foundation, and the CDO Council for review and comment.

In an emailed response, an audit liaison said that USDA generally concurred with our findings and recommendations and did not have technical comments on the draft report. In an emailed response, an audit liaison said that Commerce agreed with our recommendations and planned to continue to work to implement the recommendations. HUD and NSF agreed with our recommendations and provided written comments that are summarized below and reprinted in appendices III and IV. In its written comments, HUD officials stated that the agency is taking actions to correct the noted deficiencies. In its comments, NSF stated that it is in the process of identifying critical data skills needed for the agency and considering opportunities to provide formalized and tailored learning opportunities.

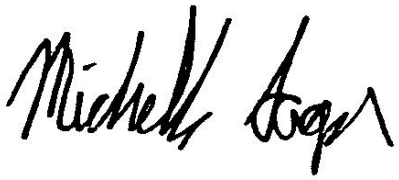
In its email comments, a senior official representing the CDO Council did not agree or disagree with the recommendation to develop processes and mechanisms for monitoring progress toward short- and long-term goals. The CDO Council acknowledged that more work needs to be done to further develop mechanisms to track and monitor its performance. The CDO Council also cited other mechanisms, such as its biennial report to Congress and OMB, and general performance measures included in the

Federal Data Strategy 2020 Action Plan, as examples of mechanisms to measure its performance. As a result of this information, the team modified the recommendation to reflect that the Council needs to develop additional performance measures to monitor its progress in meeting established goals.

In addition to its comments, the Council provided additional information related to our draft recommendation on developing written guidance and agreements on how CDO Council members would collaborate. We reviewed the information and determined that the Council is following the collaboration practice. As a result, we are no longer recommending that the CDO Council develop written guidance and agreements because the Council has already taken this action.

We are sending copies of this report to the relevant congressional committees; the Secretaries of Agriculture, Commerce, and Housing and Urban Development, the Office of Management and Budget, the National Science Foundation, and the CDO Council. This report will be available at no charge on our website at http://www.gao.gov.

If you or your staff has any questions about this report, please contact Michelle Sager at (202) 512-6806 or Sagerm@gao.gov Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of our report. Key contributors to this report are listed in appendix V.



Michelle Sager
Director, Strategic Issues

List of Congressional Addresses

The Honorable Ron Johnson
Chairman
The Honorable Gary C. Peters
Ranking Member
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Rob Portman
Chairman
The Honorable Thomas R. Carper
Ranking Member
Permanent Subcommittee on Investigations
Committee on Homeland Security and Governmental Affairs
United States Senate

The Honorable Carolyn B. Maloney
Chairwoman
The Honorable James Comer
Ranking Member
Committee on Oversight and Reform
House of Representatives

The Honorable Gerald E. Connolly
Chairman
The Honorable Jody Hice
Ranking Member
Subcommittee on Government Operations
Committee on Oversight and Reform
House of Representatives

The Honorable Mark R. Warner
United States Senate

Appendix I: Objectives, Scope and Methodology

This report examines: (1) selected agencies' efforts to establish data governance consistent with the Federal Data Strategy 2020 Action Plan (2020 Action Plan), (2) the extent to which agency data quality plans for spending data reported under the Digital Accountability and Transparency Act of 2014 (DATA Act) were consistent with Office of Management and Budget (OMB) guidance; (3) the extent to which the Chief Data Officers (CDO) Council followed leading collaboration practices; and (4) what key questions can help agency CDOs facilitate the successful implementation of data governance.

To address these objectives, we selected four agencies to represent a range of experiences with data governance. Specifically, we considered:

- when agencies' CDO positions were established to include agencies that had a CDO present prior to enactment of the Evidence Act in January 2019 and agencies that established the position after January 2019;
- Office of Inspector General reports on the quality of spending data as required under the DATA Act to include agencies that had both higher quality data and moderate- to lower- quality data; and
- the size of the agency measured as a percentage of total outlays for the federal government in fiscal year 2019 to include both agencies that had total outlays valued at more than and less than one percent of total federal outlays in fiscal year 2019.
- whether the agency is a statistical agency to include both statistical and nonstatistical agencies.[1]

We selected the following agencies: (1) Department of Agriculture (USDA), (2) Department of Commerce (Commerce), (3) Department of Housing and Urban Development (HUD), and (4) National Science Foundation (NSF). Although the findings for these agencies cannot be generalized to all federal agencies, they are designed to provide illustrative examples of agency progress in establishing data governance

[1]There are 13 federal agencies, referred to as the principal statistical agencies, which have statistical activities as their core mission.

frameworks across a range of agencies based on factors that might be expected to affect experiences with data governance.

