



The Office of the National Coordinator for  
Health Information Technology



# Connecting Public Health Information Systems and Health Information Exchange Organizations

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## LESSONS FROM THE FIELD

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## Project Overview, Purpose and Scope

The Office of the National Coordinator for Health Information Technology (ONC) engaged Clinovations Government + Health (CGH) to explore how public health jurisdictions use existing health information exchange (HIE) organizations as a method to exchange information with health care providers.<sup>1</sup> The project documents best practices and lessons learned in the use of HIE organizations to mediate connections to public health information systems.<sup>2</sup>

Health care providers transmit public health information to public health information systems through several routes, including independent connections to individual public health systems, hospital/clinic networks and jurisdictional HIE organizations. Connecting public health systems to an HIE organization is one option to efficiently achieve interoperability and eliminate redundant connections on both sides of a transaction. This report identifies the real-world experiences of jurisdictions as they apply or consider applying this approach. Findings from interviews with 16 jurisdictions synthesize the general strategies to public health and HIE integration across six categories—leadership, technical, financial, privacy and security, legal and policy, and health IT developers.

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## Health Information Exchange and Integration with Public Health Information Systems

Public health agencies perform health promotion and disease prevention activities using data collected through public health screening and treatment services, as well as from laboratories, pharmacies, environmental health monitors, emergency medical services, local public health agencies and clinical care providers.<sup>i</sup> Data collection through an HIE organization can benefit public health functions by increasing the data's robustness and timeliness. Below is an overview of the current state of public health information systems, HIE organizations and their integration statuses.

### Public Health Agencies and Information Systems

Public health agencies function at state and local levels and collect information from health care providers to house data registries and disease surveillance systems. Childhood immunization, birth defects and cancer are the three most common registries operated by state health agencies in 2010 and 2012.<sup>ii</sup> Other registry examples include autism, asthma, diabetes, HIV/AIDS and blood lead levels. State and local jurisdictions determine the type and granularity of data for providers to report for each registry, leading to technical infrastructure variation across the country. For example, immunization registries contain records of vaccinated patients and often include the manufacturer, dose and route of

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<sup>1</sup> An HIE organization is an entity that oversees or facilitates the exchange of health information among a diverse group of health care stakeholders within and across regions, according to nationally recognized standards. ([www.healthit.gov/sites/default/files/ltpac\\_value\\_prop\\_factsheet\\_6-21-16.pdf](http://www.healthit.gov/sites/default/files/ltpac_value_prop_factsheet_6-21-16.pdf)). In this document, HIE refers to the act of health information exchange. When referring to organizations that support HIE, the term "HIE organization" is used.

<sup>2</sup> This document was developed under contract No. HHSP233201500479G. This resource is designed to equip public health agencies and HIE organizations with best practices and lessons learned for HIE with public health information systems. References to any resource, tool, product, process, service, manufacturer or company do not constitute endorsement or recommendation by the U.S. government or HHS. The information contained in this document is not intended to serve as legal advice nor should it substitute for legal counsel. This document is not exhaustive, and readers are encouraged to seek additional detailed technical guidance to supplement the information contained herein.

administration. Case reporting systems allow public health agencies to monitor outbreaks and trends based on reported diagnosis codes. The variation across public health agencies' information systems results in interfaces to external trading partners that require individual specification and maintenance.

## Health Information Exchange Organizations

The Health Information Technology for Economic and Clinical Health of 2009 (HITECH) provided initial HIE grant funding through the State Health Information Exchange Cooperative Agreement Program. These funds supported states to establish or expand HIE organizations to support national interoperability and health information goals. A wide range of HIE models now exist across the country, and HIE organizations provide a variety of services for several types of users.

HIE organizations operate across the country in state and local regions to facilitate health information sharing for trading partners that may include, but are not limited to patients, inpatient and ambulatory health care providers, other care providers, care coordinators, laboratories, health insurance carriers, and local and state governments.

HIE organizations provide a range of services, usually for a membership fee. For example, some HIE organizations support provider-to-provider information exchange and support patient access to records, data exchange with payers or data transmission to public health agencies.

HIE organizations can be single, large-scale integrators of data from a majority of health care providers. They can be a collection of small-scale integrators that bring together subsets of providers and health system networks.<sup>iii</sup> In a centralized HIE model, health data collected from trading partners resides in one location and authenticated trading partners can access it. A centralized HIE organization's governance usually specifies how often trading partners send data to a warehouse. A decentralized, or federated, HIE model keeps data in the record systems of each trading partner and a record locating service facilitates data requests. Besides these models, hybrids and other architectures exist to share data across the ecosystem of care providers. Health systems, integrated delivery networks and electronic health record (EHR) developers create HIE mechanisms on local, state and national levels.

The array of HIE organizations, their services and users mean integration with public health agencies is not standardized. This report is inclusive of any type of HIE organization, with an understanding of the wide range of possibilities in any given jurisdiction for integration with public health information systems.

