Building Capacity for a National Secure Data Service

Needs, Gaps, and Considerations for State, Local, Territorial, and Tribal Governments

August 2026

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America's DataHub Consortium (ADC), a public-private partnership, implements research opportunities that support the strategic objectives of the National Center for Science and Engineering Statistics (NCSES) within the U.S. National Science Foundation (NSF). These results document research funded through ADC and are being shared to inform interested parties of ongoing activities and to encourage further discussion. Any opinions, findings, conclusions, or recommendations expressed above do not necessarily reflect the views of NCSES or NSF. Please send questions to ncsesweb@nsf.gov. NCSES has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN26-075).

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Glossary

Term	Definition
Administrative burden	The time, effort, paperwork, approvals, agreements, account setup, compliance steps, or other process requirements needed to access, share, link, or use data.
American Indian	A federal classification referring to individuals who are members of federally recognized Tribal Nations located within the contiguous United States. The term does not encompass all Indigenous Peoples and does not replace the specific names, identities, and citizenship criteria of Tribal Nations.
Alaska Native	A federal classification referring to Indigenous Peoples of Alaska who are members of federally recognized Alaska Native Tribes and/or meet statutory definitions of Alaska Native eligibility under applicable federal programs. Alaska Native Peoples maintain distinct Tribal, cultural, linguistic, and political identities that extend beyond this federal classification.
Compute environment	The technical setting where data are stored, accessed, linked, analyzed, or processed. A compute environment may include secure servers, cloud platforms, software tools, access controls, and privacy or security protections that allow approved users to work with data without downloading or moving them unnecessarily.
Data concierge	A service or support function that helps users clarify their data questions, identify relevant data sources, understand access pathways, and connect with appropriate resources, documentation, or subject matter experts.
Data ecosystem	The people, organizations, systems, policies, data sources, infrastructure, and governance processes involved in collecting, managing, sharing, linking, protecting, analyzing, and using data.
Data governance	The policies, roles, responsibilities, decision-making processes, and accountability structures that guide how data are collected, accessed, shared, protected, linked, interpreted, and used.
Data infrastructure	The technical and organizational foundations needed to collect, store, manage, protect, access, link, analyze, and share data. This can include systems, platforms, networks, metadata, standards, secure environments, staffing, and governance processes.
Data linkage	The process of connecting records or information from two or more data sources to support analysis, service delivery, evaluation, research, or decision making.
Evidence-building capacity	The ability of governments and organizations to collect, access, manage, analyze, interpret, and use data and other information to understand needs, evaluate programs, improve services, allocate resources, and inform decisions.
Federally Recognized Tribes	Tribal Nations acknowledged by the United States as sovereign political entities with a government-to-government relationship with the federal government. Pursuant to the Federally Recognized Indian Tribe List Act of 1994 (25 U.S.C. § 5131), federal recognition is the formal acknowledgment by the United States that a Tribe exists as an Indian Tribe and maintains a continuing political relationship with the United States and authority to govern themselves.
Federal Indian trust responsibility	The legal and fiduciary obligation of the federal government, arising from treaties, statutes, executive orders, judicial decisions, and the government-to-government relationship, to protect Tribal treaty rights, lands, assets, and natural and cultural resources; support Tribal self-determination and self-governance; and fulfill legally recognized responsibilities to Tribal Nations and their citizens, including responsibilities related to health, education, public safety, and welfare.
Indian Country	A legal and policy term that generally refers to lands and communities associated with Tribal Nations, including reservations, dependent Indian communities, and certain allotments, as defined in federal law.

Term	Definition
Indigenous	A term commonly used to describe peoples with longstanding ancestral and cultural relationships to their lands, waters, communities, and governance systems that predate colonization. The term is widely used in Indigenous scholarship, international law, and policy contexts but is not a defined legal category under U.S. federal Indian law.
Indigenous Data Governance	The policies, processes, institutions, protocols, and decision-making structures through which Indigenous Data Sovereignty is exercised across the data life cycle.
Indigenous Data Sovereignty	The inherent right and authority of Indigenous Peoples and Tribal Nations to govern the collection, ownership, access, use, stewardship, and application of data related to their peoples and communities, lands, resources, and knowledge, in accordance with their own laws, values, protocols, and priorities.
Interoperability	The ability of systems, organizations, or data sets to exchange, interpret, and use information in a consistent and reliable way.
Metadata	Information that describes a data set or data element, such as definitions, source, collection method, update schedule, quality, limitations, access restrictions, and appropriate uses.
Secure access	A controlled way for authorized users to access data while protecting privacy, confidentiality, security, and stewardship requirements.
Secure compute environment	A protected data access and analytical environment that allows authorized users to access, link, or analyze data while limiting disclosure, unauthorized access, or misuse.
Stewardship	The responsible management and protection of data throughout its life cycle, including decisions about access, use, sharing, documentation, quality, privacy, security, and long-term maintenance.
Technical assistance	Targeted support that helps users or organizations implement, operate, or improve data-related systems, processes, governance practices, tools, or analytic activities. For the NSDS, technical assistance includes support for users and visitors to use NSDS tools and services as well as providing them with assistance in navigating the data ecosystem.
Territories (territorial governments, U.S. territories)	Jurisdictions under the sovereignty and territorial authority of the United States that are not part of any state. U.S. territories are governed pursuant to the U.S. Constitution, federal statutes, and their respective organic acts or governing documents established by Congress under the Territorial Clause (U.S. Const. art. IV, § 3, cl. 2). Territorial governments are the political institutions established to administer local governance within these jurisdictions, with powers and limitations defined by federal law. Inhabited territories include: American Samoa, Guam, Commonwealth of the Northern Mariana Islands (CNMI), Puerto Rico, and the U.S. Virgin Islands.
Tribal sovereignty	The inherent and preexisting authority of Tribal Nations to govern themselves, their citizens, lands, resources, and internal affairs according to their own laws, customs, and institutions. Tribal sovereignty predates the formation of the United States and does not derive from federal law.

Acronyms

Acronym	Definition
AI	artificial intelligence
AI/AN	American Indian and Alaska Native
CARE	Collective Benefit, Authority to Control, Responsibility, Ethics
CHIPS	Creating Helpful Incentives to Produce Semiconductors
D4I	Data for Indigenous Implementations Interventions and Innovation
FAIR	Findable, Accessible, Interoperable, Reusable
MOU	memorandum of understanding
NCAI	National Congress of American Indians
NCSES	National Center for Science and Engineering Statistics
NSDS	National Secure Data Service
NSDS-D	National Secure Data Service Demonstration
NSF	U.S. National Science Foundation
OCAP	Ownership, Control, Access, and Possession
TDR	Tribal Data Repository
TEC	Tribal Epidemiology Center
TEP	Tribal Expert Panel
TRUST	Transparency, Responsibility, User Focus, Sustainability, Technology

Executive Summary

A National Secure Data Service (NSDS) is intended as a shared federal service to improve data access, reduce burden on agencies and data users, support responsible data linkage and analysis, support privacy protections, and strengthen evidence building. The National Center for Science and Engineering Statistics is leading the NSDS Demonstration (NSDS-D), which is a pilot of services, technologies, and techniques to inform the build-out of an NSDS. Planned components of the NSDS include discovery and navigation tools, support from human subject matter experts, capacity-building resources, and a secure compute infrastructure. As envisioned, an NSDS would not serve as a centralized data warehouse. Instead, agencies would retain control over their data while using the NSDS to make data more discoverable, support secure access and linkage, and help users navigate a complex government data ecosystem.

Mathematica conducted this study on behalf of NCSES to explore how an NSDS could improve evidence-building capacity and data use among state, local, territorial, and Tribal governments. The study examined data-related needs and gaps related to data access, sharing, linkage, governance, infrastructure, tools, technical assistance, workforce capacity, and implementation support. The findings are intended to inform NSDS design, capacity-building strategies, and future recommendations for NCSES as it continues to develop and refine an NSDS.

The study used a qualitative approach that combined structured conversations, project-hosted webinars, expert panel input, and a landscape review of publicly available materials. This study prioritizes two governmental perspectives that required unique study designs and data sources: (1) state, local, and territorial governments and (2) Tribal governments. We reviewed these two governmental perspectives as separate because Tribal governments are sovereign Nations, and Tribal data issues are closely tied to Tribal sovereignty, self-determination, Indigenous Data Governance, treaty and trust responsibilities, and government-to-government relationships. State, local, and territorial findings were drawn from structured conversations with federal staff and expert panel members; project-hosted webinars with state, local, and territorial participants; and reviews of documents, publicly available webinars, conference materials, and related resources. Tribal sources included structured conversations, input from a Tribal Expert Panel, project-hosted webinars, and reviews of Tribal consultation and listening session materials, Tribal-focused conference materials, Indigenous Data Governance scholarship, and gray literature. Findings should be interpreted as themes from available materials and selected participants, not as representative of all governments or all potential NSDS users.

Overview of state, local, and territorial needs and gaps

Need	Gaps
Practical access to usable federal and non-federal data	• Finding, understanding, and accessing relevant data can be difficult • Insufficient documentation can limit interpretation and reuse • The value of an NSDS may not be clear without concrete use cases • Limited peer learning can make practical implementation harder

Need	Gaps
Cross-agency data linkage, standardization, interoperability, and secure use	• Unclear governance roles and decision making can slow data linkage • Inconsistent rules, approvals, and legal interpretations slow data sharing • Data fragmentation and limited interoperability and standardization inhibit linkage efforts • Unclear long-term stewardship and sustainability can undermine confidence in data linkage initiatives • Privacy and security concerns can limit data linkage
Workforce capacity and technical assistance	• Limited staff time, funding, and technical skills constrain data use and evidence building • Complex administrative processes consume limited staff capacity • Data knowledge is not always documented, shared, or sustained across staff

Overview of Tribal needs and gaps

Need	Gaps
Exercise Tribal authority over data and use data to support self-determination and governance	• Federal, state, and institutional systems do not consistently recognize Tribal authority over data. • Existing governance structures often place Tribes in a reactive rather than decision-making role. • Existing legal, policy, and contractual structures may conflict with Tribal governance principles. • Power imbalances can limit Tribal control over data and data systems.
Build confidence that data will be used appropriately, ethically, and for community benefit	• Historical misuse of Tribal data continues to shape perceptions of data initiatives. • Concerns about privacy, misuse, and loss of control affect willingness to share information. • Unclear ownership, authority, and accountability can undermine trust in data governance. • Data can cause harm when used without sufficient context or Tribal involvement.
Access to accurate, timely, and relevant data to support decision making, planning, evidence building, service delivery, and advocacy	• Existing data often fail to accurately represent Tribal populations and experiences. • Tribal data are frequently inaccessible, delayed, or difficult to obtain. • Existing data systems do not consistently accommodate the geographic, demographic, and governmental contexts of Tribal Nations. • Lack of data standards and documentation further limit usability.
Data that reflect Tribal and community-driven priorities, Indigenous knowledge systems, and culturally meaningful measures of success	• Existing systems often rely on deficit-based frameworks and fail to incorporate community-defined indicators.
Intergovernmental coordination of data sharing and access to support programs and policymaking	• Burdensome data-sharing processes and fragmented systems limit Tribal access to data. • Existing governance and intergovernmental data-sharing frameworks do not consistently recognize or support Tribal authority.
Workforce capacity and technical expertise	• Staffing, technical expertise, data literacy, and long-term workforce capacity are limited.

Need	Gaps
Sustainable funding and reliable infrastructure	• Funding is often short term, fragmented, and misaligned with Tribal priorities and timelines. • Broadband limitations, outdated systems, cybersecurity concerns, and weak interoperability constrain effective data use.

Findings from this study indicate that governments may benefit from an NSDS that combines technical infrastructure with practical guidance, governance support, documentation, secure access, capacity-building resources, and implementation assistance. For state, local, and territorial governments, these services may help users move from practical policy, program, planning, service-delivery, or evaluation questions to data that can be accessed, linked, protected, and used responsibly. The Tribal government perspective highlighted that their needs for an NSDS also includes consideration of factors such as Tribal sovereignty, Indigenous Data Sovereignty, and Indigenous Data Governance as foundational design principles. Other Tribal needs included ongoing consultation, relationship building, transparency, and Tribal decision-making authority throughout the data life cycle.. This report is intended to identify recurring needs, gaps, and implementation considerations that emerged across the evidence base. Although findings may have implications for future NSDS design and service delivery, this report does not make recommendations. Specific recommendations for NCSES' consideration are presented separately in the companion recommendations report (Hassoun Ayoub et al. 2026).

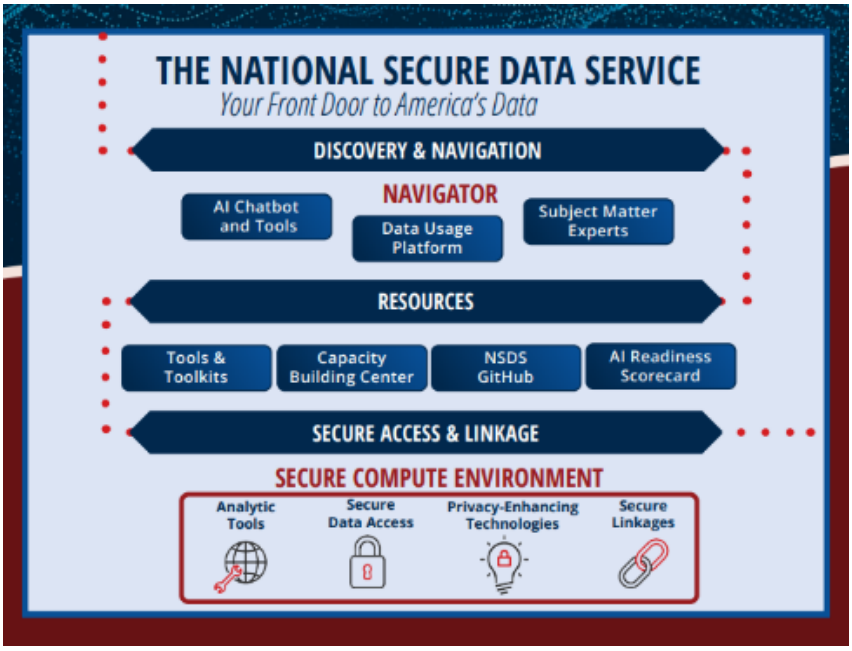
I. Introduction

A. NSDS overview

A National Secure Data Service (NSDS) is a shared federal service that includes artificial intelligence (AI)-enabled tools and navigation capabilities designed to help break down data silos, streamline data access, and support data linkage and analysis. An NSDS is authorized through the Creating Helpful Incentives to Produce Semiconductors (CHIPS) and Science Act of 2022 and currently being piloted through a five-year NSDS Demonstration (NSDS-D) led by the National Center for Science and Engineering Statistics (NCSES) at the U.S. National Science Foundation (NSF). An NSDS is intended to improve data access, reduce agency burden, bolster evidence building, and harness AI for trusted data use. As envisioned, an NSDS will feature privacy-enhancing technologies, data linkage and analysis tools, and services that help users navigate a complex government data ecosystem.

