# Immunization Information System (IIS) Sustainability:

# A Toolkit for Diversifying Funding and Optimizing IIS Efficiency

## Section 1. Introduction

Immunization Information Systems (IIS) are critical public health tools that support immunization program business processes, vaccination coverage assessment, outbreak response, and data-driven decision-making to improve population health. (1). Jurisdictions receive regular funding for their IIS through their CDC Vaccine Preventable Disease Prevention and Response Cooperative Agreement. However, many IIS face sustainability challenges due to increased operational costs, funding challenges, workforce turnover, and costs associated with modernizing aging technology. (2). This toolkit provides a practical guide to help state, tribal, local, and territorial (STLT) health agencies strengthen and sustain their IIS through funding diversification and cost reduction.

The goals of the toolkit are to:

- Define IIS sustainability and why it matters.
- Highlight strategies and approaches to diversify funding and enhance IIS efficiency through leveraging Medicaid match, billing health plans for IIS data, increasing the use of shared services, leveraging shared infrastructure, adopting open source software, implementing process automation, and modernizing the IIS .
- Offer tools and resources to support implementation of strategies and approaches for diversifying funding and optimizing IIS efficiency.
- Provide practical "success stories from the field" that illustrate how jurisdictions have successfully applied sustainability strategies and approaches and what others can learn from their experiences.

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## Section 2. How to Use the Toolkit

This toolkit is designed to guide STLT health agencies through practical strategies to strengthen and sustain their IIS. While jurisdictions receive foundational support through the CDC Vaccine Preventable Disease Prevention and Response Cooperative Agreement, many IIS programs face increasing pressure on IIS sustainability due to rising technology costs, uncertain funding, workforce turnover, and the need to modernize aging systems.

Users may choose to start at the beginning of the toolkit and work through it sequentially, or they may begin with the section that best aligns with their immediate priorities, funding environment, and level of readiness. The toolkit is designed to be flexible and adaptable to different contexts. Agencies are encouraged to review the definition of IIS sustainability, assess their current funding and operational landscape, and then identify and prioritize

strategies to diversify funding and optimize efficiency. The examples included in this toolkit, such as leveraging Medicaid match, billing health plans and others for the use of IIS data, and optimizing technology and operational efficiency, are drawn from real-world experience and demonstrate practical, achievable approaches. In particular, the *"Success Stories from the Field"* highlight how jurisdictions have successfully applied these strategies, the challenges they encountered, and the lessons learned. Structured tools, templates, and real-world examples are provided to support planning, implementation, and monitoring of sustainability strategies, helping jurisdictions build and maintain a stable, efficient, and sustainable IIS.

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## Section 3. What is IIS Sustainability and Why Does it Matter?

IISs play a critical role in supporting immunization program operations, clinical decision making, population health monitoring, and emergency response efforts (3). IIS sustainability refers to the ability of a jurisdiction to maintain, operate, and continuously improve its IIS over time despite changing funding environments and evolving public health needs. Sustainable IIS are able to consistently deliver reliable, high-quality functionality and data while adapting to new demands and situations. In practice, IIS sustainability includes:

- **Financial sustainability**: Stable and diversified funding that supports core operations, maintenance, modernization, and workforce needs.
- **Operational sustainability**: Efficient workflows, strong governance, and a skilled workforce capable of maintaining and advancing the IIS.
- **Technical sustainability**: Modern, interoperable, secure, and scalable infrastructure that can integrate with evolving technologies and data standards.
- **Strategic sustainability**: Alignment with immunization program priorities and partnerships that maximize the value of the IIS to partners and the public.

IIS sustainability is important because when IIS are sustainable and well-supported, they help to:

- Ensure timely, accurate immunization data is available for clinicians, schools, public health programs, policymakers, and the public
- Support vaccination coverage assessment and monitoring, including CDC's Immunization Quality Improvement for Providers (IQIP) program
- Identify populations that may be at risk for vaccine preventable disease
- Identify geographic areas with low vaccination coverage
- Inform program interventions to increase vaccination rates
- Enable rapid response to outbreaks and other public health emergencies

- Enable Vaccines for Children (VFC) program providers to order and manage publicly purchased vaccines
- Facilitate the operation of immunization program components, including surveillance and epidemiology, case management of vaccine-preventable diseases, prevention of perinatal hepatitis B transmission, and compliance with vaccination requirements in child care, school, and college
- Reduce administrative burden for providers and health systems

