The Health IT Landscape in the States:
Through the Lens of the State CIO

NASCIO
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The Health IT Landscape in the States: *Through the Lens of the State CIO*

The NASCIO/HIMSS State CIO Survey Collaboration

June 2013

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Executive Summary

Today, states are facing many pressures and challenges in addressing their broad scope of responsibility ranging from healthcare to public safety. Each state's unique perspective helps guide their approach to projects, and impacts ways they leverage information technology. State **Chief Information Officers (CIO)** are front and center with shaping state strategies and use of information technology to achieve their goals.

The **Healthcare Information and Management Systems Society (HIMSS)** and **National Association of State Chief Information Officers (NASCIO)** formed a collaboration to determine how the State CIO views the current information technology landscape of related state health initiatives. Specific areas of focus for this study included Medicaid Management Information Systems (MMIS), Medicaid Eligibility Systems, Data Governance and Identity Management, State Level Health Information Exchanges (SLHIE), Shared Services and Collaborations. This study combined HIMSS' expertise in **health information technology (HIT)** and **health information exchange (HIE)** with NASCIO's expertise representing state CIOs and information technology executives from the states, territories and the District of Columbia.

The results of this collaborative survey will serve those seeking to understand the current environment of state healthcare technology initiatives ranging from governance models to Medicaid projects and data exchange activities. This analysis will also facilitate understanding of the intersection of the State CIO's role with state HIT projects.

This collaboration represents one of the first comprehensive analyses focused on the State CIO perspective on state HIT projects. It is recognized that these results call for further investigation beyond this study to provide additional clarity for some of its findings.

Representatives from 26 U.S. States and Territories completed the survey in 2013, representing a 48 percent participation rate for the total targeted population. Participants represented a cross-section of the United States without a concentration from a single geographic region. The survey was completed either personally by the State CIO or in collaboration with other designated participants. Even though the results do not necessarily represent all states, this white paper presents the findings of the survey participants representing nearly half of the target population, and is believed to provide valuable information on current state activities.

Principal Findings

General Overview

- States determine their information technology strategy, related oversight and governance based on their specific needs and what is anticipated to work best for the overall environment.
    - The survey results demonstrate that all states, by nature, are not alike and will vary across business and technology strategies, approaches, models and services.

- State CIOs continue to focus on collaboration opportunities and coordinate **information technology (IT)** activities from a global or enterprise view. The overarching goal is to link existing silos, and to implement a unified framework across state agencies, departments and projects whenever possible.
- Consolidation and optimization are priorities for State CIOs moving forward with an enterprise approach and leveraging information technology across multiple initiatives.
    - CIOs are exploring how technology can be leveraged for strategic technology consolidations and shared services.

State CIOs

- State CIOs play varying roles with the many healthcare projects across state agencies, programs, and services, serving as a key link across these efforts.
- State CIOs play the key role in facilitating collaborative efforts, and are responsible for establishing the oversight, governance and processes for acquisition of information technology to support these efforts.
- 72 percent of State CIOs indicated having a significant role in the **State Level Health Information Exchange (SLHIE)**, with a wide variety of roles and responsibilities.
- CIOs are working both with intrastate collaboration efforts and with state-to-state collaboration activities.

Medicaid Management Information Systems (MMIS)

- 78 percent of respondents indicated that their state will be finished with MMIS modernization by 2014.
- States appear to be outsourcing MMIS systems and data center functions.
- The unprecedented 90/10 funding opportunity[1] and Medicaid expansion will necessitate scalability.

Medicaid Eligibility Systems

- 72 percent of respondents indicated their state will be implementing a new Medicaid Eligibility System by 2014.
- The projected costs for these systems ranged from $30 million to $154 million with a wide variation in costs associated with the implementation budget.
- 69 percent of respondents noted that state Medicaid eligibility systems currently handle other social programs' eligibility activities.

Data Governance and Identity Management

- Data governance is the least mature capability across states.
- 80 percent of surveyed State CIOs reported no data governance structure in place.

State Health Insurance Marketplaces (HIX)

[1] "Medicaid/CHIP Affordable Care Act Implementation: Answers to Frequently Asked Questions – Availability of Enhanced Funding for IT Systems (90/10)." U.S. Department of Health and Human Services (HHS). Centers for Medicare & Medicaid Services (CMS). Center for Medicaid and CHIP Services (CMCS). November 19, 2012. https://www.google.com/url?q=http://www.medicaid.gov/State-Resource-Center/FAQ-Medicaid-and-CHIP-Affordable-Care-Act-ACA-Implementation/Downloads/Eligibility-and-Enrollment-Systems-FAQs.pdf&sa=U&ei=HNSoUZS0PPGWyAGAh4HIAg&ved=0CAcQFjAA&client=internal-uds-cse&usg=AFQjCNHgvsspIAH56xlupnm-Vsy7txBmqQ

- 94 percent of participating State CIOs believe that 50 percent or less of the needed IT components for the **health insurance marketplaces (HIX)** have been completed.
- States were evenly split with their plans of integrating Medicaid eligibility and enrollment systems with the health insurance marketplaces.
    - The largest percentage of respondents, 56 percent, was undecided. 22 percent of State CIO responses indicated that they are planning to integrate Medicaid eligibility and enrollment systems, while 22 percent do not plan to do so.

State Level Health Information Exchanges (SLHIE)

- The majority of participating states noted using a state-designated health information exchange entity, with 69 percent reported as being in production or actively exchanging data.
- New and emerging stakeholders include behavioral health, post-acute services, consumer groups, public health, patient advocacy groups, payers, banks and financial institutions.
- Packaging the SLHIE service offerings for community shared services is a key focus.
- Drivers for SLHIE include the need for data liquidity and business intelligence across a broad range of stakeholders, with the ability to establish benefits and value of service offerings.

Shared Services and Collaborations

- Only 4 percent of State CIO respondents stated that they are not leveraging shared services, while the remaining 96 percent stated that they are using a shared services model for healthcare initiatives.
- The majority of respondents (86 percent) stated that they are using shared services for Medicaid eligibility modernization, 55 percent indicated MMIS, 41 percent selected SLHIE, 36 percent HIX, and 32 percent were in the process of applying shared services for other health initiatives.

Methodology

The study methodology consisted of surveying State CIOs or their designated representatives using a questionnaire that was developed and administered jointly by HIMSS and NASCIO staff. Topical areas of focus for the survey included Medicaid Management Information Systems (MMIS), Medicaid Eligibility Systems, Data Governance and Identity Management, State Level Health Information Exchanges (SLHIE), Shared Services and Collaborations. It was understood that the authority and influence of each state's CIO varies widely depending on the state governance structure; therefore, the survey questions were designed to help characterize how the State CIO, or designee, views the current landscape of IT-related state health initiatives. The survey content underwent numerous revisions before being finalized to ensure that the collected responses would provide the most useful information representing the targeted topical areas.

The finalized survey was loaded into the CheckBox® online survey tool and tested for usability by a participating state representative. It was activated on January 22, 2013, and remained open through March 18, 2013.

Outreach

NASCIO led all outreach efforts to State CIOs using email and phone calls, as well as leveraging the NASCIO Health Care Working Group participants. Through this outreach, the collaboration and the survey purpose were explained. All 54 State and U.S. Territory CIOs were initially contacted with the request to participate, with 26 states and/or territories completing the survey. This represents a response rate of slightly over 48 percent, which is significant since this was a complex survey addressing many topical areas, and because the participating CIO often required contributions from multiple participants across various state agencies and other entities. Also of note, the survey participants represent a cross-section of the United States and were not concentrated in specific geographic regions.

Findings

Survey findings are presented according to the survey's topical areas:

- Medicaid Management Information Systems (MMIS)
- Medicaid Eligibility Systems
- Data Governance and Identity Management
- State Health Insurance Marketplaces (HIX)
- State Level Health Information Exchanges (SLHIE)
- Shared Services and Collaborations

This white paper reports the findings from the survey's participants and is not intended to represent all State CIO perspectives or all state HIT initiatives. This effort recognizes and embraces the fact that states, by nature, are not all alike and will vary across projects, business models, service offerings and overall technical strategies. All information developed and discussed in this paper was compiled by the authors based strictly on the survey responses, all of which were self-reported by the state participants. No additional attempts were made to verify responses. The results presented in this paper do not reflect scientific research, nor is this a statistically accurate representation of all states across the country. The intent of these findings is to outline common themes, trends and issues as reported by the survey's participants.

Medicaid Management Information Systems (MMIS)

Meeting Compliance by 2014

Medicaid Management Information Systems (MMIS) is a mechanized claims processing and information retrieval system. States are required to have this system, unless this requirement is waived by the Secretary of the **United States Department of Health and Human Services (HHS)**.

The MMIS is an integrated group of procedures and computer processing operations (subsystems) developed at the general design level to meet principal objectives. The objectives of this system and its enhancements include:

- Title XIX program[2] control and administrative costs;
- service to recipients, providers and inquiries;
- operations of claims control and computer capabilities; and
- management reporting for planning and control.[3]

Contractual services may be utilized to perform work for the design, development, installation or enhancement of a mechanized claims processing and information retrieval system. A fiscal agent who is a private contractor to the state, normally selected through a competitive procurement process, may operate the state's MMIS. A state MMIS fiscal agent contract status report[4] is prepared quarterly by the **Centers for Medicare and Medicaid Services (CMS)** central office, based on input from regional offices. The report data include the name of the state fiscal agent contractor, the contract term with option extension period, and the regional office contact person with phone and fax number.

Figure 1[5] shows that there are currently 15 states that develop and run their own MMIS. This information from CMS demonstrates that the majority of states contract with a private vendor to fulfill the mechanized claims process requirements.

As the state MMIS fiscal agent contract status report suggests, many states are in the process of modernizing legacy systems and

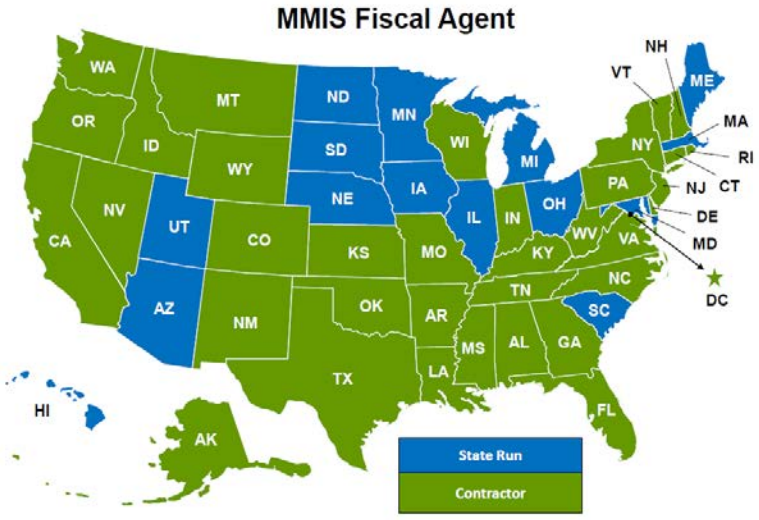


Fig. 1

[2] TITLE XIX—GRANTS TO STATES FOR MEDICAL ASSISTANCE PROGRAMS. U.S. Social Security Administration (SSA). March 23, 2010. http://www.ssa.gov/OP_Home/ssact/title19/1900.htm.
[3] Medicaid Management Information Systems (MMIS). Centers for Medicare & Medicaid Services (CMS). Accessed April 11, 2013. www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MMIS/index.html
[4] MMIS Fiscal Agent Contract Status Report. Centers for Medicare & Medicaid Services (CMS). February 11, 2011. http://www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MMIS/Downloads/MMISFAQR.pdf
[5] Medicaid Management Information Systems (MMIS). Centers for Medicare & Medicaid Services (CMS). Accessed April 11, 2013. www.cms.gov/Research-Statistics-Data-and-Systems/Computer-Data-and-Systems/MMIS/index.html

are working toward being **Affordable Care Act (ACA)** complaint by 2014. When asked if the State CIO believed that the Medicaid IT Systems would be compliant by 2014, 78 percent of survey respondents stated that they would be compliant by 2014, leaving only 22 percent indicating that they would not.

Overall, state fiscal constraints and the inability to attract and retain talent, combined with the demand for rapid innovation, put increased pressure on states to outsource services. Numerous states have outsourced information systems of entire programs, including MMIS and data center services. As part of the 2012 Deloitte-NASCIO Cybersecurity Study,[6] NASCIO called upon State CIOs and CISOs to improve security management of third party service providers.

