



RHODE ISLAND DATA GOVERNANCE PROGRAM PLAN

Rhode Island Longitudinal Data System Executive Board

November 1, 2023



Rhode Island Data Governance Program Plan

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Executive Summary

Connecting data across state programs is extremely important for effective management and improving outcomes. Most program clients and issues span multiple programs. It is impossible to understand the effects of these programs without seeing the entire picture. By allowing the data to exist in its current siloed state, the State of Rhode Island is losing out on critical insights about the people and issues in the State.

In June 2023, the Rhode Island Longitudinal Data Systems Act became law, relocating the Rhode Island Longitudinal Data System (RILDS) from the University of Rhode Island (URI) to the Office of the Postsecondary Commissioner (OPC). This legislation also established a governing board for RILDS, comprised of representatives from various state agencies. An overarching goal of the Act is to support state-directed policy research by leveraging integrated data, and this report reflects the Rhode Island Longitudinal Data System Governing Board's (Board) plan to meet this goal.

Currently, over 40 U.S. state governments utilize at least one Integrated Data System (IDS) for program evaluation. Several state agencies, such as the Office of the Postsecondary Commissioner and the Executive Office of Health and Human Services, already have an IDS and an accompanying governing body that directs how data is utilized; however, due to a lack of technological infrastructure, legal expertise, staff capacity, and coordinated governance, much of the data remains siloed, limiting the amount of collaboration, research, and analysis that can be achieved. The plan recognizes the need to keep existing IDS data standards, governance, and maintenance in place even as the state pursues greater data sharing capabilities.

The Board's plan proposes to address these challenges by establishing 1) a governing body that supports all state agency IDSs and data efforts, allowing for greater coordination and approval of data sharing, and 2) the technological infrastructure, in the form of a federated data platform, that enables agencies to reliably share data sets. The plan also contemplates additional training, security protocols, funding stream and staffing models, and transparency measures that should accompany the governance and infrastructure built over the next two years.

The world continues to increasingly rely on data, not only to drive decision-making but to enhance operations and realize better outcomes. This plan recognizes that reality and proposes steps state government should take to ensure that the state is at the forefront of these best practices. Harnessing the ability to integrate and share data across government will advance the state's ability to evaluate its resources and their effects on Rhode Islanders, better positioning government leaders and communities alike to understand and improve policies and programs.

Summary of Recommendations:

As required by law, this report provides an overview of the existing data systems and offers a plan for establishing a statewide integrated data system. The following is a summary of the Board's recommendations to preserve existing IDS infrastructure within state agencies while building out a statewide Rhode Island Data Governance Program (Program) and to create a federated system of connection:

1. Connect Existing and Future IDSs via a Federated System - Existing IDSs and other data efforts should preserve their independent missions and operations and maintain current staffing, independent governance, and data ownership. This structure will allow these IDSs to continue to serve their constituencies without disruption. In addition, data-owning agencies must retain control over their data use, including participation in the statewide data governance, and approve data access and any publication of findings derived from the data's use. This ownership is required to ensure required legal oversight. At the same time, there is much additional value that can be added by linking these efforts that benefits all participating programs.

The major existing IDSs should be connected via a federated data system model. A federated model allows for pre-existing IDSs to retain their current data infrastructure but enables agencies to potentially match or combine data set in a central plane. The model also bolsters data security; allows for the establishment of data standards; reduces duplication of data; and facilitates secure sharing of data among existing IDSs, other data systems, and researchers. This process requires commitment from all parties to continue to maintain robust data privacy and integrity standards to assure compliance with federal and state data privacy laws.

All Rhode Island agencies will be invited to participate in the Program, and other separate data systems should be encouraged to contribute to the data system. This will help create new possibilities for policy research, build additional data standards across the state, and establish a data transfer and linkage process.

2. Utilize Existing IDS Governance –To be successful, all parties contributing to the Program must be involved in its design, construction, and operation. The proposed governance structure for the Program will utilize the existing governance structures of the Rhode Island Longitudinal Data System (RILDS) and Executive Office of Health and Human Services Data (EOHHS) Ecosystem, which follow best practices outlined by the Actionable Intelligence for Social Policy (AISP). The governance structure would include an Executive Committee, a Governance Committee, and a Data Stewards Working Group, in line with the schema enacted in the Rhode Island Longitudinal Data System Act.

The Executive Committee would act as the decision-making body for the Program, prioritizing research topics, developing policies, and approving data requests that span multiple IDSs. RILDS and the EOHHS Ecosystem have proposed merging executive-level governance bodies to identify shared priorities and establish policies; the merged entity could govern the Program. The Executive Committee shall include executive leadership of any contributing agencies, and agencies should formalize their participation through standardized agreements (such as Memorandums of Understanding).

The Governance Committee(s) would include agency representatives involved in a given IDS, each of whom would have with decision-making authority over data use and release for their agency’s contributed data. RILDS and EOHHS Ecosystem propose having their own committees to govern data requests. Additional representatives should be added for any contributing agencies to the Program.

The last governing body would be the Data Stewards Working Group that contains technical representatives, as necessary, that are responsible for metadata, data quality, and the data products ownership. This body would remain separate from the existing RILDS and EOHHS Data Stewards Working Groups. Together these groups provide a robust governance structure that can handle high level prioritization down to data usage and quality.

3. Build a Data Center of Excellence – For the Program to not only be built but to be successfully maintained, it requires dedicated staff resources. The board proposes to create a Data Center of Excellence led by a newly proposed Chief Data Officer (CDO) and staffed by

data analysts and a dedicated legal counsel, given the complexity of federal and state data and privacy laws, to:

- a. assist in the development of governance and policy recommendations through statewide collaboration and coordination;
- b. support the general operations, configuration, policy enforcement, and maintenance of the federated data catalog and supporting technology;
- c. ready the State's data for AI adoption opportunities; and
- d. author Executive Branch policies for the use, access, classification, storage, transmittal, retention, and destruction of data.

The initial location for the Data Center of Excellence team is the Department of Administration's (DOA's) Enterprise Technology Strategy and Services (ETSS). ETSS's data engineering and analytics team will assist all participating data systems in executing the technology and computational framework for the federated IDS and DOA's Data Center of Excellence, with the opportunity to reconsider placement once operations are underway. Other agency staff members are invited to participate in the day-to-day operations of the team.

4. Develop a Sustainable Funding Model –The creation of a sustainable funding model is necessary for the long-term development, maintenance, and usefulness of the Program. To implement the core components, including the federated technological infrastructure, the Board proposes utilizing Information Technology Restricted Receipt funds; initial implementation costs, including staffing, are expected to approach \$2 million. After successful implementation, the state could utilize internal service funds to cover ongoing costs – salaries/benefits and systems maintenance and operations – eventually exploring opportunities to employ cost-recovery models, such as external user fees, or state appropriations.

5. Implement Robust Privacy and Security Policies - Enacting stringent privacy and security protocols is necessary to ensure the safe operation of the Program. These protocols must include statewide IDS data encryption and masking, secure authentication mechanisms, and regular security testing. This includes proper adherence with the Health Insurance Portability and Accountability Act (HIPAA), the Family Educational Rights and Privacy Act (FERPA), federal

Protection of Human Subjects regulations, and any/all other privacy laws and regulations that govern governmental data. The State Chief Information Security Officer (CISO) will provide guidance and collaborate with the Data Center of Excellence and the Chief Data Officer to ensure that policies are developed and issued in accordance with existing State and Federal policy and regulations and that technology and cybersecurity investments are recommended to support the enforcement and effectiveness of those policies.

6. Prioritize Public Transparency – Improvements to data integration need to be coupled with improvements to data accessibility. The Board recognizes the need to make better data available to the community and regularly publish data online, such as on the [State of Rhode Island Transparency Portal](#). The Board plans to weave accessibility into both its federated approach and its Executive Governance model, with a focus on increasing the availability of dashboards, visualizations, plain language summaries, and associated public data catalogs of reports conducted. The participating IDSs will continue to publish reports for their users, further enhanced by participation in the programs. <http://www.transparency.ri.gov/>

7. Timeline for Implementation – The Board expects that the above-mentioned recommendations could be implemented in one to two years. The Governance changes could occur relatively swiftly – within six months. From its inception, the Executive Committee could begin to set research priorities, develop a statewide research plan, and begin to approve inter-IDS-reliant projects six months after that (within a year, cumulatively). The Board expects that designing and implementing a federated technology solution could take up to two years, with staff brought on as soon as possible. The Board expects to refine this plan as it accumulates more information throughout the implementation process.

Background, Legislative History and Overview

In June 2023, the Rhode Island Longitudinal Data Systems Act (R.I. Gen Law Chapter 42-165) was signed into law by Governor Dan McKee. The Act officially established the Rhode Island Longitudinal Data System (RILDS) within Office of the Postsecondary Commissioner (OPC) and appointed a governing board composed of the Director of the Department of Administration (DOA), the Director of the Office of Management and Budget (OMB), the Chief Digital Officer, the Commissioner of Department of Education (RIDE), the Director of Labor and Training (DLT), the Secretary of the Executive Office of Health and Human Services (EOHHS), the Commissioner of Postsecondary Education (OPC), and the Executive Director of the RILDS Center. The Act also allocated funding for 3.0 new full-time equivalent (FTE) positions at RILDS using general revenue, with the purpose of assisting in state-directed policy research.

