Sustaining DMI: Leveraging Medicaid to Advance Public Health Data and Surveillance

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Contents

Tables

Figures

Executive Summary

Planning for sustainability from the inception of a data modernization initiative (DMI)—a change made to improve the process to access or acquire data, or to improve the outcomes from the use of data in decision-making—aligns the people, processes, technology, and funding of the DMI to enable the propagation and continuation of the DMI. This primer describes how to leverage Medicaid to design and execute a sustainable DMI. It provides guidance, resources, and practical tools for effective management, strategic planning, and skill development to strengthen sustainability planning.

Sustainability Primer at a Glance

Purpose: To provide guidance on how to design and execute a sustainable data modernization initiative (DMI) focused on the advancement of public health data and surveillance.

Learning objectives:

- What DMIs focused on the advancement of public health data and surveillance are and why they are important.
- What is a sustainability planning model and why it is important to the DMI.
- What factors and attributes facilitate a sustainable DMI.
- Why sustainable funding is crucial to DMI success.
- How to leverage Medicaid data system funds with federal, state, and local funding to sustain the DMI.

Actions the state health official should take:

- Use the primer and its toolkit to design and execute the DMI.
- Lead the development of a sustainability plan for the DMI.
- Promote collaboration with Medicaid and other state agencies and leaders to consider diverse funding sources to sustain the DMI.
- Assess and create governance structures to support linkages between people and data to sustain the DMI.
- Identify champions and leadership to sustain the DMI.
- Build a DMI team with people and experts to sustain the DMI.
- Monitor and measure DMI implementation against DMI goals.

Final product:

- A collaborative sustainability plan for a DMI focused on the advancement of public health data and surveillance. The sustainability plan will feature lasting, predictable funding; well-defined governance structures; recognized champions; efficient administrative frameworks; established policies; and robust technical infrastructure operated by clinical and data experts.

Objectives. State health officials (SHOs) and their staff who use this primer will learn how to create a plan to sustain a DMI focused on the advancement of public health data and surveillance. Users will understand how the factors and attributes of sustainability are used to build and assess human and technical infrastructure to create and sustain a DMI. After following the directions in this primer, the DMI team will have a sustainability plan that includes the following core components:

- A long-term goal to sustain the DMI.
- A summary of strengths and areas for improvement to sustain the DMI.
- Action steps for the next three months, six months, one year, and longer term.

Relevance. To sustain DMI activities, SHOs should identify champions and leaders within public health and across state and local agencies and jurisdictions, blend and braid funding streams, harmonize policies and procedures, and build a team of technical and subject-matter experts. SHOs can be the bridge to connect champions and leaders with a team composed of technical experts, clear communicators, and subject-matter experts that are needed to help ensure DMI sustainability.

Champions and leaders promote and support the DMI through the articulation of a vision, the generation and maintenance of enthusiasm and buy-in, and the mitigation and resolution of challenges. State Medicaid program leadership participation and financial support is crucial to sustain a DMI. SHOs are in a unique position to identify multiple champions, especially from Medicaid programs, to represent different organizational disciplines and position levels. SHOs and their staff may braid or blend Medicaid, state, federal, and local funding sources to improve human resources and technical infrastructure and to sustain program administration. Federal, state, and implementing partners' policies and procedures that support data sharing can facilitate sustainability of the DMI. Expertise is critical to sustainability because specialized knowledge and skills are necessary to strategically plan for and ensure continuation of the DMI.

Supporting materials. This primer provides guidance to build infrastructure capacity and foster sustainability. The toolkit provided as part of this primer contains a sustainability planning model, job aids, and key artifacts for the DMI team to develop a sustainability plan.

Introduction

The COVID-19 Public Health Emergency (PHE) drew attention to how critical robust public health infrastructure is to collect, manage, and share public health data to improve the health of individuals and decrease preventable morbidity and mortality. For example, electronic case reports and the exchange of vaccination data were critical during the PHE to support immunization against vaccine-preventable disease. As such, the PHE shed light on opportunities to advance public health data and surveillance and fully integrate public health data into states' health-related data ecosystems. Opportunities include modernizing and proliferating electronic case reporting, electronic lab reporting, public health registries, chronic disease surveillance, and syndromic surveillance; supporting interoperability between immunization information systems (IIS) and public and private data systems; facilitating public health data sharing between different systems in a single state and across multiple states; and improving collection and reporting of birth and death data (see Box 1).[1,2,3,4] Several data modernization initiatives (DMIs)—changes made to improve the process of accessing or acquiring data or to improve the outcomes from using data in decision-making—focused on the advancement of public health data and surveillance are already underway, the largest being the Centers for Disease Control and Prevention's (CDC's) multiyear, national DMI to modernize data across the federal and state public health landscape.[5]

Box 1: Examples of initiatives through which DMIs can advance public health data and surveillance

- Birth and death data
- Chronic disease surveillance
- Electronic case reporting
- Electronic lab reporting
- Immunization information systems
- Public health registries reporting
- Syndromic surveillance

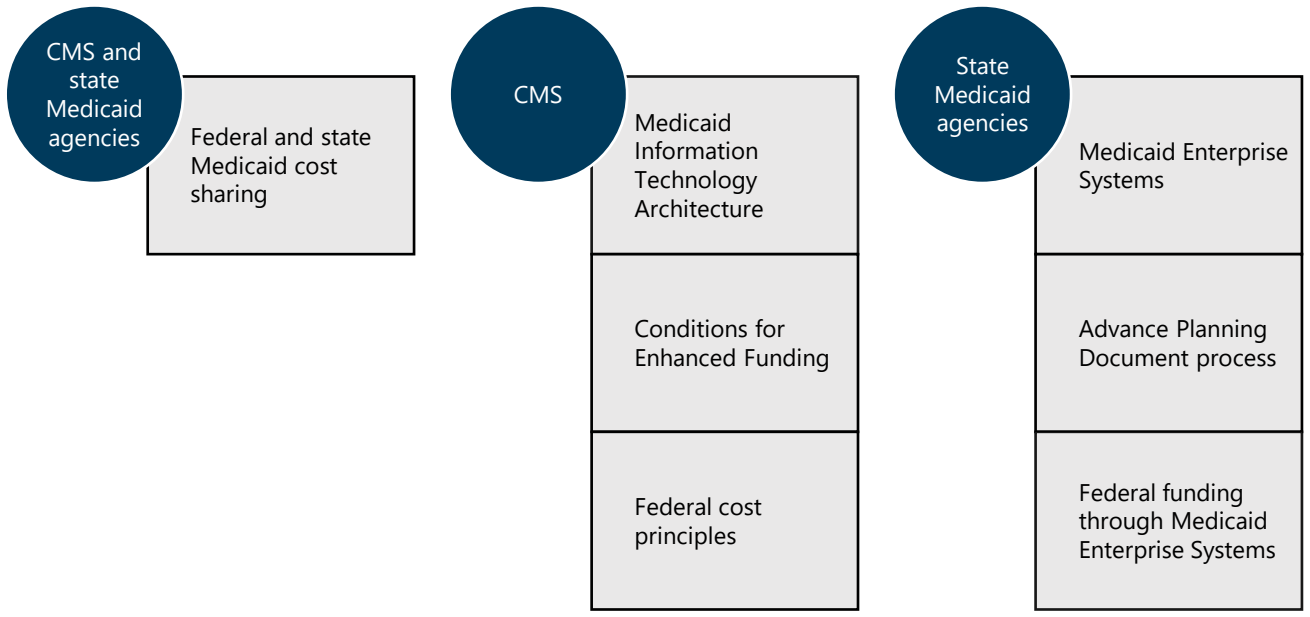
State Medicaid programs are uniquely poised to play a critical role in the advancement of public health data and surveillance

State leaders that seek to advance public health data and surveillance can consider doing so in multiple ways and with various public and private data system partners. Medicaid (Title XIX of the Social Security Act), however, is uniquely poised to play a critical role in the advancement of public health data and surveillance and can serve as a primary partner for states to fully integrate public health data into state health-related data ecosystems. Medicaid is a joint federal-state entitlement program that provides health care coverage to both low-income adults and children. Although state implementation of Medicaid varies, each state Medicaid program has enrollment and claims data on Medicaid participants, the details of which may be of value to public health programs, such as immunization programs. For example, states have data on race and ethnicity, age, diagnoses, and vaccines received. A DMI that combines Medicaid and public health data can yield various improvements to the public health program and infrastructure, such as improved data quality, public health reporting, data storage

and resiliency, and analytics to respond to pandemics. It can also set the stage for data sharing with additional data system partners, which can further improve the public health infrastructure.

States that choose to leverage Medicaid to advance public health data and surveillance should consider the key factors in the Medicaid environment presented in Figure 1. Below the figure, we describe each key factor.

Figure 1. Key factors in the Medicaid environment and the governmental authority that executes them



CMS = Centers for Medicare & Medicaid Services.

Federal and state Medicaid cost sharing. As a joint federal-state program, both the federal government—specifically the Centers for Medicare & Medicaid Services (CMS)—and state governments share the costs of the Medicaid program. States fund their share of the costs to operate the Medicaid program through various funding sources, for example, sales tax, tobacco settlement funds, and local government funding. CMS matches state Medicaid spending using the Federal Medical Assistance Percentage (FMAP) match rate, which ranges from 50% to 83% of total Medicaid service costs. States with higher per capita income compared to the national per capita income have a lower FMAP, whereas states with lower per capita income compared to the national per capita have a higher FMAP.[6,7,8] In addition, states can require that some Medicaid participants share in the cost of certain Medicaid services.[6] Enhanced federal financial participation (FFP) is available to states for the design, development, and implementation and then operations and maintenance of certain Medicaid data and technology systems. The federal government may reimburse states for 90% of their design, development, and implementation costs and 75% of their operations and maintenance costs (details of which are covered in Factor 3). As such, Medicaid is a potentially large and stable funding stream for

states. This funding stream, within Medicaid rules and regulations, can be used to support certain public health technology and staff.

Medicaid Enterprise Systems (MES). To manage its Medicaid data and run its program, each state is required to operate an MES. Increasingly, state Medicaid agencies' (SMAs') MES are composed of independent modules. CMS requires states to implement these modules in line with CMS-required outcomes, but it offers states flexibility to implement and report outcomes that substantiate that they have designed their MES in a way that supports their state's specific Medicaid operations in a timely and cost-effective manner. Traditionally, an MES contains modules in 12 categories: (1) eligibility and enrollment, (2) claims processing, (3) financial management, (4) decision-support system/data warehouse, (5) encounter processing system, (6) long-term services and supports, (7) member management outcomes, (8) prescription drug monitoring program, (9) pharmacy benefit management, (10) provider management, (11) third-party liability, and (12) program integrity (Table 1).[9,10] However, states may design their MES to contain as many modules as they see fit to administer the Medicaid program.

Table 1. Common Medicaid Enterprise Systems module categories[11]

Module category	Brief description
Eligibility and enrollment	Categorizes eligibility information by receiving, ingesting, and processing materials such as applications and renewal forms.
Claims processing	Ingests and validates claims against rules and may also generate reports to meet federal reporting requirements.
Financial management	Calculates and initiates fee-for-service provider payment or recoupment amounts and actions, supports appeals and capitation payments, and generates data needed for reports.
Decision-support system/data warehouse	Includes software to extract and analyze Medicaid data to inform program and policy decisions and report on the delivery of the Medicaid Program.
Encounter processing system	Ingests managed care organization (MCO) encounter data and sends feedback to MCOs to ensure industry-standard formatting. Also supports tracking of MCO submission requirements, payment comparisons, and cost of care analysis.
Long-term services and supports	Supports management of long-term care services and supports through and across a range of vehicles and settings, including institutional care and community-based long-term services and supports.
Member management outcomes	Determines eligibility for the Medicaid Program, enrolls and manages members in benefit delivery entities, and supports member communication and responding to member requests.
Prescription drug monitoring program	Monitors prescription drug history, prescription drug and other controlled substance use, and demographic information of prescribing providers.
Pharmacy benefit management	Provides services such as claims adjudication, rebate administration, utilization monitoring, drug utilization review, and preferred drug list oversight.
Provider management	Screens and enrolls providers into the Medicaid Program, keeps provider information current, provides data to authorized requesters, and supports provider outreach, communication, and responding to provider requests.

Module category	Brief description
Third-party liability	Identifies cases in which Medicaid beneficiaries have more than one source of coverage for health care services, such as self-insured plans and MCOs, to ensure that the appropriate payer covers services.
Program integrity	Monitors for waste, fraud, and abuse of Medicaid funds.

In addition, CMS encourages, but does not require, states to implement MES modules in line with health information exchange (HIE) outcomes.[12] Ideally, each MES should include the ability to share data with other data systems, such as HIEs, Health Data Utilities (HDU) (more expansive HIEs), Qualified Health Information Networks (QHINs), and IIS, as this helps improve a state's public health infrastructure and its ability to collect, manage, and maintain robust public health data to improve individual and population health.[13,14] In fact, as early as 2000, CMS allowed states to use enhanced federal funding to incorporate immunization registries into their MES or larger health-related data ecosystems.[1,15]

Medicaid Information Technology Architecture (MITA). MITA is a framework and initiative that supports MES by establishing national guidelines for states to follow to ensure that their Medicaid IT projects align with national-level goals.[16] MITA also gives states greater access to data, including data that can be used to improve public health surveillance.[17]

Advance Planning Document (APD) process. The APD process relates to both MES and MITA as states are mandated to submit to CMS—specifically the Center for Medicaid and Children's Health Insurance Program Services (CMCS) Data and Systems Group (DSG)—an APD, which is a plan of action, for their Medicaid IT projects if they want to receive federal financial participation for their activities. A designated CMCS DSG state officer[2] reviews APDs against their technical and operational criteria to determine if a state qualifies for funding. The state officer also uses APDs to monitor a state's project performance and outcomes.[18] In this new structure, CMCS DSG state officers review and oversee APDs (Figure 2).[18,19,20,21]

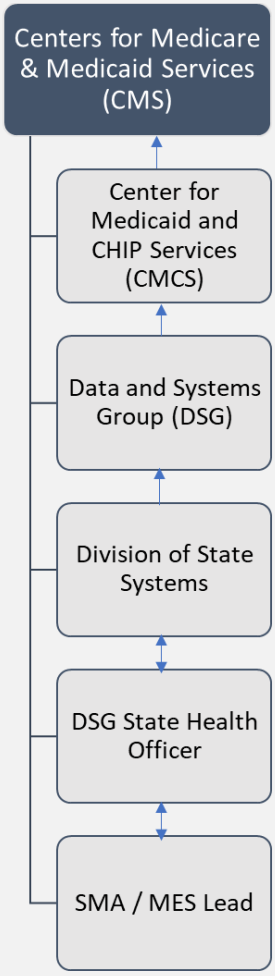
[1] The Children's Health Insurance Program Reauthorization Act of 2009 amended Section 1903(a)(3)(A) of the Social Security Act to allow states to collect federal revenues at their designated FMAP rate for the "developments or modifications of systems . . . necessary for the efficient collection and reporting on child health measures." The child health measures include immunization-related quality measures in the Child Core Set. States interested in connecting data to or extracting data from their IIS to calculate and report these measures could leverage FMAP funding to do so.