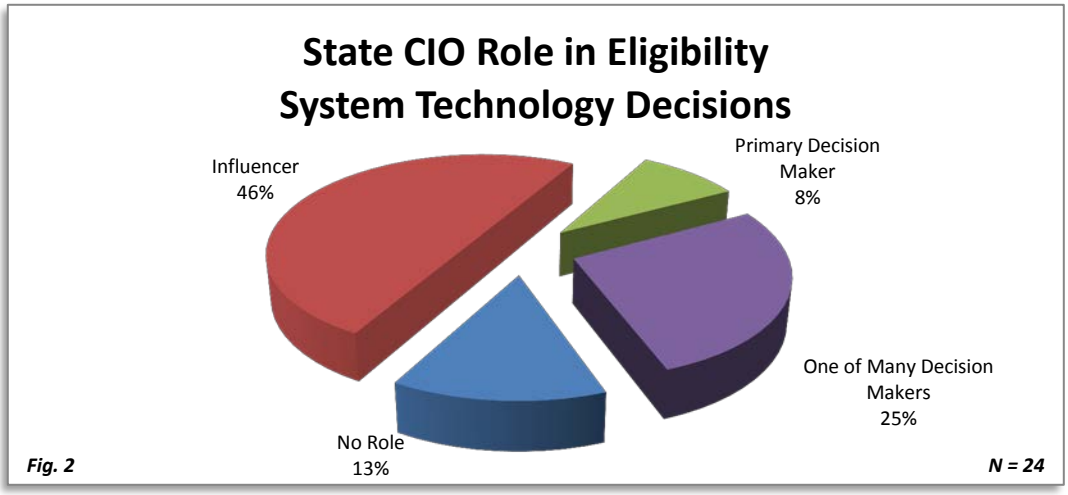
[6] Deloitte-NASCIO Cybersecurity Study. 2012. http://www.nascio.org/publications/documents/Deloitte-NASCIOCybersecurityStudy2012.pdf

Medicaid Eligibility Systems

Technology Modernization and System Integration

NASCIO and HIMSS continue to track the progress of Medicaid transformation, and have helped to educate and create awareness around the technological needs of state Medicaid systems. The **Medicaid Information Technology Architecture (MITA)**[7] initiative of the **Center for Medicaid and CHIP Services (CMCS)**[8] is intended to foster integrated business and IT transformation across the Medicaid enterprise to improve the administration of the Medicaid program. The issue brief "A Golden Opportunity for Medicaid IT Transformation: State CIO's and the MITA Framework"[9] explored the guidance that CMS formulated on the MITA vision and the emphasis on conformity across the enterprise. This set of survey questions took a closer look at state Medicaid eligibility system efforts and the various programs that can be leveraged for interoperability and integration. There are also data on solutions offered by emerging technologies, such as cloud computing.

When asked what role the State CIO plays in eligibility technology, 46 percent of respondents stated that they are an influencer, 8 percent responded that they are the primary policy maker, and 25 percent indicated that they are one of many decision-makers. Only 13 percent of respondents stated that their State CIO plays no role in eligibility system technology decisions (see Figure 2).



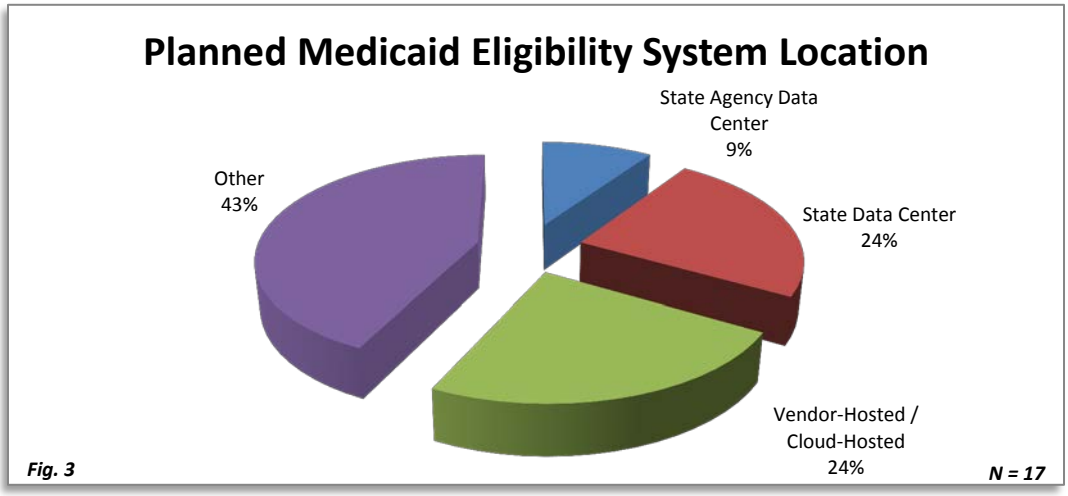
It is encouraging that a high percentage of State CIOs are involved with decision-making for Medicaid eligibility systems. Additionally, 72 percent of the respondents indicated that their state will be implementing a new system before 2014. There were many variations on the costs associated with a state's implementation budget, which ranged from $30 million to $154 million as reported by the participants.

[7] Medicaid Information Technology Architecture (MITA). Centers for Medicare & Medicaid Services (CMS). http://medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Data-and-Systems/Medicaid-Information-Technology-architecture-MITA.html
[8] Center for Medicaid and CHIP Services (CMCS). http://medicaid.gov/About-Us/CMCS-Program-Groups.html
[9] "A Golden Opportunity for Medicaid IT Transformation: State CIO's and the MITA Framework." NASCIO Healthcare Series. May 2012. http://www.nascio.org/publications/documents/NASCIO_GoldenOpportunityForMITA_May2012_FINAL.pdf

When asked what the funding source would be for system development, participants overwhelmingly responded that most of the funding would come from a 90/10 split of Federal and State funds. The exception would be **Commercial off the Shelf (COTS)** software, which is a 75/25 Federal and State funds split. It is anticipated that states will also support a mix of Federal and State funds for updating their legacy systems.

States that do not anticipate implementing a new Medicaid eligibility system before 2014 reported on one end of the spectrum that they are in process, with anticipated completion dates just beyond January 2014, while others indicated they may be waiting up to a decade for updates.

With the expansion of the eligible Medicaid population there will be an increase in data sent to the state, and participants were asked where systems and data would be hosted. Twenty-four percent of participating State CIOs reported that the system would be hosted by a vendor or cloud; another 24 percent reported that the state data center would play the primary role; and approximately 9 percent stated that the state agency data center would be the host (see Figure 3). The remaining 43 percent are considering a state partnership or they are unaware prior to the bid process.



State CIOs have placed consolidation and optimization as top priorities year after year. When considering an enterprise approach, states have applied these principles to combining Medicaid eligibility systems with other social programs. An overwhelming majority (68 percent) of State CIOs reported that the state Medicaid eligibility system handles the eligibility for other social programs. The list in Figure 4 highlights various programs that survey participants identified as having leveraged the existing Medicaid eligibility systems.

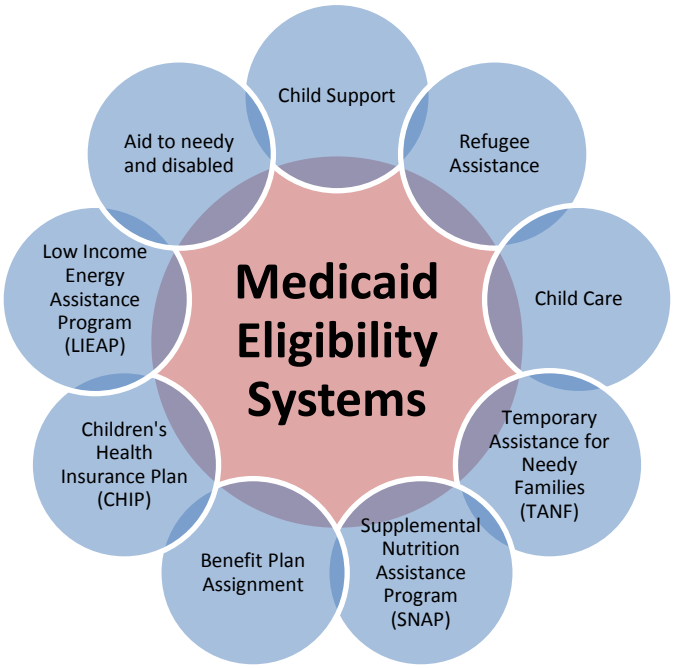


Fig. 4: Programs being leveraged on existing state Medicaid eligibility systems

Data Governance and Identity Management

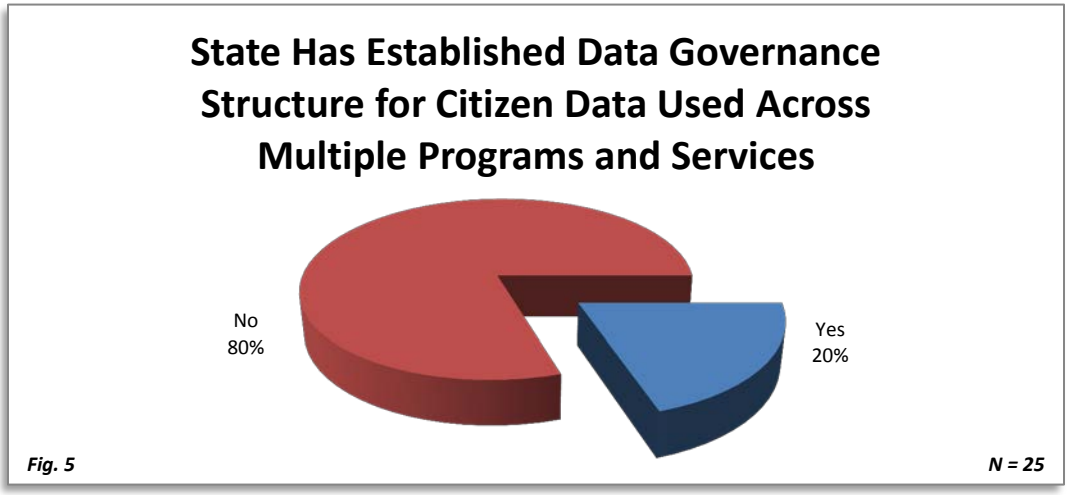
Data Governance

Many states are working their way toward a mature enterprise architecture program, effective program and project management, and are starting to use disciplines for service management such as **Information Technology Service Management (ITSM)**. However, data governance is possibly the least mature capability across the states. Even across the private sector, data governance is a significant issue.

A Call for States to Develop an Enterprise View of Data Governance and Identity Management

The demand for trusted information continues to spiral upward. States currently own significant data resources, but turning those data resources into an information asset that can be managed for effective decision-making is simply not happening at an enterprise level. There are effective point solutions within specific agencies, but managing information as an enterprise asset will require effective data governance.[10]

When State CIOs were asked if their state has established a data governance structure for citizen data, our assumption that data governance is not a matured discipline was confirmed. Only 20 percent of State CIOs reported that there was an established data governance discipline, while 80 percent stated there was no data governance structure in place (Figure 5). Numerous states shared that they are still in the development phase and that they are looking into a statewide longitudinal data system.



[10] "Data Governance – Managing Information As An Enterprise Asset." NASCIO Governance Series. April 2008. www.nascio.org/publications/documents/NASCIO-DataGovernance-Part1.pdf

Identity Management

When asked if states are using a common identifier for citizen data, 60 percent of State CIOs responded that they were using some form of common identifier. Alarmingly, the remaining 40 percent of State CIOs—nearly half—stated that they are not using a common identifier.

The survey asked State CIOs what identity and access management protocols and tools were being used for state systems that include citizen **Personally Identifiable Information (PII)**. The responses varied from state to state, but some of the aggregated responses are listed below, in no particular order:

- Active Directory
- Username / Password
- SSL VPN (remote access)
- Event Logging
- Log Reviews
- Incident Reporting
- Multi-Factor Authentication
- Matching Algorithm with Non-Exposed Identifier
- Common Identifier
- Resource Access Control Facility (RACF)
- Multiple Layers of Application Security
- Enterprise Identity and Access Management System
- IHE XUA Identity and Access Management Protocol
- Automated Provisioning System
- Data Encryption for Data in Transit and Data at Rest
- Lightweight Directory Access Protocol (LDAP)
- Restricted Database Access and Role-Based Access Controls

Unfortunately, it has proven to be very difficult to implement a common identifier solution as an approach to citizen identification in the United States. There are concerns about the cost to implement such a system, privacy concerns about the huge demographic database needed to support its operation, technical issues about how to retrofit existing automation systems to use the new identifier, and lack of a national consensus about what the identifier should look like. For well over two decades, these barriers have combined to make it extremely difficult to make progress on this subject, and the issue of privacy has perhaps been most problematic. Privacy advocates have long argued that the creation of a massive centralized database containing citizen identity, citizen demographics and/or other citizen information represents an unacceptable privacy risk.[11]

These challenges will need to be addressed, and State CIOs will need to consider how to protect the privacy of citizens without limiting the information sharing that can be beneficial to improving state processes. It is possible to put in place mechanisms, procedures, software and policies that permit balancing these two needs without sacrificing either one.[12] Fortunately, technological solutions are emerging that will help states to accomplish these goals.

[11] "Patient Identity Integrity." HIMSS Patient Identity Integrity Workgroup. December 2009. www.himss.org/files/HIMSSorg/content/files/PrivacySecurity/PIIWhitePaper.pdf
[12] *Ibid.*

State Health Insurance Marketplaces

While states looking to change the landscape of the health care industry may begin with decisions at the executive level, the rubber essentially meets the road through public interfaces that citizens use for enrollment and comparing options. States will need to consider how the use of interoperable IT systems can create greater customer service satisfaction. This is critical for state deployment and support for their own state-based health insurance marketplaces.

As states start to contemplate the long checklist of things that need to be accomplished prior to implementing their insurance marketplace, there are vital questions that should be answered by the executive branch, such as:

- Does the state want to have control of the marketplace governance and architecture?
- Does the state want to develop a partnership, or has the decision been made to delegate this responsibility to the federal government?

