California Department of Health Care Services

Health Information Exchange (HIE) Landscape Assessment

Prepared by: Intrepid Ascent, LLC

June 6th, 2017
Executive Summary

California is one of the most diverse states in the country in terms of people, geography, and economy. Approximately 80% of California is rural, yet 85% of the population lives in urban areas, creating diverse scenarios regarding access to care in both rural and urban communities. This huge range of diversity creates a complicated and divided health information technology landscape. No single entity manages health information exchange (HIE) services to move data between providers, patients, and government entities – rather, a patchwork of regional and local initiatives plays the role. In this way, California is truly a microcosm of the entire United States, reflecting the diverse technology challenges seen on a national level.

In collaboration with California Health and Human Services Agency (CHHS), DHCS has been working on developing a strategy to incorporate clinical data into the Medicaid enterprise and participate in the statewide HIE landscape. This strategy includes sending and receiving data to and from electronic health records (EHRs) and health information exchange organizations, providing data to beneficiaries, and exchanging data with state and county departments to support beneficiaries. The proposed strategy advances Medicaid Information Technology Architecture (MITA) Maturity, which requires connecting to EHRs and participating in intrastate exchange of clinical data, and maximizes enhanced federal financial participation.

A thorough understanding of the current state and national landscape is an important step in implementing the clinical data strategy. The purpose of this document is to provide a brief overview of HIE, the current HIE landscape in California (i.e., organizations, county coverage, etc.), and national HIE initiatives that DHCS will need to consider when developing the short and long-term strategy.

Overview of HIE

Health information exchange (HIE) is defined as the ability to electronically move health information among disparate healthcare information systems while maintaining the integrity of the information being exchanged. The term refers to the electronic movement of health-related information among organizations according to nationally recognized standards, as well as an organization that facilitates, oversees, and governs that movement of information among a specific group of health care organizations. Such organizations may also be referred to as health information organizations (HIOs) or health information networks. The primary goal of HIE is to facilitate access to, and retrieval of, clinical data to improve the quality, accessibility, and cost-effectiveness of healthcare.

The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 began laying the building blocks for interoperable data systems in health care. In addition to widespread adoption of electronic health records (EHRs), HITECH also provided funding to states to advance HIE and interoperability efforts. Through the State HIE Cooperative Agreement Grant, states have generally followed one of several options: (1) establish a single statewide HIE run by a state government entity or a contracted entity, (2) establish a network of community or regional health information organizations, or (3) some other public-private partnership. In all instances, the goal has been to promote the adoption and meaningful use of health IT and connect providers to ensure the right information is available when and where it is needed for patient care.

---

1 Interoperability is defined as the ability of health information systems to work together within and across organizational boundaries in order to advance the effective delivery of healthcare for individuals and communities.
There are typically three different HIO architecture models: centralized, federated (or decentralized), and hybrid. The choice of model is driven by the organization’s strategic priorities, governance, and privacy and security policies and procedures.

- **Centralized** – data is taken from multiple data sources and is stored in a single data repository as a patient-centric, consolidated longitudinal health record comprising information generated across the community. Since all data is stored in a single location, it is available for analytics to help understand health trends in the community, as well as better manage chronic conditions of a patient.

- **Federated** – data is taken from several sources, but is stored in multiple data repositories associated with and under the control of HIE participants that generated the data, or for whom the data was generated (e.g., lab results transmitted to a provider). When requested, data is retrieved from all repositories to create a patient-centric, consolidated longitudinal health record on demand.

- **Hybrid** – combines features from both centralized and federated models. It still produces a patient-centric, consolidated longitudinal health record on demand, and much of the data still resides in multiple repositories under the control of HIE participants. Selected data is also stored in a centralized repository to enable analytics on population or chronic disease management priorities of the community.

In addition, there are two primary methods of HIE: directed exchange (“push”) and query-based exchange (“pull”). Directed exchange gives healthcare providers the ability to send and receive patient information over the internet via encrypted, secure and reliable channels. Data does not “stop” anywhere en route to the destination and it is often distributed automatically. Query-based exchange allows providers to find and/or request information on a patient from other providers, sometimes from a centralized repository. Query-based exchange is implemented as a manual process with approximately the same frequency that it is deployed as an automated function.

**California HIE Landscape**

Long before the passage of the HITECH Act, California had a community-oriented, decentralized approach to health data sharing. Whereas many states developed single, statewide health information exchanges to collect and share healthcare data, California opted for a strategy that follows a neutral connectivity model: an approach in which any organization that meets a minimum set of policies, procedures, and technical standards may connect and exchange information. Stakeholders favored this approach because it preserved local autonomy to create and operate the services best meeting the needs of the local users, but they also endorsed leveraging national and state policies, standards, and capabilities for exchange within and between existing HIE initiatives (some of the nation’s earliest efforts took root in California).

Under HITECH, CHHS administered the State HIE Cooperative Agreement Grant, which provided assistance to communities establishing regional health information organizations (HIOs), but there is no state mandate.

