California State Medi-Cal Health Information Technology Plan

March 2022

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1 CALIFORNIA'S HEALTH INFORMATION TECHNOLOGY LANDSCAPE

This final State Medicaid Health Information Technology Plan (SMHP) presents the findings of a health information technology assessment completed by researchers at the University of California, San Francisco (UCSF) in February 2022. These findings are compared with findings from HIT landscape assessments performed by the Lewin Group and McKinsey & Company and UCSF at the start of the Medi-Cal Promoting Interoperability Program (PIP), originally named the Medicaid EHR Incentive Program, in 2011. These comparisons are incorporated throughout this final SMHP using the same structure as previous SMHP updates. Where possible, information has been derived from existing sources in both published and unpublished literature. Appendix 1 describes in detail the data sources used in previous SMHP updates and details of the 2022 UCSF study are presented in detail in Appendix 2. Data specific to Medi-Cal PIP participation is available to the public via the Open Data Portal[1] maintained by the California Health and Human Services Agency (CalHHS).[2]

The Medi-Cal PIP was highly successful at providing financial incentives to hospitals and professionals for the adoption and meaningful use of certified electronic health record technology (CEHRT). The initial landscape assessment conducted by Lewin and McKinsey Group projected that California could expect to distribute as much as $1.4 billion in incentive funds if all eligible professionals and hospitals applied and received full incentive funding. As of December 2021, the Medi-Cal PIP had surpassed that projection--provided federal incentive funds totaling $1.67 billion, with $846 million going to hospitals and $821 million going to professionals.

1.1 PROMOTING INTEROPERABILITY PROGRAM PARTICIPATION AND EHR ADOPTION AND USE BY PROFESSIONALS

The initial HIT landscape assessment by the Lewin Group and McKinsey & Company estimated that of the approximately 10,000 professionals in California would meet or exceed the 30 percent Medicaid patient encounter requirement for eligibility to participate in the Medi-Cal PIP.

[1] California Health and Human Services Open Data Portal. Accessed June 25, 2020.

[2] California Health and Human Services Agency. Accessed June 25, 2020.

Figure 1: ESTIMATED PROVIDER PARTICIPATION BY PROVIDER TYPE (JUNE 2009)

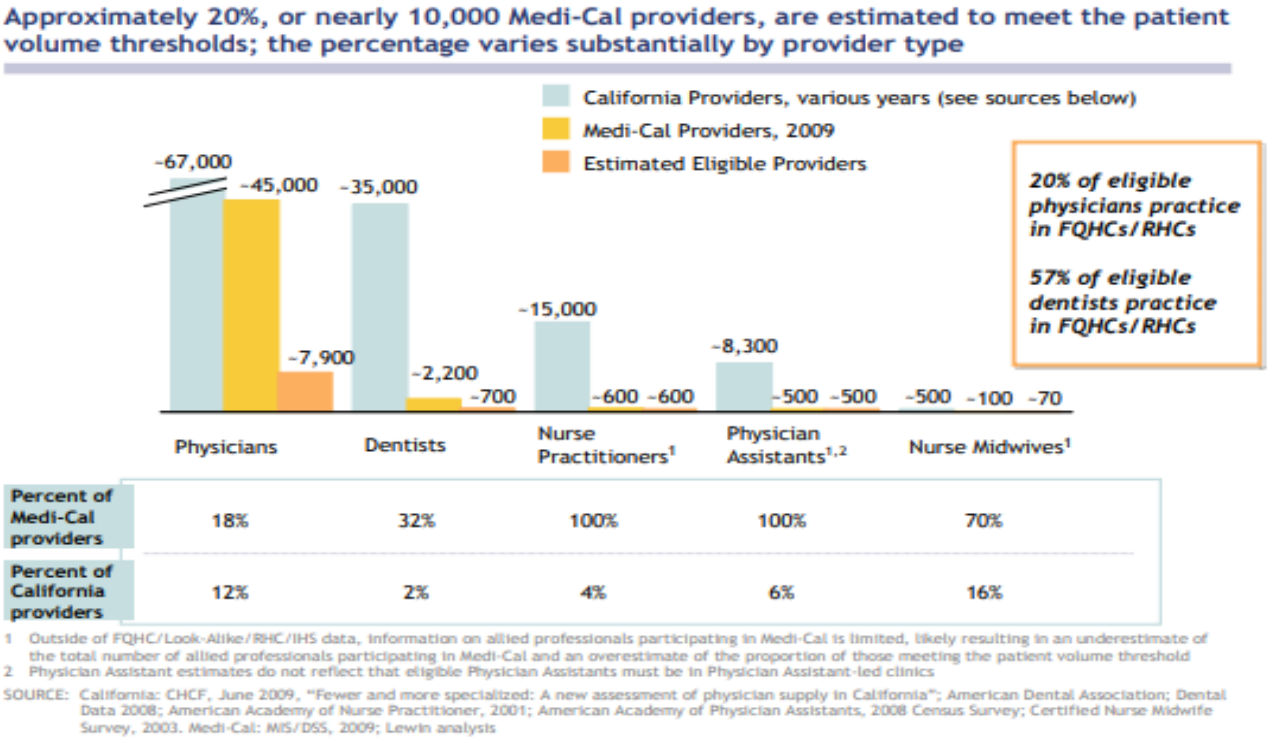


Table 1 displays the number of eligible professionals (EPs) who attested for the program by year and meaningful use stage. In the first year of participation providers did not need to demonstrate meaningful use of an EHR, only adoption, implementation or upgrade (AIU) of a certified EHR.

TABLE 1: NUMBER OF PROFESSIONALS PARTICIPATING IN MEDI-CAL PIP BY YEAR AND STAGE

Program Year	AIU	MU Stage 1	MU Stage 2	MU Stage 3	Total Attestations	Completed Program
2011	6,258	0	0	0	6,258	0
2012	4,430	2,054	0	0	6,484	0
2013	3,731	4,111	0	0	7,842	0
2014	2,511	3,876	357	0	6,744	0
2015	3,107	2,482	1,633	0	7,222	0
2016	4,945	2,540	2,301	0	9,786	372
2017	0	0	5,020	15	5,035	517
2018	0	0	4,484	28	4,512	706
2019	0	0	0	1,371	1,371	236
2020	0	0	0	1,646	1,646	380
2021	0	0	0	1,041	1,041	356
Total	**24,982**	**15,063**	**13,795**	**4,101**	**57,941**	**2,567**

The total number of participants (24,982) greatly exceeded the number (10,000) projected by the Lewin Group and McKinsey & Company study conducted in 2010. There are several potential reasons for this:

- The Affordable Care Act (ACA) increased Medi-Cal enrollment resulting in more professionals meeting or exceeding the 30 percent Medicaid encounter requirement for the program.
- In 2013, Healthy Families Program (HFP) subscribers were transitioned to the Medi-Cal Program.
- The Lewin Group and McKinsey & Company study was not able to accurately estimate how many professionals would qualify through group/clinic membership. Approximately 70 percent of professionals qualifying for the program have been members of groups or clinics.
- DHCS's use of prequalification methodologies for individual EPs and clinics encouraged many EPs to participate in the program. Approximately 42 percent of professionals were prequalified individually or as members of prequalified clinics.
- DHCS made significant investments in technical assistance for providers through the California Technical Assistance Program (CTAP) which facilitated increased participation by 7,500 professionals.

Table 2 below displays the unique number of MU attestations by participation year and program year. Participation year refers to the years of participation in the program (6 years maximum) while program year refers to the calendar year for which the EP received a payment. MU attestation was not available in Program Year 2011. Professionals could not start the program after 2016.

TABLE 2: EP MU ATTESTATIONS BY PARTICIPATION AND PROGRAM YEARS

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
1	0	71	109	142	123	106	-	-	-	-	-	551
2	-	1,983	2,603	1,641	1,591	1,299	1,832	656	104	224	66	11,999
3	-		1,399	1,594	1,137	1,216	993	1,366	226	205	175	8,311
4	-	-	-	856	819	1,103	879	992	456	333	201	5,639
5	-	-	-	-	445	745	814	792	349	504	243	3,892
6	-	-	-	-	-	372	517	706	236	380	356	2,567
Grand Total	0	2,054	4,111	4,233	4,115	4,841	5,035	4,512	1,371	1,646	1,041	32,959

Table 3 below displays the Medi-Cal PIP participation and MU participation rates for EPs according to their licensing boards. Physicians, both doctors of medicine (MDs) and doctors of osteopathic medicine (DOs) constituted 57 percent of the total number of professional participants. Dentists followed, contributing 21 percent of participants, which is considerably higher than the 12 percent national participation rate for dentists. These numbers are in the same participation order as projected in the initial landscape assessment but over two times the magnitude.

TABLE 3: MEDI-CAL ELIGIBLE PROFESSIONAL PARTICIPATIONS BY LICENSING BOARD

LICENSING BOARD	AIU	PARTICIPATION BY LICENSING BOARD	MU % (ANY STAGE)
Medical Board of California	13,415	54%	64%
Dental Board of California	5,226	21%	54%
California Board of Registered Nursing	4,291	17%	68%
Physician Assistant Committee	1,064	4%	60%
Osteopathic Medical Board of California	819	3%	64%
California State Board of Optometry	167	1%	95%
Total	**24,982**	-	**76%**

Overall, 76 percent of professionals achieved at least one of the three stages of meaningful use. Optometrists had the highest MU rate (95 percent), followed by registered nurses (68 percent). Physicians (DOs 64 percent, MDs 64 percent). While dentists had the lowest rate of AIU to MU participation at 54 percent.

To better understand the barriers for MU participation among dentists, in 2017 DHCS conducted a survey of dentists that had received AIU payments but had not returned to attest for MU. The survey revealed that there is some confusion among dentists regarding MU, as shown in Table 4. Others found that, despite this, the use of an EDR was very beneficial as it has led to integration of care.

TABLE 4: DENTIST AND DENTAL STAFF UNDERSTANDING OF MU

Dental MU Survey Questions	Yes (%)	No (%)	Uncertain (%)
I do not believe I can qualify for meaningful use because I am a dentist.	9.5	52.3	38.1
I am aware that many meaningful use measures do not apply to dentists and, therefore, can be excluded.	58.4	41.5	N/A
Many of my patients do not have email addresses or internet access, making it difficult to meet patient portal requirements.	77.7	22.2	N/A
I would like more information about meaningful use requirements.	63.6	36.3	N/A
My certified EHR/EDR does not offer dental-appropriate modules and/or applications.	43.4	56.5	N/A

DHCS identified that many dentists would benefit from additional technical assistance, as 78 percent responded that they were not able to satisfy patient portal requirements. For this reason DHCS developed and sent out the Dental MU Tip Sheet (Appendix 4). The full survey results are provided in the May 2021 SMHP, Appendix 13.

ELIGIBLE PROFESSIONAL INTEROPERABILTY

Health information exchange and interoperability remained a challenge for professionals throughout the program, despite the name change in 2018 to the Medi-Cal Promoting Interoperability Program. Some of this may have been due to the ability of professionals to claim exclusions for the health information exchange measures in meaningful use if they had fewer than 100 patient transitions of care during the 90-day reporting period. With these exclusions they did not need to report data for these measures. Analysis of Medi-Cal PIP data revealed that the majority of EPs, between 77.3 percent - 86.3 percent, depending upon the year of the program, claimed an exclusion for the HIE measure for sending summary of care records electronically.

TABLE 5: ELIGIBLE PROFESSIONALS MU EXCLUSIONS CLAIMED TO SUMMARY OF CARE RECORDS SENT ELECTRONICALLY, 2014-2021

Program Year	Reported Data	Percentage	Claimed Exemption	Percentage
2014	52	14.6%	305	85.4%
2015	311	19.0%	1,323	81.0%
2016	1,006	20.8%	3,834	79.2%
2017	1,038	20.6%	3,996	79.4%
2018	1,025	22.7%	3,484	77.3%

Program Year	Reported Data	Percentage	Claimed Exemption	Percentage
2019	239	17.4%	1,133	82.6%
2020	225	13.7%	1,421	86.3%
2021	173	16.6%	871	83.4%

1.1.1 CERTIFIED EHRS USED BY ELIGIBLE PROFESSIONALS

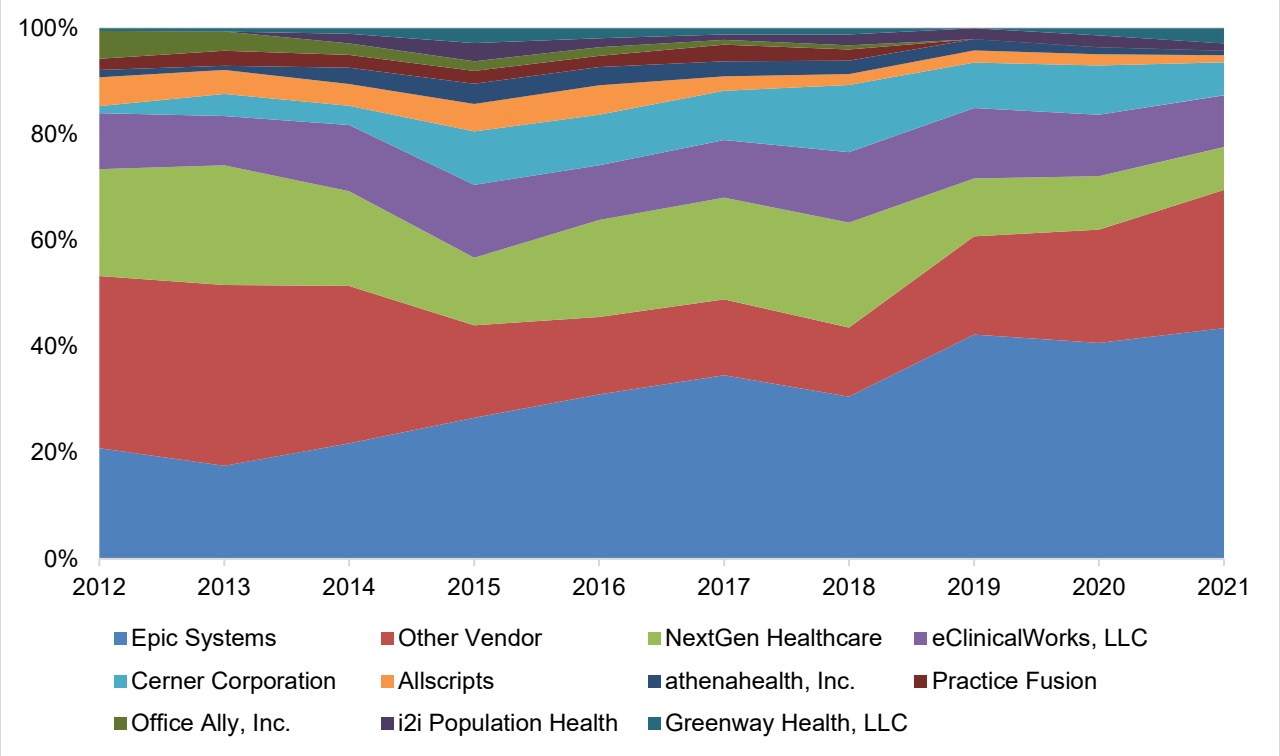
Analysis of data submitted to the Medi-Cal PIP revealed that EPs used a diverse number of certified EHR vendors over the course of the Medi-Cal PI Program. Table 6 displays vendor use as reported in all attestations and by all professionals over the course of the program. The most used EHR was Epic.

TABLE 6: EHR VENDORS USED BY EPS ATTESTING TO MEDICAID PROMOTING INTEROPERABILITY PROGRAM – OVER ALL YEARS

Vendor Name	Total	Percentage
Epic Systems	9,490	28.8%
Other Vendor	6,929	21.0%
NextGen Healthcare	5,765	17.5%
eClinicalWorks, LLC	3,811	11.6%
Cerner Corporation	2,599	7.9%
Allscripts	1,263	3.8%
athenahealth, Inc.	831	2.5%
Practice Fusion	716	2.2%
Office Ally, Inc.	584	1.8%
i2i Population Health	524	1.6%
Greenway Health, LLC	446	1.4%

Figure 2 shows how vendor use changed over the course of the program. Use of Epic increased from 21 percent in 2012 to 44 percent by 2021. Cerner was also frequently used by professionals (1.4 percent in 2012 increased to 6 percent in 2021). Other vendors were used less frequently, such as NextGen, which fell from 20 percent usage to 9.8 percent in 2021, while others basically fell out of use (such as Practice Fusion and Office Ally).

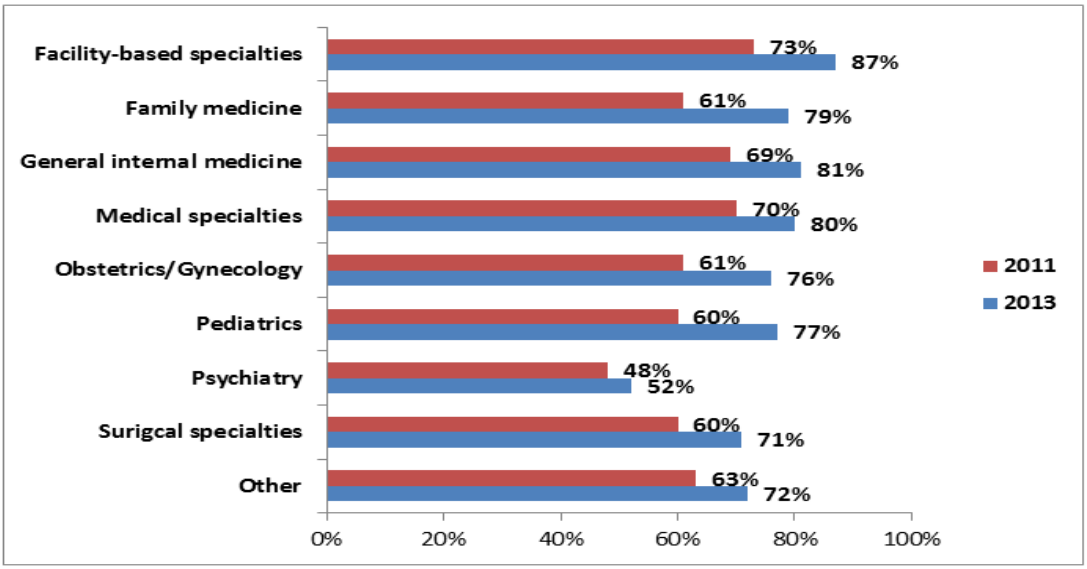
Figure 2: EHR VENDORS USED BY EPS ATTESTING TO CA MEDICAID MEANINGFUL USE – OVER TIME



1.1.2 EHR ADOPTION AND USE IN CALIFORNIA BY PROFESSIONALS

The adoption and use of EHRs by professionals in California significantly increased over the life of the Medi-Cal PIP. In 2011, at the start of the Medi-Cal PIP, DHCS partnered with researchers at University of California, San Francisco (UCSF) to develop and conduct a survey regarding EHR use (SMHP; May 2021, Appendix 2) through the Medical Board of California's re-licensure process. This survey was repeated with the same physicians in 2013. This revealed significant increases in adoption by all specialties in that two-year period, with 78 percent of all physicians reporting having an EHR in their main practice location in 2013, with the largest increase for family medicine and the lowest increase for psychiatry.

Figure 3: PERCENT WITH ANY EHR BY SPECIALTY, 2011 AND 2013*



*Differences in the percentage with any EHR are statistically significant for at p<0.05 for facility-based specialties, family medicine, general internal medicine, medical specialties, obstetrics/gynecology, and pediatrics. Chart provided by UCSF.

Additionally, in 2013, 56 percent of physicians who had EHRs reported that their EHRs had the functions necessary to achieve all of the Stage I MU objectives. Table 7 illustrates the availability of EHR functions that may be helpful for providing patient care and to achieve specific core objectives for MU.

TABLE 7: AVAILABILITY OF FUNCTIONS TO FULFILL STAGE 1 MEANINGFUL USE OBJECTIVES AMONG ALL PHYSICIANS, 2013

Survey Questions	Yes, use all or most of the time (%)	Yes, use some of the time (%)	Yes, the feature is available. Do not use (%)	Yes, the feature is available. Not applicable (%)	No, this feature is not available (%)	Don't know (%)	Do not have an EHR/Did not respond (%)
Collect patient Demographics	42	16	10	2	2	6	22
Take clinical notes	67	6	2	1	1	1	22

Survey Questions	Yes, use all or most of the time (%)	Yes, use some of the time (%)	Yes, the feature is available. Do not use (%)	Yes, the feature is available. Not applicable (%)	No, this feature is not available (%)	Don't know (%)	Do not have an EHR/Did not respond (%)
Generate patient problem list	63	8	3	1	1	1	22
Generate list of patient medications	67	6	2	1	1	1	22
Generate list of medication allergies	68	5	2	1	1	1	22
Order/transmit prescriptions electronically	55	7	7	3	4	1	22
Generate routine report of quality indicators	23	16	20	3	5	11	22
Transmit info electronically to/from providers to whom the patient is referred	24	15	19	3	8	8	22

In 2011, UCSF also conducted a survey of nurse practitioners (NPs) and certified nurse midwifes (CNMs) that found they had the same EHR adoption rates as physicians. The survey found 78 percent of all NPs and CNMs across all practice settings had some form of EHR at their main practice location. Of those respondents, 26.1 percent had an EHR at their main practice location that was able to achieve all of the Stage 1 MU objectives measured in the survey. A follow up survey of NPs was not conducted.

In order to assess EHR adoption and use by professionals in California after 2013, the UCSF researchers utilized national surveys with California-specific data. Data from the National Electronic Health Records Survey (NEHRS) was available for 2013-2017 that revealed California physician rates of EHR use of approximately 80 percent, with primary care physicians having higher rates than specialists.

TABLE 8: OFFICE-BASED PHYSICIAN EHR ADOPTION BY TYPE OF EHR; OFFICE-BASED PHYSICIAN CERTIFIED EHR ADOPTION BY CATEGORY OF SPECIALTY, 2013-2017 (CALIFORNIA)

Year	Percent physicians that have adopted any EHR	Percent physicians that have adopted basic EHR	Percent physicians that have adopted certified EHR	Percent primary care physicians that have adopted basic EHR	Percent primary care physicians that have adopted certified EHR	Percent medical and surgical specialists that have adopted certified EHR
2013	80.0%	54.0%	--	61.0%	--	--
2014	80.1%	58.5%	72.4%	--	86.7%	58.2%
2015	82.1%	49.4%	76.5%	--	83.6%	70.6%
2017	78.8%	--	72.9%	--	--	--

Note: dashes represent years that data wasn't available

Unfortunately, California-specific data was not available from NEHRS for years after 2017. In order to access more recent data, the UCSF researchers were able to access California-specific data from the American Board of Family Medicine (ABFM) for 2019-2020. ABFM collects this data from physicians registering for board certification exams. This data (Table 9) revealed that by 2020 EHR use was almost universal among family physicians in California with only three percent not reporting EHR adoption. For the three percent that did not report using an EHR, most were in an independent practice, had a sole owner, were in a solo practice, served less than 10 percent vulnerable population, and were located in rural areas.

TABLE 9: FAMILY MEDICINE PHYSICIANS EHR ADOPTION, 2019-2020 (CALIFORNIA)

		EHR Adoption at Practice Site (Row %)				
		Yes		No		Total
Total		1,187	-	43	-	1,230
Practice Site N, Row Percent	Hospital / health system owned medical practice	237	99.2%	2	0.8%	239
	Independently owned medical practice	258	89.0%	32	11.0%	290
	Managed care / HMO practice	314	100.0%	0	0.0%	314

	Academic health center / faculty practice	56	100.0%	0	0.0%	56
	Federally Qualified Health Center or Look-Alike	127	99.2%	1	0.8%	128
	Rural Health Clinic (federally qualified)	18	100.0%	0	0.0%	18
	Indian Health Service	8	100.0%	0	0.0%	8
	Government clinic, Non-Federal	63	96.9%	2	3.1%	65
	Federal	28	100.0%	0	0.0%	28
	Work site clinic	30	96.8%	1	3.2%	31
	Other	48	90.6%	5	9.4%	53
Practice Ownership N, Row Percent	No official ownership stake (100% employed)	595	98.2%	11	1.8%	606
	Sole owner	135	86.0%	22	14.0%	157
	Partial owner or stakeholder	355	98.9%	4	1.1%	359
	Self-employed as a contractor (including locums)	59	93.7%	4	6.3%	63
	Other	43	95.6%	2	4.4%	45
Practice Size N, Row Percent	Solo practice	103	85.1%	18	14.9%	121
	2-5 Providers	221	92.9%	17	7.1%	238
	6-20 Providers	295	99.0%	3	1.0%	298
	>20 Providers	568	99.1%	5	0.9%	573
Vulnerable Patient Population N, Row Percent	<10%	459	96.0%	19	4.0%	478
	10-49%	402	96.6%	14	3.4%	416
	>50%	326	97.0%	10	3.0%	336
Rurality (from RUCA) N, Row Percent	Urban	1,138	96.7%	39	3.3%	1,177
	Rural	49	92.5%	4	7.5%	53

1.2 PROMOTING INTEROPERABILITY PROGRAM PARTICIPATION AND EHR ADOPTION AND USE BY HOSPITALS

The information in this section was derived from a variety of sources over the years, most recently from the HIT landscape assessment conducted by UCSF in 2022, which provided rich information about the types of EHRs hospitals in California use as well as information about demographic variables including size, teaching status, and location (rural vs. urban). Data specific to Medi-Cal PIP participation by hospitals has been made available to the

public via the Open Data Portal[3] developed by the California Health and Human Services Agency (CalHHS).[4]

1.2.1 MEDI-CAL PROMOTING INTEROPERABILITY PROGRAM PARTICIPATION

A total of 331 hospitals participated in the Medi-Cal PIP. This number significantly surpassed the original estimate of 242 hospitals provided by Lewin Group and McKinsey & Company study in 2010. Most hospitals were dually eligible for both the Medicaid and Medicare Promoting Interoperability programs, except the 11 children's hospitals that participated only in the Medi-Cal PIP.

Of the 331 hospitals that participated, in their first year 271 attested to AIU, 24 attested to Stage 1 MU, and 36 hospitals attested to Stage 2 MU (Table 10). A total of 319 hospitals (96 percent) in California ultimately receive incentivized payments for demonstrating MU. Of these, 257 hospitals progressed to achieve Stage 2 or Stage 3 MU. In 2017 and 2018, dually-eligible hospitals could choose to attest for Stage 3 but available data from CMS does not allow DHCS to identify the specific stage selected. For this reason, all hospitals for these years are listed in Table 10 as Stage 2. In 2019, all hospitals had to attest to Stage 3. A total of 273 hospitals (82 percent) completed all 4 years of the program. Because hospitals had to start the Medi-Cal PIP by 2016 and participate in consecutive years thereafter, no hospitals participated in the Medi-Cal PIP after 2019.

TABLE 10: NUMBERS OF HOSPITALS THAT PARTICIPATED IN THE MEDI-CAL PIP BY YEAR AND STAGE

Program Year	AIU	MU Stage 1	MU Stage 2	MU Stage 3	Total Attestations	Completed Program
2011	139	-	-	-	139	-
2012	90	76	-	-	166	-
2013	19	196	-	-	215	-
2014	8	136	76	-	220	63
2015	10	28	147	-	185	90
2016	5	30	95	-	130	38
2017	-	-	79	-	79	19
2018	-	-	60	-	60	54
2019	-	-	-	9	9	9
Total	**271**	**466**	**457**	**9**	**1,203**	**273**

[3] California Health and Human Services Open Data Portal. Accessed June 25, 2020.

[4] California Health and Human Services Agency. Accessed June 25, 2020.

1.2.2 CERTIFIED EHR USE BY ELIGIBLE HOSPITALS

Analysis of Medi-Cal PIP data revealed that the EHR vendor market for eligible hospitals became increasingly dominated by Cerner and Epic over the years. Since over 90 percent of hospitals in California participated in the Medi-Cal PIP, these findings can be interpreted as representative of hospitals in general in California and probably hospitals nationwide (Table 11).

TABLE 11: TRENDS IN EHR VENDOR PREVALENCE OVER TIME

EHR Vendor	2012	2014	2015	2016	2017	2018	2019
Cerner	19.6%	20.4%	28.0%	25.1%	28.0%	26.8%	33.4%
Epic	14.1%	26.1%	24.3%	26.3%	30.8%	24.0%	27.9%
Meditech	25.2%	16.0%	16.7%	15.8%	18.3%	18.8%	17.6%
AllScripts	6.1%	5.6%	3.5%	3.6%	3.5%	7.6%	5.3%
Other	4.0%	5.0%	4.9%	8.9%	3.2%	5.8%	4.6%
CPSI	4.8%	5.4%	6.0%	5.5%	2.3%	7.5%	4.4%
Undisclosed	0.5%	0.5%	0.4%	0.0%	0.0%	0.7%	1.7%
Health Care System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%
Self-Developed	2.1%	0.8%	1.3%	0.4%	2.1%	3.7%	0.9%
MEDHOST	0.0%	0.0%	0.0%	1.8%	1.9%	2.1%	0.9%
QuadraMed	3.6%	1.2%	1.1%	1.3%	0.8%	1.1%	0.7%
Athenahealth	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.6%
Evident	0.0%	0.0%	0.0%	2.4%	2.8%	0.0%	0.5%
GE	0.8%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%
McKesson	8.4%	8.2%	4.0%	7.8%	5.0%	0.7%	0.0%
NextGen	2.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Siemens	6.7%	5.0%	2.8%	0.0%	0.0%	0.0%	0.0%
HMS	0.5%	1.9%	4.2%	0.0%	0.0%	0.0%	0.0%
Healthland	1.5%	1.5%	2.7%	1.1%	1.2%	0.7%	0.0%

Larger hospitals were more likely to use an EHR produced by either Cerner or Epic. Among small or medium hospitals, a wider range of EHRs were used.

TABLE 12: EHR VENDOR- STRATIFIED BY HOSPITAL SIZE

Small Hospitals

Year	Epic	Cerner	Meditech	Other
2012	8.1%	12.1%	7.4%	72.4%
2014	21.3%	16.6%	8.8%	53.3%
2015	18.5%	18.9%	9.0%	53.6%
2016	18.7%	21.8%	5.8%	53.7%
2017	26.5%	24.1%	10.8%	38.6%

Year	Epic	Cerner	Meditech	Other
2018	9.5%	26.5%	8.9%	55.1%
2019	16.0%	39.6%	7.3%	37.2%

Medium Hospitals

Year	Epic	Cerner	Meditech	Other
2012	8.8%	18.4%	30.0%	42.8%
2014	23.0%	22.8%	20.4%	33.7%
2015	20.4%	32.5%	22.3%	24.8%
2016	24.8%	25.3%	22.8%	27.1%
2017	24.2%	29.1%	24.4%	22.2%
2018	23.6%	25.2%	25.4%	25.8%
2019	28.9%	28.5%	24.1%	18.5%

Large Hospitals

Year	Epic	Cerner	Meditech	Other
2012	30.4%	6.1%	0.0%	63.5%
2014	42.7%	6.5%	4.0%	46.8%
2015	59.2%	22.6%	3.7%	14.4%
2016	53.1%	24.1%	4.0%	18.8%
2017	64.6%	25.7%	2.7%	7.0%
2018	54.1%	30.0%	3.8%	12.1%
2019	46.5%	35.5%	4.6%	13.4%

EHR vendors were found to vary according to location. Among rural hospitals, Cerner was by far the most commonly used EHR by 2019 (47 percent), while for urban hospitals the use of Cerner and Epic was close in 2019 (Table 13).

TABLE 13: EHR VENDOR- STRATIFIED BY HOSPITAL LOCATION

Rural	Epic	Cerner	Meditech	Other
2012	0.0%	18.7%	6.5%	74.8%
2014	10.9%	27.2%	5.4%	56.4%
2015	10.2%	37.7%	12.2%	40.0%
2016	15.4%	32.8%	10.3%	41.5%
2017	17.3%	31.1%	19.6%	32.0%
2018	8.1%	30.8%	20.4%	40.7%
2019	8.9%	47.0%	0.0%	44.1%

Urban	Epic	Cerner	Meditech	Other
2012	11.9%	14.7%	20.6%	52.9%
2014	25.8%	18.4%	15.9%	39.8%
2015	24.6%	26.3%	16.5%	32.6%

Urban	Epic	Cerner	Meditech	Other
2016	26.0%	23.3%	15.5%	35.3%
2017	31.1%	26.9%	17.7%	24.3%
2018	24.5%	25.8%	18.2%	31.5%
2019	28.4%	31.4%	18.3%	21.8%

Teaching hospitals were found to have started out the program with a high rate (22.3 percent) use of Epic that almost doubled to 41.7 percent by 2019. Non-Teaching hospitals, in contrast, experienced a significant increase in the use of Cerner (13.8 percent to 36.4 percent).

TABLE 14: EHR VENDOR- STRATIFIED BY HOSPITAL TEACHING STATUS

Non-Teaching	Epic	Cerner	Meditech	Other
2012	8.1%	13.8%	22.0%	56.1%
2014	19.3%	16.2%	19.0%	45.4%
2015	16.1%	22.6%	20.1%	41.2%
2016	17.3%	22.4%	18.0%	42.2%
2017	21.1%	25.5%	20.7%	32.8%
2018	11.5%	23.8%	21.4%	43.3%
2019	14.3%	36.4%	21.7%	27.7%

Teaching	Epic	Cerner	Meditech	Other
2012	22.3%	20.1%	8.4%	49.2%
2014	34.0%	24.4%	8.0%	33.6%
2015	38.8%	36.5%	8.0%	16.7%
2016	41.9%	27.3%	8.8%	22.0%
2017	41.9%	29.6%	14.0%	14.5%
2018	38.2%	29.0%	14.6%	18.2%
2019	41.7%	28.0%	11.8%	18.4%

1.2.3 EHR ADOPTION AND USE BY HOSPITALS IN CALIFORNIA

Detailed data on the adoption of EHRs by hospitals is available from the Annual Survey and IT Supplement conducted by the American Hospital Association (AHA). Researchers at UCSF were able to use California-specific data from these sources to track progress in EHR use over the course of the Medi-Cal PIP. Program data for 2012, and 2014 through 2019 were included in the analysis. The AHA Annual Survey and the IT Supplement data both rely upon self-reported responses which have been found to be reliable when compared to other data sources.

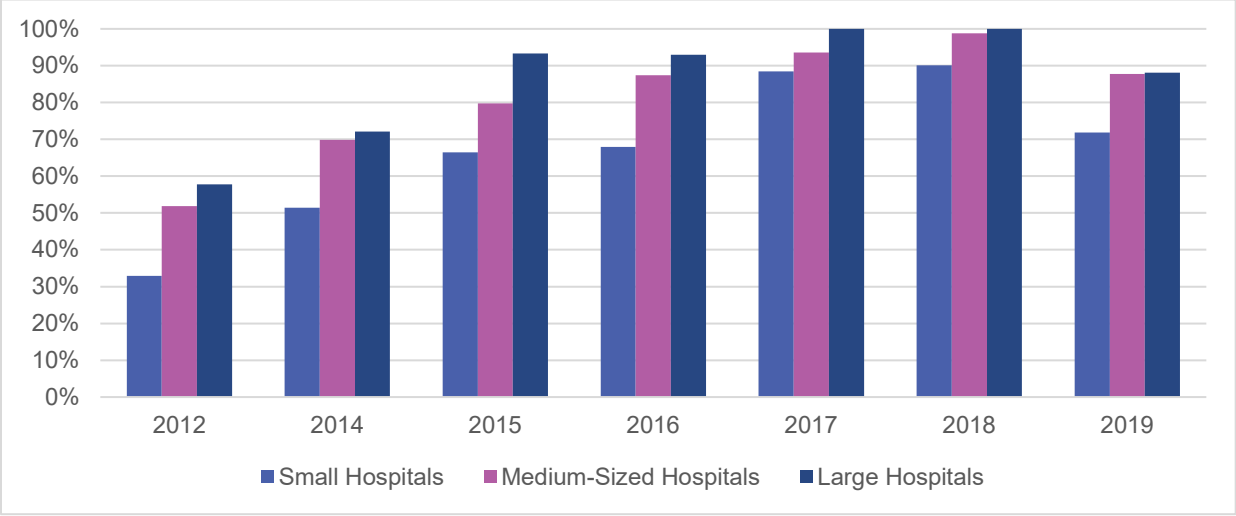
EHR adoption among hospitals markedly increased among California hospitals throughout the Medi-Cal PIP, from less than half of hospitals in 2012 to nearly all hospitals by 2019. The AHA Survey found that by 2018 nearly all hospitals in California were using an EHR that offered more comprehensive services. While 2019 data reflects a slight decline in EHR adoption, this decline was probably due to response options being changed for the survey in that year.

TABLE 15: EHR ADOPTION IN CALIFORNIA HOSPITALS, 2012-2019

Year	Basic EHR	Comprehensive EHR	Basic + Comprehensive EHR
2012	26.8%	19.4%	46.2%
2014	33.2%	31.2%	64.4%
2015	42.9%	33.8%	76.7%
2016	32.9%	48.2%	81.1%
2017	39.6%	53.4%	93.0%
2018	40.0%	56.6%	96.6%
2019	19.7%	63.5%	83.2%

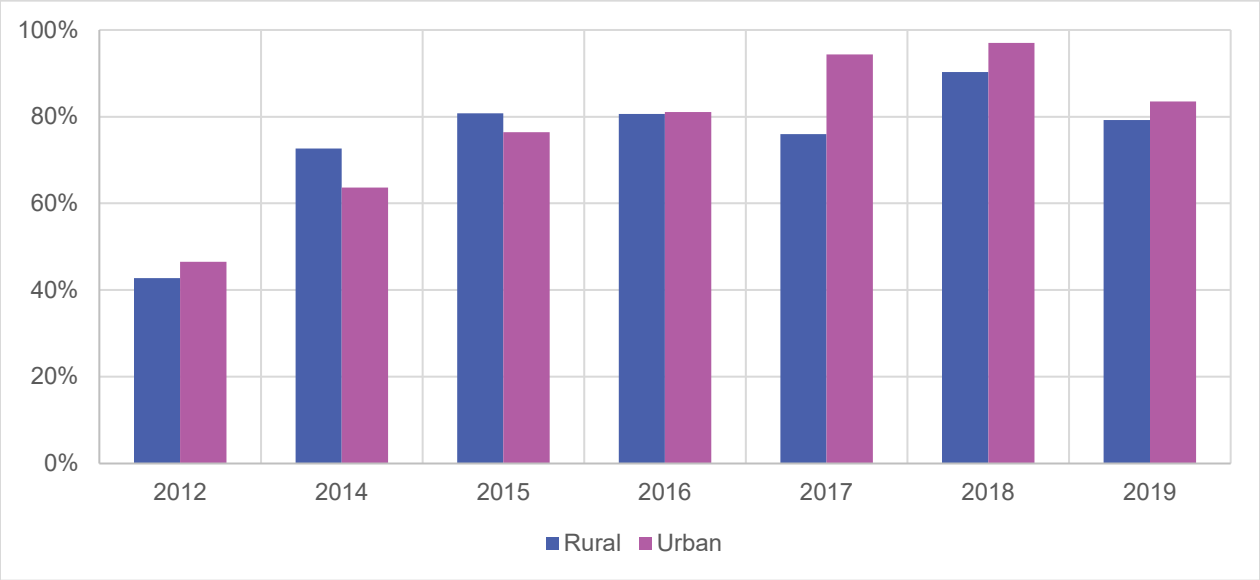
Analysis of the AHA date found that larger hospitals were more likely to have adopted comprehensive EHRs over the course of the Medi-Cal PIP program period (Figure 4).

Figure 4: EHR ADOPTION BY HOSPITAL SIZE (2012-2019)



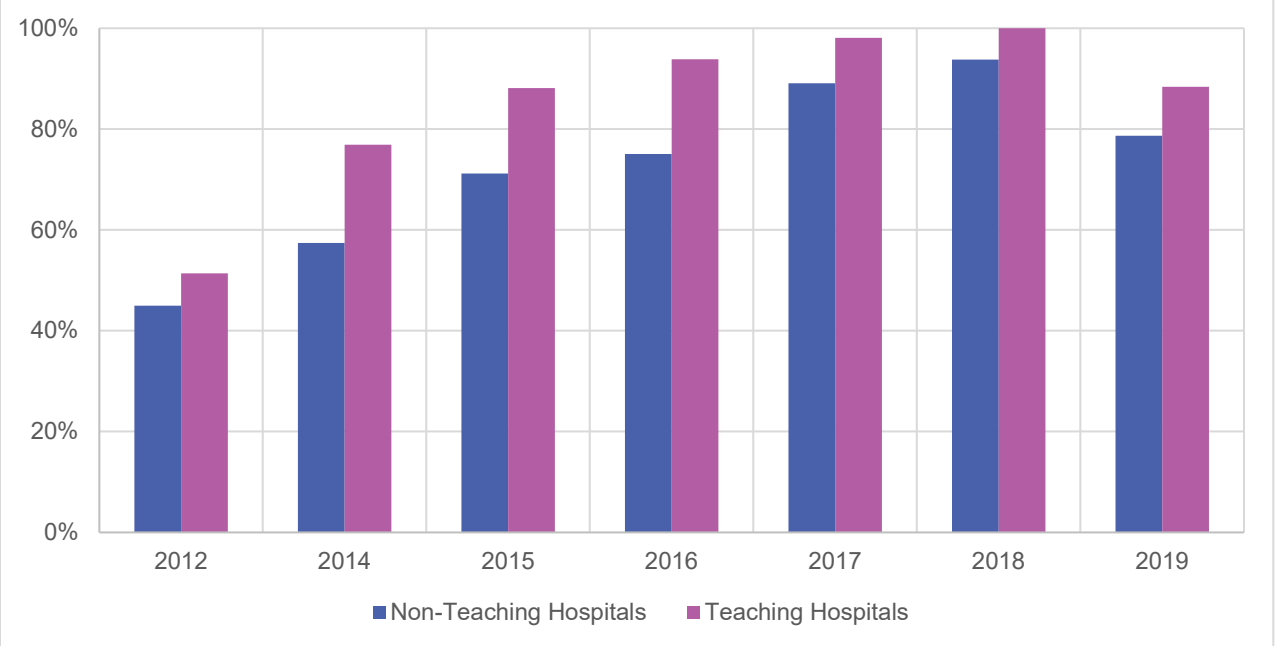
The location of the hospital was also related to EHR adoption. In 2014, 74 percent of rural hospitals had adopted EHRs, compared to 63 percent of urban hospitals. By 2016, this had changed as urban hospitals began adopting EHRs at an increased rate (Figure 5).

Figure 5: EHR ADOPTION BY HOSPITAL LOCATION (2012-2019)



Throughout the Medi-Cal PIP program period teaching hospitals exceeded non-teaching hospitals in the use of EHRs (Figure 6). This may relate to teaching hospitals being larger in size and having more resources.