These are simple questions, but still present highly contentious issues that will need to be determined prior to rationalizing what governance options would be best for states.[13]

Governance Options

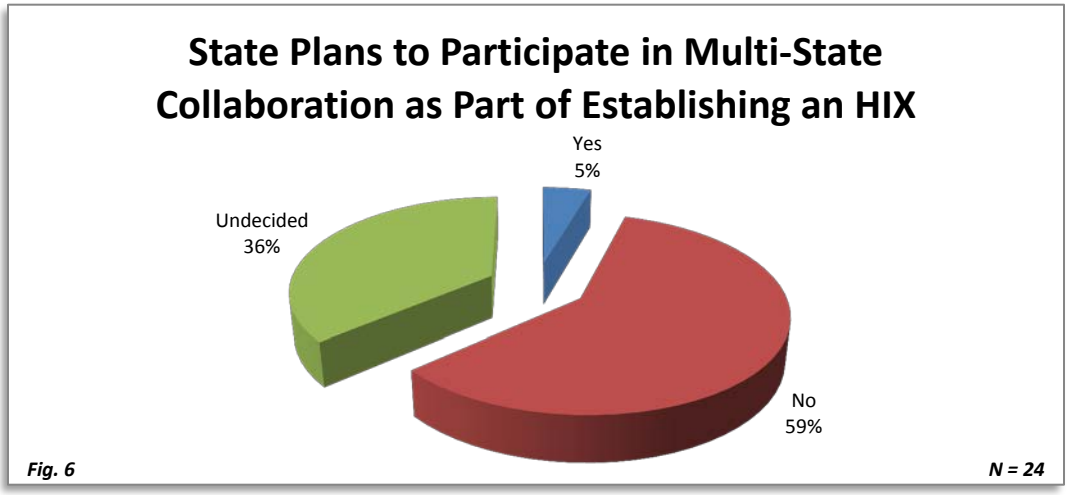
When states were asked what entity would be responsible for establishing the governance structure and implanting health insurance marketplaces, the responses varied greatly. While some states have deferred to **Federally Facilitated Exchange (FFE)**, other states have identified an organization that will carry out implementation on their behalf. Examples of the broad range of organizations that states have selected to use in deployment of their insurance marketplaces include:

- Governor's Office
- Department of Labor
- State Connector
- Department of Banking and Insurance
- Department of Revenue and Taxation
- Insurance Commissioner
- Department of Health & Human Services (HHS)
- Department of Licensing and Regulatory Affairs
- Department of Public Welfare
- Family and Social Service Administration

Multi-State Collaboration

When asked if State CIOs plan to participate in multi-state collaboration as part of establishing a health insurance marketplace, 59 percent of respondents stated they do not have any plans to collaborate with other states and over a third of respondents (36 percent) were still undecided. Only 5 percent of survey respondents reported that they are planning to participate in multi-state collaboration (see Figure 6). The key drivers for participation were improving information sharing and increasing the quality of service.

[13] State Health Facts. The Henry J. Kaiser Family Foundation. http://www.statehealthfacts.org



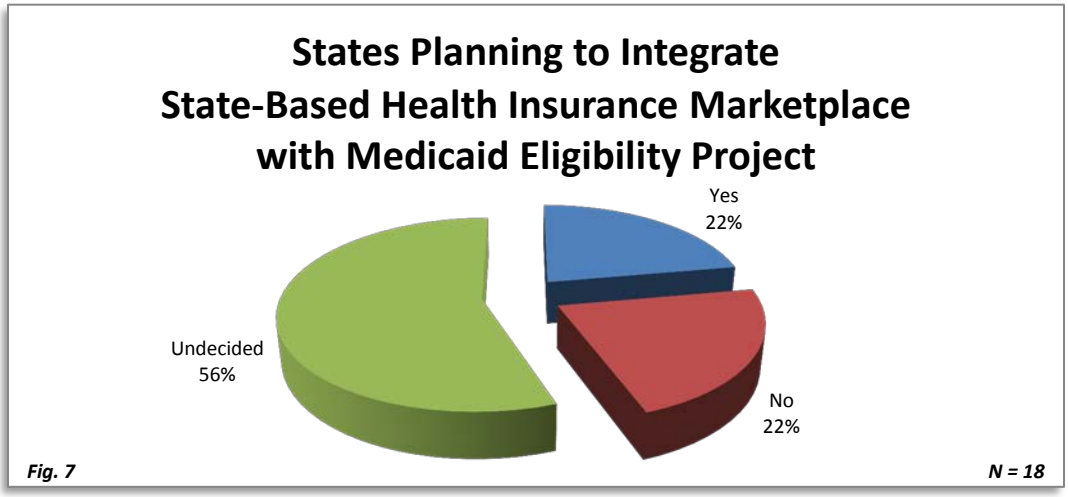
Despite the numerous challenges that exist for establishing and maintaining a multi-state collaborative, these agreements can be the catalyst for innovation. State CIOs who plan to embark on partnerships with other states will need to first identify the key drivers—and any possible pitfalls—in reaching mutually defined goals. States that are undecided or planning not to engage in collaborations with other states may wish to consider some of the following key benefits of participating in collective efforts:[14]

- Cost reduction
- Streamlining process and speed transactions
- Leveraging enterprise solutions
- Sharing risk
- Establishing relationships between organizations
- Providing increased and better services to citizens
- Improving information sharing and quality
- Taking advantage of enterprise information sharing
- Addressing fiscal constraints and lowering administrative costs by leveraging mutual resources

Eligibility and Enrollment Integration

When it came to states that were planning to implement a state-based health insurance marketplace, the largest percentage of respondents (56 percent) were undecided about their intentions for planning to combine the Medicaid eligibility and enrollment systems. Those who have made a decision were evenly split, with State CIOs planning to integrate Medicaid eligibility and enrollment systems and those not planning to do so were divided at 22 percent each (Figure 7). Findings suggest that many states have not been able to find consensus on an approach to integration.

[14] "On the Fence: IT Implications of Health Benefit Exchanges." NASCIO Health Care Working Group. June 2011. www.nascio.org/publications/documents/NASCIO_OntheFence_ITImplicationsoftheHealthBenefitExchanges.pdf

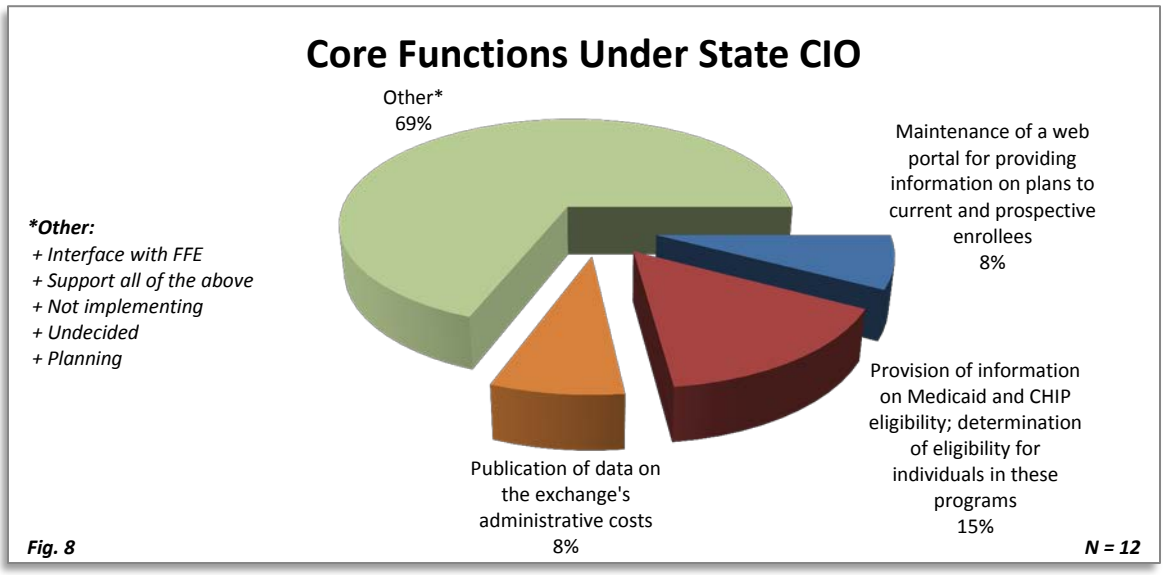


State CIO Role

A great deal of complexity remains on allocation of roles, and participants were asked to identify the core functions that State CIOs would perform if their state is developing a state-run health insurance marketplace. The responses varied greatly, but the most dominant choice was "Other" at 69 percent. The "Other" responses included:

- Interfacing with the Federally Facilitated Exchange (FFE)
- Support for all options listed
- Leveraging health information exchange
- Developing a partnership agreement and the associated IT requirements
- Facilitation of data governance
- Undecided / Still Planning
- Not implementing

For the remaining participants, provisioning eligibility was selected by 15 percent, and both web portal development and publication of data had an 8 percent response rate (Figure 8).



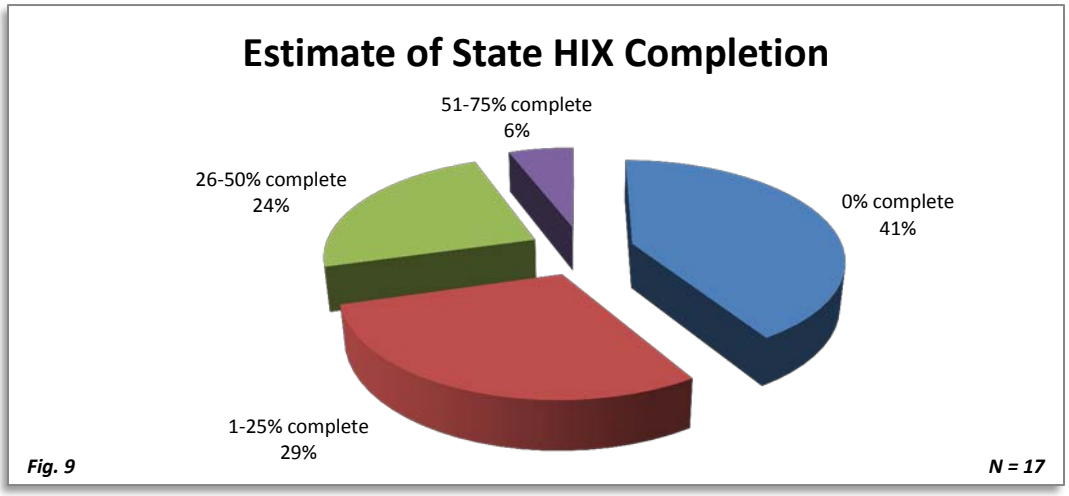
State HIX Completion

There are many questions that need to be answered with IT projects at any level, such as:

- Who is the executive sponsor?
- What is the timeline?
- When is the deadline?
- Has your state performed an IT gap analysis?
- What is the level of stakeholder engagement?
- Will there be sustained funding available?
- What is the current status of the effort?

State CIOs were asked to give an estimate for completion in bringing their state health information technology systems into compliance with the ACA. Nearly half (41 percent) of respondents stated that they are at 0 percent of completion, and another third (29 percent) reported that their state is between one and 25 percent complete. With a deadline of January 2014 right around the corner, this is a frightening figure.

Figure 9 illustrates that 94 percent of the State CIOs participating in this survey believe that 50 percent or less of the needed IT components for the health insurance marketplaces have been completed. A staggering figure, but nonetheless, states will continue working toward meeting upcoming deadlines and ensuring that the proper governance and IT systems are in place.

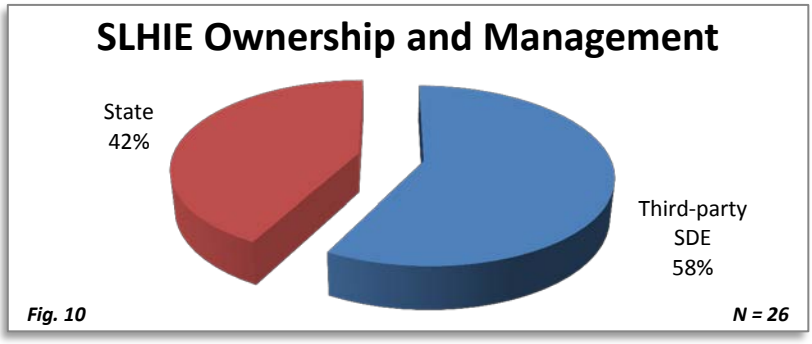


The ACA provides states with the unique opportunity to run their own exchange, create a partnership, or default to the federal government to establish and operate the exchange. State CIOs will play varying roles in healthcare reform, but irrespective of their responsibilities it will be imperative that they provide sound leadership and feedback to governors on any IT gaps that may exist during this momentous time.

State Level HIE Organizations

SLHIE Participants

The 26 states that responded to the **State Level HIE Organization (SLHIE)** section of the survey were dispersed across the country. Under the State HIE Cooperative Agreement program,[15] states are given the option to designate a nonprofit entity to assume the responsibility of an SLHIE, with the state having oversight of the designated entity. Fifteen respondents indicated that their state had identified a third-party **State Designated Entity (SDE)** to support their state's exchange activities, while eleven indicated the SLHIE is owned and operated by the state (Figure 10).



Not all state scenarios fit within these two models. In further survey questions, 45 percent of participants reported their exchange was under a state or other government agency and 32 percent functioned as an independent 501(c)(3). The remaining participants reported a hybrid scenario, ranging from a trust to various public/private partnerships and other non-profits. Based on the survey responses, it seems clear that no single model supports all states, and the states determine their strategy and direction based on both individual needs and what is anticipated to work best for their environment.