## Integration of Public Health Information Systems and HIE Organizations

Public health information systems and HIE organization integration is increasing, but is not yet widespread across the country. Data from a 2012 Association of State and Territorial Health Officials (ASTHO) survey finds 13 state public health agencies receive lab results and nine agencies receive reportable diseases through an HIE organization.<sup>iv</sup> Local health departments are connecting with HIE organizations.<sup>v</sup>

This trend occurs as researchers discover instances of higher quality in public health data transmitted from HIE organizations, as compared to clinical information systems. For example, a 2013 investigation of electronic lab report messages finds data enriched by an HIE organization is more complete, compared to data from clinical systems.<sup>vi</sup> Further, qualitative research conducted in upper New York, central Texas, Indiana and New Mexico finds public health information system integration with HIE organizations produces improvements in assessment and planning, case management, care coordination, preparedness, surveillance and workplace efficiency.<sup>vii</sup>

Recent research documents the variables that promote, or hinder, integration. The barriers to integration include a lack of trained public health informatics resources, the complexity of local, state and federal laws, a dearth of leadership and champions to advance integration, and competing priorities.<sup>viii, ix</sup> The interviews conducted for this project reinforce these integration factors and are discussed below.

## Methodology and Assumptions

### Key Resources

CGH worked with ONC to identify jurisdictions at various levels of HIE maturity and integration with public health information systems. To identify a range of best practices, jurisdictions include those with some integration and those considering or actively implementing HIE for public health reporting.

CGH reviewed available information from active ONC cooperative agreement awardees to identify 10 awardees to serve as resources and jurisdictions for analysis. For these 10 jurisdictions, the team used ONC awardee communications, documentation and discussion as resources for this report. Eight jurisdictions that are not active ONC funding awardees participated in semi-structured discussions to collect information for analysis from December 2016 through February 2017.

The jurisdictions reviewed are identified in Box 1. Perspectives include jurisdiction experts in public health information systems and HIE. Topic areas are designed to analyze and document each jurisdiction's best practices and lessons learned.

### Data Analysis

CGH took comprehensive notes during the awardee meetings and participant interviews. CGH used NVivo software to code observed topics and classify them by general concept and frequency across jurisdictions. The report organizes the findings as facilitators and barriers to public health and HIE integration in six categories: leadership; technical; financial; privacy and security; legal and policy; and health IT developers.

### Assumptions and Constraints

The report's purpose is to synthesize interview respondents' experiences for other jurisdictions to consider using in their interoperability environments. This report and its methodology should not be construed as comprehensive research work. Every attempt is made to generalize findings so no statements directly link to a jurisdiction or respondent. This approach permits interview respondents to convey candid experiences and reflections. The report attributes some examples to specific jurisdictions where it may be helpful for other jurisdictions to follow their examples; in these cases, the identified jurisdictions permitted public identification.

#### Box 1: Jurisdictions Reviewed

##### States:

- Arkansas\*
- Colorado\*
- Delaware\*
- Illinois\*
- Kansas
- Maryland
- Michigan
- Nebraska\*
- New Hampshire\*
- New Jersey\*
- New York
- Oregon\*
- Rhode Island\*
- Utah\*
- Washington

##### Regions:

- Prince George's County, Maryland
- New York City
- San Diego

\* Indicates ONC program awardees

## Best Practices and Lessons Learned

### General State of Public Health Information Systems and Health Information Exchanges

U.S. public health agencies are in the early stages of integrating or considering integration with HIE organizations to receive public health information from health care providers. In this nascent phase, a range of integration models, barriers and facilitators exist. A number of factors limit public health agencies' uses of HIE organizations. These include: 1) an existing reporting infrastructure already facilitates public health reporting for health care providers; 2) the HIE organization's technical solution does not often supply public health agencies with the level of data required for public health functions; and 3) limited resources are available to dedicate to HIE infrastructure.

Interviews with state and regional public health jurisdictions reveal the following variables needed for integration:

- Leadership with top- and second-tier champions who meet frequently and possess a range of technical and informatics skill sets;
- Flexible technical solutions with aligned terminology and transport standards that meet public health data requirements;
- A mix of state and federal funding streams;
- Privacy and security principles embedded in governance and architecture at early stages of development and ongoing operation;
- A legal and policy environment that encourages standardized public health reporting through an HIE organization and permits secondary data use; and
- Health IT developers that deliver affordable and efficient connectivity solutions.

### Goals

Respondents consistently cite two primary goals for connecting public health information systems with HIE organizations:

- Streamline the number of connections (and reduce associated costs) for health care providers, HIE organizations and public health agencies to exchange public health information; and
- Support health care providers to achieve public health requirements for the Medicare and Medicaid EHR incentive programs.<sup>3</sup>

#### State Public Health Agency

*"The original drive was the common portal for making connections to hospitals and providers through the HIE. It organized the state consumption and pushing of data. Meaningful use [the Medicare and Medicaid EHR incentive program] was the cherry on the top."*

Health care providers can fulfill their mandated public health reporting requirements through HIE organizations in two ways: submit public health messages for the HIE organization to transmit to a public health agency; and send patient records or encounter summaries to the HIE organization to parse, identify relevant public health information, and transmit to a public health agency. These two methods stand in lieu of health care providers submitting public health messages directly to the public

<sup>3</sup> For more information about the Centers for Medicare & Medicaid Services EHR incentive programs, please see: <https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html>

health agency and sending patient information to the HIE organization. The second HIE transmission scenario streamlines the number of connections for health care providers, HIE organizations and public health agencies, but it is not widely used due to the barriers discussed in this report.

A small number of respondents mention the secondary goals of developing a sustainable platform for clinical and public health exchange and for performing enhanced analytics and quality measurement.

