CHCF

Health Information Exchange in California:
Assessment of Regional Market Activity

AUGUST 2021

AUTHORS
Mark Elson, Jill Yegian, Alex Horowitz, and Sokkim Lim

Contents

About the Authors

Mark Elson, PhD, is principal, Alex Horowitz is principal technology strategist, and Sokkim Lim, PharmD, is senior clinical consultant at **Intrepid Ascent**, a consulting firm that guides clients through the adoption and use of technology to improve health outcomes. Jill Yegian, PhD, is principal at **Yegian Health Insights**, and provides consulting services aimed at improving the health care system on behalf of patients, providers, and payers.

Acknowledgments

The authors thank the interviewees, reviewers, and other contributors who shared their time and expertise related to data exchange in California at the statewide and regional levels. They also wish to acknowledge the dedication and creativity of their colleagues in the field, who show up to work every day behind the scenes so that providers and their partners have the information they need to make a positive impact in peoples' lives.

About the Foundation

The **California Health Care Foundation** is dedicated to advancing meaningful, measurable improvements in the way the health care delivery system provides care to the people of California, particularly those with low incomes and those whose needs are not well served by the status quo. We work to ensure that people have access to the care they need, when they need it, at a price they can afford.

CHCF informs policymakers and industry leaders, invests in ideas and innovations, and connects with changemakers to create a more responsive, patient-centered health care system.

DESIGN BY DANA KAY HERRICK

Introduction

A resurgence of demand for health information exchange (HIE) is underway in California. The COVID-19 pandemic has exposed fissures in our health data infrastructure, with dangerous gaps between public health and clinical care systems. Increasing focus on health equity has highlighted the lack of data available to support behavioral health and whole-person care, including addressing social needs. And sustained momentum toward value-based payment continues to focus both commercial and government payers' attention on the need for data exchange as a foundational requirement for integrated systems of care.

Shared understanding of the current data exchange landscape in California can inform key decisions shaping this landscape.

A California Health Care Foundation (CHCF) companion issue brief, *Health Information Exchange in California: Overview of Network Types and Characteristics*,[1] describes data exchange activity coalescing in four primary types of networks:

- **EHR-centered clinical data exchange networks** connect health care providers to each other and to their partners through electronic health records (EHRs). Enterprise health information organizations (enterprise HIOs), EHR vendor networks (e.g., Epic Care Everywhere), and national networks (e.g., eHealth Exchange, Carequality, CommonWell) enable information sharing within a hospital system, across hospitals using the same EHR, and increasingly across users of different EHR and IT platforms.

- **HIO-centered clinical data exchange networks** connect health care providers regardless of the EHR system used and typically aggregate data at the community level. Two examples of California HIOs are Manifest MedEx and the Los Angeles Network for Enhanced Services (LANES).

- **Specialized clinical data exchange networks** enable the exchange of specific slices of high-value data among customers. Clinical event notifications of an individual's hospital admission, discharge, or transfer (ADT) are one type of specific information that can be used to support care coordination for patients with complex health needs. Provider organizations can send these notifications through private companies (e.g., Collective Medical), HIO services (e.g., Manifest MedEx), and secure message platforms (e.g., DirectTrust).

- **Whole-person data exchange networks** combine social and behavioral health data sharing to coordinate services across sectors. These networks include those established by California's Whole Person Care (WPC) Pilot Program, a $3 billion program that supported 25 counties to integrate care for patients with complex health needs, and emerging efforts across the state to systematize referrals between clinical and social service providers via technology platforms, such as Aunt Bertha, One Degree, and Unite Us.

This report builds on that companion issue brief to describe how these different forms of HIE play out regionally. Given California's enormous size and diversity, variation in data-sharing activity at the regional level is to be expected. Such variation has significant implications for California's long-term approach to enhancing data exchange across the state over time. To explore the dynamic interaction and regional variation across these four HIE types, the authors surveyed publicly available information and conducted 20 interviews with statewide and regional leaders. Four regions were selected for this issue brief: Los Angeles County, Fresno and environs, the Sacramento metropolitan area, and Humboldt County. The regions represent a range of characteristics, such as urban and rural; they also align with the regions included in CHCF's Health Care Almanac Regional Markets Study, which provides extensive data on local populations and market characteristics.[2]

Collectively, these regional profiles paint a rich portrait of the activity, progress to date, and barriers encountered in efforts to share clinical or other data in California communities. The focus here is on local actors: provider networks and their use of EHRs and specialized networks, as well as community-driven data-sharing initiatives, such as HIOs and WPC pilots. While more comprehensive and detailed than other currently available analyses, the regional profiles are based on a limited number of interviews and should be viewed as a starting place for a broader and deeper understanding of data exchange dynamics across the state.

Key Findings

The regional profiles generated for this report indicate significant and growing investment in data exchange infrastructure across settings in California, with substantial variation in which network types predominate and how they interact based on local market dynamics and characteristics. Overall, the assessments found the following:

1 Though each form of HIE is complementary, the sheer number of overlapping networks creates a steep learning curve for providers trying to access these systems to meet their needs, and the requirement to participate in multiple networks increases the administrative and IT burdens related to implementation.

The University of California, Davis, for example, must join multiple networks to connect with local providers: Epic for local hospitals that are fellow Epic users, eHealth Exchange for government agencies like the Veterans Administration and the local HIO (SacValley MedShare), and Carequality and CommonWell for providers not using Epic. Similarly, community leaders like the Community Clinic Association of Los Angeles County (CCALAC) encourage their member clinics to join multiple forms of HIE (e.g., national networks, LANES, and Collective Medical) to best serve their patients. Safety-net and ambulatory providers are poorly positioned to grapple with overcoming data and workflow obstacles due to limited resources and health IT expertise.

2 Local investment, collaboration, and trust are important to overcoming technical, legal, and resource barriers that often stand in the way of data sharing, cross-sector exchange, and centralized data storage.

Without technical standardization, clear governance structures, and explicit legal guidance — like those developed over time to support the national networks — data sharing relies on agreements that are developed locally. Without those agreements, efforts can be stymied. In Sacramento, implementation of a data-sharing agreement for Pathways to Health + Home (the WPC pilot run by the city of Sacramento) met with resistance, especially among the large hospital systems; local CBOs, unfamiliar with handling protected health information, received robust training on data privacy and security to address concerns. Similarly, the centralized data architecture that most HIOs use to store data and enable population health analytics may raise security concerns for some potential participants, as reported in Los Angeles County with LANES. Thus, local anchor health organizations, such as county health departments and managed Medicaid plans, play a particularly important role organizing exchange networks and gaining participation from ambulatory providers. North Coast Health Improvement and Information Network (NCHIIN) benefits from support from Humboldt County and Partnership HealthPlan of California (PHC)'s pay-for-performance initiatives. LANES continues to grow with support from Los Angeles County Department of Health Services (LACDHS) and L.A. Care, where affiliated providers find value in being able to connect to LACDHS's specialty and inpatient care.

3 EHR-centered exchange is the predominant means of HIE in three out of four regions — Los Angeles, Fresno, and Sacramento — driven by the need to access external clinical records at the point of care.

Health care providers use their EHRs to access external data through vendor and national networks. Epic operates the leading example of an EHR vendor network, while it and most other major EHR vendors and health systems participate in national networks for broader data sharing. Widespread participation generates positive "network effects" that drive others to join and discourages the use of HIOs in regions where EHR networks predominate, like in Sacramento.

EHR networks have limitations. In addition to broad gaps in behavioral health and social needs data, the quality of clinical data sets can be unpredictable because of variation in how those data are configured at their source. Just as importantly, the volume of data delivered via the national networks overwhelms many providers, with significant effort required to pinpoint actionable information. Some health systems have invested in translating this flood of data into relevant information to support clinicians at the point of care. In general, the larger and better-resourced health systems are more likely to make these investments.

Others, especially ambulatory and safety-net providers with limited resources and health IT expertise, grapple with how to overcome data and workflow obstacles. Large health systems, such as Providence or Cedars-Sinai in Los Angeles County, support their network of ambulatory providers by providing enterprise HIO services that aggregate data from national networks, ADT feeds, and laboratories. But many providers with access to external data through an EHR-based network simply do not use the functionality or may not even be aware that it exists, as is true of some providers in Fresno that were interviewed for this report.

Despite their limitations, the national networks represent a critical superhighway for data exchange in California today. EHR vendors increasingly integrate access to the national networks directly into their products at no additional cost, such that bidirectional data exchange can be enabled with the "flip of a switch." Many HIOs have begun to join them as well, and the California Trusted Exchange Network (CTEN), California's local HIO data governance framework, functions as a gateway to the national networks for some of its members. HIOs joining the national networks represent a potential breakthrough for data sharing in California. An HIO's full patient records become available to providers within the workflow of their EHRs. This development brings together the strengths of the national networks (i.e., embedded within EHRs, standards-based, information available at the point of care) with the strengths of the HIOs (e.g., high-quality data consolidated from multiple sources with local buy-in).