For the states that identified a third-party SDE, a wide range of state agencies and departments provide the state oversight role, such as those identified below:

- State CIO or State HIT Coordinator's Office
- Governor's Office
- State commissions addressing health or information technology
- State agencies or departments supporting community health, family services, social services, health services or technology services

Those states that manage and operate their own exchange reported this responsibility falling under a variety of state agencies, offices and departments, including the following:

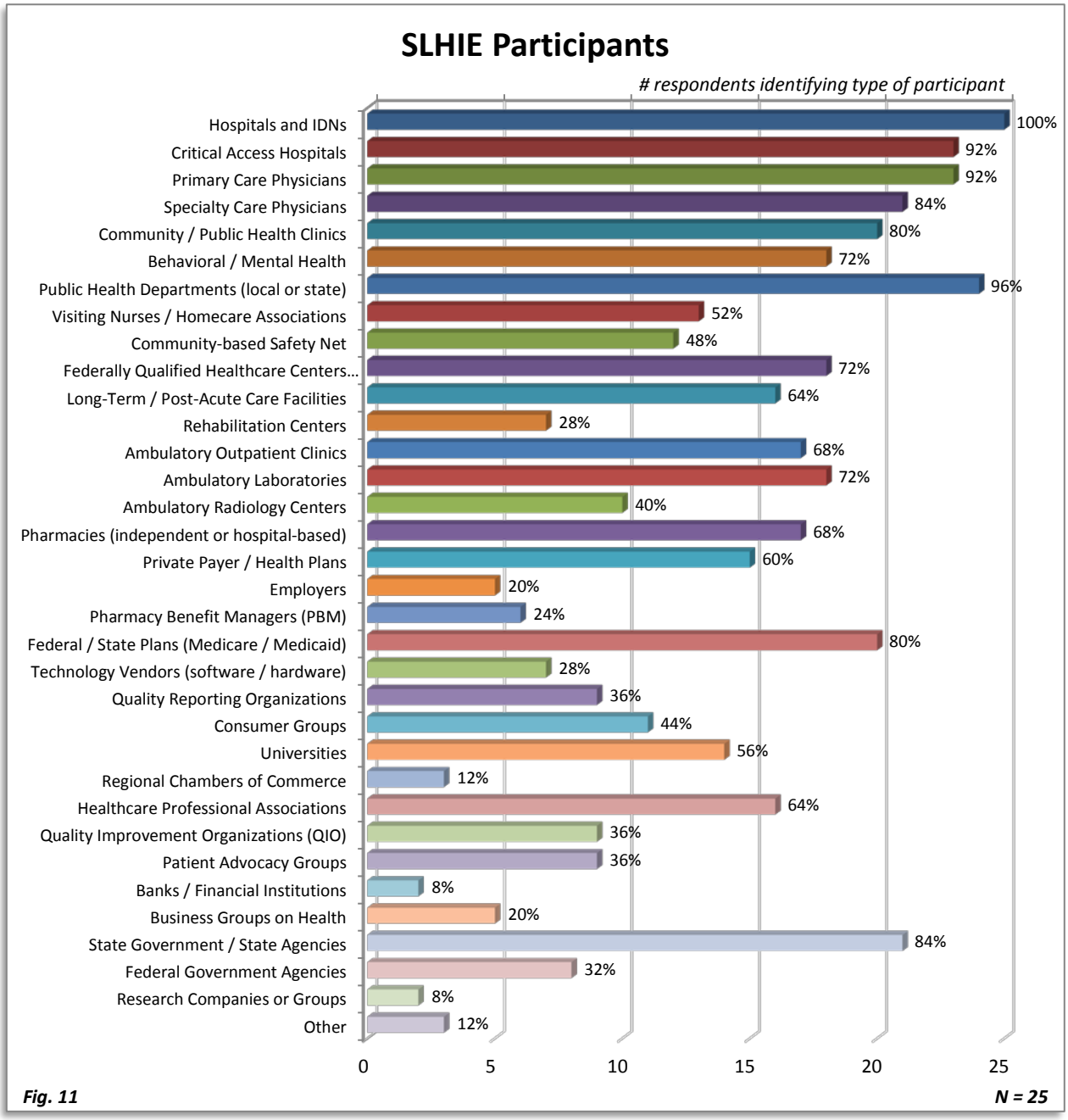
- Health Information Technology / Health Information Network
- Public Health
- Departments such as Health or Health and Human Services
- Shared responsibilities across multiple entities, such as state departments, a state department and Governor's Office, or a state department and a state governance committee

[15] State Health Information Exchange Cooperative Agreement Program. Office of the National Coordinator (ONC) for Health IT. http://www.healthit.gov/policy-researchers-implementers/state-health-information-exchange

Fifty-eight percent of participants reported that their SLHIE was in production, with 31 percent currently in the pilot or implementation phase. One state reported they had postponed implementation and another reported being in the planning phase. States with an SDE represent the majority of SLHIEs that are in production and actively exchanging data.

Stakeholders

Wide ranges of stakeholder were reported as participants in the SLHIEs, as indicated in Figure 11.



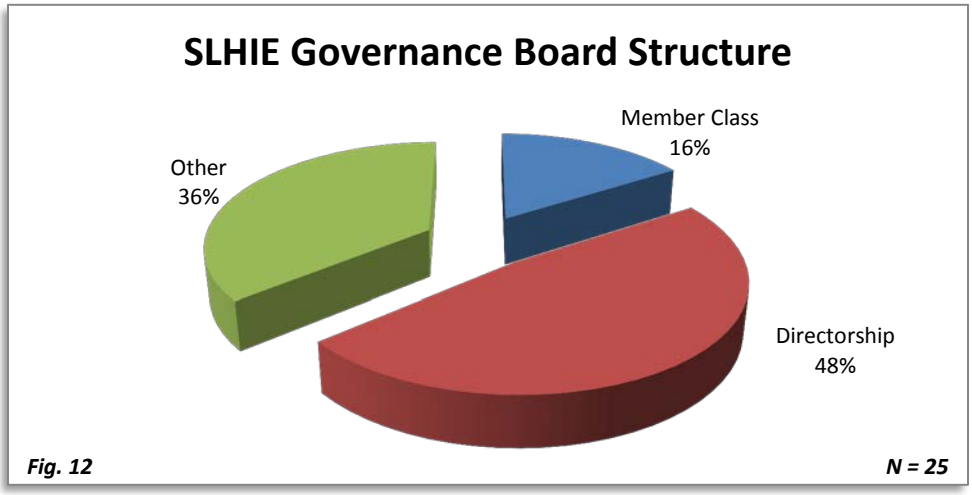
Not surprisingly, hospitals and integrated delivery networks ranked highest among reported stakeholders, along with public health departments and critical access hospitals. Ambulatory participants ranked high as

well, with primary care physicians and specialty care physician at 92 percent and 84 percent respectively. Other ambulatory settings with significant participation reported include ambulatory outpatient clinics, laboratories and radiology centers.

Today, there are many emerging stakeholders and participants in both public and private **Health Information Exchange organizations (HIO)**. Many of these are reported in this study, including behavioral/mental health, long-term/post-acute care, consumer groups, patient advocacy groups, payers, third-party administrators and employees. Although they ranked lower on the list, private payers, health plans, pharmacy benefit managers and employers were also identified as participants. Survey respondents reported an additional 12 percent representing "Other" participants such as regional chambers of commerce, banks, financial institutions and research organizations.

Governance & Oversight

The primary board structure for the SLHIE was reported to be a directorship, as noted below.



Other governance board structure types noted in the study included:

- Governor appointment structure;
- Advisory council, coordinated governance public/private model, or other legislatively formed advisory council;
- Trustee appointments; and
- Legislative or executive order formation.

Again, it appears that not all states fit a specific governance model or models, and instead deploy the structure that best fits their environment.

Seventy-five percent of SLHIEs reported that their board was composed primarily of exchange participants, with 33 percent reporting representation from funding sources, as well as additional reports of representation from community interests. This analysis did not go into further detail in this area. With only one exception, all SLHIE respondents indicated they require a participation agreement with their exchange participants.

Management of the organization is critical. Eighty five percent of the SLHIEs were reported as being managed by a paid individual who is on staff, while three respondents indicated the organization is managed by a contractor or other non-staff individual, and one respondent reported management by both a staff member and a contractor. This finding is consistent with the results from the 2012 HIMSS/AHIMA *HIE Staffing Model Environmental Scan*,[16] which showed the majority of executive management positions in HIOs were filled by in-house staff.[17] The HIMSS/AHIMA study also indicated that executive management positions were difficult to fill with qualified individuals as compared to other Operational positions.[18]

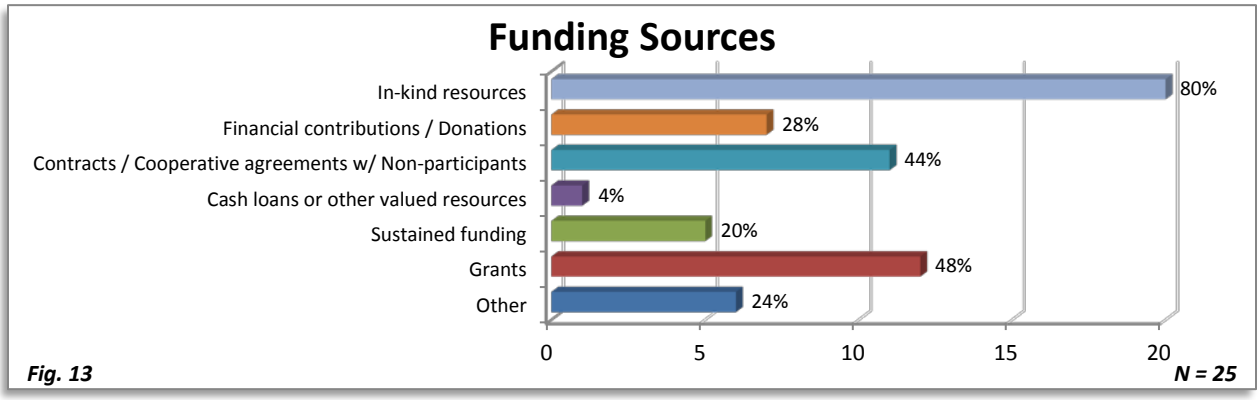
State CIO Role

The State CIO was reported as playing a specific role in the SLHIE for 72 percent of responding states and territories. The role of the CIO and/or the Office of the CIO varies across states, with the most common CIO roles identified as follows:

- Administration of state HIE grants
- Oversight, as directed by state statutes
- Chair and/or participation in advisory bodies, councils and other governance bodies
- Advisement to or serving as the State HIT Coordinator
- Participation on the SLHIE's Board of Directors as ex-officio, non-voting or co-chair
- Provision of guidance or management with the state's technology strategy, software applications, technical infrastructure and/or services

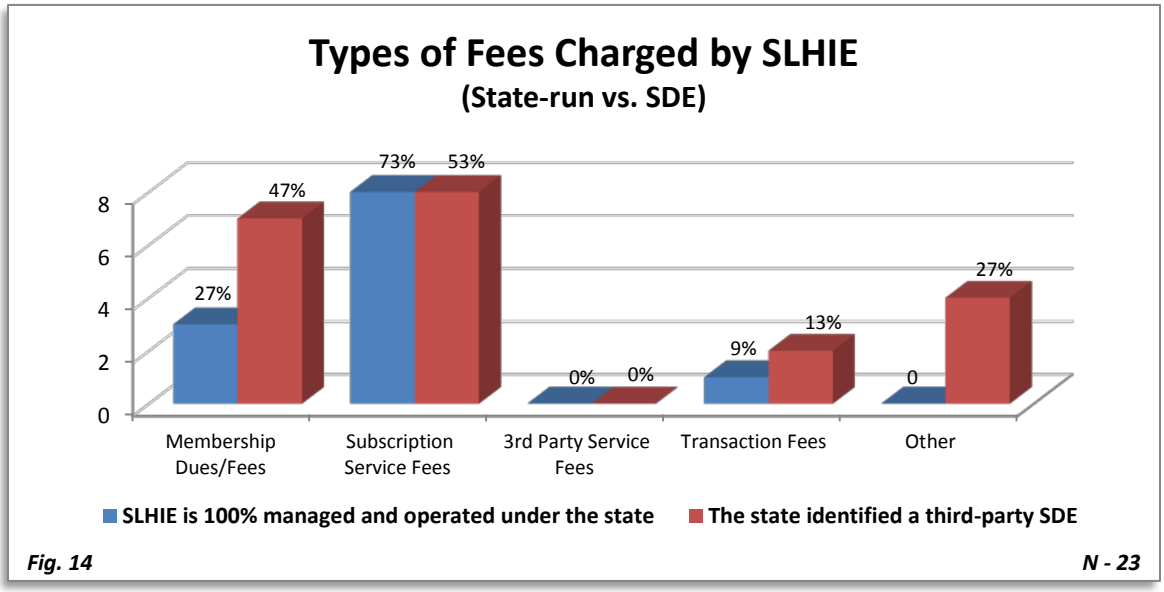
Funding

Eighty percent of SLHIEs indicated in-kind resources as a key funding source, with grants ranking second highest at 48 percent (Figure 13). This is in addition to the federal funding received through the State HIE Cooperative Agreement program.[19] Twenty-four percent of participants indicated "Other" and provided examples including contractual arrangements, state-appropriated funds and payer funding. Many indicated that they are also investigating other financial models and service offerings, such as service chargeback.



[16] *Trends in Health Information Exchange Organizational Staffing: AHIMA/HIMSS HIE Staffing Model Environmental Scan*. AHIMA/HIMSS Joint Workgroup. December 2012. http://www.himss.org/ResourceLibrary/GenResourceReg.aspx?ItemNumber=17245&navItemNumber=16146
[17] *Ibid*, page 19.
[18] *Ibid*, page 31.
[19] State Health Information Exchange Cooperative Agreement Program. Office of the National Coordinator (ONC) for Health IT. http://www.healthit.gov/policy-researchers-implementers/state-health-information-exchange

Subscription service fees were reported as the most common fees charged by SLHIEs, with membership dues ranking second. The breakdown of this information according to whether SLHIEs are operated by the state or an SDE provides an interesting comparison, as noted in Figure 14. Twenty-seven percent of respondents selected "Other" funding sources, including license fees and participation fees, which are different from membership fees.