For NSDS 1.0, its initial service components align with its planned outcomes (Exhibit 1). The discovery and navigation component includes a prototype tool, called The Navigator, that uses an AI-enabled system to route user requests to appropriate information sources and services. Users will also have the option to contact a human subject matter expert for requests that require judgment, relationship building, legal or governance nuance, or interpretation of complex data needs. An NSDS also includes resources and capacity-building services, such as tools, toolkits, an NSDS GitHub, and a Capacity-Building Center with training and curated resources for users seeking to develop data and evidence-building skills. In addition, NCSES is piloting an NSDS secure compute environment to support privacy-preserving record linkage, secure multiparty computing, collaboration, and high-performance computing for large or computationally intensive data tasks.

Exhibit 1. NSDS 1.0 overview



Source: America's Data Hub Consortium, https://www.americasdatahub.org/wp-content/uploads/2026/03/NSDS-One-Pager_Placemat.pdf.

An NSDS is not intended to serve as a centralized data warehouse. Rather, it would offer a secure compute environment that enables government agencies—including the federal statistical agencies and other federal, state, local, territorial, and Tribal government agencies—to retain control over their data, including what information is made discoverable, how data can be accessed, and whether data can be linked to other sources on an NSDS. In this model, government agencies, including the federal statistical agencies and other federal, state, local, territorial, and Tribal government agencies, can provide information about and access to their data so that policymakers, government users, researchers, and other public users can more easily discover relevant data assets and services.

B. Who can benefit from an NSDS

Multiple users may benefit from an NSDS (Exhibit 2). Governments may use an NSDS to make data more discoverable, reduce duplicative infrastructure and access-request burden, as well as support responsible data access, linkage, and analysis while retaining stewardship over their data. Policymakers, researchers, journalists, and other data users may use an NSDS to discover relevant data to inform policy questions, navigate access pathways, and identify appropriate resources or services.

Exhibit 2. Audiences for an NSDS and what it could offer them

Audience	What an NSDS could offer
Federal, state, local, and territorial government agencies	• Easier data discoverability with retained agency control over access, use, and linkage • Shared infrastructure and services that reduce duplicative tools, access-request burden, and secure-use burden • Information about how agency data are to be used and availability of related data sources • Secure cross-agency access, linkage, and analysis services • Capacity building and training for human resources, including data users and decisionmakers
Tribal governments	• Pathways to discover and access relevant government data for Tribal governments • Services that recognize Tribal sovereignty, Indigenous Data Sovereignty, Indigenous Data Governance, and Tribal authority over data • Approaches that recognize Tribal authority over data throughout the data as defined by Tribal Nations • Capacity-building resources and assistance that support Tribal participation without replacing government-to-government consultation or Tribal authority
Policymakers, researchers, academics, and other data users	• A centralized place to discover relevant government data and related services • Data concierge support to answer questions, route users to resources, and help navigate access pathways • Services that provide data users with secure access, privacy-protective analysis, and AI-enabled navigation

Note: Tribal governments are presented separately because they are sovereign Nations with unique legal, governance, and government-to-government relationships that shape their data priorities, responsibilities, and participation in an NSDS.

C. Project context and purpose

As the NSDS-D continues, input from government data users is important for informing the technologies, governance models, service approaches, and implementation supports that may shape a permanent

NSDS. Mathematica conducted this project on behalf of NCSES to explore how an NSDS could improve capacity for evidence building and data use among state, local, territorial, and Tribal governments.

The project assessed data-related needs and gaps related to federal and non-federal data use, access, linkage, governance, infrastructure, tools, training, technical assistance, and related supports. It also examined how current data practices, policies, workflows, and implementation challenges could inform NSDS design, adoption strategies, and capacity-building supports. Understanding these current conditions can help identify where shared services could reduce burden, how NSDS supports may need to integrate with existing systems and workflows, and what supports may be necessary for governments to participate effectively.

This report summarizes findings from that effort and is focused on needs and gaps among state, local, territorial, and Tribal governments. For the purposes of this report, needs refer to the supports, resources, and services governments require to use data effectively. Gaps refer to barriers, constraints, unmet supports, and implementation challenges that limit governments' ability to meet those needs. A companion recommendations report translates these findings into proposed recommendations for NCSES' consideration as it continues to develop and refine an NSDS (Hassoun Ayoub et al. 2026).

II. Methods

A. Overview of approach

The project employed a qualitative approach that combined primary and secondary data collection (Exhibit 3). Primary data collection included structured conversations with federal staff and subject matter experts and a series of project-hosted webinars with panel discussions featuring state, local, and Tribal government representatives. Secondary data collection included a systematic landscape review of publicly available documents, webinars, and conference materials, with attention to topics on data sharing, integration, governance, infrastructure, privacy, security, AI, and evidence building. In addition, project team members attended a selection of conferences in 2025 and 2026 to note topics discussed within sessions.

Exhibit 3. Overview of data sources

Evidence sources	State, local, and territorial sample	Tribal sample
Structured conversations with federal staff and members of the expert panels.	Fifteen structured conversations with eight federal staff and seven expert panel members with subject matter expertise in data governance, data systems, and data use in evidence building.	Nine structured conversations with two federal staff and seven members of the Tribal Expert Panel (TEP) with subject matter expertise in Tribal governance, Indigenous Data Sovereignty and Indigenous Data Governance, evidence building, and data systems.
Landscape review of publicly available resources, including conference materials, webinars, peer-reviewed literature, and gray literature.	A review of state-, local-, and territorial government–focused materials including 44 conferences, 20 webinars, and 64 documents (peer-reviewed literature, government reports, policy briefs, guidance documents, organizational publications, and other gray literature) to identify needs, barriers, governance considerations, and implementation supports relevant to developing an NSDS. Selection criteria varied by source type: • Peer-reviewed and gray literature were limited to a publication date of 2010 or later with a focus on the United States. Government reports and policy briefs were generally published within the previous five years. • Conference materials included a review of 37 conference agendas from 2025, session descriptions, presentations, working papers, and related materials as well as notes from seven conferences project team members attended in 2025 and 2026. • Publicly available webinars focused on state and local perspectives and took place in 2025 and 2026.	A review of Tribal-focused materials including 11 conferences, 11 Tribal consultation and listening session materials, and 32 documents (including peer-reviewed literature and gray literature) related to Indigenous Data Sovereignty and Indigenous Data Governance, Tribal governance, evidence building, data modernization, and federal–Tribal data relationships. Selection criteria varied by source type: • Peer-reviewed and gray literature were generally limited to the previous 15 years. • Tribal consultation and listening session materials were generally limited to the previous 10 years. • Conference materials included a review of six conference agendas from 2025, session descriptions, and related materials, supplemented by notes from five conferences project team members attended in 2026.

Evidence sources	State, local, and territorial sample	Tribal sample
Project-hosted webinar series with subject matter experts as panelists	Three webinars with government leaders (one each with a state, local, and territorial participants) to gather additional perspectives on governance, evidence building, data sharing, workforce needs, and potential NSDS features. The webinars hosted a panel discussion with government leaders, service providers, and subject matter experts to highlight unique perspectives related to government data needs.	Two webinars with Tribal government leaders, service providers, subject matter experts, and TEP members to gather additional insight on these same topics, with an additional focus on Indigenous Data Sovereignty, Indigenous Data Governance, and Tribal governance.

Because broader engagement with data users was outside the scope of the project, the study relied substantially on publicly available materials and existing forums where government leaders, practitioners, researchers, and federal partners had documented their experiences. Structured conversations and webinars provided targeted insight into data user perspectives and helped contextualize findings from the landscape review. The landscape review identified recurring themes and emerging practices across publicly available literature, reports, conference materials, webinars, and other sources. Tribal-specific sources were interpreted separately to account for Tribal sovereignty, Indigenous Data Sovereignty, Indigenous Data Governance, federal–Tribal government-to-government relationships, and the distinct political status of Tribal governments. The project also convened two expert panels: a Tribal Expert Panel (TEP) and a panel with state, local, and territorial representatives that provided input on the study design and findings. Additional details on data sources, study materials, and expert panels are provided in the appendices.

Because Tribal Nations are sovereign governments with a distinct political and legal relationship with the United States, data governance requires different considerations than those applicable to state, local, and territorial governments. Tribal data priorities are intertwined with Tribal sovereignty, Indigenous Data Sovereignty, Indigenous Data Governance, self-determination, treaty and trust responsibilities, and the federal government's government-to-government relationship with Tribal Nations. Accordingly, the Tribal landscape review drew upon different evidence sources and engagement approaches than the state, local, and territorial review. The review emphasized Tribal-specific sources, including Tribal consultations and listening sessions, Indigenous Data Sovereignty and Indigenous Data Governance scholarship, Tribal-focused conferences, materials developed by Tribal organizations and practitioners, structured conversations, and TEP input.

B. Data analysis

Data from structured conversations, expert panel convenings, and the landscape review were analyzed using a structured thematic coding approach aligned with the study's goals as well as the needs and gaps framework. Content was initially categorized according to whether it described current conditions, identified barriers or challenges, highlighted opportunities or promising practices, or identified areas requiring further exploration. Materials were then coded using a thematic codebook that included topics such as data governance, data sharing, interoperability, workforce capacity, funding, infrastructure, privacy and security, intergovernmental coordination, and evidence building. For Tribal materials, additional attention was given to themes related to Tribal sovereignty, Indigenous Data Sovereignty and Indigenous

Data Governance, culturally grounded approaches, and the federal government's government-to-government relationship with Tribal Nations.

Across sources, the project team synthesized findings to identify recurring needs, gaps, barriers, opportunities, and implementation considerations relevant to NSDS design, governance, capacity building, adoption, and sustainability.

C. Limitations

Study limitations should be considered when interpreting the findings as they may not be representative of needs and gaps across all sectors or levels of government. First, this study was based on purposively selected structured conversations, project-hosted webinars, and publicly available sources, limiting the generalizability of findings. Structured conversation respondents and panelists represented a small, non-random proportion of relevant data users across levels of government, and a limited number of government data users participated in the webinars and consultations. The availability of perspectives also varied across data user groups and government contexts. Perspectives from federal agencies, Tribal health organizations, and well-established data initiatives were more readily available, while perspectives from territorial governments were not well represented in the available sources.

Publicly available materials may also overrepresent organizations or sectors with greater visibility, resources, or established data initiatives. Emerging, informal, locally driven, or lower-capacity efforts may be underrepresented in this studies' data sources. This limitation may be particularly relevant for smaller jurisdictions and Tribal governments with limited capacity to publish reports, present at conferences, or participate in national forums. Similarly, some areas of the literature were concentrated in specific policy domains. For example, much of the peer-reviewed literature addressing Tribal data systems focuses on public health, epidemiology, and surveillance. Although many findings are relevant across sectors, the perspectives of some sectors may be overrepresented.

Additional limitations include the breadth and diversity of Tribal perspectives reflected in this study and the extent of Tribal engagement throughout the research process. Indigenous research and evaluation principles emphasize meaningful engagement with Tribal Nations throughout the full research life cycle, including study design, data collection, analysis, and collaborative review of synthesized findings. Although this study incorporated multiple sources of Tribal input, the evidence reviewed cannot fully reflect the diversity of Tribal Nations, governance structures, priorities, and perspectives. The short timeline of the project limited the team's ability to meaningfully engage the TEP in an iterative way across phases of the study. Consequently, the findings reflect the project team's synthesis of recurring themes across the available evidence, including TEP review, rather than a consensus among Tribal Nations. This project was designed to inform NSDS planning and should not be interpreted as a substitute for government-to-government consultation.

III. State, local, and territorial government needs and gaps

This section presents findings on needs and gaps related to evidence-building capacity among state, local, and territorial governments, with attention to areas where an NSDS could support capacity building. State, local, and territorial governments already use data for many core government functions such as policy development, service delivery, program evaluation, resource allocation, and cross-agency coordination. The findings in this section therefore focus less on whether governments need data for these purposes and more on the supports that could help governments use data effectively across agencies, programs, sectors, and levels of government (see Exhibit 4 for a summary of findings).

Reminder: Defining needs and gaps

- **Needs**: Supports, resources, and services governments require to use data effectively.
- **Gaps**: Barriers, constraints, unmet supports, and implementation challenges that limit governments' ability to meet those needs.

Exhibit 4. Overview of state, local, and territorial needs and gaps

Need	Gaps
Practical access to usable federal and non-federal data	• **Finding, understanding, and accessing relevant data can be difficult**. Potential users may not know what data exist, who holds them, what the data contain, whether the data are appropriate for a specific question, or how to request access. • **Insufficient documentation can limit interpretation and reuse**. Data may lack sufficient metadata, documentation, data dictionaries, quality information, common definitions, or user guidance to support interpretation and reuse. Jurisdictions with rapidly changing applications, systems, or data fields need to consider whether documentation efforts create unrealistic staff burden. • **The value of an NSDS may not be clear without concrete use cases**. Governments may need clearer examples showing how an NSDS could help address specific policy, program, service-delivery, planning, or evaluation questions. • **Limited peer learning can make practical implementation harder**. Governments may have limited ways to learn from peer jurisdictions about how they discovered, accessed, documented, shared, or used data in practice.
Cross-agency data linkage, standardization, interoperability, and secure use	• **Unclear governance roles and decision making can slow data linkage**. Data linkage may be slowed by uncertainty about data ownership, stewardship roles, approval authority, acceptable uses, and cross-agency decision making. • **Inconsistent rules, approvals, and legal interpretations slow data sharing**. Differences across sectors in existing rules, approval processes, data-sharing agreements, and relevant legal statutes can make data sharing and linkage slow, uncertain, or uneven across agencies and jurisdictions. • **Data fragmentation and limited interoperability and standardization inhibit linkage efforts**. Data needed to answer cross-cutting questions may be stored in fragmented systems with different formats, identifiers, definitions, permissions, and access rules. Systems may lack shared standards, common definitions, interoperable formats, consistent metadata, or reliable identifiers needed to link data across agencies, programs, sectors, or jurisdictions. • **Unclear long-term stewardship and sustainability can undermine confidence in data linkage initiatives**. Agencies may need greater clarity about who will fund, maintain, govern, support, and improve shared linkage services or secure infrastructure over time. • **Privacy and security concerns can limit data linkage**. Linked data can increase privacy, security, cybersecurity, disclosure, and re-identification risks, requiring strong safeguards and secure environments.

Need	Gaps
Workforce capacity and technical assistance	• **Limited staff time, funding, and technical skills constrain data use and evidence building**. Agencies may lack sufficient staff time, funding, technical expertise, legal support, privacy expertise, cybersecurity capacity, or analytic capacity to participate in data sharing, linkage, governance, and evidence-building efforts. • **Complex administrative processes consume limited staff capacity**. Complex data access, approval, agreement, account setup, security, and governance processes can consume limited staff capacity and discourage participation in shared data services. • **Data knowledge is not always documented, shared, or sustained across staff**. Staff may need practical, role-specific supports such as plain-language guidance, templates, data dictionaries, examples, FAQs, help desks, office hours, communities of practice, and access to human subject matter experts. Turnover and role changes can lead to loss of institutional knowledge when data processes, definitions, access steps, and appropriate uses are not documented or embedded in organizational routines.