With this Act, the legislature affirmed its commitment to integrating data usage across agencies, enhancing program efficiency, and curtailing fraud, waste, and mismanagement. It also promotes evaluative practices and strengthens transparency. Enhanced information sharing not only paves the way for evidence-based policy but also facilitates data-informed decision making.

The RILDS Act additionally mandated the issuance of a report detailing how the state would establish an enterprise-wide Integrated Data System (IDS). This report must be submitted to the Governor, House, and Senate by November 1, 2023. The report must contain the plan requirements established within the Act, which include the following elements:

1. The role an IDS can play in improving the operation of programs; reducing fraud, waste, and abuse, and establishing a state culture of program evaluation.
2. Providing state agencies with evaluation services and granting state analysts access to data based on their role.
3. Providing researchers with access to state data.
4. The importance of data privacy and security.
5. The importance of public transparency and the role of the state transparency portal.
6. Creation of a state chief data officer.

7. Sustainable funding and governance for the IDS.
8. The role of data federation.
9. The timeline for implementing the IDS.

The information in this report was compiled through a variety of modalities, including consultation with national experts, contributions from experts throughout Rhode Island state government, and conducting in-depth research. One of the primary outside experts consulted was the Actionable Intelligence for Social Policy (AISP) at the University of Pennsylvania; AISP has assisted Rhode Island and other states with establishing and operating integrated data systems in the past. Throughout the report's creation, agency representatives and management offered information and feedback. Additionally, the Office of Management and Budget undertook a survey of current statewide IDSs throughout the United States and delved into other research materials, including academic publications.

What is an IDS?

An Integrated Data System (IDS) consolidates, links, and integrates data from various sources and agencies, enhancing analysis and information sharing in a variety of areas such as education, healthcare, social services, and criminal justice on the individual level. An IDS encompasses both the technical components and the programmatic relationship framework essential for its operation, which includes policies and governance structures. The primary purpose of an IDS is to serve as a data hub that optimizes data storage, analysis, and ultimately, decision-making.¹ Stakeholders engaged with an IDS span from executive leaders and agency analysts to academic researchers and other external users.

An IDS can play a pivotal role in aiding data analysis in government, especially in policy evaluation. It provides data analysts with prompt and secure access to accurate data, empowering them to guide and enhance governmental operations. Through this system, authorized users can derive significant insights into subject matter at the population level by leveraging the interconnected data. An IDS prioritizes ensuring the accuracy and integrity of

¹ Fantuzzo, John, and Dennis P Culhane. *Actionable Intelligence: Using Integrated Data Systems to Achieve a More Effective, Efficient, and Ethical Government*. Palgrave Macmillan, 14 Jan. 2014.

data while preserving the confidentiality of individual identities.² Such linkages can be established at the system level before anonymizing the data for research purposes.

As integrated data systems integrate program-level data across state agencies, policymakers can obtain a holistic, longitudinal understanding of anonymized individuals, families, and communities. The types and topics contributed by agencies to an IDS form a robust foundation for cross-agency policy research. Instead of seeking disaggregated and unrelated datasets from individual agencies, policymakers and analysts can harness the interconnected data that an IDS provides to enhance efficiency and ensure accurate correlations between agencies' data. Using data from an IDS for evaluation studies can decrease research time, costs, and human errors that arise from manual data collection, data cleaning, and interpretation.

An IDS mitigates concerns and tensions among various stakeholders regarding data quality and access. By centralizing various agency data within an IDS, standardized practices are established, and observations are matched using a uniform style. This streamlines government operations, as agencies and researchers using the data need only utilize a single consistent system.

Another advantage is that the technical and personnel requirements can be structured to prevent duplicated efforts. While each agency may retain its governance structures, an IDS team can act as an intermediary between all the various agencies and stakeholders, synthesizing and analyzing the data for the benefit of any appropriate agency or researcher.

The presence of such a system also underscores the state's dedication to fostering a culture of data-driven program evaluation. Rhode Island initiated this culture with the development of several distinct IDSs and datasets, which individually have proven highly effective in generating reports and other analyses. By linking these independent systems, new research avenues will emerge, augmenting the efficacy of the existing systems and building upon prior analyses.

² Fantuzzo, John, and Dennis P Culhane. *Actionable Intelligence: Using Integrated Data Systems to Achieve a More Effective, Efficient, and Ethical Government*. Palgrave Macmillan, 14 Jan. 2014.

Over forty states have at least one IDS, and often multiple IDSs, to assist with data-driven policymaking for government operations.³ Over the last decade, state governments have allocated greater resources to integrated data systems to conduct data-driven policy decisions, influenced by increased funding for these initiatives, the rising prominence of data in society, and technological advancements. States such as Indiana, Ohio, and South Carolina have been at the forefront of the development of these systems. The systems in these states have been used to accomplish a wide variety of program improvements including:

- Ohio saved over \$7 million by eliminating duplicative vendor payments;
- South Carolina streamlined childcare center health and safety evaluations into one platform; and
- Indiana created a centralized hub to help address the opioid crisis, map naloxone and prescription drug distribution and use, and provide details on county-level recovery and treatment services.

For additional information on other states' IDS systems, see Appendix A.

Current State of Integrated Data Systems in Rhode Island

Currently, Rhode Island State Government employs a multitude of integrated data systems. The four largest such data environments are the RILDS, EOHHS's Ecosystem, the Office of Internal Audit (OIA) Fraud Detection System, and the Rhode Island Geographic Information System (RIGIS). This section offers a general overview of each system and outlines the current policies and practices related to:

- Improving program operations while reducing fraud, waste, and abuse
- Data sharing
- Data privacy and security
- Public transparency

Hundreds of datasets have been identified that could potentially be incorporated into a shared analytical platform. Presently, much of the information about Rhode Islanders already

³ "Statewide Longitudinal Data Systems 2021." *Education Commission of the States*, Dec. 2021, reports.ecs.org/comparisons/statewide-longitudinal-data-systems-2021.

exist in separate systems across the state. Without connecting the information together, it is extremely difficult, if not impossible, to conduct certain research projects or perform sufficient analysis that can assist government operations and policy development. IDs allow for these projects to be conducted to achieve a more holistic view of certain programs and policies in Rhode Island, so that improvements can be made. With the siloed state that the IDs currently operate in, the State of Rhode Island is losing out on critical insights about the people and issues in the State.

Rhode Island Longitudinal Data System (RILDS)

Rhode Island initiated the development of its statewide longitudinal data system in 2009. Leveraging funding from the U.S. Department of Education’s Safe and Drug-Free Schools grant and Statewide Longitudinal Data System (SLDS) grant, the state committed to creating an integrated, longitudinal data system hosted and managed by ProvPlan from 2009 to 2017 under the names “Information Group” and “DataSpark.” In February 2017, DataSpark was relocated to the University of Rhode Island (URI) and operated as part of the university library system until June 2023. The purpose of the system is to “to support research aligned with the state’s priorities, inform policymaking and program evaluation, and improve the well-being of all Rhode Islanders.” RILDS’ analysis, evaluation, research, and reporting play a crucial role in reducing waste, fraud, and abuse by providing a rigorous, systematic, and evidence-based assessment of the effectiveness, efficiency, and integrity of state programs.

Data included in the system comes from a variety of state agencies, including Department of Business Regulation (DBR), Department of Children, Youth, and Families (DCYF), DLT, Division of Motor Vehicles (DMV), Department of Corrections (DOC), OPC, RIDE, Department of Health (RIDOH), and the Secretary of State (RI SOS). The system connects three decades of previously siloed education, employment, and health data using a custom-built machine learning algorithm to ensure accurate person-level and family-level matches. Today, RILDS is designed to integrate and link data across sectors and over time to support research aligned with the state’s priorities, inform policymaking and program evaluation, and improve the well-being of all Rhode Islanders. Under R.I. Gen. Laws Chapter 42-165, the RILDS is legislatively established as Rhode Island’s repository for longitudinal, interagency linked data, with the responsibility to report on inequities in access, opportunities, and outcomes. For additional information on RILDS, see Appendix B.

Executive Office of Health and Human Services Data Ecosystem (Ecosystem)

The Rhode Island EOHHS Data Ecosystem (The Ecosystem) was established in 2017. It is an integrated data system that links data at the person and family level across state agencies with the goal of improving the overall well-being of all persons. Through the use of integrated data, researchers can provide information that helps identify gaps in services; an understanding of individuals as a whole, as well as program evaluations across state agencies to help improve services. Data is carefully governed and access to de-identified data is given to those approved for specific projects. Since the Ecosystem's development, multiple projects have been completed that address fraud waste and abuse. Examples include: the Early Childhood Care and Education (ECCE) Scorecard, the Medicaid Program Integrity Dashboard, and the Consent Decree Power BI Dashboard.

The EOHHS Data Ecosystem contains data relating to: Rhode Island Medicaid claims, encounters, and enrollment; Department of Human Services (DHS) programs including Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Comprehensive Community Action Program (CCAP), and Supplemental Security Income (SSI); wages, income insurance, and job training data from the Department of Labor and Training; child screening, immunization, and outreach program referral data from the Rhode Island Department of Health; birth and death records; housing insecurity and homelessness data; COVID testing, case, and vaccine information; developmental disabilities case management data from the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities, and Hospitals; Rhode Island Courts data; Rhode Island Department of Corrections commitment and release data; medical and pharmacy claims and enrollment data from the Rhode Island All Payer Claims Database (HealthFacts RI). For additional information on the Ecosystem, see Appendix C.