## Leadership

Universally, cross-organizational leadership and a range of champions and experts reduce the barriers addressed throughout this report and facilitate integration between public health information systems and HIE organizations. Respondents identify leadership challenges as a barrier to integration, including but not limited to lack of leadership; opposition to change; and the absence of political support. Three jurisdictions attributed these factors as obstacles to integration.

Functional and aspirational leadership are necessary to build collaboration and to drive cohesive project management. Respondents note collaboration among health care providers, the public health agency and the HIE organization is essential. Commitment to regular, frequent (e.g., monthly) meetings consistently attended by leadership ensures top-level buy-in and support. Several respondents recommend a second layer of operational leadership with project management, technical, policy and public health skillsets to coordinate conceptualization, implementation and ongoing coordination. Public health representatives on an HIE organization's board of directors is a recurring strategy.

As an example of strong leadership, in one jurisdiction with HIE and public health integration, the HIE organization and the public health agency start new initiatives by signing a joint project statement with business directives. To support the initiation by leadership, project management follows with the development of timelines and milestones. In this jurisdiction, hospital facilities send their lead IT professionals to weekly meetings with the public health and HIE organization's representatives. Respondents acknowledge adjustments and delays to some projects, but they credit the joint project statement with avoiding serious misalignment.

## Medicare and Medicaid EHR Incentive Programs

The EHR incentive programs catalyze health care providers' electronic submission of public health information to demonstrate meaningful use of EHRs and earn payments from the Centers for Medicare & Medicaid Services (CMS) and states.

The public health agencies and HIE organizations interviewed for this report are not eligible for incentive funds; however, these organizations support program participants in earning incentives by assisting with public health requirements.

In 2016 and 2017, the EHR incentive programs require eligible clinicians<sup>x</sup> and eligible hospitals<sup>xi</sup> to submit electronic public health data to a public health agency or clinical data registry.

In addition, program participants must demonstrate "active engagement" with public health information transmission, requiring registration, testing and validation, and/or being in production to transmit data.

## State Public Health Agency

*"I think the majority of people who drive [the public health and HIE organization integration] are technical, but they have the business, science and technical knowledge to bring to the table. If we had started with the clinical side, I don't think we would have the technical infrastructure we have."*

Another example of leadership is detailed project management. In another jurisdiction with public health and HIE connectivity, a project and portfolio manager from each organization conduct bi-weekly workgroup meetings to address operational issues. This structure operates alongside executive member bi-monthly meetings to manage and prioritize the project portfolio, adjust priorities and address challenges. Another jurisdiction replicates this dual-layer leadership strategy, where an executive committee launched an operational workgroup with stronger participation and productivity.

## Technical

Technical challenges to connect public health information systems with HIE organizations range from general approaches to architecture and integration, to technical obstacles with standards and interfaces. Table 1 lists primary challenges public health agencies and HIE organizations encounter. The section following Table 1 discusses the challenges in more detail and describes the respective facilitators and strategies for integrating public health information systems and HIE organizations.

**Table 1. Technical challenges and strategies**

Integration Barriers	Integration Facilitators and Strategies
Public health standards do not specify transport protocols, and legacy transport methods are already in place.	<ul style="list-style-type: none"> <li>• Educate decision-makers on emerging and available standards and use cases.</li> <li>• Organizations are already connected to public health using legacy transport protocols. Design for new transport protocols through the use of incremental integration.</li> <li>• Support public health departments' flexibility in receiving information using multiple transport protocols adopted by HIE organizations and providers.</li> </ul>
Gaps in adoption of new and current transport standards by providers and public health	<ul style="list-style-type: none"> <li>• Work with health IT developers to build EHR functionality to enable public health reporting via available sets of transport protocols (e.g., Direct, SOAP, RESTful web services).</li> </ul>
Lack of harmonization of messaging standards across domains that enable use by public health	<ul style="list-style-type: none"> <li>• Collaborate with Health Level 7 International (HL7) and standards development organizations (SDOs) to create standards that enable message content to be used for multiple purposes (e.g., including public health information within CDA).</li> <li>• Enhance implementation guides to address gaps, eliminate interpretation differences and support use of data for multiple purposes.</li> <li>• Conduct regular meetings with public health, HIE organization and health IT developer representation to ensure common interpretation of standards and requirements.</li> </ul>
Variation in local vocabulary codes for public health	<ul style="list-style-type: none"> <li>• Obtain resources to perform mapping between local codes and standards.</li> </ul>
Inconsistent data quality	<ul style="list-style-type: none"> <li>• Identify resources to monitor data and assess data quality.</li> <li>• Work with data suppliers to align interpretation of standards.</li> <li>• Build robust master patient index at the HIE launch.</li> </ul>

## Legacy Transport Methods

Existing legacy public health department integration methods have the unanticipated effect of deterring transmission to public health via an HIE organization. Approximately half the jurisdictions interviewed report this scenario.

In these localities, legacy systems support exchange. These systems include interfaces or other data sharing methods maintained by providers to send data directly to public health information systems (without HIE organization intermediaries). The systems have operated for several years, functioned sufficiently, consumed valuable and limited resources to build, and received leadership support. In light of this, respondents are reticent to switch to public health reporting via an HIE organization when the current infrastructure meets their information-sharing needs. HIE organizations cited a lack of demand from provider organizations and public health to use HIE for public health connectivity. Public health departments do not have incentives or resources to change supported transport protocols to enable potential future value cases for exchanging data via HIE that are still undefined.