To assess the extent to which selected agencies met milestones in the 2020 Action Plan, we first identified specific requirements or milestones for federal agencies to establish data governance in: (1) the Open, Public, Electronic and Necessary Government Data Act (OPEN Government Data Act); (2) OMB guidance in *Phase I Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance*; and (3) the 2020 Action Plan (see appendix II).[2] To assess the selected agencies' progress in meeting these milestones, we reviewed relevant agency documents, such as data governance body charters and data maturity assessments. We also interviewed agency CDOs on their plans to implement the milestones in the 2020 Action plan.

To assess the extent to which agency data quality plans for spending data reported under the DATA Act were consistent with OMB guidance we compared the plans to the requirements in *Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk* (see appendix II).[3] We reviewed agency documents and internal guidance related to the data quality plans. We also interviewed officials from the office of the Senior Accountable Officials (SAO) for spending data on their agency data quality plans.

To assess the extent to which the activities of the CDO Council align with our collaboration practices, we interviewed CDO Council leadership and reviewed related documents, such as the Council's charter and meeting agendas. We compared the Council's activities to collaboration practices identified in our prior work: (1) identifying and monitoring outcomes and accountability, (2) bridging organizational culture, (3) sustaining and defining leadership, (4) clarifying roles and responsibilities, (5) including

[2]Pub. L. No. 115-435, title II, 132 Stat. 5529, 5534–5544 (2019): Office of Management and Budget, *Phase I Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance,* OMB Memorandum M-19-23 (Washington, D.C.: July 10, 2019).

[3]Office of Management and Budget, *Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk*, OMB Memorandum M-18-16 (Washington, D.C.: June 6, 2018).

relevant participants, (6) identifying resources, and (7) documenting collaboration through written guidance and agreements.[4]

To identify key questions that could facilitate CDOs' success, we interviewed officials from external organizations, including state and city CDOs and officials from academia and industry, and reviewed related documentation from their organizations. We identified external organizations by first reviewing our prior work and literature on data governance and data quality to identify an initial list of external organizations. When we interviewed officials from our initial list, we requested referrals for additional organizations knowledgeable about data governance and the role of the CDO to identify additional organizations. We identified the following 16 officials and organizations:

- California Chief Data Officer
- North Carolina Chief Data Officer
- Oregon Chief Data Officer
- Oregon Department of Transportation, Strategic Data Program Manager
- Virginia Chief Data Officer
- San Francisco Chief Data Officer
- Beck Center for Social Impact + Innovation, Georgetown University
- Ash Center for Democratic Governance and Innovation, Harvard University
- Wagner Graduate School of Public Service, New York University
- Babson College
- Data Foundation
- EDM Council
- IBM Center for the Business of Government
- Data Quality Solutions
- American Council for Technology and Industry Advisory Council
- NAPx Consulting, Former Chief Statistician of the United States

[4]GAO, *Managing for Results: Key Considerations for Implementing Interagency Collaborative Mechanisms,* GAO-12-1022 (Washington, D.C.: Sep 27, 2012).

We also interviewed the federal CDOs in our study on the factors that facilitated their success. For the purpose of reporting, we defined several officials as more than five; some officials as three to five; and few officials as one or two.

We conducted this performance audit from December 2019 to December 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Statute and Guidance for Agencies to Establish Data Governance

As shown in table 2, Congress and the administration have taken steps to establish data governance at federal agencies for all federal data assets and specific to spending data reported under the Digital Accountability and Transparency Act of 2014 (DATA Act).