4 HIOs are uniquely positioned to aggregate data for population health and may serve as the primary enabler of clinical data exchange when no one large hospital system or EHR dominates the local market, such as in Humboldt County.

The value of an HIO depends upon the completeness of the data they provide, which, in turn, relies on the level of participation by providers and others in the HIO network. Where participation is robust, HIOs can consolidate data across organizations, improve data quality, and facilitate data exchange supporting multiple use cases. HIOs can be more flexible than EHR-centered networks in meeting local needs, especially if they build valuable use cases incrementally with community buy-in. For example, in Humboldt County, a region without a well-established EHR exchange network, NCHIIN worked with community stakeholders to build an alert system for clinicians registering patients already receiving specialty mental health services from other providers within the county. The population health and event notification tools offered by HIOs may be especially useful to provider organizations bearing financial risk for a defined patient population because they support key tasks, including identifying high-risk patient cohorts, managing chronic care, monitoring transitions, and following up after hospital events.

HIOs, however, struggle for a variety of reasons, including provider perceptions that adoption is more difficult than accessing the national networks, HIO tools do not fit easily into provider workflow, data are incomplete, and HIOs' underlying business models may not be sustainable. While methods for submitting data to HIOs are largely standardized, the methods for accessing HIO data are variable; some HIOs primarily push data into their participants' EHRs while others make data available via a portal. These different methods impact how well received an HIO is by its users. In the absence of workflows, staff, and resources dedicated to getting the most out of the network locally, providers are often not able to take advantage of the data and tools they offer.

5 Specialized clinical data exchange, specifically event notifications, complements other data exchange use cases and is used extensively by hospital systems and increasingly by ambulatory providers, although uptake by ambulatory providers is slow (e.g., in Fresno).

These services, which are provided both by HIOs and private networks such as Collective Medical and PatientPing, are especially impactful when they deliver notifications into providers' workflows in their EHRs. Collective Medical and PatientPing initially gained momentum as services linking emergency departments in different hospitals to provide alerts. These organizations' capability to route ADT messages to support multiple use cases, such as hospital-to-primary-care notifications and — at least in Collective Medical's case — COVID-19-related test results, has fueled their growth. Similarly, effective HIO data delivery services go beyond hospital notifications, such as NCHIIN's "mental health summary" alerts or LANES' Patient Synopsis, putting actionable information in front of providers.

The cost of specialized data exchange networks influences their pattern of adoption. When HIOs bundle these data delivery services with their core offerings, there is generally no additional charge. Services of the private networks, such as Collective Medical, may be covered by health plans, especially for ambulatory providers. Nevertheless, provider organizations today must grapple with the integration of these focused data streams into their EHRs or other data systems, which takes both effort and financial resources. Innovative application programming interface (API) approaches such as SMART on FHIR, a set of open specifications to integrate apps with EHRs and other health care IT systems, may streamline and standardize the ways that these issues are addressed in the future.

6 California's county-led WPC pilots have demonstrated the viability of cross-sector data exchange between health care and social service providers, and large health systems are investing heavily in technologies that enable referrals between hospitals and CBOs, but these initiatives are in the early stages.

Of the four regions profiled for this report, only Humboldt County has achieved extensive participation in whole-person data exchange, with the local county government and HIO taking active roles, and data sharing would have to expand significantly to realize its full potential related to community health. In Humboldt as in a number of Whole Person Care pilots, care management systems that enable distributed teams to collaborate in providing "whole-person" services for the individual patient have proven essential for success. A recent CHCF publication, *Breaking Down Silos: How to Share Data to Improve the Health of People Experiencing Homelessness*, looks more closely at initiatives in California with an emphasis on data exchange between health care and homelessness systems. The report found that local efforts, like those in Humboldt County, were essential to strengthening cross-sector relationships and building trust to overcome technical and legal challenges.[3]

Meanwhile, health systems and payers have invested in social service referral platforms, enabling coordinated handoffs between health care and social service providers. In large communities like Los Angeles County, there are multiple competing platforms established by anchor health organizations. Because these platforms are not integrated and do not share data,

some worry that an undue burden is being placed on Federally Qualified Health Centers (FQHCs), CBOs, and primary care providers that may be expected to use multiple platforms for patient and client management. Some communities are starting to work together to evaluate the impact on local CBOs and are challenging the technology platforms to collaborate for more efficiency, leveraging local HIOs where possible to support these integrations.

Table 1 characterizes the use of each network type and the need that network serves in each region, as indicated by research for this report.

Table 1. Mapping Data Exchange Network Types to Provider Needs

NETWORK TYPE / PROVIDER NEED	LEVEL(S) OF USE, BY REGION				VALUE/CHALLENGE TO PARTICIPANTS	PROMISING TRENDS
	Los Angeles	Fresno	Sacramento	Humboldt		
EHR-Centered Clinical Data Exchange						
Access to external clinical records for patients at the point of care.	Extensive Predominant (locally)	Extensive Predominant (locally)	Extensive Predominant (locally)	Growing	**Value.** Workflow integration via a single existing IT platform. **Challenge.** Significant resources required to participate and configure data, that may exceed safety-net and ambulatory provider capacity.	HIO participation in national networks has potential to improve data quality and access in the safety net.
HIO-Centered Data Exchange						
Data aggregation for population health and access to clinical data when EHR exchange is limited.	Growing	Growing	Limited	Predominant (locally)	**Value.** Flexibility to meet local needs and to facilitate information sharing outside of EHR networks. **Challenge.** Variable integration into existing IT systems and provider workflows, and incomplete data depending on network participation.	COVID-19 pandemic and CalAIM initiatives make need for population-level data more apparent to state decision-makers.
Specialized Clinical Data Exchange						
Real-time notifications of critical clinical events (e.g., ADT)	Extensive	Limited	Growing	Growing	**Value.** Specific actionable information for providers at the point of care. **Challenge.** Narrow versus comprehensive data, with incremental expense for access and use.	Clinical event notifications are now required by new federal interoperability rules.
Whole-Person Data Exchange						
Access to comprehensive patient information, including behavioral health and social needs.	Growing	Very Limited	Limited	Extensive	**Value.** Focus on cross-sector collaboration and data to support care for patients with complex care needs. **Challenge.** Robust barriers to scale including distinct data standards and legal requirements across sectors.	Ongoing prevalence of risk-bearing arrangements and CalAIM will drive continued growth.

Los Angeles County

Overview

Los Angeles County is home to 10 million people, which represents one in four California residents. More than 3 million Angelenos are enrolled in Medi-Cal, about one-third of the county's population; L.A. Care and Health Net are the Medi-Cal managed care plans in Los Angeles' two-plan model. Six major health systems account for almost half of the county's acute care hospital discharges, but none of those systems dominate the market. Medical groups and independent practice associations (IPAs) have long played a key role in the Los Angeles market, accepting financial risk and clinical responsibility for professional services; several large physician organizations in Los Angeles take global risk for hundreds of thousands of members. Los Angeles County Department of Health Services operates an integrated delivery system of four public hospitals and 27 county clinics, as well as the county's WPC program. FQHCs play a major role in the safety net; 60+ health centers with 350+ sites operate in Los Angeles County, serving as a key partner to Medi-Cal managed care plans for primary care services and as the provider to those without insurance. For a detailed portrait of the health care market in Los Angeles, see CHCF's Regional Market Study.[4]

Data exchange is multifaceted in Los Angeles County. EHR-centered networks form the core of clinical data exchange, with health systems leveraging EHR vendor networks and national networks. There is a limited but growing role for regional HIOs, particularly in the safety net. The Los Angeles Network for Enhanced Services, the local HIO, has gained traction in recent years with strong support from Los Angeles County and L.A. Care. Participation is increasing: 42 FQHCs and 33 hospitals have joined. Manifest MedEx has 28 participating hospitals, with all now sharing at least ADT data. Competing HIOs present a challenge for market participants.

Interviews with Los Angeles County respondents revealed a divergence of perspectives. Some view regional HIOs as a cornerstone to enable data exchange, particularly for safety-net providers. Others anticipate that new federal interoperability standards and data-sharing requirements will facilitate data exchange and allow market participants to leapfrog the need for HIOs in the region. Organizations with this perspective believe that the key is connecting EHRs through national networks, standard APIs, and other standards-based approaches.