### State Public Health Agency

*"We have been in production since 2012, and now we have 65 percent of providers using HL7. That represents a large volume, but we have a long way to go before we sunset our legacy ways of public health information exchange."*

## Educating Stakeholders on Technology Benefits

Educating decision-makers about using an HIE organization to reduce redundant connections for public health reporting is a challenge for respondents. Specifically, HIE organization and public health agency respondents struggle to educate decision-makers about long-term efficiencies and benefits. In one jurisdiction that considered future integration of public health information systems with an HIE organization, a respondent explains there is no added value compared to existing data exchange methods. She states, "By the time HIE (organizations) were geared up, electronic lab reporting already had an 80 percent participation rate, and there was little incentive to change the way we were doing things." In contrast, one jurisdiction interviewed reports the region's multiple legacy systems serve as a driver to use HIE for health care providers to send public health data to the HIE organization for integration to public health information systems.

## Flexible Technology Infrastructure

A flexible technical infrastructure is a key strategy for jurisdictions with public health information systems integrated with an HIE organization. Flexibility considerations applied to the combined technical readiness of health care providers, HIE organizations and public health agencies. For example, in one jurisdiction, three provider organizations want to send data to the cancer registry via the HIE organization; however, given the provider organizations represent a small percentage of interested providers, the public health agency and the HIE organization decided to continue provider reporting directly to the public health agency until the demand to report through the HIE organization increases. One respondent states: "It's about incremental integration and flexibility. We can support an interim step until everyone can be on the same technical transport method."

Emphasizing the importance of flexibility considerations, the technology solution that satisfies business requirements in one jurisdiction does not necessarily meet requirements in another jurisdiction. One jurisdiction with an HIE infrastructure for bidirectional exchange believes Direct does not meet its needs and advocates for web service implementations such as Fast Healthcare Interoperability Resources (FHIR), RESTful APIs or the Sequoia web service specification. Conversely, respondents from a jurisdiction

with a less mature HIE infrastructure report the use of Direct achieves their initial business requirements and provides a foundation to establish exchange across trading partners in the jurisdiction.

## Standards to Support Public Health Information Exchange

Respondents describe complex, myriad challenges with standards, specifically the transmission/transport, document, messaging and vocabulary standards supported by health care providers' EHRs for electronic public health reporting through HIE organizations. In general, the standards that facilitate EHR connections to HIE do not align with public health use cases for transport and semantic interoperability.

**Transport Standards:** EHRs that meet ONC's Health IT Certification Program requirements support transport protocols such as Direct for transport of Continuity of Care Documents (CCDs). CCDs are documents that follow the HL7 Clinical Document Architecture (CDA) standard constrained to support clinical document exchange in support of transitions of care and other clinical document exchange using certified health IT. Public health content is standardized at the provider (EHR) and public health level, but the method of transport is not. The HL7 implementation guides and certification standards for public health information exchange do not require any specific transport mechanism, which can vary by state or region. Certified health IT includes the capability to generate the standard HL7 message formats, but transport methods used by HIE organizations and public health agencies can include web services HL7 integration, batch uploads via protocols such as file transfer protocol or Direct secure messaging.

### State Public Health Agency

*"Sometimes the standards don't exist. We haven't let that stand in our way. We are not afraid to use the lack of standards as a barrier to get new HL7 standards written. We are trying to be innovative in our approaches to what information can be contained within an HL7 message."*

**Document Standards:** A second challenge relates to insufficient public health information in document standards for HIE. Many respondents note health care providers' EHRs support CCDs for sharing clinical data with other health care providers. However, the CCDs may not contain the detailed public health data necessary for surveillance and other public health duties. For certified health IT, certain content is tied to transport protocols through implementation guides. For example, a CCD in support of transition of care must support exchange via Direct (2014 Edition Certification) or Edge Protocols (2015 Edition Certification). HIE organizations receive and exchange HL7 admission, discharge and transfer (ADT) messages via web services. CDA documents use a wide range of transport protocols. There are emerging examples of HIE organizations, provider organizations, health IT developers and public health working together to include needed public health information in documents exchanged via HIE, such as CDA, where the HIE organization performs the needed transformation to send to public health.

Participants note an opportunity for collaboration with standards development organizations (SDOs) to coordinate new standards efforts with those used by public health that long have been in place and pre-date newer content standards such as the built using CDA including CCD. Participants express a desire for the flexibility to reuse the information sent in a single transmission for multiple purposes, rather than different having unique content and transport standards for each use case. However public health requires details missing from the existing document standards. For example, two states report the need to collect immunization data on injection site and dose in the event of recall notices, but these fields are not supported by the available CCDs within certified health IT. Several public health departments report state or local requirements for data collection contain more information, or more granular information,

than the CCD contains. Some participants report their jurisdictions' public health standards and supporting implementation guides are broader or more detailed than national standards. This creates a challenge for health IT developers to perform jurisdiction-specific enhancements and for providers to meet reporting obligations. One participant from a public health agency reports spending resources to edit and enhance an implementation guide to address the state's reporting requirements. Another HIE organization participant reports not having access to technology that could parse the CCD data and hired a full-time engineer to assist outpatient practices and facilities with public health information sharing. Collaboration with SDOs can support new and emerging use cases for public health and balloting of new standards. In the absence of a mechanism to exchange birth defects information, the Michigan Department of Health and Human Services opted to collaborate with other states and HL7 to create a new standard for birth defects information transmission.