Across reviewed sources, one theme that emerged was the need for data infrastructure, guidance, and capacity-building supports that help align available data with the questions governments are trying to answer. Governments may have access to some relevant data but still face challenges identifying which data exist, understanding whether the data are appropriate for a specific use, navigating access requirements, linking data across systems, and applying governance privacy and security requirements consistently. These challenges are often interrelated. For example, fragmented systems can make data harder to link to, weak documentation can make data harder to interpret, and unclear data governance processes can slow access or limit responsible sharing.

A. Practical access to usable federal and non-federal data

Governments need practical access to federal and non-federal data that they can find, understand, and use for the questions they are trying to answer. Usable data are data that staff can interpret and apply without excessive manual cleanup, translation, or additional explanation. In practice, this means users should be able to start with a question and identify data that may help answer it. To do that, users need clear information about what data exist, where the data are held, who oversees them, what they generally contain, what limits apply, whether they are appropriate for a specific use, and where to go for help.

Structured conversations, project-hosted webinars, expert input, and landscape review materials point to the need for both better systems and better guidance. One federal data leader suggested that an NSDS could help provide a more comprehensive understanding of available federal data assets and potential matches across agencies. This points to a practical access need: users not only need a place where data sources are referenced or linked to; they also need guidance that helps them understand what is available and how different data sources might be relevant to their questions.

Gap: Finding, understanding, and accessing relevant data can be difficult.

Findings suggest that staff across levels of government can have trouble knowing what data exist, who holds them, whether the data are relevant to their questions, and what steps are needed to use them. Poor data discoverability and navigation can prevent governments from using data even when relevant data already exists. The challenge begins with data discovery as users may begin with a policy or program question but not know what data could help answer it. A local data expert noted that smaller and mid-sized cities are still building familiarity with public data sets, including federal statistical data, census data, economic data, and state-level data. This suggests that discoverability is not only about making data sets available; it also requires helping users recognize which data are relevant to their work and what questions those data can help answer.

> "Finding the right data is really hard.... If you don't know ahead of time, you just get this sort of flat list.... It is really hard to understand what to do with that."
>
> Federal data leader

Data collected by one agency or level of government may help another agency understand policy or program outcomes, but those connections are not always visible to potential users. State and local staff also may not have time to rely on informal discovery processes. Expert panel members noted that governments often lack the staff capacity to document and share successful data efforts which impacts discovery. Staff who are less familiar with government data systems or lack technical knowledge may also struggle to identify available data or understand how those data could help answer policy questions, examine trends, or improve government operations.

Our data sources suggest that governments need discovery supports that combine better systems with better guidance. Concierge-like support could help fill this gap by helping users clarify their questions, identify relevant data sources, and understand the next step in the access process. Metadata, data catalogs, and data dictionaries can also support discovery by helping users decide whether they have found the right data in the first place. One federal data leader emphasized that metadata are more valuable than many people think because users need help finding what they want in a large universe of unfamiliar data. A state data leader similarly emphasized the practical value of metadata, describing how transparency about data linkages can help users understand how a match was made, how confident they should be in the result, and whether the information can be used safely for program implementation. In this context, metadata, data catalogs, and data dictionaries are not only technical documentation; they are part of the user experience that helps governments move from a broad question to a usable data source.

> "[We] are talking about 'how do I share data?' when we might need to be asking, 'What data exists and who owns it?'"
>
> Local data expert

Gap: Insufficient documentation can limit interpretation and reuse.

Findings suggest that users often lack enough documentation and quality information to determine whether data are appropriate for a specific question. In this section, data quality refers to whether data are complete, accurate, timely, consistent, comparable, and detailed enough for the intended use. Insufficient

data quality and documentation can make data difficult to interpret, compare, link, or reuse after users find them. A state data expert connected this issue to the user experience, noting the importance of ease of access, a good interface, training, and a data dictionary because users often do not know what is available or how to interpret what they find. Another respondent emphasized that standardized formats, stronger metadata, common definition files, machine-readable data, and easier-to-use data packages could help users work with data more efficiently. Users should have enough context and standardization to determine whether a data set is appropriate for their question and how much work is required to use it.

This gap becomes especially important when data are reused beyond their original purpose. Many administrative data systems were designed for program operations or compliance reporting, not necessarily for evaluation, cross-program analysis, or public decision making. A conference session on using government record management systems as data made this point directly, noting that these systems may help agencies measure performance and evaluate impact but are usually designed for operational users and not researchers. Findings from the landscape review similarly suggest that administrative data sets may not contain the information needed to evaluate program performance, may use inconsistent or poorly understood collection practices, and may lack useful metadata or quality information. Together, these findings suggest that documentation, quality information, and user support are especially important when operational data are repurposed for evaluation or decision making.

State data experts shared why documentation is central to usability. A state data leader described their state's efforts to modernize legacy systems, standardize key data elements, document existing data sets, and use a data catalog so users do not have to rely on individual staff to explain what fields mean or which values to use. The respondent also emphasized that data products should be straightforward, meaning they should include definitions, appropriate uses, exceptions, and caveats. Without that context, users may misinterpret data or spend substantial time finding someone who can explain how the data should be used.

Inadequate documentation can create two related risks: users may avoid relevant data because they cannot determine whether the data are reliable, or they may use data without fully understanding important limitations. This challenge may be especially acute for jurisdictions with rapidly changing applications, systems, data fields, or reporting requirements, where keeping documentation current can require sustained staff time and clear ownership. Clear documentation and transparent quality information can help users make better judgments about whether a data set is appropriate for a specific policy, program, or service-delivery question.

Gap: The value of an NSDS may not be clear without concrete use cases.

Findings suggest that governments are better able to understand how a shared data service would fit into their work when it is connected to a specific purpose. Although many agencies understand the importance of data, they still need to assess whether a shared service is worth the staff time, coordination, governance, and technical work required to participate. Broad benefits such as improved access, collaboration, and efficiency may not be sufficient if users cannot see how a shared service would help them answer a specific question, reduce a specific burden, or improve a decision they already need to make.

One state data expert noted that states need a shared vision for what cross-agency data can do for agencies and constituents; without that foundation, agency leaders may struggle to prioritize the technical work required. A state data leader similarly described the value of using longer-term data from multiple sources to understand where public investments are making a difference and how resources or practices could be adjusted in response. These examples suggest that state users may respond to use cases that connect shared data services to investment decisions, program improvement, and evidence about outcomes.

Several respondents emphasized that clear examples should show the full path from problem to result. One local data expert noted that the strongest examples walk users through a real use case from start to finish: how the problem was defined, how the solution was developed, and what the result was. Another state data leader said that a promising use case with one state or a group of states would gain the attention of state governments. These comments suggest that use cases can help users assess whether a shared service is relevant to their work and worth the time and coordination required to participate.

> "If you can develop a use case with a state or a handful of states that shows really promising results … that will get the attention of state governments."
>
> State data leader

A clear use case could show the question a government user started with, the data or supports needed, the steps involved, and the decision or service improvement the information supported. Without that level of specificity, users may understand the general promise of an NSDS but still struggle to see how it would fit into day-to-day policy, program, or service-delivery work.

Gap: Limited peer learning can make practical implementation harder.

Findings suggest that data success stories are not always visible across governments. Even when successful data efforts exist, they may not be documented or shared in ways that other governments can easily find, understand, or adapt. As a result, government data users may have limited opportunities to interact with or learn from peers who face similar challenges and operate in similar contexts.

This lack of visibility can lead governments to rely on informal networks to solve common problems. Those networks can be valuable, but they may work better for agencies that already have strong relationships, dedicated data staff, or connections to national organizations. A state data leader described this dynamic in the context of connecting local governments with research partners: for smaller community-specific issues, staff may be left trying to identify the right expert by searching websites, rather than using a structured way to connect communities, researchers, and other partners working on similar problems. The same respondent noted that a more structured connection point could help connect the right people in a timely manner. Smaller local governments, lower-capacity agencies, and territories may have fewer opportunities to find peer examples or ask how another jurisdiction handled similar access, documentation, or implementation challenges. In those contexts, peer learning is not only a professional exchange; it can reduce the burden of starting from scratch.

Respondents emphasized the value of learning directly from peers. One state data expert noted that states often find it useful to talk with and learn from other states about how they are using data systems

and improving services. Another state data leader described how multistate data efforts can give other states a clearer sense of the value proposition and level of effort for getting similar work done. The respondent explained that seeing another state partnership move forward helped their own state assess whether it was ready to join a similar effort. These examples suggest that peer learning can help governments understand not only which data or tools exist, but also how others have used them, documented them, governed them, and applied them to real questions.

Peer exchange is particularly valuable with helping governments compare starting points, understand trade-offs, and identify approaches that are realistic for their capacity and context. Governments may benefit from examples that go beyond final products or success stories and explain the process: the problem that prompted the work, the partners involved, the data and agreements required, the barriers encountered, and the supports that helped move the work forward.

State, local, and territorial considerations for practical access to usable data

For state governments: State governments may need practical access supports that help them navigate both federal-to-state data access and access across state agencies. Because state data users often work across multiple agencies, programs, data stewards, legal authorities, and compliance requirements, supports may need to clarify which data exist, who controls access, what approvals or agreements are required, and how to coordinate across federal and state partners. State contexts may therefore require access and navigation supports that address both horizontal coordination across state agencies and vertical coordination with federal partners.

For local governments: Local governments, including cities and counties, may need practical access supports that help staff identify which state, federal, regional, or local entity holds the data they need and whether those data are available for local use. Local governments vary widely in staff capacity, technical maturity, and governance infrastructure. Larger cities and counties may need more advanced access and governance supports when they manage data across many departments or participate in state, regional, or federal data efforts, whereas smaller or lower-capacity jurisdictions may need low-burden navigation, plain-language guidance, and tools that are usable without dedicated information technology, legal, analytic, or data governance staff.

For territorial governments: Territorial governments may face distinct practical access challenges because federal statistical products and data sets may exclude territories or include them inconsistently. Access supports may need to help territorial users understand what data exist, why gaps or exclusions occur, how missing or null data are treated, whether proxy indicators are appropriate, and what investments may be needed in source data, local capacity, electronic infrastructure, survey frames, standards, classification schemes, and training. Federal and territorial data administrators may need to work together as equal partners so that data access strategies reflect territorial needs, methods, and administrative realities rather than assuming state-focused models apply without modification.

B. Cross-agency data linkage, standardization, interoperability, and secure use

Governments need the ability to link data across jurisdictions, agencies, programs, and sectors to answer cross-cutting questions that single-source data cannot answer. Governments need a clear governance framework and secure infrastructure to enable linkage, develop standardization, and build interoperability across disparate organizations and data sources. These supports can help decision makers use evidence to improve service delivery, evaluate program effectiveness, and understand long-term outcomes. Findings consistently identified data linkage as a priority across multiple domains, including education, workforce development, health and human services, housing, public safety, public benefits, and economic mobility.

Linked data enable governments to examine relationships and outcomes that span organizational boundaries. Linking education, workforce, and human services data can help policymakers understand pathways to employment and economic mobility. Similarly, combining housing, health, and social services data can provide a more comprehensive understanding of factors influencing individual and family well-being. Respondents emphasized that linked data are particularly valuable for assessing long-term outcomes, identifying effective interventions, and informing decisions that require a cross-sector perspective.

> "The ability to look at cross-functional, cross-agency [federal programmatic] datasets, and potentially combine these with state-collected data, would be invaluable in understanding the effectiveness of these programs."
>
> Hart and Potak (2020)

Data linkage requires both technical and nontechnical supports. Achieving these benefits requires more than technical mechanisms for connecting records. Effective data linkage depends on a combination of technical infrastructure, governance frameworks, legal authorities, organizational coordination, and analytic capacity. Technical requirements include interoperable systems, common data standards, reliable matching methodologies, consistent metadata, secure computing environments, and high-quality source data. Equally important are nontechnical supports, including strong data governance processes, data-sharing agreements, privacy review procedures, clear stewardship responsibilities, and mechanisms for cross-agency collaboration.

> "Being able to link those workforce, health and human services, and education [data] would provide a great deal of data for decision makers to make better decisions."
>
> Territorial data expert

Data linkage requires organizational, legal, governance, and analytic capacity in addition to technical infrastructure. Findings suggest that many governments continue to face significant barriers in developing and sustaining data linkage capabilities. Unclear or absent governance structures, varying legal interpretations, fragmented systems, interoperability challenges, inconsistent standards, privacy, data stewardship, and sustainability concerns frequently constrain the ability to share and combine data across organizations. These challenges often persist even when the technical ability to link records exists. Building data linkage capacity therefore requires a comprehensive approach that addresses technical, legal, organizational, and operational considerations simultaneously. Governments need support not only in determining how data can be linked, but also in understanding whether linkage is legally permissible, how linkage quality should be assessed, how privacy risks should be mitigated, and how linked data should be interpreted and used responsibly. Linkage can introduce errors or bias if users do not understand linkage methods, match rates, unlinked records, or limitations; without these supporting capabilities, linked data may be difficult to produce, difficult to trust, or difficult to translate into actionable evidence (Bertot et al. 2014).

Gap: Unclear governance roles and decision making can slow data linkage.

Findings suggest that governance challenges often become more consequential than technical barriers over time. Although technical tools can facilitate data exchange and integration, governments often struggle to establish the governance structures needed to support lawful, responsible, and sustainable data sharing across organizations. Governments may have the technical ability to link data but lack the institutional mechanisms needed to do so efficiently.

Governance challenges are among the most significant barriers to effective data linkage and findings consistently identified governance, trust, and interagency coordination as prerequisites for successful linkage efforts. Linking data typically requires multiple organizations to agree on data access rules, stewardship responsibilities, privacy protections, decision-making processes, and acceptable uses of linked information. These requirements can be difficult to navigate when participating agencies operate under different missions, legal authorities, and organizational cultures; additionally, many systems were not designed with interagency cooperation in mind. Successful linkage initiatives require governance frameworks that establish clear authority and accountability, delineate roles and responsibilities, support trust among participating organizations, and provide repeatable processes for data sharing. Without these structures, linkage efforts frequently depend on ad hoc relationships and individual champions, limiting their scalability and long-term sustainability.

> "There's the need for strong governance frameworks, as well as common standards and definitions, staff capacity, and training."
>
> Local data expert

Agencies may lack clear governance structures, decision rights, stewardship roles, escalation pathways, or shared operating procedures. Respondents frequently described uncertainty regarding data ownership, approval authority, stewardship responsibilities, and inconsistent legal interpretations of federal requirements across agencies, departments, and jurisdictions as barriers to coordination, data sharing, and linkage. Agencies often lack clearly defined processes for reviewing linkage requests, resolving disputes, or establishing shared priorities. Ambiguity about who has authority to approve data access or authorize secondary uses can delay projects and discourage collaboration (Engin and Treleaven 2019).

> "I think cities really do need to [have] strong centralized data governance…. You have groups that are justifiably more hesitant about sharing their data, and trusting what [secure] access looks like."
>
> Local data leader

Gap: Inconsistent rules, approvals, and legal interpretations slow data sharing.