Unstable funding or inefficient operations can lead to system degradation, delayed modernization, workforce strain, and reduced data quality. When these challenges occur, IIS may struggle to provide efficient support for business functions and the collection of timely, high quality, and complete immunization data. This may result in limiting their ability to monitor coverage, identify at-risk populations, and inform public health interventions. Gaps in system performance can hinder outbreak response and disrupt vaccine ordering, management and other business processes for VFC providers and public health staff. These challenges can also increase administrative burden for providers, public health staff and other partners relying on the IIS to help achieve immunization goals. All of these effects could ultimately weaken the impact of immunization programs and broader public health efforts.

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## Section 4. Core Strategies for Diversifying Funding and Optimizing IIS Efficiency

This section presents two core strategies for strengthening IIS sustainability: diversifying IIS funding and optimizing IIS efficiency. The first strategy focuses on expanding and stabilizing financial support by leveraging Medicaid match and billing for IIS data. The second strategy emphasizes making the most of available resources, improving efficiency by increasing the use of shared services and infrastructure, adopting open source software, automating processes, and modernizing IIS. Together, these complementary approaches provide practical, actionable pathways that jurisdictions can adapt to build more resilient, cost-effective, and sustainable IIS.

### Strategy 1: Diversifying Funding

Diversifying funding is essential to IIS sustainability. As technology costs rise and system demands evolve, relying on CDC alone, or even CDC and a few other funding sources, can create financial risk and limit long-term planning. Expanding the mix of funding streams helps jurisdictions strengthen financial resilience, support ongoing modernization, and sustain core IIS operations.

This toolkit focuses on two practical approaches: leveraging Medicaid match, and billing for IIS data. These approaches were selected as they are grounded in real-world examples, broadly applicable across jurisdictions, and capable of generating meaningful, recurring financial support. Each strategy builds on the value an IIS provides to multiple

stakeholders, creating opportunities to align funding with activities to increase vaccination rates and decrease vaccine-preventable diseases.

*Other Examples of Diversifying Funding for IIS*

Some jurisdictions have succeeded in securing funding from their state or city for their IIS. One state described receiving recurring funding from a public health foundation in their state. While challenging, IIS managers may consider pursuing these potential approaches as well.

**Approach A. Leveraging Medicaid Match**

**What is a Medicaid match?**

Medicaid match, also known as Federal Financial Participation (FFP), is a funding mechanism from the Centers for Medicare & Medicaid Services (CMS) that helps states cover the costs of systems serving Medicaid beneficiaries. Under the Medicaid Enterprise System (MES) framework, enhanced federal matching rates are available for IIS. One key to successfully applying for Medicaid match is having a strong, collaborative relationship between the immunization and Medicaid programs (see *Success Stories from the Field: "Leveraging Medicaid Match"*).

Leveraging Medicaid match requires jurisdictions to commit their own state funds (nonfederal) to match the federal Medicaid funds at amounts based on the funding tier.

Medicaid match provides different tiers of funding based on proposed activities:

- **90/10 Match:** A 90% federal/10% state match is available for the **design, development, and installation (DDI)** of Medicaid Enterprise Systems.
- **75/25 Match:** A 75% federal/25% state match is available for the **ongoing operations and maintenance** of the system. To receive this enhanced rate, states must meet the requirements of the Streamlined Modular Certification (SMC) process.
- **50/50 Match:** A 50% federal/50% state match is available for administrative activities. This rate is also available for the Medicaid-associated expenditures of an IIS if it is developed, owned, and operated by a non-Medicaid agency (such as a public health department) rather than through the enhanced MES rates.

**How could Medicaid match be used to diversify IIS funding?**

Medicaid match offers a significant opportunity to diversify the IIS funding base by obtaining federal dollars for the portion of the IIS that serves Medicaid providers and beneficiaries.

To secure these funds, states must calculate a fair cost allocation. For example, North Dakota determined its Medicaid match by calculating the percentage of Medicaid-enrolled provider sites using the IIS, factored together with the state's Medicaid member population (see *Success Stories from the Field: Leveraging Medicaid Match*").