Hospitals and Health Systems

In Los Angeles County, private health systems have developed enterprise HIOs based on EHRs that actively use national networks to facilitate exchange. Among hospital systems, Epic and Cerner are dominant. Extensive effort has been invested by some systems in data exchange with an array of providers and other community partners. Some large health systems have built out major data exchange networks, both internal-facing to support providers tightly affiliated with the system and external-facing to facilitate data sharing with contracted network partners, vendors, and loosely affiliated facilities and clinicians. In general, salaried physicians affiliated with health systems use the enterprise HIO; affiliated physicians are offered an opportunity to adopt the system EHR, often on a subsidized and supported basis. Some of the hospital systems are making extensive use of national network data via Carequality and CommonWell, investing significant resources in pulling data from many sources, integrating it into the system EHR, and delivering it to clinicians for use at the point of care. Some other systems participate in national networks but have difficulty integrating and using data accessed via these networks in a way that would make it actionable by clinicians at the point of care.

Table 2 displays information on the EHR vendor, HIO participation, national network participation, and clinical event notification used by several large health systems in Los Angeles County. More detailed information on select provider organizations follows (see page 9).

Table 2. EHR and Data Exchange Network Participation Among Select Hospital Systems in Los Angeles County

	EHR VENDOR	HIO PARTICIPATION	NATIONAL NETWORK PARTICIPATION	CLINICAL EVENT NOTIFICATION PROVIDER*
Kaiser Permanente	Epic	Not participating	eHealth Exchange, Carequality	Collective Medical
Cedars-Sinai Health System	Epic	Joined LANES March 2021 (not yet sharing data)	eHealth Exchange, Carequality, CommonWell	LANES (in the coming months)
Providence	Epic	Providence HIE (see text for details), Manifest MedEx	eHealth Exchange, Carequality, CommonWell	Providence HIE, Collective Medical
County of Los Angeles Department of Health Services	Cerner	LANES	Considering CommonWell	LANES
Dignity Health	Cerner	Manifest MedEx (only in the Inland Empire)	eHealth Exchange, CommonWell, Carequality	PatientPing
UCLA	Epic	LANES	eHealth Exchange, Carequality	LANES, Collective Medical
Adventist	Cerner	LANES, Manifest MedEx	CommonWell	LANES, Manifest MedEx, Collective Medical

*A key use case for data exchange is notification of providers caring for patients when those patients experience clinical events, such as hospital admission, discharge, or transfer (ADT).

Cedars-Sinai Health System

The Cedars-Sinai Health System is the second largest hospital system in Los Angeles County based on acute care hospital discharges in 2018. In addition to Cedars-Sinai Medical Center and Marina Del Rey Hospital, affiliation with Torrance Memorial Medical Center was completed recently and is pending with Huntington Hospital. The hospital's affiliated physician network includes the Cedars-Sinai Medical Group and nine other single-specialty medical groups; Cedars-Sinai Health Associates, an IPA with 100 primary care physicians and 500 specialists; and 400 faculty physicians.[5]

Cedars-Sinai Medical Center and Marina Del Rey Hospital are both on the Epic EHR system; assuming the affiliation with Huntington Hospital is approved, Epic will be deployed there as well. Salaried physicians affiliated with Cedars-Sinai are also on Epic, and anyone on the medical staff (IPA-affiliated physicians and the faculty for the residency programs) is eligible for 80% subsidization of Epic system. Torrance Memorial had just completed an installation of Cerner's EHR prior to affiliation with Cedars-Sinai Health System, so the effort on data exchange with Torrance Memorial has focused on connections between Epic and Cerner.

If physician practices affiliated with Cedars-Sinai prefer not to switch to Epic, Cedars-Sinai will reportedly invest the resources required to connect each practice's EHR to Carequality — and has done so with more than 20 different EHRs to date. Those practices are then able to obtain patient data from Cedars-Sinai Health System. Cedars-Sinai (with a total of 137 networks to date) reports that they will share data with any organization that meets their standards (among them, data will not be sold or monetized, and data will not be cumulatively stored due to security concerns). In case none of those pathways of connectivity work, Cedars-Sinai continues to operate a large fax system that sends out thousands of faxes every day.

Cedars-Sinai Health System joined LANES in March 2021 and data exchange will begin in the coming months. Cedars-Sinai also actively participates in

the HL7 Da Vinci Project, through which payers and providers are collaborating to shift away from legacy approaches toward standardized FHIR-based APIs intended to streamline data exchange. Initial efforts have focused on providing event notifications for primary care physicians and delivering quality measures to Anthem.[6]

Providence

Providence operates six hospitals in Los Angeles County, with a strong presence in Orange County and multiple facilities in Northern California — part of a 51-hospital system headquartered in Washington State.[7] Providence's Los Angeles region has adopted Epic and deploys a specific team dedicated to supporting internal data integration.

Providence accesses all the national networks (e.g., eHealth Exchange, Carequality, CommonWell) through Epic Care Everywhere as well as Collective Medical for ADT data and hospital event notifications to partners throughout California. Providence has created its own HIO, the Providence HIE, providing clinical data and services to ambulatory providers, postacute sites, and others. Data are aggregated from multiple sources: real-time clinical data, including labs and imaging; claims data (with a lag); data from Collective Medical and the national networks; and other sources. The data are made available on a robust Providence HIE clinical portal, ShareVue. The Providence HIE has built tools, such as dashboards, that render data access and visualization to support care management and population health management. Data can be tailored for clinician needs (e.g., physicians can request that test results be delivered directly to the EHR or can request alerts for a set of attributed patients.). According to its website, Providence HIE provides secure electronic clinical data exchange among participants in California, Texas, and Alaska, including 36 hospitals, 699 practices, and 4,801 providers for an average of 49,852 daily patient encounters. Connections are available to 79 EHRs.[8]

Providence participates in the national networks to share data with facilities that are not connected to its private HIE, such as Kaiser Permanente, MemorialCare, and Sutter Health. Providence also participates in Manifest MedEx and is reportedly considering joining LANES.

County of Los Angeles Department of Health Services

The County of Los Angeles Department of Health Services operates an integrated delivery system of four public hospitals and 27 county clinics throughout Los Angeles County, caring for about 450,000 empaneled patients. LACDHS also runs Los Angeles County's WPC program and a program called My Health LA, targeting those without health insurance and providing health care for the county's juvenile justice system and jails.[9]

LACDHS has adopted the Cerner EHR throughout the integrated delivery system, in all hospitals and clinics; expansion of the Cerner integration into the Los Angeles County jails is underway in 2021. LACDHS is a strong supporter of LANES, actively participating in the HIO and supporting participation of other providers, particularly in the safety net. Many FQHCs participate in the My Health LA program, providing primary care for those without health insurance; LANES supports data exchange between the primary care providers in FQHCs and the specialist care provided by LACDHS.

LACDPH shares an EHR with LACDHS to document health care service delivery (e.g., in their immunization, sexually transmitted diseases, and tuberculosis clinics), resulting in shared medical records across LACDHS and LACDPH. LACDPH participates in LANES but is not yet sharing data pending an assessment of what data can be shared. The Los Angeles County Department of Mental Health (LACDMH) actively participates in LANES and is sharing data subject to relevant restrictions.

Ambulatory Care

FQHCs play a key role providing primary care in Los Angeles, particularly to Medi-Cal members and those without health insurance. Southern California is home to many capitated, delegated physician groups; 93 risk-bearing organizations were operating in Los Angeles County in 2020, 18 with enrollment of more than 75,000 lives.[10] While large, well-resourced physician organizations may invest substantially in data exchange infrastructure, smaller practices are more likely to struggle with the level of investment required.

Federally Qualified Health Centers

The Community Clinic Association of Los Angeles County claims 65 FQHC members with more than 350 clinic sites, caring for 1.7 million patients annually. Collectively, those FQHCs have more than 15 different EHRs; eClinicalWorks and NextGen are dominant (see Table 3). Most of the FQHCs using Epic have connected through OCHIN, a national health IT organization (see sidebar on page 22 for more information).

Table 3. Distribution of EHRs in Los Angeles County's Federally Qualified Health Centers

EHR TYPE	FQHCs
eClinicalWorks	26
NextGen	19
Epic (All but two are through OCHIN.)	8
Other	12
Total	**65**

Source: Community Clinic Association of Los Angeles County.