Figure 6: EHR ADOPTION BY HOSPITAL TEACHING STATUS (2012-2019)



1.2.4 HOSPITAL INTEROPERABILITY

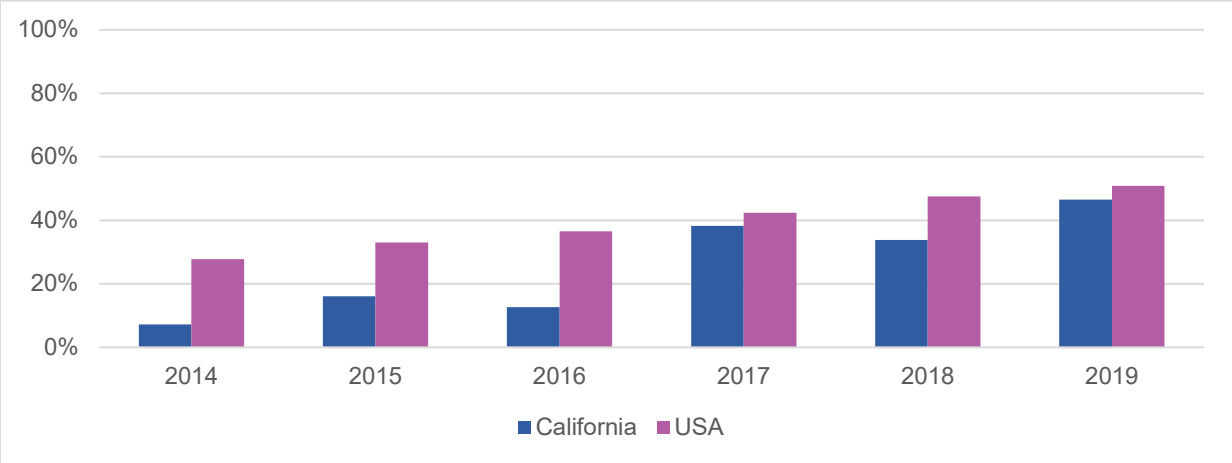
California hospitals have increased their interoperability engagement significantly as measured against the four domains defined by Jha[5] (finding/querying for data, sending data electronically, receiving data electronically, and integrating data into the EHR without manual intervention). In 2012, less than 10 percent of California hospitals reported performing all four domains, while in 2019, almost half reported performing all four domains. Sending data was the most reported capability, while integrating data was the least reported (Table 16).

TABLE 16: CALIFORNIA HOSPITAL INTEROPERABILITY ENGAGEMENT – FINDING, SENDING, RECEIVING, AND INTEGRATING DATA ELECTRONICALLY

Year	Find	Send	Receive	Integrate	All Four Domains
2014	34.1%	65.9%	38.0%	27.3%	7.2%
2015	46.6%	75.0%	49.9%	21.2%	16.1%
2016	49.1%	81.7%	61.5%	21.1%	12.7%
2017	58.7%	80.1%	73.5%	49.6%	38.3%
2018	60.4%	81.3%	73.9%	48.4%	33.9%
2019	76.3%	89.4%	69.6%	61.9%	46.5%

California hospitals have lagged slightly behind US hospitals overall, though they have closed the gap in recent years in achieving interoperability in all four domains (Figure 7).

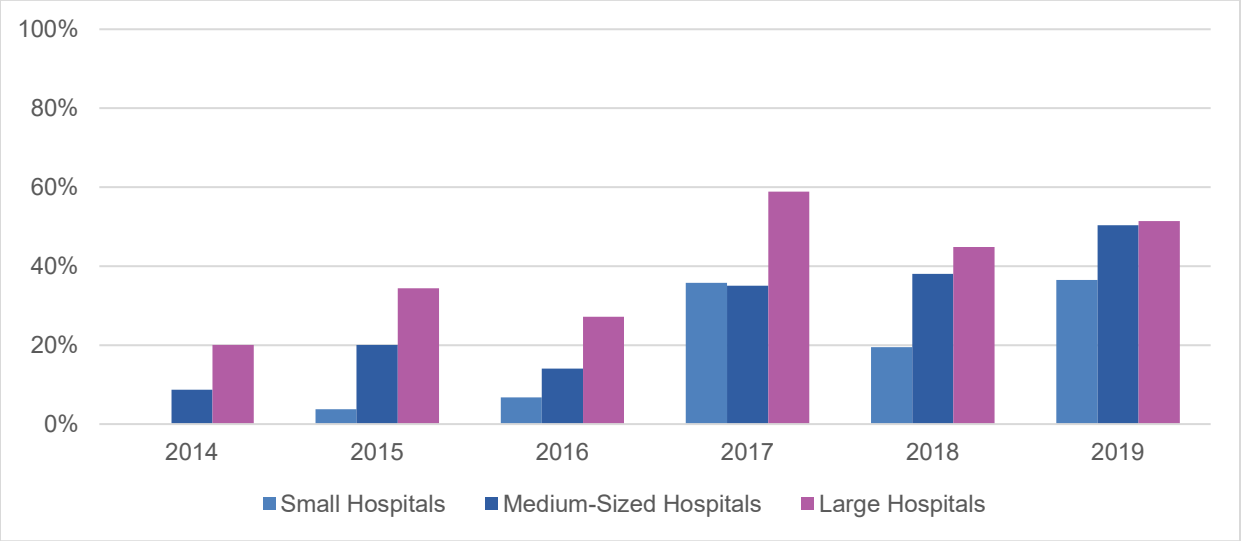
Figure 7: CALIFORNIA HOSPITAL INTEROPERABILITY (4 DOMAINS) NATIONAL COMPARISON, 2014 – 2019



[5] Jha, Ashish K., et al. "Use of electronic health records in US hospitals." *New England Journal of Medicine* 360.16 (2009): 1628-1638.

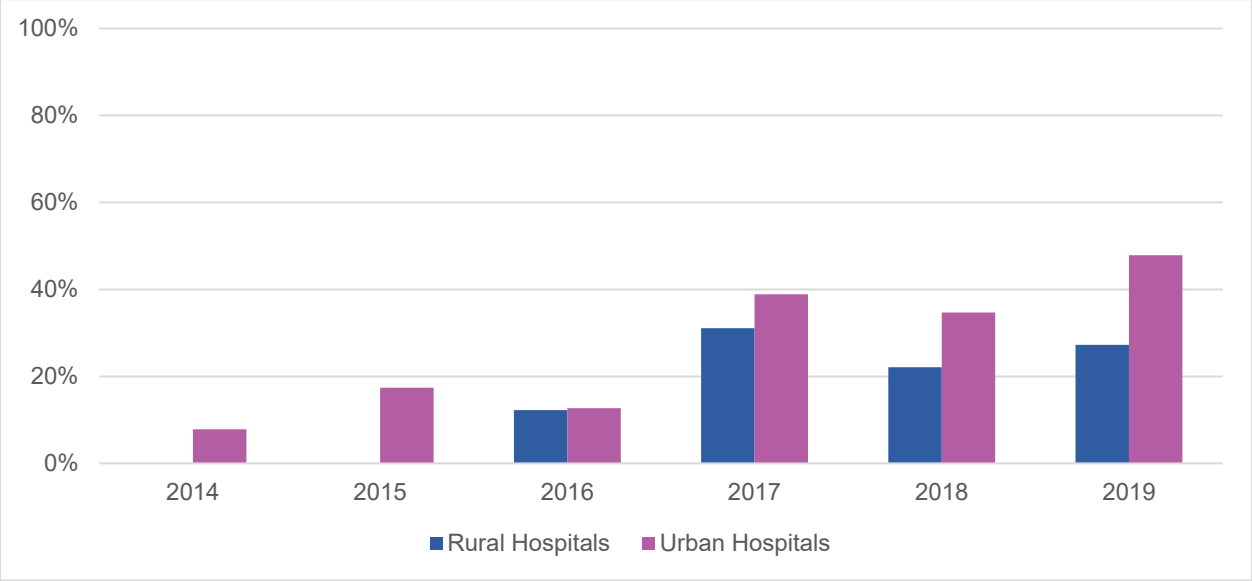
Large or medium hospitals are more likely to engage in all four domains of interoperability than small hospitals (Figure 8).

Figure 8: CALIFORNIA HOSPITAL INTEROPERABILITY (4 DOMAINS) BY HOSPITAL SIZE, 2014 - 2019



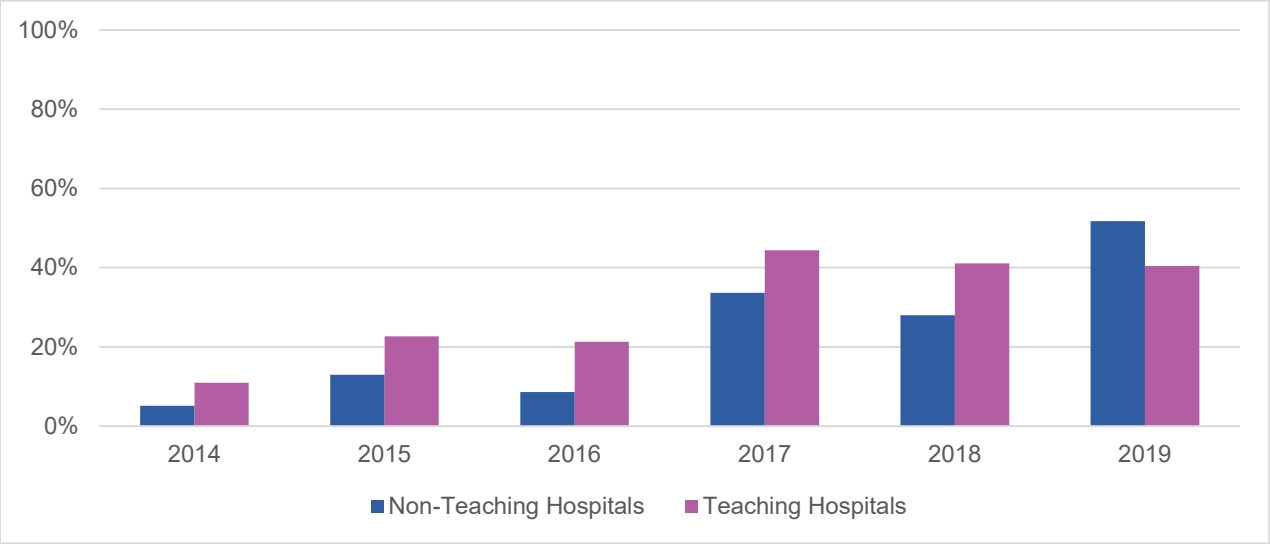
Since 2016 rural hospitals have lagged behind urban hospitals in interoperability in all four domains (Figure 9).

Figure 9: CALIFORNIA HOSPTIAL INTEROPERABILITY BY LOCATION 2014 – 2019



Traditionally, teaching hospitals have lagged behind non-teaching hospitals in interoperability for all four domains, but this switched in 2019 (Figure 10).

Figure 10: INTEROPERABILITY – BY HOSPITAL TEACHING STATUS, 2014 - 2019



1.3 EHR ADOPTION AND USE BY COMMUNITY CLINICS

Community clinics and health centers are non-profit, tax-exempt clinics that are licensed as community or free clinics under Section 1204 of the California Health & Safety Code. Patients receive services on a sliding scale or at no charge. Many clinics meet federal requirements to be considered FQHCs or FQHC look-alikes. Community clinics provide a wide variety of services to low-income and medically underserved people regardless of their ability to pay.

1.3.1 MEDI-CAL PROMOTING INTEROPERABILITY PROGRAM PARTICIPATION BY COMMUNITY CLINICS

Information collected in the Medi-Cal PIP State Level Registry does not enable DHCS to precisely define how many community clinics have participated in the Medi-Cal PIP. Every year, DHCS reviewed data from the Office of Statewide Planning & Development, now known as the Department of Health Care Access and Information (HCAI), to prequalify clinics based on Medi-Cal and other needy individual encounter volumes. This pre-qualification status allowed clinics to submit their registration for the Medi-Cal PIP without having to calculate and provide encounter data for their providers. For Program Year 2020, there were 932 prequalified clinics.

1.3.2 EHR ADOPTION AND USE IN CALIFORNIA BY COMMUNITY CLINICS

The 2011 and 2013 UCSF Physician Surveys found that physicians practicing in community clinics reported the greatest increase in EHR use after the Medi-Cal PIP began, from 50 percent in 2011 to 81 percent in 2013. This may have been because of technical assistance provided by CalHIPSO, a regional extension center associated with the California Primary Care Association (CPCA). Community clinics continued to

experience advances in EHR use throughout the Medi-Cal PIP. Analysis of 2020 ABFM data by UCSF researchers found 99.2 percent of family physicians practicing in FQHCs and FQHC look-alikes reported using EHRs. For those practicing in rural and Indian health clinics, 100 percent reported using EHRs.

Analysis of Medi-Cal PIP data revealed that professionals practicing in community clinics tended to use a different set of EHR vendors than professionals in other settings. Professionals in FQHCs used NextGen and eClinical Works most of the time (34 per cent and 21%, respectively). Epic and Cerner were little used in these settings (19% and 0%, respectively). This was in contrast to the dominate use of Epic and Cerner by professionals in other settings. The reason for this may be the higher costs of Epic and Cerner and the limited financial resources of community clinics.

An informal survey of community health centers conducted by CPCA in 2020 (DeeAnne McCallin, personal communication) revealed the largest HIT challenges for community clinics to be related to interoperability. Depending on the EHR vendor there is still a lack of information being available in a usable format to care teams. Even though there are requirements to use Fast Healthcare Interoperability Resources (FHIR) for certification, EHR vendors are still not integrating their systems well with external tools that FQHCs need or want. Obtaining useable immunization data from the state immunization registry, CAIR2, is still problematic although reporting data to CAIR2 is going smoothly. Connectivity for patient engagement and telehealth is a problem with many patients in need of equipment and technical support. It has also been difficult for community clinics to launch remote patient monitoring (RPM), although some pilots have been conducted.

1.4 EHR ADOPTION AND USE BY INDIAN HEALTH CLINICS

The California Native American population is diverse and programs must consider the multiple needs of the individual, family, and community. California is home to approximately 109 federally recognized American Indian Tribes. According to the 2020 census, California has the largest population of individuals self-identified as American Indian/Alaskan Native (AI/AN), with approximately 1,409,609[6] identifying as AI/AN alone or in combination with another race (representing 14 percent of the national AI/AN population). There are 44 California Tribal health programs (THPs) operating 105 primary care clinics and 14 Urban Indian Health Programs (UIHPs). THPs provide a range of services and are located on or near reservations, in rural and isolated communities. The 14 UIHPs are located in major urban areas. Indian health programs provide a comprehensive array of services, including primary care, dental, substance abuse counseling, and other behavioral health services. All of California's Indian health programs

[6] https://www.census.gov/library/stories/state-by-state/california-population-change-between-census-decade.html

have implemented certified EHRs such as AthenaHealth, NextGen, eClinicalWorks, and the Indian Health Services' (IHS) Resource and Patient Management System (RPMS). In addition, many also have electronic dental records (EDR) such as Dentrix and QSI Dental.

THPs in California receive partial funding from the IHS to provide care to AI/AN in their designated Contract Health Services Delivery Areas (CHSDA). In addition, these clinics also secure funding from grants, contracts, and third party reimbursement from Medicare, Medi-Cal managed care, and private insurance. THPs funded under the authority of Public Law (PL) 93-638, 25 USC 450 et seq. can participate in the Medi-Cal program as an Indian Health Service Memorandum of Agreement (IHS/MOA) or Tribal Federally Qualified Health Center (Tribal FQHC) provider type. UIHPs funded under Title V of the Indian Health Care Improvement Act, PL 94-437 can participate in Medi-Cal as a Federally Qualified Health Center (FQHC) or community clinic provider types. Most THPs and UIHPs receive a per-visit reimbursement rate from Medi-Cal, although there is some variation depending on which federal and state statutory requirements they meet, such as an IHS/MOA, Tribal FQHC, FQHC, Rural Health Clinic (RHC), or Community Health Center.

In 1998, DHCS implemented an MOA between the federal IHS and the Health Care Financing Administration (HCFA). HCFA was later renamed the Centers for Medicare & Medicaid Services (CMS). The MOA established the THP provider type and reimbursement rate for services provided to Medi-Cal recipients at Tribal health clinics funded under PL 93-638. Clinics subsequently had the option to change their provider type and most of the Tribal health clinics changed their provider status from FQHC to THP at that time to take advantage of the new reimbursement system although they did not change operations. In 2021, DHCS implemented the Tribal FQHC provider type in Medi-Cal. As of December 2021, there are 14 FQHCs, 61 IHS/MOAs, and 44 Tribal FQHCs enrolled in the Medi-Cal program serving the AI/AN population.

Services provided by THP clinics meet the description of services provided to needy patients established in 42 Code of Federal Regulations (CFR) 495.306 and the THP clinics requested consideration as FQHCs for the purposes of the Medi-Cal PIP. In compliance with CMS' published Frequently Asked Questions (FAQ) on this issue, DHCS treats the THP clinics as equivalent to FQHCs.

In October 2010, the Indian Health Services and the VA signed a MOU intended to strengthen further collaborative efforts to improve the health status of AI/AN Veterans. The language of the MOU recognized the importance of a coordinated and cohesive effort on a national level, but also acknowledged the need for flexibility at the community level. There is a strong need for THPs and UIHPs to interface with the RPMS EHR, the systems used by IHS to manage clinical, business practice, and administrative information. It is critical

that Indian health programs be included in the regional HIE landscape in rural and urban communities given that their patients receive care from a variety of hospitals and specialty care providers in a geographic region. Since there are not any Indian Health Service hospitals in California, THPs/UIHPs rely on local hospitals and specialty providers.

Substance Use Disorders (SUDs) are a significant problem for many AI/AN communities, and many of these communities are impacted by SUD-related issues. Efforts to better understand and meet the needs of this population are a high priority at both the national and state level.[7] On August 13, 2015, CMS approved the Drug Medi-Cal Organized Delivery System amendment (DMC-ODS), which CMS renewed on December 29, 2021 as part of CalAIM. The DMC-ODS provides counties and Tribal communities the option to participate and offer SUD services to meet the unique needs of beneficiaries[8]. Indian health care providers are able to participate in the DMC-ODS program today and deliver SUD treatment services to DMC-ODS beneficiaries[9]. Under this opportunity, Indian health care providers would bill the participating DMC-ODS county for the SUD services provided. Tribal communities also have the ability to create a new Tribal or Indian managed care entity that would elect to opt in to the DMC-ODS as an Indian Health Program Organized Delivery System (comparable to a DMC-ODS county). However, the creation of a new Tribal or Indian managed care entity that would elect to opt in to the DMC-ODS as an IHP-ODS (comparable to a DMC-ODS county) would be a significant change for the Tribal community because the Tribal health programs are each independently operated and owned. Currently, there is not a single entity that operates the Tribal communities' health programs or functions as a Tribal or Indian managed care entity, and most Tribal healthcare facilities have not participated in Drug Medi-Cal or the DMC-ODS. The creation of a new Tribal or Indian managed care entity that would elect to opt in to the DMC-ODS as an IHP-ODS (comparable to a DMC-ODS county) would require a higher need for coordination and collaboration and an organizational structure, analogous to the structure that currently exists in the counties. A description of the functional components of the IHP-ODS system needs to be developed and documented in preparation for implementation.

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[7] DHCS. *California Substance Use Disorder Block Grant & Statewide Needs Assessment & Planning Report (2015)*. Accessed August 16, 2019.

[8] DHCS. *Behavioral Health Information Notice 21-075: Drug Medi-Cal Organized Delivery System (DMC-ODS Requirements for the Period of 2022-2026*. Accessed February 4, 2022.

[9] DHCS. *Behavioral Health Information Notice 20-065: Obligations Related to Indian Health Care Providers in Drug Medi-Cal Organized Delivery System (DMC-ODS Counties*. Accessed February 4, 2022.

1.5 EHR ADOPTION AND USE BY VETERANS ADMINISTRATION FACILITIES

The Veterans Administration (VA) operates the nation's largest integrated health care system, supporting more than 1,700 hospitals, clinics, community living centers, domiciliaries, readjustment counseling centers, and other facilities. Although the VA facilities do not participate in the Medicaid or Medicare EHR Incentive Programs, electronic health records have long been of vital importance in efforts to improve health care provided to military veterans. Many VA patients tend to be highly mobile and health records may be located at multiple medical facilities within and outside the United States. The capability of making health records electronic helps ensure that complete health care information is available, no matter its originating source. Initial efforts began with the development of an integrated medical information system called the Veterans Health Information Systems and Technology Architecture (VistA). Modernization of the VistA system occurred in 2001, with the creation of a more veteran-centric environment, which provided the same benefits of the existing system but enhanced functionality.

Future improvements included maintaining interoperability standards in order to share health information among providers. These interoperability standards allowed electronic health records to be created, managed, and consulted by authorized clinicians and staff across more than one health care organization, regardless of the originating source. In April 2009, the VA and the Department of Defense (DOD) began work to build the Virtual Lifetime Electronic Record (VLER) Health Exchange to increase electronic health record interoperability and expand health information sharing capabilities.

The Veteran Health Information Exchange (VHIE)/ VLER Health Exchange allowed VA and non-VA health care providers to share health information electronically and securely through two types of VHIE/VLER Health Program:

- VLER Health Exchange allows VA providers and the community partner providers to query and retrieve certain Veterans' health information electronically using the eHealth Exchange. Participating community care providers can securely view specified Veteran health information through the eHealth Exchange, allowing for improved care coordination.

- VLER Health Direct (VA Direct Messaging) allows VA providers to send specific information about a Veteran's health care to participating community partners using a secure tool that is similar to email.

In addition, VistA provided integrated inpatient and outpatient electronic health records for VA patients, and administrative tools to help the VA deliver medical care to Veterans. The VistA imaging system integrated medical images and scanned documents in the patient's

chart. Various types of images, including those related to specialty care, could be incorporated into the patient's chart. Utilized in all VA medical facilities, VistA has provided a variety of benefits related to standardized terms, direct linkage between images and associated medical reports, as well as improved continuity of care. Telemedicine technologies were also incorporated into VistA technologies.

Developed in 2010, the VA launched Blue Button. Representing a national movement, the Blue Button tool was designed to make patient medical records easily available to veterans. Veterans gained access to claims information as well as personal health information maintained by doctors, hospitals, health plans, and others. Adoption of the Blue Button has spread from the VA to other government agencies and the private sector. Under the Blue Button Pledge, more than 450 organizations have made personal health data available via healthcare providers, health insurance companies, labs, and drug stores.

In June 2017, the VA Secretary announced the decision to adopt a new EHR jointly with the DOD. The decision was made after identifying that the existing VistA system required major modernization in order to remain current with health information technology and cyber security improvements. While the VA reported that interoperability with the DOD had been achieved, the seamless exchange of health information was limited by changing information sharing standards and other constraints. In order to maintain future interoperability, the VA concluded that it would adopt the same EHR system as the DOD rather than maintain a separate system. The VA believes that, through the adoption of the same core EHR system, it will enable both Departments to access patient health information without the reconciliation of data between two different systems through the storage of all patient data in one common system.

In the fall of 2018, the first test sites for the Electronic Health Record Modernization (EHRM) program were scheduled to receive the new EHR.[10] The new software will be deployed over the next 10 years. It will link with the DOD's patient records and link all VA facilities in one system. In December 2018, the VA announced its new Veterans Health Application Programming Interface. The interface will allow veterans to access their personal health data within mobile and web-based apps.

[10] U.S. Department of Veterans Affairs, EHR Modernization. https://www.ehrm.va.gov/about/ioc.

In July 2019, the VA announced the transfer of 23.5 million Veterans' health records to a Cerner Corp. data center.[11] This was the initial data migration phase of the VA's Electronic Health Record Modernization project, which replaces VistA with the Cerner Millennium EHR solution that powers the DOD's Military Health System (MHS GENESIS). The VA has stated that this effort represents progress toward achieving an interoperable EHR system to drive better clinical outcomes. A training program, the VA Innovative Technology Advancement Lab (VITAL), was launched in September 2019 to support efforts to ensure efficient and timely use adoption of the modernized EHR system.

Part of the modernization effort included implementing the capability for bidirectional exchange of health data between the VA and the DoD. In April 2020, a joint VA and DoD effort implemented a HIE that allowed the secure access of EHR data for patients seen by either a participating provider or health system. The joint HIE also includes the potential for interoperability expansion, including connecting to CommonWell. The health records of patients that opted out were not exchanged electronically through the HIE. Additional activities included implementing a new EHR at several VA facilities. The Electronic Health Record Modernization program replaces VistA and links to health records maintained by the DoD.

In March 2021, the VA announced it would conduct a full assessment of the EHR modernization program to ensure its continued success. This strategic review focused on identifying areas for additional productivity and clinical workflow optimization as well as conducting research for improving the patient portal experience. In April 2021, additional funds for continued modernization of the VA's EHR and its information technology were included in the Biden-Harris administration's fiscal year 2022 discretionary spending request[12]. Additional modernization efforts and an updated implementation plan were announced by the VA in December 2021.The revised schedule includes deployment of an EHR system across the VA by early 2024[13].

1.6 EHR ADOPTION AND USE BY PROVIDERS INELIGIBLE FOR THE PROMOTING INTEROPERABILITY PROGRAM

[11] U.S. Department of Veterans Affairs, *VA Achieves Critical Milestone in its Electronic Health Record Modernization Program (July 29, 2019)*. Accessed July 2, 2020.

[12] U.S. Department of Veterans Affairs, *Statement by VA Secretary McDonough on the president's FY 2022 Discretionary Funding Request (April 9, 2021)*. Accessed August 26, 2021.

[13] U.S. Department of Veterans Affairs, *VA Advances Electronic Health Record Modernization Program (December 1, 2021)*. Accessed January 11, 2022.

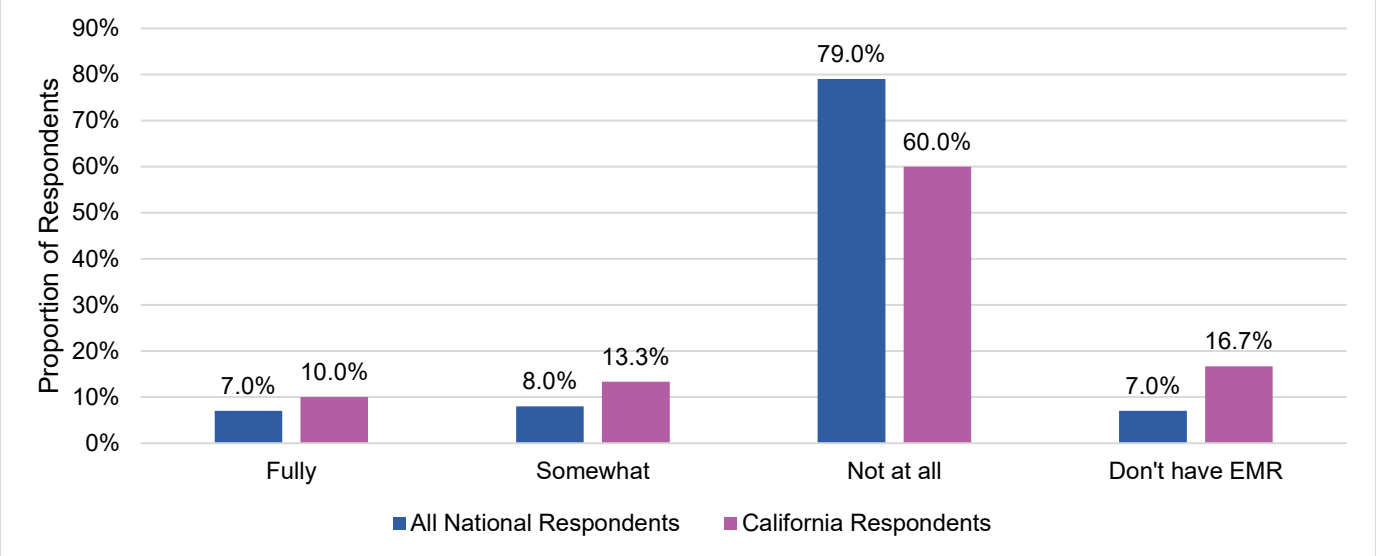
Unfortunately, not all types of professionals and health care facilities were eligible to receive incentive payments under the HITECH Act. This has potentially created a digital divide between these service providers and Medi-Cal PIP-eligible providers that may have negative effects on continuity and coordination of care. Two examples of such ineligible providers are those practicing in long term care facilities and substance use treatment facilities. As part of the final HIT landscape assessment, the UCSF researchers investigated existing data for these two types of providers and interviewed representatives from health care sectors that had been ineligible for the Medi-Cal PIP.

1.6.1 SKILLED NURSING FACILITIES

UCSF researchers previously, in 2019, had conducted a national survey of 500 randomly selected skilled nursing facilities (SNFs) and two of their high volume referral hospitals. This yielded 261 SNF responses and 504 responses from hospital-SNF pairs, for a response rate of 52 percent. California respondents were similar to national respondents in terms of size and organizational characteristics.

Most SNFs nationally and in California reported that their EHRs were not interoperable with the referring hospital's EHR (Figure 11).

Figure 11: SNF-REPORTED DEGREE TO WHICH THE HOSPITAL EHR IS INTEROPERABLE WITH SNF EHR (CALIFORNIA VS. NATIONAL)



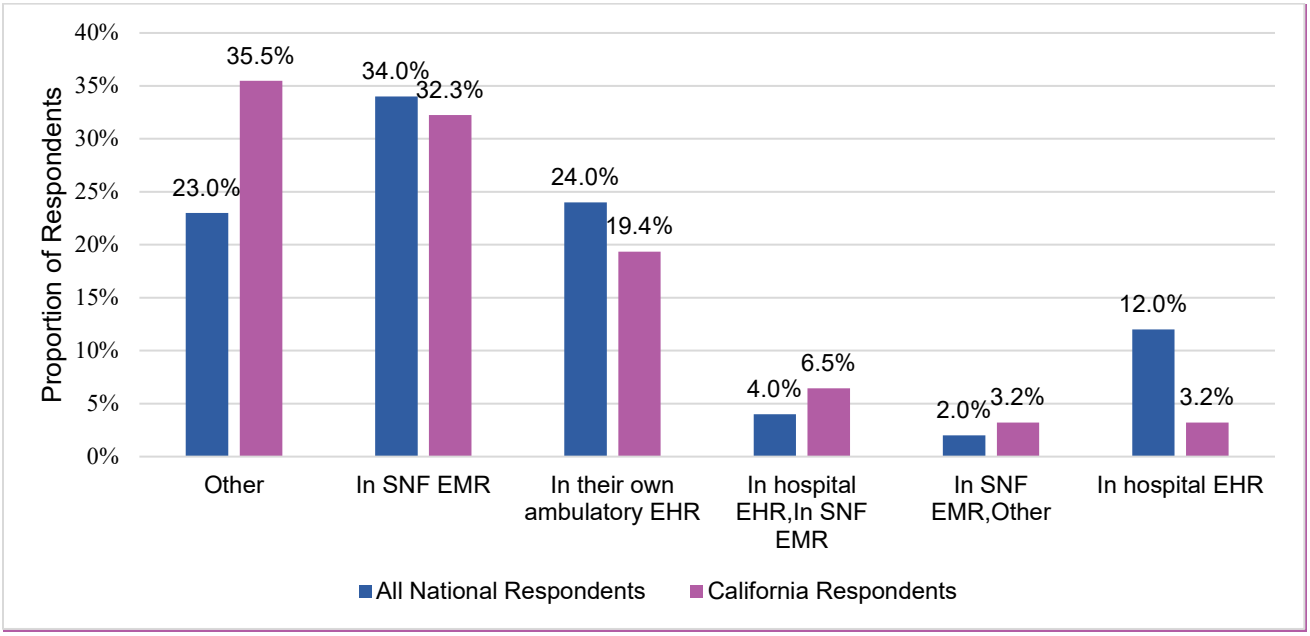
As a result of lack of interoperability, most SNFs received referral information from hospitals through non-electronic means, including physical transmission of printed documents (Table 17).

TABLE 17: SNF-REPORTED FACILITY-LEVEL APPROACH TO RECEIVE INFORMATION AT HOSPITAL DISCHARGE (CALIFORNIA)

Category	Always/Often	Sometimes	Rarely/Never
SNF staff onsite at hospital	19.4%	29.0%	51.6%
Phone conversation with staff	71.0%	19.4%	9.7%
Secure texting with hospital staff	12.9%	12.9%	74.2%
Fax/eFax to inbox or portal	64.5%	19.4%	16.1%
Shared online referral platform	48.4%	19.4%	32.3%
Shared EMR	22.6%	0.0%	77.4%
Online portal to view discharge document	38.7%	9.7%	51.6%
Online portal to view inpatient record	29.0%	16.1%	54.8%
Carried by patient/caregiver/EMS	64.5%	19.4%	16.1%

Within SNFs the location of physician documentation can vary greatly and does not always reside in the facility's EHR (Figure 12).

Figure 12: SNF-REPORTED LOCATION OF PHYSICIAN DOCUMENTATION (CALIFORNIA VS. NATIONAL)



Less than 50 percent of California SNFs report fully using electronic tools for important functions, except for medication orders (Table 18).

TABLE 18: SNF-REPORTED USE OF COMPUTERIZED FUNCTIONS (CALIFORNIA)

Category	Fully Electronic	Part electronic-part paper	All paper
Document clinical notes from faculty and staff	38.9%	38.9%	16.7%
View lab results	27.8%	22.2%	44.4%
View image reports	22.2%	33.3%	38.9%
Enter medication orders	55.6%	22.2%	16.7%
Bar-coded medication	27.8%	22.2%	27.8%
Clinical decision support for medication	33.3%	33.3%	27.8%

1.6.2 SUBSTANCE USE DISORDER TREATMENT FACILITIES

For substance use disorder treatment facilities the UCSF researchers analyzed California-specific data from the National Survey of Substance Abuse Treatment Services conducted in 2017. This revealed that these facilities rarely carried out important information functions using electronic methods only. Most functions relied on a mixture of electronic and paper-based methods (Table 19).

TABLE 19: SUBSTANCE USE DISORDER TREATMENT FACILITIES' FUNCTIONS BY METHOD (CALIFORNIA 2017)

Function	Both	Electronic Only	Paper Only	Missing
Intake	64.3%	19.7%	15.5%	0.5%
Scheduling Appointments	45.7%	29.0%	22.3%	3.1%
Assessment	53.1%	28.6%	17.5%	0.8%
Treatment Plan	47.0%	35.8%	16.3%	0.9%
Progress Monitoring	47.6%	35.3%	16.5%	0.6%
Discharge	53.9%	29.4%	15.8%	0.9%
Referrals	57.0%	15.3%	25.8%	1.9%
Issue/Receive Lab Results	47.1%	22.0%	17.5%	13.4%
Billing	48.4%	34.7%	8.4%	8.5%
Outcomes Management	49.9%	25.2%	12.7%	12.2%
Prescribing/Dispensing	28.8%	12.1%	13.4%	45.8%
Store/Maintain Health Records	50.2%	17.8%	14.5%	17.5%
Send Client Health Information	44.5%	8.1%	24.3%	23.0%
Receive Health Information	51.9%	6.7%	21.5%	19.8%

1.6.3 INTERVIEWS WITH MEDI-CAL PIP INELIGIBLE PROVIDERS

In interviews with six associations representing ineligible providers in behavioral health, long term care, home health, substance use disorder treatment, and social services, the UCSF researchers learned that:

- Most did not perceive that the Medi-Cal PIP associated increase in EP and EH adoption of EHRs had an impact on their work or members.
- Electronic documentation is a major pain point among ineligible providers – specifically that documentation is fragmented, inefficient, duplicative, and burdensome.
- In general, interoperability was described as a significant problem. Most indicated that the inability of systems to communicate with each other caused challenges in sharing and receiving needed information.
- There is a strong desire for policy action at the state and/or federal level to address ongoing challenges with health IT. Prioritized actions should include providing funding for adoption of EHR systems, revising outdated policies (particularly around documentation requirements), continuing pandemic-related telehealth policies, providing more technical assistance, expanding broadband, developing new reimbursement models for SNFs and Home Health, and moving towards statewide data sharing capabilities.

1.7 CALIFORNIA TECHNICAL ASSISTANCE PROGRAM

There are many Medi-Cal EPs in California that did not receive services under the REC program funded by the ONC. RECs were limited to providing technical assistance services to primary care providers working in practices of ten providers or less, community health centers, RHCs, and out-patient clinics at public hospitals. In addition, the RECs only received funding from the ONC to support providers through preparation for the first stage of MU, even though all providers will require significant assistance to reach Stage 2 and Stage 3 MU.

Solo practitioners and specialists represent a portion of Medi-Cal EPs not served by RECs. Many will require assistance with workflow redesign and meaningful use guidance in order to receive ongoing incentive funding. The 2014 expansion of Medicaid under the ACA increased Medi-Cal enrollment. DHCS estimates that an additional 15,000 Medi-Cal EPs not served by the RECs would need assistance over the course of the ten-year program.

DHCS was granted approval to award a total of $37,500,000 to multiple vendors under a three-year California Technical Assistance Program (CTAP) which began in 2015. Through the program, DHCS was able to support an additional 7,500 additional eligible professionals achieve AIU and MU. Due to the size of the state and the number of Medi-Cal eligible

providers, DHCS allowed multiple awards to vendors for technical assistance within defined geographical regions and/or among particular provider specialty types. In July 2015, four vendors were awarded contracts to service their defined target groups. Of the vendors selected to provide CTAP support, CalOptima, HITEC-LA, and CalHIPSO had previously provided REC services, while Object Health provided these services as a REC subcontractor. In 2018, DHCS received a two-year, no-cost extension from CMS for the CTAP program. This extended the life of the program until June 2020. DHCS had requested an extension of the CTAP contract. This request was based on discussions with CTAP contractors and subcontractors who reported being unable to visit EP offices due to shelter-in-place orders related to COVID-19. CMS approved the CTAP contract until September 30, 2020. Preliminary invoices for the CTAP program were due by November 30, 2020. All final invoices for CTAP were due on December 14, 2020, in order to be approved by December 31, 2020.

CTAP contractors were required to provide the following types of services:

- **Education and Outreach**: Disseminate knowledge about effective strategies and practices to select, implement and meaningfully use certified EHR technology. Assist eligible professionals and groups to meet the requirements to successfully apply to the Medi-Cal PIP.

- **Medi-Cal Promoting Interoperability Program:** Assist providers in understanding and meeting all requirements of the Medi-Cal PIP. Provide guidance and assistance to ensure eligible professionals and groups submit successful applications/attestations to the State.

- **Implementation and Project Monitoring/Management:** Provide coaching to the practice/clinic through all phases of implementation and advocating for the client with EHR vendor(s).

- **Practice and Workflow Redesign:** Assist providers and organizations in adapting and transitioning paper-based processes to technology enabled processes.

- **Functional Interoperability and Health Information Exchange:** Assist eligible professionals in connecting to available health information exchange infrastructure(s), including community health information organizations (HIOs), enterprise HIOs, and point-to-point health information exchange.

- **Meaningful Use Reporting:** Ensure that providers are making progress towards MU and collecting data appropriately so that the MU measures are accurate and reportable.

DHCS reimbursed the technical assistance vendors using a "milestone-based" formula similar to that used by the ONC to support the RECs. The milestones factored in the need for technical assistance throughout all three stages of MU. The number of payments for each milestone were limited to the number of EPs assigned to each CTAP contractor. Payments were issued to contractors for each milestone as listed below:

- $500 per eligible professional who had signed a technical assistance acknowledgement/agreement;
- $500 per eligible professional who had signed or was included in a legally binding contract or agreement for health information exchange (HIE);
- $750 for each eligible professional enrolled who is a specialist or solo practitioner;
- $1,500 for each AIU attestation submitted by an eligible professional;
- $2,250 for each attestation by an eligible professional for first year Stage 1, Stage 2, and Stage 3 MU attestations;
- $1,500 for each subsequent attestation for MU after the first year of any stage.

Table 20 below displays the accomplishments of the CTAP program over its duration (November 2015 to November 2020). CTAP contractors enrolled 7,500 eligible professionals, which constituted 100 percent of the 7,500 enrollment cap. Initial CTAP activities focused primarily on AIU which, beginning 2017, became unavailable. The CTAP program successfully assisted 2,317 specialists. CTAP successfully assisted professionals receive 6,353 MU payments for progression to a new stage of MU. In addition, there were 5,454 payments to professionals for achieving a subsequent year of MU within the same stage.

TABLE 20: NUMBER OF CTAP MILESTONE PAYMENTS

CTAP Milestone Payments	Count of Providers
Enrolled	7,500
Solo	303
Specialist	2,317
Health Information Exchange	2,133
Adopt, Implement, Upgrade	3,385
Meaningful Use, Stage 1	453
Meaningful Use, Stage 2	4,599
Meaningful Use, Stage 3	1,301
Subsequent Meaningful Use, Stage 1	350
Subsequent Meaningful Use, Stage 2	4,558
Subsequent Meaningful Use, Stage 3	546

In August 2018, DHCS surveyed eligible professionals using the services of the four CTAP contractors. Data collected over the course of the survey was used to evaluate the quality and value of the technical assistance provided by each CTAP contractor. The survey found that CTAP contractors offered a variety of services related to but not limited to MU, audit preparation, education and guidance, and HIE. Seventy-five percent of respondents reported being very satisfied or satisfied (51 percent and 24 percent, respectively) with the level of assistance received. Forty-six percent had received services from a CTAP contractor for over two years. Additionally, 50 percent reported that the CTAP contractor was very responsive to inquiries. Overall, 73 percent reported that assistance with MU was the most common service received. Nine percent of respondents reported being very unsatisfied (seven percent) or unsatisfied (two percent). These respondents were contacted for further clarification. After speaking with the respondents, DHCS found that 21 percent of those that initially selected very unsatisfied intended to select being highly satisfied with the assistance received from a CTAP contractor. The other unsatisfied respondents reported issues related to gathering documentation for objectives to concerns regarding the EHR software. At the close of the survey, DHCS provided the overall results and individual reports to each CTAP contractor.

1.8 BROADBAND INTERNET ACCESS

High-speed Internet access, or broadband, has become a fundamental aspect of the infrastructure needed to educate youth, create jobs, promote public safety, improve the standard of living, and deliver essential services like health care. In 2006, Executive Order S-23-06 established the California Broadband Initiative and the associated California Broadband Task Force (CBTF). The CBTF conducted a yearlong study that identified broadband availability and developed recommendations toward improving broadband accessibility. Released in January 2008, the CBTF's report included seven recommendations to further the implementation of statewide broadband access. Of those, five recommendations cited the need to build, improve or leverage existing broadband infrastructure. Health care related recommendations included a collaborative effort between public and private sectors to create a sustainable statewide e-health network.

Established by legislation in 2010 (S.B. 1462),[14] the California Broadband Council (CBC) began work to implement the recommendations outlined in the CBTF report. Federal funds received from the National Broadband Plans supported these efforts, which added to the $420 million received in broadband infrastructure grants from the federal American Recovery and Reinvestment Act of 2009 (ARRA) and the $57 million in California

[14] SB 1462 (Padilla, Chapter 338, Statutes of 2010). Accessed April 19, 2018.

Advanced Services Fund grants. The Council also worked to ensure increased coordination with other state departments and agencies involved in broadband accessibility, adoption, and usage throughout the state. It also recommends policy and legislation to establish effective structures for providing internet access throughout California. The CBC is a 12-member council run by the California Department of Technology's Office of Broadband and Digital Literacy. More recently, the CBC was directed to create a new State Broadband Action Plan by December 31, 2020, though Executive Order N-73-20.[15] The Broadband for All Action Plan[16] re the CBC's understanding that broadband access, adoption, and training are essential components of digital equity. The COVID-19 pandemic has shown that there is more that can be done for communities with limited broadband infrastructure. The order states that the COVID-19 pandemic has shown that broadband access is essential for public safety, public health, and economic resilience. In addition, it orders that California state agencies are directed to pursue a minimum broadband speed goal of 100 megabits per second to benefit all Californians.