**Vocabulary Standards:** A number of respondents note local codes used by laboratories can't be mapped or they require substantial resources to map to nationally adopted vocabulary standards. For example, one jurisdiction explains SNOMED and LOINC codes cannot be used by some reference labs for electronic lab reporting, requiring hospitals to perform the mapping prior to transmission. Challenges relate to the lack of specificity in implementation of a standard such as LOINC, where an individual lab result may have 20 valid LOINC codes, but a public health agency is expecting a smaller subset of the valid LOINC codes for the test.

An HIE organization states, "We generally get data from specialists and hospitals where [public health data] are noted in notes, and we don't get codes associated. If we try to reuse information, like the data we get for encounters and notes, for supplying cancer registries, it gets complicated." Respondents broadly acknowledge many challenges are not unique to public health reporting, while emphasizing the importance of detailed, standardized information for public health responsibilities.

## Data Quality

Challenges with data quality are widely reported as a hindrance to integrating public health information systems and HIE organizations. Data quality issues are attributed to user input/training issues; system setup or configuration; differing interpretations of document and vocabulary standards by public health agencies, HIE organizations and health IT developers; and the having resources available to monitor incoming transactions and onboard providers.

For public health, complete information is critical for accurate surveillance, planning and intervention. An early strategy for voluntary participation at the launch of the HIE organization by one jurisdiction results in incomplete information received. Another jurisdiction intentionally implements a gradual roll-out to build a strong master patient index and establish participants' trust in the data. Solutions to address data quality involve adding resources and working with data suppliers (laboratories, hospitals, physicians) to align adoption and mapping of terminology and messaging standards.

### HIE Organization

*"We don't struggle to move the data around – [the challenge is] reporting the information with data quality assurance and having the data be normalized for people consuming them. We spend more time cleaning up the data than moving it around."*

## Financial

Sustainable funding is key to integrate public health information systems and HIE organizations. Interview respondents note strong concerns about sufficient, sustainable funding and the return on investment related to public health reporting via an HIE organization.

Federal grants, state revenue, fees and other supplemental sources fund public health agencies. An ASTHO survey for fiscal years 2010 and 2011<sup>xii</sup> finds approximately half of state agency funds come from federal sources, with more than half from the Centers for Disease Control and Prevention (CDC), the U.S. Department of Agriculture and the Health Services and Resources Agency. Approximately a quarter of state agency funds come from their respective states. For fiscal year 2009, an ASTHO survey<sup>xiii</sup> finds approximately 1 percent of state public health agency revenue funds health data, 5 percent funds administration, and 5 percent funds other categories. A majority of expenditures supports public health services and population health monitoring, leaving limited funds for HIE investment.

## Funding Requirements for Integration

Every jurisdiction interviewed reports financial challenges to integrating public health information systems with HIE organizations. Public health agencies frequently cite strained budgets and limited resources available for initiatives outside of their core public health functions (e.g., disease surveillance). Consequently, HIE organization integration is often a second-tier priority for public health, and these efforts face slow or stalled execution. Specifically, respondents report challenges to finance the cost of technology and the resources to build new systems, onboard providers to the reporting systems, and maintain and monitor information flow. Public health agencies commonly note one or two resources operate several public health registries, amidst a scarcity of trained public health informatics resources. One public health agency that plans future HIE integration states, “It’s not that we don’t have the technology. We don’t have enough staff.”

Technology costs are high, relative to the public funds available. One jurisdiction notes, “At a local level, our public health departments need to invest in infrastructure. There is a lot of struggle with infrastructure costs to participate in [HIE] more effectively. They are not well armed to interact with an increasingly electronic group of providers they are expected to interface with.” A number of public health agencies opt to support providers with interface costs to achieve electronic public health reporting. In one such example, the Arkansas Department of Health directs its own funds to assist providers and explains its cost increase serves to decrease costs for providers.

HIE organization financial solvency presented challenges for some jurisdictions in an evolving landscape of HIE developers and architectures. In jurisdictions where HIE organizations have closed, health care providers and public health agencies confronted the costs of establishing alternate reporting mechanisms. As is discussed in the “Legal and Policy” section below, some HIE organizations face competition challenges from private entities operating outside the business parameters established by state law. Financial concern is consistently reported where state-designated HIE organizations are prohibited from offering services beyond information transmission, such as quality measurement and data analytics.

### Regional HIE Organization

*“Through the HIE, it’s more cost effective for public health to have one technology solution for connection. This enables more accurate data for public health, and in turn, we can demonstrate quite a bit from time savings and sunset traditional manual processes.”*

## Return on Investment

The return on investment to connect public health information systems with HIE organizations exists for some jurisdictions but is not realized by all at this time. Connectivity alleviates financial strain for public health agencies and health care providers by reducing the number of interfaces requiring maintenance and allowing resources to be deployed to other projects. Other respondents state they pursue connectivity to eliminate the costs associated with multiple connections to individual practices and facility locations. As one respondent notes, “There is no connectivity yet, but it is viewed as a desirable end state to reduce redundant connections to public health.”