As of March 2021, 42 of CCALAC's 65-member organizations had joined LANES. Of those, 21 have a bidirectional interface to exchange data with LANES, meaning the technical integration of LANES with the health center's EHR is complete (i.e., the clinic can send data to LANES and can query LANES and retrieve data via the EHR [versus through a separate portal]). Increasingly, health centers are moving toward connecting to LANES with support from the California Health Information Exchange Onboarding Program (Cal-HOP) funding.[11] L.A. Care, the largest Medi-Cal managed care plan in Los Angeles with more than 2 million members, encourages contracted providers, including FQHCs, to connect to LANES but does not require or subsidize participation. LANES is useful for FQHCs caring for uninsured patients because LACDHS specialists and county hospitals provide specialty and inpatient care for those without health insurance in Los Angeles, and all participate in LANES.

CCALAC has acted as a catalyst and bridge between FQHCs and LANES to facilitate greater data exchange and to ensure the FQHC perspective is represented and understood by LANES. The HIO's decision to implement a centralized data system has created several barriers that LANES leadership is working to address to get more FQHCs on board, such as security concerns in the case of a breach (including the belief that centralized data could be compromised more easily). CCALAC encourages members to join the national networks, Carequality and CommonWell, in addition to LANES, and Collective Medical for hospital event notifications, to leverage data exchange across EHRs, though that exchange has not been as seamless as expected.

Optum

Optum, part of UnitedHealth Group, acquired DaVita HealthCare Partners (HCP) in 2019, including its significant footprint and full-risk contracts for almost a half million people in Los Angeles. Combined with prior acquisitions in Orange County, Inland Empire, and San Diego, Optum employs or affiliates with more than 7,000 physicians across Southern California.[12] Optum is working toward integrating its Southern California physician organizations for data and clinical care.

Los Angeles physicians participating in the employed model use Allscripts and NextGen EHR platforms; physicians affiliated through the IPA may use other EHRs. As a provider taking global risk, Optum has a tremendous amount of patient data to support care coordination. Optum's primary data-sharing efforts are geared toward population health and delivering information on quality and gaps in care to contracted providers at the point of care — generally delivered

via a provider portal (i.e., versus integrated directly into the provider's EHR).

Optum only shares clinical data with its internal HIE, not with national networks or regional HIOs. Over the last decade, Optum has developed point-to-point interfaces for ADT notifications and select clinical documents (e.g., discharge summaries) with 25 partner hospitals and health systems in Los Angeles and Orange Counties; those systems are reportedly anxious to decommission these unidirectional interfaces and shift toward bidirectional exchange between Optum/HCP and local HIOs, but that has not yet occurred.

Family Care Specialists

In four Los Angeles locations, Family Care Specialists Medical Group (FCS) provides care for about 25,000 patients — 66% of whom are low income and 40% of whom are covered by Medi-Cal. FCS's EHR needs to be replaced, and the practice will opt for one of the major systems if financial support is available through a health plan partner or national IT economic stimulus to offset the cost. FCS uses many different platforms and systems for data exchange in support of patient care — and few of those systems seem to talk to each other. The practice frequently must find creative solutions to connectivity problems, acting as a data exchange "MacGyver."

FCS faces challenges sharing data with all four hospitals to which the practice admits patients. Some of those hospitals have access to the national networks and ADT alerts through Collective Medical but have not structured them to deliver data to the physicians in support of patient care. Specialist access and referral is also a challenge. FCS has created a portal for specialists to whom they refer so that those physicians can obtain relevant patient information, but many specialists serving Medi-Cal patients prefer to call and request a fax rather than log into a portal that is not integrated into their EHR. Likewise, after the patient consultation, the specialists frequently do not enter the results into the portal so FCS must call to request a fax of the visit summary.

FCS has developed an array of different programs to improve care and meet the needs of its patients, none of them integrated with the EHR. FCS runs a residency training program and uses a separate platform for secure communication with residents. Likewise, FCS has adopted a program for secure texting to patients that is HIPAA compliant — but not integrated. Yet another program is used for reaching patients without access to the internet or a smartphone. FCS uses three different portals to obtain social services data to support patient care and referrals, none of which are integrated with the EHR. All of these programs fill a specific need for a specific group but add significantly to the administrative burden of managing the flow of data for patient care.

Regional HIOs

Two HIOs operate in Los Angeles: Manifest MedEx and LANES. Manifest MedEx has 28 participating hospitals in Los Angeles County, with all now sharing at least ADT data. LANES was launched with seed funding from Los Angeles County and L.A. Care. After several years of dormancy and technology development, LANES is working to establish itself as a regional HIO for all payers and providers in Los Angeles County — not just the safety net.[13] With only the four LACDHS hospitals and eight private hospitals participating in 2018, LANES has grown to 33 data-sharing hospitals in 2021, including Cedars-Sinai Medical Center, Huntington Hospital, and the hospitals in the UCLA and Adventist Health systems. As one respondent shared, "LANES is finally getting ready for the big time; it took forever."

In early 2020, LANES was planning to connect with eHealth Exchange, and through eHealth Exchange, with both Carequality and CommonWell. However, LANES delayed this integration, prioritizing connecting to the Veterans Administration in 2021 and CommonWell in 2022. LANES rolled out clinical event notification in September 2020, along with a new Patient Synopsis application that provides key health indicators (e.g., number of Emergency Department [ED] visits, medications, laboratory results) and can be customized for users and settings (e.g., ED providers,

hospitalists). Four FQHCs are using the tools to monitor ED visits, and adoption is expected to increase. According to LANES, more than 200 public health nurses are using Patient Synopsis to track the health records of 40,000 foster children. Through a collaboration with LACDPH, LANES will make COVID-19 vaccination data available to its participants.

L.A. Care has transitioned from grant funding for LANES to paying roughly $1 per member annually for its 1.1 million members not delegated to plan partners. L.A. Care can log into the LANES portal and see data on its members — if the providers caring for those members are connected to LANES and contributing data. The centralized system architecture to which LANES has transitioned, and which most HIOs in the country have also adopted, has raised security concerns with some potential participants. However, this model more efficiently enables access to consolidated, historical records of the sort that is valuable to L.A. Care and provides a foundation for population health analytics uses.

Several interviewees raised questions about a sustainable business model for both LANES and Manifest MedEx. Some hospitals and health systems are reluctant to incur the financial and resource cost of sharing data with multiple HIOs, while others — such as Adventist Health — participate in both. Ambulatory providers are interested in joining the HIO that has signed on the hospitals most often visited by their patients.

Whole-Person Data Exchange Networks

LACDHS's WPC program uses a platform called CHAMP for data exchange, which is built specifically for the initiative to enable data sharing across multiple WPC service providers. Unlike other platforms, CHAMP can share data with WPC-affiliated housing navigators, correctional health, and mental health team members, and other social services. However, it is not integrated with LACDHS's Cerner EHR or other platforms.

Outside of the WPC pilot, data sharing to address social determinants of health is fragmented but rapidly expanding in Los Angeles, as it is in many regions. LANES is reportedly working toward incorporating social needs data. PRAPARE, a tool developed to help providers collect data on social needs to support patient care, is embedded in the NextGen and eClinicalWorks EHRs, but there is no consistent route for exchange of that data.

With social service referrals between health care providers and CBOs becoming more common, a proliferation of competing technology platforms has emerged in Los Angeles to enable these transactions and collaborations. While promising, this creates complications for health care providers, including FQHCs, and for social services providers and CBOs. In Los Angeles County, L.A. Care and Cedars-Sinai Health System use Aunt Bertha, LACDHS uses One Degree, and several large plans and providers — including Kaiser, Dignity Health, and Blue Shield of California — have adopted Unite Us. Each platform has a separate portal with varying degrees of EHR integration, requiring some providers to log in and out to gather information or make referrals from each one. In addition, providers crossing county lines may need to check multiple county portals for information on housing and other social services. The ability to make and accept referrals by any network participant and track the referral's status and outcome is in the early stages of implementation; several of the social services referral platforms provide at least some aspects of this functionality. Some providers have expressed concerns that they may refer a patient for social services and discover weeks later that the organization was overbooked and unable to accept the referral.

Fresno Region

Overview

The cities of Fresno and Clovis form the metropolitan center of this otherwise largely rural region, which includes the counties of Fresno, Mariposa, Madera, Kings, and Tulare. More than one in five of the 1.8 million residents have household income below 100% of the federal poverty level (FPL). Four major regional health systems are dominant at the urban center of this region: Kaiser Permanente, St. Agnes Medical Center (part of Trinity Health), Valley Children's Healthcare, and Community Medical Centers (CMC), with two-thirds of residents having records in one of these systems. FQHCs play a critical role in primary care delivery in the region; across the five counties, FQHCs saw more than 400,000 Medi-Cal patients in 2018. For a detailed portrait of the health care market in this region, see CHCF's San Joaquin Valley Regional Market Study.[14]

The regional hospital market achieves a somewhat integrated data-sharing environment among the four large health systems due largely to their common use of the Epic EHR; ambulatory providers not on Epic reportedly experience challenges accessing hospital data. The Central Valley HIE (CVHIE/Manifest MedEx) is a local affiliate of Manifest MedEx and uses the latter's technical and governance infrastructure coupled with a local priority-setting user group to drive regional collaboration and HIE use. CVHIE/Manifest MedEx presents an important resource for data sharing in the region but is viewed as secondary to EHR-based data exchange for supporting treatment at the point of care. There is limited sharing of behavioral health and social services data in this region, with no major WPC pilots or social services' data-sharing initiatives.