States can utilize Medicaid match to fund various categories of IIS needs:

- **Technology and Infrastructure:** Funding can be applied to system implementation, vendor costs, ongoing subscriptions, website maintenance, and cloud-based hosting.
- **Workforce and Operations:** The match can support essential personnel, including IIS managers, data quality coordinators, technology staff, and IT project managers.
- **Enhancements and Special Projects:** Medicaid funds can be used for configuration enhancements, interoperability improvements, system upgrades, and the addition of features such as consumer access portals.

**How can use of Medicaid match promote IIS sustainability?**

Medicaid match promotes sustainability primarily because **Medicaid Enterprise System (MES) funding has no end date**. Once an IIS goes through the Certification Review and demonstrates it is achieving approved outcomes, the state can continually request the 75% enhanced federal matching rate for ongoing system operations. They may also continually request the 50% administrative match rate. In all cases, ongoing justification that IIS services fit within the activities associated with each match rate, and continue to serve Medicaid providers and beneficiaries is necessary. While states must reapply for Medicaid matching funds every federal fiscal year, experience has shown that states have been approved for continued matching funding for many years after their first successful application.

Securing a continuous funding stream such as Medicaid match is critical for IIS sustainability due to the escalating costs of upgrading and maintaining modern technology. For example, as an IIS transitions from hosting in a server environment to a cloud hosting environment, annual hosting costs can rise significantly. Medicaid match helps augment the funding available to cover these operational costs to the immunization program.

It is important to recognize that applying for Medicaid match requires aligning the IIS with broader Medicaid strategic goals. Because the Medicaid program and the IIS share the same goals for increasing on-time, complete immunization to reduce vaccine-preventable diseases and lower health care costs, the opportunity for goal alignment is clear. By actively utilizing IIS data and functionality to identify immunization gaps in Medicaid populations, issue patient reminders, assess quality

measures, offer consumers access to their immunization records, facilitate Vaccines for Children (VFC) program business processes and vaccine distribution to Medicaid providers, the IIS demonstrates its critical value to the state's healthcare infrastructure. This strong partnership between public health and Medicaid can ensure that the IIS remains a priority for sustainable, long-term state and federal investment.

**Approach B. Billing for IIS data**

**What do we mean by billing for IIS data?**

Billing for IIS data means asking an IIS partner to pay for IIS data. Most often this takes the form of jurisdictions billing health plans for the IIS records of their enrolled members(see Success Stories from the Field: *"Billing for IIS Data"*). To successfully introduce an effort to bill for IIS data, IIS programs should develop a plan to obtain leadership approval by demonstrating the costs of producing the data and the benefits to the health plans. Further, IIS programs will need to work with the appropriate leadership and fiscal staff to set up a mechanism for depositing the funds generated into an account that can be accessed by the IIS. Funds deposited in a general health department account will likely be unavailable to the IIS.

Health plans use IIS data to help them conduct outreach to enrollees, assess immunization coverage rates, and achieve HEDIS (Healthcare Effectiveness Data and Information Set) performance measures for immunization. Although the Centers for Medicare & Medicaid (CMS) no longer requires immunization coverage as a performance measurement, health plans may want to continue to use this metric to market their success in meeting best practices in immunization, to drive performance-based payment for providers, or for other purposes.

Jurisdictions may also want to explore the potential to bill other entities for their IIS data. For example, foundations, universities or other institutions may want to include IIS data as part of a grant or research effort. Partnering with these entities could include not only payment for IIS data, but potentially partial payment for staff to support the work.

When states bill health plans for IIS data, they describe the payment request as a charge or contribution for cost recovery - essentially covering the IIS cost to complete the request for data. Payment amounts can be based on a cost per record or a sliding scale according to the number of records requested. Jurisdictions may choose to bill only commercial health plans.

Producing the IIS data for a health plan requires the plan to first complete a request form and then submit a file via secure transport in the IIS-required format. The file contains member identifying information, e.g., medical record number, name (first,

middle, last), address, date of birth, and gender, for matching in the IIS. The IIS typically runs the file against the IIS database and generates an output file including the immunizations documented for each member found in the IIS. The IIS makes the file available to the health plan and generates a bill, prompting the health plan to send payment to a designated office within the health department for deposit in an account designated for access by the IIS.