[2] Previously, CMS Regional Offices reviewed and oversaw APDs, but CMS recently transitioned to a new organizational structure to better support state IT programs and monitor national IT implementation.

Conditions for Enhanced Funding. The Conditions for Enhanced Funding are a series of federal requirements that states must meet to receive federal financial participation. If an SMA meets these requirements, couples them with measurable outcomes that improve the Medicaid program, and follows federal cost principles (defined below), it can receive enhanced funding at the rate of either 90% to design, develop, or implement or 75% to operate and maintain a MES module (42 C.F.R. § 433.112).[22] For example, a condition for enhanced funding is that the state "promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states."[23]

Federal cost principles. Federal cost principles are regulations that dictate the types of direct and indirect costs that are allowable under federal funding rules, along with how costs should be allocated.[24] If SMAs receive enhanced federal funding for MES modules, they must calculate funding to ensure that (1) allowable costs are *allocated* to a specific entity or user (OMB Circular A-87), (2) the allocated costs for each entity or user are assigned in accordance with the benefits received (known as the "fair share principle"), and (3) costs attributable to the state are paid for using *certain sources of funds*. Some states could follow a similar process as is depicted in Figure 3 to secure development and ongoing funding for HIEs.

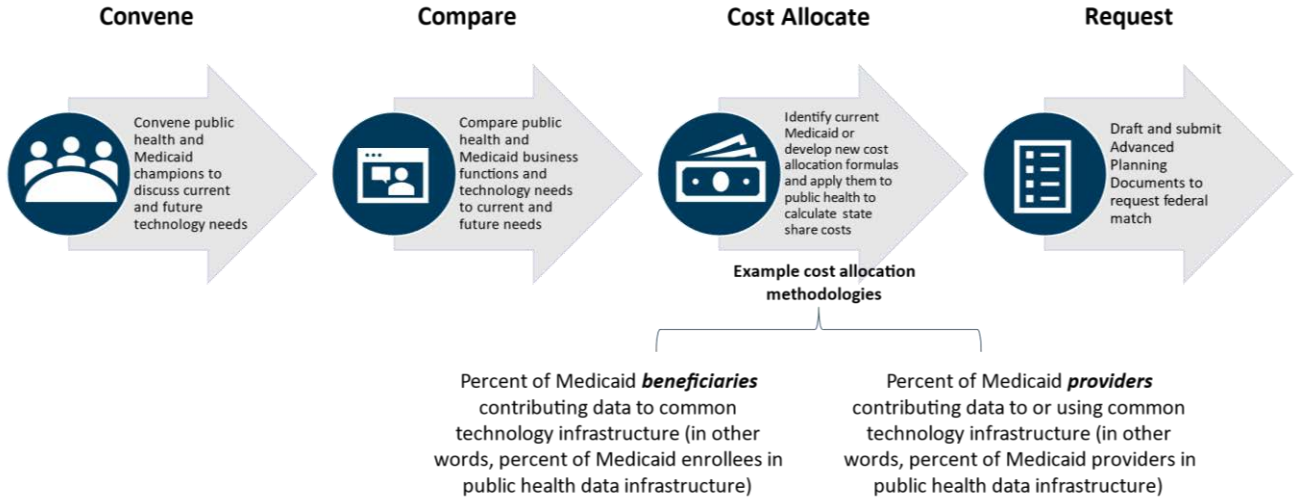
Figure 2. CMS organizational structure to support state Medicaid IT projects



MES = Medicaid Enterprise Systems; SMA = State Medicaid Agency.

Movement to MES funding from Health Information Technology for Economic and Clinical Health (HITECH) Act funding. States initially relied heavily on HITECH funding to support novel Medicaid-related data-sharing activities. For example, CMS allowed public health agencies, SMAs, and other relevant entities to access HITECH funding and share costs to design, develop, and implement data-sharing functionalities.[25] With the 2021 expiration of HITECH funding, states currently rely more on federal funding through the traditional MES funding process.[26] To qualify for and use MES funding to support data-sharing activities, SMAs need to build and maintain strong partnerships with HIEs or other exchange partners to discuss and determine how HIE technology can fit with an MES and how it can support a state's Medicaid program in meeting and achieving CMS requirements and intended outcomes.

Figure 3. Example process to secure enhanced federal funding for HIE-based functions and technology to support public health and Medicaid operations



Sustaining successful DMIs is key to making long-term DMI improvements and, in turn, to improving public health data and surveillance

A state's DMI will vary based on factors such as the maturity of the state's public health programs and technology infrastructure, its specific data-sharing needs, and its available resources. Some states might undertake simple DMIs with few components and collaborators, whereas other states might have more complex DMIs with many components, implementation partners, and interested parties. In addition, some states might implement their DMIs and meet their intended outcomes easily; others might implement, evaluate, and redesign their DMIs to better meet their intended outcomes. Regardless of a state's DMI design and approach, sustainability should be built into the planning process. Sustainability includes maintaining the roles, processes, and technology implemented through the DMI. Without a plan for sustainability, states can lose momentum and resources to fully implement and maintain the DMI.

Generally, a sustainability plan contains three core components: (1) a long-term goal to sustain the innovation—in this case, the change that results from a DMI; (2) a summary of strengths and areas for improvement to sustain and perpetuate the DMI; and (3) action steps for the next three months, six months, one year, and longer term. The implementers of a DMI must organize people, processes, and technology to obtain and maintain strong buy-in to integrate the DMI into workflows and produce results that meet interested party expectations. The length of time and level and type of resources required to develop a sustainability plan vary based on such factors as the size of the DMI and how many implementation partners and interested parties it involves.

The DMI Sustainability Primer can help SHOs include and sustain the DMI in their health-related data ecosystem

Mathematica and the Association of State and Territorial Health Officials developed the Sustainability Primer for state health officials (SHOs) and their supporting staff to create a sustainability plan for their DMIs. This primer leverages the sustainability planning model created by Johnson and colleagues and used by the Agency for Healthcare Research and Quality. [27, 28] The primer consists of two major parts:

- **Part 1.** Description of the factors and attributes that can help implementing partners build their infrastructure capacity and facilitate sustainability.
- **Part 2.** Toolkit to develop a sustainability plan that includes a sustainability planning model, job aids, and templates for the creation of key artifacts that provide information necessary to complete the sustainability plan.

Part 1 consists of several sections. Table 2 lists the sections, along with the section's purpose, the actions the SHO should take for the section, and the final product or result the SHO will have after section completion.

Table 2. Part 1 sections

Section	Purpose	Actions the SHO should take	Final product or result
Designing the DMI	To develop a thorough design plan for the DMI.	The SHO should lead development of the DMI design plan. The SHO can choose to delegate activities to their supporting staff as they see fit.	The SHO will have a thorough design plan for the DMI.
Factor 1: Administrative structures and formal linkages	To assess each implementing partner's administrative structures and formal linkages to ensure that implementing partners are ready to actively engage in, and sustain, the DMI.	The SHO should work with champions to divide and complete the activities. The SHO and champions can choose to delegate certain activities to DMI team members.	The SHO will have a key artifact that identifies administrative structures and formal linkages within and between implementing partners.
Factor 2: Champions and leadership identification	To assess champion roles to lead and sustain the DMI.	The SHO should work with champions to review the key artifact generated through Factor 1 to identify and potentially engage additional champions to lead and sustain the DMI. The SHO and champions can choose to delegate certain activities to DMI team members.	The SHO will have an updated team of champions to lead and sustain the DMI.

Section	Purpose	Actions the SHO should take	Final product or result
Factor 3: Resources	To assess resources (funding, people, and technology) needed to sustain the DMI.	The SHO should delegate the activities in this section to champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review the key artifact generated by champions. If necessary, the SHO should iterate with champions to improve the key artifact and then finalize it.	The SHO will have a key artifact that identifies resources needed to sustain the DMI.
Factor 4: Administrative policies and procedures	To assess federal, state, and implementing partners' policies and procedures that facilitate sustainability of the DMI.	The SHO should delegate the activities in this section to champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review findings identified by champions. If necessary, the SHO should iterate with champions to improve the findings and then finalize them.	The SHO will have a summary of federal, state, and implementing partners' policies and procedures that facilitate sustainability of the DMI.
Factor 5: Expertise	To develop a plan to build and maintain expertise to sustain the DMI.	The SHO should delegate the activities in this section to champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review findings identified by champions. If necessary, the SHO should iterate with champions to improve the findings and then finalize them.	The SHO will have a plan to build and maintain expertise to sustain the DMI.
Sustainability attributes	To assess the attributes that can facilitate sustainment of the DMI.	The SHO should work with champions to divide and complete the activities. The SHO and champions can choose to delegate certain activities to DMI team members.	The SHO will have a key artifact that identifies how the DMI team relates to interested parties and how the DMI relates to interested party needs.

DMI = data modernization initiative; SHO = state health official.

The remainder of this document describes each part of the Sustainability Primer.

Part 1. Factors and Attributes that Build Implementing Partners' Infrastructure Capacity and Facilitate Sustainability

In this chapter, we describe the key components of designing a DMI. We then describe the five factors that can help implementation partners build the infrastructure capacity needed to build and sustain the DMI. These five factors are (1) administrative structures and formal linkages, (2) champion and leadership identification, (3) resources, (4) administrative policies and procedures, and (5) expertise. Throughout our description, we use examples of DMIs focused on the advancement of public health data and surveillance. These examples center on birth and death data, electronic case reporting, electronic lab reporting, IIS, public health registries, chronic disease surveillance, and syndromic surveillance (see Box 1). Although these DMI use cases can vary in the ways they are designed and implemented, the principles and approach to sustainability can apply to any DMI.

Designing the DMI

SECTION AT A GLANCE

Purpose: To develop a DMI design plan.

Relevant job aids and templates: Appendix A.1 is an option to help SHOs and their supporting staff complete the activities in this section.

Actions the SHO should take: The SHO should lead development of the DMI design plan and align its creation with the key components described in this section. The SHO can choose to delegate activities to their supporting staff as they see fit.

Final product or result: The SHO will have a DMI design plan.

Successful implementation and sustainability of a DMI hinges on strong initiative design. The SHO and their support staff should develop a thorough design plan for the DMI, detailing what it is intended to do and how it will be executed. The SHO and their support staff should ensure that the DMI is designed with the following key components.

Goal. Articulate the goal of the DMI and how it will change the health-related data ecosystem to improve public health data and surveillance. Table 3 presents examples of this type of goal setting.

Table 3. Example goals for DMIs centered on public health registries reporting, chronic disease surveillance, and IIS[29]

Goal of the DMI	How it will change the health-related data ecosystem
Leverage existing infrastructure to identify funding opportunities that can mitigate legal, technical, and other types of challenges to share data between public health registries and Medicaid	Will improve ability for public health registry-Medicaid data sharing
Establish a data use agreement to get direct access to Kidney Disease Surveillance System data	Will facilitate timely and more accurate data sharing
Modernize legacy system to conduct large-batch patient matching between IIS data and other data sets	Will improve interoperability

DMI = data modernization initiative; IIS = immunization information system.

DMI team members and interested parties. Public health agencies, Medicaid, and HDUs, such as HIEs and QHINs, are key entities that create or facilitate public health data use or exchange. They should be involved in the implementation of the DMI, along with other relevant entities. Identify the (1) DMI team members who will execute the DMI and their roles and responsibilities and (2) interested parties and how their needs can be met through the DMI. DMI team members include champions and executive leaders to drive the DMI, task leads, and supporting staff. Interested parties include beneficiaries, implementers, developers, decision-makers, and evaluators of the DMI. Table 4 presents examples of DMI team member roles and their responsibilities and interested parties and their needs.

Table 4. Example DMI team member roles and responsibilities and interested party needs for DMIs centered on electronic case reporting, death data, and electronic lab reporting[29]

DMI team member role and interested party	Responsibilities and needs
DMI team role	**Responsibilities**
Champion	Oversees all aspects of the DMI, provides leadership, makes strategic decisions, and monitors progress status, quality, and fiscal progress
Manager	Oversees daily DMI activities, manages and delegates tasks, tracks budget and resources allocations, and reports to champion
Technical expert—data interchange and exchange	Develops one- and two-directional interfaces between EHRs, HIEs, data registries, and other data sets, and reports to champion or project manager
Interested party	**Needs**
State HIE, HDU, or QHIN	More robust data to produce higher-quality analyses and reports, potentially sharing data with a neighboring state's HIE, other exchange partners, and Medicaid agency to support more data sharing
State child welfare agency	More robust data to conduct higher-quality analyses and identify ways to improve care management for children in the child welfare system
National Cancer Institute[1]	More robust data to produce higher-quality analyses and reports
Lead medical examiners in a state[2]	More robust data to produce higher-quality analyses and reports
Association of Public Health Laboratories[3]	More robust data to produce higher-quality analyses and reports

EHR = electronic health record; HIE = health information exchange; IIS = immunization information system; QHIN = qualified health information network.