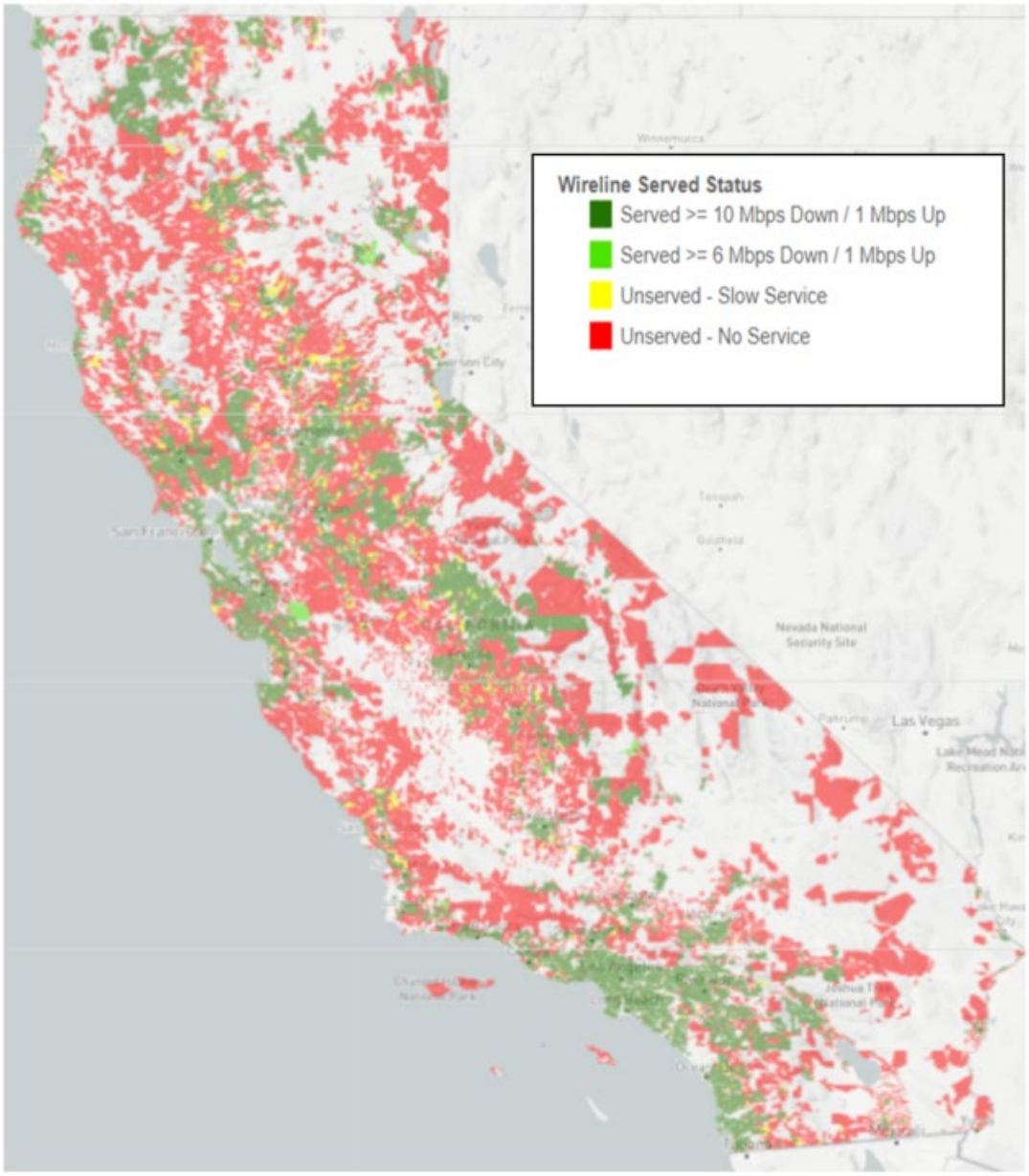
The 2021 Budget Package, as well as legislation such as S.B. 156[17] emphasized the importance of expanded broadband access.

[15] Executive Order N-73-20 (August 14, 2020). Accessed August 18, 2020.

[16] California Broadband Council, Broadband Action Plan 2020: California Broadband for All (December 30, 2020). Accessed September 14, 2021.

[17] SB 156 (Chapter 112

Figure 13: CALIFORNIA BROADBAND AVAILABILITY (2021)[18]



1.8.1 CALIFORNIA TELEHEALTH NETWORK

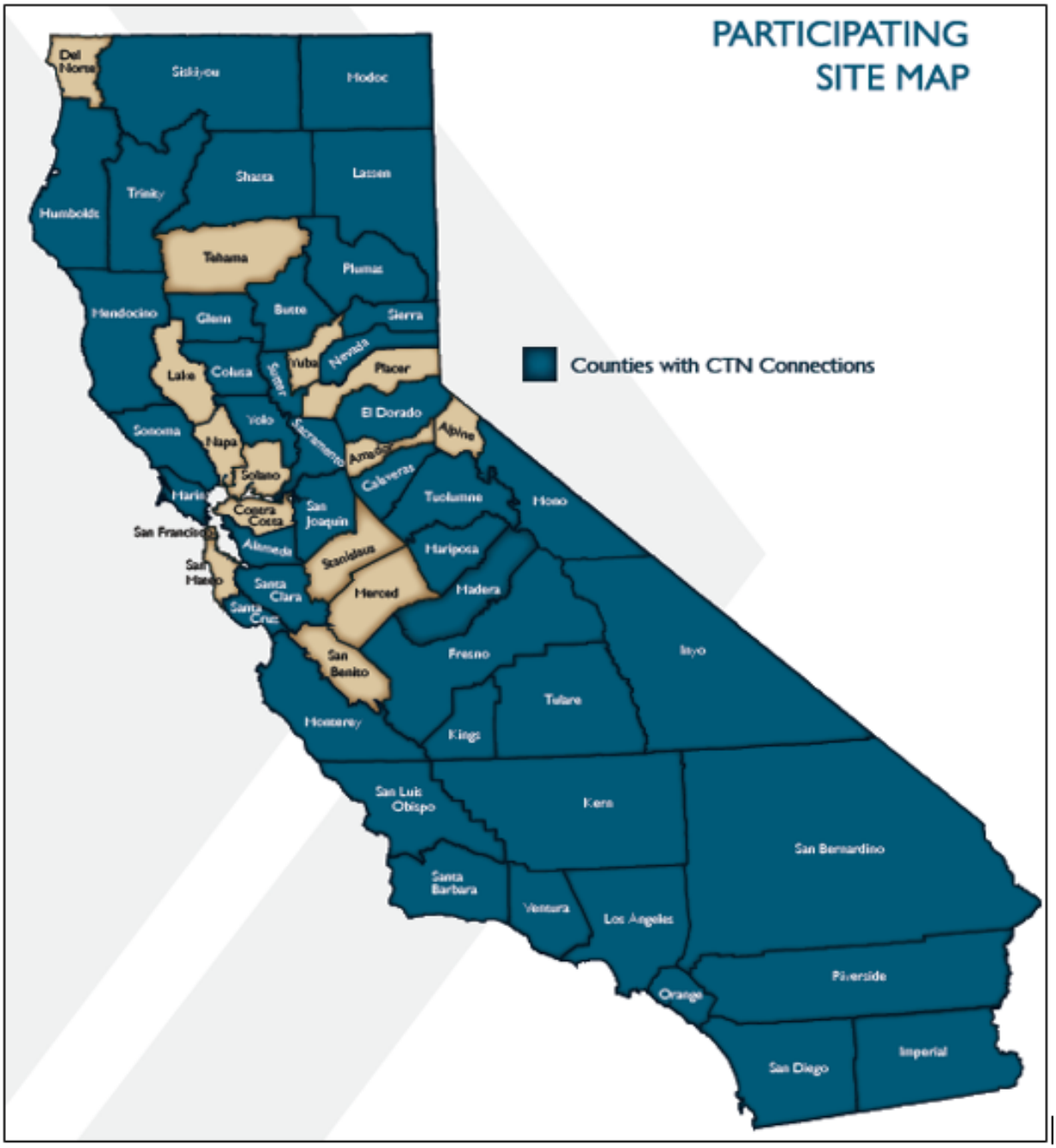
The California Telehealth Network (CTN) serves over 600 safety net clinics and hospitals in rural and medically underserved communities across California. CTN sites receive up to a

[18] California Interactive Broadband Map. Accessed September 14, 2021.

65 percent subsidy on broadband services funded by the Federal Communications Commission (FCC) Healthcare Connect Fund (HCF). The HCF makes it financially feasible to deploy broadband to healthcare providers in rural and medically underserved urban communities to improve health care delivery primarily through the use of virtual, telemedicine patient consultations and other broadband enabled healthcare applications. As demand for access to specialty care physicians in rural areas continues to grow, CTN's site count doubled in 2016 and CTN expects to reach 1,000 sites within the next two years. Participating CTN sites report that they are conducting over 20,000 live telemedicine consultations over the network annually, which is an increase of 65 percent over 2016. The vast majority of the patient served are Medi-Cal beneficiaries. Of the consultations performed via telemedicine, roughly 70 percent are for behavioral health services that are not generally available in rural communities. CTN also operates the California Telehealth Resource Center (CTRC) which is one of 12 regional telehealth resource centers funded by the federal HRSA to foster telehealth adoption, and provide training and implementation support for California health care providers. CTN plans to continue to focus on the expansion of broadband and telehealth availability in rural and underserved communities to improve health care delivery. In May 2017, the CTN became a part of the Oregon Community Health Information Network (OCHIN). OCHIN reported that CTN connects over 800 health care providers[19] in underserved areas to a state and nationwide broadband network.

[19] OCHIN, 2017 Annual Report. Accessed July 29, 2020.

Figure 14: CALIFORNIA COUNTIES WITH A CTN CONNECTION (2021)[20]



In 2007, the FCC Rural Health Care Pilot Program granted CTN a $22.1 million award in funding. Funding from the award was used to increase access to acute, primary and preventive healthcare in rural California. The Broadband Technology Opportunities

[20] California Telehealth Network, California Telehealth Network Participants, Counties with CTN Connections. Accessed September 14, 2021.

Program (BTOP) provided additional funding through a grant administered by the National Telecommunications and Information Administration. CTN and the University of California, Davis Health System were awarded $13.8 million in BTOP funds which supported the adoption of broadband and technology enabled healthcare throughout the State. Funds received from BTOP provided training opportunities made available through partnerships with libraries, community colleges, health organizations and public safety sites. Before ending in 2014, BTOP funding provided telehealth equipment to over 100 safety net health care locations and supplied the initial funding for CTN administrative expenses and staffing. Grant funding received from United Healthcare, the Blue Shield of California Foundation, the Health Resources and Services Administration, California Emerging Technology Fund, Kaiser Permanente, USDA Rural Utility Service, and the California HealthCare Foundation have supported continued operations of CTN. In August 2016, the CTN received a USDA Rural Development Distance Learning and Telemedicine (DLT) grant. The awarded DLT funds have allowed CTN to complete the second phase of infrastructure enhancements to the broadband network and launch web based video conferencing, allowing the CTN network to continue to provide much needed services to Medi-Cal and safety net patient populations. Funding from the grant provided telehealth equipment and software for rural CTN clinics and hospitals.

In November 2018, CTN received federal funds to launch the Opioid and Chronic Pain Telemedicine Project. This project spanned seven rural counties in Northern California. The selected clinics serve highly-vulnerable patient populations which have been impacted by opioid misuse[21]. CTN received $197,000 from the U.S. Department of Agriculture through the Distance Learning and Telemedicine Program. The project will utilize existing connections between clinics, behavioral health providers, and pain management specialists to extend care to patients in rural communities.[22]

In July 2020, the FCC announced CTN was awarded $1 million in funding through the FCC's COVID-19 Telehealth Program to expand telehealth programs in response to the pandemic. The funding enabled CTN to provide access to critical equipment for telehealth and remote monitoring that will enhance care delivery across member clinics.[23]

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[21] USDA, Distance Learning and Telemedicine Grants (October 31, 2018). Accessed July 29, 2020.

[22] OCHIN, *California Telehealth Network Awarded Grant to Fight Rural Opioid Epidemic (November 1, 2018)*. Accessed July 29, 2020.

[23] OCHIN Blog, *OCHIN and California Telehealth Network Awarded $2M to Improve Telehealth Access Nationwide (July 8, 2020)*. Accessed July 23, 2020.

1.8.2 CALIFORNIA PUBLIC UTILITIES COMMISSION

In September 2020, the California Public Utilities Commission (CPUC) announced its rulemaking to determine how to make reliable, affordable broadband internet available for all Californians[24]. On January 2021, the CPUC developed processes for the California Advanced Services Fund to use up to $695 million in FCC funding for the Rural Digital Opportunity Fund (RDOF)[25]. The RDOF will fund broadband deployment in rural communities that do not have broadband access. Eligible broadband providers will also receive incentives for expanding services to specified areas. The CPUC also received approval up to $8.64 million in grant funds to build the broadband internet infrastructure and increase access in Humboldt, Placer, and Sutter counties. Grant funds are expected to provide high-speed internet service to 1,477 unserved households.

1.8.3 DIGITAL 395 MIDDLE MILE PROJECT

In August 2010, the National Telecommunications & Information Administration (NTIA) announced that the California Broadband Cooperative was awarded funding for the Digital 395 Middle Mile project. The project proposed building a new 553-mile fiber network that followed U.S Route 395 between northern and southern California. The Eastern Sierras region between Barstow, California and Carson City, Nevada were dependent upon a decades-old telephone infrastructure and had limited broadband capabilities. These limited capabilities left areas of the California Central Valley and eastern California unserved. The service area for Digital 395 encompassed 35 public safety entities, 47 K-12 schools, 13 libraries, 2 community colleges and 2 universities in addition to 36 municipalities, 6 Indian reservations, 2 military bases, 15 healthcare facilities, and 104 government offices.[26] Efforts related to the project were completed in 2014. Communities along the route were able to access the network in winter of 2013-2014. These communities reported a significant increase in internet connection, an increase in bandwidth, and service stability. Effective July 2014, all schools and Boards of Education connected to Digital 395 upgraded connectivity. All hospitals and clinics in the area are

[24] California Public Utilities Commission. Broadband Infrastructure Deployment Proceeding Rulemaking (R.) 20-09-001. Accessed October 1, 2021.

[25] California Public Utilities Commission. CPUC Acts to Increase Broadband Deployment Through California Advanced Services Fund (January 14, 2021). Accessed October 1, 2021.

[26] California Broadband Cooperative. The Digital 395 Middle Mile Project. Accessed April 25, 2018.

able to access internet speeds between 100 Mbps and 1 Gbps. Seven Indian Reservations along the route are served at speeds of 50 Mbps or higher as well.[27]

1.8.4 DIGITAL 299 BROADBAND PROJECT

In February 2017, Inyo Networks, INC. (Inyo) submitted a grant request for funds from the California Advanced Service Fund (CASF) to provide high-capacity broadband services to communities along the California State Route 299. The proposed project covers rural Northern California between Redding and the California coast, including the areas of Shasta, Trinity, and Humboldt counties. Digital 299 would provide broadband connections for 307 underserved households, with as many as 102 schools, colleges, research institutions, hospitals, clinics, public safety, tribal lands, and other institutions.[28] The project also included service to five community fire stations, including two Cal Fire stations, the Trinity County Sheriff's office, six medical and health institutions, and other areas that are at risk for wildfires and earthquakes. It is anticipated that the project will be mostly completed in three years.

1.8.5 CENTRAL COAST BROADBAND EXPANSION

The Central Coast Broadband Consortium (CCBC) is comprised of local governments and agencies, economic, education and health organizations, community groups, and private businesses. The CCBC is dedicated to improving broadband availability and access in Monterey, Santa Cruz, and San Benito Counties. In 2017, the Sunesys project was completed, which provided coverage from Soledad to Santa Cruz. This enabled the Santa Cruz Fiber project to start and provided gigabit service extending from Santa Cruz to Watsonville. Additional projects have enabled access to those in the Santa Cruz Mountains and other parts of Monterey and San Benito Counties that are difficult to serve[29].

The Central Coast Broadband Consortium has received three grants from the California Advanced Services Fund. These funds support broadband adoption initiatives and

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[27] California Broadband Council. *Success Story: The Digital 395 Middle Mile Project*. Accessed July 23, 2020.

[28] Assembly member Jim Wood. Press Release. *California PUC Approves 299 Broadband Infrastructure Project*. March 27, 2017. Accessed April 25, 2018.

[29] Central Coast Broadband Consortium and Monterey Bay Economic Partnership, *Achieving Ubiquitous Broadband Coverage in the Monterey Bay Region, November 2018*. Accessed July 29, 2020.

infrastructure projects throughout Monterey, Santa Cruz, and San Benito Counties. Current grants support work until 2022.[30]

1.9 TELEHEALTH

Telehealth is a collection of methods used to enhance health care, public health, and health education delivery and support while using telecommunications technologies. Virtual medical, health, and education services can be delivered via a broad variety of technologies. These services may include, but are not limited to, dentistry, counseling, physical and occupational therapy, home health, chronic disease monitoring and management, disaster management, and consumer and professional education.

In California, telehealth represents an additional tool used in a medical practice, not a separate form of medicine. Standards of care remain the same whether the patient is seen in-person, through telehealth or another method of electronically enabled health care. DHCS considers telehealth a cost-effective alternative to health care provided in-person, particularly in underserved areas. Telehealth services can decrease travel time, enable providers to see more patients, and increase the amount and type of specialty services available to patients. These efforts toward improved patient care were reflected in the California Telehealth Advancement Act of 2011 (AB 415),[31] which removed the limitations upon where a telemedicine appointment could occur. Coverage and reimbursement policies detailed in AB 415 also aligned with federal regulations and included all California-licensed health professionals as telehealth providers, including all Medi-Cal managed care plans that contracted with DHCS. DHCS provided additional clarification regarding telehealth, which allows healthcare providers to select the type of telehealth modality used. This change, in additional to more closely aligning DHCS with CMS, also serves to better facilitate specialty consults for those in the Medicaid program. Legislation at the federal level, specifically the 21st Century Cures Act, required reporting on methods that could improve quality of care for those in a Medicaid program and emphasized telehealth as a possible method to deliver safe and effective health care services.
Due to the COVID-19 pandemic, DHCS issued revised[32] and supplemental[33] guidance for telehealth due to the COVID-19 pandemic. As conditions changed, DHCS continued to

[30] Central Coast Broadband Consortium. Accessed July 23, 2020.

[31] AB 415 (Logue, Chapter 547, Statutes of 2011). Accessed April 25, 2018.

[32] DHCS, Telehealth Services Policy, All Plan Letter 19-009 (Revised), October 16, 2019. Accessed July 29, 2020.

[33] DHCS, Emergency Telehealth Guidance – COVID-19 Pandemic (Supplement to All Plan Letter 19-009), March 18, 2020. Accessed July 29, 2020.

update its policies[34] regarding services allowable through telehealth during the state of emergency. Governor Newsom also issued an executive order[35] in March 2020 allowing the use of telehealth to provide behavioral or mental health services in addition to medical, surgical, or other health care services. AB 133 included telehealth-related provisions which stated that DHCS would temporarily continue flexibilities that were in placed as of July 2021. In addition, DHCS will continue those flexibilities through December 31, 2022, subject to approval from CMS.

CALIFORNIA TELEHEALTH RESOURCE CENTER

The CTRC provides additional support of telehealth efforts. Established in 2006, the CTRC is a federally designated Telehealth Resource Center for California whose primary focus is to assist the clinics that serve the state's rural and medically underserved population. Since September 2012, the technical assistance offered by CTRC was provided to 517 organizations throughout the state. Approximately 60 percent of these organizations received continued support from CTRC through multiple technical assistance visits. CTRC encourages the use of telehealth through on-site, customized hands-on training, which was provided to 141 safety net clinics, rural and critical access hospitals in 2017. CTRC also conducted 12 regional telehealth implementation workgroups.

1.9.1 BEHAVIORAL HEALTH TELEHEALTH

Recently, DHCS announced a request for applications (RFA) from behavioral health providers[36] in response to provider requests for additional support to develop, enhance and/or expand the telehealth infrastructure due to the COVID-19 pandemic. DHCS will utilize available federal grant funding provided by the Substance Abuse and Mental Health Services Administration (SAMHSA) to support activities to improve the existing behavioral health telehealth infrastructure. The goal of the project is to address the needs of individuals with substance use disorder and/or mental health disorders, including youth and adults with serious emotional disturbances. Additional funds are derived from the Substance Abuse Prevention and Treatment Block Grant and the Community Mental Health Services Block Grant. DHCS will receive assistance from the Center at Sierra

[34] DHCS, Medi-Cal Payment for Telehealth and Virtual/Telephonic Communications Relative to the 2019-Novel Coronavirus (COVID-19), January 5, 2021. Accessed October 1, 2021.

[35] Executive Order N-43-20, March 30, 2020. Accessed July 29, 2020.

[36] DHCS, Behavioral Health Telehealth Request for Applications Overview. Accessed August 3, 2020.

Health Foundation[37] for administration of funds as well as selection which organizations to develop, enhance and/or expand the telehealth infrastructure. The RFA includes two individual funding opportunities for Substance Use Disorder Telehealth Activities and Mental Health Telehealth Activities. The activities must begin by September 30, 2020, and be completed before June 30, 2021.

Behavioral health needs across the state have intensified due to the COVID-19 pandemic. The pandemic also created new barriers for people with mental illness and substance use disorders as well as increasing the prevalence of these conditions. DHCS implemented the Behavioral Health Response and Rescue Project (BHRRP) to increase access to behavioral health care for all Californians. Funds for BHRRP will be used to support and expand the full continuum of behavioral health care needs, including further expansion of the telehealth infrastructure by March 2023.

1.9.2 TELEDENTISTRY

In an effort to advance the utilization of teledentistry, the University of the Pacific, Arthur A. Dugoni School of Dentistry, developed and directed a six-year pilot project from 2010 to 2016 aimed at improving oral health for groups who do not receive dental care on a regular basis and have high rates of untreated dental disease. This project, called the Virtual Dental Home (VDH), utilized geographically distributed, telehealth-connected teams that provided preventive and early intervention treatment in a community setting. This community-based oral health delivery system reached people where they lived, worked, or received educational or social services and reduced the need for the patient to travel in order to receive dental care. The VDH received financial support from approximately 27 funding agencies and organizations, totaling over $5.5 million. Of the 11 communities and approximately 50 established sites in California, services were provided for 3,442 patients who received 7,967 visits. The system relied upon collaboration between dentists in dental offices and community-based dental hygienists and dental assistants. Through the partnership efforts, those patients in need of more complex treatment received referrals by the VDH to a dentist in the area. Results presented in the Virtual Dental Home Demonstration Report (June 2016)[38] cited that over 90 percent of patients seen were enrolled in the California Medicaid program and received Medi-Cal Dental benefits. The reported results were indicative of children seen over the course of

[37] The Center at Sierra Health Foundation, Behavioral Health Telehealth Funding Opportunity (July 29, 2020). Accessed August 4, 2020.

[38] University of the Pacific, Arthur A. Dugoni School of Dentistry, Report of the Virtual Dental Home Demonstration (June 14, 2016). Accessed April 9, 2018.

the VDH project. The VDH was implemented in ten counties[39] throughout California. California Department of Public Health (CDPH) was awarded HRSA funds to expand the VDH system by bringing on three additional sites for the Oral Health Workforce[40]. Telehealth connected teams were used to reach underserved populations. Establishing a virtual dental home was also a component of the Medi-Cal Dental Division's outreach plan for dental members and providers. The *2020 Medi-Cal Dental Member and Provider Outreach Plan*[41] includes activities that promote use of teledentistry and the VDH model of dental care.

In December 2020, California Northstate University and The Children's Partnership prepared a brief[42] detailing best practices for children's oral health using the VDH model of care. The brief describes efforts undertaken in five counties; Orange, Riverside/San Bernardino, Sacramento, and San Joaquin, that used VDH technology to provide dental care to children at school, early learning sites, and other community sites. DHCS' Dental Transformation Initiative allowed the development of Local Dental Pilot Projects (LDPPs). The LDPPs were part of the effort to increase the use of preventive, risk-based, and continuous dental care among children through a various pilot projects, including VDH and telehealth. VDH services were implemented in approximately 265 schools, early learning sites, medical clinics, and 17 community health centers. The community health centers that participated in the LDPPs were able to provide oral health education and support during the COVID-19 pandemic.

1.9.3 TELEHEALTH IN COMMUNITY HEALTH CENTERS

From 2017 to 2020, the California Health Care Foundation (CHCF) funded the Sustainable Models of Telehealth in the Safety Net (SMTSN) initiative to expand the use of telemedicine in nine participating health centers in California. CHCF provided funding for eight participating FQHCs and one community health center to maintain dedicated telemedicine staff for 24 months. Three Medicaid managed care plans were included so that access to specialty care through telemedicine could be added for their members.

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[39] University of the Pacific, Virtual Dental Home System of Care Project Sites. Accessed July 30, 2020.

[40] CDHP, Office of Oral Health, Oral Health Projects. Accessed August 4, 2020.

[41] DHCS and Delta Dental, 2020 Medi-Cal Dental Member and Provider Outreach Plan. Accessed August 4, 2020.

[42] The Children's Partnership and California Northstate University, The Virtual Dental Home: Building Best Practices into California's Oral Health Care Delivery System for Children (December 2020). Accessed October 12, 2021.

Behavioral health visits (48.3 percent) were the most commonly accessed followed by visits with an ophthalmologist or optometrist (26.3 percent).

The report, *Experiences of Community Health Centers in Expanding Telemedicine*[43], published by the Rand Foundation, identified that HRSA data suggests that utilization of telemedicine services is growing among health centers, with California emerging as a leader in this area. The study noted that utilization of telemedicine services grew significantly from 2017 to 2020. This has been attributed to each health center having a dedicated telemedicine staff.

1.9.4 DHCS TELEHEALTH ADVISORY GROUP

The 2021-22 Budget Act, AB 133 (Committee on Budget), Chapter 143, Statutes of 2021 states that DHCS will seek to temporarily continue telehealth flexibilities that were in place as of July 1, 2021. DHCS intends, with CMS approval, to continue these policies until December 31, 2022. In addition, AB 133 requires DHCS to develop an advisory group to provide recommendations to DHCS specific to establishing and adopting billing and utilization management protocols using telehealth as a tool to increase access to care and reduce disparities in the Medi-Cal program. Advisory group members included consultants, subject matter experts, and other affected stakeholders able to provide recommendations to DHCS regarding management protocols for telehealth modalities. The Telehealth Advisory Workgroup met from September to October 2021. In December 2021, the Telehealth Advisory Workgroup released the DHCS Medi-Cal Telehealth Advisory Workgroup Report[44]. This report found that, in response to the COVID-19 pandemic, there was a rapid increase in telehealth utilization. DHCS examined Medi-Cal claims data and found that, in February 2020, telehealth represented only 549 claims per 100,000 Medi-Cal enrollees. By April 2020, telehealth claims increased to over 12,000 claims per 100,000 enrollees. This remained the same through March 2021. While the data showed an increase in utilization, it only included outpatient medical and non-specialty mental health claims nor did it did not differentiate between audio-only and video telehealth claims.

DHCS is in the process of developing future telehealth policy based on the findings of the Telehealth Advisory Group. Providers, Medi-Cal managed care plans, and professional associations have reported that telehealth has contributed to significant declines in no

[43] The Rand Corporation, *Experiences of Community Health Centers in Expanding Telemedicine (July 29, 2020)*. Accessed August 18, 2020.

[44] DHCS, DHCS Medi-Cal Telehealth Advisory Workgroup Report (December 2021). Accessed January 1, 2022.

show rates. DHCS also found that telehealth was useful in addressing provider workforce shortages as well as geographic disparities in access to care.

1.9.5 TELEHEALTH AND BROADBAND COVERAGE

Telehealth held an increasingly important role during the COVID-19 public health emergency. Over the duration of the public health emergency, telehealth services were more extensively utilized in the prevention, diagnosis, and management of almost all non-emergency conditions. Studies, such as those reported by the American Journal of Managed Care, found that the weekly use of telehealth services rapidly increased across the nation despite pandemic specific travel restrictions. The integration of telehealth delivery with EHRs increased efficiencies and created bidirectional communication systems that assisted in continued healthcare delivery despite all the disruption.

The use of cellphones and other portable electronic devices by patients has made healthcare more accessible. This widespread use of portable electronic devices made it possible for patients to easily access healthcare through telehealth. During the pandemic, this became vital as it enabled patients to be virtually treated by their providers and ensured continuity of care.

Despite this, there are still barriers preventing the adoption and use of telehealth by those living in rural and/or underserved areas. The FCC estimates that approximately 14 million Americans are without broadband access. This estimate includes 17 percent of Americans living in rural areas and 21 percent in tribal areas. In order to address this disparity, the FCC has created Connect2HealthFCC, an independent task force, which is assessing the role of broadband and related technologies in advancing healthcare in the United States.

In addition to expanded flexibilities for telehealth services, the California Department of Technology's Office of Broadband and Digital Literacy established the California Broadband Council. The California Broadband Council oversaw efforts to expand and promote affordable and equitable broadband coverage in the state. Due to these efforts, 94 percent of Californians have access to wired broadband. For most counties in the state, the increased utilization of telehealth was supported by the existing broadband infrastructure.

Telehealth utilization by Medi-Cal beneficiaries increased across many California counties during the COVID pandemic. Some of these counties had a wider range of broadband coverage, which created the opportunity to analyze if the degree of broadband coverage affected the use of and expansion of telehealth services. In 2019, there were approximately 475,000 telehealth visits conducted for Medi-Cal beneficiaries. In contrast, close to 14.4 million visits were conducted in 2020 and 12.3 million visits were conducted by September 2021. Further review found that when the rates of telehealth utilization significantly increased, the increase correlated to the degree of broadband coverage (Appendix 8). These findings assume that all Medi-Cal beneficiaries have access to broadband and do not account for unequal broadband network deployment or speeds in

the same county. Nor does it account for disparities in demographics, income, education level, rural vs. urban locations, or access to a healthcare system that has telehealth facilities. However, it is clear that broadband coverage contributes to the expansion of telehealth services with higher expansion found in areas with higher broadband coverage. As California expands broadband services, equitably and affordability across all counties can contribute to bridging the digital divide.

1.10 HEALTH INFORMATION EXCHANGE

In August 2006, President Bush issued an executive order stipulating that health care programs sponsored by the federal government should promote high quality and efficient health care through the adoption of health information technology and set the goal of nationwide use of electronic health records by 2014. In March 2007, California's governor issued an executive order (S-06-07) calling for extensive HIT adoption and set a goal of achieving 100 percent electronic data exchange within the next 10 years. In order to meet this goal as well as the needs of a diverse group of stakeholders, California leaders recognized that the development of information systems needed to be a collaborative effort between public and private sectors.

In 2007 and 2008, California submitted CMS Transformation Grant applications for the Medi-Cal Health eSolutions project. The project goals included improved quality of care, reduced medication errors as well as reduced costs through the exchange of standardized clinical information between Medi-Cal and its providers. While California did not receive grant funding, the state was included in the Multi-State HIT Collaborative and benefited from the lessons learned from the Transformation Grant awardees and best practices for MU. The Transformation Grant process also led to collaborative projects with the Northern Sierra Rural Health Network, the California e-Prescribing Consortium, Redwood MedNet, Long Beach Network for Health, California Regional Health Information Organization (CalRHIO) and numerous other HIE/HIT efforts throughout the state.

1.10.1 STATE DESIGNATED ENTITY

In 2010, as part of the HITECH Act, CHHS, now known as CalHHS, was awarded a federal State HIE Cooperative Agreement grant of $38.8 million designated to support and expand the use of HIE technology[45]. As the State Designated Entity (SDE), CalHHS and the California Office of Health Information Integrity (CalOHII) established a cooperative agreement. CalOHII served as the governance entity responsible for executing the strategic and operational plan for HIE. As a qualified SDE, CalOHII was responsible for

[45] ONC HITECH Programs, State Health Information Exchange, State Health Information Exchange Cooperative Agreement Program. Accessed November 17, 2020.

developing and advancing mechanisms for information sharing across the health care system. As part of the strategic plan, the Cooperative Agreement focused on:

- Developing necessary technical and trust standards and agreements;
- Providing grants to local HIOs to expand and improve operations;
- Removing barriers to HIE interoperability;
- Coordination with Medi-Cal and other state and local public health programs to support meaningful use of electronic health records and population health management; and
- Convening, educating, and informing HIE stakeholders.

Much of the work in the strategic plan represented collaborative efforts of volunteer public and private stakeholders in the California healthcare community. Stakeholders had the opportunity to share ideas and feedback through committees, workgroups, webinars, and statewide summits. These collaborative efforts led to a culture change, which reflected a focus on patient needs. One such effort was the California Privacy and Security Advisory Board (CalPSAB). CalPSAB conducted an analysis of existing state laws in California and collaborated with the University of California, Hastings College of Law to develop the California Health Information Law Index (CHILI). The posted database cross sectioned all current federal and state statutes pertaining to health information, providing California's health care policy makers and stakeholders with a compendium of the relevant laws. CalPSAB recommended the adoption of affirmative patient consent (opt-in) for electronic exchange of health information in California, however this recommendation met with considerable opposition from stakeholders.

To help provide clarity in the policy debate, CalOHII awarded three State Health Information Exchange Demonstration project grants to examine issues of patient access to and consent to provide health information. Participants in the project grants included:

- San Diego Regional Health Information Exchange (SDRHIE) used a central policy of opt-in consent for sharing patient data through a HIO. Rady Children's Hospital was the only participating SDRHIE organization that had fully implemented an opt-in consent management process during the course of the Demonstration Projects.

- Santa Cruz Health Information Exchange (SCHIE) tested a process that automatically included patient data in the HIO while simultaneously notifying the patient of their right to opt-out of sharing that information. While at the physician's office, patients receive instructions and notification.

- Inland Empire Health Information Exchange (IEHIE) also tested a similar opt-out process that involved storing the patient's information and consent in the HIO. Additionally, patients receive an educational pamphlet by mail or during the registration process with the provider.

The projects found that:

- Lack of standard, consistent terminology is a barrier to successful HIE.
- When offered the choice, patients generally agree to share health information electronically.
- Previously-held beliefs about the consent management process may not be true.
- EHR and technology standardization is a barrier to electronic consent management.
- Lack of standardization among HIOs is a barrier to interoperability.
- Trust remains a critical component to successful HIE.

After a thorough evaluation and analysis of the findings from the Demonstration Projects, CalOHII recommended the following in order to successfully advance private and secure exchange of health information in California:

- Establish a common vocabulary and change the conversation to reduce confusion with terminology, create a standardized language, and move away from patient permission as a single policy lever.
- Continue to let HIOs determine the patient permission model that is most appropriate for the community they serve.
- Patients must be provided an opportunity to make a meaningful choice regarding the sharing of their protected health information.
- Technology solutions must evolve to support granularity and electronic permission capture.
- Governance of interoperability is needed to sustain efforts.

CalOHII also administered the Cooperative Agreement Grant Program to help create various programs throughout the state to promote and successfully exchange health information. Notable initiatives through the Cooperative Agreement Grant were:

- The California Immunization Gateway Service, developed for the California Department of Public Health, replaced the manual process previously used to register, test, and submit immunization data to the California Immunization Registry (CAIR). Electronic submission of immunization data assists providers meet MU requirements.

- Project INSPIRE, which focused on efficient and effective data capture at the point of care that is accessible to all of the patient's providers. The purpose of this demonstration project was to determine whether capturing data at the point of care beyond that in the cancer registry could be useful for cancer care or other conditions.

- The Partners in E program attempted to address low e-prescribing rates among independent pharmacies in California. Since many pharmacists did not feel prepared to handle continual electronic communication and technical dilemmas, a train-the-trainer program was developed in which students from California's eight schools of pharmacy provided one-on-one assistance to independent community pharmacists that serve Medi-Cal patients.

- CalOHII and the State Emergency Medical Services Authority (EMSA) collaborated in promoting the real-time exchange of health information in emergency settings. An environmental assessment found that while the state's 33 local EMS agencies were converting from paper to electronic patient care records, most were not able to transmit that information about the patient electronically to the hospital. The grant assisted Contra Costa, Monterey, and Inland Counties Emergency Medical Agency conduct demonstration projects to advance HIE in their service areas. The work conducted under this effort served as the foundation for a successful grant application from the ONC for HIE in EMS.

1.10.1.1 CAL ECONNECT AND CALIFORNIA HEALTH E-QUALITY

Starting in 2010, CalHHS contracted with Cal eConnect to implement HITECH-funded programs in line with California's HIE strategy. Cal eConnect was responsible for establishing the ground rules for appropriately sharing health information among clinicians, hospitals, health plans, patients, and government agencies. Cal eConnect managed the procurement of HIE services, to establish the HIE Trust Framework and Connectivity Services, which included Entity and Individual-Level Provider Directories. This was intended to complement existing regional HIE services by facilitating the directed and secure exchange of electronic patient health information statewide and across state borders. The services and associated program designed by Cal eConnect were intended

to enable Medi-Cal and Medicare providers to meet HIE-related MU criteria, beginning with e-prescribing, laboratory data exchange, and public health reporting.

In 2012, programmatic activities were transferred through an interagency agreement from Cal eConnect to California Health e-Quality (CHeQ), part of the UC Davis Health System's Institute for Population Health Improvement (IPHI). The CHeQ program played an integral role in the advancement of HIE in California and supported implementation of HIE programs across California by building a trusted exchange environment, improving public health capacity, accelerating HIE adoption, and monitoring HIE progress. CHeQ's California Trust Framework (CTF) documented policies and the technologies that facilitated exchange between HIOs without requiring point-to-point data sharing agreements. The CTF aligned with the efforts of the National Association for Trusted Exchange (NATE) and sharing provider directory information. Additional efforts included facilitating the electronic exchange of health information within a trusted environment, funded and supported regional HIE planning, infrastructure expansion, and interface development. CHeQ also promoted sharing immunization, laboratory and care information.

CHeQ developed the HIE Acceleration award, which provided funding for a variety of HIE related projects which increased HIE connectivity throughout the state. In 2013, CHeQ distributed $7.5 million throughout California for HIE activities to 20 dedicated organizations. CHeQ reported that recipients of the acceleration award established 270 connections between HIE participants (hospitals, clinics, and providers), increasing the ability to transmit health information electronically. From those efforts, 17 community HIOs were able to serve regions extending to the Oregon border and as far south as San Diego. The CHeQ report also found that community HIOs continued to expand and cited that clinical message traffic for Redwood MedNet increased by nearly 200 percent between 2011 and 2013. Following is a brief summary of several community HIE initiatives in California supported by HIE acceleration awards:

- Alliance Medical Center, a founding member of the Redwood MedNet community HIO, provides HIE services to more than 230 health care providers in the Mendocino, Sonoma, Marin, Lake, Napa and Colusa Counties. Redwood MedNet's expansion was accelerated when the community based FQHCs Mendocino Coast Clinics, Alliance Medical Center, and Sonoma Valley Community Health Center, combined with Mendocino Coast District Hospital, Healdsburg District Hospital, and Sonoma Valley Hospital. Redwood MedNet provides HIE services to more than 500 healthcare providers in Mendocino, Lake, Sonoma, Napa, and Marin counties.

- Tulare and Kings Counties received a planning grant from CHeQ to develop an HIO strategic plan. In 2013, both counties coordinated efforts with Fresno and Madera

counties to form the Central Valley HIO. Central Valley HIO contracted with Inland Empire HIE to provide a new community HIO with HIE services.

- eConsult was created by L.A. Care Health Plan, Department of Health Services of Los Angeles County, Health Care Los Angeles, MedPOINT Management and the Community Clinics Association of Los Angeles County. eConsult is a web-based care coordination platform that enables primary care providers and specialists to share and discuss patient care electronically. In 2013, 2,000 primary care providers in 182 clinic/health center sites used eConsult across L.A. County.

- Orange County Partnership Regional Health Information Organization (OCPRHIO), founded by Monarch Healthcare, formed in 2012 with grants from CHeQ. OCPRHIO was created to improve coordination of care and integrate HIT/HIE into Orange County's health care delivery system. Providers are able to view patient information from a single access point.

Figure 15: CHEQ HIE ACCELERATION AWARDS (2013)[46]

[46] CalHHS, *California HIE Landscape (2013)*. Accessed April 25, 2018.

CalOHII published *The State of California HIE, The Legacy of California's State HIE Cooperative Agreement Program*[47] in January 2014, which highlighted the opportunities offered by the $38 million Cooperative Agreement grant in California. The report stated that funding received from the grant further encouraged the adoption of health information exchange throughout the state and provided the impetus needed to launch large-scale health information exchange. It also allowed the state the opportunity to experiment with various models to determine which solutions would be best suited for specific environments and populations. Although the Cooperative Agreement grant ended on February 7, 2014, the program continues to have a positive impact in stimulating HIE in California. This final report can be found in the SMHP (May 2021), Appendix 6.

1.10.1.2 CALIFORNIA ASSOCIATION FOR HEALTH INFORMATION EXCHANGE AND THE NATIONAL ASSOCIATION FOR TRUSTED EXCHANGE

Created in 2013, the California Association for Health Information Exchange (CAHIE) is a 501(c)3 organization and a statewide group comprised of individuals and organizations working together to advance the secure sharing of health information with the intent to improve health care quality and lower costs. CAHIE members include 14 community and enterprise HIOs, care delivery organizations, health plans, emergency medical service agencies, government organizations (including DHCS), associations, and collaborating organizations, such as the NATE. The goals of the CAHIE are to:

- Promote a regulatory environment in California that enables providers, consumers, and other stakeholders to exchange and appropriately access health information.
- Create a collaborative environment that fosters and supports cooperation among members and other stakeholders to solve difficult problems as well as share lessons learned in health information exchange.
- Promote the growth of electronic information exchange through creating and supporting information exchange initiatives.
- Enable and support high-value information exchange among unaffiliated communities.
- Provide services in support of statewide health information exchange activities and initiatives.

The CAHIE supports statewide HIE through voluntary self-governance via the California Data Use and Reciprocal Support Agreement (CalDURSA) and the California Trusted

[47] CalHHS, The State of HIE: The Legacy of California's State HIE Cooperative Agreement Program (January 2014). Accessed April 25, 2018.

Exchange Network (CTEN). The CalDURSA is a multi-party agreement developed by the CAHIE and modeled after the federal DURSA that defines and specifies policies, procedures, and processes establishing trust and the framework for organizations to exchange data through the CTEN. The CalDURSA allows organizations to participate in both the CTEN and the eHealth Exchange, a national network. The CTEN is a virtual network based on the policies, procedures and processes established by the CalDURSA. Unlike other trust frameworks, the CTEN is able to support any transaction that shares health information for purposes of treatment, payment, or health care operations. DHCS utilizes the CalDURSA and the CTEN participation as a requirement for the CTAP organizations to receive funding for assisting providers in meeting HIE milestones. This was also a requirement for HIEs participating in Cal-HOP.

The NATE was created to help state HIE officials develop and establish standards and best practices. The NATE is a not-for-profit membership association focused on developing trusted exchange among organizations and individuals with differing regulatory environments and exchange preferences. Through its membership in the NATE, California continues to provide leadership through the identification of policy and governance drivers. Members of the NATE and stakeholders work together to find common solutions that achieve greater gains in the exchange of health information and improved patient outcomes while laying groundwork for safe interstate electronic transfer of secure health information. CAHIE is a member of NATE. In 2015, the NATE made the first release of NATE's Blue Button for Consumers (NBB4C) Trust Bundle.[48] Future plans include extending its trust community beyond direct secure messaging to include other consumer-centric technologies.

1.10.2 COMMUNITY/REGIONAL HEALTH INFORMATION EXCHANGES

Given California's size and diversity, legislators and stakeholders have communicated a preference for a decentralized HIE infrastructure that combines public and private efforts. A decentralized model, or neutral connectivity model, allows the flexibility needed to adapt to California's complex healthcare ecosystem. Several regional or community HIOs have created exchanges that meet specific needs of providers within the communities or regions that they serve. Autonomy at the local level has allowed for the creation of innovative solutions to meet the needs of local users. These community HIOs carry out most of the HIE activities in their communities and are responsible for most of the interoperability between provider systems, and communicate with each other when the situation calls for health information outside of their own service areas.

[48] National Association for Trusted Exchange, Nate Blue Button for Consumers (NBB4C) Trust Bundle. Accessed April 25, 2018.

Community HIEs have typically been independent, 501(c)(3) or state-recognized nonprofit organizations, in some cases initiated through grants or contributions from sponsoring or anchoring participants, but sustained through ongoing fees for provided services. CHeQ sought to identify the health information and interoperability needs of California generally, both within medical trading areas of community HIOs and statewide among HIOs, hospital systems, etc. Health care needs may be determined by the local or regional geographic operational boundaries, which reflect referral relationships, patterns of care, and the flow of patients among participating organizations. These efforts are often linked with the predominant provider organizations in the community that may focus special attention on the community's unique health needs (e.g. diabetes, behavioral health). Community HIOs:

- Serve a wide variety of provider types, including acute care hospitals, public health departments, primary care providers, specialists, ancillary services, payers, emergency medical service providers, home health, skilled nursing facilities, and others.