Hospitals and Health Systems

Table 4 displays summary information on the EHR vendor, HIO participation, national network participation, and clinical event notification providers. All four of the major health systems in the region — Kaiser,

Table 4. EHR and Data Exchange Network Participation Among Select Hospital Systems in the Fresno Region

	EHR VENDOR	HIO PARTICIPATION	NATIONAL NETWORK PARTICIPATION	CLINICAL EVENT NOTIFICATION PROVIDER*
Kaiser Permanente	Epic	Not participating	Carequality, eHealth Exchange	Collective Medical
St. Agnes Medical Center (Trinity Health)	Epic	CVHIE/Manifest MedEx	Carequality	CVHIE/Manifest MedEx
Valley Children's Healthcare	Epic	CVHIE/Manifest MedEx	Carequality	CVHIE/Manifest MedEx
Community Medical Centers	Epic	CVHIE/Manifest MedEx	Carequality, eHealth Exchange	CVHIE/Manifest MedEx
Adventist Health	Majority Cerner (Some smaller, rural hospitals use legacy EHR systems.)	CVHIE/Manifest MedEx (new member, sharing ADT data with the HIO, as of April 26, 2021)	CommonWell	Collective Medical, CVHIE/Manifest MedEx
Kaweah Delta Health Care District	Cerner	CVHIE/Manifest MedEx	CommonWell	CVHIE/Manifest MedEx
Veterans Health Administration	VA Health Record	Not participating	eHealth Exchange	No external service

*A key use case for data exchange is notification of providers caring for patients when those patients experience clinical events, such as hospital admission, discharge, or transfer (ADT).

St. Agnes, Valley Children's, and CMC — are using Epic (or migrating to it). As a result, Epic Care Everywhere is a major infrastructure for clinical data exchange. The four major health systems all participate in Carequality and rely on it in conjunction with Epic Care Everywhere to access clinical data; two of the four also participate in eHealth Exchange. However, hospital-based providers view the national networks as a blunt instrument for clinical data exchange, reporting that their providers often must sift through so much clinical information that is it hard to know which information is most useful and up-to-date. All major systems except Kaiser participate in CVHIE.

Community Medical Centers

The largest health system in the region and longtime Epic user, CMC has a sophisticated understanding of the various national networks and where to look for data from a particular external organization. Staff leverages internal IT resources to reduce burden on providers by providing workflow guidance and semi-automated local customizations to the EHR and supporting IT systems. Despite staff efforts, however, data coming through the national networks reportedly often overwhelms providers and limits its utility for clinical decisionmaking. Epic Care Everywhere, viewed as more reliable and curated than information retrieved via the national networks, is by far the preferred method for discovery of external clinical information.

Adventist

Adventist uses the Cerner EHR and primarily participates in HIE through CommonWell (and its network bridge to Carequality) and through multiple direct interfaces with provider organizations and smaller hospitals in the region. Adventist also connects with its facilities that are not on its enterprise version of Cerner via a product called Cerner HIE, which is similarly connected to the national networks. Some ambulatory care providers in the Fresno region have reported problems accessing Adventist data through CommonWell. Adventist reports that these issues are typically due to a lack of understanding about where the data resides in the clinical workflow and patient identity matching issues. Adventist recently joined Manifest MedEx as a statewide participant and is now sharing ADT information with the HIO, which may help it effectively exchange data with participating partners in the region.

Other Small Hospitals

Two smaller area hospitals — Kaweah Delta Health Care District and the local Veterans Administration (VA) hospital — are not currently on Epic; without participation in Epic Care Everywhere, they remain relatively siloed from other hospitals. While Kaweah Delta participates in CVHIE/Manifest MedEx and CommonWell, both ambulatory care providers and hospitals report difficulties in consistently obtaining clinical data from Kaweah Delta. The VA operates two facilities in the region and relies on eHealth Exchange for external data exchange.

Small independent hospitals, many of them rural and/or critical access hospitals, play an important role in the region but tend to engage in less data exchange than the larger systems, most often not participating in either CVHIE/Manifest MedEx or the national networks. These organizations tend instead to rely on point-to-point data exchange with specific partner organizations — often only when patient referrals are sufficiently frequent to support the effort required to establish a connection.

Ambulatory Care

Access to and exchange of clinical data among ambulatory providers and between ambulatory providers and hospitals in the region are fragmented and face significant hurdles because of constrained resources and HIE expertise. Few connect to the national networks even though these networks are natively built into their EHRs, and even fewer participate in any HIOs. For example, neither LaSalle Medical Associates nor Santé Physicians — the two largest IPAs in the region — participate in the CVHIE/Manifest MedEx or participate in a national network.

Multiple large FQHCs operate in the region, and many use the NextGen, Epic, and eClinicalWorks EHRs. Despite Carequality being a standard feature

of these EHRs, many FQHCs do not connect to the national network. A minority of FQHCs are connected to CVHIE/Manifest MedEx in the region, with one organization interviewed noting the lack of FQHC IT resources to plan and implement connectivity with CVHIE/Manifest MedEx, together with the workflow realignment that would be needed for providers to use the tools, as important reasons.

Implementation of ADT alerting for ambulatory care providers — generally seen as a critical use case for data exchange — is inconsistently available in this region, according to ambulatory providers. The most consistent ADT alerting among ambulatory organizations is through Epic Care Everywhere for providers using Epic. Otherwise, ADT alerting occurs through a patchwork of solutions, which include Manifest MedEx's notification service, Collective Medical, point-to-point interfaces, and DirectTrust secure messaging. While Manifest MedEx offers ADT alerts reflecting hospital events at all participating hospitals, adoption may be low because CVHIE does not actively recruit ambulatory care providers to take advantage of these services. Collective Medical provides ADT alerts for Adventist and now Kaiser Permanente.

Family Health Care Network

Family Health Care Network (FHCN) is a large FQHC with 41 sites spread across the region and EHR use evenly distributed between Epic and eClinical Works. Carequality is built into both EHRs and is actively used by FHCN. While FHCN reports that providers can retrieve useful data via the connection to Carequality, they often have to "hunt" for the right data due to the large volume of information that is discoverable. In addition, despite the availability of national networks in the region, FHCN faces challenges accessing patient records at the point of care from hospital systems. For example, FHCN does not receive data from Kaweah Delta or Adventist via the national networks. FHCN providers would reportedly benefit most from data for patients who are post-hospitalization and for new patients who present with complex medical histories.

The split among FHCN providers using Epic and eClinicalWorks creates challenges for those seeking a complete view of patient clinical records. FHCN clinics using eClinical Works participate in Manifest MedEx and contribute data whereas clinics using Epic reportedly do not. Without full participation in Manifest MedEx, data on FHCN patients may seem incomplete or inaccurate to providers. Broader participation in Manifest MedEx is also hindered if providers are required to log into an external web-based portal to access information, which is viewed as inefficient. FHCN uses DirectTrust, a secure messaging service built into EHR platforms and required for EHR certification, for referrals to specialty care and views it as an important component of regional interoperability. Some area hospitals use DirectTrust to distribute ADT information to ambulatory care providers. However, many ambulatory care providers in the region do not realize that they have access to DirectTrust or understand how to access and use it in their EHRs.

Regional HIOs

CVHIE serves as the local affiliate of Manifest MedEx in the Fresno region. Its members use the Manifest MedEx data-sharing infrastructure as well as its governance structure; the role of CVHIE is to provide a local forum for determining regional priorities and encouraging and coordinating new membership. CVHIE members also work together to address data-sharing challenges and opportunities that extend beyond Manifest MedEx tools. CVHIE has historically been a strong presence for regional collaboration and governance. However, relatively few organizations — particularly ambulatory care providers — consistently participate in this local forum, limiting its impact. Notable participants are Valley Children's Hospital, CMC, and St. Agnes. Priority topics for CVHIE members include establishing a standard approach for predictive modeling of health care data at the population level to supplement Manifest MedEx processes and rules, developing better algorithms for sharing and ingesting data over the national networks, and standardizing the speed of national network connections.