[1] This interested party applies only to DMIs centered on electronic case reporting.

[2] This interested party applies only to DMIs centered on death data.

[3] This interested party applies only to DMIs centered on electronic lab reporting.

Objectives and measures. Identify objectives that can help the DMI team reach the goal of the DMI. Where possible, identify objectives that may be of value to the state's Medicaid program so that the modernization activity is well-positioned to potentially secure Medicaid funding during development and operations. Create measures that the team can use to assess whether the DMI is achieving objectives. Set measure targets that, when reached within the designated time frame, collectively provide proof that your goals have been met. Linking objectives to measures allows the DMI team to track progress. Table 5 presents example pairs of objectives and measures.

Table 5. Example objective, outcome, measure, target trios for DMIs centered on syndromic surveillance, public health registries reporting, and IIS

Objective	Outcome	Measure	Target
Increase the percentage of records matched from health providers' EHRs to National Syndromic Surveillance Program data	Healthcare providers (Medicaid and non-Medicaid) contribute to and receive timely data on emerging and present public health syndromes.	Percent increase of records matched	50% increase in one year
Enhance race and ethnicity fields by hydrating public health registries with demographic data	Healthcare providers (Medicaid and non-Medicaid) can more effectively monitor equity of health statuses.	Percent decrease of empty race and ethnicity fields in public health registries	80% decrease in two years
Increase the percentage of providers who use query by parameter	Healthcare providers can more quickly execute queries.	Percent increase of providers who use query by parameter	25% increase in 14 months

EHR = electronic health record; IIS = immunization information system.

Resources. Articulate what the DMI team must have to achieve the goal of the DMI. Consider three categories of resources: (1) personnel, (2) technology, and (3) funding. Table 6 presents examples of resources in these categories.

Table 6. Example resources for DMIs centered on advancing public health data and surveillance

Resources
Personnel
Technical expert—data privacy and security
Compliance or legal issues officer
Budget officer
Technology
Hardware
Software
Funding
Federal government funding
State government funding
Private entity funding

Milestones. Articulate milestones and key products of the DMI, including start and end dates for associated activities. Table 7 presents examples of milestones.

Table 7. Example milestones for DMIs centered on advancing public health data and surveillance

Milestone
Identify and recruit of DMI team within one month of project start
Develop and complete technical design of DMI within two months of project start
Pilot new workflow within six months of project start
Refine new workflow-based pilot findings within eight months of project start

DMI = data modernization initiative.

Administrative structures and formal linkages

Factor 1. Building infrastructure capacity

Section at a Glance

Purpose: To assess each implementing partner's administrative structures and formal linkages to ensure that implementing partners are ready to actively engage in and sustain the DMI.

Relevant job aids and templates: Appendix B.1 must be used to complete the activities in this section. Appendices A.2 to A.5 are optional.

Actions the SHO should take: The SHO should work with champions to divide and complete the activities in this section. The SHO and champions can choose to delegate certain activities to DMI team members. When determining how to divide work, the SHO and champions should consider factors such as the SHO's and champions' name recognition in the state and the size of the state.

Final product or result: The SHO will have a key artifact that identifies administrative structures and formal linkages within and between implementing partners.

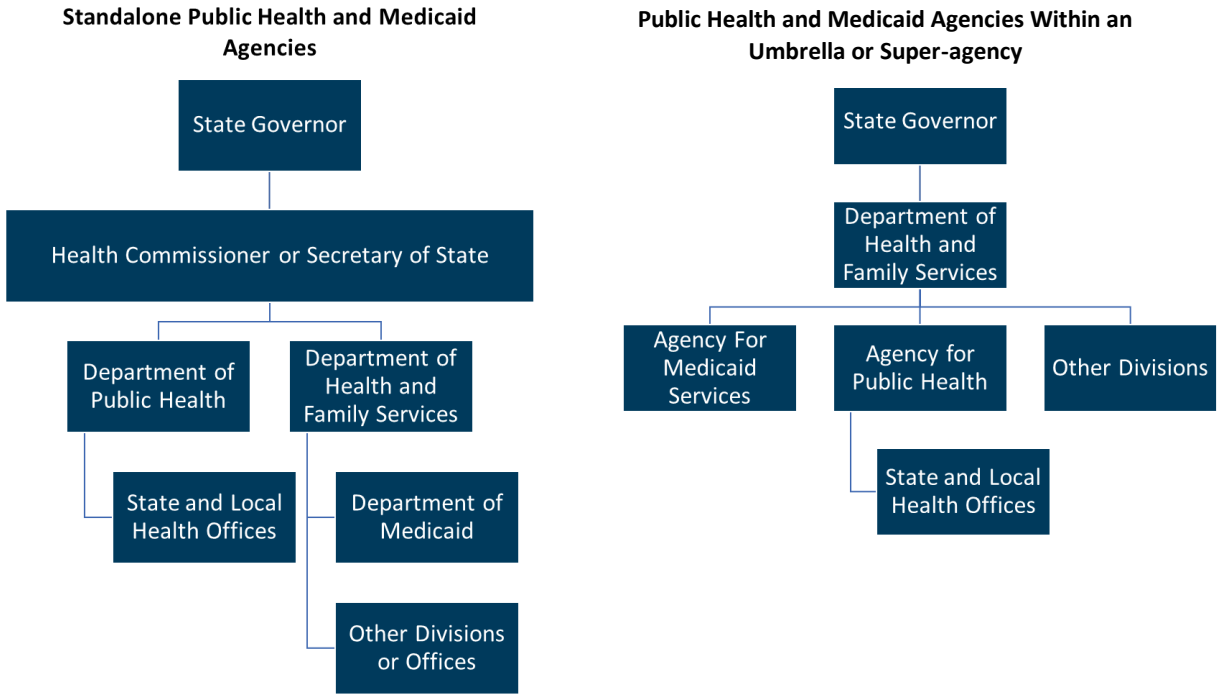
Each implementing entity's administrative structures and formal linkages between those structures and other relevant entities can facilitate or hinder collaboration in the initiative. The strengthening and maintenance of this collaboration is critical to sustainability. Each implementing entity's administrative structures should exercise strong organizational and fiscal practices and have the capacity to actively engage in the DMI. Each implementing entity's formal linkages within its own organization and to other relevant entities should be strong, ensuring that all entities have adequate support from their peers to actively engage in the DMI.[27]

When assessing implementing partners' administrative structures and formal linkages, consider the following key factors.

Governance structure between public health, Medicaid, and exchange partners. Each state can organize its public health, Medicaid, and exchange partner systems (for example, HIE, HDU, and QHIN) in a different way.[30] Therefore, the DMI team should develop a strong understanding of their state's governance structure between public health, Medicaid, and exchange partners, and how the governance structure affects data sharing.

Public health and Medicaid. A state's health agency and Medicaid agency can either be standalone governmental agencies or part of a larger agency that oversees a variety of services (sometimes called an umbrella agency or super-agency), such as a unified Department of Health and Human Services.[30,31,32] Some standalone state health agencies include overseeing Medicaid, whereas other standalone health agencies are distinct from Medicaid.[33] Figure 4 displays possible governance structures between public health and Medicaid. A state health agency's and Medicaid's access to data sources can depend on their public health-Medicaid governance structure. For example, a standalone state health agency that oversees Medicaid may have greater ability to combine public health and Medicaid data because these data may be under the protection of a single information security office and require a single, master data use agreement (DUA).

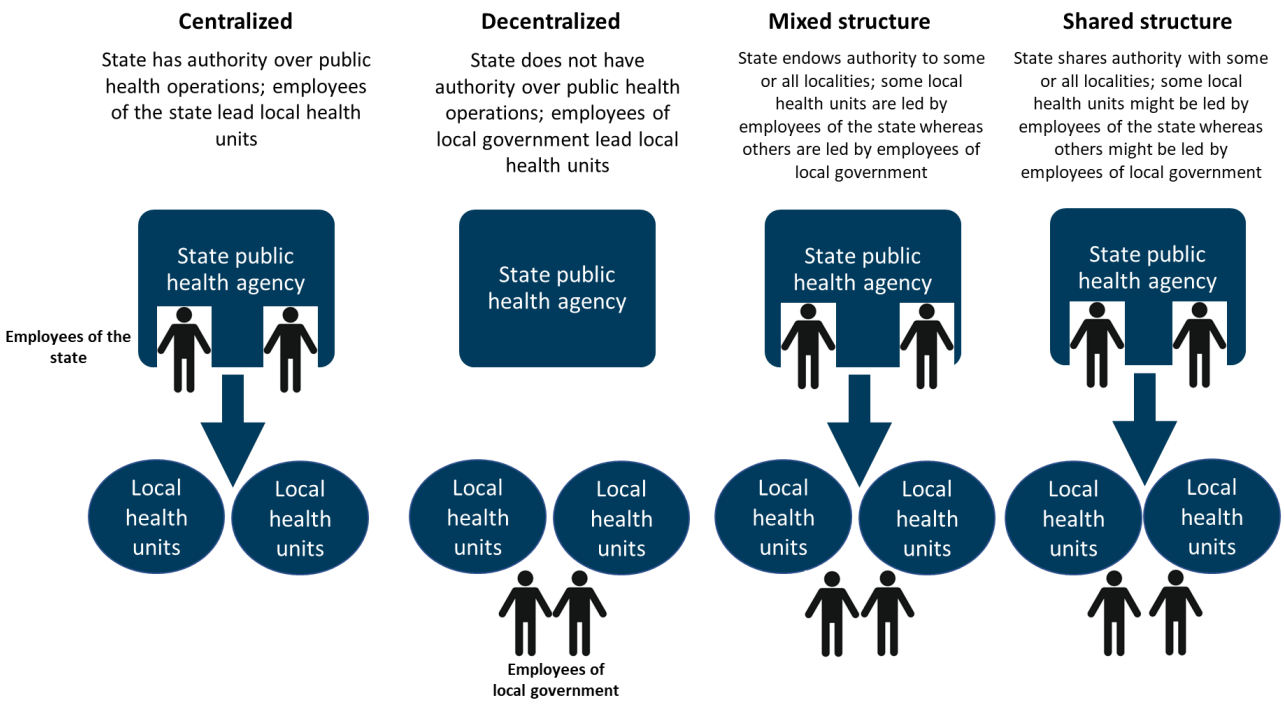
Figure 4. Possible governance structures between public health and Medicaid



Note: All 50 U.S. states, Washington, D.C., Guam, Puerto Rico, American Samoa, and the U.S. Virgin Islands have state health agencies directed by a health commissioner or secretary of state. Each state has a SHO, appointed either by the state governor, state board of health, or an agency head, as director of the state health agency. The SHO may be the director of state health or work for the director.

In addition, the governance structure between an SMA and its local public health departments can affect public health-Medicaid data sharing. A state's public health governance structure with its localities may be centralized, decentralized, of mixed structure, or of shared structure, meaning that the state either has authority over public health operations, endows authority to some or all localities, or shares authority with some or all localities.[34,35] Although there may be public health data sets that by law have special data-sharing restrictions, such as vital records, the ease with which public health data may be shared among other governmental agencies may be driven by the policies and procedures of the general counsels presiding over the public health agency and their familiarity with data exchange use cases. Figure 5 displays possible governance structures between a state's public health agency and its localities. A state health agency's ability to engage in data sharing with Medicaid may be affected by whether the agency has full authority to share data with Medicaid or whether localities must also authorize data sharing.[31]

Figure 5. Possible state public health governance structures with its localities[34]



Public Health, Medicaid, and HDUs. Many states have a state-designated entity that manages HIE, or broader HDU activities. This entity might be a state agency; health information organization contracted by state government; a public or private entity, often created by legislation; or a state agency partnering with a newly-created organization.[36] An HIE's access to data sources can depend on its state designation or affiliation with a state agency. For example, an HIE operated by a state agency, compared with an HIE operated by a health information organization or a public or private entity, might have easier access to data from state health and Medicaid agencies.[37] With the creation of the Trusted Exchange Framework and Common Agreement (TEFCA), data sharing among a wider community of providers, individuals, and public health entities is furthered with universal governance, policy, and technical specifications.[38] With this structured foundation, a Recognized Coordinating Entity maintains and updates the Common Agreement and oversees QHINs, which can connect directly to each other to ensure interoperability between the networks they represent. Similar to HIEs, a QHIN's access to data sources can depend on its affiliation with public health and Medicaid and its Common Agreement criteria.[39, 40]

Depending on the governance structure in a state, the DMI team should plan to engage, at minimum, the following individuals or their designees to integrate and sustain the DMI.[32,33,41,42] Position titles will vary across states.