- Provide a wide variety of services, including Direct messaging, longitudinal community records, alerts, text-based reports, public health reporting, consumer access, quality measures, referrals, and others; and exchange a wide variety of data types, including allergies, lab results, admission, discharge, and transfer messages, text reports, discharge summaries, immunizations, prescribed and filled medications, radiology reports, care plans, eligibility information, claims, and others.

In 2019-2020 UCSF, in coordination with and sponsored by the Office of the National Coordinator for Health IT, conducted a survey of all HIOs in the nation. The survey instrument consisted of questions in three broad sections: Organizational Demographics, Implementation and Use of Standards, and Information Blocking. In this report, national data refers to responses collected from all 89 organizations operating in the United States; For California responses were received from the California Association of HIEs, Central Coast Health Connect, Central Valley HIE, Los Angeles Network for Enhanced Services, Manifest MedEx, North Coast Health Information Network, Redwood MedNet, SacValley MedShare, Orange Country Partnership HIO, San Diego Health Connect, San Joaquin County HIE, Santa Cruz Health Information Exchange.

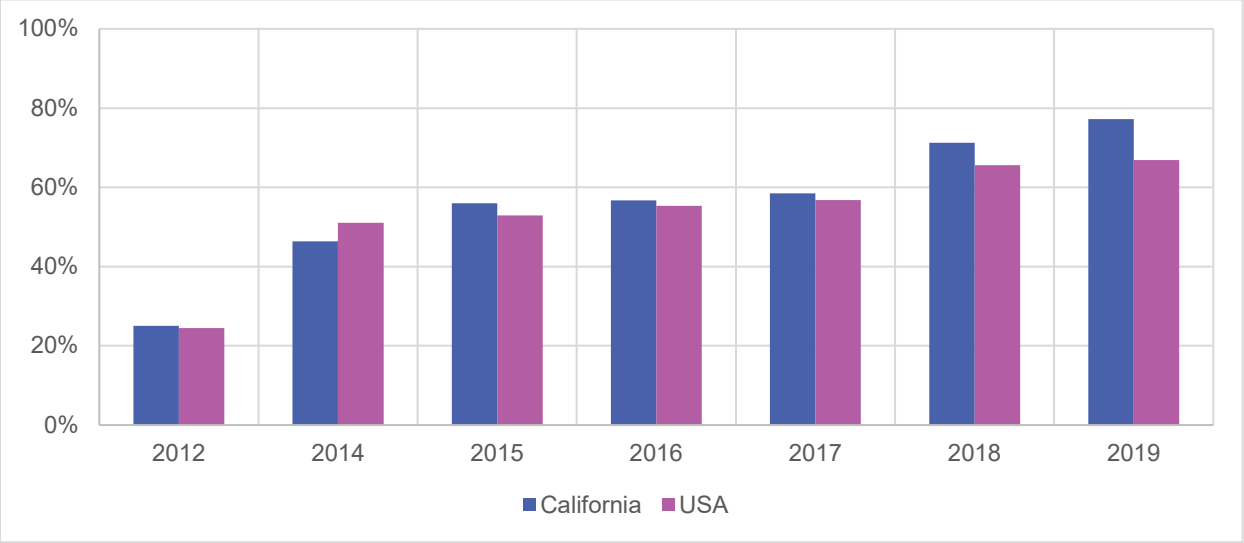
Table 21 shows the percent of HIOs that report having a specific type of stakeholder in their network, broken down by how the stakeholder participates (contributing data to the HIO, viewing or receiving data from the HIO, paying to participate in the HIO). The data reveals that California HIOs report that providers payed to participate at much lower rates than at the national level.

TABLE 21: PROPORTION OF STAKEHOLDERS PARTICIPATING IN AN HIO BY TYPE OF PARTICIPATION [CALIFORNIA (N=12) VS. NATIONAL(N=89)]

Participation by Type of Stakeholder	Contribute Data (National% HIOs)	View or Receive Data (National % HIOs)	Pay to Participate (National % HIOs)	Contribute Data (California % HIOs)	View or Receive Data (California % HIOs)	Pay to Participate (California % HIOs)
Private Medical/Surgical Acute Care Hospital	93%	91%	97%	92%	92%	83%
Hospital-Owned or Health System-Owned Physician Practice	82%	92%	92%	75%	83%	58%
Community Health Center or Federally Qualified Health Center	78%	90%	92%	92%	92%	67%
Independent Physician Practice or Practice Groups (e.g., IPAs)	76%	89%	89%	58%	75%	50%
Publicly-owned Hospital (e.g., state, county)	63%	71%	74%	58%	67%	58%
Independent Laboratory	65%	24%	65%	67%	25%	17%
Behavioral Health Provider (e.g., community mental health, SUD/OUD)	53%	80%	80%	50%	75%	58%
Long-Term Care Provider (e.g., nursing home, skilled nursing facility)	53%	66%	70%	33%	42%	17%
Private Psychiatric, Rehabilitation, or Long-Term Acute Care Hospital	48%	54%	57%	42%	42%	33%
Public Payer (e.g., Medicare, Medicaid)	43%	58%	66%	50%	58%	58%
Public Health Department	38%	69%	71%	33%	67%	42%
Private Payer (e.g., Blue Cross)	36%	56%	61%	42%	42%	42%

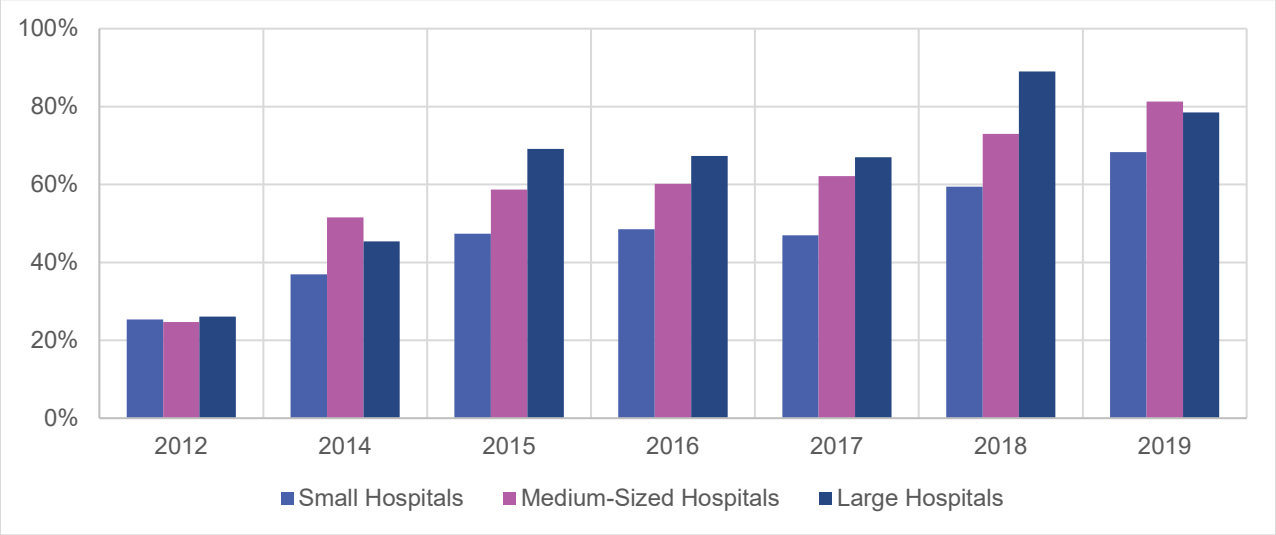
Information about hospital participation in HIOs was obtained from UCSF's analysis of 2019 AHA Survey Data. Rates of hospital participation in regional health information organizations (RHIOs) has steadily increased since 2012. Since 2015, California hospitals have exceeded the national average in this regard (Figure 16).

Figure 16: CALIFORNIA HOSPITAL RHIO PARTICIPATION COMPARED TO NATIONAL AVERAGE (2012-2019)



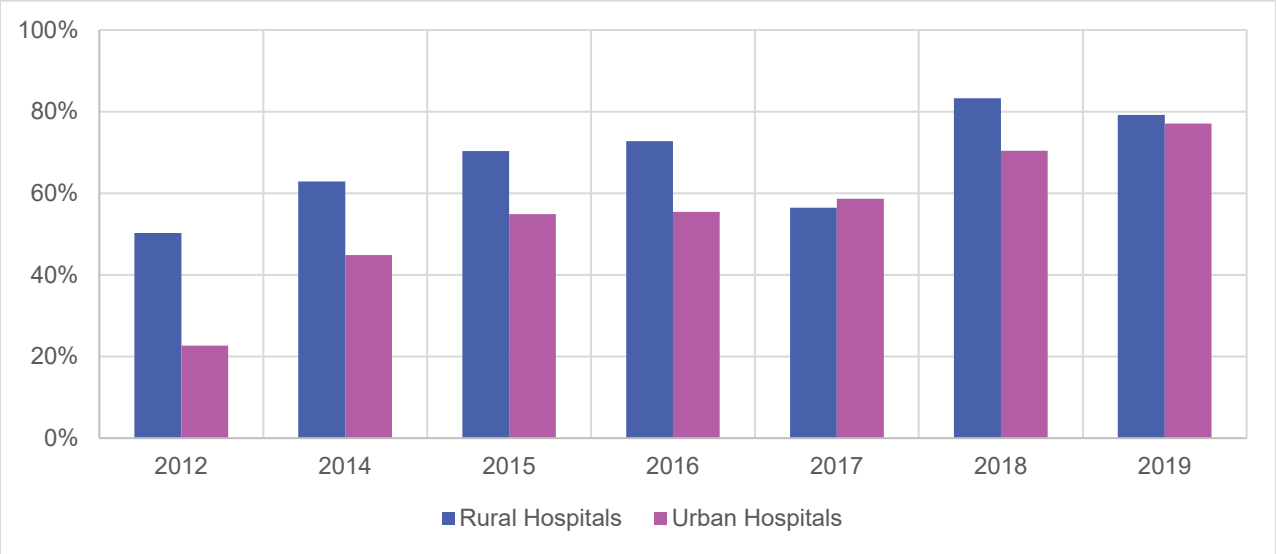
Large and medium sized hospitals in California have engaged with RHIOs more often than smaller hospitals (Figure 17).

Figure 17: RHIO PARTICPATION STRATIFIED BY HOSPITAL SIZE (2012-2019)



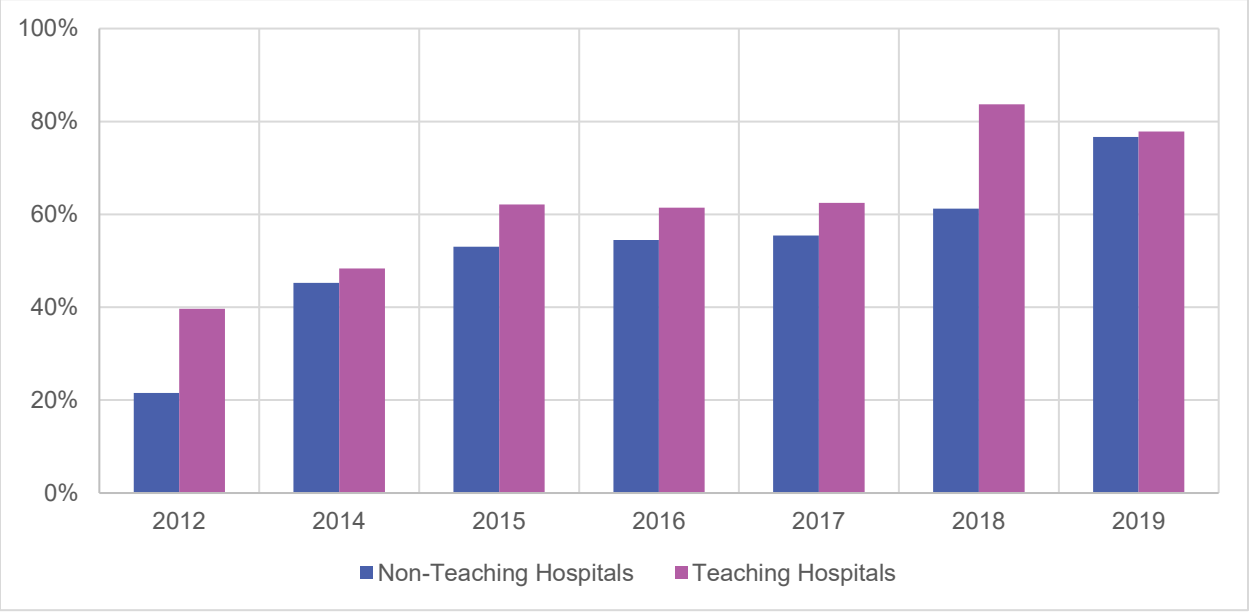
Traditionally rural hospitals have participated with RHIOs more than urban hospitals, although in 2017 and 2019 there was little difference (Figure 18).

Figure 18: RHIO PARTICPATION STRATIFIED BY LOCATION (2012-2019)



Although RHIO participation by teaching hospitals has traditionally exceeded that of non-teaching hospitals, in 2019 there was no difference between them (Figure 19).

Figure 19: RHIO PARTICPATION STRATIFIED BY HOSPITAL TEACHING STATUS (2012-2019)



California's HIOs also offer certain services at lower rates than nationally – receiving C-CDAs, alerting services, messaging with Direct Protocol, patient consent management, and provider directory. The only service area which California HIOs significantly exceed national HIOs is advanced care planning (Table 22).

TABLE 22: PROPORTION OF HIOS OFFERING SPECIFIED SERVICE TYPES (2019-2020 CALIFORNIA VS. NATIONAL)

Services Offered	National Data (N=89)	California Data (N=12)
Receiving C-CDAs (Consolidated-Clinical Document Architecture: a standardized template for clinical information)	88%	58%
Alerting services (e.g., gaps in care) and/or event notification (e.g., Admit-Discharge-Transfer)	83%	67%
Community Health Record: Aggregation of health information from across the community served by the HIE	81%	83%
Messaging using the Direct Protocol	72%	42%
Parse and store data elements from a CCDA	67%	67%
Consent Management	52%	25%
Record Locator Service	48%	42%
Provider Directory	45%	17%
Transform other document types or repositories into C-CDAs (e.g., MDS, OASIS, Community Health Record)	44%	42%
Connection to prescription drug monitoring program (PDMP)	38%	42%
Integrating claims data	34%	33%
Prescription fill status and/or medication fill history	31%	33%
Provide data to third party disease registries (e.g., Wellcentive, Crimson)	28%	25%
Advanced care planning (i.e., POLST/MOLST)	25%	42%

Although California's HIO's provide less data for analysis of value-based payment models compared to national data, they do generate quality metrics at much higher rates compared to the national data (Table 23).

TABLE 23: PROPORTION OF HIOS OFFERING SERVICES RELATED TO VALUE-BASED PAYMENT MODELS (2019-2020 CALIFORNIA VS. NATIONAL)

Services Offered: Related to Value-Based Payment Models	National Data (N=89)	California Data (N=12)
Providing data to allow analysis by networks/providers	53%	33%
Analytics (e.g., risk stratification)	39%	25%
Generating quality measures	34%	50%

Services Offered: Related to Value-Based Payment Models	National Data (N=89)	California Data (N=12)
Reporting quality measures to payers/programs on behalf of participants	30%	33%
Validating quality measures	22%	25%
Operating as a clinical registry including a qualified clinical data registry (QCDR)	17%	17%

California's HIOs generally report fewer barriers to development than national HIOs. However, California HIOs do report greater rates of the following barriers; competition from HIT vendors offering HIE solutions, integration of HIE into provider workflow, developing a sustainable business model, limitations of current interface standards as significant barriers to development, and addressing technical barriers (Table 24).

TABLE 24: HIO SELF-REPORTED BARRIERS TO DEVELOPMENT (2019-2020 CALIFORNIA VS. NATIONAL)

Barriers to Development	National Data (N=89)	California Data (N=12)
Competition from health IT vendors offering HIE solutions	63%	75%
Integration of HIE into provider workflow	51%	33%
Competition from other HIE efforts	42%	0%
Developing a sustainable business model	37%	42%
Managing complexity of consent models	34%	17%
Stakeholder concerns about their competitive position	29%	25%
Ability to hire/retain staff	24%	8%
Lack of resources to implement interface standards	22%	17%
Limitations of current interface standards	19%	33%
Addressing technical barriers	17%	25%
Stakeholder concerns about privacy and confidentiality	15%	0%
Accurately linking patient data/patient matching	12%	17%
Addressing governance issues	7%	0%

California's HIOs do not differ greatly from national trends regarding their connectivity approach and network participation, although they report an increased rate of connecting with other HIEs in the state, and a decreased rate of connecting with HIEs in other states.

TABLE 25: PROPORTION OF HIOS USING SPECIFIED CONNECTIVITY APPROACH (CALIFORNIA VS. NATIONAL)

Connectivity Approach	National Data (N=89)	California Data (N=12)
Connect to other HIEs in SAME state	57%	67%
Connect to other HIEs in DIFFERENT state(s)	53%	42%
Sell/provide your infrastructure to other HIEs	24%	17%
Buy/use infrastructure from another HIE	13%	17%

California's HIOs report involvement in national networks at approximately the same rate as other HIOs in the nation (Table 26).

TABLE 26: PROPORTION OF HIOS PARTICIPATING IN A SPECIFIED NATIONAL NETWORK (CALIFORNIA VS. NATIONAL)

Network Participation	National Data (N=89)	California Data (N=12)
e-Health Exchange	67%	75%
DirectTrust	46%	42%
SHIEC Patient Centered Data Home	38%	33%
Carequality	15%	17%
Surescripts	13%	8%
CommonWell	13%	8%
CareinAlliance	2%	0%
Digital Bridge	2%	0%
ANY OF ABOVE	83%	83%
NONE OF ABOVE	17%	17%

1.10.3 ENTERPRISE HEALTH INFORMATION EXCHANGE ORGANIZATIONS

Several of California's integrated health systems currently exchange data between and among their affiliated physicians and hospitals. Many of these systems have multiple locations and facilities spread across Northern and Southern California, with some systems extending into neighboring states. While many of these systems offer a suite of HIT applications and modalities to their hospital-based clinicians, health systems vary in their provision of HIT outside of the hospital walls. Over the past decade, these health systems have made significant investments in their HIT infrastructure and staff. While technical approaches and vendors vary among health systems, all of the health systems follow national standards and many participate in technical workgroups at the state and national levels. Today health systems vary in their interactions with and participation in

community HIE efforts, ranging from no involvement to robust participation in collaborative activities.

In 2015, DHCS contracted with researchers at UCSF to identify methods that Medi-Cal-focused HMOs and Independent Practice Associations (IPAs)/Management Service Organizations (MSOs) could use to encourage increased EHR adoption and progression toward MU among small practices. The study found that small practices need support for HIE and assistance with EHR software updates, patient portals, messaging, and reporting. Given the larger organizational structure of IPAs/MSOs, these organizations have greater access to resources that could benefit smaller practice types in efforts to advance adoption of an EHR, MU progression, and greater HIE participation. Many HMOs and some IPAs work collaboratively to develop community HIOs. One of the conclusions of the survey was that HMOs and IPAs/MSOs should assist small practices in establishing electronic connections to community HIOs which would help meet HIE-related MU objectives. This could also assist HMOs and IPAs/MSOs in meeting data needs related to notifications, care coordination, and analytics.

Health systems largely operate as closed networks and the information largely remains proprietary and locked within those networks unless addressed through statewide collaboration as exhibited by Manifest MedEx, formerly known as Cal INDEX. Founded in August 2014, through funding from Blue Shield of California and Anthem Blue Cross, Cal INDEX was a nonprofit organization working toward development of an HIE with services throughout the state. Initially, only containing Blue Shield and Blue Cross Records, in January 2017, Cal INDEX merged with IEHIE. The combined entity, called Manifest MedEx, contains 11.7 million claims records from Cal INDEX founding members Blue Shield of California and Anthem Blue Cross with the 5 million clinical patient records of IEHIE and its 150 participating partners.

The investments in these integrated systems should be leveraged as statewide HIE advances while, at the same time, encouraging sustainability models. Their implementations are being considered and incorporated into state HIE efforts in a collaborative and opportunistic way to ensure interoperability across all of California's providers. Many large health systems with hospitals and ambulatory care have developed information exchange networks, connecting affiliated hospitals and physicians using diverse EHR platforms.

1.10.4 HEALTH INFORMATION TECHNOLOGY GRANTS

CALIFORNIA STATE INNOVATION MODELS

On April 1, 2013, California was awarded $2.6 million to develop the State Innovation Model (SIM) Design Grant.[49] The SIM grant supported development of the State Health Care Innovation Plan which addressed all three aspects of the Triple Aim – better health, better health care and lower costs. The funding supported the following HIT activities:

- Identified best practices for HIE in support of care coordination and development of tool kits to facilitate use of HIE.
- Development and promotion of third party business case analyses illustrating the savings produced by technologies.
- Commissioned research regarding options for ensuring data collection to inform cost and quality of care improvement efforts on a statewide basis.

California leveraged activities undertaken during the Let's Get Healthy California (LGHC)[50] project. Since much of the project's work was in progress, California was able to utilize the network of stakeholders gathered for LGHC efforts to focus on SIM Design activities. The LGHC task force developed a 10-year plan, which envisioned a healthier California. While the period of the Innovation plan was three years, it provides the opportunity to focus on initiatives that can set in motion effective changes over the long term. Many of the initiatives built on current efforts or were in conjunction with other efforts that occurred in both the public and private sectors.

California utilized existing state and national initiatives including capitated payment models, accountable care organizations, bundled episode payments, the Coordinated Care Initiative for dual-eligible Medi-Cal and Medicare beneficiaries, and the state's Section 1115 Waiver, called Medi-Cal 2020, to inform their model design. California's design process involved a broad range of advocacy groups that addressed its diverse and geographically spread population in order to develop a model that reflected California's complex health care and financing environment. CMS recently granted California's request to renew the waiver, thereby extending Medi-Cal 2020 activities until December 31, 2020. The extension supports the state's efforts toward adopting alternative payment methodologies and supporting integration of care.

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[49] CMS, State Innovation Models Initiative: Model Design Awards Round One. Accessed April 25, 2018.

[50] CalHHS, *Let's Get Healthy California Task Force Final Report (December 19, 2012)*. Accessed April 25, 2018.

CMS awarded the State of California $3 million for model design under the second round of the SIM initiative on December 16, 2014. The grant has further refined the development of the State Health Care Innovation Plan.

CALIFORNIA EMERGENCY MEDICAL SERVICES AUTHORITY

On July 28, 2015, the California Emergency Medical Services Authority (EMSA) received a two-year grant, titled PULSE +EMS from the Office of the National Coordinator for Health Information Technology for $2.75 million. The project established interoperability and exchange of clinically relevant patient information to aid in the response to widespread disasters between the Patient Unified Lookup System for Emergencies (PULSE) and the emergency medical services system (EMS). CAHIE served as the technical advisor to EMSA for integrating the PULSE and EMS components in the PULSE +EMS project.

The PULSE component of PULSE +EMS provides a means for volunteer healthcare professionals working in non-traditional health facilities, such as field hospitals and evacuation centers, to obtain critical health information on victims and evacuees during a large scale medical emergency. It works by retrieving care summaries and other health information from HIOs and health systems across the state using nationally recognized standards and leveraging the CTEN operated by CAHIE. Access to PULSE is controlled by EMSA's Disaster Healthcare Volunteers system, which is California's version of the Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP).

CAHIE was responsible for facilitating collaboration among the various participants to convene the PULSE Workgroup. The PULSE Workgroup, comprising stakeholders in California, defined the characteristics and requirements of PULSE, including any recommendations regarding technical standards. National standards were selected for PULSE in order to share health information with minimal impact on participating organizations, while CTEN policies and procedures were selected to establish trust with participating organizations and systems. CAHIE used the recommendations of the PULSE Workgroup to document PULSE system requirements as well as the basis for conducting user acceptance testing.

CAHIE also took the lead in planning, conducting, and documenting the results of a table-top drill of PULSE in June 2017. PULSE project participants included Santa Cruz HIO, UC Davis Health, OCPRHIO, and Sutter Health.

EMS provides pre-hospital care and entry, typically through 9-1-1, into the emergency medical care system, providing evaluation, treatment, and transportation of patients to a hospital emergency department, trauma, heart attack, or stroke center. The +EMS

component of PULSE +EMS expanded the capabilities of EMS by integrating them into an HIO, enabling exchange between ambulances and the HIO and hospitals. +EMS therefore created a paradigm in which EMS becomes a full participant in the HIO, with the capability to implement the Search, Alert, File, and Reconcile (SAFR) model defined by EMSA:

- **Search** a patient's health record for problems, medications, allergies, and end of life decisions to enhance clinical decision making in the field
- **Alert** the receiving hospital about the patient's status directly onto a dashboard in the emergency department to provide decision support
- **File** the emergency medical services patient care report data directly into the patient's electronic health record for a better longitudinal patient record
- **Reconcile** the electronic health record information including diagnoses and disposition back into the EMS patient care report for use in improving the EMS system

+EMS enabled EMSA to pilot new EMS workflows in two regions by connecting EMS providers with local hospitals in two different community HIOs. The pilot demonstrated the way EMS can share prehospital data with other providers as well as how HIEs can support quality and process improvement. San Diego Health Connect (SDHC) and OCPRHIO were selected as the participating HIOs. EMSA will use what was learned from these pilots to expand SAFR to more local EMS agencies across the state in future projects.

After the successful drill completion in June 2017, PULSE was moved into production. EMSA reported that the objectives of the PULSE +EMS ONC grant were met in July 2017. SAFR capabilities developed in SDHC and OCPRHIO are also functioning today.

In response to the fires in Southern California in 2019, CAHIE completed expedited on-boarding of eHealth Exchange. This allowed PULSE and other participants of CTEN to connect to and query eHealth Exchange members not yet participating in CTEN for health information of victims and evacuees of that disaster. CAHIE is exploring becoming a long-term participant in eHealth Exchange to make it possible for PULSE to query national systems such as the VA, DOD, and national pharmacy chains.

On July 1, 2018, EMSA was awarded federal funding through an interagency agreement with CDPH for the development of health information exchange and interoperability for +EMS SAFR and PULSE. EMSA was awarded up to $36 million in federal funding, with a required $4 million in the non-federal match.

In May 2019, Manifest MedEx received a $4.9 million grant from EMSA to enable interoperability with EMS ambulances, hospitals, and other first responders. The funding will be used by Manifest MedEx to work with six EMS organizations, 13 EMS providers, and

16 hospitals to enable interoperability in Riverside, San Bernardino, Fresno, Tulare, San Joaquin, Merced, Amador, Stanislaus, and Calaveras counties.[51]

EMSA has reported the five +EMS awardees have claimed $3.8 million of the granted 14 million in available funds. It is estimated that forty percent of the awardees have completed the first milestone. However, delays in upcoming milestones are expected due to the COVID-19 pandemic.

As part of the COVID-19 response, sites in Indio and San Mateo have activated PULSE. As of March 2020, over 80 providers have been trained on PULSE specifically for COVID-19 response.

CALIFORNIA HEALTH INFORMATION EXCHANGE ONBOARDING PROGRAM

At the January 8, 2019 "HIE Onboarding and Interoperability Summit" workshop, DHCS provided an overview of the California Health Information Exchange Onboarding Program (Cal-HOP). Based on feedback obtained from stakeholders during and subsequent to the HIE Summit, DHCS modified aspects of the Cal-HOP program and presented these changes during webinars held in February and March of 2019. These webinars were well attended and resulted in additional feedback, particularly regarding financial assistance for onboarding and development of advanced interfaces to support interoperability. DHCS submitted a formal request (Implementation Advanced Planning Document-Update) to CMS requesting enhanced federal funding (90/10) to support the $50 million Cal-HOP program.

In February 2020, DHCS received approval for enhanced federal funding to support the Cal-HOP program. Under the framework of Cal-HOP DHCS made available up to $50 million in local assistance funds to support the onboarding of providers to a Qualified Health Information Organization. DHCS designed the program in consultation with key stakeholders in the space of health information technology including regional HIOs, provider professional associations, and healthcare focused research organizations over the course of in person workgroups, webinars, and conferences.

In September 2020, DHCS received approval of a revised program design which, in response to vendor feedback, afforded additional opportunities to leverage Cal-HOP funding for the modernization of existing HIE connections and allowed for the participation of provider organizations in multiple QHIO connections under specific circumstances. In November 2020, the Cal-HOP program started providing funding to access and use health

[51] EHR Intelligence, *California HIE Receives $4.9M Grant to Connect to EMS Services (May 9, 2019)*. Accessed August 3, 2020.

information exchange technology to improve the quality and effectiveness of care for Medi-Cal beneficiaries. Goals of Cal-HOP included:

- Increase the number of Medi-Cal providers that can exchange patient data via a Health Information Organization (HIOs).
- Expand the data-exchange capabilities of Medi-Cal providers already participating in HIOs.
- Facilitate Medi-Cal providers' access to the Controlled Substance Utilization Review and Evaluation System (CURES) prescription drug monitoring database.

Cal-HOP was a milestone-based program. Payments were made to HIOs for services rendered to Medi-Cal providers when specific onboarding and HIE connection milestones are met. A list of HIOs that had met qualification requirements and were eligible for participation is also available on the DHCS website.[52] Initially, eight HIOs met the qualification requirements. DHCS executed final contracts with its HIO partners in November 2020.

In December 2020, DHCS issued guidance that allowed the inclusion of standalone laboratory facilities as eligible recipients of Cal-HOP funding. In partnership with the CDPH, targeted outreach was conducted to encourage the use of Cal-HOP funds toward the reporting of COVID-19 testing results to public health registries using a HIO. In March 2021, DHCS received CMS approval to expand the scope of Cal-HOP activities to include behavioral health providers and long term care providers, including skilled nursing facilities, which may not have been eligible to participate in MU programs.

CMS authorization for the program ended on September 30, 2021. All Cal-HOP activities were completed on or before September 30, 2021. At the close of program operations, Cal-HOP participants had been awarded $25,581,278 in milestones and affiliated payments for onboarding or modernizations services. While a precise account of the number of impacted providers is not available, Cal-HOP payments supported a total of 390 Qualified Provider Organizations (QPOs) ranging in size from individual practitioner clinics to complex outpatient and inpatient service networks encompassing thousands of distinct providers.

Across all HIE contractors, 349 QPOs (89.5 percent) reached milestone 2a, admission/discharge/transfer (ADT) alerts, while 348 QPOs (89.2 percent) reached milestone 2b, linking with the California CURES prescription drug monitoring (PDMP) program. Also, 341 QPOs (87.4 percent) reached milestone 3, adoption of advanced interfaces (Table 27).

[52] DHCS Cal-HOP website. Accessed August 3, 2020.

TABLE 27: NUMBER OF QUALIFYING PROVIDER ORGANIZATIONS (QPOS) REACHING EACH MILESTONE BY HIE CONTRACTOR IN CAL-HOP

Contractors	# of QPOs @ Milestone 1 (Cal-HOP Onboard)	# of QPOs @ Milestone 2a (ADT)	# of QPOs @ Milestone 2b (CURES PDMP Link)	# of QPOs @ Milestone 3 (Advanced Interfaces)
LANES	67	64	66	62
Manifest MedEx	213	188	190	186
OCPH HIE	45	39	39	39
OCPHIO	1	1	1	1
Sac Valley MS	21	18	14	15
San Mateo HIE	11	11	10	10
Santa Cruz HIE	32	28	28	28
Totals	390	349	348	341

QPOs with 10 or more providers had a higher rate of completing all 3 milestones (90.3 percent) compared to practices with fewer than 10 providers (85.7 percent), while ambulatory providers had a higher rate of achieving all 3 milestones (89.0 percent) compared to hospitals (79.4 percent).

TABLE 28: QPO MILESTONE ACHIEVEMENT BY PRACTICE SIZE AND TYPE

Practice Size	Achieved All 3 Milestones	Achieved at least 1 but not all 3 Milestones
Practices with Fewer than 10 Providers	85.7%	14.3%
Practices with 10 or More Providers	90.3%	9.7%

Practice Type	Achieved All 3 Milestones	Achieved at least 1 but not all 3 Milestones
Ambulatory Provider	89.0%	10.9%
Hospital	79.4%	20.6%

UCSF researchers interviewed 6 of the Cal-HOP HIOs as a component of the final HIT landscape assessment. Cal-HOP HIOs reported that the program was highly successful in increasing the number of provider organizations that can exchange data via an HIO. This success was largely attributed to the Cal-HOP funding that allowed HIOs to offset the

onboarding costs that frequently prohibit these provider organizations from engaging in HIE. Many Cal-HOP HIOs stated that the increase in participants simply would not have been possible without the additional funding. The goal of expanding the data-exchange capabilities of Medi-Cal providers already participating in HIOs was also reported to have been met, particularly through moving organizations from “view only” participation (via portals) to establishing data feeds, as well as expanding the number of data elements providers were sharing. The goal of facilitating Medi-Cal providers’ access to the Controlled Substance Utilization Review and Evaluation System (CURES) prescription drug monitoring database was met, although some stakeholder interviews noted that the user experience interfacing with the CURES system presented some challenges.

The HIOs were generally positive about the design of the program and the support received from DHCS. In particular, participants thought the milestones were specific and logical, and that the dollar amounts tied to the milestones were adequate and fair. Moreover, participants appreciated the flexibility that was built into the program in terms of how milestones could be achieved and how money could be used. This flexibility allowed the HIOs to make appropriate implementation decisions in order to fit their and their participants specific needs, goals, and financial situations.

HIOs reported several barriers that limited their ability to achieve better results. All HIOs cited the program’s delayed start, which resulted in a shortened implementation timeline. This shortened timeline resulted in HIOs being unable to onboard as many new participants as they otherwise could have. HIOs reported that onboarding requires lead time in order to get into the EHR vendors work queue, to conduct complex onboarding testing or configuration at sites, and to work with practices (particularly small, under-resourced ones) that had limited technical capacity. Many HIOs described a steep learning curve, such that later implementations went more quickly and that the program ended as they were realizing these economies of scale.

A second challenge was that the program launched during the early months of the COVID-19 pandemic. This resulted in many hospitals and practices that were previously interested in joining HIOs deprioritizing their onboarding. More broadly, HIOs described ongoing hesitancy from hospitals and ambulatory practices to participate in HIE, due to a lack of awareness about HIE and minimal incentives to join. With a lack of strong incentives or mandates for providers to participate in HIE, engagement efforts fell largely on the HIOs, and some struggled to engage Cal-HOP eligible participants. Lastly, some HIOs found the program’s administrative and reporting requirements to be too resource intensive.

The UCSF researchers determined that Cal-HOP had broad benefits for both participating HIOs and the greater state HIE landscape. Several HIOs reported that their activities

under Cal-HOP helped strengthen the value proposition for participating in HIE, and that many providers and patients are beginning to see the benefit of data exchange through improved care coordination. HIOs also described their desires to begin exchanging additional data from other spheres including public health, behavioral health, and population health. Several California health IT stakeholders (not HIO representatives) who were also interviewed expressed a desire to advance bidirectional data exchange, such that Medi-Cal providers (particularly those in small and solo practices) could both send and receive data through HIOs.

While all HIOs benefitted from Cal-HOP, smaller HIOs noted the particular progress they were able to make by filling in "white space" in their communities via onboarding new participants. These HIOs also noted that, while Cal-HOP helped onboard more providers to HIE, without continued investment and supportive policies, they will struggle to sustain and build upon the progress they made under Cal-HOP.

1.10.5 CALIFORNIA HEALTH AND HUMAN SERVICES DATA EXCHANGE FRAMEWORK

The 2021-22 Budget Act, AB 133 (Committee on Budget), Chapter 143, Statutes of 2021 directed the CalHHS to develop the California Health and Human Services Data Exchange Framework. The Budget Act directs that this framework will include a single data sharing agreement as well as policies that align with national standards for information exchange. The data exchange framework is not intended to be an information technology system or data repository. It is intended to include organizations required to share health information using national standards to improve health outcomes and enable real-time access to or exchange of health information among providers and payers through any health information exchange network or health information organization.

In order to achieve these goals, the Budget Act instructed that a stakeholder advisory group be formed no later than September 1, 2021. This Advisory Group has convened and is composed of HIT/E stakeholders from throughout the state. The membership of the Advisory Group is provided in Appendix 7.

In February 2022, the Stakeholder Advisory Group released its set of Data Exchange Framework Guiding Principles which establish core expectations that guide and design implementation of the exchange framework. These include:

- Advance Health Equity
- Make Data Available to Drive Decisions and Outcomes
- Support Whole Person Care
- Promote Individual Data Access

- Reinforce Individual Data Privacy & Security
- Establish Clear & Transparent Terms and Conditions for Data Collection, Exchange, and Use
- Adhere to Data Exchange Standards
- Accountability

An initial data sharing agreement will be established by July 1, 2022. This agreement will define a common set of policies and procedures that will govern and require the exchange of health information among health care entities and government agencies in California. CalHHS expects that, by January 31, 2023, the Data Exchange Framework will be used by general acute care hospitals, physician organizations, medical groups, skilled nursing facilities, health service plans, disability insurers, Medi-Cal managed care plans, clinical laboratories, and acute psychiatric hospitals. Also, CalHHS and the California State Association of Counties will encourage as many county health, public health, and social services providers to connect with the Data Exchange Framework. Full implementation is expected to occur by January 31, 2024, with all participating entities able to exchange health information or provide access to health information to other entities in real time for treatment, payment, or health care operations.

DHCS continues to partner with the California Health Care Foundation (CHCF) in assessing the HIT/E landscape for Medi-Cal beneficiaries and the state as a whole. CHCF is currently co-sponsoring a Phase 2 HIT/E landscape assessment of local HIT/E resources that will be vital for the implementation of CalAIM, DHCS's 1115 Waiver initiative, to promote whole person and coordinate care for all Medi-Cal beneficiaries. A major component of this assessment will involve interviews and surveys of statewide and local stakeholder groups.

1.11 PUBLIC HEALTH REPORTING AND SURVEILLANCE

1.11.1 CALIFORNIA PUBLIC HEALTH HIE INFRASTRUCTURE OVERVIEW

The CDPH and the 61 local health departments (LHDs) form a federated public health system in order to promote the health and well-being of Californians. Federal regulations incentivize EPs, EHs, and CAHs to send data to state, local and tribal public health agencies. As such, it is imperative that California's public health agencies are supported in the design, development, and implementation of a public health infrastructure for HIE and HIT that will enable EPs and EHs to meet public health objectives (i.e., electronic reportable laboratory result reporting, electronic case reporting, immunization registries, public health registries, and syndromic surveillance) supporting the Medi-Cal PIP. Since 2011, California's public health agencies collaborated and coordinated in statewide Medi-Cal PIP activities including:

- **Assessed state, local and tribal public health agencies' (PHA) capabilities to receive data for all Medi-Cal PIP objectives related to public health.** CDPH posted the "California Public Health Meaningful Use Capability" table[53] publicly for EPs and EHs to access. This added clarity for EPs and EHs by directing them to the appropriate PHA to register and send data for the various public health measures. The table is printable and can be used for documentation, as well as to identify where there is not a public health agency capable of receiving electronic data in order for EPs and EHs/CAHs to claim an exclusion for a particular measure.

- **Implemented statewide coordination for Medi-Cal PIP.** Public health services and programs are led and coordinated by CDPH. The 61 local PHAs are comprised of all 58 counties and 3 city health departments in Berkeley, Long Beach and Pasadena, which function to implement those services and programs. Multiple jurisdictions may cause confusion for EPs and EHs/CAHs who were not able to differentiate between the varying reporting requirements of: (1) current federal, state, and local public health reporting requirements, (2) Medi-Cal PIP reporting to PHAs, and (3) attestation requirements for CMS EHR Incentive Programs. Accordingly, CDPH developed a public website[54] for providers and hospitals to access clear information regarding the different public health reporting requirements.

- **Assessment of technology and resources to support a public health infrastructure for HIE/HIT.** CDPH and California's LHDs have incorporated various programs that support the Medi-Cal PIP. The technical maturity that supports HIE/HIT varies greatly among LHDs, from small counties that rely on CDPH to assist with data collection for the public health measures to the more advanced LHDs that have developed HIE technology to support data exchange. To date, the ONC and CMS have supported the following public health projects in California:

  San Diego Beacon Community received $15 million from the ONC to expand electronic health information exchange through the San Diego Health Connect HIE.

  - CalHHS, through funds from the ONC HIE Cooperative Agreement, supported the development of an immunization portal for the receipt of electronic data to the California Immunization Registry (CAIR).

[53] CDPH, *California's Public Health Meaningful Use Capability* (table). Accessed April 25, 2018.

[54] CDPH, Health Information Exchange Gateway (website). Accessed on: April 25, 2018.

- The Medi-Cal PIP received 90/10 FFP funding to support development of CAIR2 which supports bidirectional exchange.

- The Medi-Cal PIP also received 90/10 FFP funding to support the onboarding of EHs for electronic laboratory reporting to the California Reportable Disease Information Exchange (CalREDIE).

In order to meet Stage 2 requirements for PHAs to declare readiness for registration, onboarding, and acknowledgement of EHs, CAHs, and EPs, the CDPH launched the HIE Gateway in October 2013. Using limited state funding, CDPH developed a secure, web-based registration system and messaging portal, which allows EPs and EHs to fulfill their Medi-Cal PIP Stage 1, 2, and 3 requirements to send data to PHAs. The HIE Gateway was designed to provide EPs and EHs/CAHs with a centralized system to register the intention to submit data to multiple CDPH programs, electronically upload their credentials for verification, and transport data through an onboarding process for automated data exchange between CDPH programs and EHR systems. The system is able to receive HL7 messages in Simple Object Access Protocol (SOAP), an ONC and CDC recommended transport messaging protocol. CDPH successfully provided a registration system to the California Cancer Registry and CalREDIE, and has been able to onboard EHs successfully to CalREDIE for electronic laboratory reporting. Attempts at migrating the existing Immunization Portal to the HIE Gateway as an enterprise solution as well as further development and expansion of the Gateway to other CDPH programs have been delayed due to lack of funding. However, DHCS is examining the possible use of HITECH funding for these efforts.

The San Diego Beacon Project has already successfully established an HIE framework for interconnecting various local healthcare facilities and services. While interoperability between and with the more mature regional solutions is a top priority for the CDPH, the State and PHAs have begun to discuss opportunities provided by the EHR Incentive Program for collaboration and coordination as a mutually beneficial partnership to establish and maintain a statewide public health HIE framework. The establishment of a statewide framework is not without challenges, from legal authority to collect and store data, to sustainability; however, there has been progress since the commencement of the EHR Incentive Program.

1.11.2 LABORATORY AND DISEASE REPORTING

In developing capacity to support Medi-Cal PIP requirements, DHCS partnered with the CDPH to improve electronic laboratory reporting. Current systems and infrastructure were

modified to adapt to new federal standards for data transmission. A brief description of public health systems and applicable Medi-Cal PIP requirements are described below.

CALREDIE

The Division of Communicable Disease Control (DCDC) through CalREDIE supports the electronic submission of laboratory results for reportable diseases via the Electronic Laboratory Reporting (ELR) system, as well as web-based Confidential Morbidity Reporting. CalREDIE is used for reporting the reportable diseases and conditions cited under Title 17, Sections 2500 and 2505 of the California Code of Regulations. State legislation (AB 2658) requires laboratories to electronically transmit laboratory reports to the State of California. CalREDIE was designed to improve the efficiency of surveillance activities and the early detection of public health events through the collection of accurate and timely surveillance information.