Office of Internal Audit Fraud Detection System

The Office of Internal Audit (OIA) was created through a merger of the Bureau of Audits and the Department of Human Services (DHS) Fraud Unit during the 2016 Legislative Session. OIA is charged with ensuring the integrity of DHS programs through the identification and investigation of fraud. Beginning in Fiscal Year 2017, OIA incorporated data analysis into

target identification and investigative process forming the Fraud Detection and Prevention system. The OIA fraud investigations team uses data related to wages, taxes, benefits (Medicaid, SNAP, etc.), deaths, incarceration, unemployment, Rhode Island Financial Accounting Network System (RIFANS) transactions, and state payroll to identify detect anomalies that could indicate individual instances of fraud. For additional information on the OIA Fraud Detection System, see Appendix D.

Rhode Island Geographic Information System

RIGIS is a statewide consortium of public, private, and academic organizations that jointly support a common statewide geographic information system repository and have the goal of furthering the knowledge and use of GIS in Rhode Island. The State of Rhode Island has operated a GIS mapping system since 1985. In 1990, state law was changed to consolidate GIS information into DOA and tasked Statewide Planning with ensuring its continuity and maintenance.

RIGIS has over 200 publicly available, geographically-referenced datasets, which are all available to the public on their website. The geospatial data provided allows end users to visually represent findings, which can, in turn, enhance their own program operations. For additional information on RIGIS, see Appendix E.

Future IDS Creation, Responsibilities & Decision Points

Database Structure & IDS Creation

Creating an IDS system in Rhode Island that assists agencies with implementing a successful Rhode Island Data Governance Program (Program) requires overcoming the existing siloed data structures and building pathways, so that the data can be synthesized in a manner that balances the various considerations necessary to building an IDS. These considerations can include ensuring data privacy and security, maintaining ease of access and useability, and maximizing data matching and data integrity. Data in an IDS can be organized in one of three ways, **centralized**, **decentralized**, or **federated**, that weigh these competing priorities differently.

A **centralized** system stores all the data in a centralized location, with a team overseeing data management. This approach entails the creation of a data warehouse or data lake for efficient storage and processing. It provides increased efficiency but comes at the cost of losing input and supervision from each respective agency. It also requires robust access controls, encryption, and authentication mechanisms to protect sensitive data stored in the centralized repository due to increased security risks associated with storing all the data in one location.

Supervision of the data is ensured through a robust data governance model, including a data governance board managing policies and procedures, a data stewards group monitoring project work and data usage, a common data dictionary capturing and conveying critical meta data, and a review process to ensure all data products are accurate, consistent with other data products, ensure privacy and convey meaning.

A **decentralized** system allows data to be shared between agencies but lacks a central framework. While this eliminates the need for a centralized IDS team, it raises issues related to privacy and security. Matching individuals across datasets in a decentralized system requires personal identifiers. Consequently, the only way to match individuals across datasets would be to share the full non-anonymized data with others, which has significant implications for security.

The **federated approach** combines elements of both centralized and decentralized systems. The federated approach allows agencies to retain ownership, governance, and daily operations of each data source, while enabling data to be linked with other registered certified data products in a centralized database or portal.

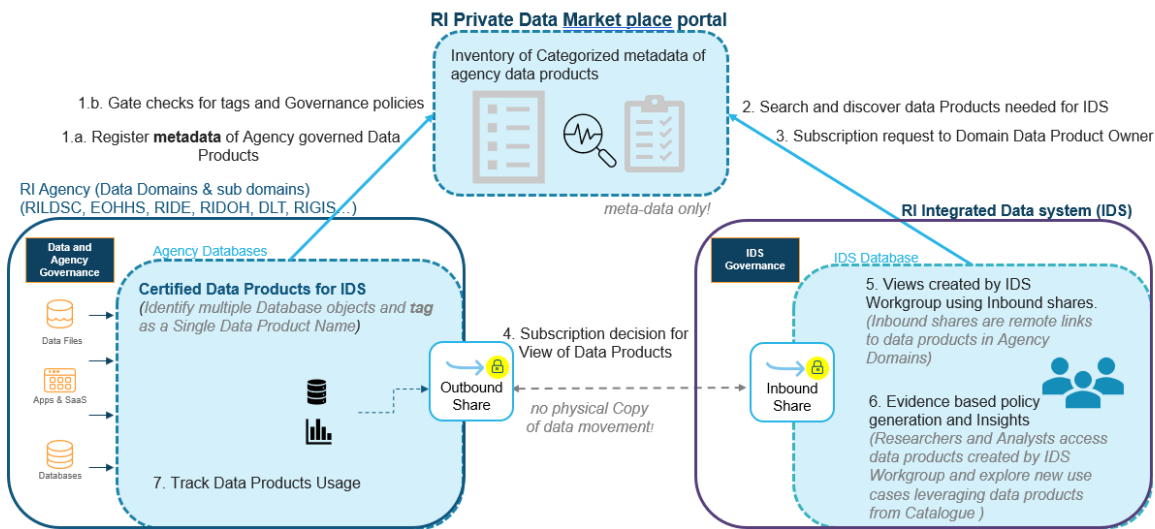
There are significant advantages to using the federated structure. Each agency retains its existing data teams and subject matter experts, while still facilitating multi-disciplinary analysis by linking all datasets. Furthermore, sensitive personal data is stored long-term only within agency systems, ensuring the privacy of Rhode Islanders' data and maintaining robust security. This personal data would only be stored temporarily for data matching by the IDS Team before being anonymized, distributed, and then removed from the system. Another

benefit is that data is readily accessible to other agencies with low latency, as well as tracking the end user’s data products usage, by respective data domain product owners.

However, even the federated data system does not exist without challenges. Outages in source systems can render data unavailable for cross-agency projects, and this structure may require high computational workloads. But of the three structures considered, the federated data approach may be the optimal choice for Rhode Island. This report refers to this approach in the Program.

Additional Considerations for the Federated Data System:

RI Integrated Data System – Framework Design considerations



In a federated system, the actual raw data remains in each respective agency’s domain. Existing IDSs should preserve their independent missions and operations and maintain current staffing, independent governance, and data ownership. All Rhode Island agencies will be invited to participate in the Program. Other separate data systems should be encouraged to contribute to the data system. This will help create new possibilities for policy research, build additional data standards across the state, and establish a data transfer and linkage process. A federated system will bolster data security, allow for the establishment of data

standards, reduce duplication of data, and facilitate secure sharing of data among existing IDSs, other data systems, and researchers.

Metadata of certified data products is registered (gate checks are done for tags and policies) into the portal by agency data product owners. Upon exploration of this metadata, subscription requests are made by Program analysts and researchers. These requests are then vetted by the agency governance process. Agency stewards create a secure outbound share within agency domains, and a read-only copy with an accessible inbound share link is made available in the Program, for actual data. These inbound shared links are used (collated) to conduct matching at the individual or family level with other inbounds share links data. The Program team evaluates use cases for anonymization and any PII needs, and then creates the data views with appropriate data elements needed for end-use cases. These data views are released (tagged with a use case description) for consumption upon approval by the Program's Governance body.

Additionally, a secure and authorized data discoverability portal for the Program should also be implemented. This allows for internal or external users from agencies and researchers to get a view of the metadata of the datasets (data products) available for research and policy making. This can be achieved by registering metadata of certified data products into the central portal by all participating agency data product owners (federated ownership). This includes data products created by participating Rhode Island agencies that are currently cross-matching datasets at person-level, generated from data ingested from other data domains.

Data virtualization should also be implemented, which allows for a read-only access to be shared with data consumers via the Program central portal, while the actual data stays within agency domain. This avoids managing duplicate copies of data sets, reducing staff time and effort, for similar use cases and employing a point-to-point solution. Data query statements (virtual data product) should be shared with data consumers and will have a criterion as a "current user" that enforces that each consumer have unique viewing permissions, even if the same query is shared with multiple data consumers. This approach accelerates the exploration effort by analysts and researchers to identify what datasets are needed for the data integration.

Data provenance is also crucial for providing information to data consumers while on a “self-serve mode” to assess the usability of data products available in a central portal. Agency data products owners will provide the data lineage information and metadata as part of data products being registered into central portal.

The Program will have an interagency data domain to house the integrated data. Selection of data products needed to create an integrated data domain will be from the Program central portal, where it will have the metadata of list of data products from various Agency domains. A robust metadata management system will need to be implemented to catalog and describe data sources, including information on data quality, lineage, and access policies. Tools and techniques for data harmonization will be required to resolve any inconsistencies or variations in data formats, structures, and semantics, depending on agency infrastructure and how the operational datasets are handled currently.

A comprehensive data governance framework should leverage existing agency data governance with additional central policies enforced, covering aspects such as data products ownership, quality, security, and compliance policies to ensure data integrity and trustworthiness. Apart from the agency level data access management, a global-level policy tagging will be enforced to ensure data products published to the Program’s portal adhere to stringent security and privacy protocols. Additional security measures involve Policy Based Access Control (PBAC) on top of the Role Based Access Control (RBAC). A few technological solutions are in consideration to make this additional step easier for Data Product owners to manage and govern their data products via the portal.

Looking forward, the establishment of data policy management standards is necessary to create a secure foundation for data sharing. Thus, the Program team will need to establish an effective tool or techniques to define, author, and manage the large number of data policies. These policies need to be verified with the data producers at the time of creation of data products and certified for consumption by all authorized Data Consumers. At the same time, agencies will retain autonomous governance to make decisions regarding data access and security and enforce automated central data security and privacy policies.