Sixty-four percent of the SLHIEs were reported to have received some type of planning grant, with the majority indicating they utilized planning funds awarded under the **Health Information Technology for Economic and Clinical Health (HITECH) Act** with the State HIE Cooperative Agreement program.[20] Other planning grants utilized by these SLHIEs included **Agency for Healthcare Research and Quality (AHRQ)**[21] HIT demonstration grants, CMS[22] grants, federal grants administered through the **Office of the National Coordinator (ONC)**[23] and state-specific grants. Additional HITECH or **American Recovery and Reinvestment Act of 2009 (ARRA)** funds used include HIE Challenge grants,[24] HIE Workforce grants[25] and funding awarded under the Beacon Cooperative program.[26] One respondent also indicated that their SLHIE is linked with the state's **Regional Extension Center (REC)**. Additional referenced funding sources are listed below:

- State-specific Medicaid projects
- Mental health-focused grants

[20] State HIE Cooperative Agreement Program. Office of the National Coordinator (ONC) for Health IT. http://www.healthit.gov/policy-researchers-implementers/state-health-information-exchange
[21] Agency for Healthcare Research and Quality (AHRQ): http://www.ahrq.gov/index.html
[22] Centers for Medicare and Medicaid Services (CMS): https://www.cms.gov/
[23] Office of the National Coordinator (ONC) for Health IT: http://www.healthit.gov/newsroom/about-onc
[24] ONC Health Information Exchange Challenge Grant Program: http://www.healthit.gov/providers-professionals/health-information-exchange-challenge-grant-program
[25] ONC Health IT Adoption Programs. Workforce Development Program: http://www.healthit.gov/policy-researchers-implementers/workforce-development-program
[26] ONC Beacon Community Program: http://www.healthit.gov/policy-researchers-implementers/beacon-community-program

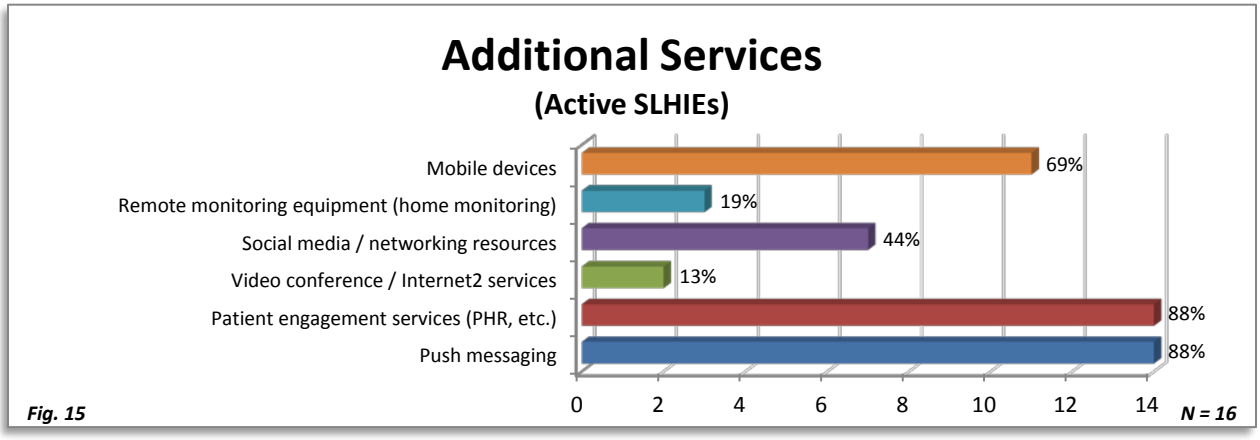
- HRSA's **Health Center Controlled Network (HCCN)**[27]
- CMS Innovation awards[28]
- **CMMI State Innovation Model (SIM)** planning grant[29]
- HIE care coordination-focused grants

Many of the respondents indicated that the current SLHIE work effort is focused on evaluation of additional service offerings for revenue generation, with the intention of supporting long-term sustainability. While some of these services are already being offered by HIOs, some SLHIEs are evaluating inclusion of these as either a core service offering or a value-add service offering. The following were identified by respondents as currently being under consideration:

- Clinical Data Exchange such as medication history and management, lab services, Continuity of Care Document (CCD), images and near-real time data access across the state.
- Reporting including quality reporting, **Accountable Care Organization (ACO)** reporting, pay for quality program reporting, public health reporting, etc.
- Alerts/Messaging/Notifications such as disability determinations, HIO participation and **admissions/discharges/transfers (ADT)**.
- Community Shared Services such as:
    - Directory services (e.g., centralized provider directory with centralized credentialing services);
    - Registry services (e.g., opt-out registries or public health registries);
    - **Master Patient Index (MPI)**;
    - Patient query services;
    - Record locator services; and
    - Public key infrastructure.
- Direct messaging services.
- Inter-HIO data exchange activities and functions across the state.
- Claims data linking state claims data with the SLHIE clinical data.
- Portals / Gateways to include consumer, patient, MMIS, immunization, PHR, etc.
- Consumer-focused offerings, including PHR and mobile applications.
- **Meaningful Use (MU)** Stage 2 consulting, including data analytics services such as integration of state data sources with private data sources and aggregation services, or analytics with provider and payer data.

Additional areas of exploration include investigation of ways the SLHIE can support state-wide functions, such as new payment/financial models, collaborations with payor/health plans and establishment of ACOs. Respondents representing SLHIEs that were actively exchanging data at the time of the survey (referred to in this paper as "Active SLHIEs") also indicated they are looking ahead to the next horizon with other tools and services that involve the exchange, as well as other state initiatives. Figure 15 shows the key services identified for Active SLHIEs.

[27] Health Center Controlled Networks. US Department of Health and Human Services (HHS). http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/OpportunitiesCollaboration/abouthccns.html
[28] Health Care Innovation Awards. Centers for Medicare & Medicaid Services (CMS). http://innovation.cms.gov/initiatives/Health-Care-Innovation-Awards/
[29] CMS State Innovation Models Initiative: http://innovation.cms.gov/initiatives/state-innovations/



Measuring **return on investment (ROI)** is always a challenge for any organization, but it can be especially challenging for HIOs. Seventy-eight percent of respondents reported that they do not have ROI measures in place, with only 22 percent—5 organizations—indicating that they do. One respondent reflected that their goal was not to "*just record process metrics and achieve milestones, but identify the impact on care provided and associated costs.*" Examples of ROI measures in place with these five organizations include:

- Duplicate testing measures
- Physician's use and satisfaction study
- Data set measures on value and savings, such as medication history, labs, radiology, immunizations and transition of care summaries
- Evaluation and identification of specific studies, such as cost reduction associated with unnecessary emergency department visits and improved care management for high-cost patients.

Value of SLHIE Participation

Demonstrating the value of data exchange services to stakeholders and participants is critical for HIOs. Respondents indicated that the following services and benefits compel their stakeholders' participation:

- Ease of transmitting personal health information
- Low cost of participation
- Ability to directly impact patient behavior (e.g., through identification of noncompliance of treatment plans)
- Cooperation and collaboration in lieu of competition across diverse stakeholders
- Ability to demonstrate time and cost savings with potential revenue increase (e.g., portals, electronic referrals)
- Ability to connect with the SLHIE through various methods
- Provision of low-cost exchange services where not otherwise available (e.g., Direct messaging)
- Connections with wide range of stakeholders and providers across large geographic areas
- Facilitation and integration of all relative public health reporting with the SLHIE
- Ability to support a wide range of reporting activities across stakeholder groups (e.g., public health, results delivery, ADT, clinical data, Meaningful Use reporting and care coordination)
- Facilitation of move to accountable care models and new payment/care reforms

One respondent specified that they believe providers are driven to participate in the SLHIE due to payment and delivery care reforms within the Meaningful Use requirements. Value is also being demonstrated by SLHIEs that participate in Federal Government IT programs supporting Indian Health Services, Social Security Administration, the Department of Defense and the Department of Veteran's Affairs.

Data Exchange

Of those exchanging data, 53 percent indicated support of bi-directional exchange, 24 percent indicated one-way data exchange and the remaining 24 percent included a mix of both bi-directional and one-way data exchange. Interestingly, the majority of SDEs appear to support bi-directional data exchange, while the majority of the state-operated exchanges support a mix of both bi-directional and one-way data exchange.

Half of those organizations not currently exchanging data (referred to in this paper as "Planning SLHIEs") indicated plans to deploy measurements once their data exchange begins. Their targeted exchange measurements are closely matched to the top three identified by Active SLHIEs—number of entities that send/receive data each month, number of providers that send/receive data each month, and number of monthly transactions—for Active SLHIEs, as indicated in Figure 16 below.

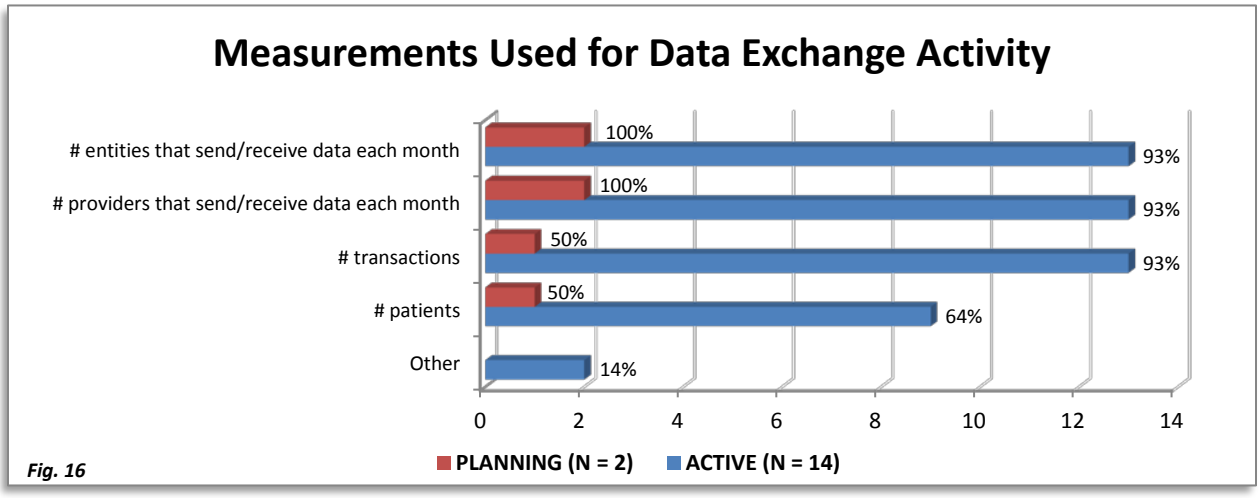


Fig. 16

Figure 17 identifies basic data exchange services currently provided, or under contract to be provided, by those organizations activity exchanging data as compared to those who are in the planning stages.

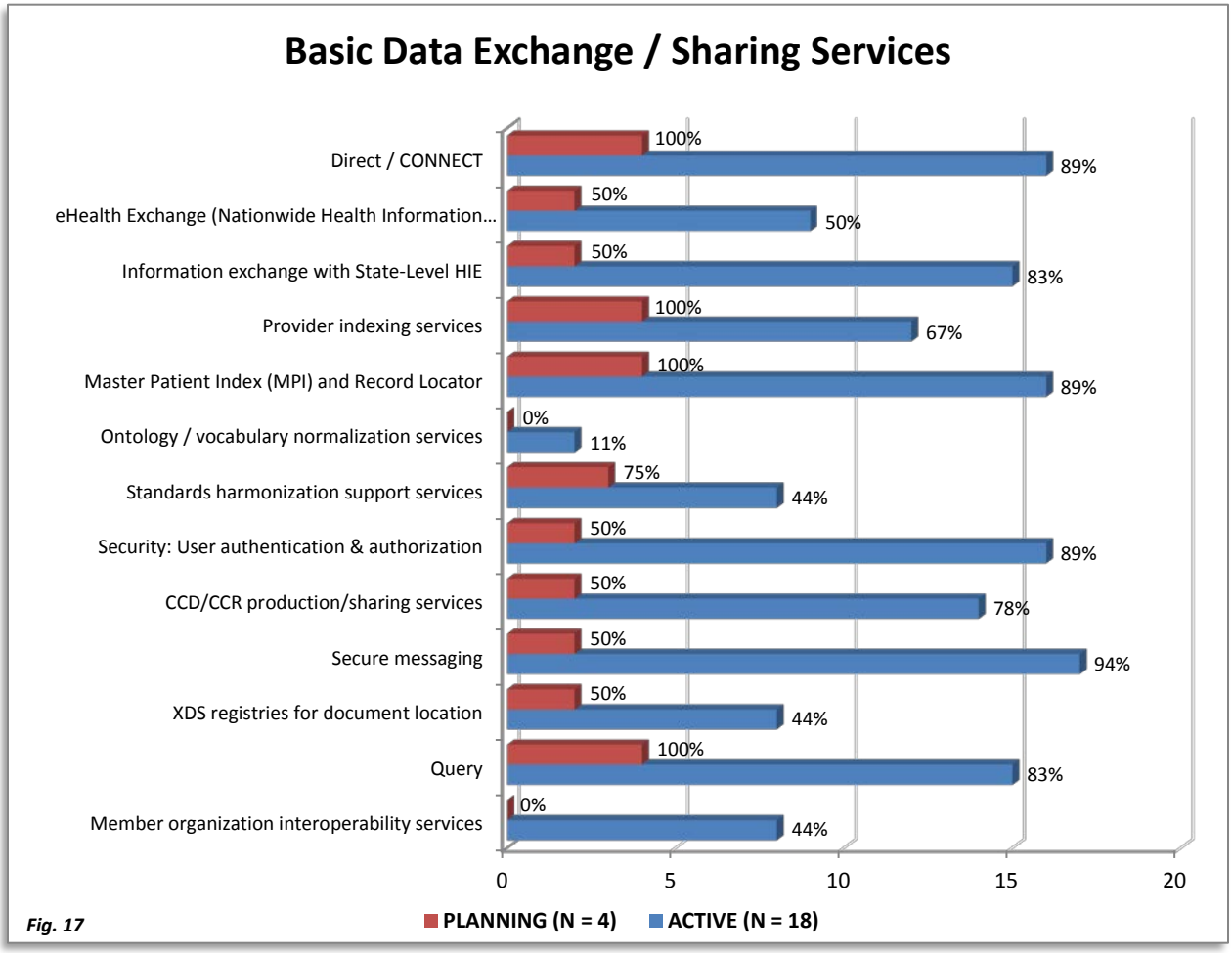


Fig. 17

The top tier service offerings shown in Figure 17 for Active SLHIEs include secure messaging, security (user authentication/authorization, MPI and **Record Locator Services (RLS)**), Direct/CONNECT, and query and exchange services for those interacting with the SLHIE. When comparing these with services planned by SLHIEs not currently exchanging data, priorities appear even more clearly, with indexing services (provider, MPI and RLS) and query services targeted for all planning organizations in addition to Direct/CONNECT. Standards harmonization support services are planned for 3 out of the 4 Planning SLHIEs, while only 2 of the 4 reported plans for secure messaging, security, exchange services for those interacting with the SLHIE or CCD/CCR production services. Both groups ranked ontology and vocabulary normalization as the least targeted services.