As of December 2021, CalREDIE had over 500 submitters in ELR production. Approximately 95 percent of reportable disease incidents in CalREDIE are electronically submitted. On average, CDPH receives approximately 375,000 production ELRs per day that are incorporated into CalREDIE or provisioned to the Office of AIDS, Los Angeles County, San Diego County, or San Francisco County. The CDPH will continue to assist EHs in achieving both Medi-Cal PIP requirements as well as compliance with state laboratory reporting regulations.

CalREDIE declared readiness on July 1, 2017 to receive HL7 formatted electronic initial case report (eICR) messages in accordance with the “HL7 CDA® R2 Implementation Guide: Public Health Case Report - the Electronic Initial Case Report (eICR)”. The state of California uses the HL7 electronic initial case report (eICR) standards for electronic case reporting (eCR) to support the new CMS Promoting Interoperability regulations for eCR. CalREDIE also requires the use of APHL AIMS and the Reportable Condition Knowledge Management System (RCKMS) to ensure appropriate routing and reporting of electronic initial case report messages.

CalREDIE has developed the “CalREDIE eCR Registration Portal” for healthcare organizations (HCO) to register their intent to submit via eCR and to facilitate the tracking of onboarding status by CalREDIE staff. CalREDIE has developed an eICR Repository to parse COVID-19 data from eICR messages to an internal database that serves as a data pipeline to feed into the CalREDIE surveillance system. As of December 2021, 484 HCOs have registered on the CalREDIE eCR Registration Portal, 21 HCOs have fully on boarded and are in parallel production for COVID-19 reporting, two are pending onboarding for parallel production of COVID-19. CalREDIE will implement an eCR module in the surveillance system in 2022 which will allow for receipt and processing of eICRs for all reportable conditions in CA.

WEBCOLLECT

The Childhood Lead Poisoning Prevention Branch (CLPPB), through its web-based reporting system (WebCollect), currently receives over 700,000 blood lead tests per year from over 300 laboratories, with the majority being by an HL7 format. CLPPB developed and maintains WebCollect, which supports both the CLPPB's childhood lead poisoning prevention Response and Surveillance System for Childhood Lead Exposure (RASSCLE II) data application and the Occupational Lead Poisoning Prevention Program's (OLPPP) Elevated Lead Visual Information System (ELVIS). The CLPPB and the OLPPP are participating in ongoing discussions with departmental programs and committees on optimizing receipt of laboratory samples and results from eligible professionals and laboratories.

CALIFORNIA CANCER REGISTRY

The Cancer Surveillance and Research Branch manages the California Cancer Registry (CCR) which collects information about all cancers diagnosed in California (except basal and squamous cell carcinoma of the skin and carcinoma in situ of the cervix). The CCR has expanded their technical capacity to receive data in compliance with the Medi-Cal Promoting Interoperability Program. Currently, CCR collects over 800,000 electronic pathology reports from roughly 400 different reporting entities via direct electronic exchange per year. Funding is needed for the program to: (1) support the technical capability for data receipt from qualified reporting entities for cancer case reporting as specified in the Medi-Cal Promoting Interoperability Program: Public Health and Clinical Data Registry Reporting: Measure 4: Public Health Registry Reporting, (2) implement new and maintain current direct connections, (3) adapt HL7 2.5.1 laboratory specification guidelines per current standards, and (4) capture structured data for the improvement in quality of care to cancer patients. In addition to receiving laboratory results, public health programs also receive specimens and generate results. Public health programs that provide results are described below.

LAB FIELD SERVICES

The Lab Field Services (LFS) provides oversight for clinical and public health laboratory operations and for the licensed and certified scientists and other testing personnel who perform testing in clinical laboratories. To assist department-wide and statewide efforts to meet MU requirements, LFS is working to disseminate information regarding these federal regulations to California laboratories and to collaborate with interagency efforts to administer lab assessments.

CALIFORNIA LABORATORY INFORMATION MANAGEMENT SYSTEM

The California Laboratory Information Management System (CalLIMS) implements a common data structure and user interface across CDPH laboratories in order to centralize tracking of patient records and laboratory specimens. This system has the capacity to

send HL7 messages although there have not been resources to implement this functionality to date.

1.11.3 SPECIALIZED REGISTRIES

CDPH supports a number of specialized registries to receive information about prevention and treatment of specific diseases and conditions.

- Tobacco Control Program, California Smoker's Hotline:

  California's Tobacco Control Program (CTCP) improves the health of all Californians by reducing illness and premature death attributable to the use of tobacco products. The CTCP has developed a telephone program called the California Smoker's Helpline[55] (Helpline) to help the public quit smoking and/or vaping. The Helpline offers free telephone counseling and mailed materials in multiple languages. They also offer tobacco cessation information and support through text messaging, web chat, and Amazon Alexa Skills coaching, as well as training to healthcare providers. In 2011, CMS approved of provider referrals to the Helpline in order to meet NQF Measure Number 0027 for smoking and tobacco use cessation. As such, the CTCP has been working with EHR vendors as well as the University of California healthcare systems to develop an interface for electronic referrals to the Helpline. CDPH has determined that the helpline, meets the "Other Specialized Registry" Medi-Cal PIP measure. Further funding could expand the EHR interface to other provider clinics, hospitals and healthcare systems.

- Genetic Disease Screening Program- A Registry for Genetic Disorders:

  The Genetic Disease Screening Program[56] (GDSP) which includes the Prenatal Screening Program (PNS) and Newborn Screening (NBS) Program screens pregnant women and newborns in California for genetic and congenital disorders in a cost-effective and clinically effective manner. The screening programs provide testing, follow-up and early diagnosis of disorders to prevent adverse outcomes or minimize the clinical effects. The GDSP is working towards the electronic submission of screening results in HL7 v.2.5.1 messaging standards to hospitals and clinicians as well as the receipt of clinical provider order entries for newborn and prenatal screenings. Currently, there are 27 hospitals and one physicians' group receiving all their newborn screening results electronically.

[55] CDPH, California Smoker's Helpline. Accessed November 18, 2020.

[56] CDPH, Genetic Disease Screening Program. Accessed April 25, 2018.

The GDSP is also responsible for maintaining California case registries of all targeted disorders detected by the Newborn and Prenatal Screening Programs. With respect to newborn screening, the registries include metabolic, endocrine, hemoglobin, lysosomal storage and spinal muscular disorders. The registries also include affected newborns that were born in military hospitals, residents that were born in facilities outside the State, individuals diagnosed that did not participate in the NBS, and cases that were missed through screening. Data from these registries are used to evaluate screen test performance and the incidence rate of these disorders in the California population. De-identified data from these registries have been used in a variety of epidemiological studies. With respect to the PNS Program, two additional registries include newborns diagnosed with chromosome abnormalities and neural tube defects. These registries include both prenatally diagnosed cases as well as infants up to one year of age. The registry includes both cases that were screened and not screened by the program. The information in the registries is used for a variety of purposes, including estimating program detection rates and overall impact on birth defect prevalence rates.

- Stroke Registry:

  The California Stroke Registry / California Coverdell Program (CSR/CCP) aims to: 1) reduce the rate of premature death and disability form acute stroke, 2) increase public awareness of stroke treatment and prevention, and 3) reduce disparities in acute stroke care by providing underserved populations with better access to treatment. The CSR monitors the quality of acute stroke care across clinical settings, including pre-hospital care, provided via emergency medical services (EMS) and in-hospital care. Registry data are used to help hospitals and EMS partners close the gap between stroke care guidelines and practice. As noted in the CHHS HIE Plan 2012-2014 submitted to the ONC under the HIE Cooperative Agreement, electronic capability to receive real-time information about patients with suspected or confirmed stroke cases into the CSR from hospitals and local EMS agencies would assist in assessing the quality of care and care coordination to patients. Even more so, the capability to send information electronically from the CSR to EMS agencies will support improvements in effective emergency treatment and response.

- California Parkinson's Disease Registry:

  Legislatively established in 2004, the California Parkinson's Disease Registry was intended to be a confidential database that contains information about the extent and characteristics of Parkinson's disease (PD) in California. Information collected from local physicians, pharmacists, and health care facilities (designated as reporting sources in the statute) will include demographic information (such as name, birth

date, address) about people with PD, their health care providers (such as physician specialty), as well as basic clinical information (such as date of diagnosis, medications, disease features). CPDR has collected 186,414 reports of Parkinson′s diagnosis since July 1, 2019. 179,000 reports have been submitted via direct electronic reporting through established connections with over 300 reporting entities. Over 7,000 reports have been submitted via manual data entry. Although implementing legislation was passed and the program was implemented at a minimal level for surveillance, funding is needed to support further development.

- Office of Oral Health:

  The California Office of Oral Health (OOH) promotes oral health and reduces oral diseases through prevention, education, and organized community efforts. The California Oral Health Surveillance System (CA OHSS) is responsive to the California Oral Health Plan 2018-20228. It provides a consistent source of reliable and valid information for use in developing, implementing, and evaluating programs to improve the oral health of California residents. The CA OHSS objectives are to provide current data on oral health diseases/conditions, risk/protective factors, and use of dental services; and to guide oral health needs assessments, policy development, and assurance functions. In addition, CA OHSS provides a mechanism to routinely monitor state-specific oral health data and the impact of interventions within specific priority populations.

1.11.4 SYNDROMIC SURVEILLANCE REPORTING

Currently, the CDPH does not have a statewide syndromic surveillance system but is evaluating the use and expansion of the CDC National Syndromic Surveillance Program's (NSSP) BioSense/ESSENCE platform. CDPH-CHSI (Center for Health Statistics and Informatics) has two, limited-term staff working part-time to assess statewide expansion and implementation of BioSense. This team will present findings and recommendations to CHSI leadership in the summer of 2022. Currently, California state law does not explicitly grant the CDPH the authority to collect syndromic surveillance data. However, 11 LHDs have independently on boarded to NSSP-BioSense and have the authority and capabilities to receive electronic syndromic surveillance data with the priority being emergency department data. The counties that independently on boarded with BioSense include: El Dorado, Madera, Monterey, Nevada, Plumas, Riverside, Sacramento, San Mateo (including some facilities in Santa Clara and Alameda counties), Santa Cruz, Stanislaus, and Yolo. In addition, there is one EH contributing data in the following five counties: Tuolumne, Napa, Kings, San Joaquin, and Yuba. In summary, there are 18 California counties contributing syndromic surveillance data to NSSP-BioSense in some capacity.

1. El Dorado County
2. Monterey County
3. Nevada County
4. Plumas County
5. Riverside County
6. Sacramento County
7. San Mateo County (includes some facilities in Santa Clara and Alameda)
8. Santa Cruz County
9. Stanislaus County
10. Yolo County
11. An additional 5 Adventist sites in Tuolumne, Napa, Kings, San Joaquin, and Yuba County
12. Yosemite Region (Madera County)

1.11.5 IMMUNIZATION REGISTRIES

The California Immunization Registry (CAIR) provides secure, electronic exchange of immunization records to support the elimination of vaccine-preventable diseases. CAIR allows users to see patient demographic data, immunization history, immunization forecasting, contraindications, overdue immunizations and other functions. CAIR provides users with copies of standard immunization record cards, usage reports, appointment reminders, and inventory management. At the present time, there is no interoperability between CAIR and public health surveillance reporting databases, although both state and county surveillance staffs are able to access patient information in CAIR.

Electronic HL7 data submission to CAIR began in 2012 with the installation of add-on software (HL7Jump) that was able to translate HL7-formatted immunization messages into the CAIR software's native 'flat file' format.

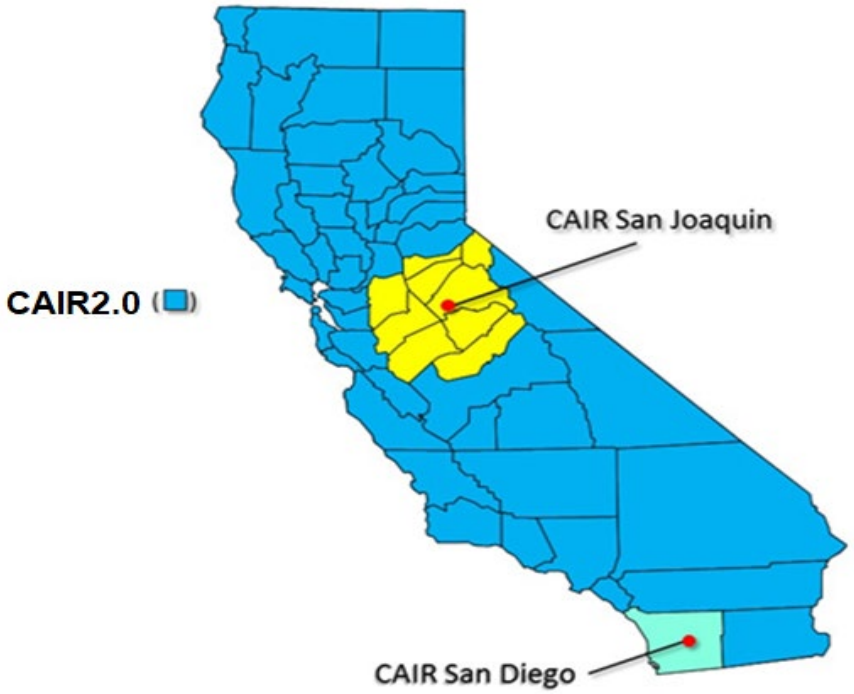
Additionally, in preparation for Medi-Cal PIP Stage 2, the ONC HIE Cooperative Agreement with CalHHS funded the development of an online web application known as the CAIR Immunization (IZ) Portal to automate and manage registration for provider clinics, hospitals, and HIEs/HIOs) via HL7 message testing, and onboarding of sites to full production immunization data submission. The IZ Portal was first launched on August 2013 and since that time, the Portal has received and imported more than 150 million vaccination records into the registry.

More recently, with the implementation of a California-customized version of the Wisconsin Immunization registry (WIR) software in October 2016, CAIR is now fully capable of receiving and sending HL7 messages in compliance with the Medi-Cal PIP specifications.

In 2017, California completed the first stage of the immunization registry consolidation project (CAIR2). The project combines data from 7 of the 10 CAIR regional registries (comprising 87 percent of CA's population) into a single statewide CAIR2 registry hosted by CDPH. The second stage of the project, which began in late 2017, involves the transfer of historical data and ongoing daily uploads to CAIR2.0 from the three remaining CAIR regional registries, such that the entire state becomes consolidated into CAIR2. This will allow statewide patient lookup of immunization records. Integration of Imperial County data was completed in 2018 and Imperial County users began using CAIR2. The two remaining regions listed below (and shown in Figure 22**)** will continue to use their own software locally but will be connected to CAIR2 via a web service connection. The second stage of the project was stalled due to the global pandemic and COVID response. During the time, CAIR San Diego has decided to migrate fully into CAIR2, with a target of spring 2022 for completion.

- CAIR San Joaquin (locally known as RIDE)
- CAIR San Diego (locally known as SDIR)

Figure 20: STATEWIDE INTEGRATION OF THE CALIFORNIA IMMUNIZATION REGISTRY



As noted in Table 29, CAIR2 currently has over 10,000 sites submitting ‘production’ patient data in HL7 format to CAIR and qualifying for ‘ongoing submission’ (terms are defined below the table). With respect to the range of EHR solutions being used, greater than 76 percent of the registered sites are using one of eight s that have already achieved data exchange with CAIR2, with Epic holding 55.5 percent of the share.

TABLE 29: CURRENT CAIR IZ PORTAL PARTICIPANTS AND STATUS* (EXCLUDES SAN DIEGO AND SAN JOAQUIN REGIONS)

Site Type	Ongoing Dose Submission	Bidirectional Messaging (BiDX)	% BIDX
Direct submission to CAIR2	614	178	30%
Indirectly submission via Sending Facilities	8,952	3,056	34%
Sending Facilities	107	-	-
TOTAL Submitters	9,763	3,234	-

* As of January 10, 2022.

While the majority of Medi-Cal PIP submissions are to CAIR2, each hospital or provider in San Diego County and San Joaquin County is required to submit information to the immunization registry in their jurisdiction. CAIR2.0 declared readiness for Medi-Cal PIP Stage 3[57] in 2018, established the capacity to receive National Drug Codes (NDCs), and in late 2017, implemented new software that allows bi-directional, real-time HL7 messaging. As of January 2022, 3,234 sites are actively engaged in submissions and bidirectional data exchange.

1.11.6 HOSPITALS AND PUBLIC HEALTH REGISTRY REPORTING

A number of barriers still remain for public health reporting. Using questions derived from the AHA survey (2017 through 2019), UCSF researchers identified the proportion of California hospitals reporting specific barriers to public health reporting and compared to national barriers reported by the Office of the National Coordinator for Health Information Technology. Understanding the barriers to interoperable data exchange with public health agencies became especially critical after the COVID-19 pandemic highlighted the difficulties with sharing and aggregating data across multiple stakeholders.

The most commonly reported barrier in California hospitals, as well as in hospitals across the US, is that public health agencies are unable to receive data electronically. This decreased slightly from 2017 (46.7 percent) to 2019 (44.9 percent). California hospitals

[57] CDPH, Health Information Exchange Gateway. Accessed April 25, 2018.

reported this barrier slightly less than hospitals nationally. Several response options were added to the survey in 2018, so data is unavailable for some questions in 2017.

TABLE 30: CALIFORNIA HOSPITAL-REPORTED BARRIERS TO ELECTRONICALLY REPORTING HEALTH INFORMATION TO PUBLIC HEALTH AGENCIES

Challenge Reported	2017	2018	2019
Public health agencies lack the capacity to electronically receive the information	46.7%	45.1%	44.9%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	33.9%	30.3%
Difficulty extracting relevant information from EHR	-	12.5%	20.2%
NA (e.g. not participating in CMS EHR incentive program)	-	9.5%	11.1%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.8%	11.3%	10.2%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	9.9%	4.5%
Other challenges	13.4%	5.5%	4.0%
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	1.4%	1.9%	2.2%

Large hospitals and teaching hospitals reported fewer barriers in most years (Tables 31 and 32). Urban hospitals were also less likely to report that public health agencies were unable to receive data electronically (Table 33).

TABLE 31: BARRIERS TO ELECTRONICALLY REPORTING HEALTH INFORMATION TO PUBLIC HEALTH AGENCIES BY HOSPITAL SIZE

Small Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	2%	5%	5%
Public health agencies lack the capacity to electronically receive the information	35%	44%	46%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	22%	10%
Difficulty extracting relevant information from EHR	-	20%	19%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	33%	28%
We use different vocabulary standards than the public health agency, making it difficult to exchange	22%	14%	4%
Other - challenges	22%	5%	5%
NA (e.g. not participating in CMS EHR incentive program)	-	17%	9%

Medium Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.9%	0.8%	1.2%
Public health agencies lack the capacity to electronically receive the information	52.8%	47.3%	48.5%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	6.4%	1.8%
Difficulty extracting relevant information from EHR	-	10.1%	23.9%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	36.5%	36.3%
We use different vocabulary standards than the public health agency, making it difficult to exchange	16.6%	9.0%	13.5%
Other - challenges	10.1%	6.1%	3.2%
NA (e.g. not participating in CMS EHR incentive program)	-	6.4%	10.5%

Large Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	3.2%	0.0%	0.0%
Public health agencies lack the capacity to electronically receive the information	44.6%	36.9%	24.1%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	0.0%	4.6%
Difficulty extracting relevant information from EHR	-	7.8%	4.4%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	23.9%	4.0%
We use different vocabulary standards than the public health agency, making it difficult to exchange	14.8%	17.8%	8.1%
Other - challenges	9.2%	3.1%	4.6%
NA (e.g. not participating in CMS EHR incentive program)	-	7.8%	20.0%

TABLE 32: BARRIERS TO ELECTRONICALLY REPORTING HEALTH INFORMATION TO PUBLIC HEALTH AGENCIES BY HOSPITAL TEACHING STATUS

Non-Teaching Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.0%	3.5%	4.1%
Public health agencies lack the capacity to electronically receive the information	39.1%	49.0%	51.9%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	13.1%	6.3%
Difficulty extracting relevant information from EHR	-	15.4%	26.5%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	34.8%	44.2%
We use different vocabulary standards than the public health agency, making it difficult to exchange	18.3%	13.2%	7.6%
Other - challenges	15.7%	5.7%	4.3%
NA (e.g. not participating in CMS EHR incentive program)	-	12.1%	6.3%

Teaching Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	3.4%	0.0%	0.0%
Public health agencies lack the capacity to electronically receive the information	56.8%	40.2%	37.0%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	6.0%	2.5%
Difficulty extracting relevant information from EHR	-	8.9%	13.1%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	32.9%	14.4%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.3%	9.0%	13.1%
Other - challenges	10.4%	5.3%	3.5%
NA (e.g. not participating in CMS EHR incentive program)	-	6.3%	16.5%

TABLE 33: BARRIERS TO ELECTRONICALLY REPORTING HEALTH INFORMATION TO PUBLIC HEALTH AGENCIES BY HOSPITAL LOCATION

Rural Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.0%	0.0%	12.6%
Public health agencies lack the capacity to electronically receive the information	36.9%	63.8%	52.0%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	11.5%	12.6%
Difficulty extracting relevant information from EHR	-	39.0%	22.7%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	52.4%	41.7%
We use different vocabulary standards than the public health agency, making it difficult to exchange	19.6%	11.5%	10.7%
Other - challenges	35.6%	0.0%	10.7%
NA (e.g. not participating in CMS EHR incentive program)	-	9.7%	0.0%

Urban Hospitals

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	1.6%	2.1%	1.4%
Public health agencies lack the capacity to electronically receive the information	47.5%	43.7%	44.4%
We lack the capacity (e.g., technical, staffing) to electronically send information.	-	9.8%	3.9%
Difficulty extracting relevant information from EHR	-	10.6%	20.1%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	-	32.6%	29.5%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.7%	11.3%	10.2%
Other - challenges	11.6%	5.9%	3.5%
NA (e.g. not participating in CMS EHR incentive program)	-	9.5%	11.9%

1.12 INFORMATION TECHNOLOGY INFRASTRUCTURE AND MEDICAID INFORMATION TECHNOLOGY ARCHITECTURE

Medicaid Information Technology Architecture (MITA) is a CMS initiative and framework aimed at improving Medicaid administration through integrated business, information, and technology transformation. States must comply with MITA requirements when developing project solutions and when preparing Advance Planning (APDs) and procurements in order to be approved by CMS and receive enhanced federal funding for projects. MITA aims to move the design and development of Medicaid systems and processes away from the siloed sub-systems that have comprised typical legacy systems. MITA encourages states to leverage business solutions and to share information both within the state and across Medicaid programs nationwide.

1.12.1 MEDICAID ENTERPRISE SYSTEM

Using CMS' MITA Framework as the reference architecture, DHCS defines the Medi-Cal Enterprise as the business organization, processes, information, and tools / technologies that support the administration of Medi-Cal and other DHCS programs. Historically, the technology supporting the Medi-Cal services was broken down into three major areas - Medicaid Management Information Systems (MMIS), Eligibility and Enrollment (E&E) Systems and Health Information Technology for Economic Clinical Health (HITECH). However, in recent years, these three areas have merged to form DHCS' Medi-Cal Enterprise System (MES). DHCS defines the MES as the collection of systems and other technical components used in the management and support of the Medi-Cal Enterprise.

Additionally, the MES includes projects and systems outside of the Department, including, but not limited to, the California Statewide Automated Welfare System (CalSAWS); Case Management, Information and Payrolling System; and the California Healthcare Eligibility, Enrollment and Retention System (CalHEERS).

DHCS has embarked upon a continuous modernization approach to update and modernize existing MES components, which rely on a broad mix of technologies, some of which were originally built over 40 years ago and have been cobbled together over the following decades. Built to meet different program and business needs in different times, the MES only provides partially automated support for business processes supporting California's Medi-Cal Enterprise, has overlapping or non-comprehensive functionality without comprehensive and consistent business rules, and is unable to keep up with changing and evolving programs. It therefore struggles to meet the critical health care demands of California.

To improve outcomes, DHCS changed its approach from focusing on individual technology systems to focusing on the entire MES. DHCS' MES Modernization represents a transition from separate efforts to a single, holistically managed modernization-focused approach to the MES. Moving from the traditional historical models and transforming to an enterprise-focused MES Modernization approach, supports a higher degree of interoperability among systems, while maximizing value and minimizing burden on the recipients and providers of the Medi-Cal program.

The MES Modernization focuses on delivering a more holistic and cohesive MES comprised of strategic modules to meet business needs, eliminate overlap, and fill gaps. This enterprise strategy enables DHCS to re-architect, reuse, and build capability and efficiency to deliver an MES that can sustainably meet California's needs to delivering Medi-Cal services now and in the future. The MES Modernization effort also includes modernizing and/or replacing subsystems that support the Medi-Cal Managed Care Program, where more than 80 percent of beneficiaries are enrolled for Medi-Cal services.

1.12.2 MEDICAID INFORMATION TECHNOLOGY ARCHITECTURE

The State Medicaid HIT plan has been implemented in accordance with the MITA principles as described in the Medicaid Information Technology Framework 3.0. DHCS submits an annual MITA State Self-Assessment (SS-A) for the Medi-Cal program, identifying the "as-is" and "to-be" maturity levels of the Medi-Cal program across all major business processes. DHCS is using the SS-A today to support major projects across DHCS enterprise. Current SS-A goals transition Medi-Cal to a service-oriented program with enhanced capabilities for its customers and business partners. DHCS MITA Roadmap, which documents how DHCS intends to advance along the maturity continuum, is included in the annual SS-A. As part of the MITA SS-A, DHCS identified intrastate

health information exchange capabilities as a key to achieving increased MITA maturity, and support of the Care Management business domain. MITA has the following goals:

- Develop seamless and integrated systems that communicate effectively to achieve common Medicaid goals through interoperability and common standards.
- Promote an environment that supports flexibility, adaptability, and rapid response to changes in programs and technology.
- Promote an enterprise view that supports enabling technologies that align with Medicaid business processes and technologies.
- Provide data that is timely, accurate, usable, and easily accessible in order to support analysis and decision making for health care management and program administration.
- Provide performance measurement for accountability and planning.
- Coordinate with public health and other partners to integrate health outcomes within the Medicaid community.

MITA AND HIE/HIT

The goals for MITA's "business-driven enterprise transformation" require the ability to easily and readily exchange health data electronically, the key connection between MITA and HIE/HIT. In 2014, CalHHS and DHCS completed an HIE/HIT Architecture Roadmap to define and provide the actionable roadmap for the "To-Be" for HIE at DHCS. (SMHP; May 2021, Appendix 7) Since that time, DHCS has worked through managed care plans and with providers to advance clinical data exchange. Data exchange is critical for current DHCS initiatives related to coordination of care for beneficiaries, including California Advancing and Innovating Medi-Cal (CalAIM), which is a long-term commitment to transform and strengthen Medi-Cal, offering Californians a more equitable, coordinated, and person-centered approach to maximizing their health and life trajectory. These care coordination initiatives align with MITA goals to mature the exchange of health information using health information technology.

MITA AND ELECTRONIC CLINICAL DATA

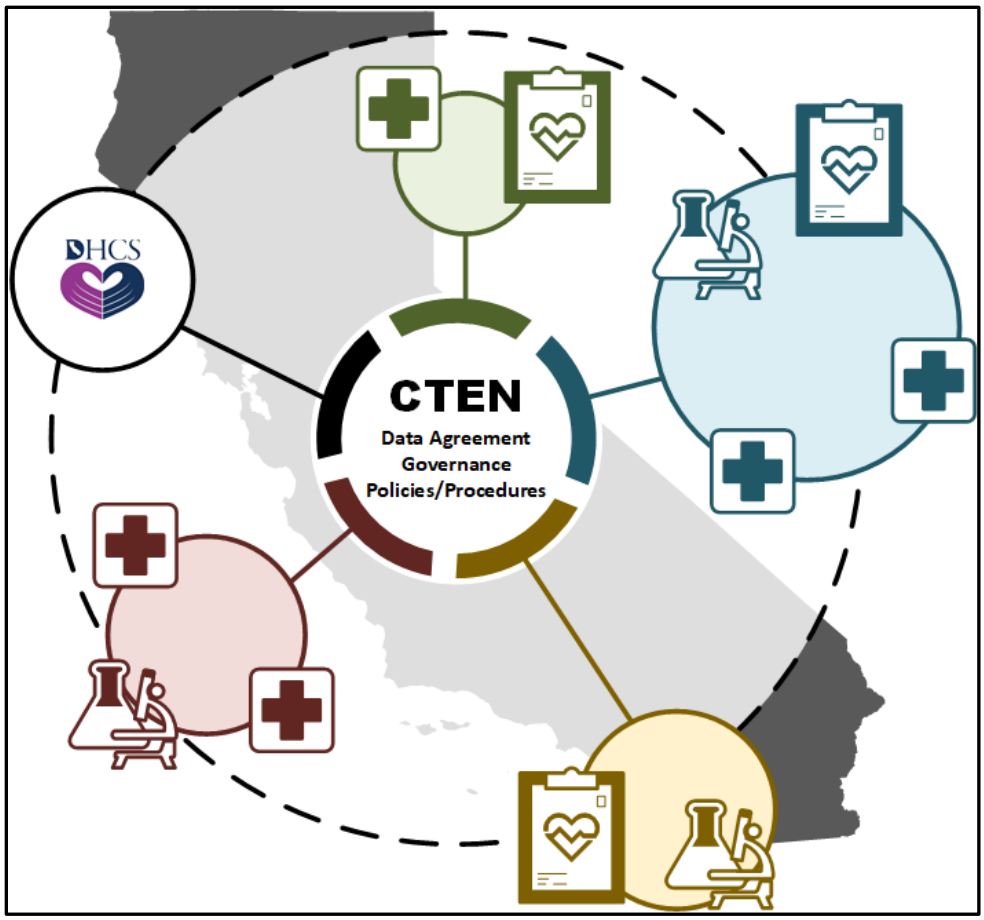
The use of clinical data by DHCS is a critical component for improving the quality, efficiency, and cost-effectiveness of care delivered to Medi-Cal members. Through the evaluation of data collected by clinical quality management programs, it becomes possible to identify gaps and areas for improvement as well as identify high-risk patients and disease or risk-specific programs. Within DHCS, as allowed by the Superior Systems Waiver (SSW), the Clinical Assurance Division performs utilization review and post-claims oversight for services provided to FFS Medi-Cal members. This oversight includes the

determination of specific types of services which do not require a Treatment Authorization Request (TAR). Additionally, the SSW specifies how non-designated public hospitals and private hospitals can transition from the current use of TARs to the use of their own utilization management systems. Through the TAR-Free process, participating hospitals provide access to the electronic medical records to DHCS clinical staff to facilitate claims review. This allows DHCS to more efficiently collect the information needed to implement a TAR-free process through the use of clinical data obtained from hospitals.

DHCS is an active participant in the California Trusted Exchange Network (CTEN), which allows the Department to query external organizations for clinical documents using industry-standard HIE technologies and practices. DHCS will use HIE through the CTEN to obtain clinical documentation for Medi-Cal members in support of CAD program operations under the SSW. DHCS expects use of HIE through CTEN to expand to other program areas over time.

The CTEN is administered by the California Association of Health Information Exchanges (CAHIE). Participating organizations are bound by the California Data Use and Reciprocal Support Agreement (CalDURSA) to ensure proper standards and practices among all parties. In addition, the California Interoperability Committee (CIC), which consists of voting members from CTEN-participating organizations, provides governance for the network.

Figure 21: DHCS APPROACH TO HEALTH INFORMATION EXCHANGE



Effective intrastate data exchange processes and protocols utilized by the DHCS clinical data exchange effort will lay the groundwork for leverage within California across hospital trading partners. The clinical documentation storage and management mechanisms sophisticated enough to better share data with CalHHS and its associated departments, including DHCS, CDPH, and CDSS. CalHHS provides leadership and goal-setting for the specific issue of leverage, since so many California State departments under the CalHHS umbrella have business needs and existing investments in the area of health information management.

MITA AND PUBLIC HEALTH

CDPH understands the importance of the public health inclusion in MITA, which places it in alignment with the Medi-Cal PIP and ONC rules. Key benefits of CDPH involvement in MITA includes:

- Facilitation of collaboration, communication, and coordination with providers, hospitals, health systems, laboratories, local public health agencies, state agencies, and federal agencies.
- Increased standardized data collection in real-time to public health registries for a quicker public health response to emerging threats and disease prevention.
- Meaningful use of public health data for public health surveillance, quality of care, care coordination, and reduction of health care costs.
- Standardized data collection for analytics.
- Facilitation of interoperability within Public Health systems and with other state, health and medical systems.

A list of the CDPH registries, as well as other CDPH programs that may be included in the HIE/HIT Architecture Roadmap were noted in Section 1.11. These programs may be included under the various business areas as outlined by the HHS and the CMS. The development of a public health HIE infrastructure with supportive technical solutions would allow the CDPH and the 61 LHDs to further data exchange with the State Medicaid Agency.

1.13 INTERSTATE EXCHANGE ACTIVITIES

Some Medi-Cal beneficiaries, such as college students, receive medical services from out of state providers. A review of data from DHCS's MIS/DSS system for fiscal year 2020-21 found that approximately 751,000 beneficiaries (six percent of beneficiaries) received Medi-Cal-funded services from out of state providers. Of these, approximately ten percent (76,600) received services from providers in the border states of Oregon, Nevada and Arizona. Some residents from other states also receive Medi-Cal funded services in California. In fiscal year 2020-21 these beneficiaries totaled approximately 378,000.

For EHR Incentive Program eligibility purposes DHCS allows hospitals and professionals to choose between counting only discharges or encounters for California residents, or discharges for residents of both California and another state – whichever will result in the highest percentage of Medicaid discharges or encounters for the hospital or professional. The CMS Cost Reports are used to capture data on out-of-state discharges from hospitals. Since cost reports do not break out data by state, in the case where a hospital

chooses to establish patient volume only using California patients and cost report data do not correspond to that reported by the hospital, DHCS requires the hospital to submit other supporting documents such as audited annual hospital disclosure reports. It is important to note that the CMS National Level Registry (NLR) does not allow hospitals or professionals to claim EHR incentive funds in more than one state for each program year. DHCS has not experienced a significant number of providers using beneficiaries across state lines to establish eligibility. On the rare instances when this has occurred, DHCS has reached out to the other states to confirm the provider's credentials as well as reported patient volumes.

1.13.1 WESTERN STATES CONSORTIUM

Established in October 2011, the Western States Consortium (WSC) was comprised of eight core states (Oregon, California, Arizona, Hawaii, Utah, Nevada, Alaska, and New Mexico) and two satellite states (Washington and Idaho). Five other states; Colorado, Florida, Georgia, Michigan, and Ohio, later joined the consortium. The goal of the WSC was to establish policies and technical solutions to support direct exchange and advance HIE across state borders. California and Oregon participated in two proof-of-concept pilot demonstrations to show how local agreements and trust structures could be established to support interstate HIE. Additional states were included as the scope of the pilot expanded. Over the course of the demonstration pilot, the WSC found that trust bundle development remained easiest when focused on the minimum requirements. Additional findings included the need to further develop the infrastructure to facilitate the exchange of health information. Variances in state law or regulation and practice were identified as a possible barrier to the statewide expansion of direct exchange. At the end of the demonstration pilot, the WSC incorporated as NATE in May 2013 to continue to efforts of HIE exchange across state borders. In October 2015, CAHIE and NATE announced an effort designed to increase effective sharing of health information among providers and between providers and consumers. As part of this collaboration, NATE transitioned the Provider-to-Provider Trust Bundle to CAHIE[58]. The bundle enabled exchange across the nation and included California, Oregon, Utah, and Alaska. During the transitionary period, CAHIE agreed to establish a new national forum to develop policies and procedures to manage this trust bundle. From the forum discussions, it was determined that, due to the prevalence of existing DirectTrust accredited organizations, the effort to develop procedures would have been duplicative of those already in place. CAHIE has since decided to discontinue CTEN trust bundles published for DirectTrust.

1.13.2 UCSF HIO SURVEY (2019-2020)

[58] CAHIE, *NATE to Transfer Administration of Nation's First Trust Bundle for Provider Systems to CAHIE (October 7, 2015)*. Accessed April 25, 2018.

The HIO Survey conducted by UCSF in 2019-2020 found that 42 percent of HIEs in California exchange information with out-of-state HIEs. Also, 83 percent of California HIEs exchange data with a national network, with 75 percent participating in e-Health Exchange.

TABLE 34: PROPORTION OF HIOS USING SPECIFIED CONNECTIVITY APPROACH (CALIFORNIA VS. NATIONAL)

Connectivity Approach	National Data (N=89)	California Data (N=12)
Connect to other HIEs in SAME state	57%	67%
Connect to other HIEs in DIFFERENT state(s)	53%	42%
Sell/provide your infrastructure to other HIEs	24%	17%
Buy/use infrastructure from another HIE	13%	17%

TABLE 35: PROPORTION OF HIOS PARTICIPATING IN A SPECIFIED NATIONAL NETWORK (CALIFORNIA VS. NATIONAL)

Network Participation	National Data (N=89)	California Data (N=12)
e-Health Exchange	67%	75%
DirectTrust	46%	42%
SHIEC Patient Centered Data Home	38%	33%
Carequality	15%	17%
Surescripts	13%	8%
CommonWell	13%	8%
CareinAlliance	2%	0%
Digital Bridge	2%	0%
ANY OF ABOVE	83%	83%
NONE OF ABOVE	17%	17%

1.14 THE LEGAL LANDSCAPE

In October 2009, California passed Senate Bill (SB) 337[59]. The bill emphasized that the full benefits of health information technology could not be completely utilized unless electronic health record systems were supported by secure exchange of health records and used by health care providers and others throughout the state and across state boundaries. The ARRA of 2009 (Public Law 111-5) and its included HITECH Act, provided California the opportunity to improve its health care system through development of a statewide health information technology infrastructure. Federal grant funds provided by Section 3013 of the ARRA were used to expand the use of health information according to nationally recognized standards. SB 337 authorized CalHHS, or a department under its

[59] SB 337 (Alquist, Chapter 180, Statutes of 2009). Accessed April 25, 2018.

jurisdiction, to apply for federal health information technology and exchange funding made available through the ARRA. An included provision allowed for the selection of a qualified nonprofit to act as the state entity should CalHHS not submit an application for federal funds. In that instance, the state-selected entity would facilitate and expand the use and disclosure of health information electronically among organizations while protecting individual privacy and confidentiality of electronic medical records. All related funds received through the ARRA would be stored in the California Health Information Technology and Exchange Fund and used solely for the purposes of health information technology and exchange.

Assembly Bill (AB) 278,[60] enacted in 2010, stated that the Office of Health Information Integrity (CalOHII) as a department within CalHHS, was able to apply for federal funds available through ARRA. The identified role of CalOHII was to enforce state law as related to confidentiality of medical information and to impose administrative fines for the unauthorized use of medical information. Additionally, the bill allowed CalOHII to annually approve a maximum of four demonstration projects, or Health Information Exchange Privacy and Security Demonstration Projects, to evaluate possible solutions to facilitate HIE that promote quality of care and maintain the privacy and security of personal health information. The demonstration projects identified and examined barriers preventing the implementation of HIE, tested security and privacy policies for the secure exchange of health information, and identified and addressed any differences between state and federal laws surrounding the privacy of health information.

Approved in October 2011, SB 945[61] required DHCS to establish and administer the Medi-Cal EHR Incentive Program. Program administration duties included providing federal incentive payments to Medi-Cal providers for the implementation and use of electronic health records systems. Additionally, SB 945 required DHCS to accept applications from and make incentive payments to eligible professionals and hospitals to adopt, implement, upgrade, and meaningfully use certified electronic health records technology. The incentive payments made to eligible professionals and facilities must meet all standards included in the Medicaid EHR Incentive Program and used federal funds made available through Section 4201 of the ARRA (Public Law 111-5). The bill also required DHCS to develop the State Medicaid Health Information Technology Plan for federal approval. The bill included language that it would become inoperative on July 1, 2021, and would be repealed on January 1, 2022 unless a later enacted statute deletes or extends the dates on which it becomes inoperative.

[60] AB 278 (Monning, Chapter 227, Statutes of 2010). Accessed April 25, 2018.

[61] SB 945 (Committee on Health, Chapter 433, Statutes of 2011). Accessed April 25, 2018.

In September 2011, DHCS submitted SPA 11-017 for CMS review. Included in the SPA was the request to add optometrists as an eligible provider for purposes of the EHR incentive program. Approved in January 2013, the SPA allowed optometry services to be inclusive of services that a physician is authorized to perform. After receiving approval, DHCS designated optometrists as eligible providers, as indicated in CFR 495, Subpart B, section §495.100.

SB 870[62] was approved in June 2014 for the 2014-15 fiscal year. The bill approved appropriation of $3.7 million to DHCS to support the California Technical Assistance Program (CTAP) in accordance with the State Medicaid Health Information Technology Plan as specified in Section 14046.1 of the WIC.

In September 2016, the California Legislature enacted Senate Bill 482[63] to amend Sections 11165 and 11165.1 of, and to add Section 11165.4 of the Health and Safety Code. These changes required providers to both report and consult the Controlled Substance Review and Evaluation System (CURES) database before and after prescribing controlled substances. The expanded role of CURES has the potential to increase the role of health information exchange widely in California. In October 2017, AB 40[64] was approved and required that prescription drug records be made accessible through integration with a health information technology system. AB 528[65], approved October 2019, continues and adds reporting requirements for record integration with a health information technology system.

In October 2019, AB 1494 added Section 14132.724 to the Welfare and Institutions Code, which requires DHCS to post guidance on its website regarding reimbursement and submission of claims for telehealth or telephonic services rendered during a state of emergency. This guidance was not specific to any particular state-declared emergency and/or federally-declared public health emergency, but provided information regarding potential state and federal flexibilities that DHCS may be able to request and implement during a state-declared or federally-declared emergency.

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[62] SB 870 (Committee on Budget and Fiscal Review, Chapter 40 Statutes of 2014). Accessed April 25, 2018.

[63] SB 482 (Lara, Chapter 708, Statutes of 2016). Accessed October 30, 2018.

[64] AB 40 (Santiago, Chapter 607). Accessed September 3, 2020.

[65] AB 528 (Low, Chapter 677). Accessed July 29, 2021.

In July 2021, AB 133[66] was approved. This bill required CalHHS establish the California Health and Human Services Data Exchange Framework on or before July 1, 2022. The framework will be designed to enable real-time access to or the exchange of health information among health care providers and payers through any health information exchange in accordance to state and federal data requirements.

1.15 CLINICAL QUALITY

Each state Medicaid agency is required by the Medicaid Managed Care and CHIP Final Rule (42 CFR 438.340) to implement a written quality strategy to assess and improve the quality of health care and services. In 2018, DHCS wrote the *Medi-Cal Managed Care Quality Strategy Report* to meet the requirements. In 2020, updates from the *Medi-Cal Managed Care Quality Strategy* were combined with updates and revisions to the 2018 *DHCS Strategy for Quality Improvement in Health Care (Quality Strategy)*[67] to develop the *State of California Department of Health Care Services Comprehensive Quality Strategy (CQS)*[68] draft report. The CQS outlines the processes used to maintain and develop the broader quality strategy to assess the quality of care received by beneficiaries, regardless of delivery system through defining measurable goals and tracking improvements. Delivery system reforms and the coordination of efforts to improve performance on behavioral health quality measures as well as policy changes for all Medi-Cal delivery systems to be implemented through CalAIM are also included in the CQS.

DHCS identified improving patient safety and need through Whole Person Care approaches and addressing Social Determinants of Health as a critical issue for health care systems. Part of this effort includes reducing complexity and increasing flexibility of the Medi-Cal program. Additionally, this effort includes strengthening the ambulatory care infrastructure to prevent errors such as missed/delayed diagnoses, delay of proper treatment or preventive services, medication errors/adverse drug events, and ineffective communication and information flow. Advances in information technology, including those related to EHR systems, may aid in an improved and more efficient safety infrastructure. DHCS hopes to achieve this goal through identifying proven models that effectively improve workflows in the ambulatory care setting and exploring methods for implementation across the state.