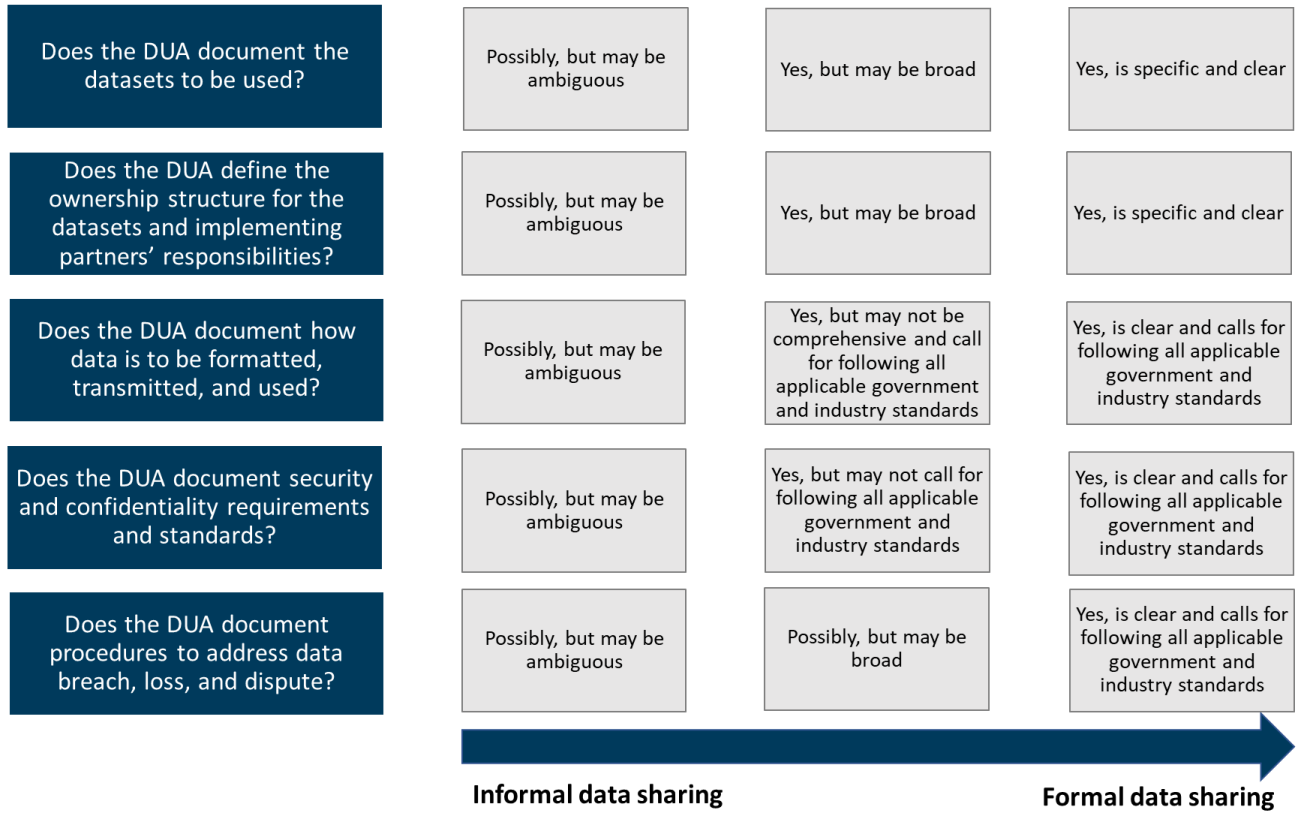
- **State health agency director** if the role is distinct from that of the SHO. If a state health agency is part of a larger agency, also engage the director of the larger agency.
- **State health agency's board or council of health** if one exists. These boards or councils generally consist of gubernatorial appointees, public health professionals, consumers, and others.
- **State Medicaid director.** If the Medicaid agency is part of a larger agency, also engage the director of the larger agency.
- **State Medicaid program's medical care advisory committee** that contributes to program administration. These committees generally consist of government representatives, providers, consumers, and others.
- **State HIE or HDU director.**
- **QHIN administrator.**
- **Local health department directors** if the state's governance structure with its localities is decentralized, has a mixed structure, or has a shared structure.

Implementing partners' budgets for data sharing. After identifying and engaging the appropriate leaders from public health, Medicaid, HDU and other relevant entities, the DMI team will gather information on each entity's available budget to engage in data sharing. Entities may have vastly different budgets. Therefore, the DMI team should work to align activities in the DMI with each entity's budget, helping ensure that each entity's expected level of engagement in the DMI is feasible. In some cases, the DMI team will identify where entities' work overlaps through common projects, roles, and individuals. The DMI team should then assess if the overlap points to how some data-sharing activities can be prioritized over others.

Implementing partners' data use agreements. The DMI team should assess formal and informal DUAs (1) within each entity and (2) between the entities. For formal DUAs, the DMI team should assess whether a current DUA can be strengthened by adding, for example, a new data set, or broadened to focus on acceptable use cases. In the case that public health and Medicaid both have DUAs with the same HIE, the existing DUAs may be revised, or a new DUA specifying the public health–Medicaid collaboration with HIE may be created. Public health and the state can also leverage TEFCA's floor of universal interoperability. Public health and state governments can predict the availability and requirements of data to be shared with a QHIN's compliance with the Common Agreement's criteria.[38,41,43,44] For informal DUAs, the DMI team should work to formalize the agreement by developing a DUA that specifies data sets and defines implementing partners' needs, responsibilities, and if possible, use cases that are outcomes- or goal-focused.

By broadening the DUA to encompass outcomes or goals, entities keep the DUA focused on the "what" (that is, the data), and let the exchange partners focus on refining the "how." Figure 6 displays the continuum of informal and formal DUAs. When strengthening or developing DUAs, the DMI team should aim to make a DUA as comprehensive as possible. For example, if the DMI team is developing a DUA between a state health agency and Medicaid, it should try to include all of the state health agency's divisions and programs in the DUA so that individual divisions and programs do not have to develop an individual or ad hoc DUA with Medicaid.[31]

Figure 6. Continuum of informal and formal data use agreements for DMIs centered on advancing public health data and surveillance



DUA = data use agreement.

Champions and leadership identification

Factor 2. Building infrastructure capacity

Section at a Glance

Purpose: To assess champion roles to lead and sustain the DMI.

Relevant job aids and templates: Appendix B.1 must be used to complete the activities in this section. Appendices A.2 to A.5 are optional.

Actions the SHO should take: The SHO should work with champions to review the key artifact generated through Factor 1 to identify and potentially engage additional champions to lead and sustain the DMI. The SHO and champions can choose to delegate certain activities to DMI team members.

Final product or result: The SHO will have an updated team of champions to lead and sustain the DMI.

Existing literature indicates that champions—influential and proactive individuals that drive and lead the DMI—are critical facilitators for DMI sustainability.[27,45,46] In fact, Mullins and colleagues found that only those organizations with a champion for technology were likely to adopt the technology.[45] Champion leaders promote and support the DMI by helping to articulate a vision for the DMI, generating and maintaining enthusiasm and buy-in for the DMI as a necessary part of workflow, and helping mitigate and address challenges to successful DMI implementation.[27,46] Therefore, champion roles should be strengthened and maintained to sustain the DMI.

When assessing champion roles, consider the following key factors.

Champions' affiliation to state system. Champions can be employed inside or outside of a state system. In fact, multiple champions representing different organizational disciplines and position levels can help facilitate sustainability. This is because they each offer different skill sets and perspectives to the DMI and can potentially connect with and obtain stronger buy-in and support from a range of interested parties.[27] For states choosing to implement and sustain DMIs that leverage Medicaid to advance public health data and surveillance, at least one of the champions must have a strong affiliation with the SMA.

Formal and informal champions. Champions can be ***formal*** (that is, officially designated as a champion by an agency leader or other type of authority) or ***informal*** (that is, organically emerge as an unofficial champion). In addition, a state might use a combination of formal and informal champions to drive and lead its DMI. Formal champions are more likely to have authority and associated credibility from their position level and official designation as a champion to drive and lead the DMI, using this authority and credibility to become familiar with, and have some level of control over, available resources. They can also use this authority and credibility to conduct DMI-related activities such as building partnerships with interested parties to sustain the DMI. In contrast, informal champions are likely to have less authority, familiarity, and control over resources because they do not have the official title of champion. They can, however, drive and lead the DMI through their professional and interpersonal

influence on executive leaders who have more authority over the DMI.[27,46] In addition, without the responsibilities that a formal designation of champion might bring with it, informal champions might have more flexibility to advocate for more feasible and practical solutions to DMI-related challenges. Table 8 lists key skills and characteristics of formal and informal champions.

Table 8. Key skills and characteristics of formal and informal champions for DMIs centered on advancing public health data and surveillance[27,46,47,48]

Skills and characteristics	Formal champion	Informal champion
Coaching or training skills	x	x
Communication skills, including presentation and engagement skills	x	x
Broad understanding of the implementing partners and how they work	x	x
Broad understanding of the interested parties involved	x	x
Influencing skills	x	x
Interpersonal skills	x	x
Positive professional reputation	x	x
Problem-solving skills	x	x
Senior staff or long-term tenure with organization	x	x
Strong commitment to the DMI	x	x
Ability to leverage sufficient organizational resources	x	
Facilitation skills	x	
Leadership position or decision-maker with authority and power	x	
Project management skills	x	
Policy, regulatory, or program knowledge or position	x	
Able to translate overall change vision into local benefit understanding		x
Seen as a go-to person		x
Technical or domain knowledge		x
Well-networked within the organization and respected by peers		x

DMI = data modernization initiative.

Champions' tenure. A long-tenured champion can be more familiar with the risk, uncertainty, and resistance associated with the DMI and, therefore, better able to mitigate and address challenges. Long-tenured champions can also have a deeper understanding of the implementing agencies and the way they work and greater ability to build information and communication networks.[27,46]

Available supports for champions. Aligning available supports for champions with the specific champion's skills and characteristics is key to cultivating effective champions. An agency leader or other type of authority designating a champion should ensure that the champion has the support they need to drive and lead the DMI. For example, if a champion is a less-tenured individual, authorities should provide coaching and training opportunities to the champion so they can strengthen their leadership skills and behaviors.[46]

Champions' representation of specific communities affected by the DMI. Depending on factors such as the specific geopolitical area where the DMI is implemented and the demographics of the community most affected by the DMI, an agency leader or other type of authority designating a formal champion should consider whether champions should share characteristics of the community. Shared characteristics can lead to greater buy-in and support from the community and other interested parties to support and sustain the DMI.

Resources

Factor 3. Building infrastructure capacity

Section at a Glance

Purpose: To assess champion roles to lead and sustain the DMI.

Relevant job aids and templates: Appendix B.1 must be used to complete the activities in this section. Appendices A.2 to A.5 are optional.

Actions the SHO should take: The SHO should work with champions to review the key artifact generated through Factor 1 to identify and potentially engage additional champions to lead and sustain the DMI. The SHO and champions can choose to delegate certain activities to DMI team members.

Final product or result: The SHO will have an updated team of champions to lead and sustain the DMI.

Resources include the funding, people, and technology used to implement and sustain the DMI. Existing literature points to the necessity of sufficient resources to sustain innovations, with an emphasis on adequate, stable, and diverse funding sources to stabilize all other resources.[27] Adequate and sustained funding can increase the likelihood that public health agencies can obtain and retain staff with advanced degrees, such as biostatisticians and epidemiologists, whose current public health compensation packages may not be competitive with job market rates.[49] Moreover, the speed at which technology improves means that public health agencies must continuously evaluate and update their technology to continue to deliver on their missions.

When assessing resources, consider the following key factors as a starting point for the assessment.

Funding. Since at least federal fiscal year 2023, stemming from the COVID-19 Public Health Emergency, many state public health DMIs combined annual and supplemental federal funding to improve core infrastructure to better protect, monitor, and improve the response to public health threats. However, without additional and guaranteed funding, many and potentially all the improvements made to the public health system in response to the public health emergency will be one-time advancements. Therefore, the SHO and supporting staff must optimize existing and potential funding streams, typically by blending or braiding administrative approaches to grow and maintain their programs (see Box 2).[50] As previously described (see Introduction), Medicaid is a potential large and stable funding stream for public health technology and staffing and could be leveraged to obtain and maintain technology and personnel.

Box 2: Blending and braiding approaches

To **blend** funding sources, program officers combine funding into a single stream, which results in a loss of award-specific requirements and thus requires statutory authority.

To **braid** funds allows program officers to direct funds toward a single strategy or initiative while preserving funding requirements (AGA 2014).

Technology supported with Medicaid funding. As previously noted, sustainability includes maintaining the technology implemented through the DMI, such as ongoing cloud costs. States, when permissible, often establish and maintain technology by blending and braiding Medicaid funding with other funding sources. For example, Florida and Kentucky, through the Child and Caregiver Outcomes Using Linked Data project, used Medicaid funding, the project's honorarium, and child welfare funding to combine Medicaid administrative data and child welfare system case-level data into a multistate deidentified data set.[51] The data set contains information on participant demographics, medical diagnoses, services, and outcomes. Florida similarly combined funding streams to support its Children with Special Health Care Needs Program. It supported the program with Medicaid funds, Children's Health Insurance Program funds, Title V Maternal and Child Health block grant funds, and public and private partner funds.[52,53,54,55]

The SHO and supporting staff can consider using Medicaid funding to secure, enhance, or maintain mission-critical technology. This funding avenue may be available to SHOs if they adhere to federal cost principles and align the Conditions for Enhanced Funding to applicable standards. For example, SHOs seeking to sustain an IIS-focused DMI can align the Conditions for Enhanced Funding with IIS Functional Standards (see Box 3).

Box 3: National standards to consider when using Medicaid funding to support technology, and applicable resources on standards[56, 57]

- Conformance Test Tools are resources for developers to use in implementing interoperability standards.
- Fast Healthcare Interoperability Resources is a widely used set of standards developed by Health Level 7 (HL7) to enable health data to be quickly, efficiently, and consistently exchanged.
- Health IT Certification Program is a voluntary program that encourages entities to ensure that their health IT adheres to standards adopted by the Secretary of Health and Human Services.
- Interoperability Standards Advisory process includes a list of recommended interoperability standards for entities to use for their interoperability needs. The Office of National Coordinator for Health Information Technology (ONC) coordinates the identification, assessment, and determination of the standards.
- National IIS standards create high-quality data for reliable immunization and data exchange. Adherence to national standards increases the credibility and value of IIS and contributes to improved program sustainability.
- National Syndromic Surveillance Program standards support data sharing between medical facilities, state and local health departments, and HIEs.
- North American Association of Central Cancer Registries Data Standards support standardization for hospital and central cancer registries.
- TEFCA outlines a common set of terms and conditions to support the development of a Common Agreement to establish a universal floor for nationwide interoperability.
- United States Core Data for Interoperability is a standardized set of health data classes and elements for interoperable HIE across the country.