---


3 CalOHII, Consent Demonstration Project Report to Legislature, March 2014, p. 24
of the current landscape, which is undergoing significant change. Manifest MedEx recently formed as a merger.
between Inland Empire Health Information Exchange (IEHIE) and California Integrated Data Exchange Network (Cal INDEX). Prior to the merger, IEHIE provided the technical infrastructure to three other community HIOs: Central Valley Health Information Exchange, ConnectHealthcare, and San Joaquin Community Health Information Exchange. All of the affiliated organizations are in the process of harmonizing their privacy and security policies and processes; the HIOs will operate under the governance umbrella of Manifest MedEx, with nested local governance and management of local services and use cases. In addition, Santa Cruz Health Information Organization (SCHIO) and Orange County Partnership Regional Health Information Organization (OCPRHIO) announced that they will be merging and consolidating their combined 3 million patients into a single infrastructure.

Also identified are the enterprise HIOs that operate statewide, although other regional organizations may exist. University of California Health comprises the five academic medical centers and 18 health professional schools within the University of California system. Traditionally, each medical center and affiliated provider clinics and groups operated independently, but the system is currently working to consolidate operations for a majority of health activities such as overseeing and coordinating business and financial activities of the clinical enterprise. The map also indicates the public and DRG hospitals participating in the TAR-free program.

---

4 Source: conference call with Erica Galvez on May 10, 2017
5 Source: email announcement from Santa Cruz HIE on May 16, 2017
Figure 1 Health Information Exchange in California

Health Information Exchange in California

Community HIOS
1. Central Coast Health Connect
2. Cottage Community HIE
3. LANES
4. Manifest MedEx: Affiliated Organizations: Central Valley HIE, ConnectHealthcare, Inland Empire HIE, San Joaquin Community HIE
5. North Coast Health Improvement & Information Network
6. OCPHIO
7. RAIN Live Oak Technology
8. Redwood MedNet
9. Sac Valley Medshare
10. San Diego Health Exchange
11. Santa Cruz HIO

Enterprise HIOS - Operating statewide
Adventist Health
Dignity Health
Kaiser Permanente
St. Joseph Health
Sutter Health
University of California Health

Olive View-UCLA
Harbor-UCLA
LAC-USC
UC Irvine
Rancho Los Amigos
Rehab Center

Olympia Medical Center
White Memorial Medical Center
Fountain Valley Regional Hospital
Glendale Adventist Medical Center
UC San Diego

Pomerado Hospital
Palomar Medical Center
Sharp Memorial Hospital
Sharp Chula Vista Medical Center

San Joaquin community Hospital
Kern Medical Center
Arrowhead Regional Medical Center
Riverside County Regional Medical Center
John F. Kennedy Memorial Hospital
Desert Regional Medical Center

Updated: May 2017
National Perspective

Over a decade ago, the Office of the National Coordinator for Health IT (ONC) first conceived of the Nationwide Health Information Network (formerly NHIN/NwHIN, now eHealth Exchange), with the goal of establishing uniform expectations while minimizing one-off approaches. The nationwide network would establish a common “dial tone” for nationwide data sharing across geographies, technology platforms, and healthcare settings, using a federated approach and building a common trust agreement through a cooperative effort of the private sector and government. While participation and use of the nationwide network has expanded, additional initiatives have emerged, increasing the quality and types of content shared. Communities of data sharing now exist to promote exchange of information within a given geographic region or to support a particular technology, standard, or use case. Because of overlap in governance agreements, policies and processes, recently the trend has been towards consolidation of and/or coordination among the various initiatives to improve interoperability.

Following the end of the HITECH grant period, the ONC released the “Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap” (Roadmap) in 2015. The Roadmap outlines the ONC’s vision for a “learning health system” meant to “build upon and shore up the existing foundation of health IT, move quickly to short-term success, and lay out a longer term set of drivers and policy and technical components that will achieve the outcomes necessary to achieve the vision.” One of the critical pathways identified in the Roadmap is coordination among stakeholders to promote and align policies and business practices that support interoperability. Similarly, the 21st Century Cures Act of 2015 also includes provisions designed to build consensus and develop a trusted exchange framework. Because of overlap in governance agreements, policies and processes, recently the trend has been towards consolidation of and/or coordination among the various initiatives to improve interoperability.

Table 1 compares several of the most common approaches to interoperability, or initiatives, prevalent throughout California (and across the country). The Sequoia Project7 is an independent non-profit organization that manages both the eHealth Exchange and Carequality. The eHealth Exchange is a network of organizations connected by a multiparty data sharing agreement and federated architecture, whereas Carequality is an interoperability framework comprised of a common set of rules, technical specifications, and a participant directory. CommonWell Health Alliance is a not-for-profit trade association of health IT companies, including acute care and ambulatory EHRs, post-acute care, imaging, laboratory, retail pharmacy, and emergency services. The California Trusted Exchange Network (CTEN), managed by the California Association of Health Information Exchanges (CAHIE), is a trust framework that includes a common set of policies and procedures, plus lightweight technical infrastructure to enable primarily HIO-to-HIO information exchange.