Figure 18 identifies specific clinical data exchange services that are currently provided—or under contractual commitment to be provided—by those organizations actively exchanging data, as compared to those organizations still in the planning stages.

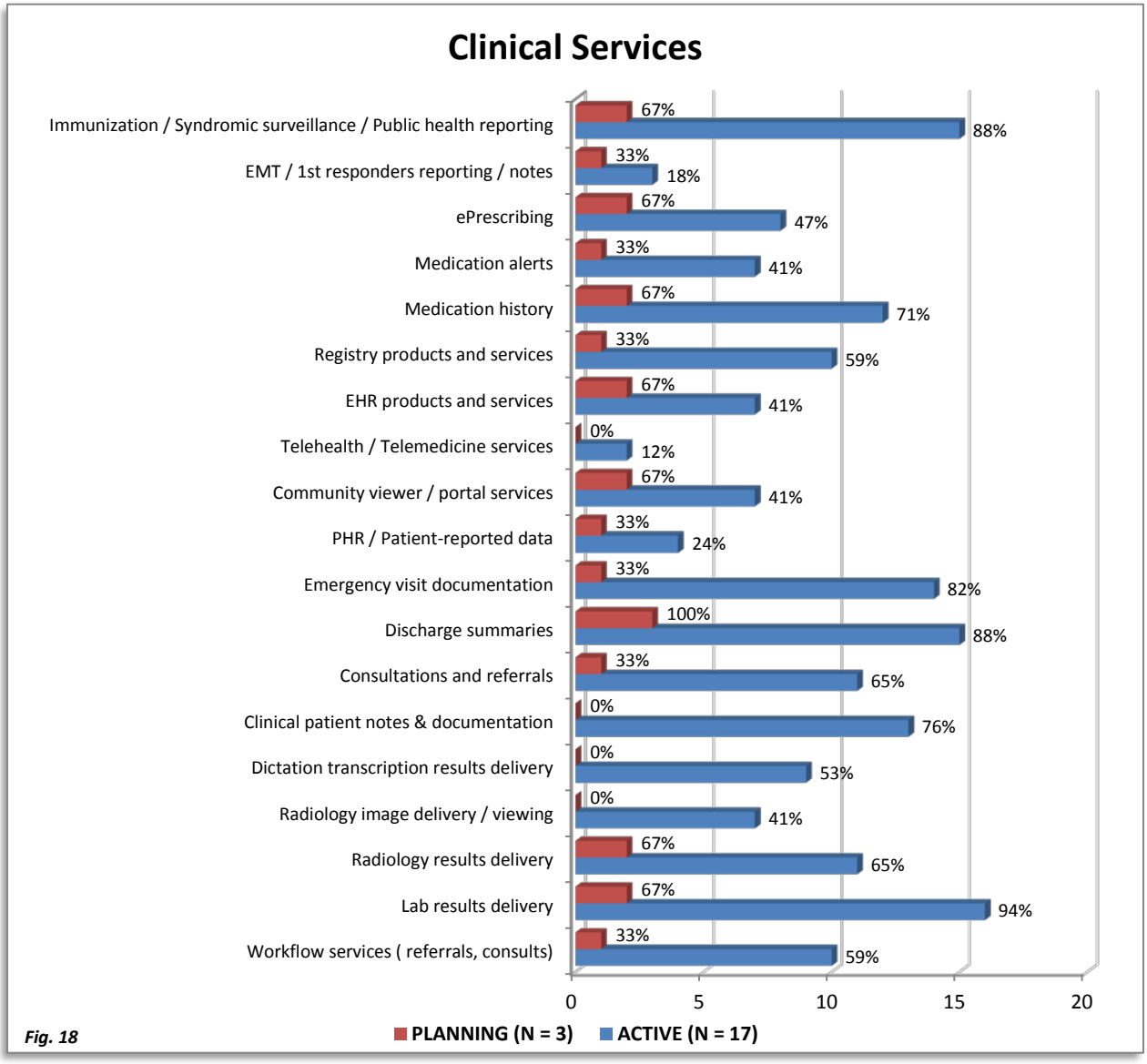


Fig. 18

Lab results delivery was the highest ranked service offering for Active SLHIEs, followed by discharge summaries, immunization/syndromic surveillance and public health reporting. These services were also targeted by the majority of Planning SLHIEs, likely reflecting the impact of Meaningful Use requirements on the decisions made by states around which services to provide. The lowest ranking service reported by both groups was telehealth/telemedicine services, along with clinical patient notes & documentation, dictation transcription results delivery and radiology image delivery / viewing for those still in the planning stages.

Eight SLHIEs actively exchanging data indicated that they include financial and administrative services in their offerings, as shown in Figure 19. Only one respondent from those not yet actively exchange data reported planning for financial and administrative services, with the focus on ACO services and administrative data exchange.

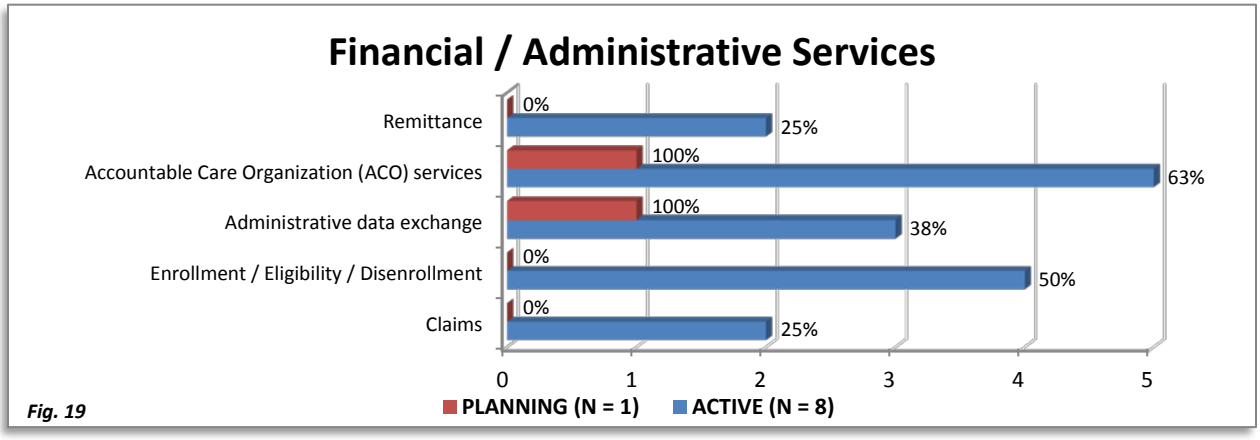


Fig. 19

Immunization reporting topped the list of healthcare outcomes and research services for those organizations not yet exchanging data, while public health reporting was most prominent for Active SLHIEs. Interestingly, the other services selected by the two groups did not match up for the most part, with 67 percent of Planning SLHIEs focused on quality indicator reporting, population health monitoring and data evaluation and performance management compared to a third or less of Active SLHIEs (Figure 20).

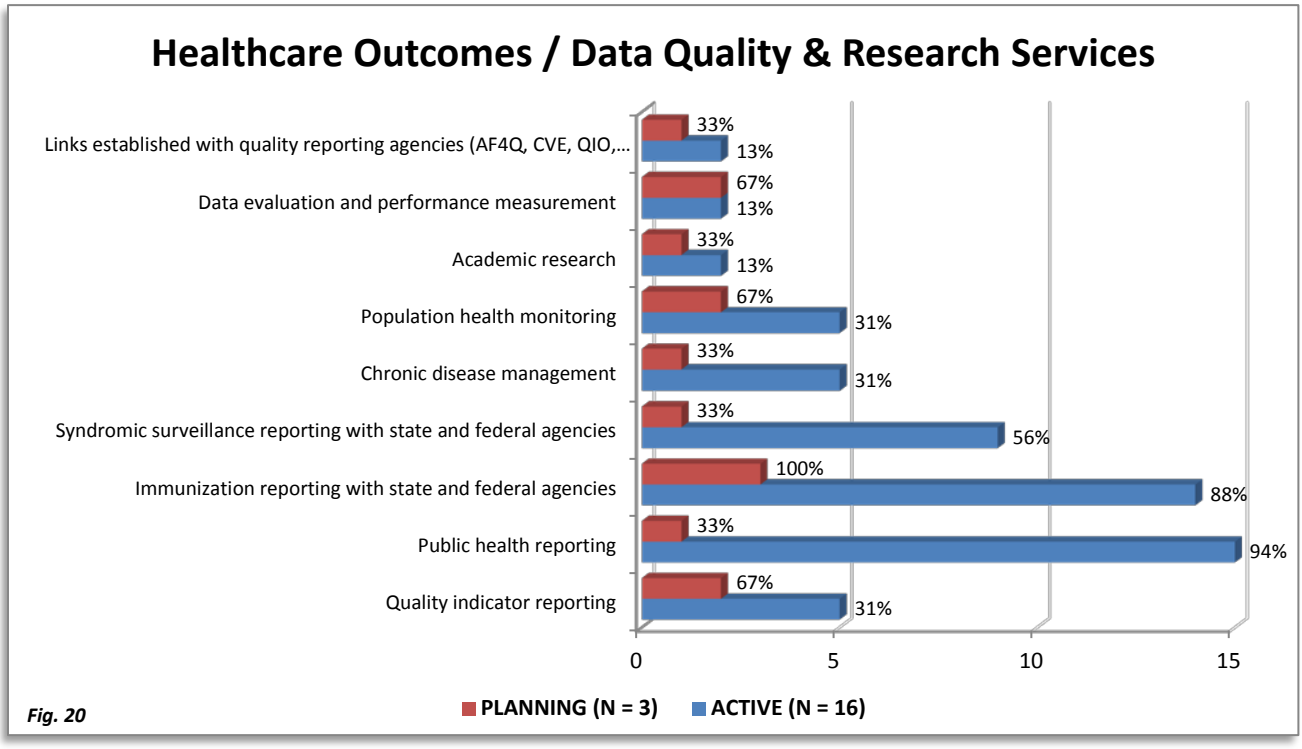


Fig. 20

Portal service offerings were popular across both groups with 72 percent of Active SLHIEs currently offering portal services with their data exchange activities, and 60 percent of Planning SLHIEs including this in their planned service offerings upon launch of data exchange.

Technical Overview

The technical architecture strategy and system design is critical for initial deployment and future growth of any organization. Industry experience has demonstrated that a hybrid model appears to be the most common technical architecture approach taken by HIOs. The results of this study reaffirmed the prevalence of the hybrid approach, with 70 percent of Active SLHIEs and 50 percent of Planning SLHIEs reportedly supporting this model. Six of the organizations indicated that their technical environment was selected as the result of a specific vendor, while the majority of organizations remained vendor neutral with their technology strategy and architecture.

Sixty-three percent of the SLHIEs actively exchanging data use a "buy" strategy for their technical strategy and deployment, while the rest used a mix of buy, build and in-house development. Similarly, for those organizations not yet exchanging data, 50 percent indicated a buy strategy over a mixed environment. Eighty-nine percent of Active SLHIEs and 67 percent of those in planning stages indicated that they outsource, or plan to outsource, their technical environment, while two Active SLHIEs retain their technical environment in house and one Planning SLHIE intends to do the same. For those who currently (or plan to) outsource their technical environment, 75 percent of active SLHIEs and 100 percent of those in the planning stages have a vendor manage their environment while the rest retain their own management.

Security

Figure 21 identifies the selected security controls utilized by participating organizations. The responses for Active SLHIEs match up with those of Planning SLHIEs for the most part, with the main difference between the two groups being that single sign-on ranks higher for those organizations not yet exchanging data.