The cost of new connections to an HIE organization hinders public health reporting via HIE in jurisdictions where health care providers have existing connections to public health agencies. Public health respondents from one jurisdiction with its immunization information system integrated with the statewide HIE organization recall significant resources to assist a large pediatric practice’s exploration of an HIE interface. The practice decides against immunization reporting via the HIE organization due to the interface’s upfront costs. The respondents convey disappointments that the effort produces no connection after the practice determines there is insufficient value relative to the health IT developer’s charges.

## Financial Strategies

Two types of federal funding alleviate some financial challenges.

**CMS 90-10 Matching:** Funding program to support integration between public health information systems and HIE organizations. Referred to as the “HITECH/HIE Federal Financial Participation Program,” through 2021, the program matches 90 percent of approved administrative costs for states to help eligible providers to connect to certain Medicaid providers including, but not limited to, public health providers. Funding is exclusively allocated for the design, development or implementation of systems and infrastructure to support connectivity; to support the onboarding of providers to public health reporting systems; and to support the demonstration of meaningful use for the EHR incentive programs.

### State Public Health Agency

*“Our 90-10 funds are targeted for public health use cases. If we did not have that funding, we would have more silos. That funding allowed for a care coordination and public health mindset to coalesce faster.”*

More than half of the jurisdictions interviewed employ 90-10 funds for public health information system integration with HIE organizations. 90-10 matching funds are unobtainable for some jurisdictions. States must identify the 10 percent match from non-federal funds in the state budget,<sup>xiv</sup> which amounts to significant and uncertain undertakings to plan technology-pricing requirements ahead of the state budget’s legislative cycle. Once obtained, line item budgets for public health and HIE connectivity are critical facilitators for public health and HIE connectivity. The 90-10 funds may not support ongoing operations or maintenance,<sup>xv</sup> and as such, do not guarantee financial ease, causing some respondents to report concerns with sustainability.

**CDC Funding:** Public health agencies receive individual funding from the CDC for specific disease registries. These funding streams are described as siloes that create hurdles for public health agencies to connect to HIE organizations. One jurisdiction explains it cannot develop an enterprise-wide exchange capability and workforce due to categorical funding streams that prohibit merging funding and resources across public health reporting areas.

## Privacy and Security

Privacy and security are paramount elements of HIE, including connections to public health. Respondents report protecting privacy and security as a challenging, but surmountable, hurdle.

Public health agencies send and receive health information for a number of purposes, including registry and disease reporting from health care providers, outbreak monitoring and intervention, and communicable disease investigation. Although these exchanges disclose protected health information (PHI), public health agencies are authorized by state and federal laws to conduct the transactions for public health purposes.<sup>xvi</sup> The ONC brief, “Permitted Uses and Disclosures: Exchange for Public Health Activities,” details scenarios of exchange and the relevant legal frameworks that apply. (Resources section).

Efforts to integrate PHI systems with HIE organizations encounter privacy and security issues common to HIE initiatives. For example, the complexity of managing patient consent and business associate agreements (BAAs) revisions challenge jurisdictions. Despite these hurdles, only one jurisdiction interviewed specifically identifies privacy and security issues as a barrier to connecting HIE organizations with public health information systems. Most note a wide range of strategies to overcome these challenges and safeguard PHI including: state privacy regulation alignment with the Health Insurance Portability and Accountability Act (HIPAA) to reduce technical complexity and streamline BAAs and other documentation; representation in HIE organization governance structure, with privacy and security workgroups that include public health representatives; legal counsel and expert involvement in architecture and governance development from the beginning of integration efforts; standardized consent forms; and a BAA structure that consolidates forms and facilitates new use cases without substantial and redundant documentation.

Opt-out policies emerge as a key strategy to address privacy and security challenges. Several jurisdictions cite patient consent opt-out policies as critical facilitators to realizing benefits from HIE organization connections to public health. These policies tend to permit information exchange between a specified set of entities, unless a patient signs a document to opt-out of that exchange. In the context of public health, population data gaps significantly compromise surveillance and analysis if enough people opt-out of information sharing.

Opt-out policies impact HIE organization viability. San Diego originally used an opt-in model, requiring patients to agree to information exchange before including their records in exchange activities, including public health connection. After determining this approach threatened the sustainability of the exchange, the HIE organization, San Diego Health Connect, undertook a two-year strategy to convince health care providers to update their patient privacy policies to follow the opt-out model. Rhode Island attributes its decision to not connect the HIE organization to public health to the state’s opt-in model, noting less than 50 percent of the state’s population has enrolled in the exchange. A respondent from the state HIE organization emphasizes, “Public health would require data on 100

### HIE Organizations and HIPAA

HIE organizations are generally not health plans, clearinghouses or providers conducting financial and administrative transactions. However, many perform services with PHI on behalf of providers and therefore are considered covered entities and subject to the HIPAA Privacy Rule. As covered entities under HIPAA, HIE organizations serve as business associates and must have the requisite policies and protocols in place to safeguard PHI during exchange.

percent of applicable patients for the connection to be a benefit.” This jurisdiction was pursuing a change to an opt-out policy.

Regardless of a jurisdiction’s opt-in or opt-out strategy for an HIE organization, existing transmission routes exist for public health agencies to receive public health data and uphold privacy and security practices.

## Legal and Policy

Jurisdictions report an array of legal and policy areas that aid or hinder efforts to integrate public health information systems with HIE organizations.