The CHCF San Joaquin Valley Regional Market Study found that many local providers reported limited use of Manifest MedEx despite the HIO's continued growth, the platform's features, and free services for physician practices and other outpatient settings.[15] Reported barriers to adoption included challenges integrating practice EHR systems with the HIO platform and a lack of resources for staff training and onboarding. The relative ease of accomplishing data exchange through other tools, like the national networks, which are generally integrated into existing EHR systems, appealed to providers compared to logging into an external portal to use Manifest MedEx.

Consistent with those findings, interviewees reported that local providers are already overwhelmed with data from their EHR vendor and the national networks and see little need to add yet another data source. Confusion about which organizations are participating in which data exchange networks also plays a role. Manifest MedEx is seen as more difficult to implement and onboard than "built-in" features, such as Carequality or Epic Care Everywhere. Moreover, many providers in the region do not seem to realize that the CVHIE/Manifest MedEx unified record may be available to them through the eHealth Exchange or Carequality national networks.

HIO participants see value in the platform to support population health management, data analysis, and public health use cases, which require longitudinal patient records. Several respondents noted that while CVHIE/Manifest MedEx provides limited utility for point-of-care provider access to clinical information today, the potential future population health benefit from the aggregate data collected by the HIO warrants continued support and participation in the network.

Whole-Person Data Exchange Networks

Outside of a small WPC pilot program in Mariposa, sharing of behavioral health and social services data is limited in this region. In part due to unique characteristics of the region, including small counties and limited health plan influence, the potential conveners for cross-sector data sharing have yet to invest significant effort in cross-sector data-sharing initiatives. Several respondents were unaware of any significant cross sector data exchange efforts. Early in 2021, however, social service referral platform Unite Us was deployed across the region with support from Kaiser Permanente and Common Spirit Health and including a number of FQHC participants. In Fresno, St. Agnes is leading an Adverse Childhood Experiences (ACEs) Aware effort funded by the State of California, and is using Unite Us as one solution to screen and refer children.

Sacramento Region

Overview

The Sacramento region spans El Dorado, Placer, Sacramento, and Yolo Counties and has a population of about 2.3 million people. Each of the counties uses a different Medi-Cal managed care model to provide coverage under commercial and regional health plans. Kaiser Permanente, Sutter Health, Dignity Health and University of California, Davis, Health (UCDH) are the largest health systems in the region and continue to expand their footprint with more facilities and affiliations with medical groups and IPAs. A large presence of FQHCs exists in the metropolitan areas, extending into neighboring rural counties. For a detailed portrait of the health care market in the Sacramento region, see CHCF's Regional Market Study.[16]

Data exchange in the Sacramento region is primarily driven by EHR-centered clinical data networks. Three of the four major health systems use the Epic EHR system, allowing clinical information to be shared internally within their own organizations and with each other through Epic Care Everywhere. Health system providers rely on the national networks to share information with providers that are not on the same EHR platform. As in Fresno, data exchange outside of the major health systems is more fragmented due to the variety of EHR systems that are used and the lack of connectivity between them. Collective Medical has a presence in the region among providers for hospital event notification.

The regional HIO, SacValley MedShare, has a footprint primarily north of the Sacramento region; respondents noted that its use is quite limited in the metropolitan area due to the expansive data-sharing networks among the major hospital and health systems. Data linkages between health care and social services remain a significant gap in the region; WPC initiatives in the Sacramento metropolitan area and Placer County are relatively small, and social service referral networks are just beginning to get off the ground.

Hospitals and Health Systems

Kaiser Permanente, Sutter Health, Dignity Health, and UCDH, the largest health systems in the Sacramento region, are on the Epic platform and share information through the Epic Care Everywhere network. Clinical data are shared with providers using other EHRs via the national networks, primarily Carequality and CommonWell. Dignity Health uses the Cerner EHR and leverages multiple national networks to share data with the other health systems. Table 5 provides additional details on HIO participation and clinical event notifications.

Table 5. EHR and Data Exchange Network Participation Among Select Hospital Systems in the Sacramento Region

	EHR VENDOR	HIO PARTICIPATION	NATIONAL NETWORK PARTICIPATION	CLINICAL EVENT NOTIFICATION PROVIDERS*
Dignity Health	Cerner	SacValley MedShare	eHealth Exchange, CommonWell, Carequality	PatientPing; Collective Medical for Woodland Memorial in Yolo
Kaiser Permanente	Epic	Not Participating	Carequality	Collective Medical
Sutter Health	Epic	Not Participating	Carequality	Collective Medical
UC Davis Health	Epic	Not Participating	Carequality, eHealth Exchange	DirectTrust Secure Messaging via Epic/Surescripts

*A key use case for data exchange is notification of providers caring for patients when those patients experience clinical events, such as hospital admission, discharge and transfers (ADT).

UC Davis Health

UCDH, the only academic medical center in the region, is the largest hospital in Sacramento County by beds and discharges with 605 beds and nearly a quarter of countywide discharges. Its associated medical group is staffed by more than 1,100 physicians, some of whom also serve in clinical roles in the community. UCDH uses Epic Care Everywhere to link patients across encounters with other Epic providers, which includes several FQHCs in the region.

UCDH uses multiple national networks to exchange data with different community partners with varying levels of success. Specifically, UCDH uses eHealth Exchange for data exchange with government entities, such as the VA facilities, and uses Carequality and CommonWell for providers not on Epic. Representation and completeness of clinical data transmitted through national networks can vary considerably. While the national networks allow UCDH and its affiliates to exchange data natively through their EHRs, requests for UCDH to customize data are common, especially to accommodate the needs of small primary care providers in the community that often lack technical resources to use data from the national networks without support. The IT staff designates time to work with EHR vendors to accommodate these requests, ensuring that primary care providers have access to the information that they need from UCDH's hospitals and specialists. UCDH uses DirectTrust secure messaging outside of Epic.

To date, UCDH has not identified a business case for full participation in SacValley MedShare given that the system's data exchange needs are largely met through Epic and the national networks. UCDH is connected to SacValley MedShare via eHealth Exchange but is not currently a member of the HIO.

Dignity Health

In Sacramento County, the four Dignity Health facilities — Mercy General Hospital, Mercy Hospital of Folsom, Mercy San Juan Medical Center, and Methodist Hospital of Sacramento — collectively have 1,224 beds and account for roughly 38% of countywide discharges.[17] (Following the 2019 merger of Catholic Health Initiatives [CHI] and Dignity Health to create CommonSpirit Health, California hospitals continue to be branded as Dignity Health.)

Dignity Health has standardized on the Cerner EHR platform and primarily uses eHealth Exchange for data sharing with other health systems. Dignity Health has made significant investments, in partnership with other eHealth Exchange participants, to improve the completeness and quality of the data. Dignity Health is connected to CommonWell and Carequality to reach additional partners. The health system also participates with SacValley MedShare to facilitate exchange with providers in the region that are not on a national network. In some cases, Dignity Health has funded building integration tools for providers with a clear need to connect and share via the regional HIO.

Ambulatory Care

While more independent physician practices are affiliating with health systems, several large IPAs serve the region, including Hill Physicians and River City Medical Group (RCMG). Although IPAs often have a preferred EHR vendor and provide support to physicians using the vendor, many physicians participate in multiple IPAs and may use different EHRs, making it more challenging for IPAs to establish a data governance structure and support their physicians in sharing data.

Numerous FQHCs have large footprints in the Sacramento metropolitan area, with several extending into adjacent counties; the largest by patient volume are WellSpace Health and Sacramento Community Clinics.[18] The majority of FQHCs are on Epic, NextGen, or AthenaHealth EHRs and can engage in data exchange through connections with one or more of the national networks. For providers not on any of these platforms, SacValley MedShare has the potential to fill in some remaining data exchange gaps for the FQHCs, but participation has been limited.

River City Medical Group

River City Medical Group (RCMG) is the second largest IPA in the Northern California region (after Hill Physicians) and the largest in Sacramento County, with approximately 3,500 affiliated physicians and 1,300 mid-level providers in 600 provider and clinic locations. RCMG serves approximately 300,000 Medi-Cal managed care patients within a 10-county region of Northern California.[19] The majority of physicians are not exclusive to the IPA; many also belong to Hill Physicians. RCMG physicians use a range of EHRs, with some leveraging national networks to exchange data with other providers. Some of RCMG's physicians currently have read-only access to Kaiser Permanente and Dignity Health records, requesting data in advance and retrieving the response as a secure data file. RCMG receives a daily feed of clinical event notifications from Dignity Health to alert providers about patients who have been admitted to the ED the previous day, and recently joined Manifest MedEx.