Conditions for Enhanced Funding. The Conditions for Enhanced Funding are a series of federal requirements, if met and coupled with measurable outcomes that improve the Medicaid program, that allow SMAs to receive enhanced funding at the rate of either 90% to implement or 75% to operate an MES module.[22] The SMA can make the official request for this enhanced funding through the APD (see Box 4). If the SMA abides by federal cost principles when requesting and claiming federal funds and public health data systems share the infrastructure and services of the MES modules, the Medicaid share of the costs is eligible for enhanced funding and public health funding streams cover the public health share of the costs. The net result could be a reduction in state-only funds and increased access to stable federal funding. For example, Wisconsin implemented a $72.2 million project, using state general purpose revenue and 90% federal matching funds, to integrate public health program data into its Medicaid Data Warehouse.[58,59,60] Although the financial impacts of leveraging enhanced federal match for the public health component of this project are likely substantial, the actual cost savings may only be found in the state's APD, a document rarely made public.

Box 4: APD process

To request enhanced federal funding for MES systems and activities, SMAs must complete the APD template that aligns with where they are in the development of their project and submit it to a designated state officer in CMCS DSG.

- **Planning:** Describes steps and estimates the funds necessary to prepare for technology systems.
- **Implementation:** Identifies the activities and funds necessary to design, develop, or launch a technology system.
- **Operations:** Costs and actions necessary to upgrade and maintain the system.

More information at 45 CFR 95.610.

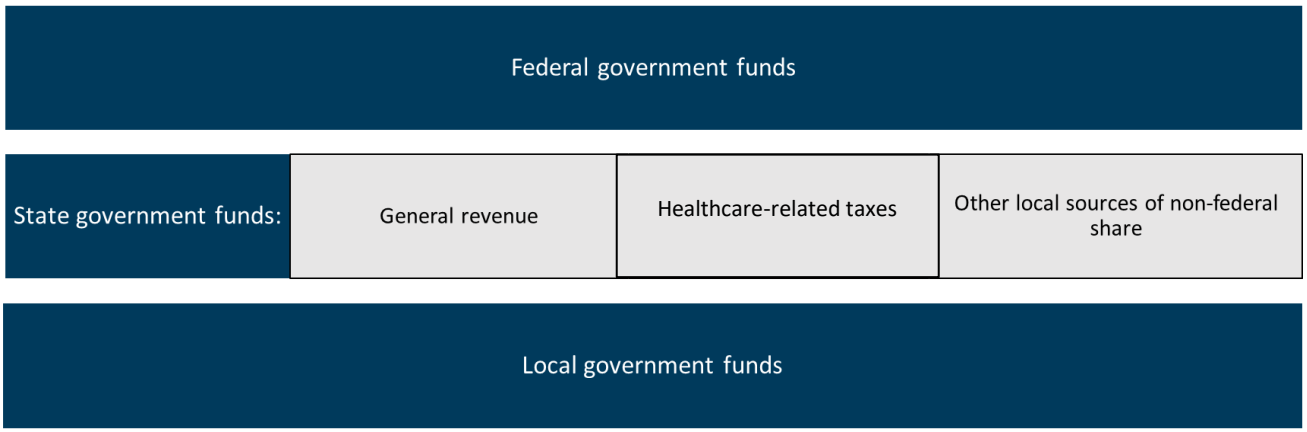
Federal cost principles. The enhanced federal funding available to SMAs for MES modules must be calculated so that (1) allowable costs are *allocated* to a specific entity or user (OMB Circular A-87), (2) the allocated costs for each entity or user are assigned in accordance with the benefits received (known as the "fair share principle"), and (3) costs attributable to the state are paid for using *specific sources of funds*. These first two tenets concern costs directly impacting either Medicaid participants or providers, whereas the third tenet concerns the source of state funding. Applicable state fund sources include general revenue (for example, income taxes), healthcare-related taxes (for example, provider taxes), and other local sources of non-federal share (for example, fund transfers from county governments). Figure 7 presents these applicable state fund sources. Of note, states have historically supplied over 50% of the state share through general funds even though only 40% is required to come from state government (the other portion can come from local government).[61,62]

For example, for an IIS-focused DMI, if a state Medicaid director submits an Implementation APD for a Medicaid provider enrollment module so the state can use provider information in the state's IIS to conduct outreach to non-Medicaid providers and encourage them to sign up to serve Medicaid participants and is approved for enhanced federal funding, the state Medicaid program would share the cost of the MES with the state's IIS in accordance with the first two tenets. The SMA could multiply

the total cost of the module (for example, $100) by the percentage of estimated provider identities that will participate in the Medicaid program as enrolled providers (for example, 89%). This would yield a Medicaid program attributable cost of $89 ($100 X 89% = $89). The $89 amount would be eligible for a 90% match or $80.10 from the federal government. The $19.90 remaining amount from the 90% match ($100 − $80.10 = $19.90) would be supplied by the state in accordance with the third tenet.

Somewhat similarly, an SMA could use the data lake, integration layer, and rules engine of an HIE as a series of MES modules to increase automated electronic data exchange for electronic case reporting and electronic lab reporting, improve electronic public health reporting data quality for public health, and reduce administrative and reporting burden for Medicaid providers. In this scenario, the SMA could multiply the total cost of the component modules by the percentage of reported patients participating in the Medicaid program. The same HIE module could support automated reporting for syndromic surveillance and chronic disease surveillance.[63]

Figure 7. Applicable state fund sources in the federal cost principles



Example for an IIS-focused DMI: Leveraging Medicaid funding through the Conditions for Enhanced Funding and IIS Functional Standards. As previously described (see Introduction), an SMA can receive enhanced funding to operate an MES module if it meets the Conditions for Enhanced Funding and couples them with measurable outcomes that improve the Medicaid program.[22] For an IIS-focused DMI, the SHO and supporting staff could collaborate with the SMA and the state's IIS leaders and staff to leverage Medicaid funding by supporting the IIS in linking CDC's IIS Functional Standards with the MES funding principles of MITA, along with outcomes-based assessments and measurable results obtained from the SMA's use of technology.[3]

Table 9 provides an illustrative potential crosswalk of IIS Functional Standards and Conditions for Enhanced Funding. To leverage Medicaid funding in this way, the SHO and supporting staff would need to (1) establish strong relationships between the SMA and the state IIS business, technical, and

[3] A similar process has been used to claim enhanced federal funding for HIE-related modules and functionality. For example, CMS approved enhanced match under the Medicaid Management Information System Implementation APD process for Maryland to use its HIE for care coordination, image exchange, and population health monitoring and reporting. Additionally, CMS approved planning funding for Washington State's public health strategy.

financial leads in order to share the IIS Functional Standards with the SMA and have the SMA share what, if any, MES outcomes they have in place (see Champions and Leadership Identification); (2) confirm the extent to which the IIS and MES share or could share (that is, reuse), the core technical component in column 3, "Technical components applicable to MES"; (3) discuss and seek to align the extent to which the IIS Functional Standard (column 2) meets the SMA's MES outcome objective (column 5); and (4) incorporate the shared outcome metrics in future APDs and develop methods for measuring those outcomes.

Table 9. Illustrative potential crosswalk of IIS functional standards and conditions for enhanced funding for DMIs centered on IIS

No.	IIS functional standard	Technical components applicable to MES	Condition for Enhanced Funding that includes integration of IIS into MES supports	Outcome that meets IIS and MES objectives
1	The IIS contains complete and timely demographic and immunization data for children, adolescents, and adults residing or immunized within its jurisdiction.	Decision Support System and Data Warehouse (DSS/DW): Master data and identify management	Promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states	• System supports business processes' reporting requirements in IIS Functional Standard 12 (DSS/DW1). • Solution includes analytical and reporting capabilities to support key policy decision-making related to vaccination coverage rates and Core Set reporting (DSS/DW2).
2	The IIS identifies, prevents, and resolves duplicated and fragmented patient records using an automated process.			
26	The IIS provides data or produces reports for VFC and state and local immunization programs.			
8	The IIS exchanges data with health information systems in accordance with current interoperability standards endorsed by CDC for message content, format, and transport.	HIE; data router; data exchange layer	System supports seamless coordination and integration with the Marketplace, Federal Data Services Hub, and allows interoperability with HIEs, public health agencies, human services programs, and community organizations providing outreach and enrollment assistance services as applicable.	Solution allows for the integration of IIS data with other data sources to improve the accuracy and completeness of immunization records and to facilitate broader data exchange.*
22	The IIS reliably exchanges information electronically with IIS in other jurisdictions consistent with the current CDC-endorsed HL7 Implementation Guide.			

No.	IIS functional standard	Technical components applicable to MES	Condition for Enhanced Funding that includes integration of IIS into MES supports	Outcome that meets IIS and MES objectives
7.1	The IIS offers help desk support to users who submit or access IIS data or functions.	Customer Relationship Management	Promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states.	Solution allows self-service support or state-user facilitated support for providers administering or patients seeking to receive vaccinations.*
21	The IIS ensures interested parties have appropriate access to the data in the IIS for public and population health purposes.	Public access layer	Promote sharing, leverage, and reuse of Medicaid technologies and systems within and among states	Solution allows self-service support or state-user facilitated support for providers administering or patients seeking to receive vaccinations.*
23.1	The IIS captures provider site Master Data in accordance with VTrckS data exchange specifications.	Provider Management	CMS determines the system is likely to provide more efficient, economical, and effective administration of the state plan.	• State user can verify any provider purportedly licensed in a state is licensed by such state, that the provider's license has not expired, that there are no current limitations on the provider's license, and can ensure valid licenses for a provider (PM3) • System checks appropriate databases to confirm provider's identity and exclusion status for enrollment and reenrollment and conducts routine checks using federal databases (PM10)
23.6	The IIS supports the collection of the Provider Profile data for provider sites enrolled in VFC and state and local vaccine programs.			

Note: Not all IIS Functional Standards are used in this example.

* Potential state-specific outcome measure.

CDC = Centers for Disease Control and Prevention; CMS = Centers for Medicare & Medicaid Services; DSS/DW = decision support system/data warehouse; HIE = health information exchange; IIS = immunization information system; MES = Medicaid Enterprise System; VFC = Vaccines for Children; VTrckS = Vaccine Tracking System.

Personnel supported with Medicaid funding. As previously noted (see Designing the DMI), the SHO should identify the DMI team members responsible for implementing the DMI. When shifting focus from the DMI implementation to sustainability, the SHO should reassess the DMI team and make any necessary staffing changes according to individuals' full-time equivalents, skill sets, and functions. Individuals on the DMI team are often executive directors, managers, clinical and technical experts, compliance or legal officers, and financial experts (see Factor 5: Expertise). These individuals may be hired through interagency agreements, which can allow for the use of subject-matter expertise at state universities, or master services agreements between the state and preselected vendors who provide staff augmentation services. The salary costs for these individuals may be covered using the blending and braiding approaches or cost-allocated via the APD process or the Administrative Cost Allocation Plan described in Social Security Act Section 1903(a)(7). The Administrative Cost Allocation Plan provides 50% match for costs that meet a series of requirements. An SHO interested in exploring whether Medicaid administrative claiming may be an option to cover a portion of public health personnel costs should discuss this option with the State Medicaid Director and financing office.

Administrative policies and procedures

Factor 4. Building infrastructure capacity

Section at a Glance

Purpose: To assess federal, state, and implementing partners' policies and procedures that facilitate sustainability of the DMI.

Relevant job aids and templates: Appendices A.2 to A.5 can optionally be used to complete the activities in this section.

Actions the SHO should take: The SHO should delegate the activities in this section to the champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review findings identified by champions. If necessary, the SHO should iterate with champions to improve the findings and then finalize them.

Final product or result: The SHO will have a summary of federal, state, and implementing partners' policies and procedures that facilitate sustainability of the DMI.

Federal, state, and implementing partners' policies and procedures that support data sharing can facilitate sustainability of the DMI. Federal and state laws, rules, regulations, and initiatives can publicly signal the desirability of the DMI and help address obstacles to data sharing in the political landscape. Similarly, implementing partners' policies and procedures can signal entities' commitment to the DMI and help integrate new data-sharing activities into entities' routine operations. Therefore, policies and procedures that facilitate sustainability should be maintained and strengthened. For example, an implementing entity could strengthen its data-sharing procedures by adding clear standards for performance and penalties for noncompliance.[27]

When assessing federal, state, and implementing partners' policies and procedures, it is important to also identify associated funding streams and whether any funding streams can apply across implementing partners. Consider the following policies and procedures as a starting point for the assessment.

Federal. Several federal policies and procedures provide major support for data sharing:

Medicaid Enterprise System (MES). Each state is required to operate an MES to manage its Medicaid data.[9,64] Each state's MES varies but should ideally include the ability to share data with other data systems.[65, 66] If a state's MES meets CMS certification standards, it can receive federal funding.[67] With the expiration of funding through *HITECH* in 2021, states are relying more on federal funding through MES to support Medicaid-related data-sharing activities.[26]

MITA. MITA is a framework and initiative that supports MES by establishing national guidelines for states to follow to ensure that their Medicaid IT projects align with national-level goals.[16] MITA also gives states greater access to data, including data that can be used to improve public health surveillance.[68]

APD process. The APD process relates to both MES and MITA as states are mandated to submit to CMS—specifically CMCS DSG—an APD (a plan of action) for their Medicaid IT projects if they want to receive federal funding for their activities. A designated CMCS DSG state officer reviews the APD against its technical and operational criteria to determine if a state qualifies for funding. The CMCS DSG state officer also uses the APD to monitor a state's project performance and outcomes.[18]

CDC's DMI. This large-scale, national DMI is intended to improve public health data, data sharing, and surveillance. It provides a foundation that implementing partners can use to implement and sustain their own, smaller-scale DMIs.[69] For example, it promotes improved data sharing and interoperability through use of common standards such as HL7 Fast Healthcare Interoperability Resources.[70]

Child and Adult Core Health Care Quality Measurement Sets.[4] States are encouraged to report on core sets of measures for children in Medicaid and the Children's Health Insurance Program and adults in Medicaid; state reporting on some measures will be mandatory in 2024.[71] Core Sets measure data are used to evaluate and improve the quality of health care provided to children and adults enrolled in Medicaid and can be used to focus on pressing public health issues.