Respondents described uncertainty about how privacy laws, confidentiality provisions, and data-sharing authorities should be interpreted and applied in practice. Variation in judicial and administrative legal interpretations and approval processes can significantly constrain governments' ability to share and link

data. These differences can create delays even when agencies share similar goals and possess the technical capability to exchange data.

Many governments rely on case-by-case negotiations to establish data-sharing arrangements. Data-use agreements, memoranda of understanding, privacy reviews, and legal approvals often require substantial staff time and may be repeated for similar requests. Respondents noted that these processes can be particularly burdensome when agencies interpret federal or state requirements differently, resulting in inconsistent decisions across jurisdictions.

"It takes a considerable amount of time to execute initial MOUs [memoranda of understanding] for individual use cases, executing DSAs [data-sharing agreements], DUAs [data-use agreements]. There's just so much bureaucracy involved … we have to go through all the steps and … all the paperwork."

State data leader

Uncertainty around legal authorities and approval processes impair efficiency and consistency of data-sharing decisions. Agencies lack clear guidance, standardized agreement templates, and shared interpretations of common legal requirements. The challenge is often not the absence of legal authority, but uncertainty regarding what existing authorities permit. State data leaders highlighted situations in which data-sharing efforts were delayed until state legal authorities conferred with federal data authorities to clarify that proposed data uses were permissible under existing law.

"Can we get common definitions across this ecosystem especially about how federal statutes are interpreted so that we can level set and come to a clear understanding across the different jurisdictions of how data can be used and can't be used?... Oftentimes it is those legal hurdles that really truly hang up opportunities."

State data leader

Gap: Data fragmentation and limited interoperability and standardization inhibit linkage efforts.

Findings suggest that fragmentation and challenges with interoperability and standardization are key structural barriers to data linkage efforts. Fragmentation refers to data being separated across agencies, programs, or platforms, while interoperability and standardization refer to whether those systems can communicate, align, exchange, or combine data in a usable way. Data relevant to a single policy issue are often distributed across multiple agencies, programs, and technology platforms that were developed independently and are not designed to work together. Respondents frequently described environments in which education, workforce, human services, housing, public safety, and public benefits data are maintained in separate systems with different governance requirements, technical architectures, and access controls. As a result, obtaining a comprehensive view of individuals, families, programs, or outcomes often requires substantial manual coordination across organizations and various methods of matching.

"Right now [our program data are] disconnected …, so it's hard … for a state to understand what its [programs] look like because [the data] live across [several] agencies."

"When we have these big [policy] questions, [we ask] why is it that our data sit in so many different places across the state?"

State data leaders

Fragmentation increases the time, cost, and complexity associated with data linkage. Governments may need to negotiate access agreements with multiple agencies, reconcile inconsistent data structures, and develop customized workflows for individual projects. Respondents described how these challenges can limit the routine use of linked data for decision making and reduce governments' ability to conduct timely analyses. Although integrated data systems can help address these barriers, successful implementation depends on governance, standards, and organizational capacity in addition to technical integration.

Effective linkage depends not only on access to data and data systems, but also on the ability to align information across systems that may use different definitions, formats, variables, identifiers, metadata, and documentation practices**.** Respondents consistently identified inconsistent data definitions and standards as major obstacles to cross-system linkage and analysis. Agencies may collect similar information but define key concepts differently, making it difficult to determine whether data elements are comparable or can be combined reliably.

"We have 70 feeds of data coming in but we can't be managing every single one of these 70 feeds in a different and unique way. We don't have enough resources for that."

Federal data leader

Interoperability and standardization challenges often prevent governments from linking data efficiently, even when data-sharing agreements and technical connections exist. Respondents highlighted the importance of common standards that support data exchange while preserving flexibility for diverse organizational contexts. They emphasized that governments do not necessarily need identical systems, but they often require shared definitions, metadata standards, data dictionaries, and documentation practices that enable users to interpret and combine information consistently.

"Inconsistency in data definitions and standards causes the bigger challenge because the way one agency defines something is not necessarily the way another agency defines and stores something … I have apples here and oranges here. Can these connect in any meaningful way?"

Federal data leader

Efforts to improve interoperability can create new privacy, security, and governance challenges that increase implementation costs and slow adoption of proposed solutions. Although interoperability solutions are often designed to facilitate data sharing across agencies and systems, they frequently

require organizations to invest in additional safeguards, compliance processes, access controls, monitoring capabilities, and governance structures to manage the risks associated with broader data access and exchange. As a result, technical solutions that appear to address interoperability barriers may not fully resolve the organizational, legal, and operational requirements necessary for responsible data sharing (DeFranco et al., 2024).

Gap: Unclear long-term stewardship and sustainability can undermine confidence in data linkage initiatives.

Findings suggest that agencies and partners need clarity about who owns, maintains, governs, funds, supports, and improves shared data services or secure environments. Respondents highlighted concerns about who is responsible for maintaining shared systems, overseeing governance processes, funding ongoing operations, and ensuring compliance with privacy and security requirements, which extends to an NSDS. Trust emerged as a key component to securing support for data-sharing efforts. Uncertainty about these responsibilities can reduce participation in collaborative data initiatives and create hesitation among potential partners. Data owners are concerned about how data will be managed and protected once it is shared. A state data leader noted that agencies tend to trust how they are managing their own data but may not know how other agencies manage their data, which makes them less willing to collaborate.

Respondents also emphasized that stewardship extends beyond technical management. Effective stewardship includes maintaining trust among participating organizations, ensuring transparency regarding data use, and demonstrating that shared data assets continue to provide value. These responsibilities require sustained organizational commitment rather than one-time investments.

> "A secure source of funding [for an NSDS] is necessary to assure continuity, oversight, and the ability to meet future demands. Researchers and potential system users will need some level of certainty, including among federal agencies, that if they are to invest time and resources to support developing the infrastructure that it will be sustained long-term."
>
> Hart and Potok (2020)

Trust considerations also extend to AI-enabled tools and supports within NSDS. Findings suggest that governments need clear information about what AI-enabled tools can and cannot do; what information they can access; how outputs are reviewed or corrected; when human assistance is available; and how users can flag inaccurate, incomplete, or confusing responses. Without this transparency, AI-enabled tools and supports could create uncertainty about whether guidance is reliable, appropriate for sensitive questions, or sufficient for responsible data access and use (Ahn and Chen 2022; Aikens et al. 2026; Alhosani and Alhashimi 2024; Androutsopoulou et al. 2024; Charles et al. 2022; DeSouza et al. 2020; Engin and Treleaven 2019; Engstrom et al. 2020; Harrison and Luna-Reyes 2022; Janssen et al. 2020; Reis et al. 2019).

> "Where AI could create risk: Providing inaccurate [...] information about data availability or access requirements; creating false confidence when governance rules are nuanced or context-dependent; recommending access to restricted or sensitive information without proper authorization checks; [...] surfacing incomplete or incorrect metadata; and reducing transparency if users cannot understand how recommendations were generated."
>
> Local data expert

Long-term operations, maintenance, funding, governance, and support models may also affect whether secure infrastructure is trusted and adopted. Findings indicate that state and local governments are unlikely to participate in an effort like an NSDS if they are not confident the service will be supported financially and regularly updated over the long term.

Gap: Privacy and security concerns can limit data linkage.

Findings suggest that privacy and security concerns are a central barrier to data linkage efforts. Although linking data can generate substantial public value, it can also increase the sensitivity of information by creating more comprehensive records about individuals, households, organizations, or communities. As a result, agencies often perceive linked data as carrying greater privacy and security risks than individual source data sets.

> "Important privacy and security concerns often add unexpected delay to, or prohibit altogether, data sharing."
>
> Allard et al. (2018)

Concerns about when data can be kept private, secure, and unavailable to non-authorized entities can slow or prevent sharing, especially for sensitive data. Respondents identified concerns related to unauthorized access, re-identification, disclosure risk, misuse of data, and loss of control over information once it is shared across organizational boundaries. These concerns can delay data-sharing agreements, increase compliance requirements, or discourage agencies from participating in linkage initiatives altogether. The landscape review similarly emphasized the challenges associated with protecting sensitive information in increasingly complex data environments. As governments link larger and more diverse data sets, traditional de-identification approaches may become less effective, increasing the importance of robust governance, access controls, disclosure review processes, and secure computing environments (Allard et al. 2018; DeFranco et al. 2024; Engin and Treleaven 2019; Löfgren and Webster 2020; Mergel et al. 2016).

Public trust also emerged as a recurring theme related to privacy and data security. Respondents noted that governments must demonstrate not only that data are secure, but also that they are being used responsibly, transparently, and for legitimate public purposes. Maintaining this trust is essential to sustaining support for data-sharing and linkage efforts.

> "The real effort on data sharing [is actually] about the people-to-people interaction that creates the trust so that people know and have a sense of how the data are being used."
>
> State data leader

State, local, and territorial considerations for data linkage capacity

For state governments: States often operate large, complex data ecosystems that require coordination across multiple agencies, programs, and legal authorities. As a result, governance, interoperability, and cross-agency coordination challenges may be particularly pronounced in state contexts. State agencies may also face additional administrative and compliance requirements when accessing or integrating federal data.

For local governments: Local governments vary considerably in their capacity to support data governance and linkage activities. Smaller jurisdictions may lack dedicated legal, privacy, cybersecurity, or data management staff, making it difficult to navigate complex data-sharing requirements. As a result, successful solutions may need to be designed for users with limited technical and administrative capacity.

For territorial governments: Territorial governments may face governance, infrastructure, and federal data access challenges that differ from those experienced by states. Existing sources suggest that territorial data ecosystems are shaped by unique legal, administrative, and statistical contexts. For example, territories are not always consistently included in federal statistical surveys and products, and some federal data sets have limited territorial coverage. Territorial governments may also face infrastructure constraints while navigating federal programs and reporting requirements that were often designed with state-based governance structures in mind. These differences highlight the importance of engaging territorial partners directly rather than assuming that state-focused governance tools can be applied to them.

C. Workforce capacity and technical assistance

Governments need workforce capacity and technical assistance to make effective use of data systems, tools, and shared services. Tools alone are unlikely to meet government needs if staff do not have the time, knowledge, support, and organizational routines needed to use them. Staff need capacity to access data, assess whether data are usable for their purposes, and translate data into decisions. Hosted webinars and landscape review findings suggest that implementation support is central to whether data governments can adopt and sustain data systems, analytic tools, data-sharing workflows, and NSDS-related shared services in practice.

A core part of this need is helping staff connect real-world problems to data-informed solutions. Government staff may begin with a policy, program, or service-delivery challenge but need support framing that challenge as a question that can be answered with data. They may also need help identifying what information would be needed, what data sources might exist, and what analytic approach may be appropriate.

Workforce supports also need to account for different levels of staff capacity and data maturity. Some existing staff may have deep program and operational knowledge but may work with older systems,

processes, or routines, and newer staff may bring different ways of working with data that could strengthen existing processes.

For local governments, including cities and counties, supports should meet users where they are by aligning with existing tools and workflows. When capacity is limited, low-friction access, onboarding, and routine use are important to whether tools and supports are adopted in practice.

Gap: Limited staff time, funding, and technical skills constrain data use and evidence building.

Findings indicate that limited staff time, technical skills, and funding can constrain governments' ability to participate in data sharing, linkage, and evidence building. Funding helps agencies dedicate staff time to data work instead of adding that work on top of existing responsibilities. Without that support, data sharing and evidence building can become extra tasks for already-stretched staff rather than functions agencies can sustain over time.

> "We have a real resource issue in the state with being able to focus on the data and what the data is telling us and how we can improve our programs and services based on the data. We are stretched pretty thin in terms of our resources, and we are focused on service delivery."
>
> State data leader

Structured conversation and webinar findings illustrated how limited capacity can hinder data use and innovation. One state data leader said staff were stretched thin and focused on service delivery, leaving limited capacity to examine what the data show and how those insights could improve programs and services. A federal data leader similarly noted that agencies lack the capacity or bandwidth to think through innovative approaches to data sharing or analysis and suggested that NSDS-related supports could include guidance, strategic thought partnership, or temporary staff-like support to help agencies get started. This illustrates a broader implementation gap: governments want to use data for learning and improvement but may not have the capacity to move beyond immediate service-delivery demands.

Findings also showed how capacity constraints intersect with technology needs. One local data leader said a city's sewer infrastructure information was spread across different software platforms and paper maps. The city had to invest in updated systems and train staff to use them before the data could be integrated and used more effectively. This example shows that technology modernization and workforce capacity are linked: new systems can create value only if governments also have staff who can implement, learn, and sustain them.

Capacity constraints can also make other gaps harder to overcome. Poor data discoverability requires staff time to locate relevant data and identify the right contacts. Limited documentation requires staff time to interpret data or seek support. Governance processes require legal, privacy, program, and leadership capacity. Secure infrastructure requires information technology, cybersecurity, and operational expertise. In this way, staff capacity is not a stand-alone issue; it affects whether governments can address related gaps in access, documentation, governance, linkage, and secure data use.

Gap: Complex administrative processes consume limited staff capacity.

Findings show that procedural requirements can consume limited staff capacity and reduce participation in data sharing, data linkage, and evidence-building efforts. In the workforce context, the concern is not

only that data access, approval, and governance processes are complex. The larger issue is that navigating those processes can pull staff away from the work the data are meant to support, including analysis, implementation, service delivery, and program improvement. When each data request requires a new set of approvals, agreements, or security processes, staff may spend substantial time getting ready to use data before they can actually apply those data to policy or program questions.

Structured conversation findings described memoranda of understanding, data-sharing agreements, and data-use agreements for individual use cases as time-consuming and bureaucratic. A federal data leader described clearance paperwork, background checks, account setup, passwords, signed forms, and recurring password resets as staff burdens. These examples suggest that administrative burden can arise not only because access is unavailable, but because the pathway to access often requires repeated steps that must be recreated or maintained across projects.

Hosted webinar findings reinforced the same workforce concern. One local data expert noted that even small friction points can become barriers for city staff when they make it harder to log in, get started, or use a tool in practice. Similarly, a state data leader described a process in which each data share requires a bespoke data-use agreement negotiated between agency legal counsels and contrasted that approach with a more streamlined process based on documented data sensitivity and risk. These examples show why process design matters for adoption: governments that are already stretched may not be able to absorb another complicated workflow, even if the underlying service is useful.

The administrative and process burden gap affects both data users and data providers. Providers may need staff time to review requests, prepare data, establish secure access, and monitor use. Users may need staff time to identify the right contacts, complete agreements, and navigate approval pathways. For NSDS planning, this suggests that workforce and technical assistance support should account for the time and effort required to participate in data-sharing processes. Supports that fit existing tools, workflows, and capacity levels may be especially important for local governments and lower-capacity jurisdictions that cannot easily absorb new administrative requirements.

Gap: Data knowledge is not always documented, shared, or sustained across staff.

A recurring theme across the evidence was that governments can struggle to sustain data use when knowledge about data sets, systems, access processes, and appropriate uses is held by a small number of individuals rather than documented and shared across the organization. This gap reflects a broader knowledge-management challenge: governments (particularly state and local) need ways to build staff skills, bring new staff up to speed, keep guidance current, and preserve institutional knowledge when staff leave or change roles.