Regional HIOs

SacValley MedShare is a nonprofit, regional HIO that serves a largely rural 21-county area mostly north and east of Sacramento. Several hospital systems in the region, notably Dignity Health and Adventist, participate in SacValley MedShare. UCDH is connected to the HIO via eHealth Exchange, but participation is limited to rural areas where data exchange partners are less likely to have access to other networks. Reportedly, subscription fees and resource requirements to manage the data shared through the regional HIO present barriers to participation.

RCMG joined Manifest MedEx in spring 2021 and will begin receiving clinical event notifications through the HIO. In April 2021, RCMG launched a campaign to connect approximately 200 contracted providers serving Medi-Cal members to Manifest MedEx, subsidized by Cal-HOP; RCMG plans to use the resulting data to support population health improvement programs.

Reportedly, several attempts have been made to establish a viable regional HIO in the Sacramento metropolitan area; the nonprofit structure was considered ideal for fostering collaboration and communication among members of competing health systems and EHRs. However, the large health systems have struggled to find a clear business case for collaboration via a regional HIO, given that they are largely able to rely on their EHR-centered networks to exchange clinical data with one another and with their primary data-sharing partners.

Whole-Person Data Exchange Networks

Data exchange efforts in the Sacramento region to address behavioral health and social services needs for individuals have been limited to specific use cases and relatively narrow client populations. The City of Sacramento's WPC pilot program, Pathways, focuses on individuals experiencing or at risk of homelessness. Since the pilot is led by the city rather than the county, it does not have access to Medi-Cal data to establish eligibility; as a result, participation in the program is limited to those referred by hospitals, managed care plans, health clinics, and the police Impact Team.[20] Similarly, Placer County's WPC pilot program is focused on providing complex case coordination and management services across health care, housing, and county behavioral health services, with a focus on individuals who are homeless or at risk of homelessness. Unlike the Pathways program, Placer's WPC pilot also offers medical respite service linkages, receives Medi-Cal data from local managed care plans to assist with enrollment, and provides some services via county-based programs.[21]

Data exchange to support care coordination has encountered technical and legal challenges. In Sacramento, implementation of a data-sharing agreement for the Pathways to Health and Home WPC pilot (run by the City of Sacramento) required robust privacy and security education for CBOs, often handling protected health information for the first time, to address concerns among the large hospital systems.[22]

Sharing behavioral health data has also proved to be challenging, in part due to federal restrictions. In addition, the EHR used by Sacramento County's specialty mental health plan does not participate in any HIE networks. In Placer County, most WPC program data is centralized within the county's behavioral health EHR system, which is used as a "hub" for data sharing and management.[23] Placer County has addressed technical barriers to data sharing by implementing interfaces between the county behavioral health EHR and key partner systems (including HMIS, the county's housing information system, as well as hospital and FQHC EHR systems). The technical and legal challenges also apply to data exchange with CBOs; the current data exchange infrastructure is not well equipped to share and manage data on social services other than housing in either of these WPC programs.

Without significant presence of a regional HIO or other mediating body, a uniform approach for the sharing of data on behavioral health care and use of social services remains a gap. Despite an overlapping client population due to their adjacent geographies, Pathways and Placer WPC do not currently share data with one another, even on common clients. SacValley MedShare, according to interviewees, has the potential to fill these gaps — and to make social needs data available outside of narrow WPC pilot programs. Also, in late 2020, Kaiser Permanente and Blue Shield California initiated the launch of a closed-loop referral network, utilizing the Unite Us platform, with participation from several county agencies, school districts, FQHCs, and community-based agencies.

Humboldt County

Overview

Humboldt County, on California's northern coast near the Oregon border, has a population of approximately 136,000 — nearly 60% of whom obtain health coverage through Medi-Cal or Medicare. Partnership HealthPlan of California is the only Medi-Cal health plan in the county, serving a large and growing share of the population, with 56,000 members in 2018; Anthem and Blue Shield of California are the only health plans offered through Covered California, the state's health insurance marketplace. St. Joseph Hospital is the largest hospital in Humboldt; both St. Joseph and smaller Redwood Memorial became part of the Washington State-based Providence Health in 2016 when St. Joseph Health merged with Providence. The erosion of physicians in independent practice has resulted in Open Door Community Health Centers (Open Door), the largest FQHC in the region, becoming the main provider of primary care services in the area. For a detailed portrait of the health care market in Humboldt, see CHCF's Regional Market Study.[24]

Data exchange in the Humboldt County region is relatively advanced due to nimble community leadership and collaboration, effective delivery of services by the NCHIIN, and the absence of pervasive EHR-based exchange between hospitals and ambulatory care providers. Providing clinical data at the point of patient care is the primary driver for data sharing in Humboldt, with pay-for-performance incentives from PHC also serving as a driver, especially for hospitals. Unique for a regional HIO in California, NCHIIN focuses on information exchange for health improvement across sectors — medical care, behavioral health, social care, justice, education and more — pursuing this agenda even without a county-based WPC pilot.

Table 6. EHR and Data Exchange Network Participation in Hospitals in Humboldt County

	EHR VENDOR	HIO PARTICIPATION	NATIONAL NETWORK PARTICIPATION	CLINICAL EVENT NOTIFICATION PROVIDERS*
Providence: St. Joseph, Redwood Memorial	Meditech (transitioning to Epic)	Providence HIE (see text for details), NCHIIN, Manifest MedEx	eHealth Exchange, CommonWell, Carequality (testing)	Providence HIE, NCHIIN, Collective Medical
Mad River Community Hospital	Evident	NCHIIN	CommonWell	NCHIIN, Collective Medical
Jerold Phelps, Southern Humboldt County Healthcare District	Evident	NCHIIN	CommonWell	NCHIIN

*A key use case for data exchange is notification of providers caring for patients when those patients experience clinical events, such as hospital admission, discharge, or transfer (ADT).

Hospitals and Health Systems

Table 6 displays information on the EHR vendor, HIO participation, national network participation, and hospital event notifications among the four hospitals that operate in Humboldt County. The two Providence-affiliated hospitals, St. Joseph and Redwood Memorial (a critical access hospital), use the Meditech EHR with plans to transition to Epic. Mad River Community Hospital and Jerold Phelps Community Hospital, a nine-bed critical access hospital with a skilled nursing facility operated by Southern Humboldt County Healthcare District, use Evident. All four hospitals participate in NCHIIN, with mixed participation in the national networks, Manifest MedEx and Collective Medical. Providence has created its own health information organization, the Providence HIE, providing clinical data and services to ambulatory providers, post-acute sites, and others; for details, see the Providence section of the Los Angeles County regional profile.

Ambulatory Care

Open Door is the largest FQHC in the region, with 12 sites across Humboldt and Del Norte Counties offering primary care, dental care, and behavioral health care, and operating three mobile clinics.[25] Open Door uses a version of Epic hosted by OCHIN and maintains a bidirectional connection with NCHIIN (see sidebar). While Open Door accesses external data

OCHIN and FQHCs

OCHIN, a national nonprofit health information technology organization with two decades of experience providing shared EHR platforms to FQHCs, is a leading example of the integration of the national networks — and other interoperability capabilities — directly into the EHR. OCHIN deploys and hosts a full suite of Epic and practice management solutions for hundreds of community health centers nationwide, including 31 member organizations in California. EHR operations are tailored to serve the needs of health centers, including navigators for support services, correctional facilities, and refugee patients. All providers on the OCHIN network are connected to each other through a single instance of Epic that provides a unique patient record across all participating organizations nationally. OCHIN engages in data sharing on behalf of its customers to connect them with the broader delivery system through the national networks and HIOs (including seven HIOs, such as NCHIIN, in California). Given the scale of their operations, OCHIN's IT team has the resources and expertise to address workflow and data quality issues associated with the national networks for its customers.

via Epic and the national networks, there have been data gaps since not all local hospitals participate in these networks; those gaps should close when the two Providence hospitals migrate to Epic in 2021. However, information coming from the national networks can be overwhelming to providers, burdening care team members and IT staff who are charged with interpreting the incoming data.

Open Door has played an active role in the development of NCHIIN, benefiting from the ability of stakeholders to design and build an HIE system to meet their needs. With a combination of strong local leadership, talent, and institutional collaboration, one interviewee reported that the initiative to develop NCHIIN "really was grassroots and not like an outsider came in and told [us] what to do." As a result, NCHIIN is well positioned to respond to local needs. For example, clinicians caring for patients at Open Door receive a "mental health summary" that alerts the clinician that the registering patient is receiving specialty mental health services from the county and includes current mental health diagnoses and a medication list.[26] Hospitals also receive these specialty mental health alerts.