Vaccines for Children (VFC) Program. State health agencies, along with some local health agencies, play a large role in the CDC's VFC program by distributing government-purchased vaccines to VFC providers to administer to eligible children.[72] VFC encourages data sharing because health agencies and VFC providers can benefit from more-complete data to identify their VFC-eligible population and the population's vaccination needs.[73]

CDC's IIS Functional Standards. The Functional Standards describe what the IIS needs regarding operations, data quality, and technology.[74] Adherence to these national standards increases the credibility and value of IIS and contributes to the ability for IIS and other data systems to share data.[75]

ONC's Health IT Certification Program. This voluntary program encourages entities to ensure their health IT, including electronic health records, adheres to standards adopted by the Secretary of Health and Human Services. Health IT developers certify their products conform to certification criteria using test procedures and tools approved by ONC. The use of certified health IT promotes interoperability between government, health care entities, and nongovernment programs.[76]

TEFCA. TEFCA seeks to provide universal governance, policy, and technical standards to promote nationwide interoperability.[77] It includes principles, terms, and conditions that can help develop a common agreement between health information networks to share data. It helps ensure that a core set of data can be shared through the common agreement for public health activities.[39]

State. Unlike federal policies and procedures, state policies and procedures vary widely across states due to factors such as the state's governance structure between public health, Medicaid, and HIE. [35] Generally, several types of state policies and procedures provide major support for data sharing:

Opt-out and opt-in data-sharing consent policies. Some states use opt-out policies for sharing an individual's health data with HIEs, public health registries, IIS, and other data systems, meaning that an

[4] For more information, see footnote 1.

individual's data will be shared unless they request otherwise. Other states use opt-in policies, requiring an individual to provide explicit consent before data are shared. In addition, some states have a consent policy that applies to all HIEs operating in the state, whereas others have a consent policy that is specific to the individual data system.[78] States with opt-out policies tend to have more comprehensive data for individuals than states with opt-in policies; however, a state might find any of these types of policies as facilitators to sustaining the DMI, depending on the state's political climate, its population's sentiments on data sharing, and other factors.[79]

Statewide or consolidated DUAs. As described under Factor 1 (Administrative Structures and Formal Linkages), a state's public health governance structure with its localities affects how data are shared in the state. Depending on the governance structure, a state may have full authority to share data or may need each individual locality to authorize data sharing.[31,34,35] Statewide or consolidated DUAs can facilitate data sharing in states, particularly in states with decentralized, mixed, or shared governance structures.

State requirements for laboratory reporting. State policies on the types of findings laboratories must report to health officials vary by state.[80] For example, Idaho does not require laboratory reporting of all HIV viral loads, CD4 cell counts, and HIV molecular data, but its neighboring state Montana does.[81]

State procedures for reporting birth and death data. Although the National Center for Health Statistics is legislatively mandated to collect vital statistics from states, states are not required to share this information with the National Center for Health Statistics. Procedures for sharing vital statistics can vary by state.[82]

Implementation partners. Several types of organizational policies and procedures can provide major support for data sharing:

Data-security policies. Clear data-security policies and enforcement of these policies are key to data sharing because they help ensure individuals' data are protected and that confidentiality requirements are observed.

Authorized-user policies. Policies specifying who can access data systems and how are key to maintaining accuracy and protection of individuals' data.

Written data-sharing procedures and workflows. Written procedures for data sharing and clear guidance on how they can be incorporated into routine workflows can facilitate data sharing. Procedures and workflows can be strengthened by attaching them to clear performance standards and penalties for noncompliance.[27]

Expertise

Factor 5. Building infrastructure capacity

Section at a Glance

Purpose: To develop a plan to build and maintain expertise to sustain the DMI.

Relevant job aids and templates: Appendix B.2 must be used to complete the activities in this section. Appendices A.2 to A.5 are optional.

Actions the SHO should take: The SHO should delegate the activities in this section to champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review findings identified by the champions. If necessary, the SHO should iterate with the champions to improve the findings and then finalize them.

Final product or result: The SHO will have a plan to build and maintain expertise to sustain the DMI.

Lastly, expertise is critical to sustainability because specialized knowledge and skills are necessary to strategically plan for and ensure continuation of the DMI. Expertise should be built or maintained in topic areas relevant to the DMI. Table 10 lists key topic areas and possible position titles of experts who can provide insight on the topic areas.

Table 10. Key topic areas and possible position titles of experts who can provide insight on the topic areas for DMIs centered on advancing public health data and surveillance[27]

Key topic area	Possible position title of expert to provide insight
Technical knowledge and skills to support data systems and infrastructure	• Database administrator • Information technology specialist • Network engineer • Systems engineer
Knowledge and skills related to conducting needs assessments to identify data-sharing needs that should be addressed	• Clinical immunization expert • Researcher • State and local health and Medicaid department administrators
Knowledge and skills related to understanding the health-related data ecosystem, including its political implementation landscape	• Clinical immunization expert • Financial management specialist • Policy specialist • Researcher
Knowledge and skills related to process and outcome evaluation to understand the effectiveness of the data modernization initiative	• Data analyst • Researcher • State and local health and Medicaid department administrators
Communication and data-presentation skills to communicate effectiveness of the data modernization initiative to interested parties	• Data analyst • Researcher • State and local health and Medicaid department administrators

When assessing expertise needs and developing a plan to build and maintain expertise, use the personnel needs identified through Factor 3 (Resources) as a starting point. Determine the existing level of expertise and assess for any deficits. If deficits exist, determine whether training or new hires are needed. It is also important to identify associated funding streams to attach to expertise needs. Where possible, prioritize ongoing and low-cost funding streams.

Sustainability attributes

Section at a Glance

Purpose: To develop a plan to build and maintain expertise to sustain the DMI.

Relevant job aids and templates: Appendix B.2 must be used to complete the activities in this section. Appendices A.2 to A.5 are optional.

Actions the SHO should take: The SHO should delegate the activities in this section to champions. Champions can then choose to delegate certain activities to DMI team members. The SHO should review findings identified by the champions. If necessary, the SHO should iterate with the champions to improve the findings and then finalize them.

Final product or result: The SHO will have a plan to build and maintain expertise to sustain the DMI.

After the DMI is integrated into a state's health-related data ecosystem and the implementing partners' infrastructure is strengthened, an SHO and the DMI team should focus on the attributes of the DMI that meet interested parties' needs or provide interested parties with benefits. These attributes can facilitate sustainment of the DMI.[27] These attributes are covered in more depth in Part 2 and integrated into the creation of a sustainability plan. The five attributes are (1) relationship with interested parties, (2) interested parties' needs, (3) monitoring, (4) effectiveness, and (5) establishment of ownership.

Relationship with interested parties. Establish and maintain positive relationships with interested parties—both immediate interested parties that are directly affected by the DMI and proximate interested parties that could be affected by the DMI. This work includes assessing and enhancing, where necessary, interested parties' level of trust, ability to collaborate, communication, credibility, enthusiasm, and ability to generate excitement about the DMI.

Interested parties' needs. Increase and maintain alignment of interested parties' needs with the DMI. This work includes assessing interested parties' needs and how they are met through the DMI. It also includes identifying interested parties' potential future benefits from the DMI and how the initiative could be improved to realize these benefits. When identifying how the DMI meets interested parties' needs and how it can realize potential future benefits, consider the initiative's integrity, including complexity, effectiveness, compatibility, and perceived benefit.

Monitoring. Produce suitable process evaluation results and use results appropriately to ensure implementation quality and integrity of the DMI. This work includes identifying the intended final outcome of the initiative for each interested party, developing measures for the outcomes, and developing short-term and intermediate outcomes and measures that assess whether the DMI team is progressing toward achieving final outcomes.

Effectiveness. Produce relevant outcome evaluation results to ensure effectiveness of the DMI. This work includes assessing the adequacy of outcome evaluation strategy. It also includes operationalizing measures and establishing a process and frequency for calculating outcomes.

Establishment of ownership. Establish and maintain sufficient ownership, including succession planning, among the DMI's interested parties. This includes implementing, evaluating, reassessing, and modifying the ownership plan when necessary. It also includes identifying ways to solidify the DMI champions and keep interested parties notified of the initiative and integrated in the decision-making process.

Part 2. Sustainability Planning Toolkit

In this chapter, we present the toolkit consisting of a sustainability planning model and accompanying job aids and key artifacts for the DMI team to develop a sustainability plan for its DMI. First, we describe the sustainability planning model. We then describe action steps to use the model, which leverage optional job aids and required key artifacts, to create a sustainability plan.

After following the directions in this toolkit, the DMI team will have a sustainability plan (see template on page 51), which includes the following core components:

- A long-term goal to sustain the DMI.
- A summary of strengths and areas for improvement to sustain the DMI.
- Action steps for the next three months, six months, one year, and long term.

In addition, the key artifacts in this toolkit are necessary to complete and further refine the sustainability plan in the future as resources and other factors in the health-related data ecosystem change. The key artifacts are as follows:

- Venn diagram that identifies administrative structures and formal linkages within and between implementing partners.
- Resource map that details what is needed to run the DMI.
- Interested party map that identifies the needs that the DMI meets or potentially meets, and how.

Sustainability planning model

The sustainability planning model is organized like the information presented in Part 1 of this Sustainability Planning Framework. The model consists of two key parts: (1) infrastructure capacity building and (2) sustainability attributes, explained in Table 11. Within each part there are five factors with specific objectives, tasks, and outcomes that indicate the DMI team's readiness to sustain the DMI. Figure 8 is a conceptual diagram that shows how the sustainability planning model, job aids, and key artifacts are used to create a sustainability plan.

Figure 8. A conceptual diagram of the sustainability planning model

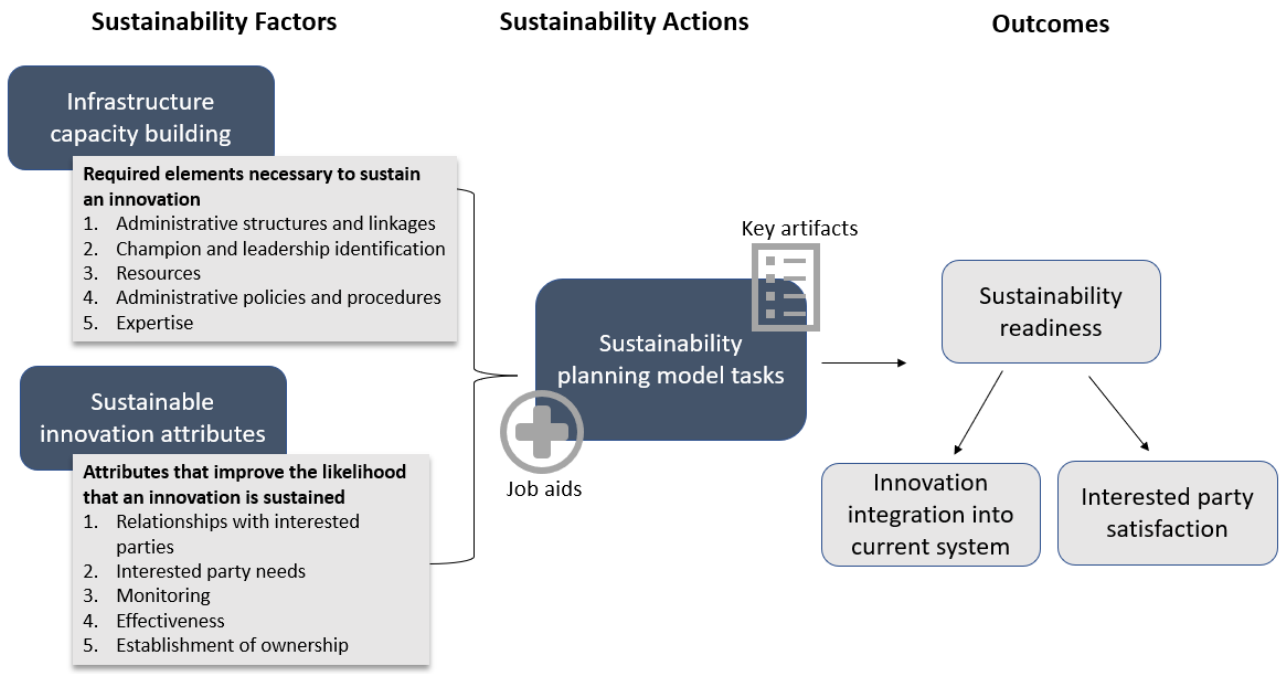


Table 11. Sustainability planning model

Part 1: Infrastructure capacity building

Factor	Description	Objective	Tasks	Approach	Outcomes indicating readiness
Administrative structures and formal linkages	The implementing partners' organizational structures and formal linkages to other entities to facilitate collaboration in the DMI; this includes how an entity's structures relate to itself and to other implementing partners.	Strengthen and/or maintain administrative structures and formal linkages to sustain the DMI	1.1. Assess structure and formal linkages to sustain the DMI – Determine definitions, needs, responsibilities or requirements to formalize linkages within and between entities – Assess existing formal collaborative agreements within and between entities 1.2. Plan strategically for building and/or maintaining structures and formal linkages to support the DMI 1.3. Implement, evaluate, and reassess and modify, if necessary, plan for strengthening structure and formal linkages to support the DMI 1.4. Create and/or maintain structures and formal linkages to support the DMI	**Gather information and develop diagram** • Obtain organization charts that contain departments and department heads for HIE, Medicaid, and public health • Identify financial/budget leads for each entity (HIE, Medicaid, public health) • ***Complete Venn diagram*** (Appendix B.1) to depict each of these areas: – Common roles and individuals – Common projects • Identify methods to continually engage those individuals who converge in the Venn diagram • Notes: Larger states with many departments, department heads, and financial/budget leads might develop two Venn diagrams to be used together, one for primary interested parties and the other for secondary interested parties.	• Sufficient incorporation and maintenance of administrative structures to support the DMI • Defined formal linkages within and between entities to support the DMI
Champion and leadership identification	The influential and proactive individuals inside or outside an organization that drive and lead the DMI	Strengthen and/or maintain champion roles and leadership actions to sustain the DMI	1.5. Assess existing champions (those who act as advocates for the functional area related to the DMI) roles and leadership actions that can sustain the DMI 1.6. Plan strategically to strengthen and/or maintain leadership actions and champion roles to support the DMI 1.7. Implement, evaluate, and reassess and modify, if necessary, a plan to sustain the champion roles and leadership actions 1.8. Cultivate champions and leaders, establish linkages between leader(s) and champions and DMI interested parties	**Investigate roles** • List individuals on the project charter with any new individuals identified by the Venn diagram • Compare project charter to Venn diagram results – Individuals identified by the Venn diagram that are not in the project charter should be assessed to perform a champion role – Include considerations for impact of the DMI on underserved and marginalized groups and representation from or for those communities needed in leadership	• Effective champion(s) and leader(s) who take appropriate actions to sustain the DMI • Defined and effective linkages among leader(s), champions, and DMI interested parties