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[66] AB 133 (Chapter 143). Accessed July 28, 2021.

[67] DHCS, *DHCS Strategy for Quality Improvement in Health Care (March 2018)*. Accessed September 8, 2020.

[68] DHCS, State of California Department of Health Care Services Comprehensive Quality Strategy. Accessed September 8, 2020.

The efforts to improve the ambulatory infrastructure complement those undertaken to advance the adoption of health information technology and health information exchange essential to delivery of efficient care. By following the Medicare model, DHCS plans to develop the capacity for members to view personal health information. The adoption of EHRs assists in facilitating health care decisions at the point of care. Through partnerships with other HITECH programs in California and across the nation, DHCS has supported the development of HIE capacity in the state. As referenced in Table 20, a survey of HIOs in 2019-2020 found California HIOs to generate and validate clinical quality measures at a higher rate than HIOs nationwide.

2 CALIFORNIA'S FUTURE HIT LANDSCAPE

DHCS' original SMHP delineated an ambitious plan for promoting the use of health IT throughout California. This plan concentrated mainly on promoting the adoption of certified EHRs. The goals specified in DHCS initial five-year plan (2011-2016) have been largely attained or surpassed. The specific goals and results of the initial 5-year plan were included in the May 2021 SMHP, Appendix 9. As described in Section 1, EHR adoption is now widespread for both professionals and hospitals. Based on the findings of the HIT landscape assessment conducted by UCSF, DHCS has identified the following several areas of need within the HIT community that may inform future initiatives.

2.1 FUTURE DIRECTION BASED ON CURRENT HIT LANDSCAPE ASSESSMENT

2.1.1 PROFESSIONAL EHR ADOPTION

Data from the ABFM for 2019-2020 demonstrates that EHR adoption is now almost universal among California physicians. It is a reasonable assumption that other eligible provider types experienced similar gains, except for perhaps optometrists, who participated in the program at a low rate. For primary care physicians there is still room for an addition 10 percent EHR adoption by those practicing in small or solo practices. However, providers practicing in facilities ineligible for Medi-Cal PIP incentive payments, such as SNFs and substance use disorder treatment facilities, did not enjoy similar gains in the use of EHRs. Professionals in these health care settings need financial support and technical assistance to both adopt and meaningfully use certified EHR technology. Lacking this a large digital divide will continue in the healthcare community that will make the concept of whole person care difficult to implement because of the lack of infrastructure to coordinate and collaborate across care settings. The Phase 2 Landscape Assessment being conducted by UCSF in collaboration with CHCF should help define other HIT/E needs at the local level to implement whole person care through CalAIM.

2.1.2 HOSPITAL EHR ADOPTION

Data from the AHA surveys reveals that the use of EHRs among large and teaching hospitals is essentially universal. There is still room for improvement among a few small and rural hospitals. It is a reasonable to assume that these hospitals were not participants in the PI, probably due to ineligibility. Psychiatric hospitals and long term care hospitals (like SNFs) did not benefit from the incentive funding, technical assistance, and EHR certification standards that acute care hospitals experienced. A similar incentive program may be needed for these types of hospitals.

2.1.3 HEALTH INFORMATION EXCHANGE

Health Information Exchange remains the most important HIT challenge for California. The Medi-Cal PIP did not do enough to correct this problem, perhaps because the HIE measures were too easy for professionals to exclude from reporting. The vast majority of professionals could receive incentive payments without having to demonstrate meaningful HIE activity because of having less than 100 transitions of care during a 90-day reporting period. Another factor is the lack of a statewide HIE organization or network. California has greater provider participation in regional HIOs than the rest of the country, but these HIOs do not provide the same level of some services, such as receiving C-CDAs and alerting, that HIOs in the country do as a whole. California stakeholders also pointed to a lack of bidirectional exchange as a limiting factor in creating value for those participating in HIOs. It is hard to disentangle cause and effect. It may be that lack of resources is preventing HIOs from providing these valuable services—HIOs in California had lower levels of payment for participation among core stakeholders including varied types of provider organizations than HIOs nationally. However, it is also possible that these stakeholders aren't willing to pay to support HIOs because they don't have a strong business case for doing so. If California is to create a network of HIOs to span the state, strong business drivers for broad provider participation (particularly hospital and health system participation) is needed alongside a sustainable funding model to support HIOs. Incentive programs, such as Cal-HOP, can successfully provide a jump start for onboarding of providers and the creation of needed electronic interfaces. If possible, a program like Cal-HOP should be established, since the broad consensus of stakeholders is that Cal-HOP ended too early. In the long run, however, what will be needed most is sustainable funding for the maintenance and operation of HIOs.

In addition to sustainable funding, HIOs need assistance through the creation of standards for data elements, exchange interfaces and many other important operational issues. The CalHHS Stakeholder Advisory Group, established by AB 133, is a good start in this direction as it will establish an initial data exchange framework by July 1, 2022. Public health/social services integration and the finalized data sharing agreement should be in

place by January 2023. Full implementation will allow all those participating to exchange health information in real time by January 2024.

2.1.4 BROADBAND ACCESS AND TELEHEALTH

The access to broadband internet remains problematic in some areas of California—particularly in rural areas. The study conducted by DHCS using Medi-Cal claims and FCC broad band maps demonstrated that access to broadband is directly related to the rate of use of telehealth (Appendix 8). Telehealth has played a vital role in supporting healthcare delivery during the COVID-19 pandemic and efforts to promote its use after the pandemic should be continued. One way this can be done is by filling in the blank spots on the broadband map through both state and federal programs, such as the recently passed federal infrastructure bill. Community health centers report that access to high-quality electronic equipment, such as cell phones and computers, remains a problem for their low income patients, as well as access to technical assistance to use them properly for telehealth and health information exchange. Programs to address the needs of these patients who are on the wrong side of the digital divide should be considered, and perhaps modeled after the regional extension center and California Technical Assistance programs, with patients rather than professionals being the focus.

2.2 IT ARCHITECTURAL CHANGES

To support HIE goals and objectives, DHCS has developed several strategies, initiatives and activities that directly shape the DHCS IT System Architecture landscape. DHCS fully realizes it has a role in the promotion of EHR adoption and health information exchange, and continues to work to advance the business, information, and technical functionality required to support these capabilities.

The broader context of HIE in California is largely supported by other California state government entities (such as CalHHS, CalOHII, CDPH), as well as private sector organizations such as CAHIE, thus much of the planned State Medicaid Agency activities during the next five years involve aligning Medi-Cal processes, data, and technology to support the guidelines and directives proposed by these and other organizations. In addition, the state anticipates providing financial support to further these efforts.

In terms of business processes, DHCS primarily collects administrative data related to claims and encounters, member eligibility and enrollment, and provider enrollment. This administrative data is used by DHCS to support the programs administered. Clinical data from EHRs provides a more complete view a member's medical history and, when merged with administrative data, would allow DHCS to improve the quality, efficiency, and cost-effectiveness of care delivered to Medi-Cal members. Merging the data would allow DHCS to do the following:

- Meet federal goals for program improvement and delivery system redesign, such as Medicaid Information Technology Architecture (MITA).
- Improve care for members through care coordination, case management, and quality monitoring.
- Help advance interoperability and health information exchange across the heath care ecosystem.

Since 2013, DHCS has been developing a strategy to incorporate clinical data into the Medi-Cal enterprise and participate in the electronic exchange of health information. This strategy includes sending and receiving data from EHRs and HIE organizations, providing data to members, and exchanging data with state and county departments to support members. DHCS has set an overall target goal of a MITA Level 3 maturity across all business areas. The use and exchange of clinical data across DHCS business processes improves the efficiency and effectiveness of decision-making, while also promoting national standards for interoperability.

DHCS has already succeeded in advancing Medi-Cal information architecture to many MITA Maturity Level 3 goals. It has documented the Medi-Cal Conceptual and Logical Data Models, at both the enterprise and the business area levels. In addition, DHCS now has a documented Enterprise Data Management Strategy which are processes for identifying and adopting Data Standards and an enterprise metadata repository to define Medi-Cal data entities, attributes, data models, and relationships sufficiently to convey the overall meaning and use of Medi-Cal data and information. Over the next five years, further architecture advancements will involve extending these standards into true adoption enterprise-wide, including where possible to the Medi-Cal business partners. Specific Medi-Cal 2016 MITA State Self-Assessment information architecture goals included:

- Standardize structure and vocabulary data in support of automated electronic intrastate interchanges and interoperability.
- Adopt industry standards and other nationally recognized standards in support of intrastate exchange of information.
- Target the expansion and adoption of an intrastate metadata repository where Medi-Cal defines the data entities, attributes, data models, and relationships sufficiently to convey the overall meaning and use of Medi-Cal data and information.
- Update and improve processes for adoption of Medi-Cal’s Logical Data Models that identify data classes, attributes, relationships, standards, and code sets in support of regional data exchange including clinical information.

- Expansion and further adoption of an information governance process and structure.
- Working with statewide partners to define and adoption of statewide standard data definitions, data semantics and harmonization strategies.
- Update and improve processes for adoption of a Conceptual Data Model that depicts the business area high-level data and general relationships for intrastate exchange.

DHCS is also in the exploratory stages of developing a Master Data Management plan and expects to have initiated projects advancing this within the next five years. Related to this is work to develop standards with respect to patient identification and a consolidated master Medi-Cal Provider directory.

2.2.1 STATE LEVEL REGISTRY

California's State Level Registry (SLR) accepts the registration data for Medi-Cal providers from the CMS NLR using Secure File Transfer Protocol Software (FTPS). The interface file is processed and loaded into the SLR.

Medi-Cal providers interface with the SLR via the web portal user interface. The application is designed for manual entry of data, with providers directed through a simple set of screens where information is entered that provides the state with the data necessary to determine Medi-Cal PIP eligibility for EPs and EHs, and payment calculations. By the end of 2018, modifications were made to support automated payment processes and payment offsets to ensure providers are paid appropriately and in a timely manner. In the interim, DHCS continues to perform quarterly reconciliations.

IBM hosts the application in a secure data center and manages the development of functionality to ensure that the system remains in compliance with CMS rules for the incentive program. IBM will continue to operate and enhance the SLR under the existing contract which ends September 2022. The DHCS is working on successfully transitioning the SLR from IBM to an in-house support team no later than September 2022.

The SLR will continue to be operational until September 30, 2023 because of the continued need for auditors and administrative staff to access information it and to issue revised payments resulting from audits and appeals. DHCS has not identified additional uses for the SLR and anticipates retiring it on September 30, 2023. Arrangements will be made to archive data according to State data retention policies.

3 ADMINISTRATION & OVERSIGHT OF THE PROGRAM

The following information documents California's administration and oversight of the Medi-Cal PIP. California has implemented a robust program to ensure eligibility of the maximum number of providers in accordance with the Final Rule, while ensuring that incentive payments are timely, proper, and without fraud or abuse.

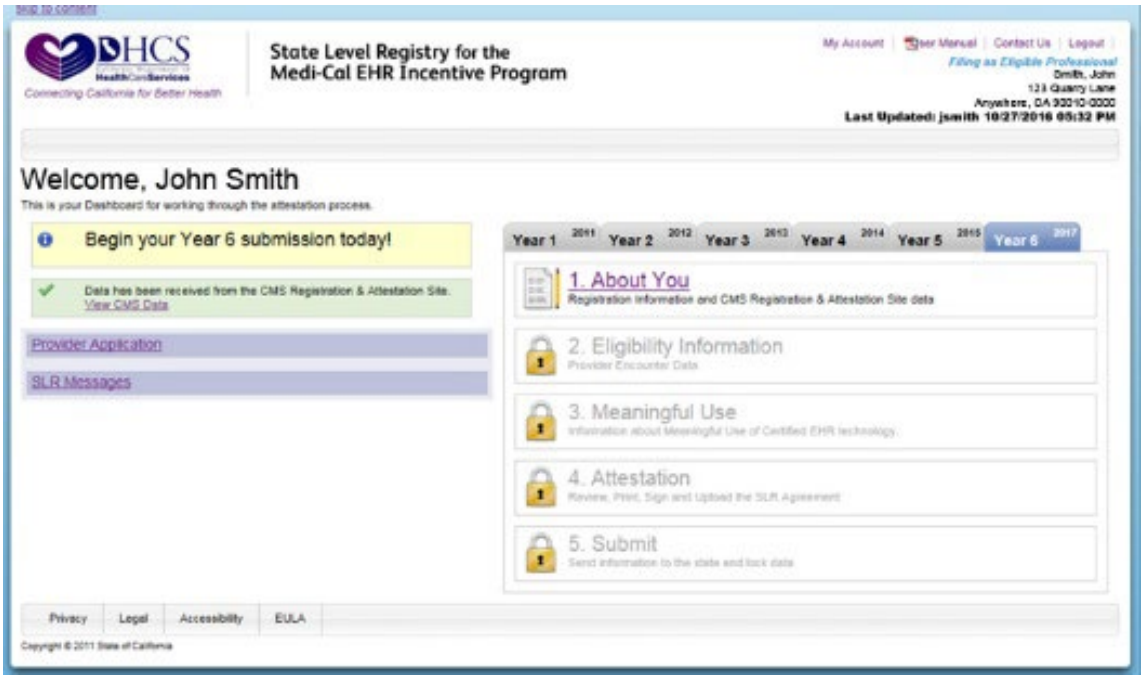
3.1 STATE LEVEL REGISTRY

3.1.1 OVERVIEW

The State Level Registry (SLR)[69] is a web-based portal utilizing a Software-as-a-Service (SaaS) solution developed through collaborative work between DHCS, Conduent, and program stakeholders.

With a focus on delivering a user-friendly application, the home page of the SLR has a series of status fields organized in a single view.

Figure 22: SLR WELCOME SCREEN



[69] DHCS State Level Registry. Accessed April 25, 2018.

The SLR accommodates a wide range of users and allows providers access to a complete set of tools for state-level registration, attestation, and centralized user management of their SLR account.

The core functions of the SLR application can be categorized into the following:

- Registration (Account Creation)
- Step 1: About You
- Step 2: Eligibility Information
- Step 3: AIU or MU
- Step 4: Attestation
- Step 5: Submit

REGISTRATION (ACCOUNT CREATION)

Participation in the Medi-Cal PIP requires the provider to register through CMS' National Level Registry (NLR) before registering in the SLR. NLR registration data is delivered to the SLR and verified against the state's Provider Master File (PMF) and other data sources to confirm the provider's legitimacy as a Medi-Cal provider. Upon authentication of the provider's credentials, the provider is able to create an account in the SLR.

STEP 1: ABOUT YOU

Users are prompted to enter contact information which includes an email address and telephone number. Additionally, providers will enter their professional license information which is validated with the appropriate licensing board before the provider is able to proceed to the next step.

STEP 2: ELIGIBILITY INFORMATION

Once the user completes Step 1 they proceed to Step 2 where they are prompted to enter eligibility data. The system verifies that the data entered meets the program's eligibility requirements, such as the Medicaid patient volume, before the user is able to proceed to the next step.

STEP 3: AIU OR MU

Once eligibility is confirmed, the provider then continues on to enter AIU or MU data. The option to do AIU was only available during the provider's first year of participation and only through Program Year 2016. As required by CMS guidelines, the AIU option required the provider to provide legal and/or financial binding documentation showing AIU of certified EHR technology. Providers attesting to MU are prompted to enter MU data directly into the SLR and, as of program year 2019, to upload a copy of their EHR MU dashboard as well as copy of the Security Risk Analysis (SRA) (Appendix 6) or a signed letter describing the SRA. If the provider fails to enter any of the required information or does not meet the

requirements of a particular measure, they are notified with system messaging and will be unable to proceed to the next step.

STEP 4: ATTESTATION

Once the provider successfully completes Step 3, they proceed to Step 4 where they are prompted to print, sign, and upload their attestation form. The attestation form is populated with the data the provider entered in Steps 1 through 3. The user may review all content prior to signing and uploading the form to the SLR.

STEP 5: SUBMIT

To complete the process, providers must then submit their application to the state. After the user completes Step 5, the application is then ready for state review.

3.1.2 PROGRAM TIMELINE AND SLR FUNCTIONALITY

The Medi-Cal PIP continues to grow and change as additional guidance and requirements are provided by CMS. DHCS communicates changes to stakeholders through the SLR homepage, email notifications, and via bi-weekly calls with the RECs and CTAP contractors who disseminate information to their providers. The following is a list of important milestone dates in the history of the Program:

- October 2011 – The SLR was launched and the state began accepting hospital AIU applications.
- November 2011 – The SLR began accepting group and clinic AIU applications.
- December 2011 – The SLR began accepting individual professional AIU applications.
- December 2011 – DHCS began issuing the first incentive payments.
- September 2012 – The SLR began accepting Stage 1 MU applications.
- October/November 2013 – The SLR was updated to reflect CMS changes to Stage 1 2013. See Program Change Descriptions.
- June/September 2014 – The SLR was updated to reflect CMS changes to Stage 1 2014. See Program Change Descriptions.
- June 2014 – The SLR began accepting Stage 2 MU applications from hospitals.

- September 2014 – The SLR began accepting Stage 2 MU applications from professionals.
- April 2015 – The SLR was modified to allow providers to apply using the parameters of the Flexibility Rule (delineated in the September 4, 2014 Final Rule)[70].
- September 2016 – Date the SLR began receiving Modified Stage 2 MU applications.
- April 2017 – Date the SLR began receiving Stage 2 applications for 2017.
- June 2017 – CMS granted DHCS' request to extend the attestation period for Program Year 2016 for providers attesting to 2016 as their first program year.
- June 2018 – The SLR opened for 2018 attestations on June 21, 2018. Providers were able to attest to either Stage 2 or Stage 3. Attestation to Stage 3 is optional.
- January 2020 – The SLR opened for 2019 attestations. Providers must attest to Stage 3. This delay was due to changes in the State Fiscal Intermediary, which operates the SLR.
- April 2020 – The SLR opened for 2020 attestations.
- June 30, 2020 – The SLR closed for 2019 attestations.
- March 31, 2021 – The SLR closed for 2020 attestations.
- April 1, 2021 – The SLR opened for 2021 attestations.
- September 15, 2021 – The SLR closed for 2021 attestations.
- December 15, 2021- Final Regular Incentive Payment Check Write
- March 1, 2022- Planning Phase for State Level Registry Transition
- October 1, 2022- Transition of State Level Registry Administration

[70] Medicare and Medicaid Programs; Modifications to the Medicare and Medicaid Electronic Health Record (EHR) Incentive Program for 2014 and Other Changes to the EHR Incentive Program; and Health Information Technology: Revisions to the Certified EHR Technology Definition and EHR Certification Changes Related to Standards; 2014 Edition Certified Electronic Health Record Technology Flexibility Rule.

- September 30, 2022- End of Planning Phase for SLR Transition
- December 30, 2022- End of Regular Appeals Filing Window
- September 30, 2023- Transmission of Final Audit and Appeals Findings via State Level Registry
- September 30, 2023- Archive of State Level Registry Data

4 CALIFORNIA'S AUDIT STRATEGIES

4.1 INTRODUCTION

For DHCS, audits are conducted by the Audits and Investigations Division (A&I). The overall goal of A&I is to improve the efficiency, economy, and the effectiveness of DHCS while ensuring the financial and programmatic integrity of its programs. As part of its mission, A&I promotes sound management of public funds, performs specific audits of DHCS operations, performs medical and financial audits of Medi-Cal and public health providers, conducts investigations of suspected violations of Medi-Cal laws and regulations, identifies public funds spent inefficiently or illegally for recovery, and has the lead responsibility for DHCS' Medi-Cal anti-fraud program.

The Deputy Director of A&I reports to the Chief Deputy Director and has direct access to the Director of DHCS. This enables A&I to operate independently with no organizational impairments in order to fulfill its oversight and fiduciary responsibilities with regard to DHCS programs and operations. A&I is comprised of four branches: the Medical Review Branch (MRB), Financial Audits Branch (FAB), Investigations Branch (IB), and the Internal Audits Office. The two branches with primary responsibilities for auditing the EHR incentive program are MRB and FAB. MRB audits the non-institutional providers (e.g. laboratories, pharmacists, durable medical equipment providers, and various individual providers and practitioners), while FAB audits institutional providers (e.g. acute care hospitals, nursing home facilities, FQHCs, and RHCs). A&I conducts its audit work in accordance with Generally Accepted Governmental Auditing Standards (GAGAS). In addition to full access and authority over DHCS program operational data, A&I also utilizes Medi-Cal claims data, the Provider Master File (PMF), and other relevant data and information needed to carry out its oversight activities of Medi-Cal providers. A&I oversight and audit activities provide assurance that payments made to Medi-Cal providers are valid, reasonable, and in accordance with federal and state laws, regulations, and program intent.

FAB audits EHs and EPs who work in FQHCs, herein referred to as EP/Clinics. MRB audits EPs who have individual practices and/or work in a group. A&I has assigned EHR audit activities to the same audit branches that normally audit the specific provider types, with an intent to integrate EHR audits with other existing audit workload. This arrangement also leverages the auditors' familiarity with the providers' operations and programs. The audit activities for MRB and FAB are further described in Section 4.2 and the following sections.

The IB is primarily involved in EP and EH oversight, monitors the Medi-Cal Fraud Hotline and facilitates referrals to the California State Department of Justice (DOJ), Bureau of Medi-Cal Fraud and Elder Abuse (BMFEA). IB is also involved with various federal and state Program Integrity and Fraud Task Force activities to coordinate A&I's investigative and oversight activities with the Office of Inspector General, U.S. Attorney's Office, and other law enforcement agencies.

MRB and FAB will refer EHR incentive program providers to IB, if they suspect there has been misuse, abuse, or fraudulent activity or a multi-disciplined effort is needed to conduct unannounced reviews of high risk providers.

In an effort to ensure there is appropriate administration and oversight of the state's EHR incentive program, A&I's Internal Audits Branch periodically conducts an internal audit of the incentive program. The internal auditors examine all aspects of the program in detail, including but not limited to: the SLR, attestation process, department pre-payment review of applications, eligibility support documentation, payment approvals, payment processing, payment reconciliation, payment adjustments and recoupments, and system security/integrity.

In 2014, DHCS submitted an audit strategy that detailed the AIU audit plan. The strategy included a description of the departments risk assessment methodology, risk criteria and risk scores for EHs, EPs in individual practice, groups, and FQHCs/RHCs. The strategy also included copies of the audit programs and audit correspondence templates. CMS approved this audit strategy on May 5, 2014.

DHCS received CMS approval of its initial MU audit strategy on January 16, 2018. In accordance with the updated audit strategy, DHCS conducted MU audits of EPs as well as Medi-Cal only EHs. For dually eligible EHs, DHCS relied on the results of the Medicare MU audits for Program Years 2011-2014. For Program Years 2015 and later, DHCS conducted MU audits for a sub-sample of EHs. DHCS submitted a revised MU audit strategy that was approved in September 2021 and does not anticipate submitting another revised MU audit strategy. However, if there are changes, a revised audit strategy will be submitted.

4.2 PENDING REPORTING

The SLR provides DHCS with an actionable reporting package to effectively manage the Medi-Cal PIP. Key SLR reporting features include:

- Active eligible professional attestation applications currently being completed.
- Active eligible professional attestation applications currently being adjudicated by CMS.
- Active eligible professional attestation applications currently awaiting payment, include the dollar value of the payments.
- Inactive eligible professional attestation applications currently pending.
- Completed eligible professional attestation applications.

Additional reporting functionality scheduled to be deployed in June 2018 was delayed due to the transition of SLR support from Conduent to IBM and establishment of NLR interfaces by the new SLR contractor. This functionality was implemented as follows:

- Ad hoc reporting functionality was implemented in June 2020.
- Audit reporting functionality was implemented in October 2020.

DHCS anticipates audits and appeals will continue through September 2023. Although regular audits and appeals processes will likely conclude by December 2022, it is anticipated that adjustments for a subset of hospital audits currently in litigation will be reported by September 30, 2023. At present there are twenty-five hospital audits in this situation.

4.3 A&I AUDIT LANDSCAPE AND PROCESS

A&I has numerous field offices located throughout the state which are responsible for conducting audits and reviews of institutional and non-institutional providers within a given region or territory. The MRB conducts provider audits out of six field office sections located throughout the state. MRB is staffed by multi-disciplined auditors (e.g. health program auditors, research analysts and medical staff) who also focus on anti-fraud initiatives, research and data mining, which has become an important component of the antifraud strategies by the branch. FAB has thirteen audit sections located throughout the state. These sections perform desk or field audits of Medi-Cal institutional providers which include; acute inpatient hospitals, children's hospitals, critical access and rural hospitals, designated public hospitals), long-term care facilities, FQHCs, rural health clinics (RHCs), Drug Medi-Cal providers, mental health providers, ground emergency transportation providers, Local Educational Agencies (LEA), and Targeted Case Management providers. To minimize audit burdens on the providers and for purposes of efficiency, FAB has

attempted to integrate EHR Incentive Program audits of EH's with other Medi-Cal hospital desk or field audits.

As DHCS has a large universe of eligible professionals participating in the Medi-Cal PIP, A&I has devised a two-tier audit approach to EHR Program audits, which include pre-payment audits and post-payment audits. In each of the tier levels, desk or field audits will be utilized depending on the assessed audit risk as described in Section 4.2.1 Pre-Payment Audits and in Section 4.2.2 Post-Payment Audits.

To supplement the historical profiles when developing risk profiles, A&I has access to the SLR, which contains relevant provider information submitted during the application process. The SLR also contains "hard stops" and "soft stops" which are used in risk evaluation. Comparing the severity of the registration stops with historical data allows A&I to develop a risk profile.

A&I audit procedures are designed to ensure that the provider has met the financial and programmatic requirements of the EHR Incentive Program. A&I has developed a risk assessment process that analyzed various risk factors and assigns risk ranking scores. The assigned risk ranking score determines the provider risk level and the number of discharges to test. The risk assessment process is detailed in A&I's Audit Strategy. Risk scores also take into consideration, information that may be provided in referrals from HIMD.

To ensure the consistency of audits, A&I conducts training for A&I staff in accordance with audit procedures approved in the Audit Strategy. A&I is committed to auditing 100 percent of year one EH applications, ensuring the accuracy of the calculated incentive payments.

4.3.1 PRE-PAYMENT AUDITS

Pre-payment audits are initiated through referrals from HIMD. The purpose of the referral is to address areas of concern identified by an analyst during prepayment review that warrants further examination by an auditor. Concerns may include, but are not limited to, the validity of information uploaded to the SLR by providers or their representatives, "soft or hard stops" generated by the SLR, known or suspected histories of fraud, waste or abuse by the provider.

Referrals contain a comprehensive description of HIMD's concerns including supporting documentation or other relevant information. Once received by A&I, audit program administrators review the referral, research applicable databases, and further develop the audit case. If warranted, field or desk audits are conducted by audit staff. Once the review or audit is completed, results are shared with HIMD, whom reviews the findings and

recommendations and takes appropriate action on the application. A&I and HIMD databases are also updated with audit findings.

4.3.2 POST-PAYMENT AUDITS

A&I is responsible for conducting AIU and MU post-payment audits of EPs and EHs consistent with the approved Audit Strategy. Post-payment audits are conducted through field audit reviews (FARs) and desk audit reviews (DARs) of Medi-Cal providers to verify compliance with program requirements and identify potential fraud, waste or abuse.

MRB has developed a risk assessment for all EPs (excluding those in FQHCs, RHCs, IHCs) who received payments for AIU and MU. The risk assessment determines audit selection by risk category. MRB conducts field or desk audits depending on the eligible professionals' overall risk score.

MRB's audit program includes the verification of ownership and controlling interest as a standard audit procedure. The intent of this procedure is to ensure that any individual receiving payment, or entity with an ownership or controlling interest in the provider, does not appear on state or federal exclusion lists.

MRB staff use the CMS approved calculation methods for EPs as stated in 42 CFR 495.306. Validation of EP SLR attestations will be conducted by audit staff to confirm the Medi-Cal percentage, utilizing claim data, provider data, and other applicable and reliable audit sources for patient encounters and panel patients. By using Medi-Cal claims and Managed Care encounter data, audit staff are able to verify the EP's encounter and patient panel volumes.

MRB has audited a statistically relevant sample of EPs to ensure compliance with AIU and eligibility requirements. As of April 2021, 28 AIU audits and 7 MU audits have resulted in negative findings. With regard to AIU audits, in many cases it was determined that EPs met the 30 percent Medicaid patient volume requirement, although patient volumes differed from those that were reported at the time of attestation. Most EPs were still able to satisfy the volume requirements using a different 90-day reporting period, which fell within the acceptable timeframe based on the program year for which they had attested.

As of April 2021, FAB has completed 217 hospital AIU audits which resulted in 167 recoupments. Of the MU audits conducted, there was only one audit resulting in a negative finding. This was due to insufficient document retention because the hospital had closed.

FAB's post payment audit scope for EHs in payment year one includes, but is not limited to:

- Review EH records to validate patient volumes, inpatient stays, and discharges and compare to EHR calculated payment for accuracy.

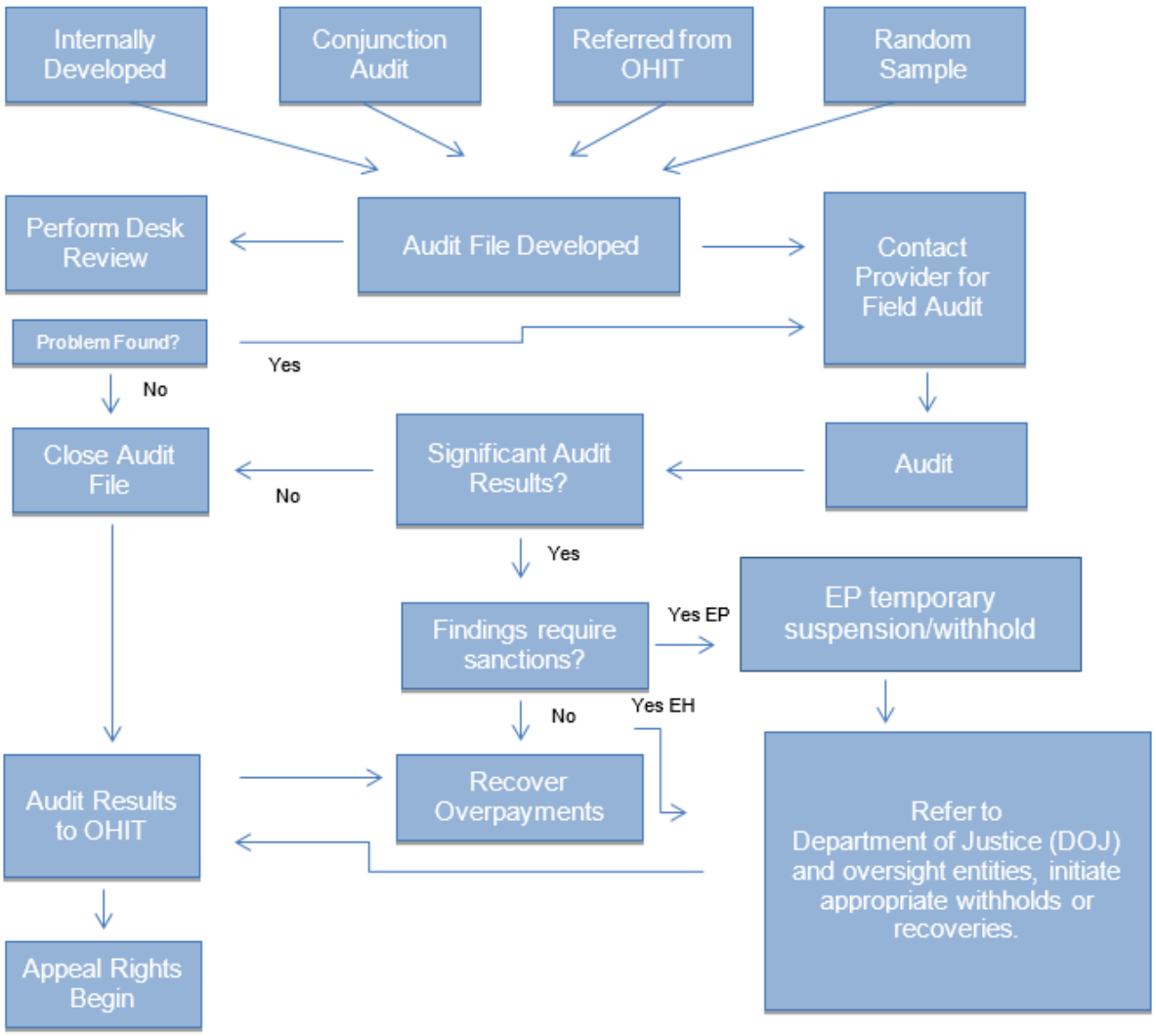
- Reviewing the attestation and supporting documentation (contracts, leases, invoices, receipts, hardware, and software certifications/serial numbers).

- Review the HIMD EH workbook[71] as well as verification that incentive fund calculations and payments are correct. This includes comparing disbursement ratios by fiscal year and actual disbursements through the SLR payment database.

Once the audit is completed, FAB notifies HIMD and the EH of the findings. The EH is given a two-week timeframe to provide additional information and documentation to resolve the findings. If the provider submits additional information or documentation, FAB reviews the additional information/documentation and determines whether the findings are adequately addressed. Where findings are insufficiently addressed, FAB issues an audit report to the provider, identifying any overpayments. HIMD also receives a copy and determines whether overpayments will require immediate recoupment, or can be offset against future incentive payments. Recoupment may consist of off-setting against future fee-for-service payments or voluntary/involuntary collection action. In addition, FAB will enter the results in the CMS audit reporting tool and/or through the State Administrative Module (SAM).

[71] Department of Health Care Services, Hospital Workbook (Updated 01/10/2017). Accessed May 21, 2018.

Figure 23: AUDIT PROCESS



AUDIT DATA RESOURCES

A&I uses a number of data resources in its work auditing the Medi-Cal PIP and investigating providers for fraud, waste, and abuse. These are described in the table and narrative below.

TABLE 36: AUDIT DATA RESOURCES

Data Resource	Resource Function	Resource Benefit
State Level Registry (SLR)	Provider Registration	Review provider statements and submissions, and compare to other data sources and audit findings.
Surveillance and Utilization Review Subsystems (SURS)	Extensive report system of claim data for all Medi-Cal providers and beneficiaries.	Claim detail reports will be run on EHs and EPs to help verify Medi-Cal eligibility percentages and participation.
Provider Enrollment Tracking System (PETS)	Reviewing provider CA Medi-Cal enrollment applications.	Compare SLR registration information for EHs to their PETS file to verify accuracy of information provided on the SLR (cross-referenced with MRB for clinic ownership status).
Provider Master File (PMF)	Master file on all Medi-Cal providers from information submitted by the provider to the Provider Enrollment Division.	Will be used to compare locations, businesses, practices, owners, tax identification numbers, NPI numbers, provider names, payment and location addresses, review Medi-Cal status, Medi-Cal payment histories, etc.
CA Dept. of Consumer Affairs	Licensure of medical professionals.	Verify licensure status and professional licensure sanctions.
American Board of Medical Specialties website	Tracking of physician certification of 24 medical specialties.	To assist in the verification of an eligible professional's designation as a pediatrician.

Data Resource	Resource Function	Resource Benefit
Gatekeeper List	Data list of providers, businesses, locations, individuals, etc. in which previous significant adverse audit findings were found.	Compare SLR data to Gatekeeper list to verify providers, locations, assigned payees, etc. to see if provider may be listed on the Gatekeeper in which MRB will exercise increased audit awareness.
Case Tracking System	Tracks audit cases and their results, amounts, sanctions, findings, etc.	Review the Case Tracking System for previous audit findings on providers.
Financial Audits Tracking System (FATS)	Maintains the historical record of a provider's payment activity, Auditor assignments, and recoveries.	Review FATS for historical payment background.
A&I Documentum System	Maintains complete audit files for Hospital audits conducted for fiscal years ending 2008 years and filed cost reports.	History of previous audit findings for each EH.
TeamMate	Electronic audit work paper system implemented during fiscal year 2014-15. Replaces hard copy audit working papers, also compiles provider documentation obtained during the audit.	Full history of all previous audit findings for each EH.
Certified HIT Product List (CHPL)	Official database of certified EHR programs.	Database of the criteria measures of EHR programs selected for certification measure. MU module audit procedures to be developed in future years.

Data Resource	Resource Function	Resource Benefit
Office of Statewide Health Planning-- Annual Utilization Report	All licensed clinics in California submit an Annual Utilization Report.	Used to obtain encounters by payer source.
Management Information System/Decision Support System (MIS/DSS)	Database of eligibility, provider, and claims information for Medi-Cal.	Review provider statements and submissions, and compare to other data sources and audit findings.

STATE LEVEL REGISTRY (SLR)

A&I has access to the SLR, which is maintained by IBM. The SLR is the primary access point for source data submitted by providers during the application process. EHR lead auditors and managers will utilize the SLR to access EH workbooks, applications, attestations, and supporting documentation uploaded by EHs and EPs. The SLR provides information needed for preliminary audit work scoping prior to starting the desk or field audit.

SURVEILLANCE AND UTILIZATION REVIEW SUBSYSTEMS (SURS)

The SURS system is a mainframe-based reporting system that captures all elements of submitted claims by Medi-Cal providers whether paid or not paid. The SURS system is used extensively by auditors when verifying EHR Medi-Cal requirements, such as the 30 percent-20 percent EP eligibility, 30 percent Needy Individuals patient volume when practicing more than 50 percent of encounters over six months in the prior calendar year at FQHC/RHC's, and the 90 percent hospital-based measures. MRB EHR Program Administrators run frequency distribution reports as well as claim detail reports during the case development scoping process.

PROVIDER ENROLLMENT TRACKING SYSTEM (PETS)

The PETS system is utilized frequently by MRB to compare data attested by the provider in the SLR and NLR systems to application data the provider attested to in order to participate in California's Medicaid/Medi-Cal program. The PETS system is used extensively for ownership and control disclosures, practice locations, provider's affiliations with sub-contractors, medical specialties, etc. Review of the PETS system is a standard audit case development tool used for both pre-payment audits and post-payment audits. When discrepancies are found between the provider's attestations in the SLR/NLR and their CA Medi-Cal enrollment data, the audit risk increases.

PROVIDER MASTER FILE (PMF)

Maintained by the Provider Enrollment Division (PED), the PMF stores all eligible provider information as well as the payments received by each provider for the Medi-Cal program. Address information, including pay-to address, tax identification numbers, social security numbers, active statuses, declared profession type, payment history, etc. is stored in the PMF. Data can be used by A&I auditors to identify address discrepancies, activity status, and for payment tracking.

GATEKEEPER LIST

The Gatekeeper list was developed by MRB to track individuals and sites (addresses, regional areas, etc.) where significant Medi-Cal fraud, waste, or abuse has occurred. The Gatekeeper list is checked to determine if any of the EPs, locations, entities, owners, affiliated individuals, etc. are listed.

CASE TRACKING SYSTEM (TEAMMATE)

During fiscal year 2014-15, A&I transitioned to an electronic work paper software known as TeamMate. TeamMate increases the level of security necessary to access audit working papers, which contain sensitive and personal information, and reduces paper and storage costs. The tracking system assigns a specific case number for each audit and records the entire history of the case from beginning to end. Once a case is closed, the tracking system will return all data. Each audit file in the tracking system contains many elements that include, but are not limited to, audit periods, monetary amount subject to review, monetary overpayments, and dates of all actions relating to the audit, case notes, and the auditors/staff and A&I office(s) assigned to the review/audit. A&I EHR Program Administrators and auditors have access to the tracking system and are able to search the system by provider number and retrieve any prior audit information and results available for a particular provider. Audit and overpayment information for each EP/EH is available in A&I's case tracking program.

FINANCIAL AUDITS TRACKING SYSTEM (FATS)

FATS is a database developed by FAB to track the history of all audit types and capture relevant financial data for extraction and evaluation. FAB field audit sections can access the FATS data base.

A&I DOCUMENTUM 2 SYSTEM (ELECTRONIC FILE ROOM)

During fiscal year 2012-13, A&I transitioned from hard copy file to an electronic file room. ARAS is the custodian of the audit records maintained by the Documentum 2 System (D2). D2 is an enhanced PDF system with an optical reader that is capable of searching and querying documents by fiscal year, name, or word search. D2 contains the audit working papers and audit reports and records going back to 2008. During the risk

assessment process, EHR audit staff will refer to the files. EHR audit working papers and audit reports are scanned into the D2 system.

CERTIFIED HIT PRODUCT LIST (CHPL)

The ONC Certified Health IT Product List (CHPL) is the comprehensive listing of health IT products that have been tested and certified under the Health IT Certification Program administered by the Office of the National Coordinator for Health IT (ONC). The CHPL is a starting point in researching eligible EHR systems available, and may be used to develop MU attestation audit procedures in conjunction with CMS updates of Level 1-3 criteria.

OSHPD ANNUAL UTILIZATION REPORT

The OSHPD Annual Utilization Reports is used for reference in planning in EH and FQHC/RHC audits. The reports contain encounters by payer source and procedure. FQHCs/RHCs file an Annual Utilization Report and the reports will supplement the claims data from the SURS system for patient volume verification

MIS/DSS

The MIS/DSS is a subsystem of the California Medicaid Management Information System (CA-MMIS) and serves as the California Department of Health Care Services (DHCS) Medi-Cal Data Warehouse. As a current and comprehensive database of eligibility, provider, and claims information for the Medi-Cal Program, the MIS/DSS is the largest Medicaid data warehouse in the nation. It is Teradata-based, a leading-edge, hardware and software technology platform that enables the MIS/DSS to store great volumes of data and allow large numbers of users to simultaneously access the data without any deterioration in system performance. As an integrated repository of data that offers the capability for robust queries and analyses, MIS/DSS will be used in a fashion similar to SURS.

4.4 AUDIT APPEALS

EPs and EHs are allowed appeal rights through an administrative hearing process under W&I Code section 14171. As of September 30, 2017, FAB issued audit reports for 60 EHs and DHCS received 30 requests for informal or formal appeal hearings. In these audits, the issues cited as contributing to most overpayments are the improper inclusion of unpaid Medi-Cal bed days, the improper inclusion of psychiatric bed days, and the improper inclusion of administrative bed days in the calculation of EH payments. DHCS has consulted with CMS and has determined that administrative bed days can be included in EH payment calculations, as well as psychiatric and rehabilitation bed days if the beds are paid under CMS's IPPS payment system. In response to this, DHCS is recalculating its auditing findings in these areas. In the case of the first appeal, the administrative law

judge decided that it was proper for DHCS auditors to exclude unpaid Medicaid bed days. Two other hearings are pending a decision at this time.

In 2016, the U.S. Department of Health and Human Services Office of the Inspector General (OIG) audited 64 eligible hospitals in California, finding approximately $24 million in overpayments. Payments made to these hospitals represented 53 percent of total incentive payments from October 1, 2011 through December 31, 2014. Based on HIMD's response to the audit findings, FAB has audited these same hospitals utilizing adjudicated claims data vs. hospital generated schedules. Results have varied in most instances, with some EHs having greater overpayments and, in some instances, underpayments. The OIG determined that DHCS made incorrect payments to 61 of these eligible hospitals, including over and underpayments of $22,043,234. These findings were similar to findings for other states audited by the OIG. Consistent with DHCS' response to the OIG audit recommendations and prior discussions with CMS, DHCS is in the process of using its audit findings for the payment adjustments for these hospitals.

In written comments to the OIG report, DHCS agreed that incorrect incentive payments may have been made, but did not concur with the OIGs reliance on hospital generated schedules and internal financial records. Historical experience suggests actual payments and adjudicated claims data from claims payment reports yield more accurate findings, which can be supported in an appeal. DHCS committed to conducting audits of 100 percent of the hospitals participating in the incentive program, prioritizing and completing audits of the 64 eligible hospitals audited by the OIG. As of October 2020, all hospitals have been audited and DHCS is in the process of determining how recoupments or additional payments will be made.