Table 2: Statute and Guidance for Agencies to Establish Data Governance

Statute or guidance	Requirements related to data governance
Foundations for Evidence-Based Policy Making Act, Tile II: Open, Public, Electronic and Necessary Government Data Act	Required agencies to: • Appoint a Chief Data Officer (CDO). The CDO shall be responsible for: (1) lifecycle data management; (2) coordinating with any agency official responsible for using, protecting, disseminating, and generating data; (3) managing data assets, including: standardization of data format, sharing of data assets, and publication of data assets: (4) consulting with statistical official of the agency; (5) carrying out the requirements under the Paperwork Reduction Act; (6) ensuring that agency data conforms with data management best practices; (7) engaging agency employees, the public, and contractors in using public data assets and encouraging collaborative approaches on improving data use; (8) supporting the Performance Improvement Officer; (9) supporting the Evaluation Officer of the agency; (10) reviewing the impact of the infrastructure of the agency on data asset accessibility and coordinating with the Chief Information Officer of the agency to improve such infrastructure to reduce barriers that inhibit data asset accessibility; (11) ensuring that the agency maximizes the use of data in the agency, including for the production of evidence, cybersecurity, and the improvement of agency operations; (12) identifying points of contact for roles and responsibilities related to open data use and implementation; (13) serving as the agency liaison to other agencies and the Office of Management and Budget on the best way to use existing agency data for statistical purposes; and (14) complying with any regulation and guidance issued on the acquisition and maintenance of any required certification and training. • Establish the Chief Data Officers (CDO) Council to be responsible for: (1) establishing government-wide best practices for the use, protection, dissemination, and generation of data; (2) promoting and encouraging data sharing agreements between agencies; (3) identifying ways in which agencies can improve upon the production of evidence for use in policymaking; (4) consulting with the public and engaging with private users of government data and other stakeholders on how to improve access to data assets of the federal government; and (5) identifying and evaluating new technology solutions for improving the collection and use of data.

Statute or guidance	Requirements related to data governance
Office of Management and Budget (OMB) Memorandum M-19-23, Phase I Implementation of the Foundations for Evidence-Based Policymaking Act of 2018: Learning Agendas, Personnel, and Planning Guidance	• Directed agencies to establish an agency data governance body to be chaired by the CDO, by September 30, 2019, with participation from relevant senior-level staff in agency business units, data functions, and financial management. At a minimum, M-19-23 states that the data governance body is to include membership from the CDO, Evaluation Officer, and Statistical Official.

Federal Data Strategy 2020 Action Plan (2020 Action Plan)	Six actions in the 2020 Action Plan are designated for individual agencies, three of which are related to a data governance framework.
	• Action 2: Constitute a Diverse Data Governance Body[a]
	  • Publish agency data governance materials (membership, charter, meeting cadence) on [agency].gov/data web page by January 31, 2020[b]
	  • Document how the data governance body receives its authority by September 30, 2020[b]
	  • Dedicate staff to support the data governance body by October 31, 2020[b]
	  • Put in place a data strategy or road map (one activity per quarter, any order)[b]
	  • Develop a plan for capital planning for enterprise data assets and infrastructure (one activity per quarter, any order)[b]
	  • Adopt a master data management program (one activity per quarter, any order) [b]
	• Action 3: Assess Data and Related Infrastructure Maturity
	  • Select an operational maturity assessment model for data and data infrastructure by July 31, 2020[a]
	  • Conduct and document the outcome of the initial data maturity assessment by September 30, 2020[c]
	• Action 4: Identify Opportunities to Increase Staff Data Skills
	  • Perform an assessment of current staff data literacy and data skills by July 31, 2020[c]
	  • Conduct a gap analysis between the current staff's skills and the skills the agency requires by September 30, 2020[c]