States that currently bill health plans for IIS data:

1. Are legally allowed to share data with health plans for their members based on authorizing legislation and/or a Data Use Agreement;
2. Previously went through an internal process to justify the practice to leadership by demonstrating how much it costs the IIS to produce the data and the benefits to the health plans;
3. Have a system for tracking health plan requests through to completion;
4. Have a mechanism to receive reimbursement for completed requests where funding is used specifically for IIS activities;
5. May model their billing processes after fee-for-service programs within the health department (e.g., licensing, vital records ).

See a description and examples of the above in *Success Stories from the Field: "Billing for IIS Data"*.

**How could billing for IIS data be used to diversify IIS funding?**

Billing for IIS data can be a substantial source of recurring funding for the IIS. Health plans may have a large number of members, often in the tens or hundreds of thousands. For example, Louisiana reported that midway through the current fiscal year they had generated approximately $690,000 in revenue by billing commercial health plans for IIS data at a cost of $0.50 per record. A different state, with a smaller population, reported receiving about $300,000 per year by billing health plans according to a sliding scale based on the number of records requested.

Once charges are introduced for IIS data, health plans may have questions regarding why reimbursement is needed and may lower the number of records requested. This may lead to uncertainty in projecting income generated from billing for IIS data. Jurisdictions need to provide an explanation of the value of the IIS to the health plans, costs borne by the IIS to produce the data, and the billing structure. Having a clear rationale for the need for reimbursement, while emphasizing the value of the data and service will help alleviate concerns from health plans.

**How can billing for IIS data promote IIS sustainability?**

Billing for IIS data can promote IIS sustainability by generating a recurring revenue stream that helps offset the costs of system operations, infrastructure, and staffing. By charging partners, such as health plans, payers, or other organizations that benefit from IIS data, jurisdictions can better align funding with the value the system provides. This approach can reduce reliance on a single funding source, improve financial stability, and support ongoing system maintenance and modernization. In addition, revenue generated through billing can be reinvested in activities such as data quality improvement and system enhancements, further strengthening the long-term sustainability and performance of the IIS.

**Strategy 2. Optimizing IIS Efficiency**

Optimizing efficiency is a key component of IIS sustainability. As technology costs rise and funding environments remain uncertain, jurisdictions must find ways to maximize the value of existing resources and use opportunities to streamline business processes and adopt functionality that reduces costs associated with IIS (4). Improving efficiency helps control costs, reduce duplication, and free up resources that can be reinvested in modernization and long-term sustainability (see *"Success Stories from the Field: Optimizing IIS Efficiency"*).

This section highlights five practical approaches for optimizing efficiency: increasing the use of shared services, leveraging shared infrastructure, using open source software, automating processes, and modernizing the IIS. These approaches were selected because they are broadly applicable, feasible across a range of technical environments, and supported by emerging examples from the field. They offer opportunities to strengthen IIS sustainability by reducing duplication of effort, lowering long-term operational costs, improving performance and scalability, as well as building on existing public health and enterprise investments.

**Approach A. Increasing the Use of Shared Services**

**What Are Shared Services?**

Shared services refer to operational functions that are jointly used across programs, agencies, or jurisdictions rather than being developed and maintained independently. Services may be shared with IIS at the jurisdictional or national levels and can include not only technology and tools, but also staffing capacity. For example, IIS programs may partner with other parts of their agency or organization to share staff with epidemiologic, technical, informatics, or data analytics expertise that supports IIS activities. Examples include:

Jurisdictional Level

- Health Information Exchange (HIE) services for promoting interoperability with providers to enable IIS query and reporting

- Health department epidemiology staff analyzing and producing data for reporting vaccination-related data to partners and the public

National Level

- Smarty software for patient address verification - available through the American Immunization Registry Association (AIRA)
- Aggregate Analysis Reporting Tool (AART) for improving compliance with IIS data standards and data quality - available through AIRA as part of the IIS Measurement and Improvement (M&I) initiative
- AIRA Provider Onboarding Templates - includes resources, templates, and a course on onboarding best practices
- AIRA Onboarding Shared Services - includes resources, templates, and a provider organization for IIS onboarding course
- Immunization Evaluation and Forecasting Engines (commercial and open source)
- Privacy-Preserving Record Linkage (PPRL) software for record deduplication - available through CDC

**How can increasing use of shared services optimize IIS efficiency?**

Instead of each program funding and managing its own services, costs are either distributed across multiple users or provided by national partners at no cost. This reduces duplication of effort, lowers overall operational expenses, and allows IIS programs to leverage existing expertise, infrastructure, tools, and staffing capacity rather than building and maintaining their own solutions. As a result, shared services can improve efficiency, increase scalability, and free up resources that can be redirected toward system improvements and long-term sustainability.