The Program will leverage existing, individual data-matching algorithms developed and refined over many years within RILDS and EOHHS. While in the design phase of the Program, various parameters such as feasibility, effectiveness, and organic transition need to be considered regarding the portability/reusability of such algorithms that already exist and reside in various agencies that are built for specific use cases. Design and development of additional matching algorithm, if needed, will be done in the cross-domain node in data mesh as new data products within the Program.

The technical development of a federated model involves decisions on several critical points. When creating a federated integrated data system, it is recommended to use a relational database model with a data mesh. This model organizes data into tables with predefined relationships between them and is widely used for structured data. Data warehouses or NoSQL databases are also options, each with distinct strengths and weaknesses. Data warehouses are better suited for centralized databases, while NoSQL databases are more suitable for decentralized databases, respectively.

To achieve these requirements and goals, the Enterprise Technology Strategy and Services (ETSS) Division is exploring viable solutions such as Snowflake, Immuta (with Snowflake as the backend), Starburst, AWS DataZone, and Nexla as potential options for Data Mesh based implementation.

- Snowflake features:
 - User-friendly graphical user interface (GUI) for data querying and management
 - Clear cost structure
 - Databases segregated into a warehouse
 - No data copy-sharing in the system
- Immuta (with Snowflake as the backend) features:
 - Easy-to-use GUI for managing Data governance policies
 - Especially useful for handling many roles
- Starburst features:
 - Pre-built data mesh solution
 - Capabilities for data product metadata tagging
 - Federated governance support
 - Ability to publish and subscribe data products

- Nexla features:
 - Ready-to-use data mesh solution
 - Alternative to Starburst
- Informatica:
 - Comprehensive data integration and governance platform
 - Provides end-to-end management of the data ecosystem
 - Data ingestion ETL (Extract Transform and load) and Change data capture from Sources
- Other options for technical systems:
 - Custom development
 - Open-source solutions
 - Alternative Cloud-Based Software as a Service (SaaS) solutions
- Power BI for Reports and Dashboards

Governance Structure

The proposed governance structure for the Program is based on the existing governance structures of the RILDS and EOHHS Ecosystems, which follow AISP recommendations. The governance structure would include an Executive Committee, a Governance Committee, and a Data Stewards Working Group. The task of the Executive Committee would be to prioritize tasks and policies for which the IDS will be used. RILDS and the EOHHS Ecosystem have agreed to merge executive-level governance bodies to identify shared priorities and establish policies. This same merged committee should oversee the newly created statewide IDS. This board shall include top leadership of any contributing agencies.

The Governance Committee would include one representative per agency involved in each IDS, each of whom would have with decision-making authority over data use and release for their agency's contributed data. RILDS and EOHHS Ecosystem propose having their own committees to govern data requests. Additional representatives should be added for any contributing agencies to the Program. All contributing agencies to each data system (RILDS, Ecosystem) would have representation on these subcommittees and final approval over their data usage.

The last governing body would be the Data Stewards Working Group that contains technical representatives, as necessary, that are responsible for metadata, data quality, and the data products ownership. This body would remain separate from the existing RILDS and EOHS Data Stewards Working Groups. Together, these groups provide a robust governance structure that can handle high level prioritization down to data usage and quality.

This structure follows both the direct recommendation from representatives of AISP, as well as follows the best practices identified by the organization. The governance structure supports all three groups outlined on [AISP's guidance page](#): deciders (Executive Committee), recommenders (Governance Committee), and doers (Data Stewards Working Group).

As part of these agencies' commitments to serve as contributing members to the Program, it is the recommendation that standardized agreements, such as Memorandum of Understandings (MOUs), should be issued. Such agreements should allow for the longevity of the Program by providing a more formal, long-term commitment by agencies.

Staffing Models

The State's first step for the staffing of the federated Program would be the creation and hiring of a new Chief Data Officer (CDO) position. This position focuses on developing and implementing a comprehensive data strategy that aligns with the state's goals and objectives. The role would also require the following: remaining current with data innovation and emerging technologies, overseeing data management, spearheading data analysis and insights, implementing robust data security and privacy, facilitating data integration and interoperability, promoting data sharing and open data initiatives, forming data partnerships, conducting data training and awareness, ensuring ethical data usage and responsible AI, and the monitoring of data compliance and auditing.

Assuming a federated data model, additional staff would be required under the CDO to assist with daily and long-term operations of the Program. The initial location for the Program is proposed to be the Department of Administration's (DOA) Enterprise Technology Strategy and Services (ETSS). This location was chosen due to the close working relationship with members of the ETSS data engineering and analytics team to execute the technology and computational framework for the federated IDS and DOA's Data Center of Excellence (COE).

DOA is planning on funding two additional Data Analyst II positions and associated technology to bolster the Data Center of Excellence. Data engineers, analysts, and other data representatives from the statewide IDS's and potential participants will also be invited to participate and support the Data Center of Excellence. In conjunction with RILDS and the Ecosystem Team, regular trainings will be conducted to emphasize data security and integrity procedures. These trainings can include, but are not limited to, topics like HIPAA, 42CFR Part 2, FERPA, and general cybersecurity training related to the IDS. Tabletop exercises could be hosted by the Data COE utilized to assist with training and prevention efforts for the existing IDSs and the new federated IDS.

As a whole, the IDS Team is tasked with the following:

- Assist in the development of governance and policy recommendations through statewide collaboration and coordination.
- Support the general operations, configuration, policy enforcement, and maintenance of the federated data catalog and supporting technology.
- Ready the State's data for AI adoption opportunities.
- Draft Executive Branch policies for the use, access, classification, storage, transmittal, retention, and destruction of data.

Additionally, a legal counsel for the Program should be hired to ensure that each agency remains in compliance with federal and state law and that there is a readily available resource to manage data sharing agreements. This legal counsel will work closely with the legal counsels for RILDS and the EOHHS Ecosystem. This will be an extremely important portion of the Data Center for Excellence as perceived legal barriers are the most common barrier to sharing and matching data to improve policy and operations.

The state must also ensure appropriate communications resources are available to the Program and participating agencies. Initial recommendations are to leverage existing communications team members within various agencies to address the requests and continually evaluate whether there is sustained demand for dedicated communications support within the Data COE.

Furthermore, agencies will still employ existing staff to maintain respective data systems. Agencies will also provide representatives to assist with technical operations and governance. Representatives also provide subject matter expertise to assist in decisions related to data from each specific agency. As agencies maintain ownership of each respective data source, representatives will remain in their current roles and provide assistance with access to data and general governance.

Several other options were considered for the staffing model. One other method is to create a new IDS unit that moves existing agency data stewards to a centralized location. This centralizes the data operations, subject knowledge, and internal policy research in one location. Another option is to have a non-centralized structure, where only a CDO and several staff are responsible for the IDS and other agencies give resources as needed to support the daily and long-term operations of the IDS.

Funding Models and Recommendations

According to AISP at the University of Pennsylvania, well-run IDS systems can yield substantial returns by allowing governments to identify what works, coordinate to decrease duplication, and target resources to maximize impact. However, the costs associated with starting and sustaining an IDS may present a barrier to implementation. Funding, in whole or in part, can come from the following sources:

- **Direct Appropriations or Internal Service Fund Billing:** AISP recommends seeking direct appropriations when constructing and managing such a Program in order to avoid unfunded mandates. Internal proposed state appropriations or billings through internal service funds will be required for sustainment of established operations. This funding will be requested from existing the Information Technology Restricted Receipt Account (ITRR Account).
- **User Fees:** Many Programs charge fees to help cover the costs. This can include charging external researchers and evaluators for access to datasets or custom matching requests. Other systems also charge public agencies who don't participate in the system for using the data or reports in the system (funding from internal service provision). The user fees can serve as a cost-recovery model for some operations.
- **External Support from Foundations or Universities:** AISP found that some efforts utilize external support from foundations and university partners, particularly during the early

phases of their development. Foundation funding is often tied to ad hoc research projects and, while not typically an ongoing source for core IDS operations, can be used to get started, demonstrate proof of concept, and inspire state investment.

- **Federal Funding:** States may also look to federal legislation and grants for opportunities to support cross agency data capacity, particularly when program objectives or evaluation requirements necessitate data sharing and integration.

Applications of the Program: Fraud Detection, Internal Research, External Research

Three general applications of the Program are fraud detection, internal research, and external research. Currently, fraud detection is primarily based around OIA's database, which exists with the goal of fraud detection and prevention for many social programs. This data already currently enhances operations and reduces waste and abuse of these programs. As used in the Program, this data would be read-only. When paired with other data, additional analysis could be made regarding reducing fraud of these programs.

From other states' experience, the largest and primary use of similar Programs is internal policy research. The driving motivation behind the creation of the system is for internal research to assist in making data-driven policy decisions with the goal of enhancing program operations across state government. Rhode Island's existing smaller integrated data systems have previously assisted with this goal, and additional data connections can broaden the spectrum of projects that can be conducted.

This data can be utilized by several types of teams to assist in data evaluation. Internal (in-house) evaluation teams can be established or coordinated, either as a separate unit under the CDO or as a project team consisting of members from various agencies. These teams can assess program effectiveness, identify areas for improvement, and measure outcomes against program goals. External evaluation consultants can also be hired that have the expertise to conduct independent assessments. Other possibilities include collaborations with research institutions (non-governmental organizations (NGOs), universities, etc.) to receive independent feedback or applying performance management software and tools to facilitate ongoing monitoring and evaluation.