Statute or guidance	Requirements related to data governance
OMB Memorandum M-18-16, Appendix A to OMB Circular No. A-123, Management of Reporting and Data Integrity Risk	Directed agencies to create a data quality plan to help improve the data quality of spending data required to be reported under the DATA Act. The guidance aligns data governance activities with our *Standards for Internal Control in the Federal Government*. Data quality plans should cover significant milestones and major decisions pertaining to[d] • Organizational structure • Key processes providing internal controls for spending reporting • Management's responsibility to supply quality data to meet the reporting objectives for the DATA Act in accordance with OMB Circular No. A-123 • Testing plan and identification of high-risk reported data, including specific data the agency determines to be high risk that are explicitly referenced by the DATA Act • Confirmation that these data are linked through the inclusion of the award identifier in the agency's financial system • Data reported with plain English award descriptions • Actions taken to manage identified risks Additional responsibilities related to Internal Controls over Reporting and the DATA Act include: • Agency management should utilize their risk profiles and apply the concepts of risk appetite and risk tolerance provided in OMB Circular A-123 when making assessments of risk to identify whether internal controls are an appropriate response • Management has responsibility for determining the materiality of internal controls activities • And whether these materiality thresholds align with the level of control activities needed to provide reasonable assurances • Should leverage existing processes for identifying and assessing risks and reporting objectives as well as existing regulatory requirements over data quality for defined areas, such as procurement and procurement-related data.

Source: GAO analysis of statutes, OMB memorandum, and the Federal Data Strategy 2020 Action Plan | GAO-21-152

[a]All agencies are directed to take this action.

[b]All agencies are encouraged to achieve these milestones.

[c]Action 4 can serve as an input to the capacity assessments required by the Evidence Act. 5 U.S.C. § 313(d). This requirement applies to agencies listed in the Chief Financial Officer Act of 1990 (CFO Act agencies). 31 U.S.C. § 901(b). All of the selected agencies in our study are CFO Act agencies.

[d]OMB M-18-16 states that an agency's data quality plan should include significant milestones and major decisions pertaining to: (1) organizational structure, (2) key processes providing internal controls for spending reporting, (3) management's responsibility to supply quality data to meet the reporting objectives for the DATA Act in accordance with OMB Circular No. A-123, (4) testing plans and identification of high-risk reported data including specific data the agency determines to be high-risk that are explicitly referenced by the DATA Act, (5) confirmation that these data are linked through the inclusion of the award identifier in the agency's financial system, (6) reported with plain English award descriptions, and (7) actions taken to manage identified risks. The guidance for data quality plans is part of updates made to align appendix A with the 2014 update to our Green Book in part, by expanding the scope from internal control over financial reporting to internal control over reporting to support the need for higher quality data to support better data-driven decisions, which also assigns responsibility to agency management to (1) utilize agency risk profiles and apply the concepts of risks appetite and risk tolerance provided in OMB Circular No. A-123 when making assessments of risk to identify whether internal controls are an appropriate response, (2) determine the materiality of internal control activities, (3) determine whether materiality thresholds align with the level of control activities needed to provide reasonable assurances, while (4) leveraging existing processes for identifying and assessing risks and reporting objectives as well as existing regulatory requirements over data quality for defined areas, such as procurement and procurement-related data. We assessed agencies on these additional components because they are relevant to spending data reported under the DATA Act.

Appendix III: Comments from the Department of Housing and Urban Development

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D.C. 20410-3000

CHIEF INFORMATION OFFICER

11/23/2020

Ms. Michelle Sager
Director, Strategic Issues
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Ms. Sager:

The Department of Housing and Urban Development (HUD) appreciates the opportunity to review and comment on the draft audit report entitled *Data Governance: Agencies Made Progress in Establishing Governance but Need to Address Key Milestones* (GAO-21-152 / 103984). This report assigned four recommendations to HUD. Please review the attached document for HUD's comments. Additionally, HUD is taking actions to correct the noted deficiencies.

Again, thank you for the opportunity to review and comment on the draft audit report. If you have any questions concerning this response, please contact OCIO's Audit Executive, Ms. Ekanem Fleming, Acting Deputy Chief Information Officer of Business and IT Resource Management. Ms. Fleming is available at (202) 402-5021 or ekanem.o.fleming@hud.gov.