**How can using shared services promote IIS sustainability?**

Using shared services promotes IIS sustainability by reducing duplication of effort and distributing costs across multiple programs or partners, lowering overall operational expenses. By leveraging existing expertise, tools, and infrastructure, which are often provided at reduced or no cost, IIS programs can operate more efficiently and redirect limited resources toward system improvements and long-term sustainability. It is important to note that while shared services can reduce overall costs, they may require some technical assistance through a vendor with an associated cost for those vendor-provided services.

**Approach B: Leveraging Shared Infrastructure**

**What is Shared Infrastructure?**

Shared infrastructure refers to technology resources used by multiple IIS at the national level or by IIS and other programs at the jurisdictional level. Examples at the jurisdictional and national levels include:

Jurisdictional Level

- IIS platforms - modernization and other enhancement costs are shared among multiple jurisdictions using the same IIS platform
- State enterprise cloud hosting environments
- Data storage platforms, e.g., data lake to support analytics
- Analytics and reporting platforms, e.g., dashboards for data visualization
- Identity and access account management systems

National Level

- CDC IZ Gateway for interjurisdictional IIS data exchange and IIS immunization data exchange with national providers, like the Departments of Defense and Veterans Health Administration. Jurisdictions sign a Public Health IIS Jurisdictional MOU to participate.
- REDCap (Research Electronic Data Capture) software platform for operational data collection, which is available through CDC. Note that the state of Louisiana uses REDCap to collect and track HEDIS data requests - see presentation.

**How can leveraging shared infrastructure optimize IIS efficiency?**

As with shared services, costs for shared infrastructure may be shared across multiple users or provided by national partners at no cost. This approach reduces the need for individual IIS programs to invest in and maintain standalone systems, lowers infrastructure and maintenance costs, and enables access to more advanced, scalable technologies. By leveraging shared infrastructure, jurisdictions can improve system performance, enhance interoperability, and focus limited resources on higher-value activities such as data quality, analytics, and program improvement.

**How can leveraging shared infrastructure promote IIS sustainability?**

Leveraging shared infrastructure promotes IIS sustainability by reducing the financial and operational burden on individual programs while providing access to scalable, modern technologies. By lowering infrastructure and maintenance costs and enabling shared investments across jurisdictions or national partners, IIS

programs can operate more efficiently and redirect resources toward ongoing system improvement, data quality, and long-term sustainability. Jurisdictions should consider putting service level agreements in place to secure the terms, conditions and services associated with shared infrastructure services, and cost sharing.

## Approach C: Using Open Source Software

### What Is Open Source Software?

Open source software is publicly available code that can be used, modified, and shared without licensing fees. Open source solutions are widely used in public health, including IISs, and can support functions such as:

- Relational database, i.e., PostgreSQL
- Operating system, i.e., Linux
- Immunization forecasting engines, .e.g., the Immunization Calculation Engine (ICE)
- Data validation and deduplication tools, e.g., Choicemaker (patient matching)
- Interoperability solutions (e.g., FHIR-based APIs)
- Analytics and dashboard platforms

### How can using open source software optimize IIS efficiency?

Open source software can lower costs by reducing reliance on proprietary vendors and allowing jurisdictions to collaborate on system improvements. Use of open source software such as ICE may not be entirely free, however. Support of the vendor who updates and maintains ICE is necessary. The cost of this support may be far lower than support of a commercial immunization forecaster.

Some jurisdictions have substantially reduced IIS costs by using open source software such as ICE and other software systems, services, and infrastructure. For example, one large jurisdiction realized significant savings by migrating its IIS off of Oracle to PostgreSQL, an open source relational database.