Internal data sharing is another important component of the Program. Data access agreements must be established to outline the terms and conditions for sharing data internally. As part of the governance structure, representatives of each contributing agency will provide data experts and data stewards to ensure the proper access and usage of data. Data will be exchanged using secure data exchange platforms that will exist with data encryption protocols and security measures in place.

External policy research – such as by higher education institutions or research organizations – is another, often secondary, application of the Program. The Program must establish a clear research data-access framework that outlines the processes for researchers to request access to specific datasets within the Program. The governance structure includes representatives from each agency who can review research proposals and decide which data is shared with external sources. For external use, all data must fully undergo data deidentification and anonymization and only be accessed in secure environments. Researchers are often required to sign Data Use Agreements and researcher training and certification could be offered to ensure that all data privacy and security protocols are properly followed. Additionally, in many cases, the Program Team reserves the right to final approval of research conducted using the data from contributing agencies, thereby preventing misuse or misinterpretation of data provided to researchers from the system.

Data Privacy and Security

Ensuring data privacy and security is paramount to ensuring the Program's safe operation that contains personally identifiable data. The following security protocols can be implemented to decrease the risk that data is accessed improperly:

- **Privacy Impact Assessments:** Conduct privacy impact assessments to assess and mitigate potential risks to privacy associated with data processing activities. These assessments allow for the early identification of privacy concerns and ensure compliance with policy regulations.
- **Role-Based Access Controls:** Allow the organization to control who has access to specific datasets based on users' roles and responsibilities, reducing the risk of unauthorized exposure.

- **Data Encryption and Masking:** Apply encryption protocols to protect data during transit and implement masking techniques to conceal sensitive information to safeguard the confidentiality and integrity of data, particularly when transmitted or viewed by authorized personnel.
- **Secure Authentication and Authorization Mechanisms:** Implement strong authentication methods and authorization processes to verify the identities of users accessing the Program to ensure that only authenticated individuals with appropriate permissions can access the system.
- **Incident Response and Data Breach Protocols:** Develop clear procedures for identifying, reporting, and responding to data breaches or security incidents to enable timely and effective responses to security incidents, minimizing potential harm and damage.
- **Data Retention and Disposal Policies:** Establish guidelines for the retention and disposal of data, including procedures for securely deleting or archiving information to help maintain compliance with data protection regulations and prevents unauthorized access to outdated or unnecessary data.
- **Regular Security Audits and Penetration Testing:** Conduct regular security audits and penetration tests to identify vulnerabilities and weaknesses in the IDS. This will allow for the identification of potential security risks and allows for proactive measures to be taken that will strengthen the system's defenses.
- **Data Privacy Training and Awareness Programs:** Provide training programs and awareness initiatives to educate staff and users about data privacy best practices. This will build a culture of security awareness and ensures that all stakeholders understand their responsibilities in protecting data.
- **Data Privacy Impact on System Design:** Integrate data privacy considerations into the system's design and architecture, including encryption, access controls, and privacy-by-design principles to embed data privacy measures from the outset, reducing the likelihood of privacy issues in later stages.
- **Vendor and Third-Party Security Assessments:** Perform security assessments on vendors and third-party services involved in the Program to ensure they meet privacy and security standards to verify that external partners adhere to the same level of security and privacy.

- **Legal and Regulatory Compliance Framework:** Establish a framework to monitor and comply with relevant data protection laws, regulations, and industry standards to ensure that the Program operates within the legal boundaries of data privacy and security.

These data privacy procedures include proper adherence with the Health Insurance Portability and Accountability Act (HIPAA), the Family Educational Rights and Privacy Act (FERPA), and any/all other privacy laws and regulations that govern governmental data. The Chief Information Security Officer (CISO) shall provide guidance and collaborate with the Data COE and the Chief Data Officer to ensure that policies are developed and issued in accordance with existing state and federal policy and that technology and cybersecurity investments and regulations are maintained to support the enforcement and effectiveness of those policies.

By implementing these policies and procedures, state agencies can establish a robust framework for ensuring data privacy and security in the operations of the Program with longitudinal data. This safeguards sensitive information and builds trust among stakeholders. Furthermore, the data availability and sharing agreements will have stringent data privacy and security components. The sharing agreements and information that can be shared will, by necessity, be different depending on the application (investigation of waste/fraud/abuse, internal research, or external research). The state will modify conditions of data sharing based on the intended use of the data.

Public Transparency

Public transparency is a pillar of the Program and one that Rhode Island state government has embraced. Clear policies regarding transparency reporting requirements will need to be established. Privacy impact assessments, stakeholder engagement and consultation, and transparency in Data Use Agreements can assist in transparency efforts. Findings from the Program that are appropriate for public consumption will be provided on a state website. Public access portals should provide access to information and reports generated related to the Program and provide public data catalogs and metadata documentation.

Additionally, efforts should be made to educate the public without requiring additional data analysis. Dashboards and visualizations, plain language summaries, and public education and outreach campaigns assist with increasing transparency for all Rhode Islanders. Public feedback mechanisms must also be in place to receive concerns and foster a culture of openness and accountability.

Furthermore, there are current discussions on the improvement of the State of Rhode Island's Transparency Portal. It is proposed that all final reports, publications, or dashboards that utilize the Program be linked to the Transparency Portal. It is also strongly suggested that important publications or dashboards related to other data systems also be present on the Transparency Portal or linked there. This allows the Transparency Portal to be the centralized source to inform Rhode Islanders about the efforts in state government. The proposed improvements of the Transparency Portal along with the Program would allow Rhode Island State Government to rank amongst the highest states in public transparency efforts.

In addition to these connections on the Transparency Portal, it is also suggested that RILDS and EOHHS link each other and their respective public-facing data products.

Reduction of Fraud, Waste, and Abuse

The Program may also emphasize the reduction of fraud, waste, and abuse in its operations and in assisting other agencies reduce these areas as well. In reducing fraud, comprehensive data analysis will be conducted that provides a holistic view of individuals, programs, and transactions over time. Additionally, pattern recognition, anomaly detection, data matching and verification, predictive modelling for fraud prevention and real-time monitoring and alerts may be implemented using data in the Program. This data system allows for the data to be matched and utilized in such a manner to allow for fraud detection and reduction.

The Program will also likely reduce waste and abuse through enhanced collaboration and coordination between agencies to prevent duplicative efforts and to allow for identification of other abuse that could span multiple programs or departments. Transparency and accountability, along with improved data accuracy, also prevent waste and misuse of resources. The Program's auditing and compliance monitoring aspect is a driver of reduction

of abuse. Data privacy and security measures will prevent abuse of the existing data and protect against unauthorized access to any of the data stored by the federated technological infrastructure.

Timeline for Implementation

The timeline for building the team and technology that accompanies the program could take over a year. When Rhode Island developed the EOHHS Ecosystem, it did so in three major phases over five years. The first phase was the Ecosystem Pilot (2017-2019), which tested the feasibility and impact of integrating state government sources into the Medicaid IT Enterprise Environment. This 18-month Ecosystem Pilot concluded on June 30, 2019 and was the fastest such national data integration project, according to the University of Pennsylvania's Actionable Intelligence for Social Policy (AISP) program.

The second phase (2019-2022) included the integration of additional state agency data sources and streamlined the data governance process. The Phase 2 work cemented the Ecosystem as a permanent, integrated data system in Rhode Island that links health and human services data at the person and family level across state agencies with the goal of improving the overall well-being of all persons. Since 2022, the Ecosystem has focused on streamlining data governance processes to support Rhode Island State agency requests, requests from the Secretariat that require priority and urgency, and the integration of the Medicaid analytics and Ecosystem analytic fulfillment processes.

After consultation with a representative from Actionable Intelligence for Social Policy (AISP), it was communicated that Rhode Island's previous history with having built several integrated data systems will likely allow for implementation to be conducted at a faster pace than many states that are new to building such a system. The governance structure and general framework can be copied from two of the main IDSs that Rhode Island currently has – the EOHHS Ecosystem and the existing RILDS.

Based on preliminary discussions, key contributors and stakeholders believe the following timeline to be feasible:

- <6 months: Investments can be made in staffing and training procedures.
Transparency Portal upgrades
- 6 months: Merge executive-level governance bodies. The larger body will be tasked with identifying shared priorities and establish standard policies among the largest IDSs (RILDS and Ecosystem).
- 12 months: Shared priorities will be identified to create the shared learning goals (research agenda) for the state IDSs.
- 24 months: Data sharing between data systems can exist.

Plan Review & Amendment

This report outlines a general proposal for the creation and initial plans for a federated IDS Program. It is recommended that the Executive Board considers regular updates to this plan as the Program develops. While this report provides a strong foundation for the Program, the development of such a system is an iterative process.

Appendix A: IDSs in State Governments Across the US

Over forty states have at least one IDS, and often multiple IDSs, to assist with data-driven policymaking for government operations.⁴ Over the last decade, state governments have allocated greater resources to integrated data systems to conduct data-driven policy decisions, influenced by increased funding for these initiatives, the rising prominence of data in society, and technological advancements. States such as Indiana, Ohio, and South Carolina have been at the forefront of the development of these systems.