Respondents illustrated why these supports matter. State leaders and experts emphasized that documentation and knowledge transfer are essential for ensuring data are usable. Without a strong data catalog and clear documentation, users may have to rely on individual staff to explain what fields mean or how data should be used. This creates a fragile model of data use: if the right person is unavailable, changes roles, or leaves the agency, other staff may lose the practical knowledge needed to use existing data systems or platforms effectively.

Local data leaders also noted that capacity building cannot rely only on a central expert team. One local data leader described a small central data team that supports work across departments but noted that a central team cannot support all data work on its own. The participant's jurisdiction began focusing on broader data and AI literacy across departments. Another local data leader pointed to practical supports such as samples, templates, and peer learning so staff do not have to start from scratch when using new data resources or tools. Together, these examples show that capability building is not only about training staff to use a tool but also about helping staff develop the judgment, language, and routines needed to apply data in their work.

Poor documentation can increase the amount of support users need, slow onboarding, and leave staff dependent on informal knowledge held by specific individuals. When guidance is clear and reusable, new staff can learn processes more quickly, and existing staff do not have to repeatedly answer the same questions. Because staff turnover, role changes, and shifting priorities are expected, capacity-building supports need to embed knowledge in documentation, workflows, onboarding materials, templates, role-based processes, communities of practice, and organizational routines.

State, local, and territorial considerations for workforce capacity and technical assistance

For state governments: State capacity can vary both across states and across agencies within the same state. A larger state or agency may have a central data or technology office with dedicated staff, while a smaller state or program agency may rely on a few staff who manage data work alongside program delivery, reporting, and compliance responsibilities. Even when a state has a central data office, program staff often hold practical knowledge about what the data mean, how they are collected, and what decisions they are meant to inform. Because of this variation, workforce and technical assistance supports should not assume one statewide model will work for all agencies. States may need to consider where data expertise sits, who has authority to make access or governance decisions, and how central offices and program agencies can work together to use shared systems, interpret data, and sustain data practices over time.

For local governments: Local capacity can vary widely by jurisdiction size, staffing, funding, and available technology. Smaller cities and counties may have limited budgets and staff, which may cause them to rely on the same people to handle program delivery, reporting, technology, data requests, and compliance. Larger cities and counties may have dedicated data or technology teams, but they may still need support helping staff across departments use data consistently. Local governments may also need help participating in state, federal, or regional data efforts without taking on new administrative burden. For busy local staff, even small friction points—such as difficult logins, unclear onboarding, or tools that are hard to start using—can become barriers to adoption.

For territorial governments: Territorial governments may have workforce and technical assistance needs that differ from state and local contexts. Available sources suggest that territories may have small data teams, limited local data infrastructure, gaps in source data, inconsistent inclusion in federal statistical products, funding constraints, and language access needs (e.g., documentation in Spanish for Puerto Rico). These conditions mean that one-time training may not be sufficient if agencies also need support building basic data infrastructure, maintaining data systems, interpreting federal data gaps, or applying data to local decisions. As a result, territorial participation in NSDS-related services may require sustained capacity-building supports that reflect territorial data systems, staffing constraints, and federal statistical inclusion issues.

IV. Tribal government needs and gaps

This section summarizes the unique needs and gaps related to Tribal governments including related data priorities and governance considerations. It also examines the ways Tribal Nations use data to support self-determination, governance, planning, service delivery, evidence building, and community well-being, as well as the structural, legal, technical, and resource barriers that can affect Tribal governments' ability to fully exercise authority over data to support self-determination, governance, service delivery, and community well-being. In Exhibit 5, we provide a high-level summary of Tribal governments' needs and gaps, which are described in greater detail in this section.

Reminder: Defining needs and gaps

- **Needs:** Supports, resources, and services governments require to use data effectively.
- **Gaps:** Barriers, constraints, unmet supports, and implementation challenges that limit governments' ability to meet those needs.

Tribal Nations are sovereign governments with inherent authority to govern their citizens, territories, resources, and internal affairs. The relationship between Tribes and the United States is rooted in the U.S. Constitution, treaties, federal law, executive actions, and long-standing principles recognizing Tribal sovereignty. As part of this government-to-government relationship, the federal government has trust and treaty responsibilities to Tribal Nations, including supporting Tribal self-determination and honoring commitments related to the health, welfare, and governance of Tribal communities. Data are fundamental to the exercise of Tribal sovereignty, as Tribal governments rely on data to make decisions, administer programs, allocate resources, evaluate outcomes, protect community interests, and advocate for their citizens. Consistent with principles of Indigenous Data Sovereignty, Tribal Nations have the authority to govern the collection, ownership, access, management, interpretation, sharing, and use of data related to their citizens, communities, lands, resources, and governments (Russo-Carroll et al. 2021). As a result, many of the needs and gaps discussed throughout this section are not solely technical in nature but are closely tied to Tribal sovereignty, self-determination, governance authority, and the government-to-government relationship between Tribal Nations and the federal government. Further, thoughtful engagement with Tribal governments and the broader Tribal data ecosystem, such as Tribal organizations, Tribal Epidemiology Centers (TECs), Tribal colleges and universities, Tribal consortia, and other entities that steward, manage, or use Tribal data, requires building trusted, long-term relationships to understand and support Tribal priorities, governance structures, and data needs. For brevity, we use the term Tribal governments or Tribes in this report, which could include non-governmental entities that may interact with or use data on behalf of Tribes, as these entities are an integral part of the data infrastructure that supports Tribal Nations.

An important point of context for this discussion is that although common themes emerged from this body of work, the experiences, governance structures, and available resources of Tribal Nations are not uniform but varied and context-specific. Tribal Nations are diverse sovereign governments with distinct histories, cultures, legal contexts, and approaches to governance and evidence building. A Tribal data leader emphasized in an structured conversation that no single individual or Tribe can speak for the experiences, priorities, or circumstances of all Tribal Nations.

Findings showed that Tribal Nations, Tribal organizations, and Tribal-serving entities demonstrated sustained leadership in advancing data governance, evidence building, program administration, and community-driven decision making. These efforts occur within governmental systems shaped by federal policies that have not consistently recognized Tribal sovereignty, governance authority, or Indigenous knowledge systems. Consequently, many of the needs and gaps discussed throughout this section are influenced by historical and contemporary factors, including chronic underinvestment, fragmented data systems, barriers to accessing and sharing data, evolving legal and regulatory environments, and historical misuse of Tribal information. These factors continue to affect Tribal governments' ability to access, govern, protect, and use data in ways that support Tribal priorities and self-determination. As one structured conversation participant explained, "the notion of data trust is very tender for very understandable historical reasons."

Despite these challenges, Tribal governments, Tribal organizations, and Tribal-serving entities across Indian Country are resilient and continue to advance innovative approaches to data governance, evidence building, program administration, and community-driven decision making. The needs and gaps identified in this section should therefore be understood within the broader context of Tribal Nations exercising sovereignty and advancing self-determined priorities while navigating data systems and institutional structures that do not always fully recognize or support Tribal governance authority and data priorities.

Exhibit 5. Overview of Tribal needs and gaps

Need	Gaps
Exercise Tribal authority over data and use data to support self-determination and governance	• **Federal, state, and institutional systems do not consistently recognize Tribal authority over data**. Governance structures, policies, and data systems may not adequately recognize Tribal authority over data concerning Tribal citizens, communities, lands, or resources. • **Existing governance structures often place Tribes in a reactive rather than decision-making role**. Tribal Nations may be consulted after key decisions have already been made rather than participating in governance, stewardship, and decisions about data collection, access, sharing, interpretation, and use. • **Existing legal, policy, and contractual structures may conflict with Tribal governance principles**. Existing agreements, ownership expectations, and governance processes may conflict with Indigenous Data Sovereignty and Indigenous Data Governance principles or create uncertainty regarding Tribal authority and consent. • **Power imbalances can limit Tribal control over data and data systems**. External institutions often retain authority over data systems, infrastructure, governance processes, and access pathways, reducing Tribal control over information needed to support governance, planning, resource allocation, and self-determination.

Need	Gaps
Build confidence that data will be used appropriately, ethically, and for community benefit	• **Historical misuse of Tribal data continues to shape perceptions of data initiatives**. Previous experiences with extractive research, misuse of Indigenous data, and limited Tribal involvement in decision making continue to influence how Tribal communities view contemporary data collection, sharing, and governance efforts. • **Concerns about privacy, misuse, and loss of control affect willingness to share information**. Tribal governments and communities may be reluctant to participate when they are uncertain how data will be accessed, shared, interpreted, or used, particularly for sensitive cultural, environmental, health, or community information. • **Unclear ownership, authority, and accountability can undermine trust in data governance**. When governance responsibilities, stewardship expectations, decision-making authority, and oversight mechanisms are not clearly defined, Tribal governments may have less confidence that data will be managed in ways that respect Tribal priorities and interests. • **Data can cause harm when used without sufficient context or Tribal involvement**. Data that are interpreted, shared, or applied without Tribal participation or community context may reinforce harmful narratives, misrepresent Tribal communities, or produce unintended social, cultural, or policy harms.
Access to accurate, timely, and relevant data to support decision making, planning, evidence building, service delivery, and advocacy	• **Existing data often fail to accurately represent Tribal populations and experiences**. Federal data sets frequently undercount and misclassify American Indian and Alaska Native populations, which undermines Tribal visibility in policy and funding decisions, hinders evidence building and resource allocation, and can have significant consequences in areas such as public health. • **Tribal data are frequently inaccessible, delayed, or difficult to obtain**. Tribal Nations face significant barriers to accessing timely, comprehensive, and locally relevant data due to fragmented data systems, gaps in federal data sets, and limited resources for Tribal data collection and management, hindering effective governance and evidence-based decision making. • **Existing data systems do not consistently accommodate the geographic, demographic, and governmental contexts of Tribal Nations**. Existing data systems often fail to reflect the unique realities of Tribal Nations, resulting in incomplete representation and limiting the availability of data needed to support Tribal governance and decision making. • **Lack of data standards and documentation further limit usability**. Inconsistent definitions, data standards, and documentation are barriers to producing reliable, comparable, and interoperable Tribal data.
Data that reflect Tribal and community-driven priorities, Indigenous knowledge systems, and culturally meaningful measures of success	• **Existing systems often rely on deficit-based frameworks and fail to incorporate community-defined indicators**. The lack of alignment underscores the need for data systems that better reflect Tribal priorities while respecting Tribal authority over sensitive information.
Intergovernmental coordination of data sharing and access to support programs and policymaking	• **Burdensome data-sharing processes and fragmented systems limit Tribal access to data**. Sources consistently found that complex data-sharing agreements, fragmented systems, and inconsistent recognition of Tribal authority limit Tribal access to timely, comprehensive data about their own citizens and communities. • **Existing governance and intergovernmental data-sharing frameworks do not consistently recognize or support Tribal authority**. As sovereign governments, Tribal Nations possess inherent public health authority to protect and promote the health and well-being of their citizens and communities.

Need	Gaps
Workforce capacity and technical expertise	• **Staffing, technical expertise, data literacy, and long-term workforce capacity are limited**. Workforce recruitment and retention challenges, increasing administrative demands, limited access to sustained training opportunities, and insufficient long-term funding constrain workforce development and retention.
Sustainable funding and reliable infrastructure	• **Funding is often short term, fragmented, and misaligned with Tribal priorities and timelines**. Administratively burdensome funding limits Tribal Nations' ability to build and sustain the long-term data infrastructure, workforce, and governance capacity needed for Tribal self-determination and evidence building. • **Broadband limitations, outdated systems, cybersecurity concerns, and weak interoperability constrain effective data use**. Jurisdictional and geographic complexities further complicate Tribal Nations' access to reliable infrastructure.

A. Exercise Tribal authority over data and use data to support self-determination and governance

Tribal Nations possess inherent authority to govern data concerning their citizens, lands, resources, governments, and communities. To fully exercise that authority, Tribal Nations need data governance structures that recognize and operationalize Tribal authority throughout the data life cycle. Across structured conversations, consultations, conferences, and the literature, Tribal participants emphasized that data are not value neutral. Rather than viewing data simply as information to be collected and analyzed, participants described data as representing people, communities, histories, cultures, relationships, and responsibilities. They emphasized that meaningful data must be defined by Tribes themselves and grounded in Tribal priorities, community values, local context, and Indigenous ways of knowing. Within this framework, data were consistently described as tools for governance, nation building, public health, emergency response, service delivery, advocacy, and self-determination. Indigenous Data Sovereignty and Indigenous Data Governance are consistently framed as extensions of Tribal self-determination, emphasizing Tribal authority over how data are collected, governed, shared, interpreted, and used (All of Us Research Program 2023; Northwest Portland Area Indian Health Board n.d.; Rainie et al. 2017; Rodriguez-Lonebear 2016; Russo-Carroll et al. 2021).

Tribal sovereignty extends across the full data life cycle. Findings suggest that Tribal authority includes decisions about data collection, storage, access, stewardship, dissemination, and reuse. The literature emphasizes that Indigenous Peoples must play a meaningful role in shaping policies, governance structures, and data-sharing arrangements that affect their communities (All of Us Research Program 2021; Garba et al. 2023; Indigenous Data Sovereignty Network 2024; Rodriguez-Lonebear 2016; Russo-Carroll et al. 2021).

> "Indigenous Data Governance is decision making. It is the power to decide how and when Indigenous data are gathered, analyzed, accessed and used."
>
> Walter et al., as cited in Russo-Carroll et al. (2021)

Tribal Nations exercise authority not only over data governance, but also over how data are defined, interpreted, and applied. Tribal leaders emphasized that meaningful data must be grounded in Tribal priorities, community needs, and local context. Conference discussions similarly highlighted the importance of Indigenous knowledge systems, community values, and Tribal definitions of success in

shaping evidence-building activities (Indigenous Innovation Initiative 2021; LaFrance et al. 2010; Locklear et al. 2023).

Gap: Federal, state, and institutional systems do not consistently recognize Tribal authority over data.

Findings suggest that Tribal authority is frequently constrained by systems that were not designed to support Indigenous Data Governance. Consultation participants described federal systems that often fail to accommodate Tribal governance priorities and noted that federal agencies frequently control data systems, standards, and access pathways. Similarly, the literature finds that federal, state, and local governments often retain authority over systems used to collect, manage, and disseminate Tribal information (Rainie et al. 2017; Rodriguez-Lonebear 2016; Russo-Carroll et al. 2021).

States often function as gatekeepers to public health and administrative data. Several authors note that Tribes may depend on state processes, agency relationships, and interpretations of law to access information needed for governance and decision making (Field et al. 2024; Hernandez and Robinson 2014). Gray literature similarly describes Tribal dependence on externally controlled systems and data sets that may not reflect Tribal priorities or governance requirements (Brookings Metro 2025; National Congress of American Indians [NCAI] 2018).

Gap: Existing governance structures often place Tribes in a reactive rather than decision-making role.