State policies assist integration efforts by encouraging or requiring public health reporting through the HIE organization. For example, Delaware mandates all public health hospital reporting is received electronically through the HIE organization. The state works in partnership with hospital IT leadership and the HIE organization to ensure standardized formats and reporting requirements are implemented. To ensure deadlines are met, the state imposes financial penalties on hospitals that do not conform to the state’s reporting and technical standards by the published deadlines. Respondents emphasize once fines are implemented, completion of outstanding work is prioritized, and the state is able to focus more resources on data quality.

Other state laws limit integration efforts. For example, states that permit several methods of transport for electronic reporting public health data unintentionally slow efforts to integrate HIE and public health information systems. In the absence of regulations that require public health reporting via HIE organizations and identify specific transport methods and terminologies, public health agencies, HIE organizations and providers expend resources to support multiple methods of connection and perform data quality review. Public health agencies can receive insufficient data for surveillance. For example, one jurisdiction’s state law prevents requiring organizations to use the state-designated HIE organization for public health. The HIE organization established one Direct address for hospitals to report public health information directly to the state public health agency. In the absence of a requirement to transmit information through the HIE organization, the public health agency maintains several virtual private network connections to facilities and practices. In addition, state law prohibits aggregation, use and disclosure of data by the state-designated HIE organization. The HIE respondents in this jurisdiction comment their abilities to compete with other HIE organizations that perform aggregation and other data services are limited.

In several jurisdictions, states designate a specific entity to perform HIE or require a certificate of authority to conduct exchange. This strategy is not reported as a barrier or facilitator to HIE, generally, and with public health, more specifically. Kansas established a certificate of authority structure whereby businesses that perform HIE must apply for a certificate from the state every two years. In this arrangement, businesses with a certificate must comply with parameters and expectations for exchange set by the state (for example, assisting providers with meeting EHR incentive program requirements.)

### State Public Health Agency

*“Our state has created requirements [to report data to public health], but it’s hard to enforce them. That gives us an opportunity to insert a data quality check in the middle. We’ll say, ‘You can’t [report] until you have LOINC coded a certain way.’”*

Interstate and international HIE present challenges ranging from technical and financial resources, to governance and prioritization. One jurisdiction with an international border specifically identifies difficulty aligning consent policies for privacy and security but reports a strong relationship with its counterparts with shared desire to support the health of communities on each side of the border.

### Health IT Developers

Respondents do not characterize health IT developers<sup>4</sup> as a barrier that prohibits integrating public health information systems with HIE organizations. However, there is a high frustration with using EHRs to report public health information and the sense that EHR developers do not prioritize public health functions. Challenges with HIE technology developers<sup>5</sup> are not widely reported, and a small number of HIE respondents positively characterize relationships with their HIE technology developers. One respondent notes, “We’re in it together.”

Public health agency and HIE organization respondents routinely cite challenges with the cost, time and resources required to assist health care providers and EHR developers with public health reporting requirements for the EHR incentive programs. As discussed in the goals section above, these requirements are incentivized by CMS, with providers receiving payment following completion of public health reporting, along with other requirements. However, public health agencies do not receive funding to support the staff and technical resources for onboarding providers and receiving the incoming data.

About half of the jurisdictions report difficulties working with providers’ EHR systems and establishing interfaces. (See the technical section above for further information.) One respondent comments, “I wish vendors had a greater public health perspective about the need for us to collect this data so the systems could be set up to assist us. We are not high priority for the vendors, and we have a hard time getting the data we need.” A wide range of costs and timelines to build interfaces stymies integration, and in several instances, the public health agency and the HIE organization absorb some of the cost to complete the interface. As one respondent reflected, “I don’t know why one vendor can charge \$30,000 for an interface and another vendor charges nothing at all for the same interface.” As described further in the technical section above, respondents report challenges with EHR developers’ abilities to send public health messages via standardized transport methods.

#### Regional HIE Organization

*“Vendors are just part of the challenge. They have their bandwidth issues, needs, requirements and costs associated with doing this work. It’s just difficult work.”*

To address technical and management challenges, a small number of jurisdictions report receipt of grant funds to offset providers’ costs to build interfaces, or otherwise use their own resources to assist. For one jurisdiction, however, the small number of providers in its geographical area means health IT developers reportedly do not prioritize the technical enhancements required. Another jurisdiction explains how monthly check-in meetings with the health IT developer, HIE organization and provider representatives

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<sup>4</sup> Health IT developers produce technology to help clinicians, patients and other health system stakeholders manage health and wellness activities. In this report, HIE and EHR developers are termed subsets of health IT developers. HIE developers’ solutions specifically serve to exchange health information. EHR developers’ solutions specifically deliver an electronic patient records system.

streamline communications about business requirements, timelines and costs and help to resolve differing interpretations of vision and scope.

To address contracting issues, one jurisdiction succeeds in having the health IT developer remove a project manager from its charges. Another jurisdiction requires one contract to cover all interfaces to the public health agency’s registries, which simplifies contracting and management and produces modest savings. An ONC guide to health IT developer contracting, “EHR Contracts Untangled,” may help health IT consumers navigate purchasing decisions and negotiations. (See Resources section.)