### How can using open source software promote IIS sustainability?

Using open source software promotes IIS sustainability by reducing reliance on costly proprietary vendors and lowering long-term licensing and maintenance expenses. In addition to cost savings, open source solutions provide greater flexibility, allowing jurisdictions to adapt systems to meet evolving needs without being constrained by vendor timelines or contracts. They also enable collaboration across jurisdictions and partners, supporting shared development and continuous

improvement while reducing duplication of effort. While some open source tools may still require support for maintenance and updates, these costs are often lower than commercial alternatives. Together, these benefits help create more adaptable, cost-effective systems that can be sustained and enhanced over time with limited resources.

## Approach D. Implementing Process Automation

### What is meant by process automation?

Process automation involves the use of technology such as software and artificial intelligence (AI) to carry out recurring, rules-based tasks with minimal manual intervention. IIS programs can strengthen sustainability by increasing their use of process automation. Automating processes that previously required manual intervention frees up staff time that can be allocated to other key activities such as data quality improvement. It can also speed up response time for data requests, strengthening support for the IIS by internal and external partners. For example, Minnesota implemented an automated process using a data lake and bulk query process running on the state's Cloud Drive site. This process allows for very large files (e.g., 1.4 million patients) to be processed independent of IIS staff.

### How can implementing process automation optimize IIS efficiency?

Process automation can optimize IIS efficiency by streamlining workflows, increasing operational speed, and reducing errors. While IIS use of AI is evolving, some jurisdictions have made significant efficiency gains by developing software solutions for automating major tasks. Current IIS examples include:

- Producing data for CDC - extracting, formatting, and sending data to CDC at required intervals
- Fulfilling bulk data requests from health plans and other partners
- Generating immunization provider feedback reports (e.g., report cards showing the practice's immunization rates over time)
- Analyzing vaccination data to produce coverage rates and populate dashboards

Each of the above tasks are highly labor intensive if extensive manual intervention by technical staff was required to complete them. By automating these processes, tasks can be completed by staff without advanced technical training, freeing up technical staff for other tasks and decreasing the amount of time needed to complete the tasks. Doing so increases productivity and could significantly lower costs if the IIS reduces reliance on a vendor to perform these tasks.

### How can implementing process automation promote IIS sustainability?

Using process automation promotes IIS sustainability by reducing reliance on manual, labor-intensive workflows and enabling programs to operate more efficiently with existing resources. It may also empower a broader pool of staff to complete tasks that previously required specialized skills, and enable staff with specialized skills to focus on data quality improvement. By automating routine tasks, such as data reporting, bulk data requests, and report generation, IIS programs may increase responsiveness to partners and lower operational costs, ultimately supporting long-term system stability and performance.

## Approach E: Modernizing IIS

### What is meant by modernizing IIS?

Modernizing IIS may involve many facets of technical or infrastructure enhancement. It often involves transitioning to cloud-based, interoperable, and secure platforms to increase data quality, facilitate real-time data exchange with health systems and federal partners, enable information sharing across jurisdictions, expand analytic capacity, bolster the workforce, and enable consumer access to immunization records (6, 7). It may also include updating legacy coding, using modern programming or modular components to streamline business processes and move away from monolithic structure.

IIS and immunization program teams have worked to enhance and modernize IIS for many years, predating the CDC-funded Data Modernization Initiative (DMI) underway in health departments across the US. The work of these teams continues and may also include participating in DMI activities with other programs within their jurisdictions. These collaborative efforts are focused on realizing CDC's broader vision of creating a stronger and more resilient public health system at the jurisdictional and national levels across the US. The goal of this wider effort is to better meet current health needs and increase the nation's preparedness for future health threats.

In recognition of the need for public health to modernize its data, technology and workforce infrastructure, Congress allocated funds to CDC to support the Public Health Infrastructure Grant (PHIG) initiative. CDC has operationalized the PHIG initiative through an extensive grant program for jurisdictions. A specific PHIG initiative for modernizing IIS (MIIS) was established in late 2024 and was designated to support IIS modernization and be directed by immunization programs under the umbrella of participation in their agency's overarching Data Modernization efforts.

CDC defines a **modern public health system** is one that is:

**Scalable:** able to receive, send, and process unpredictable volumes of data.

**Flexible:** supports rapidly changing data, workflows, end users, and end user needs.

**Interoperable:** can easily exchange data with other relevant systems.

**Sustainable:** system is designed. ensure that continuous development, maintenance, and operations costs can be covered by the jurisdiction's routine funding sources.