Consultation participants emphasized that Tribal Nations should be engaged as decision makers from the outset when determining what data are collected, how data are governed, and how findings are interpreted, shared, and applied. However, Tribes are often consulted after major decisions have already been made rather than being included as decision makers throughout planning, implementation, and governance processes (All of Us Research Program 2023; National Indian Health Board 2023a, 2023b). The literature similarly emphasizes that Indigenous Peoples should have a meaningful role in developing governance frameworks, data-sharing agreements, and implementation strategies (Garba et al. 2023; Rodriguez-Lonebear 2016; Russo-Carroll et al. 2021). Tribal review boards, Tribal research governance processes, and Indigenous governance structures are frequently identified as mechanisms for supporting more meaningful participation (National Inuit Strategy on Research 2018; Native Nations Institute 2020).

Gap: Existing legal, policy, and contractual structures may conflict with Tribal governance principles.

Several publications identify tensions between Indigenous Data Governance principles and existing legal, policy, and contractual arrangements. Federal contracts, intellectual property provisions, ownership expectations, and data-sharing agreements do not always align with Indigenous Data Sovereignty principles or frameworks such as Collective Benefit, Authority to Control, Responsibility, Ethics (CARE); Findable, Accessible, Interoperable, Reusable (FAIR); Transparency, Responsibility, User Focus, Sustainability, Technology (TRUST); and Ownership, Control, Access, and Possession (OCAP) (First Nations Information Governance Center 2014; Lin et al. 2020; Russo-Carroll et al. 2020; Wilkinson et al. 2016). Consultation and conference findings suggest that interpretations of law and policy can create uncertainty regarding Tribal authority over data access, sharing, stewardship, and consent (United States Department

of the Interior, Indian Affairs 2022). These challenges often stem from governance structures rather than technical limitations alone.

Gap: Power imbalances can limit Tribal control over data and data systems.

Across evidence sources, Indigenous Data Governance challenges are frequently described as manifestations of broader power imbalances between Tribal governments and external institutions (Rodriguez-Lonebear 2016; Native Nations Institute 2019). External entities often retain authority over data systems, infrastructure, governance processes, and access pathways even when the underlying information concerns Tribal citizens and communities. These dynamics can limit Tribal access to information needed for planning, resource allocation, advocacy, and decision making (Brookings Metro 2025; Mays et al. 2022; NCAI 2018). Conference discussions repeatedly emphasized that Tribal control over governance processes and data stewardship is necessary to address these long-standing imbalances.

B. Build confidence that data will be used appropriately, ethically, and for community benefit

> "Tribes are the experts in what works for Indian Country … to meet the unique needs of Tribes and Tribal citizens. Tribes must always be at the table as decisions are made about the future of data modernization."
>
> National Indian Health Board (2023b)

Across structured conversations, consultations, conferences, and literature, trust, transparency, and ethical data use consistently emerged as foundational considerations for Tribal Nations to participate in data sharing, evidence building, and governance activities. A recurring need identified across the evidence was for data to be governed, used, and shared in ways that respect Tribal priorities, protect Tribal interests, and provide meaningful benefits as defined by Tribal Nations. Trust is a prerequisite for Tribal participation in data sharing, evidence building, and governance activities. Across these sources, Tribal participants consistently emphasized that trust shapes whether communities are willing to share information, participate in research, engage in data-sharing initiatives, or support new data systems. Findings suggest that Tribes are more likely to participate when they understand how data will benefit their communities, retain meaningful control over data access and use, and trust the institutions responsible for governance and stewardship (Rhodes et al. 2024; Russo-Carroll et al. 2020). Consultation participants similarly emphasized that meaningful engagement, transparency, and long-term relationships are necessary conditions for successful federal data initiatives (All of Us Research Program 2023; National Indian Health Board 2023b).

Trust is built through transparency, accountability, reciprocity, and demonstrated benefits that are defined by Tribal Nations. Structured conversation participants stressed that Tribal communities want to understand how data will be used, who will make decisions about access and use, and how participation will benefit Tribal citizens and communities. Several respondents cautioned against framing data-sharing initiatives primarily in terms of efficiency, modernization, or cost savings, noting that such framing can undermine trust if community benefit is unclear. Instead, the findings emphasize relationship building, reciprocity, and the demonstration of tangible value. The literature similarly describes trustworthy

stewardship as requiring accountability, transparency, and ethical engagement rather than technical safeguards alone (Lin et al. 2020; Rhodes et al. 2024; Russo-Carroll et al. 2020).

Ethical stewardship is grounded in governance and extends beyond data protection to include organizational practices, accountability, and responsible data use. Findings suggest that ethical data use depends not only on security and privacy protections, but also on governance structures, organizational practices, staff behavior, and accountability mechanisms. Gray literature indicates that many Tribal Nations are actively investing in governance structures, data offices, and data hubs to strengthen stewardship and protect Tribal information (NCAI 2018). Additional literature emphasizes the importance of provenance, stewardship protocols, and governance mechanisms that ensure Indigenous data are managed according to community expectations and values (Jennings et al. 2025; Local Contexts n.d.[a]; Local Contexts n.d.[b]).

Gap: Historical misuse of Tribal data continues to shape perceptions of data initiatives.

Historical and ongoing experiences continue to influence how Tribal communities view contemporary data collection, governance, and sharing efforts. Consultation participants expressed concerns about previous federal initiatives that proceeded without adequate Tribal involvement or consultation. Similarly, the literature identifies exploitative research practices, external control of Indigenous data, and exclusion from decision-making processes as major contributors to community mistrust (Garba et al. 2023; Garrison et al. 2023; Rhodes et al. 2024). Gray literature further documents long-standing misuse and misappropriation of Indigenous data, cultural information, and intellectual property, resulting in social, cultural, environmental, and economic harms (Rhodes et al. 2024). Together, these experiences contribute to caution toward new data initiatives, particularly when governance structures, community benefits, and accountability mechanisms are unclear.

> "There's generational resistance to the collection of data about our Peoples and how it's going to be used and how it's going to be protected."
>
> Tribal data expert

Gap: Concerns about privacy, misuse, and loss of control affect willingness to share information.

Many Tribal participants described concerns that information shared for one purpose may be used in ways that were not anticipated or approved. Consultation participants emphasized that information perceived as low risk or non-sensitive by external organizations may be viewed as sensitive by Tribal communities because of the potential for misuse or unintended consequences. Structured conversation participants similarly highlighted concerns that sharing environmental, cultural, ecological, or subsistence-related information could expose sensitive locations, resources, or practices to outside actors. Conference discussions repeatedly emphasized the need to safeguard Indigenous Peoples' data and establish clear expectations regarding access, use, and protection, including AI usage. In these discussions, participants noted concerns around the potentially harmful impacts of AI interpretations that misrepresent or hallucinate findings using Tribal data. Additionally, some participants shared trepidation around the inevitable evolution of AI, wanting governance that keeps pace with technology. These findings suggest that concerns about misuse and loss of control remain important barriers to participation in data-sharing initiatives (First Nations Information Governance Center 2014; Local Contexts n.d.[a]; Local Contexts n.d.[b]; Rhodes et al. 2024; United States Department of the Interior, Indian Affairs 2022).

Gap: Unclear ownership, authority, and accountability can undermine trust in data governance.

Trust can be difficult to establish when ownership, authority, and accountability are unclear. Consultation findings indicate that Tribal leaders remain concerned about the publication or dissemination of Tribal information without Tribal permission or oversight. The literature similarly notes that external ownership and control of Indigenous data can limit Tribal authority over how information is interpreted, shared, and used (First Nations Information Governance Center n.d.; Northwest Portland Area Indian Health Board n.d.; Russo-Carroll et al. 2021). Several sources emphasize that trust is strengthened when governance responsibilities, decision-making authority, and stewardship expectations are clearly defined (Rhodes et al. 2024; Russo-Carroll et al. 2020). Conference discussions likewise suggest that concerns regarding ownership, stewardship, and accountability continue to influence participation in data-sharing initiatives.

Gap: Data can cause harm when used without sufficient context or Tribal involvement.

Findings suggest that data are not inherently neutral and may cause harm when used without Tribal context, interpretation, or participation. Peer-reviewed literature highlights the risk that large-scale data sets may reinforce harmful narratives, perpetuate inequities, or misrepresent Tribal communities when context is absent (Mays et al. 2022; White et al. 2022). Consultation participants expressed concern about how information is interpreted, represented, and communicated to external audiences. Structured conversation participants similarly emphasized that Indigenous knowledge systems are relational, place-based, and context-specific, making generalized interpretation or dissemination potentially problematic. These findings underscore the importance of Tribal involvement not only in data governance, but also in how information is interpreted, communicated, and applied (Center for Behavioral Health Statistics and Quality 2024; Indigenous Innovation Initiative 2021; Locklear et al. 2023; Local Contexts n.d.[a]; Local Contexts n.d.[b]).

C. Access to accurate, timely, and relevant data to support decision making, planning, evidence building, service delivery, and advocacy

Across Tribal governments and communities, data is viewed as essential for Tribal governance, planning, decision making, evidence building, and effective service delivery. High-quality, timely data help Tribal governments understand community conditions, identify emerging needs, evaluate programs and services, and inform strategic planning and resource allocation. Data are used to support a wide range of Tribal priorities, including public health, housing, workforce development, education, public safety, and social services. By providing evidence on community strengths, priorities, outcomes, and needs, data support informed decision making, guide investments aligned with Tribal priorities and strengthen Tribal self-determination and governance.

Beyond supporting day-to-day governance, data also play a critical role in securing resources and advancing Tribal self-determination. Participants emphasized the importance of data to support funding formulas, develop competitive grant applications, and strengthen advocacy efforts with federal, state, and other partners. Evidence generated through Tribal data systems enables Tribes to document community needs, demonstrate program impacts, justify investments, and advocate for resources that align with Tribal priorities. In this way, data serve as both an operational tool and a strategic asset that supports governance, sovereignty, and long-term community well-being.

For example, health-focused organizations, particularly TECs—Tribal public health authorities that provide epidemiology, surveillance, and data support for Tribes and Tribal organizations—highlighted the central role of data in understanding and responding to community health needs. Epidemiological analyses, public health surveillance systems, and data dashboards were described as essential tools for monitoring health outcomes, identifying disparities, and informing public health action. Conference presentations similarly underscored the importance of data for responding to public health emergencies and other crises, including the COVID-19 pandemic, where timely and accurate information was critical for protecting Tribal communities.

> "The data is absolutely essential in order for us to be able to accurately not just define and describe health challenges, but to really find solutions to ongoing disparities. And so data is power."
>
> Tribal data expert

Across sectors, Tribes and Tribal organizations are developing their own solutions to gathering data, including Tribal surveys, community assessments, public health surveillance systems, data dashboards, and locally developed evaluation frameworks. One successful example is the D4I (Data for Indigenous Implementations Interventions and Innovation) TDR (Tribal Data Repository). This Indigenous-led, federally funded project demonstrates how a data system built by and for Tribes can prioritize community alignment over researcher interest, facilitate Tribal control over their own data, and operationalize the CARE Principles for Indigenous Data Governance. Through custom data management and educational resources, TDR supports the needs of Tribes at all levels of resources and expertise, serving as a model for building data systems that respect Tribal sovereignty, safeguard Tribal data, and are culturally responsive.

Data were consistently framed as a foundation for Tribal governance, strengthening programs and services, and achieving positive outcomes for Tribal citizens. Therefore, robust evidence building is needed not only to evaluate programs and measure outcomes but also to support governance, advocate for resources, respond to emerging challenges, and advance community well-being.

Gap: Existing data often fail to accurately represent Tribal populations and experiences.

Despite the many essential uses and functions of data, sources identified significant challenges related to data quality and accuracy that affect the ability of Tribal governments and Tribal organizations to generate timely, relevant, and actionable evidence.

Multiple sources noted that federal data sets often underrepresent Native populations and fail to capture the complexity of Tribal identities and communities. Participants highlighted challenges associated with multiracial classification, incomplete racial coding, and the undercounting of Tribal populations in federal systems. Racial misclassification of American Indians and Alaska Natives (AI/ANs)—when AI/ANs are incorrectly identified as another race—can occur in a number of instances, such as (1) AI/AN options not being included in data collection forms or systems, (2) respondents being forced to choose only one racial identity, (3) respondents not seeing their identity on the form, (4) refusal to answer (for example, distrust), (5) data entry error, (6) a service provider failing to ask for race when providing a service, or (7) assumptions are made based on how someone looks or how a name sounds. In a recent conference presentation, Canterero et al. (2025) shared an example using 2020 census data for California that showed how only pulling data for the "AI/AN alone and non-Hispanic" category—rather than the "AI/AN alone or

in combination with any other race/ethnicity"—reduced the population output from more than 1.4 million to less than 157,000. Such undercounting renders AI/AN populations statistically invisible in many federal data sets, resulting in the non-fulfillment of treaty and trust responsibilities and can lead to their invisibility in important policy and public health discussions (Urban Indian Health Institute 2021). Issues with data accuracy can be particularly consequential in areas such as the Missing and Murdered Indigenous Persons crisis, where incomplete, inaccurate, or inconsistent data directly affect visibility, resource allocation, and response efforts. Race misclassification also reduces confidence in federal and state data sets and creates barriers to effective planning, resource allocation, advocacy, and evidence building.

Gap: Tribal data are frequently inaccessible, delayed, or difficult to obtain.

Multiple sources reported that important data sets are often unavailable, insufficiently detailed, outdated, siloed across government agencies, or not collected in ways that meet Tribal needs. This is especially pronounced in specialized areas such as environmental management and agriculture. For example, organizations such as Brookings Metro (2025) and the Native Nations Institute (2019, 2024) have noted gaps in information related to environmental conditions, land use, business ownership, and other priority areas. In some cases, important aspects of Tribal economies, governance systems, and community conditions remain largely invisible in federal data systems. The absence of comprehensive data on Tribally owned businesses, a major source of economic activity and government revenue for many Tribes, illustrates how existing data systems can fail to provide information critical to Tribal planning and development.

> "Data is out there, and it's fragmented, or it's not out there, or it's collected in such a way that it's not usable [...] so it's a giant spreadsheet that someone has to spend hours to manipulate—not everybody has that capacity within their organization. So it's available publicly, but it's not usable."
>
> Tribal data expert

Sources also highlighted infrastructure and resource constraints that make it difficult to collect, manage, and maintain high-quality data. National survey findings of Tribal governments indicate that nearly half of all Tribes fund their own surveys or censuses, often relying on Tribal resources or federal grants or contracts that also fund Tribes' enrollment and program service systems (NCAI 2018). Additionally, reporting requirements associated with federal programs can impose substantial administrative burdens (NCAI 2018). These constraints make it more difficult for Tribal governments and Tribal organizations to sustain robust data systems and generate timely evidence to support planning, service delivery, program improvement, and decision making.

Consequently, many Tribal Nations rely on multiple external data sets because existing federal and state systems do not consistently provide timely, comprehensive, or locally relevant information needed to support Tribal governance. Several sources describe Tribal governments as having to navigate a fragmented landscape of federal, state, and local data systems with inconsistent standards and reporting practices.

Gap: Existing data systems do not consistently accommodate the geographic, demographic, and governmental contexts of Tribal Nations.