Although only the four primary interoperability approaches are included for comparison, several more exist and/or are emerging, such as DirectTrust, the Strategic Health Information Exchange (SHIEC) Patient-Centered Data Home (PCDH), and the National Association for Trusted Exchange (NATE). The EHR vendor Epic has an HIE product called Care Everywhere that is typically included in comparisons of interoperability approaches, but is not included here because it is a closed network, only available to Epic customers.

---

Table 1 Comparison of Interoperability Approaches

<table>
<thead>
<tr>
<th></th>
<th>eHealth Exchange</th>
<th>Carequality</th>
<th>CommonWell</th>
<th>CTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relevant history</strong></td>
<td>Evolved out of federal government’s NHIN/NwHIN as the public-private national network of networks</td>
<td>Created by Sequoia Project, in part to accommodate needs of EHR vendors since they are ineligible to join the eHealth Exchange directly</td>
<td>Created by a group of EHR vendors led by Cerner, Athena, and others (not EPIC), partially as market response to EPIC’s Care Everywhere network</td>
<td>Established to provide voluntary self-governance of HIE in California</td>
</tr>
<tr>
<td><strong>Interoperability goal</strong></td>
<td>Onboard enough participating providers and HIEs to cover the country</td>
<td>Gain participation of EHR vendors, which gain participation of their customers to cover the country</td>
<td>Gain participation of EHR vendors, which gain participation of their customers to cover the country</td>
<td>Enable trusted exchange among California HIOs and eliminate HIE “white space”</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>The Sequoia Project (legal entity) and the Coordinating Committee</td>
<td>The Sequoia Project</td>
<td>Board of Directors</td>
<td>CAHIE (legal entity) and the California Interoperability Committee (CIC)</td>
</tr>
<tr>
<td><strong>Eligible participants</strong></td>
<td>Any HIPAA-covered entity</td>
<td>Implementers may be HIO, EHR vendor, payer, clearinghouse, or other organization</td>
<td>EHR vendors (who may pass access to the network down to their customers)</td>
<td>Any organization that overseas and conducts electronic exchange of health information among groups of persons or organizations[^8]</td>
</tr>
<tr>
<td><strong>Network type</strong></td>
<td>Provider-centric network</td>
<td>Provider-centric, network-to-network trust framework</td>
<td>Patient-centric network</td>
<td>Provider-centric network</td>
</tr>
<tr>
<td><strong>Exchange type</strong></td>
<td>Peer-to-peer, query-based exchange</td>
<td>Peer-to-peer, query-based exchange</td>
<td>Query-based exchange based on centralized record location</td>
<td>Query-based exchange and secure messaging</td>
</tr>
</tbody>
</table>

[^8]: A Participant is any business or government agency in good standing, with headquarters in California, that oversees and conducts, on their own behalf and/or on behalf of their Participant Users, electronic transactions or exchanges of health information among groups or organizations and that (i) have the technical ability to electronically transact health information on their own behalf or on behalf of their Participant Users, (ii) have the organizational infrastructure and legal authority to comply with, and require their Participant Users to comply with, the CalDURSA, and (ii) has a system implemented in a production-ready environment and is ready to begin exchanging data with other Participants in production.


<table>
<thead>
<tr>
<th>Most common transaction</th>
<th>eHealth Exchange</th>
<th>Carequality</th>
<th>CommonWell</th>
<th>CTEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital or HIE to SSA or VA</td>
<td>EHR vendor or HIO on behalf of user to another EHR vendor or HIO to get clinical data to the point of care</td>
<td>EHR vendor on behalf of customer to another EHR vendor to get clinical data to the point of care</td>
<td>HIO to HIO exchange</td>
<td></td>
</tr>
<tr>
<td>Least common: hospital to hospital for patient care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Onboarding process, costs, barriers</th>
<th>Annual fee: $19,900$^{12} Testing fee: $19,000</th>
<th>Fees: unknown – paid by EHR vendors, who can pass down the fee to providers</th>
<th>Fees: variable, included in cost of EHR system</th>
<th>Onboarding fee: $5,000 Annual fee: $400 quarterly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrier: limited use cases beyond treatment</td>
<td></td>
<td></td>
<td>Barrier: subscription to services limited to HIT vendors (EHRs, PHRs, etc.)</td>
<td>Barriers: 1. Small number of participants 2. Large hospital systems unlikely to join without incentive</td>
</tr>
</tbody>
</table>

|--------------------------|---------------------------------------|---------------------------------------------------|---------------|-----------------------------------------------|

<table>
<thead>
<tr>
<th>Number of endpoints/participants</th>
<th>Total endpoints: unknown 4 federal agencies 65% of hospitals 50,000 medical groups 3,400 dialysis centers 8,300 pharmacies</th>
<th>Total Implementers: unknown 19,000 clinics 800 hospitals 250,000 providers</th>
<th>Live at 4,700 sites, plus 3,200 in process</th>
<th>8 HIOs 1 Government Agency</th>
</tr>
</thead>
</table>

$^{12}$ Annual fee covers ongoing support and maintenance of trust framework, specifications, service registry, certificate management, etc. For government agencies, fees are based on annual operating costs. Annual fee cited is based on annual operating costs of more than $10 million.