Sincerely,

David Chow

David Chow
Chief Information Officer

Enclosure

www.hud.gov espanol.hud.gov

Agency Comment Letter

Text of Appendix III: Comments from the Department of Housing and Urban Development

Page 1

November 23, 2020

Ms. Michelle Sager
Director, Strategic Issues
U.S. Government Accountability Office
441 G Street NW
Washington, DC 20548

Dear Ms. Sager:

The Department of Housing and Urban Development (HUD) appreciates the opportunity to review and comment on the draft audit report entitled Data Governance: Agencies Made Progress in Establishing Governance but Need to Address Key Milestones (GAO-21-152 / 103984). This report assigned four recommendations to HUD. Please review the attached document for HUD's comments. Additionally, HUD is taking actions to correct the noted deficiencies.

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Sincerely,

David Chow
Chief Information Officer

Enclosure

Appendix IV: Comments from the National Science Foundation

National Science Foundation
Office of the Director

December 4, 2020

Michelle Sager
Director
Strategic Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, D.C. 20548

Dear Ms. Sager:

Thank you for the opportunity to review and provide comments on the Government Accountability Office (GAO) draft report, *DATA GOVERNANCE: Agencies Made Progress in Establishing Governance, but Need to Address Key Milestones* (GAO-21-152). The National Science Foundation (NSF) values the GAO staff's professionalism and many constructive interactions during this GAO engagement.

NSF appreciates GAO's acknowledgement of agency efforts to ensure the quality of federal data assets through effective data governance. As the draft report describes, the Foundation has made overall progress in establishing data governance by meeting the Federal Data Strategy 2020 Action plan milestones, including establishing a data governance body, conducting the initial data maturity assessment, and developing agency-wide data strategies. As part of the implementation of the Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act), the Foundation is in the process of identifying critical data skills needed for the agency and considering opportunities to provide formalized and tailored learning opportunities.

NSF concurs with the recommendation made by GAO for additional actions the agency should take to conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps.

Again, thank you for the opportunity to review and comment on this draft report. Please feel free to contact Veronica Shelley at vshelley@nsf.gov or 703-292-4384 if you have any questions or require additional information. We look forward to working with you again in the future.

Sincerely,

Sethuraman Panchanathan
Director

2415 Eisenhower Avenue, Suite 19100 Alexandria, VA 22314

Agency Comment Letter

Text of Appendix IV: Comments from the National Science Foundation

Page 1

December 4, 2020

Michelle Sager
Director
Strategic Issues
U.S. Government Accountability Office
441 G Street, NW
Washington, D.C. 20548

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NSF concurs with the recommendation made by GAO for additional actions the agency should take to conduct a gap analysis between the current staff's skills and the skills the agency requires, and establish a baseline performance plan to close the identified data skills and literacy gaps.

Again, thank you for the opportunity to review and comment on this draft report. Please feel free to contact Veronica Shelley at vshelley@nsf.gov or 703-292-4384 if you have any questions or require additional information. We look forward to working with you again in the future.

Sincerely,

Sethuraman Panchanathan
Director

Appendix V: GAO Contacts and Staff Acknowledgments

GAO Contact

Michelle Sager, (202) 512-6806 or sagerm@gao.gov

Staff Acknowledgments

In addition to the contact named above, Kathleen Drennan (Assistant Director), Barbara Lancaster (Analyst-in-Charge), Jenny Chanley, Rob Gebhart, Peter Kramer, Joseph Neumeier, Jungjin Park, Robert Robinson, Andrew J. Stephens, and Sarah Veale made key contributions to this report.

Appendix VI: Related GAO Reports

Open Data: Agencies Need Guidance to Establish Comprehensive Data Inventories; Information on Their Progress is Limited. GAO-21-29. Washington, D.C.: October 8, 2020.

DATA Act: OIGs Reported That Quality of Agency-Submitted Data Varied, and Most Recommended Improvements. GAO-20-540. Washington, D.C.: July 9, 2020.

Evidence-based Policymaking: Selected Agencies Coordinate Activities, but Could Enhance Collaboration. GAO-20-119. Washington, D.C.: December 4, 2019.