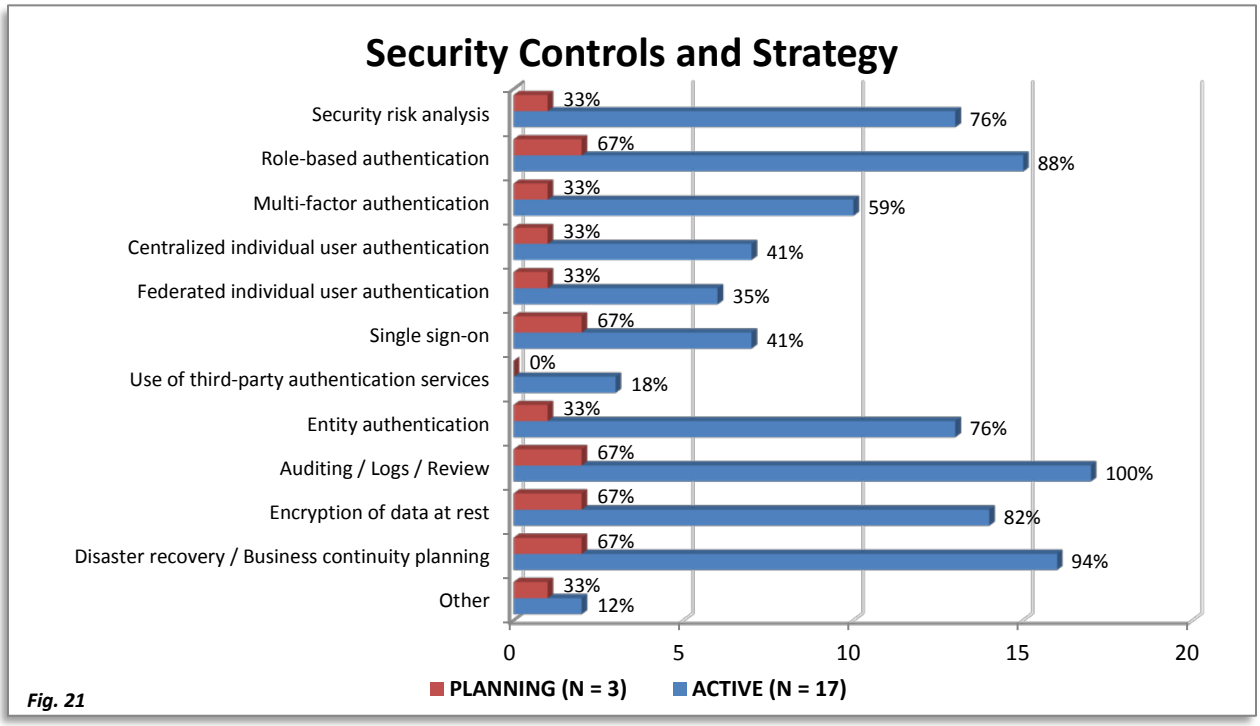


Fig. 21

The following Figure 22 outlines the patient privacy consent methods used by organizations exchanging data as compared to planned methods for organizations not yet exchanging data.

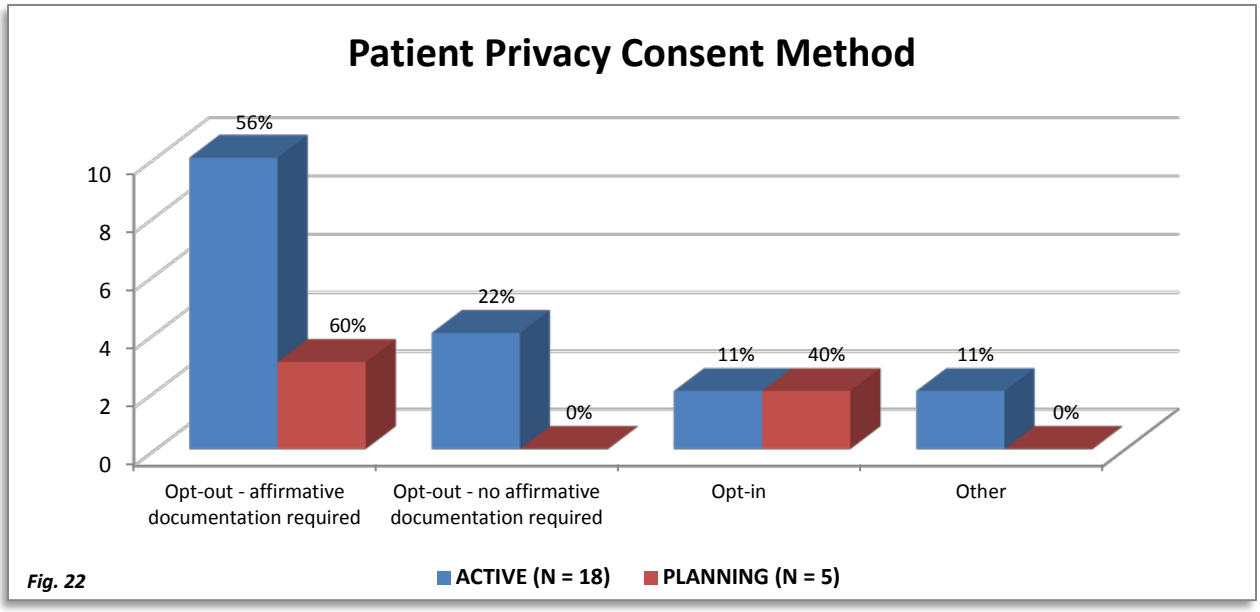


Fig. 22

The following identity proofing strategies were identified as deployed by Active SLHIEs:

- Organizational and user participation agreements and data use agreements
- Formal onboarding procedures for each user of the SLHIE (one participant indicated a 10-point check verification process)
- State licensure status, **National Provider Identifier (NPI)** and the OIG's LEIE list[30] are verified for provider participants
- Use of names and passwords
- Audit log review and vetting
- **Public-key infrastructure (PKI)** solution with registration authority model

Identified standards and frameworks supported include **National Institute of Standards and Technology (NIST)** standards[31] (level 2+ e authentication) and federal standards to establish a **Health Information Service Provider (HISP)**[32] or HISP Trust Fabric.[33]

Some states have delegated identify proofing as a responsibility to participating health care providers or regional HIOs. Their participant agreements include responsibility for both authenticating the identity of new users and maintaining user integrity. While delegating this function at a local level can be advantageous, it may not be feasible or appropriate in all cases.

[30] List of Excluded Individuals and Entities (LEIE). Office of the Inspector General. http://oig.hhs.gov/exclusions/exclusions_list.asp
[31] Computer Security Division – Computer Security Resource Center Standards. National Institute of Standards and Technology (NIST). http://csrc.nist.gov/groups/STM/cmvp/standards.html
[32] "What is a Health Information Service Provider (HISP)?" NwHIN Connections. http://nwhin.siframework.org/HISP
[33] "Building the trust fabric for direct exchange of health information." A. Steciw. Health IT Pulse. February 17, 2012. http://searchhealthit.techtarget.com/healthitexchange/healthitpulse/building-the-trust-fabric-for-direct-exchange-of-health-information/

Data Management

Data management is critical for any HIO, and the selected approach may depend on many factors including technical architecture strategy and service offerings. For those organizations actively exchanging data, a variety of strategies were indicated by respondents (see Figure 23), with code set translation and data normalization ranking the highest. Additional responses provided for the "Other" category included the use of a combination of methods, as well as data management responsibility assigned to the participating organizations.

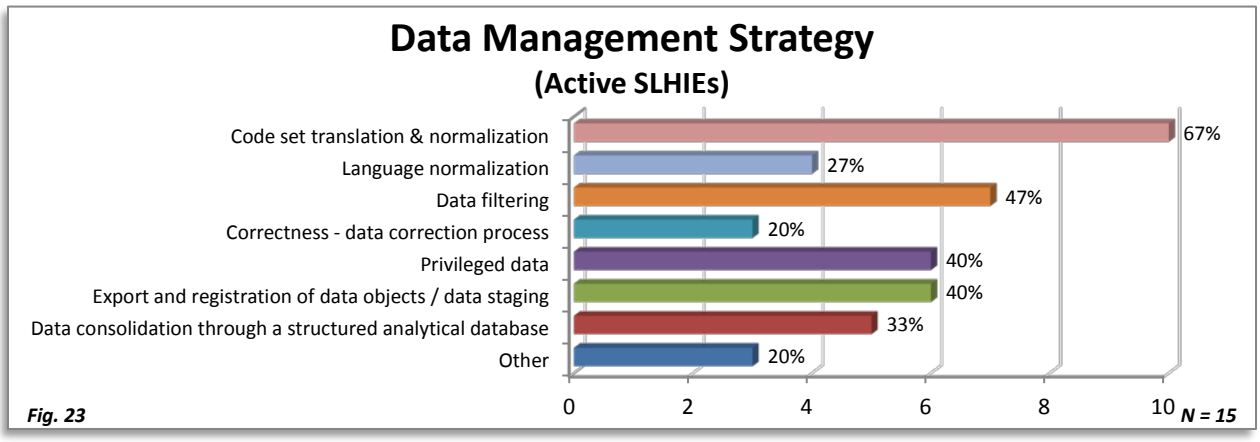


Fig. 23

Support of nationally recognized standards and interoperability frameworks is critical for both the SLHIE and its participating organizations. More than half of the SLHIEs actively exchanging data were reported as relying on their vendors to ensure that their products support nationally recognized standards. Figures 24 and 25 identify the primary data and message encoding standards used by Active SLHIEs—these results correlate to their service offerings, which primarily focus on clinical data.

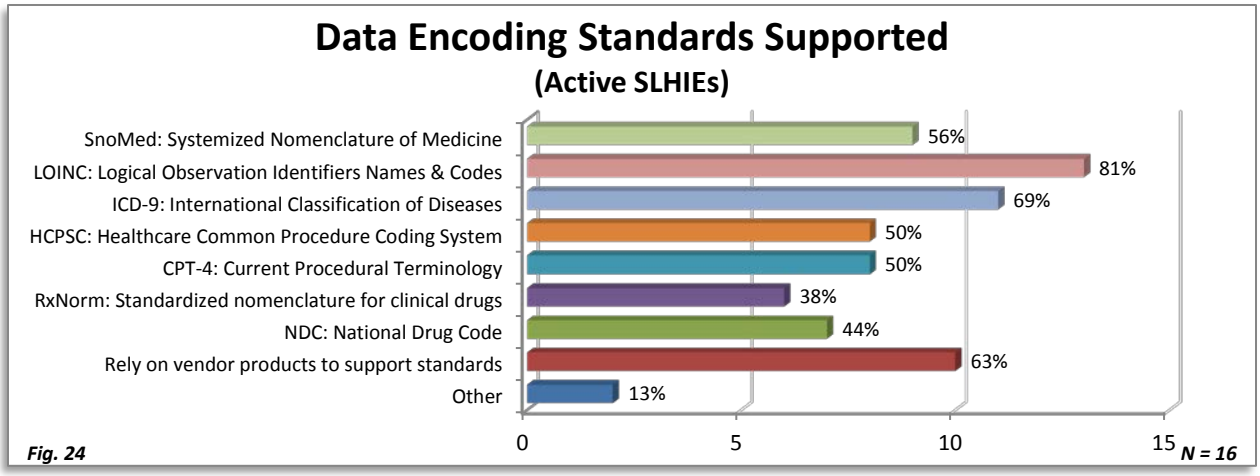
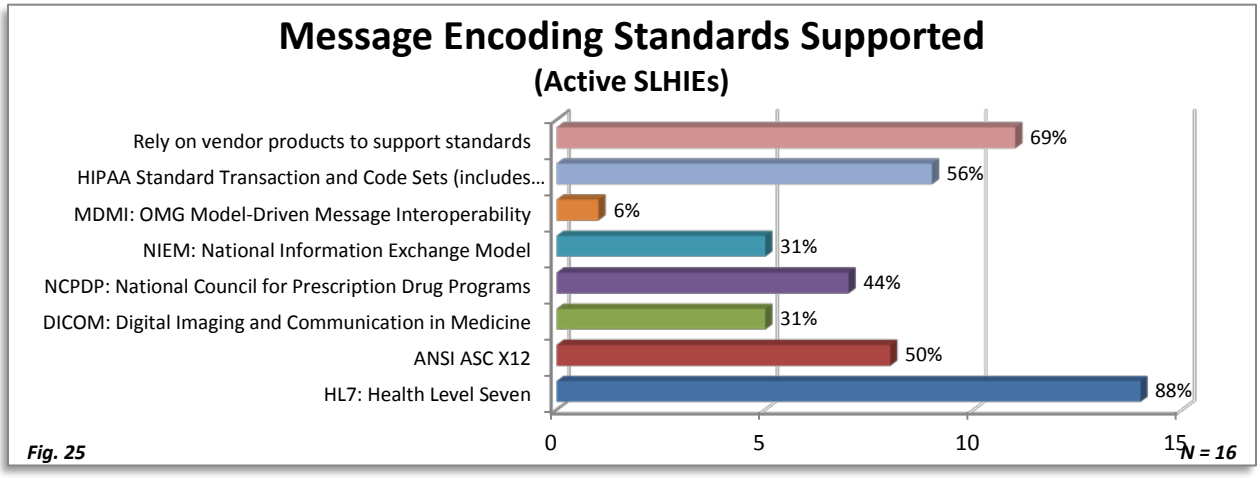


Fig. 24



In conjunction with standards, the use of referenced implementation guidelines and profiles is necessary. For those SLHIEs actively exchanging data, 75 percent were reportedly using **Integrating the Healthcare Enterprise (IHE)**[34] profiles and 31 percent chose **CAQH CORE**[35] guidelines.