Indiana's primary IDS is the Management Performance Hub, established in 2014 by executive order. Located within Indiana's Office of Management and Budget and overseen by a Chief Data Officer, its creation aimed at linking, storing, and analyzing administrative data. The hub encompasses over 200 datasets from domains like health, child welfare, education, law enforcement, economic security, and employment. Public dashboards within the hub are designed specifically to inform and address the opioid crisis, showcase data on naloxone and prescription drug distribution and use, and provide details on county-level recovery and treatment services. The Management Performance Hub is integrated with the state's Transparency Portal, offering citizens a centralized platform for accessing state data and reports.

InnovateOhio, established in 2019 by executive order, serves as Ohio's chief IDS. Designed to be an ecosystem for data sharing and analysis, it facilitates public data access, data transfers, and fraud detection. The platform's director is the current lieutenant governor of South Carolina, and its Advisory Board includes local business figures. The IDS houses over 300 datasets, covering areas like health, corrections, education, environmental resources, broadband access, and telehealth in schools. InnovateOhio, in collaboration with the Office of Budget and Management (OBM), introduced software in Spring 2019 to detect duplicate payments in state expenditures, uncovering issues traditional accounting couldn't. By 2023, this system had pinpointed 662 duplicate payments, recovering close to \$7 million.

The South Carolina Integrated Data System, established in 2014 by the South Carolina General Assembly, came into being as part of a governmental restructure. Positioned within

⁴ <https://reports.ecs.org/comparisons/statewide-longitudinal-data-systems-2021>

the Health and Demographics Section of the Revenue and Fiscal Affairs (RFA) Office, the RFA takes on the role of offering a variety of fiscal and statistical analyses and services to state stakeholders, from the Governor to the general public. The IDS's mission revolves around providing data and analyses that enable well-informed policy decisions and effective service administration. It maintains datasets on several areas, from education and health care to demographics and local government finances. Notably, the South Carolina Department of Social Services uses the system for funding childcare programs statewide, integrating quality reviews with childcare voucher payment data to ensure appropriate reimbursements.

The North Carolina Longitudinal Data System (NCLDS) and its governing board were established in February 2022 by Executive Order 249. The soft opening of the NCLDS is proposed to be in January 2024. North Carolina already had several, separate preexisting integrated data systems and the goal of the NCLDS is to connect these systems through a federated data structure. At the core of its operation is the establishment of standard protocols and data sharing arrangements that were established and shaped by the contributing agencies and preexisting data systems. While challenging, the establishment of these policies, including a common Data Use Agreement (DUA), is instrumental.

To provide oversight and make amendments to these policies, several governing boards were created. These allow for agencies to have influence and decisions over data use. NCLDS has a multistage application process for obtaining the data, which gives the agency owners of the data to have multiple opportunities to approve or reject the request. The projects granted access are decided based on the cross-disciplinary (cross-agency) learning goals that were established as part of the formation of NCLDS. Once the data is utilized and a report is created by internal or external users (outside of the agency data owner), a subcommittee of each contributor can review the final result and decide whether to endorse or not endorse the publication. This established a quality indicator for reports created using the data, while still allowing data users to publish even if the results are contested by agencies that initially allowed for access. This design strives to prevent a heavy bias in the results that can occur when data owners have final decision over the reports that can be published.

Additionally, the matching of the several existing data systems is done by matching algorithmically. In a meeting with a representative with NCLDS, it was recommended that

matching occurs algorithmically for a new IDS as opposed to purely using one-to-one matching. The ideal use is to leverage one-to-one matching with an algorithm to provide the best matching result possible. One-to-one matching provides the cleanest data matching but gives the least representative dataset as certain groups may not be included. Alternatively, algorithmic matching provides a much more representative dataset, but is less clean and could contain false matches. NCLDS is an example of balancing cleanliness and the representativeness of a data system.

North Carolina is a strong candidate for comparison against the proposed Rhode Island Program and provides valuable insight into challenges the statewide IDS effort might face because of its federated model, similar structure of combining several existing IDSs, and that it is newly created, thus leveraging the current technologies available.

Appendix B: Information on the RILDS History and General Overview

Rhode Island initiated the development of its statewide longitudinal data system in 2009. Leveraging funding from the U.S. Department of Education's Safe and Drug-Free Schools grant and Statewide Longitudinal Data System (SLDS) grant, the state committed to creating an integrated, longitudinal data system. RILDS was initially hosted and managed by ProvPlan from 2009 to 2017 under the names "Information Group" and "DataSpark." In February 2017, DataSpark was relocated to the University of Rhode Island (URI) and operated as part of the university library system until June 2023. In June 2023, Governor Dan McKee signed the [Rhode Island Longitudinal Data System Act](#) that institutionalized and invested in the SLDS. It renames the Rhode Island DataHUB the "RILDS", renames DataSpark the "RILDS Center", and relocates both from the URI to the Office of Postsecondary Commissioner (OPC). This move centers the RILDS within the Rhode Island Data Contributing Agencies' existing partnership structure, and since OPC supports all three public higher education institutions, it strengthens partnerships between the RILDS Center and state researchers.

Data included in the system comes from a variety of state agencies, including Department of Business Regulation (DBR), Department of Children, Youth, and Families (DCYF), DLT, Division of Motor Vehicles (DMV), Department of Corrections (DOC), OPC, RIDE, Department of Health (RIDOH), and the Secretary of State (RI SOS). RILDS has approached EOHHS and the Department of Revenue (as a whole), but these agencies or respective groups were unable to share the Personally Identifiable Information (PII) required to match with the existing data.

RIDE provides data about Rhode Island public school records from 2004 to present, including enrollment, attendance, graduation, special education, adult education programs, and standardized test scores. OPC provides data on students in all of Rhode Island's public higher education institutions, including enrollment, course completion, majors, degrees earned, and workforce programs. DLT shares quarterly wages and industry employment for workers in Rhode Island since 1993 and provides additional data on individuals using unemployment insurance and workforce training programs. DCYF provides data on birth records for all Rhode Islanders born since 1997 and those individual's development risk factors, lead screenings, and immunizations. Through other partnerships, RILDS has

information on public candidate and voter data, and access to out-of-state education and employment records.

The system connects three decades of previously siloed education, employment, and health data using a custom-built machine learning algorithm to ensure accurate person-level and family-level matches. Today, RILDS is designed to integrate and link data across sectors and over time to support research aligned with the state's priorities, inform policymaking and program evaluation, and improve the well-being of all Rhode Islanders. Under R.I. Gen. Laws Chapter 42-165, the RILDS is legislatively established as Rhode Island's repository for longitudinal, interagency linked data, with the responsibility to report on inequities in access, opportunities, and outcomes.

RILDS is a comprehensive and robust integrated, longitudinal data system as evidenced by the accolades it has received. As of December 2021, the Education Commission of the States identifies Rhode Island as one of only 18 states and the District of Columbia had built a full P-20W system linking early childhood, K-12, postsecondary, and workforce data. Additionally, the G.W. Bush Presidential Library, adapting the Data Quality Campaign's framework created by experts, compares the statewide longitudinal data systems in four areas: vision and governance; capacity and resources; accessibility and data-driven policy; and transparency and reporting. This ranking historically noted governance, capacity, and funding as Rhode Island's weakness, but still places RILDS among in the top half of state data systems. With improvements in funding and the institutionalization of RILDS into Rhode Island State Government, it is expected to rise significantly in the rankings.

Enhancing Operations and Reducing Waste, Fraud and Abuse (RILDS)

The system's functions and the RILDS Center's responsibilities speak obliquely to reducing abuse, fraud, and waste only through centralized reporting and program evaluation. The purpose of the system is to "to support research aligned with the state's priorities, inform policymaking and program evaluation, and improve the well-being of all Rhode Islanders." Per the RILDS Act, the Executive Governing Committee is responsible for "identify[ing] the state's critical research and policy questions." The purposes and responsibilities of the Center include to: "conduct research and evaluate programs," "provide analysis and reports that assist with evaluating programs and measuring investments," and "respond to approved

research data requests.” The Executive Governing Committee sometimes prioritizes research and policy questions related to enhancing operations and reducing waste, fraud, and abuse.

More generally, RILDS’ analysis, evaluation, research, and reporting play a crucial role in reducing waste, fraud, and abuse by providing a rigorous, systematic, and evidence-based assessment of the effectiveness, efficiency, and integrity of state programs. Program evaluations can identify misallocated resources and ineffective programs. Regular monitoring by neutral parties increases accountability, oversight, and transparency, which, in turn, reduces the opportunities for waste, fraud, and abuse. Some recent and ongoing examples include:

- Measuring the return on investment of non-degree credentials.
- Informing alignment of funding streams to effectively deliver career-focused programming.
- Analyzing outcomes for a two-generation cohort receiving adult education services and wrap-around supports through the state’s TANF program.
- Assessing districts’ compliance with Rhode Island’s Basic Education Program and determine the incremental cost to meet the requirements.

Analyses by the Center can have immediate, positive impacts on the finances of the state and the lives of Rhode Islanders. For example, the Center submits reports on the healthcare employment outcomes for healthcare graduates from Rhode Island’s public institutions for higher education. This report allows EOHHS to claim reimbursement of federal Medicaid dollars. Thanks in part to an early RILDS data story exploring chronic absenteeism in kindergarten, Rhode Island extended compulsory attendance to kindergarten. This policy has profound implications for long-term educational achievement because [the project revealed](#) that, compared with children who attend regularly, chronically absent kindergartners:

- scored roughly 20 percentage points lower in reading;
- scored 25 percentage points lower in math;
- were twice as likely to be retained in grade;
- were more than twice as likely to be suspended by the end of 7th grade.