**Reusable:** usable for both daily and emergent public health action, across multiple disease areas and types of public health threats.

**Intuitive:** can be quickly understood and used effectively by new staff, whether for purposes of routine public health action or emergency response.

Specific IIS modernization activities may include: (8)

**Upgrading Technology Infrastructure:** Moving from legacy, server-based systems to cloud-based infrastructure to expand scalability and improve secure access for immunization providers and other authorized IIS users.

**Promoting Interoperability and Data Quality:** Implementing standards (e.g., HL7, FHIR) to facilitate data exchange between systems within a jurisdiction, such as disease surveillance systems, the IIS, and jurisdiction-specific data lakes. Other interoperability efforts might include data exchange between the IIS and immunization providers, including pharmacies, and federal agencies (i.e., U.S. Department of Defense and the Veterans Health Administration).

**Enhancing Functionality:** Creating, improving, and integrating functions for monitoring the supply and distribution of publicly-purchased vaccines, mobile application access to immunization records for providers and consumers, and updating automated immunization reminder/recall systems.

**Strengthening Analytics:** Developing cloud-based data lakes and increasing capacity to quickly analyze, interpret, visualize and act on data. Working toward AI solutions that focus on areas such as predicting vaccine needs, identifying at-risk populations due to low immunization rates, and improving analysis of vaccine administration data to better inform immunization program interventions.

**Developing the IIS Workforce:** Training staff in advanced tools and analytics to maximize use of modernized systems and data.

**How can modernizing IIS optimize IIS efficiency?**

Modern IIS facilitate more efficient and accurate immunization data reporting and submission between partners. They also support more rapid detection of

immunization coverage gaps in at-risk populations to promote health equity and early intervention to prevent or control disease outbreaks.

**How can modernizing IIS promote IIS sustainability?**

Modernizing IIS promotes operational and technical sustainability. Workflows are streamlined and the skills of the workforce are expanded to better maintain and enhance the IIS over time. As IIS infrastructure becomes more scalable, interoperable, flexible, reusable, and intuitive, the IIS can more easily integrate with evolving technologies and data standards to meet the needs of immunization programs, providers, consumers, and other partners now and into the future.

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## Section 5. "Success Stories from the Field" - Diversifying Funding and Optimizing IIS Efficiency in Practice

The following "Success Stories from the Field" highlight how state public health jurisdictions are putting IIS sustainability strategies into practice. Each story showcases a real-world example of how agencies have diversified funding, strengthened partnerships, or improved operational efficiency to support their IIS. These stories are designed to translate strategy into action by illustrating the public health challenge, the approach taken, the outcomes, and practical lessons learned.

The stories featured in this section include examples of leveraging Medicaid match, billing external partners for IIS data, and managing operational costs through efficiency and innovation. Together, they provide actionable insights, key takeaways, and resources that can be adapted to program and agency-specific context during the implementation of the sustainability strategies and approaches.

- **Success Story from the Field: Billing for IIS Data**
- **Success Story from the Field: Optimizing IIS Efficiency**

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## Section 6. Additional Considerations

Beyond funding and efficiency strategies, several cross-cutting factors influence IIS sustainability. Governance, workforce capacity, partnerships, and continuous learning shape how well sustainability efforts are implemented and sustained over time. The considerations below highlight organizational practices that help ensure IIS programs remain resilient, adaptable, and well-supported.

**Strengthen Governance and Leadership**

Strong governance and leadership provide the structure and direction needed to sustain IIS over time. Clear roles, shared decision-making, and alignment with broader organizational priorities for technology, infrastructure, staffing and data use help ensure that IIS is integrated into routine agency operations and strategic planning and not managed in isolation. This alignment makes it more likely that IIS needs are considered in budgeting, staffing, technology investments, and policy decisions—helping secure ongoing support and resources. Establishing governance structures (e.g., sustainability workgroups) and clarifying responsibilities across immunization, IIS, information technology (IT), procurement, and other teams strengthens accountability and coordination. Aligning IIS priorities with data modernization and immunization program goals further ensures that IIS remains relevant, well-supported, and positioned as a critical component of broader public health infrastructure.