DATA Act: Quality of Data Submissions Has Improved but Further Action Is Needed to Disclose Known Data Limitations. GAO-20-75. Washington, D.C.: November 8, 2019.

DATA Act: Customer Agencies' Experiences Working with Shared Service Providers for Data Submissions. GAO-19-537. Washington, D.C.: July 18, 2019.

DATA Act: Pilot Effectively Tested Approaches for Reducing Reporting Burden for Grants but Not for Contracts. GAO-19-299. Washington, D.C.: April 30, 2019.

DATA Act: OMB Needs to Formalize Data Governance for Reporting Federal Spending. GAO-19-284. Washington, D.C.: March 22, 2019.

Open Data: Treasury Could Better Align USAspending.gov with Key Practices and Search Requirements. GAO-19-72. Washington, D.C.: December 13, 2018.

DATA Act: Reported Quality of Agencies' Spending Data Reviewed by OIGs Varied Because of Government-wide and Agency Issues. GAO-18-546. Washington, D.C.: July 23, 2018.

DATA Act: OMB, Treasury, and Agencies Need to Improve Completeness and Accuracy of Spending Data and Disclose Limitations. GAO-18-138. Washington, D.C.: November 8, 2017.

DATA Act: As Reporting Deadline Nears, Challenges Remain That Will Affect Data Quality. GAO-17-496. Washington, D.C.: April 28, 2017.

DATA Act: Office of Inspector General Reports Help Identify Agencies' Implementation Challenges. GAO-17-460. Washington, D.C.: April 26, 2017.

DATA Act: Implementation Progresses but Challenges Remain. GAO-17-282T. Washington, D.C.: December 8, 2016.

DATA Act: OMB and Treasury Have Issued Additional Guidance and Have Improved Pilot Design but Implementation Challenges Remain. GAO-17-156. Washington, D.C.: December 8, 2016.

DATA Act: Initial Observations on Technical Implementation. GAO-16-824R. Washington, D.C.: August 3, 2016.

DATA Act: Improvements Needed in Reviewing Agency Implementation Plans and Monitoring Progress. GAO-16-698. Washington, D.C.: July 29, 2016.

DATA Act: Section 5 Pilot Design Issues Need to Be Addressed to Meet Goal of Reducing Recipient Reporting Burden. GAO-16-438. Washington, D.C.: April 19, 2016.

DATA Act: Progress Made but Significant Challenges Must Be Addressed to Ensure Full and Effective Implementation. GAO-16-556T. Washington, D.C.: April 19, 2016.

DATA Act: Data Standards Established, but More Complete and Timely Guidance Is Needed to Ensure Effective Implementation. GAO-16-261. Washington, D.C.: January 29, 2016.

Federal Spending Accountability: Preserving Capabilities of Recovery Operations Center Could Help Sustain Oversight of Federal Expenditures. GAO-15-814. Washington, D.C.: September 14, 2015.

DATA Act: Progress Made in Initial Implementation but Challenges Must be Addressed as Efforts Proceed. GAO-15-752T. Washington, D.C.: July 29, 2015.

Federal Data Transparency: Effective Implementation of the DATA Act Would Help Address Government-wide Management Challenges and Improve Oversight. GAO-15-241T. Washington, D.C.: December 3, 2014.

Government Efficiency and Effectiveness: Inconsistent Definitions and Information Limit the Usefulness of Federal Program Inventories. GAO-15-83. Washington, D.C.: October 31, 2014.

Data Transparency: Oversight Needed to Address Underreporting and Inconsistencies on Federal Award Website. GAO-14-476. Washington, D.C.: June 30, 2014.

Federal Data Transparency: Opportunities Remain to Incorporate Lessons Learned as Availability of Spending Data Increases. GAO-13-758. Washington, D.C.: September 12, 2013.

Government Transparency: Efforts to Improve Information on Federal Spending. GAO-12-913T. Washington, D.C.: July 18, 2012.

Electronic Government: Implementation of the Federal Funding Accountability and Transparency Act of 2006. GAO-10-365. Washington, D.C.: March 12, 2010

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