Part 1: Infrastructure capacity building					
Factor	**Description**	**Objective**	**Tasks**	**Approach**	**Outcomes indicating readiness**
Resources	The people, technology, and funding that created the DMI and that need to be in place to maintain the DMI	Increase and/or maintain resources to sustain the DMI	1.9. Assess resources to sustain the DMI 1.10. Develop a resource acquisition plan to sustain the DMI, to include funding from continuous streams, staffing and their skill sets, hardware, and software 1.11. Implement, evaluate, and reassess and modify, if necessary, resource acquisition plan	**Assess resources and funding streams** • ***Complete the resource map*** (Appendix B.2) that details what you need to run the DMI by organization (HIE, public health, Medicaid) – Personnel (e.g., % FTE, skill set) – Technology • Identify funding streams supporting the HIE, Medicaid, and public health – Note whether the funding is one-time or ongoing, funding source (e.g., federal, state, private), funding type (e.g., grant, pass-through), or whether there are any stipulations for the funding • Identify if funding aligns with resource needs	• Adequate yet flexible resource acquisition plan that promotes ongoing human, physical, technological, and informational resources • Increase in resources dedicated to the DMI
Administrative policies and procedures	The written laws, rules, and regulations that impact how the DMI is developed and maintained	Strengthen and/or maintain policies and procedures to sustain the DMI	1.12. Assess policies and procedures such as workflow, operations, and standard operating procedures to sustain the DMI 1.13. Develop plan to strengthen and/or maintain policies and procedures specific to the DMI – Develop policies and procedures and/or revise existing policies and procedures as needed 1.14. Implement, evaluate, and reassess and modify policies and procedures when necessary	**Assess policies, procedures, and funding streams** • List any laws, rules, or regulations that may improve the likelihood of the continued use of the DMI (e.g., opt-in/opt-out policies, consolidation of DUAs, quality metric reporting, Vaccines for Children) • Identify whether funding streams that support the DMI can apply across organizations (e.g., Medicaid Enterprise) • Note: Larger states with many policies and procedures, including workflows, might develop two lists to be used together, one for primary policies and procedures and the other for secondary policies and procedures	• Formal policies and procedures with clear standards for performance to sustain the DMI

Part 1: Infrastructure capacity building					
Factor	**Description**	**Objective**	**Tasks**	**Approach**	**Outcomes indicating readiness**
Expertise	The specialized knowledge implementing partners need to ensure continuation of the DMI	Build and/or maintain expertise to sustain the DMI	1.15. Assess necessary expertise to sustain the DMI 1.16. Ensure inclusion of skills related to – Technical knowledge and skills to support data systems and infrastructure – Needs assessment, data collection and interpretation to identify prevention interventions to meet the needs of the target population(s) and modify approach as identified – Process and outcome evaluation methods to assess and understand effectiveness of the DMI – Communication and data presentation skills to communicate effectiveness to key interested parties 1.17. Develop a plan to acquire and/or maintain adequate expertise specific to the DMI 1.18. Implement, evaluate, reassess, and modify, if necessary, expertise development plan	**Assess expertise needs and funding streams** • Use personnel needs identified during the resource mapping to determine level of expertise present, and, if a there is a deficit, whether training or new hires are required – Ensure inclusion of local experts, leaders, and community members • Identify funding streams to attach to expertise needs. Where possible, prioritize ongoing and low-cost funding streams from resource mapping exercise.	• Sufficient technical and clinical expertise to sustain the DMI • Effective training and delivery skills to diffuse knowledge within and across system levels • Fundraising expertise to develop flexible funding acquisition

Part 2: Sustainable innovation attributes					
Factor	**Description**	**Objective**	**Tasks**	**Approach**	**Results indicating readiness**
Relationship with interested parties	How the implementing partners, champions, leaders, and owners of the DMI relate to interested parties	Establish and/or maintain positive relationships with the DMI's interested parties	2.1. Assess and enhance, where necessary, the network among interested parties' ability to collaborate, level of trust, communication, credibility, enthusiasm, ability to generate excitement about the DMI 2.2. Develop a plan to establish and/or maintain relationships with interested parties 2.3. Implement, evaluate, and reassess and modify plan when necessary following a Plan, Do, Study, Act cycle	**Complete interested party map** • For each interested party, ***use the interested party map*** in Appendix B.3 to identify key contacts (e.g., organization leads), frequency of contact, and forums for outreach	• Adequate long-term positive relationships among interested parties

Part 2: Sustainable innovation attributes					
Factor	**Description**	**Objective**	**Tasks**	**Approach**	**Results indicating readiness**
Interested party needs	The interested party needs that the DMI potentially meets (or the reasons why interested parties would support the DMI) and the ways in which you will meet those needs. Interested parties include implementers, developers, decision-makers, and evaluators.	Increase and/or maintain alignment of DMI interested parties needs with the DMI	2.4. Assess DMI interested parties and their needs and the DMI's integrity, including complexity, effectiveness, compatibility, and perceived benefit 2.5. Develop a plan to adopt, adapt, and/or maintain a DMI with integrity 2.6. Implement, evaluate, and reassess and modify plan when necessary	**Refine interested party map** • Identify immediate (those directly impacted) and proximate (those who could be impacted) interested parties • List current and potential future benefits to interested parties from the DMI – If potential future DMIs require improvements to the DMI, list them – Prioritize future DMIs and estimate costs and timeline • Note: Larger states with many interested parties can develop two lists to be used together, one for primary interested parties and the other for secondary interested parties.	• Adequate alignment and maintenance between DMI interested party needs and DMI • Adoption and or maintenance of DMI with integrity that adequately meets DMI interested party need
Monitoring	The means by which the DMI is monitored and evaluated to ensure that it meets objectives	Produce adequate process evaluation results and use appropriately to ensure implementation quality and integrity of the DMI	2.7. Assess adequacy of process evaluation strategy 2.8. Develop a plan to conduct process evaluation and use results to ensure quality (fidelity, strength, reach) and integrity of the DMI during implementation of the DMI 2.9. Implement, evaluate, and reassess and modify plan when necessary following a Plan, Do, Study, Act cycle	**Identify short- and long-term outcomes and measures** • Revisit the project charter and determine what is the intended outcome of the DMI for each interested party • Develop a measure for identified outcomes • Develop intermediate or short-term outcomes and measures that let you know you are on the path to achieve final outcomes	• Appropriate process-evaluation methods for assessing the implementation quality and integrity of the DMI • Adequate level of implementation quality and integrity of the DMI
Effectiveness	Develop and produce outcome metrics for the DMI	Produce adequate outcome evaluation results to ensure effectiveness of the DMI	2.10. Assess adequacy of outcome evaluation strategy 2.11. Develop a plan to conduct outcome evaluation and use results to ensure effectiveness of the DMI during implementation of the DMI	**Measure the effect** • Operationalize measures and establish a process and frequency for calculating outcomes • Assign responsible individual	• Appropriate outcome evaluation methods for assessing effectiveness of the DMI • Adequate effectiveness of the DMI

Part 2: Sustainable innovation attributes					
Factor	**Description**	**Objective**	**Tasks**	**Approach**	**Results indicating readiness**
Establishment of ownership	The identification of individuals to oversee the continuation of the DMI. This includes succession planning.	Establish and/or maintain sufficient ownership among DMI interested parties	2.12. Implement, evaluate, and reassess and modify plan when necessary, following a Plan, Do, Study, Act cycle 2.13. Assess ownership among DMI interested parties 2.14. Develop a plan to establish DMI interested parties and/or maintain ownership among interested parties 2.15. Implement, evaluate, and reassess and modify plan when necessary, following a Plan, Do, Study, Act cycle	**Sustain ownership and engagement** • Identify means to solidify champions and keep interested parties notified of DMI and integrated in decision-making process	• Adequate and continued ownership of the DMI among interested parties

DMI = data modernization initiative; DUA = data use agreement; FTE = full-time equivalent; HDU = health data utility.

How to use the toolkit

Using the sustainability planning model, job aids, and key artifacts to develop a sustainability plan is a multistep process. Figure 9 outlines the five major steps that the DMI team should follow to develop their sustainability plan.

Figure 9. Steps to develop a sustainability plan

Note: Optional job aids can be used to support completion of the steps. Some of the steps can result in the creation of key artifacts.

DMI = data modernization initiative.

Further details on how to complete each step are included below. **Optional job aids** are available in Appendix A where relevant to support completion of each step. The **required sustainability plan template** can be found in Step 5 (page 51).

Step 1. Articulate the DMI's objectives and expected outcomes

DMI team leads should review and validate the information in their project charter and action plan. You may use Optional Job Aid Appendix A.1 to enter the DMI objectives and expected outcomes.

Step 2. Review the sustainability planning model and create a plan for completing the tasks in the model

DMI team leads should review **Table 11**, the sustainability planning model. The model includes two key parts: (1) infrastructure capacity building and (2) sustainable innovation attributes. Within each part, there are five factors with a series of tasks.

DMI team leads should determine which individuals on the team can best complete the tasks for each factor of the model. They should identify a task lead for each task and, if needed, staff to support the task lead. Optional Job Aid Appendix A.2 is a work plan template that you may use to complete this step. The work plan assigns factors and tasks to task leads and specifies a due date for submission of results.

To organize tasks and to report on results, DMI team leads may direct task leads to document task results in the task results template in Optional Job Aid Appendix A.3.

Step 3. Complete sustainability planning tasks

DMI team leads, task leads, and supporting staff should complete their assigned tasks. Some early factors in the sustainability planning model inform subsequent factors. Some factor tasks also have optional steps DMI team leads can take to further develop their sustainability plan. DMI team leads may choose to complete these optional steps based on considerations such as the size of their state and their availability of resources.

The Optional Job Aid Appendix A.4 shows which factors inform others and which factors are independent. It also lists optional steps DMI team leads can take to further develop their sustainability plan. DMI team leads may use the table to track progress on each factor's tasks, document optional steps, and mark when tasks and steps are complete.

Step 4. Review results from task leads and support staff

DMI team leads should review the written task results from task leads and supporting staff and meet with them to share and discuss task results across the team. During the meeting, DMI team leads should ask follow-up questions (including discussing any mismatches in task results) and may populate the job aid table (Optional Job Aid Appendix A.5) to create a plan to address the follow-up questions.

Step 5. Synthesize task results to develop a sustainability plan

When synthesizing task results, DMI team leads should focus on how the results from each task fit together to convey cohesive key takeaways about how the DMI can be sustained. This includes identifying a long-term goal for sustaining the DMI, strengths, areas for improvement for sustaining the initiative, and detailed actions steps for the team to take in the next three months, six months, one year, and in the long term. Enter the goal, summary of strengths and areas for improvement, and action steps in the table on the following page.