**Build and Retain a Skilled Workforce**

A skilled, capable, and stable workforce is essential for maintaining and evolving IIS; however, many jurisdictions operate with very small teams. In these contexts, workforce development should emphasize flexibility, cross-functional roles, strategic use of available resources, and maintaining core knowledge. Strengthening capacity can include identifying priority skill gaps, building internal "super users" where feasible, and cross-training staff to ensure continuity despite limited personnel. Leveraging CDC educational opportunities, AIRA interoperability and other AIRA trainings, and the PHII IIS Learning Hub, along with peer collaboratives and shared resources, can help strengthen and extend staff capacity. In some cases, jurisdictions may also rely on shared services or contracted support from their vendor, a staffing agency, or other resource to supplement internal expertise.

**Strengthen Partnerships and Stakeholder Engagement**

Strong partnerships help reinforce the value of IIS and create shared ownership of sustainability efforts. Engaging both internal and external partners early and consistently builds alignment, trust, and opportunities for collaboration. Regular engagement with immunization programs, IT teams, providers, payers, electronic health record (EHR) vendors, health information exchanges (HIEs), and other public health and private sector partners can support shared investments and coordinated planning. These partnerships may also create strong advocates for justifying the value of the IIS and the need to sustain it. Regular engagement with these partners, and the use of tools such as data-use agreements, success stories, and performance dashboards help demonstrate impact and sustain stakeholder interest.

**Enact Policies**

Enacting new policies or amending existing ones can help strengthen IISs by facilitating complete and accurate data capture, exchange, and use. Because IISs in the US are independently operated by states, cities, and territories, IIS laws and regulations vary by

jurisdiction (9). AIRA points out that federal policies can facilitate uniformity, while state and local laws can ensure a consistent response to emergencies and routine immunization needs (10). Combined, the right policies can help create a nationwide network of interoperable, secure, and high- performing IISs.

While most jurisdictions have some policies in place to support their IIS, many need new or amended policies to further the effectiveness of their IIS (11). AIRA identifies three policy areas most requiring attention and action: (12)

1. **Vaccine Reporting** - Policies are needed to ensure timely and complete reporting of vaccine doses administered by all immunization providers for all patients across the lifespan (13). Currently, reporting of vaccinations administered to children is more complete than that for adults. Reporting needs to include key data elements, e.g., patient names, date of birth, and gender, along with other fields, e.g., race, ethnicity, address, phone number, and email address. This information helps to inform an understanding of immunization coverage among various populations, facilitate outreach to improve coverage, and assist with matching vaccination reports to the correct patient's IIS record over the patient's lifetime. In addition, providers need to have timely access to consolidated IIS records for their patients to help inform clinical decision-making at the point of care.

2. **Data Exchange** - Policies are needed to allow for interstate data exchange between IISs and reporting of aggregate information to CDC. Research has shown, on average, a person in the US changes residence 11 times over a lifetime. Hence, data exchange across jurisdictions is necessary to ensure complete immunization records. Allowing aggregate vaccination reports to be shared by IIS with CDC will inform national immunization coverage and data-driven decision-making at the federal level.

3. **Consent** - An opt-out consent policy for participation in IIS by patients of all ages will help IISs capture information for all people in their jurisdictions. Currently, the majority of states have opt-out, or a similar policy, but consent policies in some states require patients to give explicit written or verbal permission to opt-in to have their immunization information included in an IIS. Opt-out,or similar policies such as immunization reporting mandates, reduce barriers to capturing immunization information in IISs for the entire population of their jurisdictions.

**Create a Learning Organization**

A learning organization is one that continuously reflects, adapts, and improves based on experience, stakeholder input and data. Continuous learning supports IIS sustainability by enabling programs to adapt, improve, and respond to changing needs. Organizations that foster a culture of reflection and improvement are better positioned to manage complexity and uncertainty. Establishing a culture of learning and improvement, applying qiQuality Improvement (QI) methods, using data to inform decisions, listening to partners and

capturing lessons learned all contribute to stronger, more resilient systems. Participation in national organizations and peer networks, such as AIRA and other public health organizations, also plays an important role by helping IIS teams stay up to date on best practices, learn from other jurisdictions, and remain connected to a broader community of experts. Over time, embedding continuous learning into both internal practices and external engagement helps ensure sustainability efforts remain dynamic, informed, and responsive.