Data Sharing and Use Process (RILDS)

The RILDS Executive Governing Committee (Executive Committee, also known as the RILDS Governing Board in the RILDS Act) is responsible for “approv[ing] policies regarding how data requests from state and local agencies, the Rhode Island General Assembly, universities, third-party researchers, and the public will be managed” and for approving a “data request fee policy to compensate for excessive use of the data system, to recover costs that would otherwise typically be borne by the requesting data researcher, or both.”

Data Privacy and Security (RILDS)

The RILDS Executive Committee is responsible for “approv[ing] standards implemented by the center for security, privacy, access to, and confidentiality of data,” and existing policies are scheduled for review.

The Center prioritizes data privacy and security. Per the RILDS Act and existing RILDS policies, data are not accessed, used, released, or otherwise disclosed without prior approval from the appropriate RILDS Data Contributing Agency. The Data Governance Committee must approve use of data shared through RILDS. Data are transferred, stored, and used to ensure confidentiality and meet the requirements of federal and state laws and regulations particularly regarding the confidentiality, privacy, and security of education, health, and workforce records. Policies and procedures for the secure transfer, storage, and use of data conform to the Security and Privacy Controls for Information Systems and Organization issued by the U.S. Department of Commerce, National Institute of Standard and Technology (NIST Special Publication 800-53 Revision 4 or superseding versions).

RILDS safeguards individual-level data through physical, technical, and administrative controls. There are at least two barriers between RILDS data and an unauthorized individual or entity, including but not limited to physical barriers, virtual access controls, Identity and Access Management (IAM), multifactor authentication, and firewalls and Intrusion Detection/Prevention Systems (IDPS). After completing the required privacy and security trainings on federal privacy and security laws and regulations as well as RILDS policies and procedures, RILDS Center personnel are granted privileges consistent with their role.

Public Transparency (RILDS)

Since its origination, RILDS has committed to data use for the benefit of Rhode Islanders. This commitment means striving to disaggregate data and to publish products whenever possible with available data under disclosure avoidance policies and as permitted by the Data Contributing Agencies and federal and state law. RILDS disaggregates counts and percentages by sex/gender, race/ethnicity, age, disability status, English language proficiency, economically disadvantaged status, and other demographic categories. RILDS also shares dashboards, data stories and reports on its website. The featured reports include Healthy Housing (analysis of four indicators of unhealthy housing in Rhode Island – childhood lead exposure, asthma, median family income, and older housing), the Educational Impacts of Lead Exposure, the Identification of Credential of Value (workforce outcomes of non-postsecondary holders that do have other non-degree credential), and Educational Outcomes of Youth Involved with Foster Care. Other reports are broken down into the categories of K-12 education, health and human services, higher and adult education, and workforce.

Appendix C: Information on the EOHHS Data Ecosystem

EOHHS Data Ecosystem General Overview

The Rhode Island EOHHS Data Ecosystem (The Ecosystem) was established in 2017. It is an integrated data system that links data at the person and family level across state agencies with the goal of improving the overall well-being of all persons. Through the use of integrated data, researchers can provide information that helps identify gaps in services; an understanding of individuals as a whole, as well as program evaluations across state agencies to help improve services. Data is carefully governed and access to de-identified data is given to those approved for specific projects.

The EOHHS Data Ecosystem contains data relating to: Rhode Island Medicaid claims, encounters, and enrollment; Department of Human Services (DHS) programs including Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Comprehensive Community Action Program (CCAP), and Supplemental Security Income (SSI); wages, income insurance, and job training data from the Department of Labor and Training; child screening, immunization, and outreach program referral data from the Rhode Island Department of Health; birth and death records; housing insecurity and homelessness data; COVID testing, case, and vaccine information; developmental disabilities case management data from the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities, and Hospitals; Rhode Island Courts data; Rhode Island Department of Corrections commitment and release data; medical and pharmacy claims and enrollment data from the Rhode Island All Payer Claims Database (HealthFacts RI).

Originally established as an internal state resource, the Ecosystem has matured into a vital asset for state and non-state partners. Data can be used by program managers, researchers, providers, health insurers, and others to examine trends across populations and time. EOHHS priority research areas include factors of economic opportunity and healthcare access and outcomes.

Enhancing Operations and Reducing, Waste, Fraud and Abuse (Ecosystem)

The Executive Board ensures Ecosystem work aligns with state priorities, recommends large projects that represent 70 percent of Ecosystem resources, ensures Ecosystem sustainability

and statewide support. The Ecosystem Executive Board convenes quarterly, with a primary objective of aligning projects with the state's strategic priorities to enhance program efficiency. Furthermore, the EOHHS Ecosystem extends its data resources to both state agencies and external partners. Research initiatives encompass diverse areas, such as providing overdose data to support the Governor's Overdose Prevention Task Force and offering workforce data to monitor the evolving needs of different segments of Rhode Island's population, including long-term care and healthcare domains. The Ecosystem Data Stewards review and approve all project requests prior to project approval. Data Stewards are also required to review and approve all final projects to ensure data is being used and displayed appropriately.

Since the Ecosystem's development, multiple projects have been completed that address fraud waste and abuse. Examples include the following:

- 2021_33 Early Childhood Care and Education (ECCE) Scorecard: A compilation of metrics that collectively work to assess the health of the early childhood (birth to five years) system of care in Rhode Island. As the States single source of integrated early childhood data, ongoing efforts to collaboratively review data and metrics ensure that data integrity is optimized and that Rhode Island can maintain nationwide leadership in allowing for unduplicated counts of children and families utilizing early childhood services.
- 2023_103 Medicaid Program Integrity Dashboard: An interactive Power BI report that is used by the Medicaid Integrity Team to pull data from the Ecosystem for the purpose of investigating reports of fraud abuse and waste.
- The Consent Decree Power BI Dashboard: A dashboard built in 2020 with the purpose of helping the Department of Behavioral Healthcare, Developmental Disabilities & Hospitals (BHDDH) meet the requirements of the Consent Decree and Interim Settlement Agreement (ISA) objectives. Data within the RI Ecosystem was be used to assist the BHDDH team in monitoring and assessing individuals with intellectual and developmental disabilities (I/DD) and supportive services provided by BHDDH over time.

The EOHHS Ecosystem uses a formalized data request process. Upon submission of a Data Request Form, the Ecosystem Project Manager collaborates with the requester and corresponding agency Data Stewards to develop all project details and obtain signatory approvals. A Data Use License (DUL) is issued to the requestor and the designated EOHHS signatory, who ensures compliance and proper data usage protocols. Upon conclusion of the project, a meticulous data destruction protocol is initiated to guarantee the secure deletion of any utilized data.

Data Privacy and Security (Ecosystem)

The current Ecosystem protocol prioritizes data privacy and security. The Ecosystem contains individual observation-matching across the various datasets and removes any personally identifiable information. Only the Ecosystem Technical Team, comprised of four individuals, has access to the sensitive personal identifiers. Data extracts and Power BI reports can then be generated from this anonymized data. Additionally, the data is only sent to recipients through secure channels previously identified. Policies and procedures are in place to maximize the privacy and security of data in the EOHHS Ecosystem while achieving the goals of rich, high-quality analytics to support the operations of State government and inform critical policy decisions.

The EOHHS Ecosystem receives data from about a dozen internal and external State agencies. Those data include, by necessity, Personally Identifiable Information (PII), used to match individuals across data sets. These PII are segregated in the Ecosystem's staging database, which is only accessible by the EOHHS Analytics Technical Team and exclusively for linking individuals across data sets. Protected Health Information (PHI) is also often included and requires a high level of security as well. Once individuals have been linked across data sets, the data is stripped of PII and published to an analytics database, accessible only by the EOHHS Analytics team. Analysts may access only data specifically licensed from the Data Providers via a Data License for their projects. They must be specifically identified in the Data License Agreement, with data elements and criteria specified and a limited timeframe to access and analyze the data.

Furthermore, any report, analysis, or visualization based on Ecosystem data, before presentation to any audience external to the EOHHS Analytics team, must be presented to

and vetted by the Data Steward for each included data sets to ensure that the data are presented accurately, and that privacy is protected.

Security is a main priority of the Ecosystem. The Ecosystem is hosted on two Amazon Web Services (AWS) virtual servers and network access to these servers is limited to a single remote desktop server. Access to the servers and databases can only occur when the user is connected to the State network remote desktop, to which access is limited to those needing it. This provides a significant extra level of security as, even if the State network had a security breach, it would require additional steps and permissions to connect to the EOHHS Analytics data. At a database level, there are additional security protocols and limited access to PII/PHI. Data within the Ecosystem database are segmented by content or specific project. Permissions are managed using the State's Active Directory, employing specifically created and managed Active Directory Groups. Groups are created for each unique set of permissions.

Public Transparency (Ecosystem)

There are multiple areas where the EOHHS ecosystem is either sharing data externally or working on doing so. The [Return to Normal Operations \(RTNO\) dashboard](#) is updated bi-weekly and is available on the EOHHS website. The [Prevent Overdose RI \(PORI\) website](#) is in the process of being moved into EOHHS and will be updated to include new metrics in collaboration with the Overdose Data Council. A comprehensive Early Childhood Care and Education Scorecard is currently monitored internally, but a portion is slated for public sharing on the Department of Human Services (DHS) website in the imminent future, providing valuable insights into early childhood education initiatives. Other areas where data are currently shared with community groups or work groups include our [Money Follows the Person \(MFP\) program](#) and [Long-Term Care Supports and Services \(LTSS\)](#).