Sustainability plan				
Long-term goal for sustaining the data modernization initiative:				
Summary of strengths and areas for improvement:				
Factor	**Action step in the next 3 months**	**Action step in the next 6 months**	**Action step in the next year**	**Action step in the long-term**
Part 1: Infrastructure capacity building				
Administrative structures and formal linkages				
Champion and leadership identification				
Resources				
Administrative policies and procedures				
Expertise				

Part 2: Sustainability attributes				
Relationship with interested parties				
Interested party needs				
Monitoring				
Effectiveness				
Establishment of ownership				

Appendix A. Optional Job Aides

A.1. Step 1 – Data modernization initiative objectives and expected outcomes

Data modernization initiative objective	Expected outcome

A.2. Step 2 – Work plan

Factor	Task #	Task	Task lead and supporting staff	Due date
Part 1: Infrastructure capacity building				
Administrative structures and formal linkages	1.1			
	1.2			
	1.3			
	1.4			
Champion and leadership identification	1.5			
	1.6			
	1.7			
	1.8			
Resources	1.9			
	1.10			
	1.11			
Administrative policies and procedures	1.12			
	1.13			
	1.14			
	1.15			
Expertise	1.16			
	1.17			
	1.18			
Part 2: Sustainability attributes				
Relationship with interested parties	2.1			
	2.2			
	2.3			
Interested party needs	2.4			
	2.5			
	2.6			
Monitoring	2.7			
	2.8			
	2.9			
Effectiveness	2.10			
	2.11			
Establishment of ownership	2.12			
	2.13			
	2.14			
	2.15			

A.3. Step 3 – Task results template

Task results for [enter task number]
Key findings:
Methodology:
Detailed analysis:
Key artifacts: [List key artifacts developed to complete the task and attach them to this template when submitting to DMI team leads]

A.4. Task order and progress tracker

Factor and tasks	Order of operations	Key artifact	Tasks complete (y/n)	Optional steps	Optional steps complete
Part 1: Infrastructure capacity building					
Administrative structures and formal linkages (Tasks 1.1–1.4)	Complete Tasks 1.1–1.4 before Tasks 1.5–1.8.	Venn diagram (Appendix B.1)		• Larger states can develop two Venn diagrams to be used together, one for primary interested parties and the other for secondary interested parties. • Assess the identified leadership team through a diversity, equity, and inclusion lens and make any necessary changes to advance equity.	
Champion and leadership identification (Tasks 1.5–1.8)					
Resources (Tasks 1.9–1.11)	Complete Tasks 1.9–1.11 before Tasks 1.16–1.18.	Resource map (Appendix B.2)		• None	
Expertise (Tasks 1.16–1.18)					
Administrative policies and procedures (Tasks 1.12–1.15)	Tasks can be completed concurrently with other tasks.			• Larger states can develop two lists of policies and procedures to be used together, one for primary policies and procedures and the other for secondary policies and procedures.	
Part 2: Sustainability attributes					
Relationship with interested parties (Task 2.1–2.3)	Complete Tasks 2.1–2.3 before Tasks 2.4–2.6.	Stakeholder map (Appendix B.3)		• Larger states can develop two lists to be used together, one for primary interested parties and the other for secondary interested parties.	
Interested party needs (Tasks 2.4–2.6)					
Monitoring (Tasks 2.7–2.9)	Tasks can be completed concurrently with other tasks.				
Effectiveness (Tasks 2.10–2.11)	Tasks can be completed concurrently with other tasks.				
Establishment of ownership (Tasks 2.12–2.15)	Tasks can be completed concurrently with other tasks.				

A.5. Plan to address follow-up questions

Factor and tasks	Key artifact	Follow-up question	Individual responsible for addressing follow-up question	Next steps
Part 1: Infrastructure capacity building				
Administrative structures and formal linkages (Tasks 1.1–1.4)	Completed Venn diagram			
Champion and leadership identification (Tasks 1.5–1.8)				
Resources (Tasks 1.9–1.11)	Completed resource map			
Expertise (Tasks 1.16–1.18)				
Administrative policies and procedures (Tasks 1.12–1.15)				
Part 2: Sustainability attributes				
Relationship with interested parties (Task 2.1–2.3)	Completed interested party map			
Interested party needs (Tasks 2.4–2.6)				
Monitoring (Tasks 2.7–2.9)				
Effectiveness (Tasks 2.10–2.11)				
Establishment of ownership (Tasks 2.12–2.15)				

Appendix B. Key Artifacts

B.1. Venn diagram template

What is this template? This template corresponds to the "Administrative structures and formal linkages" and "Champion and leadership identification" factors in Part 1 (infrastructure capacity building) of the sustainability planning model.

When to use this template? Please use this template as part of Tasks 1.1–1.4 and 1.5–1.8 in the sustainability planning model.

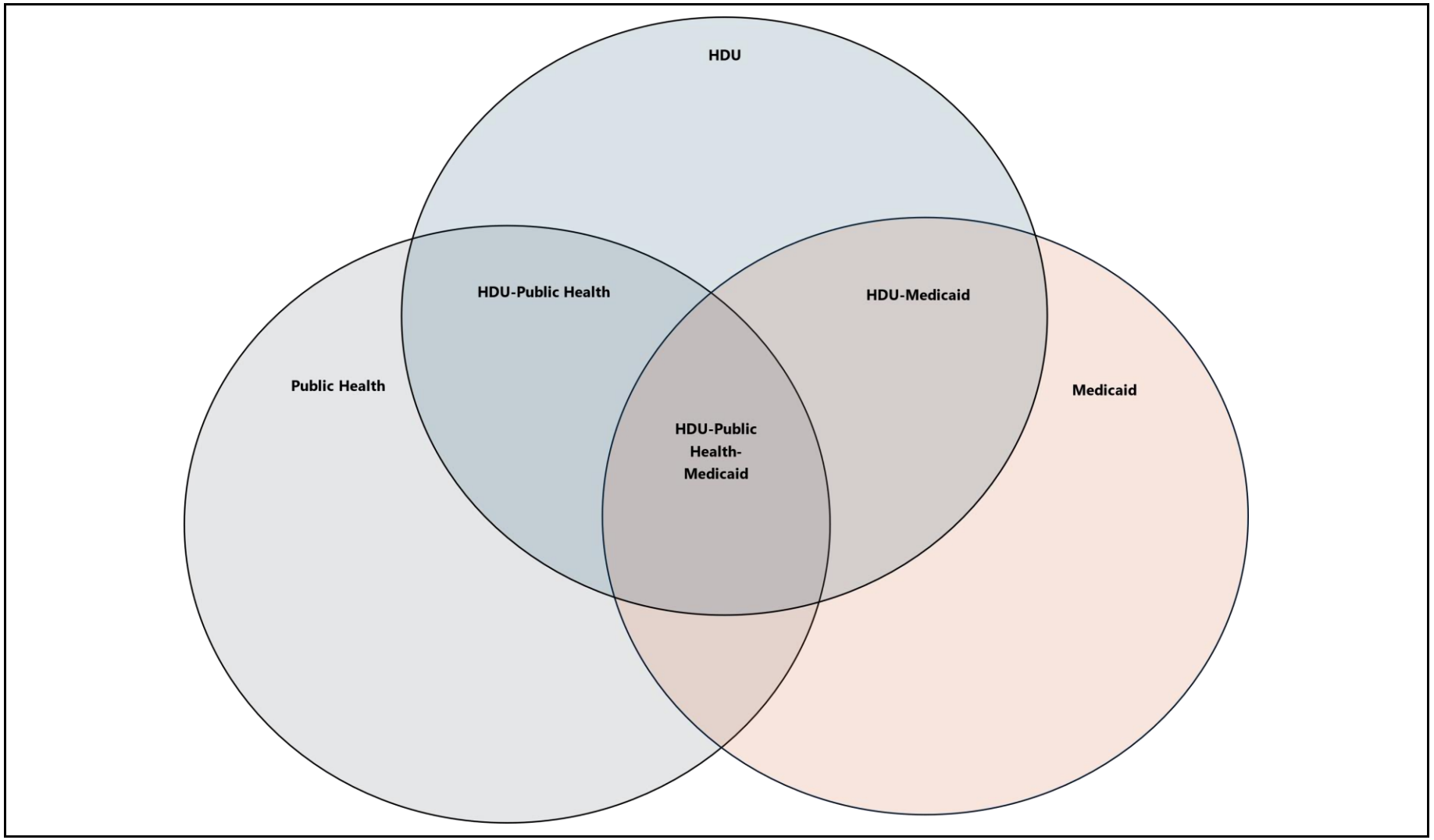
How to use this template: Please complete the steps below to identify administrative structures and formal linkages needed to run the data modernization initiative. Organize the structures and linkages by the three key agencies that are creating public health data connections: (1) Public health, (2) Medicaid, and (3) Health Data Utility (HDU).

Template completed by: _____ Date completed: _____

STEP 1: Identify departments, department and budget leads, and projects at public health, Medicaid, and HDU that are relevant to the data modernization initiative. Gather this information by reviewing organization charts and potentially reaching out to the agencies. Populate the table below. Add more rows to the table if needed.

Number	Department	Department and budget leads	Relevant projects
PH			
1			
2			
3			
4			
Medicaid			
1			
2			
3			
4			
HDU			
1			
2			
3			
4			

STEP 2: Identify common roles, individuals, and projects across public health, Medicaid, and HDU. Populate the Venn diagram on this page by entering the numbers from the table above into the appropriate sections of the three circles. Common roles, individuals, and projects will be those that are entered in the sections where the three circles converge.



B.2. Resource map template

What is this template? This template corresponds to the "Resources" and "Expertise" factors in Part 1 (infrastructure capacity building) of the sustainability planning model.

When to use this template? Please use this template as part of Tasks 1.9–1.11 and 1.16–1.18 in the sustainability planning model.

How to use this template: Please complete the table below to develop a resource map that details what you need to run the data modernization initiative. Please note that the table is organized by:

- Three major resource categories that created the data modernization initiative and that need to be in place to maintain the initiative: (1) personnel, (2) technology, and (3) funding.
  - The table includes pre-populated key personnel, technology, and funding, along with blank rows for other resources.
- Key agencies that are creating public health data connections: (1) Public health, (2) Medicaid, and (3) Health Data Utility (HDU).

Template completed by: _____ Date completed: _____

Resource	Relevance to the data modernization initiative	Acquired or need to acquire?	Who has acquired or needs to acquire?		
			Public health	Medicaid	HDU
Personnel					
Executive Director	• Oversees all aspects of the DMI • Has broad scope of responsibility; makes strategic decisions; provides leadership; monitors progress status, quality, and fiscal progress • May serve as liaison between overall DMI structure and individual entities				
Manager	• Oversees daily DMI activities, manages and delegates tasks, manages DMI team, collaborates with Executive Director to plan DMI, reports DMI status, tracks budget and resources allocations, manages licensing agreements • Reports to Executive Director				
Clinical Expert	• Provides immunization expertise from clinical knowledge and work perspective • May be at the executive level or part of ongoing team				

Resource	Relevance to the data modernization initiative	Acquired or need to acquire?	Who has acquired or needs to acquire?		
			Public health	Medicaid	HDU
Technical Expert – Data Interchange and Exchange	• Develops one- and two-directional interfaces between EHRs, HDUs, data registries, and other data systems • Serves as bridge between technical and program teams; coordinates closely with HDU, potentially EHR vendor/implementer, and others working with data registries and other data systems; may provide input on budget issues • May be a dedicated role or combined with another position; may report to Manager, Executive Director, or HDU Manager				
Technical Expert – Data Integrity and Quality	• Provides knowledge of public health data and surveillance terminology and practices, and data elements that support them; relevant exchange electronic data exchange standards, HL7, and SOAP/Web; public health reporting standards; and health information systems and large databases • Ensures data is standardized and normalized for data exchange • May be a dedicated role or combined with another position; may report to Manager, Executive Director, or HDU Manager				
Technical Expert – Data Privacy and Security	• Creates and enforces privacy and security standards and processes • Ensures organization and ongoing activities are compliant with applicable data protection rules from federal, state, local, and regulatory bodies • May be a dedicated role or combined with another position; may report to HDU Manager or be at executive level as a Privacy or Security Officer				

Resource	Relevance to the data modernization initiative	Acquired or need to acquire?	Who has acquired or needs to acquire?		
			Public health	Medicaid	HDU
Compliance or Legal Issues Officer	• Complies with grants and data use agreements, ensures no conflicts of interest among the mix of participating agencies, provides oversight to high-level budget, interprets policy and regulatory information • May be a dedicated role or combined with another position; may report to Executive Director				
Budget Officer	• Oversees grants; provides or oversees preparation of revenue and expenditures, and financial statements and reports • May be a dedicated role or combined with another position; may report to Executive Director				
Technology					
Hardware	• Computers, broadband, infrastructure needed to centrally control and manage the DMI				
Software	• Software needed to send data to, and retrieve data from, data systems; to clean and normalize data; to dedupe data; security software to manage PII; terminology software				

Resource	Relevance to the data modernization initiative	Acquired or need to acquire?	Who has acquired or needs to acquire?		
			Public health	Medicaid	HDU
Funding					
Federal	• Money from the federal government that can be used for ongoing data exchange				
State	• Money from the state government that can be used for ongoing data exchange				
Private	• Money from private entities that can be used for ongoing data exchange				

DMI = data modernization initiative; EHR = electronic health record; HDU = health data utility; HL7 = Health Level Seven; PII = personally identifiable information; SOAP = Simple Object Access Protocol.

B.3. Interested party map template

What is this template? This template corresponds to the "Relationship with interested parties" and "Interested party needs factors in Part 2 (sustainability attributes) of the sustainability planning model.

When to use this template? Please use this template as part of Tasks 2.1–2.3 in the sustainability planning model.

How to use this template: Please complete the steps below to identify how the DMI team relates to interested parties and how the DMI relates to interested party needs.

Template completed by: _____ Date completed: _____

STEP 1: Identify interested parties and their needs. Populate the table below. Add more rows if needed. Immediate interested parties are those directly affected by the data modernization initiative. Proximate interested parties are those who could be affected by the data modernization initiative. When listing the initiative's current or potential future benefits, consider the initiative's integrity, including complexity, effectiveness, compatibility, and perceived benefit.

Interested party	Key contact	Frequency of contact	Forums for outreach	Immediate or proximate	DMI's current or potential future benefit to interested party	Improvements needed to realize potential future benefits

DMI = data modernization initiative.

STEP 2: Categorize interested parties. For each of the interested parties listed in Step 1, place them in the appropriate quadrant of the diagram below. This will help identify the way in which each interested party should be engaged.


Support for the DMI team
Support for the DMI
Reservations about the data modernization initiative but strong support for the DMI team. Keep these interested parties informed of data modernization initiative activities in the effort to obtain their buy-in over time.
Strong support for both the data modernization initiative and DMI team. Engage closely and frequently with these interested parties.
Reservations about both the data modernization initiative and the DMI team. Identify ways to build trusting relationships with these interested parties and keep them informed of initiative activities.
Strong support for the data modernization initiative but reservations about the DMI team. Identify ways to build trusting relationships with these interested parties and keep them informed of the DMI team's activities, successes, and outcomes.

STEP 3: Prioritize improvements. Populate the table below to estimate costs and timeline for making improvements to the data modernization initiative that are needed to realize potential future benefits to interested parties. Use the information to rank the improvements as high, medium, and low priority in the last column.

Improvements needed to realize potential future benefits	Estimated costs	Estimate timeline for completion	Other considerations	High, medium, or low priority

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