[34] Integrating the Healthcare Enterprise (IHE): http://www.ihe.net/
[35] CAQH Committee on Operating Rules for Information Exchange (CORE): http://www.caqh.org/CORE_overview.php

Shared Services and Collaboration: Breaking Down the Barriers to Success and Collaborating

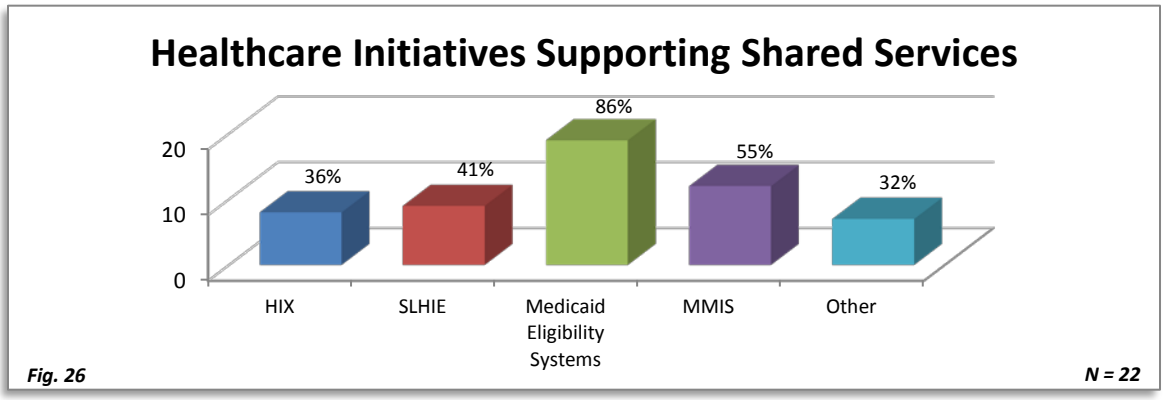
Shared Services and Support of Common IT Components

State CIOs continue to prioritize the need for state IT services to be delivered in the most efficient and cost-effective manner possible. The "enterprise" vision is a complex set of dynamics that include governance, an introspective look at the state IT infrastructure, and how IT services and automated business solutions are provided via consolidated, decentralized or shared service modes of delivery.[36] State CIOs have begun to explore how health IT initiatives can be leveraged for strategic IT consolidations and shared services, including outreach and collaboration at various levels of government, in their strategy for shared services.

Although shared services and collaboration provide great opportunity, they also present great challenges for State CIOs. Fundamental change in the way IT is governed, managed and operated within a state will certainly be confronted by resistance in a variety of forms.

State CIO respondents overwhelmingly indicated that they are using shared technology infrastructure components and services to support multiple healthcare initiatives. Only 4 percent of State CIOs responded that they are *not* leveraging shared services, while the remaining 96 percent stated that they are using a shared services model for healthcare initiatives.

Survey results identified a detailed depiction of the healthcare initiatives that are leveraging shared technology infrastructure. The majority of State CIOs (86 percent) stated that they are using shared services for Medicaid eligibility modernization, 55 percent indicated MMIS, 41 percent indicated SLHIE, 36 percent selected HIX, and 32 percent were in the process of applying shared services for other health initiatives. Figure 26 below gives a visual representation of health projects that are using shared services by State CIOs. Based on these initial finding it is clear that there is still room for greater adoption of shared services models.



[36] "IT Consolidation and Shared Services: States Seeking Economies of Scale." NASCIO. March 2006. http://www.nascio.org/publications/documents/NASCIO-Con_and_SS_Issue_Brief_0306.pdf

Collaboration at the Agency and State Level

Cross-jurisdictional arrangements being used by State CIOs include state-to-federal, state-to-state, state-to-county, county-to-county and city-to-county collaborations. In this study, only state-to-state collaborations and those within state agencies were observed. For State CIOs, cost savings have been noted as the primary motivation for collaboration.[37]

When asked if State CIOs are planning to or are in the process of leveraging the state's technology infrastructure across multiple state agencies and services, the response was a resounding "Yes." 92 percent of the responding State CIOs reported that they are indeed in process or planning to collaborate with other state agencies, with only 8 percent stating that they are not planning to do so.

Once collaborative efforts have been agreed to, in many instances State CIOs will then be responsible for establishing the rules, regulations and procedures governing the acquisition of information technology hardware, software, systems and services for the state's agencies and institutions of higher learning. Below you will find examples, in no particular order, of targeted collaborative efforts in state government:

- Integrated eligibility systems
- Public health reporting
- Medicaid HIT Meaningful Use
- Master data management
- Unemployment insurance
- Military and veterans affairs
- Department of Motor Vehicles
- Voice services
- Department of Revenue
- Data center consolidation
- Enterprise Resource Planning (ERP)
- Networks
- State Health Information Exchange
- SHOP / private insurance for the individual market
- Corrections and juvenile justice programs
- Identity and access management
- Insurance marketplaces under the ACA
- Mental health and substance abuse services
- Department of Treasury
- E-mail services
- Content and document management systems
- Geographic Information Systems (GIS)
- Dashboards
- Security

When asked if State CIOs were collaborating on state-to-state healthcare related initiatives, 77 percent responded that they were working with other states. While state-to-state collaboration has a slightly lower adoption rate than agency-to-agency, only 23 percent of respondents reported that they are not collaborating with other states on health-related initiatives.

For a more accurate depiction of the state-to-state collaborative healthcare initiatives, State CIOs were asked to select all programs that applied. Sixty-eight percent of State CIOs reported that they are using shared services for SLHIE, 42 percent stated Medicaid Eligibility Systems, 32 percent reported both HIX and MMIS, and 21 percent were in the process of applying shared services for other health initiatives. Figure 27 compares the in-state and state-to-state collaborative initiatives being pursued by State CIOs. The initial findings would suggest that while there is some adoption of state-to-state collaboration on health-related

[37] "What Makes Collaborative Initiatives Work?" NASCIO Collaboration Series: Targets of Opportunity for Collaboration. 2012. http://www.nascio.org/publications/documents/NASCIO-What-Makes-Collaborative-Initiatives-Work.pdf

initiatives, there is a great deal of opportunity that exists for states that are looking to partner with other states.

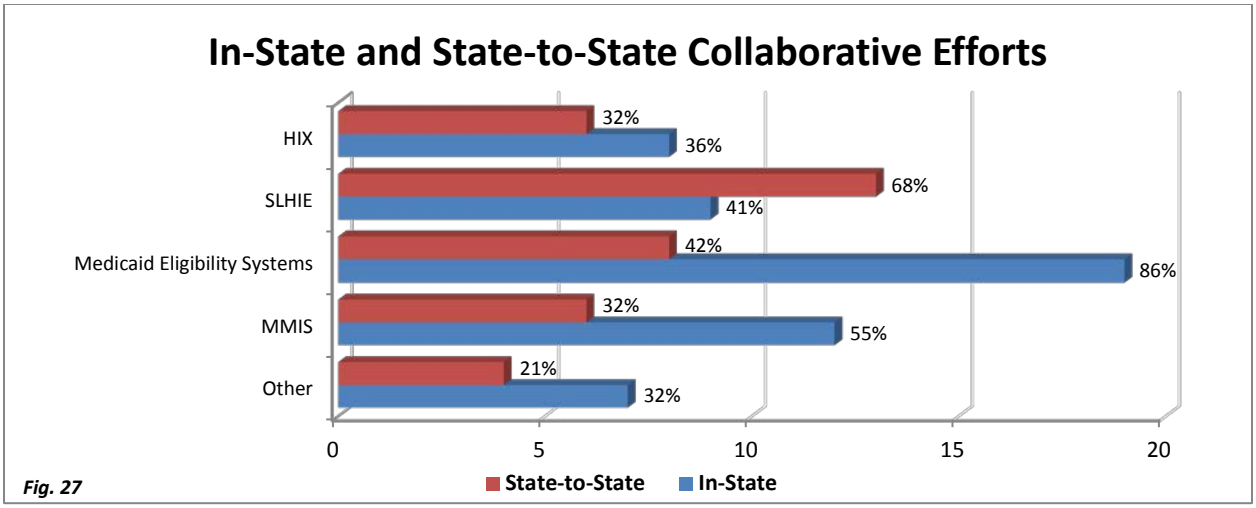


Fig. 27

Concluding Observations

This study is one of the first in-depth industry studies of this nature. These findings should be a call to action for states and State CIOs in navigating their future successfully.

State CIO Call To Action!

- Provide strong leadership and effective communication amongst state agencies, programs, and with Governor-focused IT initiatives.
- Look to identify and deploy a data governance structure for state health IT initiatives.
- Continue to strive to leverage technology infrastructure across all state projects, initiatives and agencies.
- Pursue state-to-state collaboration and partnerships around healthcare related opportunities.
- Explore ways the state can leverage existing HIE technology infrastructure and effectively use existing service offerings for other healthcare projects.
- Identify ways to increase security education and identify existing budget gaps.
- Explore activities to harmonize state-specific policies and regulations with federal policies and regulations.
- Identify new opportunities to financially support healthcare initiatives with sustainable business and revenue models.
- Identify and educate on ways that information technology can demonstrate value and benefits in healthcare initiatives.
- The backbone of achieving lower costs, better health outcomes, and system interoperability relies on a state enterprise view.
    - Become an advocate for state-wide enterprise solutions and find ways to decouple legacy systems and break down existing silos in state government.
    - Integrate business, information and technological approaches to building health systems.
    - Use nationally recognized standards to advance interoperability.
    - Take an enterprise approach to identity and access management. States can improve critical service capabilities within state operations and with trusted external partners, while better managing their risk and liability

Additional Resources

HIMSS

- HIMSS Privacy and Security Toolkit
- HIMSS State Government Affairs
- AHIMA/HIMSS Collaboration: Trends in Health Information Exchange Organizational Staffing
- 2011 HIMSS HIE Common Practices Survey
- Health Information Exchange Toolkits
  - HIE Toolkit
  - Ambulatory HIE Toolkit
  - Enterprise HIE Toolkit
- HIMSS Interoperability definition

NASCIO

- For more information on maturing your state's data governance program, please reference the NASCIO Data Governance series: www.nascio.org/publications/documents/NASCIO-DataGovernance-Part1.pdf.
- For more information on the IT requirements for Health Insurance Marketplaces, please review the NASCIO issue brief, *On the Fence: IT Implications of the Health Benefit Exchanges*, which can be downloaded at: www.nascio.org/publications
- A recent NASCIO Collaboration Series, *Targets of Opportunity for Collaboration*, provides a more in-depth look at ways to strategically partner for collaborative arrangements. For more information on the NASCIO Collaboration Series please visit: www.nascio.org/publications/documents/NASCIO-What-Makes-Collaborative-Initiatives-Work.pdf.
- For more information on identity and access management, please reference the *NASCIO State Identity, Credential and Access Management Guidance and Roadmap*: http://www.nascio.org/publications/documents/SICAM.pdf
- To gain a better understanding of the requirements and architectural goals of MITA 3.O, please view the NASCIO issue brief *A Golden Opportunity for Medicaid Transformation*: http://www.nascio.org/publications/documents/NASCIO_GoldenOpportunityForMITA_May2012_FINAL.pdf
- See NASCIO's *Recommendations for State Government Adoption of the National Information Exchange Model (NIEM) to Enable Government Information Sharing*: http://www.nascio.org/committees/EA/download.cfm?id=132
- For more information on the State CIO's role in State Level Health Information Exchange, please visit the NASCIO Profiles of Progress series: http://www.nascio.org/publications/documents/NASCIO-Profiles%20in%20Progress%204.pdf
- For more information on NASCIO and CISO's perspectives on security, please reference the 2012 NASCIO-Deloitte Cybersecurity Study: http://www.nascio.org/publications/documents/Deloitte-NASCIOCybersecurityStudy2012.pdf.

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Appendix A: Abbreviations and Acronyms

ACA	Affordable Care Act
ACO	Accountable Care Organization
ADT	Admissions/Discharges/Transfers
AHRQ	Agency for Healthcare Research and Quality
ANSI	American National Standards Institute
ARRA	American Recovery and Reinvestment Act (2009)
CAQH	Council for Affordable Quality Healthcare
CCD	Continuity of Care Document
CCR	Continuity of Care Record
CIO	Chief Information Officer
CMCS	Centers for Medicaid and CHIP Services
CMMI	Center for Medicaid & Medicare Innovation
CMS	Centers for Medicare & Medicaid Services
CPT	Current Procedural Terminology
COTS	Commercial Off-the-Shelf
DICOM	Digital Imaging and Communication in Medicine
ERP	Enterprise Resource Planning
FFE	Federally Facilitated Exchange
FFS	Fee-for-Service
GIS	Global Information Services
HCCN	Health Center Controlled Network (HRSA)
HHS	US Department of Health and Human Services
HIE	Healthcare Information Exchange
HIMSS	Healthcare Information and Management Systems Society
HIO	Healthcare Information Exchange Organization
HIPAA	Health Insurance Portability and Accountability Act (1996)
HISP	Health Information Service Provider
HIT	Healthcare information technology
HITECH	Health Information Technology for Economic and Clinical Health
HIX	Health Insurance Marketplace
HL7	Health Level 7
HRSA	Health Resources & Services Administration
ICD	International Classification of Diseases
IHE	Integrating the Healthcare Enterprise
IDN	Integrated Delivery Network
IT	Information technology
ITSM	Information Technology Service Management
LDAP	Lightweight Directory Access Protocol
LEIE	List of Excluded Individuals/Entities
LOINC	Logical Observation Identifiers Names & Codes
MDMI	Model-Driven Message Interoperability
MITA	Medicaid Information Technology Architecture

MMIS	Medicaid Management Information Systems
MPI	Master Patient Index
MU	Meaningful Use
NASCIO	National Association of State Chief Information Officers
NCPDP	National Council for Prescription Drug Programs
NDC	National Drug Code
NIEM	National Information Exchange Model
NIST	National Institute of Standards and Technology
NPI	National Provider Identifier
OIG	Office of the Inspector General
ONC	Office of the National Coordinator for Health Information Technology
PBM	Pharmacy Benefit Manager
PHR	Personal Health Record
PII	Personally Identifiable Information
PKI	Public Key Infrastructure
QIO	Quality Improvement Organization
RACF	Resource Access Control Facility
REC	Regional Extension Center
RLS	Record Locator Service
ROI	Return on Investment
SDE	State-Designated Entity
SICAM	State Identity and Credential Access Management
SIM	State Innovation Model
SLHIE	State-Level Health Information Exchange
XDS	Cross-Enterprise Document Sharing