An estimated 90% of primary care physicians in Humboldt County participate in NCHIIN.[27] The primary provider of specialty services, Providence Medical Group (affiliated with St. Joseph Hospital and the larger Providence system), participates as well. Only two ambulatory care providers of significant size do not participate in NCHIIN: United Indian Health Service (UIHS) and Planned Parenthood of Humboldt County. UIHS serves nine of the 11 tribes in Humboldt and Del Norte Counties at seven clinic sites and has focused in recent years on shifting away from paper-based processes and adopting the NextGen EHR.[28] Planned Parenthood of Humboldt County provides reproductive health services; Open Door and other providers serving patients receiving those services have been unable to access information, such as cervical care screening. That data gap should close, at least for Open Door, with the local Planned Parenthood's migration to OCHIN Epic in 2021.

Regional HIOs

North Coast Health Improvement and Information Network (NCHIIN) is a regional HIO that was chartered in 2010, the year after the HITECH Act was enacted. NCHIIN supports health care providers across the community to share real-time ADT data on laboratories, radiology, and ancillary services. NCHIIN also sends data to the California Immunization Registry and the California Reportable Disease Information Exchange (CalREDIE) and has supported Humboldt County's COVID-19 response. NCHIIN is widely used by Humboldt County providers, including all of its hospitals. For more context on NCHIIN and its role in the community, see the CHCF Regional Market Report on Humboldt and Del Norte Counties.[29]

Overall, NCHIIN is viewed in a positive light, described as "innovative, nimble, and adaptive." One respondent noted that "curating data and turning it into meaningful information for care teams is potentially the greatest value that NCHIIN provides." Its services are dependably use case driven, with a focus on sharing actionable information within workflows. Factors contributing to NCHIIN's success include visionary leadership, trust among stakeholders, collaborative problem solving, a "small and mighty" attitude that uses innovative tools to address local problems, and direct ownership and management of the HIE software development environment (i.e., enabling flexibility, adaptability, and cost control). The presence of a single supportive Medi-Cal managed care plan and strong partnership from county government, along with the lack of major hospital participation in EHR-centered exchange via the national networks, have shaped an environment in which NCHIIN, as the local HIO, has had space to develop and provide meaningful data exchange services.

In late 2021, St. Joseph and Redwood Memorial — the two Providence hospitals — will both migrate to the Epic EHR, becoming connected to each other and to Open Door via Carequality. This expansion of EHR-based data sharing may replace some of the clinical data exchange services provided by NCHIIN to these key members of the community, with the

potential to erode NCHIIN's local value and financial sustainability. NCHIIN, in anticipation of this shift, has focused increasingly on cross-sector data exchange with human services agencies to support community health outcomes.

Whole-Person Data Exchange Networks

Data sharing between the health care and social services sectors has been pioneered by NCHIIN in Humboldt County. In 2016, NCHIIN became the first HIO in California to provide care management services for cross-sector care coordination. NCHIIN's community care coordination platform, which is provided by the vendor Activate Care, serves approximately 2,000 clients with complex needs across Humboldt County using interfaces that were built between NCHIIN, the Humboldt County Department of Health and Human Services (DHHS), the Homeless Management Information System (HMIS), and the probation department; data from Open Door, local hospitals, and the local jail are also pulled into Activate Care via NCHIIN.[30]

This care coordination platform also supports Humboldt County's efforts to provide housing for Medi-Cal enrollees with serious mental illness, a major focus since the Board of Supervisors adopted a "Housing First" model in 2016.[31] Notably, NCHIIN has implemented a community care coordination platform even without a county WPC pilot, which was the instigator of similar efforts in other parts of the state. Instead, NCHIIN secured seed funding from the Robert Wood Johnson Foundation, a national philanthropy, and currently participates in the "All In" national collaborative, whose participants test new ways to improve community health through multi-sector partnerships to share data.[32]

Humboldt County leaders hope to build a community information exchange that would facilitate screening for social service needs and support closed-loop referrals. The county is directing WPC-like funds from DHCS to this effort. As a first step, the county's permanent supportive housing team began reviewing jail admissions and other information available in Activate Care, alongside health care utilization data from PHC and county psychiatric hospital admission data, to assess vulnerability for chronically unhoused people. In a second step, NCHIIN publicly released the North Coast Resource Hub, a database of local CBOs, to promote referrals to appropriate services. The Hub initially focused on substance use disorder services but is expanding to include additional service providers and those in neighboring Del Norte County. Open Door also has access to a social services referral platform (i.e., Aunt Bertha) embedded within its instance of OCHIN Epic, giving providers the ability to stay in their EHR while referring patients for social services. This service may leverage directory information from the North Coast Resource Hub in the future.

Conclusion

The current data exchange landscape represents a significant maturation from the highly inefficient point-to-point connections of the past, in which every organization needed to connect to every other organization. Today, organizations can consider leveraging one of many networks for data sharing, including EHR-centered clinical data networks, HIOs, specialized clinical data exchange networks, and whole-person data exchange networks.

Nevertheless, in most cases, the current experience of data sharing does not live up to current needs. While the progress demonstrates sustained effort and ingenuity, it also highlights frustration from the field, including the somewhat surprising frustration of data overload.

Looking ahead, the immediate call to action is to achieve alignment between today's data exchange networks in ways that harness their unique strengths and bring them into harmony for users in the field: within a single workflow, a single encounter, a single insight. This kind of coordination may look different across California, as networks with varying characteristics take center stage in accordance with the assets and infrastructure at the local level. It matters less that each region, from Los Angeles to Humboldt County, is unique than that those regions are moving together toward a system that is coherent and unified from the users' perspective.

Endnotes

1. Mark Elson, *Health Information Exchange in California: Overview of Network Types and Characteristics*, California Health Care Foundation (CHCF), originally released March 2021, updated August 2021.
2. "2020 Edition — Health Care Almanac Regional Markets Study," CHCF, April 2021.
3. Homebase, *Breaking Down Silos: How to Share Data to Improve the Health of People Experiencing Homelessness*, CHCF, July 13, 2021.
4. Jill Yegian and Katrina Connolly, *Los Angeles: Vast and Varied Health Care Market Inches Toward Consolidation*, CHCF, January 20, 2021.
5. Yegian and Connolly, *Los Angeles*, CHCF.
6. David Raths, "Cedars-Sinai, Anthem Make Progress on FHIR-Based Data Exchange," *Healthcare Innovation*, June 18, 2020.
7. Yegian and Connolly, *Los Angeles*, CHCF.
8. "Providence Health Information Exchange Participants," Providence Health Information Exchange website, accessed March 23, 2021.
9. Yegian and Connolly, *Los Angeles*, CHCF.
10. Yegian and Connolly, *Los Angeles*, CHCF.
11. "Cal-HOP," California Department of Health Care Services website, last modified March 24, 2021.
12. Yegian and Connolly, *Los Angeles*, CHCF.
13. Walter Sujansky, *Promise and Pitfalls: A Look at California's Regional Health Information Organizations*, CHCF, January 15, 2019.
14. Len Finocchio and James Paci, *San Joaquin Valley: Despite Poverty and Capacity Constraints*, Health Care Access Improves, CHCF, December 18, 2020.
15. Finocchio and Paci, *San Joaquin Valley*, CHCF.
16. Len Finocchio and James Paci, *Sacramento Area: Large Health Systems Grow in a Pricey and Tumultuous Market*, CHCF, February 26, 2021.
17. Finocchio and Paci, *Sacramento Area*, CHCF.
18. Finocchio and Paci, *Sacramento Area*, CHCF.
19. Finocchio and Paci, Sacramento Area, CHCF.
20. Brian Rinker, "Finding Shelter and Support Along the Road to Better Health," *Health Affairs*, August 2019.
21. "Whole-Person Care (WPC)," Placer County Health and Human Services website, accessed April 1, 2021.
22. Rinker, "Finding Shelter."
23. PY3 Annual Report (PDF), Placer County Health and Human Services website, accessed April 1, 2021.
24. Jill Yegian and Katrina Connolly, *Humboldt and Del Norte Counties: Community Collaboration in the Face of Health Adversity*, CHCF, October 30, 2020.
25. Yegian and Connolly, *Humboldt and Del Norte*, CHCF.
26. Yegian and Connolly, *Humboldt and Del Norte*, CHCF.
27. Sujansky, *Promise and Pitfalls*, CHCF.
28. Yegian and Connolly, *Humboldt and Del Norte*, CHCF.
29. Yegian and Connolly, *Humboldt and Del Norte*, CHCF.
30. Yegian and Connolly, *Humboldt and Del Norte*, CHCF.
31. Yegian and Connolly, H*umboldt and Del Norte*, CHCF.
32. "All In: Data for Community Health," All In website, accessed April 1, 2021.