4.5 APPEALS

Eligible professionals and hospitals have the right to appeal DHCS' decision on participation eligibility, attestations, and incentive payment amounts. The appeals for pre-payment denials follows the process described in W & I Code section 14043.65. This code designates a written appeal process to the director's designee. No formal administrative hearing is required. The provider has 60 days from the date of the department's action to file their written appeal with all of the supporting materials. The director/designee has 90 days from receipt of the appeal to issue a decision. The decision may uphold, continue or reverse the department's action in whole or in part. Any further appeal shall be via a writ to the Superior Court under §1085 of the Code of Civil Procedure.

For audit appeals, DHCS has an established administrative hearing process referenced in the WIC, Section 14171, and California Code of Regulations, Title 22, Section 51016. Audit appeals are referred to the Office of Administrative Hearings and Appeals (OAHA), an independent office within DHCS, which handles Medi-Cal provider appeals for the

Department. The EH or EP has 45 days from the date the EHR audit report is issued to file for an appeal with OAHA. OAHA affords providers an administrative hearing. If the provider wishes to appeal further, the appeal must be filed through Superior Court.

4.6 FRAUD AND ABUSE

A&I has lead responsibility for DHCS' Medi-Cal Anti-Fraud program. Various data sources, as previously referenced in Table 14, are utilized to develop risk assessments and profiles which help identify providers whom pose the greatest risk for committing fraud or abuse. Providers meeting these criteria are often prioritized for review and audit. Examples of criteria that would normally identify a provider as a risk for fraud or abuse include, but are not limited to:

- Unrelated investigations of a provider due to improper billing practices, data mining claims patterns irregularities, or whistleblower complaints.
- Manual reviews of uploaded AIU or MU documentation identify evidence of improper modification, alterations, or fabrication of submitted documents.
- Verification of self-certified patient utilization, encounters, charity care charges, or discharges has significant variances to reported numbers with no explanation.
- Review of Medi-Cal claims volume identifies a sudden drop in claim submissions after payments are remitted to the provider.

If, upon completion of a referral, pre-payment, or post payment review, A&I identifies that the providers submissions and representations exhibit misuse/abuse and/or fraudulent activities related to the EHR incentive program, it will make a referral to the IB. The IB will log the case into the Case Tracking System and assign for review by an investigator. The IB will determine whether there is potential misuse or reliable evidence that fraudulent activity has occurred, and refer the case to the State Department of Justice (DOJ) Bureau of Medi-Cal Fraud and Elder Abuse (BMFEA) where there is reliable evidence.

In addition to referrals to IB and the DOJ, when A&I identifies reliable evidence of fraud and/or abuse perpetrated by a provider participating in the Medi-Cal PIP, DHCS withholds or denies EHR incentive payments. Temporary suspensions of providers and payment withholds may also be instituted by A&I.

4.7 RECOVERY/RECOUPMENT

EHs found upon audit to have received an incentive payment in error for a payment year, will have the overpayment recovered by offsets against pending incentive payments or, in

the case that the EH does not have pending payments to cover the overpayment, through recoupment. EP overpayments will be recovered by recoupment only.

In the case that an audit determines that the EP or EH had engaged in fraud through deliberately attesting to false information, the EP or EH will permanently lose the payment for that participation year. Examples would be as follows:

- EPs in their first year of the program will not be able to receive a first year payment of $21,250 in a subsequent program year.
- EHs in their first year of the program will not be able to receive their calculated first year payment in a subsequent program year.
- EPs or EHs in the second year of participation, will lose the ability to receive their second year payment during the subsequent year of participation.

Such EPs and EHs will have their eligibility for the program reduced by one program year (from 4 years to 3 years for EHs and from 6 years to 5 years for EPs).

In the case that an audit determines that the EP or EH had received a payment in error but had not engaged in fraud, the EP or EH will not permanently lose the ability to receive payment for the participation year and will not have the total years of eligibility reduced. Such EPs in the example above may receive a first year payment in a subsequent program year and such EHs will be able to receive their calculated first or second year payments in subsequent program years.

EPs or EHs receiving only one payment before 2017 that are found on audit to be ineligible for that year (whether due to fraud or not) will lose the ability to receive payments in 2017 and subsequent years. EHs found on audit to be ineligible for any program year after 2015 will lose the ability to receive payments in any subsequent program year. If such payments have already been made, they will be recovered.

4.8 A&I CONTINUING DEVELOPMENT

A&I conducts staff webinars and has developed PowerPoint presentations on audit procedures. In addition to TeamMate, working paper templates and audit report templates have been developed to enhance consistency in conducting audits.

A&I monitors the implementation of the EHR audit program along with both the new and previously established audit processes and tools to measure their effectiveness and make modifications and refinements as needed. Audit programs and processes are expanded and modified when requirements are added or revised.

5 CALIFORNIA'S HIT ROADMAP

5.1 POST-HITECH PATHWAY FOR HIT/HIE SYSTEMS CONTINUING UNDER MES

DHCS is in active coordination with CMS to transition several state systems previously funded under HITECH to MES funding mechanisms. On January 26, 2021 DHCS submitted in partnership with CDPH an advance planning document to transition CAIR and CalREDIE to secure 50 percent federal financial participation on these system with intention to pursue enhanced funding opportunities via MES certification. Additionally, this document included a request for development support of the Surveillance, Health, Intervention, and Environmental Lead Database (SHIELD) system, a new project intended to coordinate public health and environmental services for children exposed to lead and to support state mandated case management and reporting functions. This proposal was approved by CMS on March 18, 2021. DHCS and CDPH are currently working to submit an advanced planning document to secure continued funding.

DHCS is also working with EMSA to transition several systems developed under the HITEMS project to MES funding mechanisms including the +EMS and PULSE systems. The state will similarly leverage MES funding opportunities to support the development of the Physician's Order for Life-Sustaining Treatment (POLST) Statewide Registry to create a single statewide POLST eRegistry in order to ensure all POLST information is readily available to EMS, hospitals, acute care facilities and SNFs as required under state law.

5.2 FUTURE GOALS

Refer to Section 2.1 Future Direction Based on Current HIT Landscape Assessment. DHCS formulated six goals based on the landscape assessment.

- Establishment of the CalHHS Data Exchange Framework which creates:
    - Standards for statewide data exchange.
    - A functional HIE network throughout the state.
- Meet key business needs supported by the CalHHS Data Exchange Framework that:
    - Meets the needs for whole person care and the California Advancing and Innovating Medi-Cal program
    - Improves access to bidirectional exchange with public health registries.
    - Increases utilization of health information exchange by emergency services.
    - Establishes a statewide registry for advanced directives.

- Implementation of the CMS Interoperability and Patient Access Rule to increase beneficiary access to health care data through payer, formulary, and patient access application programming interfaces.
- Funding identified for existing gaps in the HIT/HIE landscape as recommended by the CalHHS Data Exchange Framework Advisory Group, including:
    - Financial stability for the state's HIEs.
    - Increased EHR adoption by professionals who have been ineligible for Medi-Cal PIP with associated technical assistance on EHR and HIE use to address gaps.
    - Increased EHR adoption by hospitals and other facilities that have been ineligible for Medi-Cal PIP with associated technical assistance on EHR and HIE use to address gaps.
- Establish universal broadband access throughout California as supported by the California Broadband Council under the Broadband for All Action Plan, which in turn supports:
    - Continued increased use of telehealth throughout California after the end of the COVID-19 public health emergency.
- Improve availability to equipment and technical assistance for low-income Californians to bridge the digital divide, access their health information, and benefit from the Interoperability and Patient Access Final Rule.

APPENDICES

APPENDIX 1: SUMMARY OF RECENT HIT SURVEYS IN CALIFORNIA

- Centers for Disease Control and Preventions. (2015). *National Ambulatory Medical Care Survey (*National, sample of office-based physicians) [Annual]

- University of California, San Francisco; California Medical Board of California. (2013). *Study of Physician Use of HIT in California* (California, Random sample of physicians renewing medical license). [N/A]

- University of California, San Francisco; California Medicaid Research Institute. (2011-2012). *Study of Physician Use of HIT in California* (California, Random sample of physicians renewing medical license). [Annual through 2013]

- University of California, San Francisco; California Medicaid Research Institute. (2011-2012). *Use of Electronic Records by Nurse Practitioners and Nurse Midwives* (California, sample of Nurse Practitioners and Nurse Midwives). [N/A]

- McKinsey & Company; The Lewin Group. (2010). *Landscape Assessment Summary Report* (California, Physicians surveyed). [N/A]

- American Hospital Association. (2008-2015). *Adoption of Electronic Health Records Systems among U.S. Non-Federal Acute Care Hospitals: 2008-2015* (National, national sample of hospitals surveyed). [Annual]

- Centers for Disease Control and Preventions. (2013-2014). *Adoption of Certified Electronic Health Records Systems and Electronic Information Sharing in Physician Offices: United States, 2013 and 2014* (National, Random sample of office-based physicians surveyed). [Annual]

- California Primary Care Association. (2014). *California Primary Care Association Survey* (California, random sample of member and non-members in Community Clinics and Health Centers). [N/A]

- University of California, San Francisco. (June-July 2013). *The Availability of Electronic Health Records in California Physician Practices* (California, sample of physicians). [N/A]

- California Primary Care Association. (2012). *Health Information Technology (HIT) Landscape Survey* (California, sample of member and non-members in Community Clinics and Health Centers). [N/A]

- Health Resources and Services Administration. (2012). *Progress Towards Meaningful Use Among Critical Access and Other Small Rural Hospitals Working with Regional Extension Centers* (National, surveyed all Critical Access and Small Rural Hospitals). [N/A]

- University of California, Centers for Disease Control and Prevention's National Center for Health Statistics, Health Resources and Services Administrations, American Hospital Associations, SK&A, Healthcare Information and Management Systems Society. (2010-2013). *Health Information Technology in California: Milestones and Miles to Go* (Physicians, Acute Care and Ambulatory Facilities, Hospitals, and Health Centers surveyed). [N/A]

- California HealthCare Foundation. (January-April 2010). *Health Information Technology in California Dental Practices: Survey Findings* (California, sample of dentists surveyed). [N/A]

- Department of Health Care Services. (October-December 2017). Meaningful Use Survey for Dentists (California, sample of dentists participating in the Medicaid Promoting Interoperability Program surveyed). [N/A]

APPENDIX 2: UCSF HIT LANDSCAPE ASSESSMENT (2022)

California Health IT Landscape Assessment

Final Report – February 2022

Agreement Number: 21-10135

Prepared For:

The California Department of Health Care Services,
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This report was prepared by University of California, San Francisco, under contract to the California Department of Health Care Services.

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Summary & Key Findings

Topic A1: Trends in EHR Adoption & Use

- California health IT stakeholders cited large gains in EHR adoption as a key impact of the HITECH Act programs
- Hospitals rapidly adopted electronic health records from 2012 through 2019, and EHRs are now nearly ubiquitous in California hospitals.
- By 2013, EHR adoption among office-based physicians reached 80% and stayed relatively consistent through 2017 (most recent available data).
- While primary care physicians adopted certified EHRs at higher overall levels, medical and surgical specialists had larger increases in adoption over time.
    - For example, within family medicine physicians, only 3% reported not using an EHR by 2020. Family medicine physicians that had not yet adopted an EHR were more likely to be in an independent practice, have a sole owner, be a solo practice, serve less than 10% vulnerable population, and be located in a rural area.
- Specific to the HITECH programs, Eligible Professional (EP) participation in Medi-Cal Promoting Interoperability Program peaked in 2017, with over 5,000 EPs participating in any stage. A significant number of EPs were able to attest to the final stage of the Medi-Cal Promoting Interoperability Program, Stage 3 by 2021.
- The EHR vendor market for EPs attesting to the Medi-Cal Promoting Interoperability Program changed significantly from 2012 through 2021. The largest vendor, Epic, was used by 20.9% of EPs in 2012, and rose to 43.5% by 2021. Cerner market share also rose significantly, from 1.4% in 2012 to 6.2% in 2021. In comparison, several other vendors either decreased in popularity (such as NextGen, which fell from 20.2% of EPs in 2012 to 9.8% in 2021) or fell completely out of the market (Practice Fusion and Office Ally).

Topic A5: Engagement in Health Information Exchange

- Health information exchange (HIE) was a domain in which California health IT stakeholders had differing perspectives on the progress achieved under HITECH. While some stakeholders believe that substantive advances have been made, others described serious, ongoing fragmentation and interoperability challenges that have limited meaningful data exchange across the state.
    - Most stakeholders agreed that data exchange is occurring through a variety of mechanisms including HIEs, EHR vendor networks, and national networks. However, the data being exchanged is often challenging to use, lacking standard data elements or formats.
- Among hospitals, engagement in the four domains of interoperability – finding, sending, receiving, and integrating - increased rapidly, from fewer than 10% of hospitals engaging in all four domains in 2012 to nearly half by 2019.
- However, these gains did not appear to translate into improved performance on Medi-Cal Promoting Interoperability Program HIE measures: the mean proportion of summary of care records sent electronically by dual-eligible hospitals (a stage 2 Medi-Cal Promoting Interoperability Program requirement) stagnated from 2015-2018 at between 31 – 33%.

- For EPs, Medi-Cal Promoting Interoperability Program data also suggests low interoperability engagement: 77.3% - 86.3% of Medicaid EPs claimed an exemption on the electronic transmission of summary care records measure across years of the Medi-Cal Promoting Interoperability program.
- Among eligible hospitals (EHs), the proportion of patients with data available electronically (a Stage 3 Medi-Cal Promoting Interoperability program requirement) stayed relatively constant across years of the Medi-Cal Promoting Interoperability program, between 88 – 91%. However, the proportion of patients who actually accessed that data was much lower, between 10 and 12%.
- The Cal-HOP program was perceived as a key driver of onboarding new provider organizations to HIOs across the state. This success was largely attributed to Cal-HOP funding that allowed HIOs to offset the onboarding costs that frequently prevent these organizations from engaging in HIE.
- Across all participating HIOs, 390 qualifying provider organizations (QPOs) reached the first milestone, onboarding onto the Cal-HOP program. 349 (89.5%) reached milestone 2a, admission/discharge/transfer (ADT) alerts, while 348 (89.2%) reached milestone 2b, linking with the California CURES prescription drug monitoring (PDMP) program. 341 (87.4%) reached milestone 3, adoption of advanced interfaces.
    - Practices with 10 or more providers had a higher rate of completing all 3 milestones (90.3%) compared to practices with fewer than 10 providers (85.7%), while ambulatory providers had a higher rate of achieving all 3 milestones (89.0%) compared to hospitals (79.4%).
- While HIOs were very positive about the design of Cal-HOP and the support received from DHCS, several barriers impeded their ability to achieve better results. These included the substantially delayed timeline from program design to “go live,” COVID-19, and burdensome administrative and reporting requirements.
- Several HIOs described that their activities under Cal-HOP helped strengthen the value proposition for provider participation in HIE, and that many providers and patients are beginning to see the benefit of data exchange through improved care coordination.
- Future HIE priorities identified by HIOs include data sharing mandates, provider incentives to engage in HIE, and further funding to support and ensure the long-term sustainability of HIOs.

Topic A7: HIO Activities in California

- There are 12 operational HIOs in the state as of 2019, an increase from 3 at the start of HITECH.
- On a national HIO survey, competition from HIT vendors offering HIE solutions was reported as the most significant barrier to development (75% in CA and 63% nationally).
- However, CA HIOs generally reported fewer barriers to development as compared to national HIOs.
- CA HIOs also reported that participants pay to participate at lower rates across many participant types compared to the national data. For example, 17% of HIOs in CA reported paying Long-Term Care providers to participate, compared to 70% nationally.

- CA health IT stakeholders had varied perspectives on the role of HIOs in the broader state HIE ecosystem, and in particular cited challenges with HIOs accumulating data but struggling to share it (i.e., bidirectional exchange). Stakeholders also described challenges with providers not seeing the value in HIE and thus not fully trusting the data or integrating it into their workflows.

Topic A13: HIO's Connectivity Approach and Reach

- California HIOs did not differ greatly from HIOs nationally regarding their connectivity approach and national HIE network participation. However, they are slightly less likely to report participating in one or more national HIE networks (75% in CA vs 83% nationally).

Topic A14: Public Health Data Exchange

- Nearly half of California hospitals reported that public health agency inability to receive data electronically was a barrier to interoperable data exchange with public health agencies
- However, relevant CA health IT stakeholders described the increase in electronic public health reporting under HITECH as a success and that there were no waiting lists or delays in onboarding providers for public health related reporting, as was seen in other states.
- CA health IT stakeholders also described the need for public health information systems to undergo modernization in order to support more robust reporting and data exchange.

Topic B1: HIT Trends in Additional Settings

- Interviews with representatives from behavioral health, long term support services, and social services sectors revealed that these stakeholders did not experience a direct impact of the Medi-Cal Promoting Interoperability Program on their work or the work of their members in terms of increased health IT adoption.
- Available data suggests that these settings have only moderate levels of health IT adoption. For example:
    - In a 2019 national survey of Skilled Nursing Facilities (SNFs), just over half of the California SNFs in the sample reported using at least partially electronic methods to execute basic functions such as viewing lab results (9 of 18) and documenting clinical notes (14 of 18)
    - In a 2017 national survey of substance use disorder treatment facilities, a minority of those in California predominantly used only electronic methods for progress monitoring (35.3%) and treatment plan documentation (35.8%). The lowest rates of only electronic methods were reported for sending (8.1%) and receiving (6.7%) client health information.
    - However, compared to substance use disorder treatment facilities across the nation, those in California reported storing and maintaining health information using only electronic methods at higher rates (18% in CA vs 7% nationally).
- Among the ineligible provider stakeholders interviewed, beyond the lack of widespread health IT adoption, other challenges included lack of interoperability, burdensome and duplicative data entry processes and requirements, as well as staff resistance to using technology.

- Looking forward, IT priorities include reimbursement support for telehealth, increased broadband infrastructure, and interoperability (particularly under new state initiatives such as CalAIM).
- Among the broader set of CA health IT stakeholders, there was consensus that CalAIM, AB133, and the state data exchange framework provide strong policy levers for the next set of health IT advancements in the state that will include ineligible providers.
- However, stakeholders also expressed concerns about gaps in these initiatives that may limit their success. These gaps include immature data standards and infrastructure, lack of alignment on core data elements and standards, and lack of data exchange capacity among providers ineligible for the Medi-Cal Promoting Interoperability Program.
- Stakeholders called for greater investment and technical assistance for ineligible providers and greater discussion and policy guidance around data sharing with non-Health Insurance Portability and Accountability Act of 1996 (HIPAA) covered entities

Data Sources & Methods

Our report draws on a broad set of primary and secondary data sources to characterize the current extent of health IT adoption in California and the trajectory of progress under the HITECH programs. In this section, we briefly describe each data source, how it was collected/captured, and our approach to analysis. Within the report, we integrate data from the various data sources to address relevant topic areas of the State Medicaid Health Information Technology Plan (SMHP).

Primary Data Sources & Methods

Ineligible Provider Interviews

This set of interviews sought to characterize and contextualize the quantitative measures of the current state of health IT adoption among providers that were ineligible for the Medi-Cal Promoting Interoperability Program and identify future strategies for such professionals to adopt EHRs and engage in HIE. We focused on the perspectives of long-term support services, including nursing homes, home health, and other aging services providers, behavioral health providers, and social service providers.

An interview guide was developed by the project team (including UCSF, DHCS and CHCF) to assess the current state of health IT adoption and identify future IT strategies and priorities for providers ineligible for the Medi-Cal Promoting Interoperability Program. The interview guide covered topics including IT priorities, IT systems used, data sharing, the impact of state and federal policies, future IT strategies, telehealth, and CalAIM. The full interview guide can be found in the appendix of this report.

A list of organizations and specific interviewees was developed by the project team. Interviewees were invited via email to a 50-minute interview. Interviews were conducted via Zoom during November and December 2021. Each interview was attended by two project team members, one to lead the interview and one to take notes and record the interview. We synthesized the key findings from the interviews based on notes and transcripts.

Table 1: List of Ineligible Provider Interviewees

Organization	Name(s)	Role(s)	Sector
California Association of Home Facilities (CAHF)	Craig Cornett DeAnn Walters	CEO; Director of Clinical Affairs & Quality Improvement	Long Term Support Services
LeadingAge California	Jeannee Parker-Martin Eric Dowdy	President & CEO; Chief Government Affairs Officer	Long Term Support Services
California Association for Health Services at Home (CAHSAH)	Lucy Andrews	Chair	Long Term Support Services

HealthRIGHT 360	Evan Hoese	Vice President of Systems Integration and Innovation	Behavioral Health
California Mental Health Services Authority (CalMHSA)	Amie Miller	Executive Director	Behavioral Health
County Welfare Directors Association (CWDA)	Christiana Smith	Director of Information Technology Policy	Social Services

Cal-HOP HIO Interviews

Interviews with HIOs participating in the Cal-HOP program sought to assess their perceptions of and experiences with Cal-HOP, as well as the impact of Cal-HOP on their HIO and the broader HIE landscape in California. An interview guide was developed by the project team (including UCSF, DHCS and CHCF) and covered topics including program design and administration, HIO activities and experiences under the program, barriers or challenges encountered, impact and lessons learned, and future HIE priorities. The full interview guide can be found in the appendix of this report.

A list of HIOs that participated in Cal-HOP was generated by DHCS along with specific contacts at each organization. Interviewees were invited via an email from DHCS to a 50-minute interview with the UCSF team. All but one HIO (OCPHRIO) participated. Interviews were conducted via Zoom during January and February 2022. Each interview was attended by two project team members, one to lead the interview and one to take notes and record the interview. We synthesized the key findings from the interviews based on notes and transcripts.

Table 2: List of HIO Interviewees

HIO	Name(s)	Role(s)
Santa Cruz HIE	Bill Beighe	Chief Information Officer
San Mateo Connected Care	Tamara Muccia David Anderson	Director HIE Technical Architect
Los Angeles Network for Enhanced Services (LANES)	Ali Modaressi	Chief Executive Officer
Manifest Medex	Claudia Williams Erica Galvez Felix Su	Chief Executive Officer Chief Operating Officer Director, Health Policy
The Coalition of Orange County Community Health Centers	Mike Matull	Project Director
SacValley MedShare	John Helvey Liz Steffen	Executive Director Board Chair

CA Health IT Stakeholder Interviews

Interviews with California stakeholders sought to gather global perspectives about the HITECH Act-funded programs and how those efforts relate to the next set of health information technology priorities and programs in California. An interview guide was developed by the project team (including UCSF, DHCS and CHCF) and covered topics including progress made under HITECH, unfulfilled HITECH goals, lessons learned from HITECH, involvement in and perceptions of CalAIM, and future HIT trends and priorities in California. The full interview guide can be found in the appendix of this report.

A list of stakeholders and contact information was generated by DHCS. Interviewees were invited via an email from DHCS to a 50-minute interview with the UCSF team. Interviews were conducted via Zoom during January and February 2022. Each interview was attended by two project team members, one to lead the interview and one to take notes and record the interview. We synthesized the key findings from the interviews based on notes and transcripts.

Table 3: List of CA Stakeholder Interviewees

Name(s)	Organization	Role(s)
DeeAnne McCallin	California Primary Care Association (CPCA)	Director, Health IT
David Ford	California Medical Association (CMA)	VP, Health IT
Megan Howard Ryan Witz Trina Gonazales	California Hospital Association (CHA)	VP, Federal Policy Group VP, Policy VP, Policy
David Lown	California Health Care Safety Net Institute (SNI)	Chief Medical Officer
Lori Hack	Mazars	Principal
John Ohanian	Center for Data Insights and Innovation Office (CDII) - California Health and Human Services	Chief Data Officer
Bela Matyas	Solano County Public Health Department	Health Officer
Jonah Frohlich	Manatt Health	Senior Managing Director
Scott Fujimoto Eric Dansby Tamara Hennessy-Burt	California Department of Public Health (CDPH)	Promoting Interoperability Coordinator Interoperability Coordinator CalREDIE Surveillance Coordinator
Ali Modaressi	Los Angeles Network for Enhanced Services (LANES)	Chief Executive Officer

Secondary Data Sources & Methods

AHA IT Supplement

Analyses relied on data from the American Hospital Association (AHA) Annual Survey and Information Technology (IT) Supplement, a broad, nationally representative survey sent each year to the leadership of every hospital in the United States. Hospitals are asked to have their leadership team complete the survey or designate completion to the most knowledgeable person in the organization each year. The Annual Survey asks a variety of questions on hospital organizational characteristics such as size, academic medical center status, system membership, ownership, for-profit status, and more. The IT Supplement focuses on measuring the state of health information technology capability at the hospital including level of EHR sophistication, participation in various forms of health information exchange (HIE) and interoperable data sharing.

The AHA Annual Survey regularly receives a very high response rate of over 80% and includes the majority of US hospitals. The IT Supplement receives a response rate of over 60% in most years. The responses are collected and aggregated by the AHA and distributed via survey databases available for purchase.

To empirically describe the state of health information technology adoption in California hospitals, we analyzed AHA Annual Survey and IT Supplement data for 2012, 2014, 2015, 2016, 2017, 2018, and 2019. We report measures of basic and comprehensive EHR adoption following the Jha et al[72] taxonomy of EHR adoption, participation in a regional health information exchange organization (HIO), distribution of EHR vendor, hospital engagement in the four domains of interoperability (finding / querying for data, sending data electronically, receiving data electronically, and integrating data from outside organizations into the EHR without manual entry), and barriers to reporting data to public health agencies, for both the most recent available year as well as longitudinally from 2012. We also report these measures stratified by hospital organizational characteristics including size, academic medical center status, and rurality.

Since not all hospitals respond to the IT Supplement, to create a state-level representative estimates we created non-response weights using an inverse probability model that predicts hospital response to the IT Supplement by organizational characteristics, using the same design employed by the Office of the National Coordinator for Health Information Technology (ONC) for their Data Briefs that use AHA IT Supplement data.

While the AHA data is a powerful data source to understand hospital IT capability, it has some limitations that should be understood in the interpretation of the data. First, while the survey is designed to be nationally representative, including only a single state in our analysis can create “small cell” problems where changes over time are more likely to represent small differences in respondents rather than actual changes in IT adoption.

[72] Jha, Ashish K., et al. "Use of electronic health records in US hospitals." *New England Journal of Medicine* 360.16 (2009): 1628-1638.

While we use our non-response weights to create state-level representative estimates to the extent possible, we are unable to completely mitigate this effect. Second, some AHA questions change over time. Our measure of basic EHR adoption is impacted by this change, as the survey response options to several questions used to construct this measure in 2019 changed. Specifically, several questions that asked hospitals about EHR capabilities - including clinical documentation, results viewing, computerized provider order entry, and decision support - changed by removing the "Partially implemented" response option, which was previously counted as having the functionality in the definition of a "basic EHR." In 2019, the response options were simply "Yes" or "No", leading hospitals that would have previously responded with "partially implemented" and considered a "yes" to be treated as a "no". This led to a lower number of hospitals adopting at least a basic EHR than in 2018, but likely reflects the change in the survey rather than de-adoption of EHR capabilities by hospitals. Additionally, new response options were added to the questions on barriers to electronic public health reporting beginning with the 2018 survey. Further, full AHA IT Supplement data for 2020 was not available by the deadline for this report. Instead, state-level representative estimates were provided by ONC for certain variables, such as the four domains of interoperability, for that year. This also prevented us from analyzing 2020 data by hospital characteristics. Finally, like all survey research, the AHA Annual Survey and IT Supplement are self-reported responses, and we are unable to independently verify the accuracy of the responses. However, the AHA IT Supplement has been found to have good reliability and validity when assessed against other data sources.

HIO Survey

The data is derived from a survey of all US HIOs as of January 1, 2019, conducted by the Center for Clinical Informatics and Improvement Research at the University of California, San Francisco in coordination with and sponsored by the Office of the National Coordinator for Health IT. The survey instrument consisted of screening questions to determine eligibility to participate and then three broad sections: Organizational Demographics, Implementation and Use of Standards, and Information Blocking. The survey was administered between May 2019 and February 2020 to capture responses from 89 organizations that met inclusion criteria and to achieve a response rate of 84 percent. In this report, national data refers to responses collected from all 89 organizations operating in the United States; California data refers to responses from organizations who indicated that they facilitate HIE in the state of California (California Association of HIEs, Central Coast Health Connect, Central Valley HIE, Los Angeles Network for Enhanced Services, Manifest MedEx, North Coast Health Information Network, Redwood MedNet, SacValley MedShare, Orange Country Partnership HIO, San Diego Health Connect, San Joaquin County HIE, Santa Cruz Health Information Exchange). For Table 43, HIOs were asked to report types of stakeholders participating in three ways: contributing data, viewing or receiving data, and/or paying to participate. For Tables 44-46, HIOs were offered a list of participant types and asked to select all answer choices that applied to them.

The main limitations of this dataset are that responses are self-reported and impossible to independently verify. Moreover, geographic coverage data is difficult to interpret as HIOs are constantly connecting to one another and indicating that they participate in a region

does not capture the level of participation of providers in that region. The small N of California HIOs make it difficult to compare percentages to national numbers.

SNF Data

The data come from a survey conducted by CLIIR, funded by the John A. Hartford Foundation. The survey was developed to capture important concepts such as information continuity, data usability, facility characteristics, and hospital-SNF relationships. A random nationwide sample of 500 SNFs and two highest volume referral hospitals was selected. The survey was then fielded January through December 2019, yielding 261 SNF responses and 504 responses from hospital-SNF pairs, for a response rate of 52%. California data is defined as SNFs operating within California that responded to the survey.

Substance Use Disorder Treatment Facility Data

We analyzed data from the National Survey of Substance Abuse Treatment Services, a survey conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA). The survey was developed to capture important concepts such as operations across different settings, facility characteristics, and client usage of these facilities. The field period for this survey was March 31, 2017 through December 4, 2017, yielding responses from 17,029 facilities. California data is defined as substance use disorder treatment facilities operating within California that responded to the survey.

Cal-HOP Data

We analyzed data provided by DHCS regarding enrollment in the Cal-HOP program, including number of Eligible Professionals enrolled by each health information exchange organization, as well as the specific milestones that each enrolled provider achieved. We then calculated milestone achievement performance across the entire program as well as for each health information exchange organization. Finally, we examined milestone achievement performance across the practice characteristics included in the Cal-HOP data: practice type (hospital or ambulatory-only facility) and practice size (10 or more providers compared to fewer than 10 providers.)

Promoting Interoperability Program Data

We analyzed data from the Medi-Cal Promoting Interoperability Program, previously known as the Medi-Cal EHR Incentive Program, attestation files from two sources. First, for Eligible Professionals (EPs,) we analyzed attestation data from 2012 through 2021 for EPs attesting to the Medi-Cal Promoting Interoperability Program. We used this data to assess the level of participation in the Medi-Cal Promoting Interoperability Program, longitudinal participation over time, and stage of attestation by year. For one attestation variable related to data exchange, proportion summary of care records sent electronically for transitions of care, we evaluated the proportion of EPs that claimed an exemption due to not meeting the required volume of transitions of care. We merged the Medi-Cal Promoting Interoperability Program attestation data from DHCS with ONC's Certified Health IT Products List (CHPL), available at https://chpl.healthit.gov/ to identify the EHR vendor used to attest to the Medi-Cal Promoting Interoperability Program in each year. Finally, we identified EPs practicing in federally qualified health centers (FQHCs) using

data provided by DHCS in order to examine aspects of Medi-Cal Promoting Interoperability Program participation for that population of providers.

We also analyzed data for eligible hospitals (EHs) that included dual-eligible facilities that attested to both the Medicare and Medi-Cal Promoting Interoperability Programs from 2011 through 2019. We created similar measures of Medi-Cal Promoting Interoperability Program participation as described above for EPs. Additionally, we analyzed hospital attestation data for three data exchange related measures: proportion of summary of care records sent electronically, proportion of patients with data available to access electronically, and proportion of patients who accessed data electronically (view/download/transmit), for the years the data was available (2015 – 2018).

NEHRS Data

Since 2008, the Centers for Disease Control and Prevention's National Center for Health Statistics has fielded a mail survey of office-based physicians, the National Electronic Health Records Survey (NEHRS). ONC helps fund this supplement to track office-based physician adoption and the use of EHRs for health information exchange and patient engagement. Starting in 2010, the NEHRS's sample size was increased to allow for state-level estimates. The data set estimates each measure nationally and individually for each state and the District of Columbia beginning in 2010, unless otherwise noted.

We first report physicians that have adopted any EHR, by year. Physicians have adopted any EHR if they report that they use an electronic health record or electronic medical record. These reported systems cannot include billing record systems. We then report physicians that have adopted a basic EHR, by year. Physicians have adopted a basic EHR system if the computerized system has the following capabilities: patient demographics, patient problem lists, electronic lists of medications taken by patients, clinician notes, orders for medications, viewing laboratory results, and viewing imaging results. We then report physicians who have adopted a certified EHR, by year. Physicians have adopted a certified EHR if they report that their current EHR system meets the Medicaid Promoting Interoperability Program criteria as defined by the Department of Health and Human Services.

We then break down physicians who have adopted a certified EHR into primary care physicians and medical or surgical specialists. A physician is categorized primary care if she specializes in one of the following areas: adolescent medicine, pediatrics, family practice, general practice, geriatrics, internal medicine, obstetrics, or gynecology. A physician is categorized as a medical or surgical specialist if she specializes in a non-primary care medical or surgical specialty.

Limitations include a lack of recent data (the most recent being 2017), gaps in reporting for each category for the years shown (2013-2017), and a lack of granularity in the data (EHR use is not available at by medical specialty, only at the binary primary care provider or medical specialist level). Data from the 2019 NEHRS was unable to be used because cell sizes were too small to produce state-level estimates. The threshold for reliability was having more than 30 observations per state, the difference between upper and lower confidence levels was less than .3, and the ratio of the difference between upper and

lower bound to the mean does not exceed 130%. California did not meet this threshold for reliability and thus the most recently available data is from 2017.

Additional detail on the survey and analytic methodology is available at ONC's webpage on Office-based Physician Health IT and Use:
https://www.healthit.gov/data/datasets/office-based-physician-health-it-adoption-and-use

ABFM Data
The American Board of Family Medicine (ABFM) regularly collects data on practice organization and scope of practice from candidates during the examination registration process. CLIIR received 2019-2020 ABFM Exam Registration Survey Data directly from contacts at ABFM. They sent a 20% subsample of California practices who registered for the survey in the years 2019-2020.

Practice site, practice ownership, practice size, and vulnerable patient population are self-reported. To report vulnerable patient population, respondents answered the question asking, "What percentage of your patient population in your principal practice site is part of a vulnerable group?" Rurality is derived from RUCA. EHR usage is derived from respondents' answer to the question, "Do you use an electronic health record at your principal practice site?" The survey does not ask about usage of certified EHRs

Since NEHRS data from 2019 was unusable, the decision was made to include 2019-2020 ABFM data in order to provide recent estimates of EHR adoption in ambulatory settings.

Results

Perspectives from Interviews with California Health IT Stakeholders

Significant Areas of Progress Under HITECH

EHR Adoption and Technical Assistance
There was widespread consensus that an area of substantial progress under HITECH was driving adoption of EHR systems. HITECH and the Promoting Interoperability Program incentive funding catalyzed rapid EHR adoption in a variety of care settings including acute care hospitals, clinics, small provider groups and FQHCs. Stakeholders describe that before HITECH very few hospitals and clinics used an EHR, and many may not have been able to financially afford to implement one without HITECH program funding. Stakeholders also agreed that the coupling of incentive dollars with substantial technical assistance is responsible for much of the success in driving adoption in small, rural, and other settings that lack financial and technical resources. Overall, all forms of technical assistance – under the California Technical Assistance Program (CTAP) and Cal-HOP – were described as highly valuable and noted as something that stakeholders hoped would continue to be a part of future programs.

Public Health Reporting
Another successful area of progress under HITECH was an increase in electronic public health reporting. Public health stakeholders described that EHR adoption under HITECH rapidly expanded the number of providers and systems reporting data electronically to

public health systems. The process to onboard providers to state registries was also described as organized and efficient, with few to no providers having to wait to onboard in California, which was a challenge in other states.

Table 4: Significant Progress Under HITECH

Theme	Supporting Quotes
HITECH catalyzed rapid EHR adoption across many practice settings.	"I do think that it [HITECH & Promoting Interoperability Program] served as a catalyst for many smaller health care providers to implement EHRs…A lot of smaller ones, FQHCs, they needed the money to be able to implement in a meaningful way. Now the money wasn't sufficient to build out a full system, but it was enough of a carrot to bring other dollars to bear so that the entities were for the most part wiling to proceed. So, I think the landscape today, 10 years later is one where most health care providers and certainly systems operate with an EHR." "I think they [HITECH programs] certainly helped rapidly incentivize the adoption of EHRs. We see that in hospitals, almost all hospitals are now using certified EHR technology, if not all in California…So we certainly see for that acute care hospitals it rapidly expanded EHR technology." "A lot of systems were already on the path of EHR adoption before Meaningful Use, but it certainly helped provide that nudge that was needed to move them forward." "Before HITECH you could count on fingers and toes how many hospitals and clinics had EHRs and that completely and dramatically changed, it's not 100%, but at least there's electronic documentation."
HITECH technical assistance programs were crucial to support successful EHR adoption.	"It was not only the dollars that were associated with HITECH, but it was the technical assistance that came with HITECH that was really the dual edge there. That you not only provided the funding source for the IT system investments, but provided ongoing technical assistance is really critical and crucial, particularly for smaller entities that was probably a crucial part of the equation." "If you were to look at who got the funding and who maximized the funding, whose been successful in using the EHR in the way it should be, it's entirely due to the technical assistance program." "We're incredibly proud of the work the regional extension centers did, the EHR adoption, getting providers to Meaningful Use, we were able to mobilize tens of thousands of providers and when the ONC publishes the numbers of providers that were helped by the regional extension centers, we dwarf every other state. The work we were able to do and the coordination between the

Theme	Supporting Quotes
	organizations involved in that process I think has been absolutely resounding success."
Electronic public health reporting increased significantly under HITECH.	"I would say yeah the floodgates opened up [on public health reporting]…our provider population grew probably from 1200 providers to well over 3500 providers in a short period of time. And I would definitely attribute that to HITECH and EHR adoption and incentives that were coming to them" "We now have probably 90% of provider and provider sites report [public health data] electronically. I mean it's huge. Now would it have happened without HITECH, maybe, it would have just taken a lot longer time. I think HITECH really pushed those providers forward, I think it really helped" "I think California was actually ahead of the game in some respects. We never really had a huge waiting list for onboarding providers for Meaningful Use. We had a system in place where they could enroll and get all their credentials and everything they needed to start testing their messaging with us. And I think that's one thing we had over a lot of the other states. We'd see states that had a year or two-year waiting period for providers to onboard to the registry. We're a lot bigger state and we had no lines."

Challenging Areas Under HITECH:

Challenges with ongoing EHR costs and functionality

The rapid adoption of EHR systems under HITECH was perceived to have some unintended consequences. The expense of maintaining and optimizing an EHR system has led many small practices to affiliate with larger groups. In addition, many small and rural practices that initially purchased limited, less expensive EHR systems are now having to replace their systems entirely because they are no longer certified EHRs or no longer meet the practices' needs for more sophisticated data capture and sharing. This, in turn, suggests that the EHR Certification program may have set too low a bar.

Public health and other state-level systems require updating

Some stakeholders described weaknesses in the state public health reporting systems that will require substantial updates and standardization to accommodate future expanded reporting requirements and data exchange. Certain systems, such as CalREDIE and CURES, were described as challenging to use and not yet delivering value. Stakeholder's also expressed desire for public health entities to share information back with health systems to a greater degree.

Health Information Exchange

Health information exchange was a major topic of discussion in the interviews and a domain in which stakeholders had differing perspectives on the progress achieved under HITECH. While some stakeholders believe that substantive advances have been made,

others described serious, ongoing fragmentation and interoperability challenges that have limited meaningful data exchange across the state. With multiple dedicated efforts including the State HIE Cooperative Agreement Program and Cal-HOP, stakeholders thought meaningful data sharing would already be occurring in the state. Rather than a single root issue, they pointed to the complexity of achieving widespread HIE in a state like California, and the varied challenges in play with each program (citing leadership issues within the State HIE Cooperative Agreement Program, and delays in launch of the Cal-HOP program).

Most stakeholders agreed that data exchange is occurring through a variety of mechanisms including HIEs, EHR tools, and national networks. However, often times the data being exchanged comes in an unusable format, namely large data dumps with no standard data elements or formats. At times, this was blamed on the lack of data sharing requirements under HITECH, which led some entities to share data only to meet the letter of the law but without strong interest in achieving meaningful exchange. Stakeholders also described challenges with providers not seeing the value in HIE and thus not fully trusting the data or integrating it into their workflows. While the technology has advanced enough for exchange to occur, several stakeholders described that greater change management and stronger incentives are needed if meaningful exchange is ever to occur.

Health IT Workforce

Another area where progress under HITECH was limited was in the development of a sustainable health IT workforce. Many stakeholders weren't aware that workforce development was a priority of HITECH and described that hospitals, clinics, and public health departments, especially in rural areas, continue to struggle to recruit and maintain a sufficient health IT workforce. Interestingly, some stakeholders felt that efforts by Regional Extension Centers and CTAP organizations had a spillover effect of providing training and experience to those who worked there, who then dispersed throughout the state to work on a variety of subsequent health IT-related efforts.

Table 5: Challenging Areas Under HITECH

Theme	Supporting Quotes
Challenges with ongoing EHR costs and functionality	"The smaller systems, smaller provider groups, smaller providers benefitted initially but once MU was over, they didn't have that continued support to upgrade and optimize and as a result HITECH probably pushed a lot of smaller providers to consolidate into bigger systems because they didn't have the infrastructure and financing to support ongoing use of EHR." "This is so big [EHR adoption and data exchange], it's so complicated and it's so expensive that it becomes the tipping point where the practices affiliate even if they were trying hard to remain independent." "We're seeing the trend of rip and replace. Practices got very low end EHRs to check the boxes and now they're going 'shoot, now I have to get another thing that actually allows me to be part of

Theme	Supporting Quotes
	the future.' Certification could have looked more at usability, data exchange capability, could have built in measures that looked past just checking the boxes." "Rural hospital definitely had a tougher time. And that led a lot of them to go with a smaller, cheaper, more barebones EHR vendor which over time didn't update their technology to remain certified. And then we see now rubber hits the road and they've totally got the change EHR systems because the one they went with at first is no longer supporting the certified criteria."
Public health systems require updating	"We need more robust systems in the near future because of all the reporting. We're seeing probably 1.5 million queries a day, and probably over 400,000 vaccination messages sent to us daily. So, its huge and it seems to be growing" "Public health reporting, particularly in California, has been a challenge and now the measure requirements will be that hospitals have to report to all four of these measures in the public health objective and the state does not necessarily have the systems to support that kind of reporting from the hospital to the public health agencies across the state and the counties." "The usability on those systems [CalREDIE, CURES 2] is severely lacking and needs to have much more investment in infrastructure and standards around that."
Data exchange is happening, but it is often unusable and not meaningful.	"Sometimes we hear that the data that does come [from the community] isn't useful. If it comes in a PDF format that's direct emailed and the clinician is going to have to read 40 pages of a record to find something…We do hear that side of it that it isn't useful. So USCDI and standardizing the set of data that everyone is working with is something that's really important going forward, especially as we start talking about health equity and social determinants of health we really need to be working with the same set of data and the same formatting for this to be useful." "In our comments to California in the past we've always talked about California's fragmented HIEs and a lack of statewide [HIE]. We hear from our members that they are exchanging a lot of data, some of it is through regional HIEs, but a lot of it is through tools in their EHRs and the Carequality network… Our members feel like they do exchange a lot of data, is it getting to the right place all the time, I don't know, but we would say a lot of that is a lack of adoption of EHR technology in those settings that were left out."