Appendix D: Information on the OIA Fraud Detection System

OIA Fraud Detection System General Overview

OIA was created through a merger of the Bureau of Audits and the Department of Human Services (DHS) Fraud Unit during the 2016 Legislative Session. OIA is charged with ensuring the integrity of DHS programs through the identification and investigation of fraud. Beginning in Fiscal Year 2017, OIA incorporated data analysis into target identification and investigative process forming the Fraud Detection and Prevention system. OIA has data sharing agreements in place to access data from several state agencies and uses this data to identify possible instances of fraud.

The Audit Fraud System is housed in the Office of Management and Budget's (OMB) Office of Internal Audits (OIA) and uses data related to wages, taxes, benefits (Medicaid, SNAP, etc.), deaths, incarceration, unemployment, Rhode Island Financial Accounting Network System (RIFANS) transactions, and state payroll.

This data is analyzed by the OIA team and made available to the fraud investigations team to detect individual instances of fraud.

Enhancing Operations and Reducing, Waste, Fraud and Abuse (OIA Fraud)

The current system is an integral part of fraud detection and prevention capabilities for the Supplemental Nutrition Assistant Program, Child Care Assistance Program, Rhode Island Works, and Medicaid. Spotfire, a business intelligence tool, can be used to generate reports that match data from disparate data sources, allowing for a holistic view of recipients and providers. This allows for the comparing and cross checking of recipient and provider statements, applications, and perceived facts. Any new OIA data source generally identifies significant amounts of fraud and waste quickly, at low cost, with a low rate of false positive.

Data Sharing and Use Process (OIA Fraud)

The OMB Audit Fraud System uses an on-premises server to run the database. Data is loaded into the database from multiple internal agencies and external corporations using multiple methods, allowing data to be accepted in various formats.

OIA fraud investigators access the database through Spotfire, which allows data analysts to develop canned reports according to OIA end user requirements. Standard reports are preconfigured to show the data requested and offer basic functionality to end users such as allowing users to sort, filter, or aggregate records. This tool is similar to other business intelligence tools like Tableau and Microsoft PowerBI.

To request access to a new dataset, OIA contacts leadership of the applicable agency to explain the purpose. Upon agreeing to use of the data, a data sharing agreement is created to specify what data can be accessed and for what purpose. OIA has never received data requests previously. Additionally, as most of the data in the system is given via these agreements and the agreements do not allow OIA to share the data with any other party, OIA would be unable to accommodate such data requests. Therefore, no established processes exist for data sharing (including fees or timeline).

Data Privacy and Security (OIA Fraud)

The SQL Server and Server Admins at DoIT determine who has access to systems in OIA. DoIT is responsible for security, privacy policies, and training. Additionally, DoIT creates server firewalls and maintains the security software, and security configurations. Additionally, all Fraud employees are required to have federal tax information (FTI) and Health Insurance Portability and Accountability Act (HIPAA) training annually as a condition of employment.

Public Transparency (OIA Fraud)

OIA publishes annual reports. These reports contain information on the cases that have been resolved and quantify the savings by program from the fraud investigations.

Appendix E: Information on the RI Geographic Information System

RIGIS General Overview

RIGIS is a statewide consortium of public, private, and academic organizations that jointly support a common statewide geographic information system repository and have the goal of furthering the knowledge and use of GIS in Rhode Island. The State of Rhode Island has operated a GIS mapping system since 1985, when Rhode Island DEM partnered with URI to establish a GIS for the management and analysis of environmental data. The Department of Transportation, DOA's Division of Statewide Planning, and the Rhode Island Solid Waste Management Corporation joined shortly thereafter. In 1990, state law was changed to consolidate GIS information into DOA and tasked Statewide Planning with ensuring continuity and maintenance.

RIGIS has over 200 publicly available geographically referenced datasets. The metadata provided with each of the datasets assists in reducing the misuse or abuse of the data. RIGIS distributes open geographically referenced datasets that represent a wide range of topics, including transportation, infrastructure, and the environment. The data is provided publicly, which allows other agencies to access and utilize the data to assist their policymaking decisions and reports. The University of Rhode Island Environmental Data Center (RIEDC) maintains the RIGIS website, database and map services through a Cooperative Agreement with the Department of Administration's Division of Statewide Planning. The largest contributor of data is the RIEDC itself, with other state, federal, and nonprofit partners providing additional data. The missions of RIGIS are to monitor, coordinate, and provide leadership for activities relating to the use of GIS technology within Rhode Island, to support initiatives that implement or use GIS technology, and to provide easy access to an extensive database of geospatial data for the state. Additionally, there exists an enterprise statewide geospatial platform funded by the Rhode Island Emergency Management Agency (RIEMA) for emergency management purposes called RISEGIS (Rhode Island State Enterprise Geographic Information Systems).

Enhancing Operations and Reducing, Waste, Fraud and Abuse (RIGIS)

The RIGIS and its participants preserve and rely upon an open and honest exchange of knowledge related to the use of geospatial information in Rhode Island. The geospatial data

provided allows end users to visually represent findings, which can, in turn, enhance their own program operations.

Data Sharing and Use Process (RIGIS)

RIGIS distributes open, geographically-referenced datasets that state agencies and the public can access and download. RIGIS also supports the RISEGIS by continuing to monitor its geospatial inventory, the planned geospatial hardware, software, applications, and networking capacities and updates, and connections to existing databases within the Rhode Island State Government departments and agencies.

The downloading of RIGIS individual data sets, standalone Geodatabase (GDB), metadata, and links to map services are available at no cost to the RIGIS user.

Data Privacy and Security (RIGIS)

The RIGIS website, online database, and map services, are hosted and maintained by the URI-EDC and is provided 'as is.' The host, contributors to this database, the RIGIS members and participants, and the State of Rhode Island do not make any warranties of any kind for this database and are not liable for any loss or damage caused by use of the RIGIS website, database, or map services.

Through the [RIGIS 5 year strategic management plan](#), RIGIS members researches hardware and software solutions and security methods for accessing and displaying map products, and archiving historical data and information

Public Transparency (RIGIS)

RIGIS distributes open geographically referenced datasets for public consumption through its website and geospatial data hub.

Acronym & Initialism Dictionary

Listed in alphabetical order.

| | |
|---------|--|
| Program | Rhode Island Data Governance Program |
| IDS | Integrated Data System |
| AISP | Actionable Intelligence for Social Policy |
| AWS | Amazon Web Services |
| BHDDH | Department of Behavioral Healthcare, Developmental Disabilities, & Hospitals |
| CCAP | Comprehensive Community Action Program |
| CDO | Chief Data Officer |
| DBR | Department of Business Regulation |
| DCYF | Department of Children, Youth, and Families |
| DEM | Department of Environmental Management |
| DHS | Department of Human Services |
| DLT | Department of Labor and Training |
| DMV | Division of Motor Vehicles |
| DOA | Department of Administration |
| DOC | Department of Corrections |
| DoIT | Division of Information Technology |
| DOT | Department of Transportation |
| DUL | Data Use License |
| ECCE | Early Childhood Care and Education |
| EOHHS | Executive Office of Health and Human Services |
| ETL | Extract Transform and Load |
| ETSS | Enterprise Technology Strategy and Services |
| FTE | Full-Time Equivalent (positions) |
| FTI | Federal Tax Information |
| FY | Fiscal Year |
| GDB | Geodatabase |
| GIS | Geographic Information System |
| GUI | Graphical User Interface |
| HIPAA | Health Insurance Portability and Accountability Act |
| HSDW | Health System Data Warehouse |
| I/DD | Intellectual and developmental disabilities |
| IAM | Identity and Access Management |
| IDPS | Intrusion Detection and Prevention Systems |
| IDSs | Integrated Data Systems |
| ISA | Interim Settlement Agreement |
| LTSS | Long-Term Care Supports and Services |
| MES | Medicaid Enterprise System |
| MFP | Money Follows the Person Program |
| NGO | Non-Governmental Organizations |
| OIA | Office of Internal Audit |
| OMB | Office of Management and Budget |
| OPC | Office of the Postsecondary Commissioner |

| | |
|---------|--|
| PHI | Protected Health Information |
| PII | Personally Identifiable Information |
| PORI | Prevent Overdose RI |
| RIDE | Rhode Island Department of Education |
| RIDOH | Rhode Island Department of Health |
| RIEMA | Rhode Island Emergency Management Agency |
| RIFANS | Rhode Island Financial Accounting Network System |
| RIGIS | Rhode Island Geographic Information System |
| RILDS | Rhode Island Longitudinal Data System |
| RISEGIS | Rhode Island State Enterprise Geographic Information Systems |
| RTNO | Return to Normal Operations |
| SaaS | Software as a Service |
| SIM | State Innovation Model |
| SLDS | Statewide Longitudinal Data System |
| SNAP | Supplemental Nutrition Assistance Program |
| SOS RI | Secretary of State for the State of Rhode Island |
| SQL | Structured Query Language |
| SSI | Supplemental Security Income |
| TANF | Temporary Assistance for Needy Families |
| URI | University of Rhode Island |
| URI-EDC | University of Rhode Island Environmental Data Center |

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