**Regional HIE Organization**

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*“We’ve been innovative to ask about community pricing models rather than per interface. The vendor gets more customers. We have less management for the interfaces, and we do a good job to come together and negotiate community pricing and models with our vendor community.”*

## Summary of Best Practices and Lessons Learned

Public health agencies rely on accurate and robust data to identify, treat and prevent the spread of disease. Partnering with HIE organizations to electronically receive data is one method to enhance public health agencies’ capacities to conduct continual and timely (ideally real-time) monitoring, disease reporting, community health assessments, outbreak detection and intervention planning activities.<sup>xvii</sup> Interviews with respondents in 16 public health jurisdictions describe integration challenges and produce several overarching strategies and solutions as in Table 2.

**Table 2. Key stakeholders for integrating public health information systems and HIE organizations**

Integration Facilitators	Strategies and Solutions	Public Health Agency	HIE Organization	Health Care Provider
Leadership	Collaboration across entities	✓	✓	✓
	Top leadership buy-in	✓	✓	
	Second-tier leadership with project management, technical and policy skills	✓	✓	✓
	Public health representation on HIE board of directors	✓	✓	
Technical foundation	Flexible infrastructure tailored to regional readiness	✓	✓	
	Participation in standards supporting public health exchange use cases	✓	✓	✓
	Data quality resources	✓	✓	
Financial	Medicaid 90/10 match funding	✓		
	Education on opportunities to streamline future connections	✓	✓	
Privacy and security	Opt-out consent policies		✓	
	Legal counsel at all stages of infrastructure development	✓	✓	

Integration Facilitators	Strategies and Solutions	Public Health Agency	HIE Organization	Health Care Provider
Legal and policy environment	Specific transport mechanism mandates or convergence	✓	✓	
	Promotion of HIE data use activities (e.g., analytics, quality measurement)	✓	✓	
Health IT developers	Community pricing models with health IT developers	✓	✓	
	Aligned interpretation of standards	✓	✓	
	Regular collaboration	✓	✓	✓

One jurisdiction’s HIE organization respondents describe an increasingly electronic environment as being overall good for the community with the ability to share information across trading partners. However, public health agency respondents caution against the growing electronic gap between public health and health care providers, where health care providers increasingly use health IT with exchange capabilities, but public health agencies do not have comparable technology to participate in exchanges.

The value case for public health information systems’ integration with HIE depends on collaboration between public health agencies, HIE organizations and health care providers (as well as each of their technology health IT developers) to pursue bidirectional, standards-based information exchange. Currently, that value case is limited due to investments in one-to-one connections between trading partners and a lack of legal and policy drivers to encourage public health reporting through HIE organizations. Standards alignment must integrate public health information systems and HIE organizations, with transport mechanisms and terminologies meeting all of the public health data requirements. Ultimately, the value case may emerge when HIE offers public health agencies complete data covering a jurisdiction’s population through efficient, electronic transmission.

## Appendix A – Resources for Public Health Agencies and Health Information Exchange Organizations

### Developing a Public Health Informatics Profile: A Toolkit for State and Local Health Departments to Assess their Informatics Capacity

- The Minnesota Department of Health, supported by Public Health Informatics Institute and Robert Wood Johnson Foundation, developed “Public Health Informatics Profile Toolkit” to assist state and local health departments assess their informatics capacities and modernize their information systems.  
<http://www.phii.org/phi-toolkit>

### Digital Bridge

- Digital Bridge is a Robert Wood Johnson Foundation funded initiative to assemble stakeholders to advance information exchange between public health and health care providers. Participants include federal agencies, public health and provider professional associations, and health IT developers.  
<http://www.digitalbridge.us>

### EHR Contracts Untangled: Selecting Wisely, Negotiating Terms, and Understanding the Fine Print

- This ONC guide assists health IT purchasers to understand the process and details of selecting the right technologies and establishing a contract that meets the consumer’s needs for system performance, data rights, intellectual property, risks and liability, and dispute resolution.  
[https://www.healthit.gov/sites/default/files/EHR\\_Contracts\\_Untangled.pdf](https://www.healthit.gov/sites/default/files/EHR_Contracts_Untangled.pdf)

### Explore Ways of Leveraging Health Information Exchanges (HIEs) and Regional Health Information Organizations (RHIOs)

- The Association of State and Territorial Health Officials (ASHTO)’s toolkit outlines best practices for improving access to EHRs, as no single set of standards exists for connections to multiple EHR systems to obtain and transmit/receive patient health information. This brief discusses how some states use HIE organizations and RHIOs to facilitate health information exchange and provides insights into laws and barriers that impact Texas, New York and Indiana.  
<http://www.astho.org/Toolkit/Improving-Access-to-EHRs-During-Outbreaks/Access-and-Use/Leveraging-HIEs-and-RHIOs/>

### Getting the Right Information to the Right Health Care Providers at the Right Time: A Road Map for States to Improve Health Information Flow Between Providers

- The National Governors Association Center for Best Practices developed this roadmap for states to improve health information flow between providers. This resource provides states with strategies to overcome legal and market barriers.  
<https://www.nga.org/files/live/sites/NGA/files/pdf/2016/1612HealthCareRightInformation.pdf>

## Issue Brief: Health IT for Public Health Reporting and Information Systems

- This ONC brief describes electronic public health reporting progress and discusses opportunities for improving reporting and information systems. Public health agencies can gain understanding of the infrastructure and standards considerations that impact public health information exchange.

<https://www.healthit.gov/playbook/pdf/public-health-issue-brief.pdf>

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