The review of literature highlighted several structural factors that complicate data collection and evidence building in Tribal communities. Small population sizes, geographic dispersion, remote locations, and limited investment in Tribal data infrastructure can reduce the availability, reliability, and utility of data. These challenges are often compounded by the fact that Tribal lands and communities do not always align with conventional administrative or statistical boundaries, making data collection, aggregation, and reporting more difficult. For example, a Tribe may want data on enrolled Tribal citizens, Native residents not enrolled in the Tribe, and non-Native residents living on their reservation or receiving Tribal services. Tribes may also want data on enrolled Tribal citizens who do not live on the reservation. The intersection of Tribal citizenship, Native identity, and residence can make data requests more complex than for other levels of government.

Additionally, federal recognition status influences access to data, with state-recognized and non-federally recognized Tribes frequently excluded from major federal data systems and reporting mechanisms, resulting in significant gaps in data availability and representation.

Gap: Lack of data standards and documentation further limit usability.

Persistent data quality challenges are driven in part by inconsistent definitions, weak data standards, and poorly aligned data systems. Variations in how Tribal populations and communities are defined, collected, and reported across organizations can lead to significant inconsistencies across data sets, making it difficult to compare information or develop a complete picture of community needs and outcomes. Sources also highlighted ongoing concerns related to data provenance, metadata, documentation, and overall data reliability. Collectively, these challenges underscore the need for stronger standards, improved data management practices, and more consistent, high-quality data to support effective governance, resource allocation, and evidence-based decision making.

D. Data that reflect Tribal and community-driven priorities, Indigenous knowledge systems, and culturally meaningful measures of success

Tribal Nations have engaged in research, observation, evaluation, and knowledge sharing for centuries to "sustainably manage resources, mitigate the impacts of climate change, engineer seaworthy crafts, selectively propagate crops, and prevent illness," among other purposes (Locklear et al. 2023). As with any community, Tribes are best positioned to identify their own priorities and guide data collection efforts in ways that maximize benefits and minimize harm.

> "The story of our community, that's what it [data] is for me—it's a story and a testament to the work of our programs."
>
> Tribal data leader

For many Tribal communities, data do not simply refer to quantifiable measurements of process and outcomes. As one webinar speaker described, "[Data is] a relationship that [carries] context and information and respect as it moves through system." Tribal understandings of data often include stories passed from one generation to another, non-human relations with the environment, and cultural artifacts.

Understanding "data" within this comprehensive, cultural context helps ensure Tribal sovereignty and Indigenous ways of knowing are respected while centering the needs, values, and priorities of Tribal communities. It also empowers Tribes to reclaim their own narratives by dispelling harmful myths about Native Peoples and affirming the validity of Tribally generated data.

Sources consistently emphasized that Tribal evidence-building efforts should be grounded in Tribal priorities and understanding of data and that meaningful evidence cannot be defined solely through externally developed metrics and evaluation frameworks. Instead, data collection, analysis, and interpretation should reflect the unique histories, traditions, cultures, and aspirations of Tribal communities.

A recurring theme was the need for locally relevant indicators and evaluation approaches that reflect Tribal contexts and lived experiences. Participants noted that evidence building should support community-defined goals and priorities, rather than relying exclusively on standardized measures that may not reflect what matters most to Tribal citizens.

> "We, as tribal people, want research and scholarship that preserves, maintains, and restores our traditions and cultural practices. We want to restore our homelands; revitalize our traditional religious practices; regain our health; and cultivate our economic, social, and governing systems. Our research can help us maintain our sovereignty and preserve our nationhood."
>
> LaFrance et al. (2010)

For example, in a 2018 survey conducted by NCAI, Tribes reported needing more or better data on a wide range of topics, with over half of participants noting Tribal language fluency or other cultural information, education level, health, housing, demographics, and employment status.

These ideas were reinforced by multiple conferences and workshop sessions that have recently highlighted Indigenous Data Governance and other approaches that center Tribal values, cultures, and ways of knowing. Discussions emphasized the importance of Indigenous Peoples shaping research agendas, defining meaningful outcomes, interpreting findings, and guiding decisions about data use. Across governance, health, education, and innovation initiatives, presenters often described culturally grounded evidence building as essential for ensuring that data serve Tribal communities in ways that are relevant, respectful, and aligned with Tribal self-determination.

Sources also highlighted the opportunity to better incorporate Indigenous knowledge systems into evidence-building activities and ensure that measures of success align with community-defined understandings of well-being, resilience, and progress. Indigenous knowledge systems are place-based, relational, and context-specific, and rely more heavily on qualitative input than most current federal data collections. For example, in a 2024 report, the Native Nations Institute suggested that federal "data related to agriculture must include Indigenous definitions of agriculture data encompassing oral knowledge and histories, environmental conditions, crops and livestock. This definition must also incorporate information about farmers and ranchers, practices, methods and observations" (p. 1).

Multiple voices underscored the importance of recognizing the diversity and heterogeneity of Tribal governments, communities, and their priorities. Researchers and Tribal leaders emphasized that no single set of measures or methods can adequately represent the experiences, priorities, or strengths of all Tribes. As a result, effective evidence building requires flexibility, local leadership, and the ability to adapt frameworks and measures to reflect distinct cultural, geographic, and governance contexts. Recommended approaches to addressing these needs included (1) developing community-driven indicators of well-being, (2) grounding data interpretation in Tribal perspectives, and (3) protecting culturally sensitive and place-based knowledge. These approaches help ensure that evidence is meaningful, actionable, and responsive to local needs.

Gap: Existing systems often rely on deficit-based frameworks and fail to incorporate community-defined indicators.

A significant gap in existing federal and mainstream data systems is that they often rely on externally defined, deficit-oriented frameworks that do not reflect the Tribal priorities, understandings of data, or community-defined measures of success discussed above. Current data collection efforts frequently focus on documenting disparities and challenges, such as poverty, unemployment, poor health outcomes, and other social indicators. Native scholars have noted that official census and administrative data often do not fully capture the complexity of AI/AN identities because these collection efforts are not designed with these communities in mind (Rodriguez-Lonebear 2016). These measures can be important for understanding inequities, yet sources noted that they often fail to reflect Tribal strengths, resilience, cultural vitality, and the outcomes that communities themselves consider meaningful. Additionally, mainstream data systems often do not share data on how Tribes can provide positive influences even outside of their community or population. For example, one Tribal data leader noted that a number of Tribes have released their own economic impact reports to highlight the value they provide to the surrounding local and state economy by providing jobs and supporting education funding for public schools. This example demonstrates how data can be used not just to identify gaps in service delivery, but also as leverage for Tribal communities.

> "Mainstream understandings of indigenous peoples are constrained by data that inform the prevailing narratives. We witness this time and again in native communities. High rates of suicide, diabetes, unemployment and substance abuse are but a few of the pervasive deficit statistics used to characterize native populations, so it is time to develop our own data that speak to our strengths."
>
> Rodriguez-Lonebear (2016, p. 261)

Participants also described limitations in existing federal and state data systems, which often overlook issues that are important to Tribal communities or fail to capture the complexity of Tribal economies, governance structures, and cultural practices. For example, Tribally owned enterprises may not fit neatly within conventional economic data sets, while indicators such as Indigenous language proficiency, cultural participation, or connection to traditional lands are rarely included in government surveys (Brookings

Metro 2025). As a result, available data may not provide the information Tribes need to assess community well-being, plan programs, or demonstrate progress toward locally defined goals.

Although some in the field push for more expansive data collection efforts, this prompts caution from others about centralizing or broadly sharing data—especially environmental, cultural, or subsistence-related information—that could expose sensitive locations or resources. In Alaska Native contexts, for example, sources described concerns that sharing data about subsistence areas or ecological conditions could unintentionally increase outside access or exploitation. To build trust around more easily accessible federal data, it is imperative that data are clearly defined within data sets and data systems so that Tribes have a say in how they are accessed and used.

"What do we mean when we say data?… I think those are things that are still not well defined in some of the dialogue around data sovereignty, because so much of the infrastructure that has been built has been in those spaces of biospecimen and genetics research. It becomes much more broad when you think about data on cultural knowledge, qualitative data, data about programs."

Tribal data expert

E. Intergovernmental coordination of data sharing and access to support programs and policymaking

Participants at listening sessions and in structured conversations consistently emphasized that improvements in how data are both shared and accessed across Tribal, federal, state, and local systems are required to support programs, decision making, and policy. Better integration was also identified as a means of reducing administrative burden and improving emergency response. Coordination of data sharing and data access needs to occur across state and Tribal public health authorities, surveillance, and other administrative systems and through Tribal organizations, TECs, and regional partners through both formal and informal networks.

Tribal data leaders and Tribal health data experts described public data sets held by state and federal agencies as useful for broadband mapping, community comparison tools, public dashboards, strategic planning, and grant development. Participants also expressed appreciation for the accessibility of public data, as it can reduce the need for lengthy approval and institutional review board processes. As one Tribal data leader noted: "despite the limitations of official statistics, they remain critical sources of evidence that Tribes can use in pursuit of their goals." At the same time, limited interoperability and inconsistent access to data held by state and federal entities were identified as a notable concern across participant types.

"We can't combat the same battles because we don't have access to the same information, and that's a huge struggle."

Tribal data leader

"They [a state department of health] created this public-facing cancer registry dashboard. And they showed how anyone really can go there and filter cancer data by disease type. They can filter it by race, not by tribe, but just American Indian, Alaska Native. But that was pretty helpful.... And they have partnered with [Tribal Nation], and now [that Tribal Nation] has a similar dashboard for cancer. So [data is] powerful when it's accessible like that, what can be done."

Tribal data leader

Significant attention has been devoted to understanding how data sharing and interoperability can be improved across Tribal, federal, state, and local systems. Tribal leaders, academics, national advocacy organizations, federal agencies, and Indigenous Data Sovereignty experts regularly gather to discuss key considerations related to Tribal data. These discussions take place at events such as the National Indian Health Board's National Tribal Health Conference, the Indigenous Data Sovereignty Institute, and other regional, national, and international forums. These discussions consistently highlight that data-sharing initiatives must account for the geographic, legal, cultural, and governance complexities that characterize Tribal Nations and communities. Specifically:

1. **Geographic identifiers such as zip codes do not always align with Tribal communities.** Large portions of Indian Country, including many areas of Alaska, do not have zip codes. In other cases, Tribal communities span multiple zip codes, and a single zip code may include multiple Tribal Nations, a mix of Tribal and non-Tribal lands, or communities with both Tribal and non-Tribal residents.
2. **Geography alone may not accurately identify Tribal populations or communities.** Not all Tribal Nations have reservations or Tribal lands, and Tribal citizens may live on or off Tribal lands regardless of whether their Tribe maintains a reservation or other Tribal land base.
3. **Tribal affiliation, citizenship, residency, and community membership are not always interchangeable concepts, and approaches to defining Tribal populations vary across Tribal Nations.** Depending on the context, a Tribal Nation may include enrolled citizens regardless of residence (particularly when substantial portions of the Tribal population live in urban areas or away from Tribal lands); individuals affiliated with multiple Tribes or other cultural or community identities (such as Alaska Native regional or village corporations); citizens of one Tribe residing on another Tribe's lands; or non-citizens—including spouses, descendants, Tribal health care beneficiaries, or other AI/AN community members—who maintain meaningful connections to the community or receive Tribal services.

A common thread in this dialogue is the notion that Tribes should retain authority over decisions regarding how data about their citizens, communities, lands, and resources are collected, accessed, interpreted, shared, and used. Participants and experts emphasized that these goals may be advanced through formal data-sharing partnerships, memoranda of understanding, collaborative governance structures, and other approaches designed to improve coordination and access. Regardless of the modality, Tribal, state, and federal entities cited transparency and equal partnership as key to successful data sharing and access.

Many participants commented that historical relationships have not always supported equitable participation, transparency, or shared decision making in data access and governance.

"Because states govern most public health data systems, states become the de facto arbiters of access to public health data. Tribes often find themselves at the mercy of individual relationships between the Tribe and state government officials."

Tribal data leader

Gap: Burdensome data-sharing processes and fragmented systems limit Tribal access to data.

Structured conversation participants, including federal employees and those who work with both Tribal and federal data, described federal data access as increasingly difficult, delayed, and bureaucratically complex. They gave several specific examples of burdensome data-sharing and access agreements, including (1) delays caused by government shutdowns, (2) expired data-use agreements (delaying access for months), (3) suspension or disruption of federal data request pathways, (4) requirements to negotiate separate agreements with multiple states, and (5) difficulty navigating fragmented federal systems.

These circumstances can preclude Tribes from accessing their own data all together. For example, Tribal Nations often face barriers to accessing personally identifiable data about their citizens because privacy protections and data-sharing restrictions limit access to information held by federal, state, and local governments (Brookings Metro 2025). Tribal leaders and those who work with Tribal health data also described a "hide-and-seek" environment where data access depends on agency relationships and interpretations of law, which results in limited data-sharing mechanisms.

Participants also discussed the federal application process for accessing confidential microdata, which requires applicants (such as Tribal governments) to apply for access on a project-by-project basis. This is not only a time-intensive process, but it leaves open the possibility that Tribal officials may be denied access to data (Brookings Metro 2025).

Gap: Existing governance and intergovernmental data-sharing frameworks do not consistently recognize or support Tribal authority

Participants discussed a major contributing factor that creates barriers in data sharing and access: Tribes are frequently not recognized as public health authorities by state and federal public health data systems. As sovereign governments, Tribal Nations possess inherent public health authority to protect and promote the health and well-being of their citizens and communities. Some Tribes may choose to have the regionally designated TEC perform public health authority functions or support public health data activities. Despite these legal designations, the ownership, use, and application by Tribes of their own data are routinely compromised by both federal and state agencies. Participants observed that these restrictions may conflict with principles of Indigenous Data Sovereignty, which emphasize Tribal authority over data related to Tribal citizens, communities, lands, and resources.

"When we first began and we started asking external partners or sources for data … we were told no, that we couldn't have access to our own data. And so that's where those [data sharing] agreements come into play. Do you have to sit down and have conversations and have meaningful conversations with these external partners? Absolutely. Because not everyone understands our authority as a public health authority."

Tribal data expert

Participants also described challenges obtaining data held by state and local governments, including information maintained by utilities, water agencies, land use regulators, educational institutions, and school districts (Brookings Metro 2025). Limited communication between Tribes and other governments sometimes mean that Tribes are unaware of relevant data, even if they exist. One participant described this burden: "How do we establish something that's comprehensive between state agencies, local Tribes, Pueblos, and Nations, and others, so that way we as policymakers or as a department of health or others are making informed decisions?" The landscape review corroborated these findings and showed that despite growing interest in collaboration, coordination, governance, and transparent data sharing and mechanisms, these remain ongoing challenges.

F. Workforce capacity and technical expertise

Workforce capacity was identified as a priority for Tribes and Tribal organizations, emphasizing the importance of developing and retaining technical expertise over time. Structured conversation participants noted that while many Tribal communities have talented individuals, sustaining that expertise and institutional knowledge can be challenging. Participants also emphasized that effective capacity building depends on long-term relationships and trusted partnerships rather than one-time technical assistance. One example was how an ongoing partnership with a technical consultant enabled a Tribe to develop its first environmental database while building local expertise and retaining institutional knowledge. This example illustrates the importance of viewing capacity building as a long-term investment in people, relationships, and Tribal data capabilities.

"Tribal leaders recognize the importance of data modernization and are well aware of the issues caused by lack of accurate, complete, and timely data, but need more clarity and training to be able to fully participate and engage in data modernization initiatives. More information and continuous engagement are needed for laying the necessary foundation of trust between Tribes and federal/state public health entities to meaningfully advance public health data modernization for Tribes. We need to give our Tribal leaders and our Tribal communities the opportunity to understand where this is all going. Trust is a very important component to any change, and this is a big change."

Tribal data leader

The landscape analysis also emphasized the need for technical expertise and workforce development at all levels (including Tribal and federal) across varying capacities (data governance, privacy, analytics, internal reporting, increasingly sophisticated data use, system administration, data modernization, legal issues, syndromic surveillance, and electronic case reporting) and via various modalities (training, education, technical assistance and capacity building).

Gap: Staffing, technical expertise, data literacy, and long-term workforce capacity are limited.

Tribal Nations are at different stages of developing and sustaining the workforce, technical expertise, and organizational supports needed to advance their data priorities. The sources reviewed for this study consistently identified a need for sustained investments in staffing, data literacy, technical expertise, and long-term workforce development to support Indigenous Data Governance and evidence building. Many Tribal Nations have already established innovative data governance programs, analytical capabilities, and administrative data systems, while others are in the process of strengthening these systems in ways that reflect their priorities, governance contexts, available resources, and long-term goals. These differences reflect variation in historical investment, funding opportunities, organizational structures, and local priorities rather than differing levels of commitment to Indigenous Data Governance or evidence building.

"In Alaska, [there are] 229 federally recognized tribes with governments, and most of those have like maybe one person on half-time in the office. So you can't even call somebody [...] you need to build the capacity of the people developing and holding this to serve the communities that they're holding the data for. So in a tribal space that will be like actual funding for a data person. And that might [not] be [...] at the tribal level."

Tribal data expert

There remains an opportunity in many contexts to strengthen Tribes' ability to collect their own data. Some Tribes have experienced research partnerships in which universities collected data with limited direct benefit or sustained return to the Tribal Nation or the individuals who participated. The need for resources to support Tribal-led data collection and evidence building presents an opportunity for mutually beneficial partnerships between Tribal Nations and external data experts across the academic, corporate, and government sectors that strengthen Tribal workforce, infrastructure, and long-term data governance.

In the structured conversations, participants described the technical expertise necessary to ensure federal data accurately reflect Tribal populations and can be analyzed in ways to support Tribal priorities, such as grant applications and more sophisticated analyses that yield robust estimates. Additionally, different sources noted that a gap exists in data literacy at all levels of education and could benefit from more training, which could be accomplished using existing resources such as the TECs and continued support for successful initiatives such as the Native American Research Centers for Health.

G. Sustainable funding and reliable infrastructure

Sustainable funding and long-term investment were consistently identified as essential for strengthening Indigenous Data Governance and evidence-building efforts. Ongoing resources are needed for Tribes to develop and maintain the infrastructure, staffing, governance systems, and technology needed to collect, manage, analyze, and use data effectively. Participants emphasized that evidence building is not a one-time activity but an ongoing function that depends on sustained support for data systems, workforce development, training, and data modernization initiatives. Despite funding challenges, many Tribal governments have leveraged available resources to strengthen data governance, develop Tribal data systems, conduct Tribal surveys and assessments, and expand evidence-building activities that support Tribal priorities.

The federal government has trust and treaty responsibilities to Tribal Nations, including funding for data systems and evidence-building activities. However, funding is often distributed through annual appropriations and competitive mechanisms that require Tribes to continually demonstrate need and eligibility. As a result, access to accurate and timely data is critical for determining eligibility for funding opportunities, preparing competitive applications, and advocating for resources. High-quality, relevant data are also essential for Tribal governments, which typically do not have a tax base like other levels of government. As such, grant-based funding accounts for a large portion of Tribal governments' budgets (Brookings Metro 2025). The current funding environment, therefore, creates a strong interdependence between data access, evidence building, and resource acquisition.

Reliable broadband, secure technology infrastructure, modern information systems, and long-term operational support are foundational to Tribal participation in modern data ecosystems, including an NSDS. However, Tribes have long been excluded from national initiatives to build and strengthen data infrastructure. Disparities in national investment and chronic underfunding of Tribal data infrastructure mean that many Tribes are not sufficiently well positioned to take advantage of new opportunities for data modernization and may not have the means to meaningfully participate in new efforts like an NSDS. Many Tribes are also working with aged infrastructure plus outdated equipment and systems.

> "The average age of our facility is now 41 years old. That's alarming, especially when we're trying to recruit new talent to the agency. Imagine yourself having two offers, one at a 40-year-old building with archaic infrastructure and systems versus a robust new facility with new technology that you were just trained on. I don't think it's that difficult to determine which one you would choose."
>
> Tribal data leader

Considerations to improve infrastructure are further complicated by land issues, rights-of-way, and whether a Tribe is willing to dig, excavate, and pipe in services. In large states with multiple communities spread across rural areas such as California and Alaska, the cost of creating access to broadband may be prohibitive. One health administrator noted that they are struggling to run their electronic health record,

given charges of $18,000 a month for a 6-megabit circuit. A Tribal Chief stated that some rural areas in Alaska do not even have electronic health records because they do not have access to broadband at all.

Gap: Funding is often short term, fragmented, and misaligned with Tribal priorities and timelines.

The sources reviewed consistently identified a persistent gap in sustained, reliable funding to support Indigenous Data Governance, infrastructure, workforce development, and evidence-building activities over the long term. Instead, funding was frequently described as insufficient, fragmented, and often misaligned with Tribal priorities, while chronic underfunding, limited Tribal set-asides, and reliance on competitive grant programs were cited as barriers to developing the capabilities needed to support Tribal data sovereignty and evidence-based decision making.

Access to funding is often closely tied to the quality and availability of federal data, creating additional challenges when existing data sets are incomplete, inaccurate, outdated, or otherwise fail to reflect Tribal communities. Federal funding formulas and eligibility requirements frequently rely on census and administrative data that may undercount Tribal populations, fail to accurately represent community conditions, or overlook important aspects of Tribal economies and governance (Brookings Metro 2025). Participants described instances in which Tribes were excluded from funding opportunities because necessary data were unavailable, while others noted that outdated or misleading economic indicators could make Tribes appear less eligible for needs-based assistance despite ongoing community needs.

Participants further emphasized that federal funding mechanisms often require Tribes to navigate multiple reporting systems and extensive administrative requirements, frequently relying on external data about their own citizens because no federal statistical standard governs Tribal population data across agencies (Rodriguez-Lonebear 2016). These requirements were described as duplicative and burdensome, diverting limited staff capacity toward compliance rather than Tribal priorities and evidence building for Tribal governance.

> "Given the destruction of traditional tribal economies in the aftermath of colonization … federal monies sustain vital tribal services on reservation lands, such as health care, education and housing. The reality is that contemporary tribal governments endure varying stages of federal dependency, including data dependency."
>
> Rodriguez-Lonebear (2016, p. 258)

Other structural barriers—including short funding cycles, "complex application processes, matching fund requirements, and jurisdictional barriers" that may conflict with Tribal sovereignty—further limit long-term investments in Tribal data systems and infrastructure (Satterfield 2025, p. 10). One webinar speaker described federal grant cycles as the biggest challenge for capacity building, stating that because much of federal funding operates in two- to three-year cycles, that short-term output often means Tribes end up holding infrastructure they cannot sustain long term. These findings suggest that strengthening sustainable Tribal evidence building requires not only improved data systems but also long-term, flexible funding approaches that align with Tribal priorities, reduce administrative burdens, and support the development of lasting Tribal capacity and self-determination.

Gap: Broadband limitations, outdated systems, cybersecurity concerns, and weak interoperability constrain effective data use.

Historical exclusion of Tribes from the development of data collection systems and infrastructure has resulted in fragmented systems that limit data integration, exchange, and evidence building. As one webinar participant noted, Tribal programs often must rely on "multiple systems instead of one central system." Participants also described how data systems developed without Tribal input often fail to include all the information that Tribes need, limiting its scope and applicability for other purposes, such as applying for grants. These findings underscore the importance of engaging Tribes early in the design of data systems to ensure they reflect Tribal priorities and support flexible, long-term use.

Participants also identified inadequate digital infrastructure as a major barrier to Tribal data capacity. Tribal leaders and administrators described limited broadband availability, outdated technology, weak interoperability, cybersecurity challenges, and dependence on commercial internet providers. The *2025 Tribal Digital Sovereignty Guidebook* emphasizes that effective Indigenous Data Governance requires reliable broadband, Tribal governance frameworks for data privacy and cybersecurity, and infrastructure that supports emerging technologies such as AI (Satterfield 2025).

Infrastructure challenges are compounded by jurisdictional and geographic complexities. Overlapping local, state, and federal authorities often hinder planning and implementation, while the rural locations, difficult terrain, and multiple land ownership types increase construction costs and administrative complexity (Satterfield 2025). As a result, 23 percent of people living on Tribal lands still lack access to high-speed internet, compared to just 7 percent of the overall U.S. population (Satterfield 2025). Several participants said that significant investment in infrastructure development, increasing access to broadband, and training to build staff expertise are mandatory before many Tribes can even consider participation in an NSDS. Similarly, a paper on Indigenous Data Sovereignty suggested the Census Bureau invest in Tribal data infrastructure instead of collecting self-identified Tribal counts (Rodriguez-Lonebear 2016).

V. Discussion

A. Summary of key findings for state, local, and territorial governments

The findings from this study suggest that state, local, and territorial governments would benefit from an NSDS that helps users move from a practical policy question to data that can be found, understood, accessed, linked, protected, and used responsibly. These needs align closely with core NSDS functions, including discovery and navigation, data linkage, secure access, capacity-building resources, and human support for users navigating complex data environments.

Across the state, local, and territorial findings, the main gaps were not only technical. Fragmented systems, weak documentation, inconsistent standards, unclear governance, legal uncertainty, privacy and security requirements, administrative burden, and limited staff capacity can reinforce one another. Together, these barriers can make it difficult for governments to use data across agencies, programs, sectors, and levels of government, particularly for smaller local governments and other lower-capacity jurisdictions.

Territorial findings should be interpreted cautiously because territorial perspectives were less represented in the available materials than state and local perspectives. Available territorial resources suggest that territories may share many state and local data-related challenges while also facing distinct issues, including inconsistent inclusion in federal statistical products, limited clarity about the reasons for data gaps or exclusions, and the limited fit of state-oriented models. These findings suggest that territorial needs for capacity building should be validated through targeted engagement and that NSDS supports may need to be adapted to territorial legal, administrative, infrastructure, and federal data contexts.

B. Summary of key findings for Tribal governments

Tribal findings require separate interpretation because Tribal governments are sovereign Nations and Tribal data needs are closely connected to Tribal sovereignty, self-determination, Indigenous Data Governance, federal trust and treaty responsibilities, and government-to-government relationships. The data gathered for this report illustrate that many barriers were rooted in governance and relationships rather than technology alone. Tribes described challenges related to inconsistent recognition of Tribal authority, historical misuse of Tribal data, limited access to high-quality and representative data, fragmented federal and state systems, burdensome data-sharing processes, workforce and infrastructure constraints, and funding structures that do not always align with Tribal priorities or timelines. Findings also emphasized that data can be misinterpreted or misused when Tribal context, governance requirements, and community priorities are not incorporated into data systems and decision-making processes.

These findings suggest that NSDS planning involving Tribal data or Tribal participation should treat Tribal sovereignty and Indigenous Data Governance as foundational design principles rather than ad hoc implementation considerations. They also suggest that successful Tribal participation will require ongoing government-to-government consultation, relationship building, transparency, and mechanisms that support Tribal governance, stewardship, and decision-making authority throughout the data life cycle. In addition, findings indicate that an NSDS should account for substantial variation across Tribal Nations and

support Tribal access to data, capacity-building resources, contextual information, and coordination mechanisms that respect Tribal sovereignty and governance requirements.

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Acknowledgements, disclosures, and citation

Acknowledgements

We extend our sincere thanks to all the government data leaders and experts who took the time to share their perspectives on data access, use, and capacity building for an NSDS through participating in structured conversations or attending our hosted webinars. We also thank our partners at NCSES, Carlos Restrepo and Heather Madray, for their guidance and support.

We are deeply grateful to the members of our two expert panels (state, local, and territorial—Milda Aksamitauskas, Mary Craigle, Anna Hui, Jeff Lambart, Rizalina Liwag, Christin Lotz, David Park, James Smith, Kate Tromble—as well as Tribal—Tanner Amdul-Clark, Deana Around-Him, Lannesse Baker, Gary Burnette, Garet Couch, Leonard Forsman, Heather Sauyaq Jean Gordon, Jessica Imotichey, Lydia Jennings, Traci Morris, Vanessa Palmer, Ahniwake Rose, Stephanie Russo-Carroll, Bobby Saunkeah, Desi Small-Rodriguez, Victoria Warren-Mears) for their invaluable insight. Additionally, we extend our sincere thanks to our organizational partners: Abby Davidson, Teryn Zmuda, Isabella Reed, and John Matelski at the National Association of Counties; Casandra Hockenberry at the Council of State Governments; Christine Baker-Smith and Lindsay Rapkin at the National League of Cities; Kate Tromble at the Data Quality Campaign; Amanda Winters and Portia Polk at the National Governors Association; Rochelle Ruffer and Carrie Field at the National Indian Health Board; Melly E. Wilson at the Pacific Resources for Education and Learning; and Yvette Roubideaux at the Colorado School of Public Health and National Congress of American Indians.

We also thank all members of the Mathematica team who contributed to this project: Lauren Amos, Lama Hassoun Ayoub, Sheldon Bond, Jennifer Brown, Timothy Bruursema, Steve Lipscomb, Allison Pinckney, Debbie Reed, and Josh M. Stewart.

Disclosures

This report was prepared for the Advanced Technology International (ATI) for the National Secure Data Service Demonstration within the National Center for Science and Engineering Statistics (NCSES) under American Data Consortium (ADC) Base Agreement No. 2023-638. The views expressed are those of the authors and should not be attributed to ATI, ADC, NCSES, the U.S. National Science Foundation, expert panel members, or partners, nor does mention of trade names, commercial products, or organizations imply endorsement of same by the U.S. government, expert panel members, or partners.

Citation

Milless, Katlyn Lee, Diana Gates (Čiruʔęhá·ka·ʔ), Kamillah Smith, Raquel Whitt, Kathleen Feeney, Lauren Tingey, Stephen Wyatt, Jeannie Le, and Samina Sattar. 2026. *Building Capacity for a National Secure Data Service: Needs, Gaps, and Considerations for State, Local, Territorial, and Tribal Governments*. Alexandria, VA: U.S. National Center for Science and Engineering Statistics, U.S. National Science Foundation.

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