Theme	Supporting Quotes
	"HIE was helped to a certain extent [via HITECH] but progress was mainly made through Epic's Care Everywhere or Carequality, eHealth Exchange, and not through HTIECH. We heard over and over again that while there was data exchange happening as a result of HITECH, it was not meaningful data exchange. It was a lot of big data dumps, not sortable, not ingestible and not usable and with no obligation to actually exchange data, just meet the letter of the law." "We have a lot of foundation for this next step. Everyone seems to have a pretty good electronic handle on their own files in their own office, but to really actually send what you need to the referring specialist and to get back what you need is not happening at all…From one end of the state to the other, it is not happening…It is absolutely not happening. And I've been sitting on these HIE committee meetings and its stunning. Sure, there's lots of data in a siloed warehouse in each of the HIEs but it's not being shared. And that's sort of the elephant in the room so if we're going to do some work that's where it needs to happen. To train people how to use the tools they have, to get people the tools they need where they don't have it and enforce and incentive people to use the tools once they're trained and have them."
HITECH era efforts around data exchange ran into challenges and were further hindered by lack of data sharing requirements.	"I think we all thought we'd be a lot farther along with data exchange than we are…It certainly hasn't been for lack of effort because there was the State HIE Cooperative Agreement, there was Cal-HOP and now there's this current effort [data exchange framework], and all three of those have run into different challenges. I think a lot of us wouldn't have guessed it in 2009 or 2010 that we would have to be going through the process that we're going through right now to try to do data exchange. We thought 'no we should be past that by now.' And I think we were all probably a little sanguine about the parochial interest that would be involved, the complexity of doing data exchange in a state this large and this complicated, the bureaucratic headwinds we would run into…The amount of effort that's been thrown at it, we'd all thought we'd be a lot farther along than we are right now." "I don't think HITECH did a very good job of actually putting that in [data sharing requirements] place and making it a requirement that you not only have a system, but you exchange it"
Additional change management and workflow	"Community health centers and clinicians are still not sold on the value of being part of an HIE. But when they want that information at the point of care, they love HIE. It's still a

Theme	Supporting Quotes
integration is needed for providers to engage in HIE.	contradiction and people are trying to figure out how to lean on it more and trust it." "If we can get more standard health information exchange operating systems out there, the leaners and more streamlined those systems can work and interoperate together, then this final mile shouldn't have to be that big of a lift, it might be a big lift with the number of folks with change management, but not necessarily in technology." "The hardest part were the years of getting people to the table to say that they were going to do it [data exchange]. Honestly that's the biggest barrier…Nowadays all the tech is out there to link records and find someone's record and put all that data together. What I ran into a lot was once they said 'yes' it flowed" "The technology is there that it [HIE] works, the capacity to digest it and to use it is still a problem…Their HIE functions, it works, there's a lot of it, but there's still corralling of it, standardization, confidences – it's still relatively young, that clinicians and leadership might not feel confident in the data not coming out of their 4 walls." "In terms of data sharing, I think the issue was that we're having a different in dialogue. So the HIEs are out there saying to DHCS and folks, I've got all this data, I'm sharing data, data's coming to me, which may be true, an ADT feed may be going from a hospital to a particular HIO. But then you as a doctor have to go out and query that database. So you have to know to do that, you have to want to do that and you have to have an experience where you got something back from doing that. And so what's not being said is that the hospitals that are sending off to this database are limiting very, very much because they don't trust where it's going and the IT shops that are sending all this stuff back and forth haven't talked to clinicians or the manager to say 'hey did you know there's a bunch of data out there, let's set up a mechanism where you come in and out of your EHR and look for that data and see if it's helpful, give feedback and really optimize the process.'"
Health IT workforce still lacking	"Finding people with the technical skills was very challenging, so we hired people with the capability to learn things and then got them training…even though we tried to hire people with those skills initially we didn't have any luck, so we ended up sort of pivoting and hiring people with the capacity to learn."

Theme	Supporting Quotes
	"IT workforce particularly is a space where buying the system is just step 1, you have to have the personnel and the infrastructure to be able to maintain and basically stay ahead of the curve because that's where others are.…It [workforce] seems challenging across the board, even rural and urban. But for rural providers particularly, the source [of candidates] is low anyhow and so just trying to cobble that together becomes challenging." "The regional extension centers kind of became farm teams. You look at some of the organizations that are out there now, and they're staffed with folks now who either came out of CalHIPSO - former employees, subcontractors etc. That is a really big success that we created a generation of folks that are building the next generation of health IT."

HITECH as the Foundation for the Next Era of State Health IT Priorities

In general, stakeholders had positive impressions of the progress made under HITECH. The sentiment among stakeholders was that immense, important progress was made under HITECH, but that sustained effort is needed if California is to achieve its ultimate health IT goals. Stakeholders also agree that California is well positioned to leverage its learnings from HITECH and stakeholder's willing attitudes in this next phase of work.

Table 6: HITECH as the Foundation for Future Progress

Theme	Supporting Quotes
Progress under HITECH was substantial, and California is positioned for the next phase of work.	"I feel like we made a lot of progress, we're just not across the finish line" "We have spent the last 10 years on the adoption and getting everything electronic and the data collecting of it all. We need another decade on how to use it…It's a long road" "HITECH was worth the investment and has us in a good place for places we still need to get to" "We couldn't do what we're doing now without 99.9% of providers being on electronic health records and having the past 10-12 years of learning how to function in a digital environment" "I would say we have an attitude that we probably didn't have 10 years ago around everyone saying, 'we need to do this.' Which I think if half the battle sometime"

Perspectives on Next Era of State Health IT Policy

In general, stakeholders expressed support for CalAIM, AB 133, and the state data exchange framework. There was consensus that these initiatives provide strong policy levers for the next set of health IT advancements in the state. However, stakeholders also expressed concerns about gaps in these initiatives that may limit their success. A common concern was that data standards and current infrastructure may not be mature enough to begin exchanging data with entities outside the traditional medical sphere who were not part of HITECH programs. Stakeholders described defining core data standards and elements, as well as aligning with federal standards as critical to advancing HIE. Stakeholders also expressed worry that California hasn't achieved meaningful clinical data exchange yet but is rapidly trying to expand the types of data being shared. Many medical and non-medical entities that were left out of HITECH still lack robust EHR systems or the decade-worth of experience electronically documenting and exchanging information. As a result, many stakeholders identified the need for investment and technical assistance for these providers. Without this, it will be challenging to meet the initiatives' goals. Lastly, the expansion of HIE called for in these initiatives has created legal and privacy concerns about sharing data with non-HIPAA covered entities and has prompted the need for further discussion and policy guidance.

Table 7: Perspectives on Future Health IT Policy

Theme	Supporting Quotes
Data standards and infrastructure, as well as clinical HIE may not be mature enough to successfully expand data exchange as envisioned.	"EHR adoption in HITECH ventured into realms that people had not been venturing into. It opened up a huge can of worms that people had not been thinking about, caused huge amounts of disruption in a positive but incredibly painful way and it forced the conversation of 'ok we said we're going to do this exchange, clearly we don't have the infrastructure or standards or requirements in place, what are those?'…With the data exchange framework, I think it's great that we're getting more specific into how we think about the standards and particularly federal standards and also getting clarity on what is and not allowable for exchange." "We're still struggling to do the blocking and tackling parts of data exchange – ADT feeds, event notifications, the public health connections, exchange of medical data. We're still trying to get all that stuff right and I think we'd thought it'd be more of a progression. We do that and then start talking about these nontraditional sources of data. And now because of all the delays in doing the medical data we're trying to do all of that at once and its making things very convoluted…it feels like trying to paint the walls in a house we haven't finished building." "I saw the use cases that were presented for the stakeholders to review and we were all like 'oh my god, ok first of all you can't even get primary care data to specialty, or hospital data downloaded consistently etc.' I think though that outlining those

Theme	Supporting Quotes
	goals, focusing on them and bringing to bear the Medi-Cal reimbursement to make this happen will help us even start to address it."
Core data and standards need to be agreed on and aligned with federal standards.	"Our main priority is that we should follow and align with national standards. That's probably our number one issue that we're advocating for heavily here at the state level." "The need for standards, and everyone to follow national standards, is still a huge hole. And the data exchange framework is definitely going to be helping to push that discussion." "California should not be creating its own standards for anything, we should be adopting federal standards and then working with the feds to basically get them to recognize the use cases that we're identifying and work together to create standards so that we are in line what they will adopt."
Providers left out of HITECH will require funding and technical assistance to achieve next set of health IT goals.	"We do have those that are very far behind…inpatient psych, community clinics, small providers, they're now way behind where providers that were eligible for HITECH funding and technical assistance were. So that's the next challenge. If we're going to be able to really get to the true promise of interoperability that gap needs to be made smaller." "There are Health IT haves and have nots and the state needs to figure out and prioritize how they're going to support some of these various providers, some in the health care and non-health care human services spaces, and that's going to require investments of some sort and prioritization of some sort to get us there" "There's still a lot of progress that needs to go especially for underserved communities, under resourced organizations, many small and solo providers, some practices that are focused on pediatrics, some providers who are substance use disorder and other mental health providers that did not benefit from HITECH in the same degree. So, we still have gaps in the types of entities that don't have systems, they don't even have an EHR and that should be a major priority for any state or federal administration to figure out how to create that capacity, the systems, to fund them, and then for interoperable data exchange to actually take place" "The reality is that we have to work with these practices, and they have limited resources both financially and human resources…I

Theme	Supporting Quotes
	think you're going to have a big issue – behavioral health is going to be a big challenge to take them through this EMR adoption and connection to HIEs…A lot of them have mom and pop systems…I think you'll see a lot of surprises and a lot of challenges with behavioral health practices." "The requirement that all these entities are actively sharing by the middle of 2024 – there isn't an allocation for any entity that hasn't qualified for HITECH to get a system. There's no money for them in AB 133." "Our number one priority is technical assistance and support for small practices to make sure we don't just foist this on them without any sort of support or any kind of help at the elbow." "Most of these entities [not eligible for HITECH] are not on electronic documentation systems and haven't been for the last 10-15 years, evolving, learning how to work those systems, the workflows, the efficiency, the optimization…there kind of needs to be a meaningful use for these community partners. Funding to help get them on electronic platforms, regional extension centers to help them learn how to actually use the software and use standards and meaningfully exchange data. It needs that same infrastructure."
Expanding HIE participation creates legal and privacy concerns, specifically around sharing data with non-HIPAA covered entities.	"There is more and more concern about data being shared, particularly as we get into SDOH data sharing and sharing with nonmedical, non-HIPAA covered entities." "I think you have people in the IT camp and people in the patient protection camp and then you have frustrated health care providers in the middle who are just trying to provide care to people and who would love to have the data but aren't involved in how to get access to it." "As we're trying to rapidly exchange data, we will increasingly bump up against California's very well-developed privacy laws. The tension between wanting data to be available at the point of care and have patients have access to data, the federal information blocking rule, all of that against a very well developed set of privacy laws. That tension is just going to get hotter and hotter over the next few years." "Huge concern [about CalAIM] – there's the legal aspect that all these entities are not HIPAA covered entities so who's making the rules about what they can and can't get."

Theme	Supporting Quotes

Topic A1: Trends in EHR Adoption & Use

AHA IT Supplement

This set of analyses captures the current extent of EHR adoption by hospitals in California, using the basic and comprehensive EHR taxonomy developed by Jha et al[73] and used to track hospital EHR adoption nationally. A hospital is characterized as having a basic EHR if the ten basic functions defined by Jha et al are present. These functions include electronically maintaining patient demographic information, physician notes, nursing assessments, patient problem lists, patient medication lists, and discharge summaries, as well as electronically viewing laboratory reports, radiologic reports, and diagnostic test results; and electronically ordering medications. A hospital is characterized as having a comprehensive EHR if all ten basic functions, as well as fourteen additional functions are present in the EHR. Comprehensive functions include electronically maintaining advanced directives, electronic order entry for lab tests, radiologic tests, medications, consultation requests and nursing orders, ability to view radiology images, diagnostic-test images, and consultant reports, as well as decision support for clinical guidelines, clinical reminders, drug-allergy alerts, drug-drug interaction alerts and drug-dose support.

We measured trends over time and stratified by hospital demographic variables including size, teaching status, and rurality. Finally, we measured the proportion of hospitals using each EHR vendor over time in California. All calculations use non-response weights to generate state-representative estimates.

Table 8: Proportion of California Hospitals Adopting an EHR, 2012 – 2019

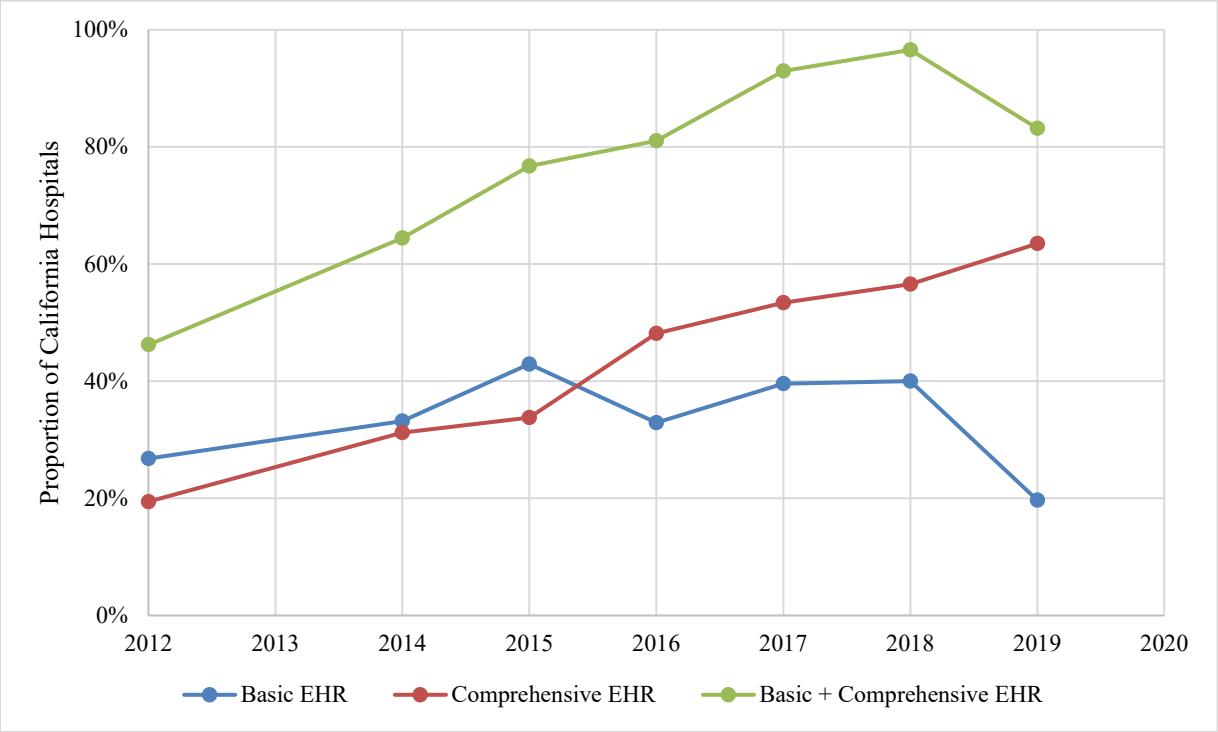
Year	Basic EHR	Comprehensive EHR	Basic or Comprehensive EHR
2012	26.8%	19.4%	46.2%
2014	33.2%	31.2%	64.4%
2015	42.9%	33.8%	76.7%
2016	32.9%	48.2%	81.1%
2017	39.6%	53.4%	93.0%
2018	40.0%	56.6%	96.6%
2019	19.7%	63.5%	83.2%

[73] Jha, Ashish K., et al. "Use of electronic health records in US hospitals." *New England Journal of Medicine* 360.16 (2009): 1628-1638.

EHR adoption has markedly increased over time among California hospitals, from less than half of hospitals in 2012 to nearly all hospitals by 2019, even after accounting for changes in survey methodology. The reduction in basic EHR adoption is likely driven in part by changes in the survey instrument used by the AHA in 2019, which removed the response option "partial implementation" for EHR functions, and thereby resulted in some hospitals that previously responded they had "partially implemented" these functions to instead report their EHR did not have the function.

All figures include non-response weights to create state-level representative estimates. *Note: The American Hospital Association (AHA) Annual Survey – IT Supplement changed response options in 2019 which likely accounts for the significant decrease in EHR adoption percentages.*

Figure 1: Proportion of California Hospitals Adopting an EHR, 2012 – 2019



Larger hospitals and teaching hospitals were more likely to have adopted EHRs throughout the study period, while urban hospitals had lower adoption compared to rural hospitals in 2012 but progressed faster, overtaking them by 2016.

Figure 2: Proportion of California Hospitals Adopting an EHR – Stratified by Hospital Size, 2012 – 2019

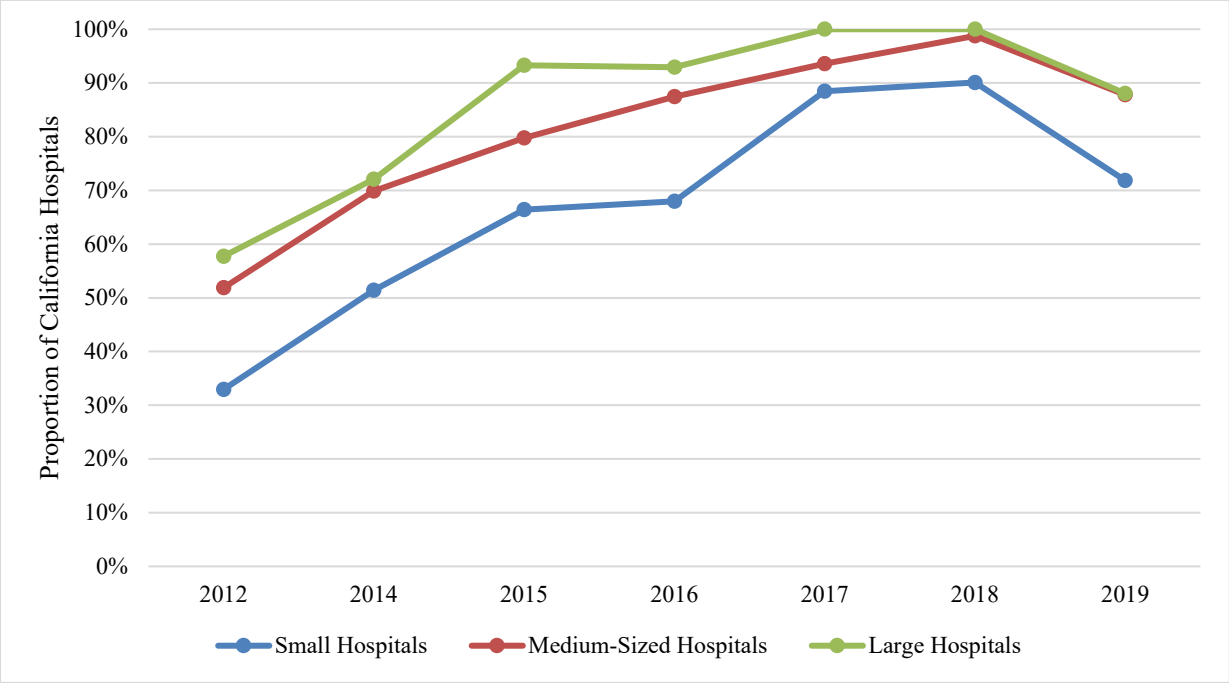


Figure 3: Proportion of California Hospitals Adopting an EHR – Stratified by Hospital Teaching Status, 2012 – 2019

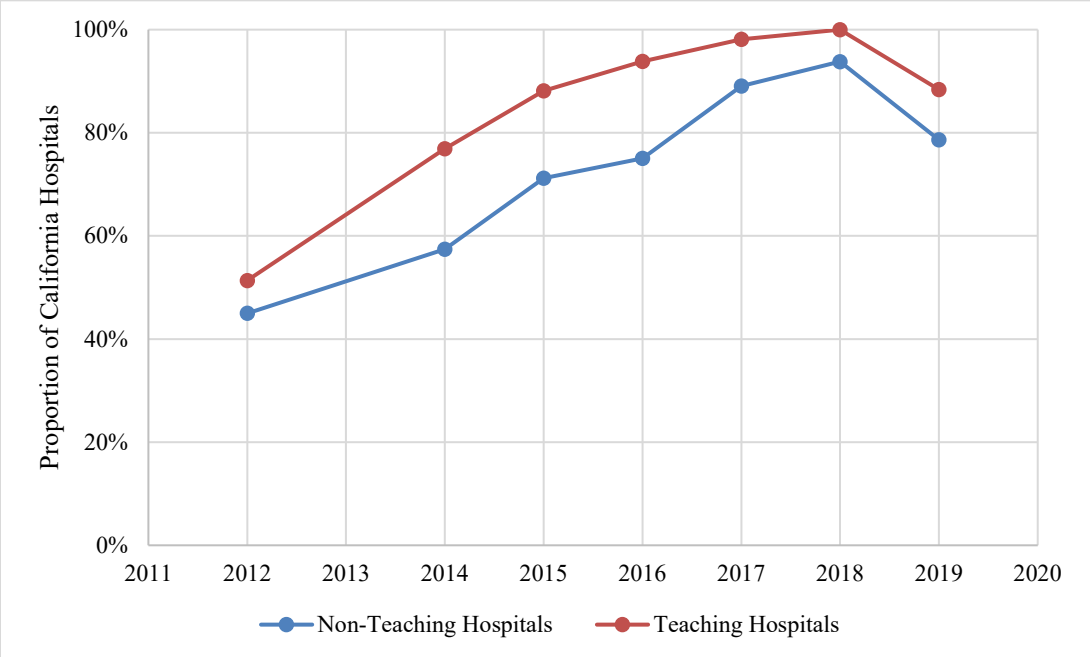
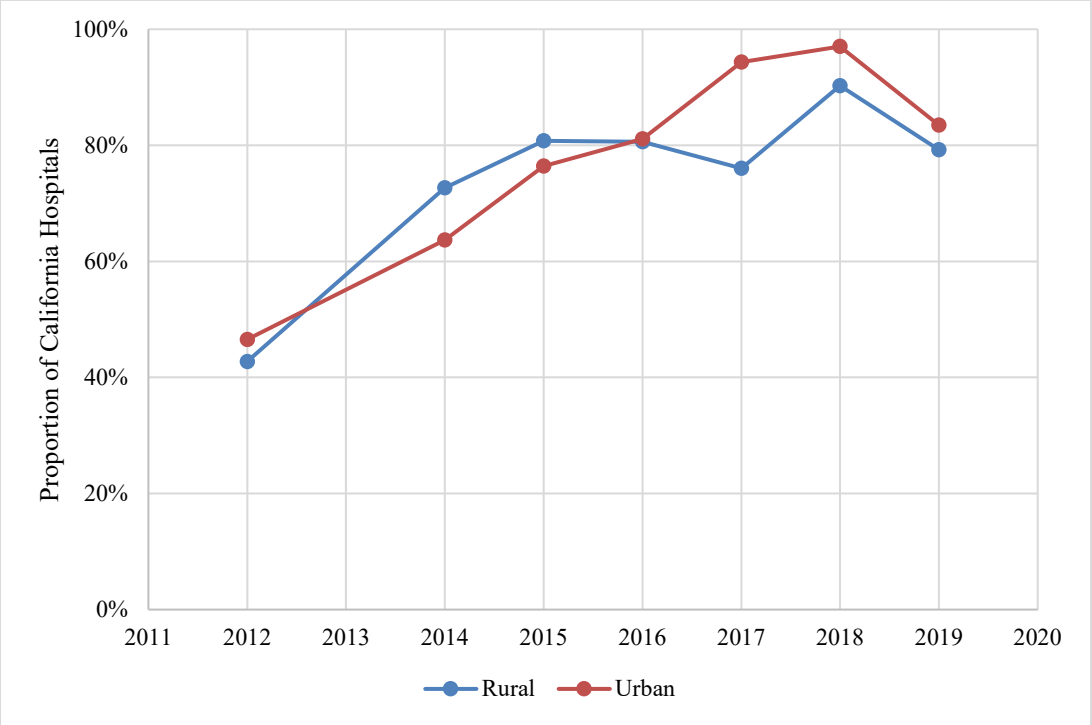


Figure 4: Proportion of California Hospitals Adopting an EHR – Stratified by Hospital Rurality, 2012 – 2019



In addition to examining trends in EHR adoption, we also assessed trends in EHR vendor prevalence over time. The EHR vendor market has become increasingly more dominated by the top vendors, especially Cerner and Epic. These trends are broadly representative of the US hospital market as a whole.

Table 9: Proportion of California Hospitals Using a Specified EHR Vendor Over Time, 2012-2019

EHR Vendor	2012	2014	2015	2016	2017	2018	2019
Cerner	19.6%	20.4%	28.0%	25.1%	28.0%	26.8%	33.4%
Epic	14.1%	26.1%	24.3%	26.3%	30.8%	24.0%	27.9%
Meditech	25.2%	16.0%	16.7%	15.8%	18.3%	18.8%	17.6%
AllScripts	6.1%	5.6%	3.5%	3.6%	3.5%	7.6%	5.3%
Other	4.0%	5.0%	4.9%	8.9%	3.2%	5.8%	4.6%
CPSI	4.8%	5.4%	6.0%	5.5%	2.3%	7.5%	4.4%
Undisclosed	0.5%	0.5%	0.4%	0.0%	0.0%	0.7%	1.7%
Health Care System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%
Self-Developed	2.1%	0.8%	1.3%	0.4%	2.1%	3.7%	0.9%
MEDHOST	0.0%	0.0%	0.0%	1.8%	1.9%	2.1%	0.9%
QuadraMed	3.6%	1.2%	1.1%	1.3%	0.8%	1.1%	0.7%
Athenahealth	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.6%
Evident	0.0%	0.0%	0.0%	2.4%	2.8%	0.0%	0.5%
GE	0.8%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%

EHR Vendor	2012	2014	2015	2016	2017	2018	2019
McKesson	8.4%	8.2%	4.0%	7.8%	5.0%	0.7%	0.0%
NextGen	2.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%
Siemens	6.7%	5.0%	2.8%	0.0%	0.0%	0.0%	0.0%
HMS	0.5%	1.9%	4.2%	0.0%	0.0%	0.0%	0.0%
Healthland	1.5%	1.5%	2.7%	1.1%	1.2%	0.7%	0.0%

Large hospitals and teaching hospitals predominately use Epic or Cerner, while small and medium-size hospitals use a wider range of EHR vendors.

Table 10: Proportion of California Hospitals Using a Specified EHR Vendor Over Time – Stratified by Hospital Size, 2012-2019

Small Hospitals	Epic	Cerner	Meditech	Other
2012	8.1%	12.1%	7.4%	72.4%
2014	21.3%	16.6%	8.8%	53.3%
2015	18.5%	18.9%	9.0%	53.6%
2016	18.7%	21.8%	5.8%	53.7%
2017	26.5%	24.1%	10.8%	38.6%
2018	9.5%	26.5%	8.9%	55.1%
2019	16.0%	39.6%	7.3%	37.2%
Medium Hospitals	Epic	Cerner	Meditech	Other
2012	8.8%	18.4%	30.0%	42.8%
2014	23.0%	22.8%	20.4%	33.7%
2015	20.4%	32.5%	22.3%	24.8%
2016	24.8%	25.3%	22.8%	27.1%
2017	24.2%	29.1%	24.4%	22.2%
2018	23.6%	25.2%	25.4%	25.8%
2019	28.9%	28.5%	24.1%	18.5%
Large Hospitals	Epic	Cerner	Meditech	Other
2012	30.4%	6.1%	0.0%	63.5%
2014	42.7%	6.5%	4.0%	46.8%
2015	59.2%	22.6%	3.7%	14.4%
2016	53.1%	24.1%	4.0%	18.8%
2017	64.6%	25.7%	2.7%	7.0%
2018	54.1%	30.0%	3.8%	12.1%
2019	46.5%	35.5%	4.6%	13.4%

Table 11: Proportion of California Hospitals Using a Specified EHR Vendor Over Time – Stratified by Hospital Teaching Status, 2012-2019

Non-Teaching	Epic	Cerner	Meditech	Other
2012	8.1%	13.8%	22.0%	56.1%
2014	19.3%	16.2%	19.0%	45.4%
2015	16.1%	22.6%	20.1%	41.2%
2016	17.3%	22.4%	18.0%	42.2%
2017	21.1%	25.5%	20.7%	32.8%
2018	11.5%	23.8%	21.4%	43.3%
2019	14.3%	36.4%	21.7%	27.7%
Teaching	Epic	Cerner	Meditech	Other
2012	22.3%	20.1%	8.4%	49.2%
2014	34.0%	24.4%	8.0%	33.6%
2015	38.8%	36.5%	8.0%	16.7%
2016	41.9%	27.3%	8.8%	22.0%
2017	41.9%	29.6%	14.0%	14.5%
2018	38.2%	29.0%	14.6%	18.2%
2019	41.7%	28.0%	11.8%	18.4%

Cerner dominates the rural hospital EHR market, while urban hospitals use a wider mix of EHR vendors.

Table 12: Proportion of California Hospitals Using a Specified EHR Vendor 2012-2019 – Stratified by Hospital Rurality

Rural	Epic	Cerner	Meditech	Other
2012	0.0%	18.7%	6.5%	74.8%
2014	10.9%	27.2%	5.4%	56.4%
2015	10.2%	37.7%	12.2%	40.0%
2016	15.4%	32.8%	10.3%	41.5%
2017	17.3%	31.1%	19.6%	32.0%
2018	8.1%	30.8%	20.4%	40.7%
2019	8.9%	47.0%	0.0%	44.1%
Urban	Epic	Cerner	Meditech	Other
2012	11.9%	14.7%	20.6%	52.9%
2014	25.8%	18.4%	15.9%	39.8%
2015	24.6%	26.3%	16.5%	32.6%
2016	26.0%	23.3%	15.5%	35.3%
2017	31.1%	26.9%	17.7%	24.3%
2018	24.5%	25.8%	18.2%	31.5%
2019	28.4%	31.4%	18.3%	21.8%

NEHRS

Physician EHR adoption remained consistent over the period 2013-2017. As of 2015, primary care physicians adopted certified EHRs at greater rates than medical and surgical specialists, although rates among medical and surgical specialists were increasing. Adoption levels of certified EHRs are traditionally higher that adoption levels of basic EHRs because the definition of a basic EHR involves full adoption of patient demographics, patient problem lists, electronic lists of medications taken by patients, clinician notes, orders for medications, viewing laboratory results, and viewing imaging results, which are not all required functions of certified EHRs.

Table 13: Office-based Physician EHR Adoption by Type of EHR; Office-based Physician Certified EHR Adoption by Category of Specialty, 2013-2017 (California)

Year	% physicians that have adopted any EHR	% physicians that have adopted basic EHR	% physicians that have adopted certified EHR	% primary care physicians that have adopted basic EHR	% primary care physicians that have adopted certified EHR	% medical and surgical specialists that have adopted certified EHR
2013	80.0%	54.0%	--	61.0%	--	--
2014	80.1%	58.5%	72.4%	--	86.7%	58.2%
2015	82.1%	49.4%	76.5%	--	83.6%	70.6%
2017	78.8%	--	72.9%	--	--	--

Note: dashes represent years that data wasn't available

ABFM

97% of family medicine physicians report using an EHR. For the 3% that don't report using an EHR, most are in an independent practice, have a sole owner, are a solo practice, serve less than 10% vulnerable population, and are located in rural areas.

Table 14: Family Medicine Physicians EHR Adoption, 2019-2020 (California)

		EHR Adoption at Practice Site (Row %)				
		Yes		No		Total
Total		1,187		43		1,230
Practice Site N, Row Percent	Hospital / health system owned medical practice	237	99.2%	2	0.8%	239
	Independently owned medical practice	258	89.0%	32	11.0%	290
	Managed care / HMO practice	314	100.0%	0	0.0%	314
	Academic health center / faculty practice	56	100.0%	0	0.0%	56
	Federally Qualified Health Center or Look-Alike	127	99.2%	1	0.8%	128
	Rural Health Clinic (federally qualified)	18	100.0%	0	0.0%	18
	Indian Health Service	8	100.0%	0	0.0%	8

	Government clinic, Non-Federal	63	96.9%	2	3.1%	65
	Federal	28	100.0%	0	0.0%	28
	Work site clinic	30	96.8%	1	3.2%	31
	Other	48	90.6%	5	9.4%	53
Practice Ownership N, Row Percent	No official ownership stake (100% employed)	595	98.2%	11	1.8%	606
	Sole owner	135	86.0%	22	14.0%	157
	Partial owner or stakeholder	355	98.9%	4	1.1%	359
	Self-employed as a contractor (including locums)	59	93.7%	4	6.3%	63
	Other	43	95.6%	2	4.4%	45
Practice Size N, Row Percent	Solo practice	103	85.1%	18	14.9%	121
	2-5 Providers	221	92.9%	17	7.1%	238
	6-20 Providers	295	99.0%	3	1.0%	298
	>20 Providers	568	99.1%	5	0.9%	573
Vulnerable Patient Population N, Row Percent	<10%	459	96.0%	19	4.0%	478
	10-49%	402	96.6%	14	3.4%	416
	>50%	326	97.0%	10	3.0%	336
Rurality (from RUCA) N, Row Percent	Urban	1,138	96.7%	39	3.3%	1,177
	Rural	49	92.5%	4	7.5%	53

Promoting Interoperability Program

Eligible Hospitals

This set of analyses examines hospital participation in the Medi-Cal Promoting Interoperability Program EHR Incentive Program using attestation data for dual-eligible hospitals, as well as non-Medicare hospitals participating in the Medi-Cal Promoting Interoperability EHR Incentive Program such as children's hospitals.

Table 15: Number of Eligible Hospitals Participating in Medi-Cal Promoting Interoperability Program, 2011-2019 (California)

Program Year	Number of Hospitals
2011	51
2012	162
2013	266
2014	267
2015	259
2016	247
2017	245
2018	228
2019*	1

***** 2019 data is preliminary and not complete.

Table 16: Number of Eligible Hospitals Participating in Medi-Cal Promoting Interoperability Program by Year and Program Stage, 2011-2019 (California)

	Promoting Interoperability Program Stage		
Program Year	*1*	*2*	*3*
	n	n	n
2011	51	0	0
2012	161	1	0
2013	266	0	0
2014	155	112	0
2015	28	231	0
2016	25	222	0
2017	1	244	0
2018	0	218	10
2019	0	1	0

Eligible Professionals

This set of analyses examines eligible professional participation in the Medi-Cal Promoting Interoperability Program, using attestation data, as well as data on FQHC status and EHR vendor data from ONC's CHPL database.

EP participation in the Medi-Cal Promoting Interoperability Program peaked in 2017, with over 5,000 Eligible Professionals. A significant number of EPs were able to attest to Stage 3 of Medi-Cal Promoting Interoperability Program by 2021.

Table 17: Number of Eligible Professionals Participating in CA Medi-Cal Promoting Interoperability Program by Year, 2012-2021

Program Year	Number of Participating EPs
2012	2,054
2013	4,111
2014	4,232
2015	4,116
2016	4,840
2017	5,034
2018	4,509
2019	1,372
2020	1,646
2021	1,044

Table 18: Number of Eligible Professionals Participating in CA Medi-Cal Promoting Interoperability Program by Year and Program Stage, 2012-2021

	Promoting Interoperability Program Stage

Program Year	*0*	*1*	*2*	*3*
	n	n	n	n
2012	2,054	0	0	0
2013	674	3,437	0	0
2014	1,786	2,089	357	0
2015	0	2,482	1,634	0
2016	0	2,540	2,300	0
2017	0	0	5,019	15
2018	0	0	4,481	28
2019	0	0	0	1,372
2020	0	0	0	1,646
2021	0	0	0	1,044

The Medi-Cal Promoting Interoperability Program had a participation limit of 6 years, and only 0.4% of EPs who participated in the Medi-Cal Promoting Interoperability program attested in all 6 years. Many EPs were able to attest in multiple years, while 31.7% attested in only a single year.

Table 19: Longitudinal EP Participation in CA Medi-Cal Promoting Interoperability Program

Years of Participation	Unique EPs	%
1	3,904	31.7%
2	2,725	22.1%
3	1,771	14.4%
4	1,347	10.9%
5	2,523	20.5%
6	48	0.4%

To assess whether we saw differences in longitudinal participation in the Medi-Cal Promoting Interoperability Program by practice size or volume of Medicaid patients, we examined these across quartiles. Differences across quartiles were small, with means between 2.5 and 3 years, suggesting little variation across both Medicaid volume and practice size in terms of number of years of Medi-Cal Promoting Interoperability Program participation.

Table 20: Longitudinal EP Participation in CA Medi-Cal Promoting Interoperability Program, by Practice Size

Practice Size Quartile	
1 (Lowest)	2.66
2	2.56
3	2.66
4 (Highest)	2.83

Table 21: Longitudinal EP Participation in CA Medi-Cal Promoting Interoperability Program by Practice Size by Medicaid Volume

Medicaid Volume Quartile	
1 (Lowest)	2.65
2	2.96
3	2.78
4 (Highest)	2.51

Our multi-variate results find that the largest (top quartile) practice EPs on average participated for 0.2 years more compared to the smallest (first quartile) EPs ($p < 0.001$). Compared to EPs in the lowest quartile of Medicaid volume, EPs in the 2nd quartile participated slightly longer (0.30 years, $p < 0.001$), while EPs in the highest quartile of Medicaid patients participated in CA Medi-Cal Promoting Interoperability for 0.19 *fewer* years on average ($p < 0.001$).

Table 22: Multivariate Analysis of Association Between Practice Size and Medicaid Volume Quartiles and Years of CA Medi-Cal Promoting Interoperability Program Participation

DV: Years of Promoting Interoperability Program Participation	Coefficient	p-value	95% CI Lower	Upper
Medicaid Volume Quartile				
1 (Lowest)	Ref			
2	0.30	<0.001	0.20	0.40
3	0.08	0.03	0.01	0.15
4 (Highest)	-0.19	<0.001	-0.26	-0.12
Practice Size Quartile				
1 (Lowest)	Ref			
2	-0.10	0.01	-0.18	-0.03
3	0.02	0.52	-0.05	0.10
4 (Highest)	0.20	<0.001	0.12	0.28

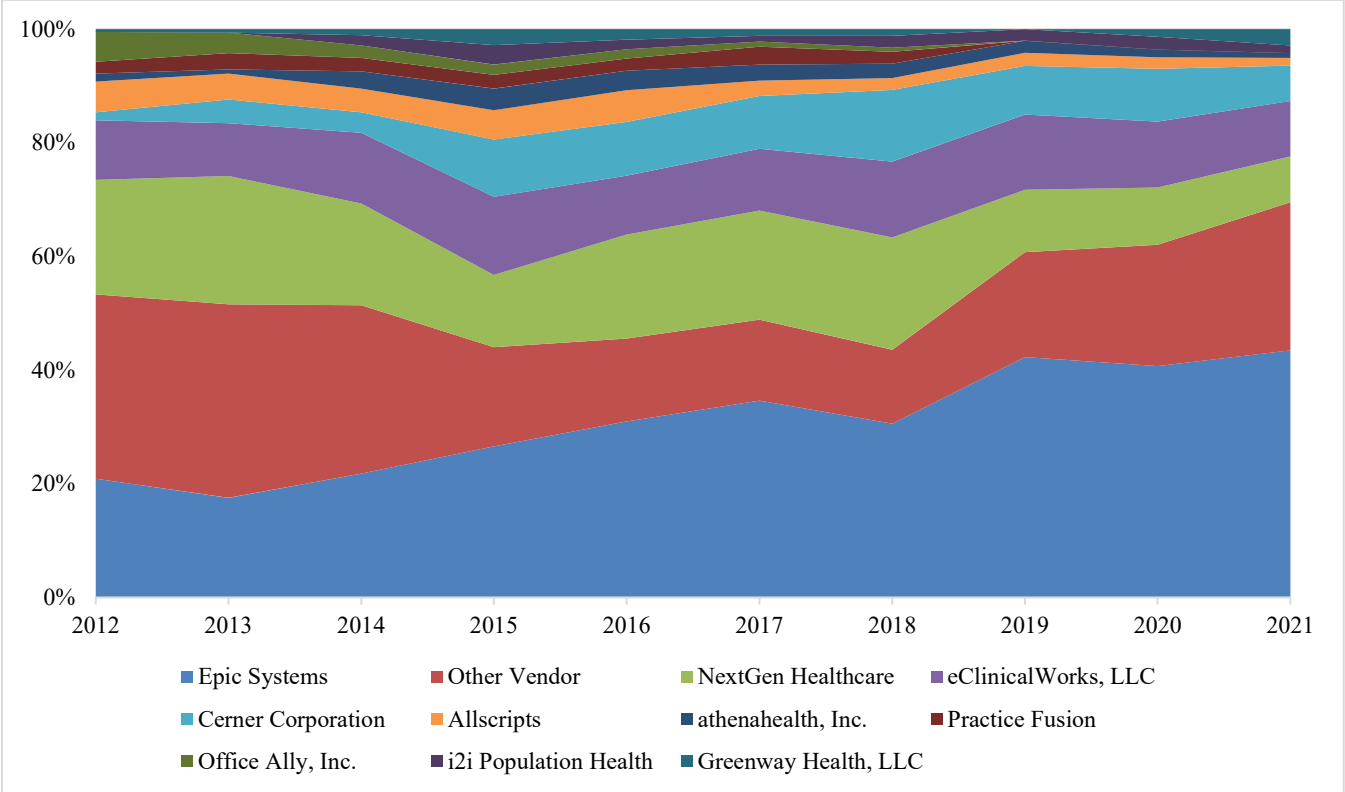
Based on ordinary least squares regression analysis with robust standard errors clustered at the EP-level.

The EHR vendor market for EPs attesting to Medi-Cal Promoting Interoperability Program was lead by Epic Systems, with 28.8% of attestation-years using Epic throughout the 2012 – 2021 period. The market composition changed significantly from 2012 through 2021. Epic was used by 20.9% of EPs in 2012, and rose to 43.5% by 2021. Cerner also rose significantly, from 1.4% in 2012 to 6.2% in 2021. In comparison, several other vendors either decreased in popularity (such as NextGen, which fell from 20.2% of EPs in 2012 to 9.8% in 2021) or fell completely out of the market (Practice Fusion and Office Ally).

Table 23: EHR Vendors Used by EPs Attesting to CA Medi-Cal Promoting Interoperability Program – Overall 2012-2021

	Total	
Vendor Name	**n**	**%**
Epic Systems	9,490	28.8%
Other Vendor	6,929	21.0%
NextGen Healthcare	5,765	17.5%
eClinicalWorks, LLC	3,811	11.6%
Cerner Corporation	2,599	7.9%
Allscripts	1,263	3.8%
athenahealth, Inc.	831	2.5%
Practice Fusion	716	2.2%
Office Ally, Inc.	584	1.8%
i2i Population Health	524	1.6%
Greenway Health, LLC	446	1.4%

Figure 5: EHR Vendors Used by EPs Attesting to CA Medi-Cal Promoting Interoperability Program – Over Time



The 10 most popular vendors during the sample period were retained as distinct while all other vendors were classified as "Other Vendor."

Topic A5: Engagement in Health Information Exchange

AHA IT Supplement

This set of analyses uses American Hospital Association Annual Survey and IT Supplement data to capture hospital participation in health information exchange (HIE) and interoperability. Specifically, we measured participation in any health information exchange organization, defined using responses to the question "Please indicate your level of participation in a state, regional, and/or local health information exchange (HIE) or health information organization (HIO)," and measured what proportion of hospitals responded they were participating and actively exchanging data through an HIE or HIO.

We then measured the engagement of hospitals in California in using ONC's technology-agnostic four domains of interoperability (finding/querying for data, sending data electronically, receiving data electronically, and integrating data into the EHR without manual intervention, as well as reported engagement in all four domains).

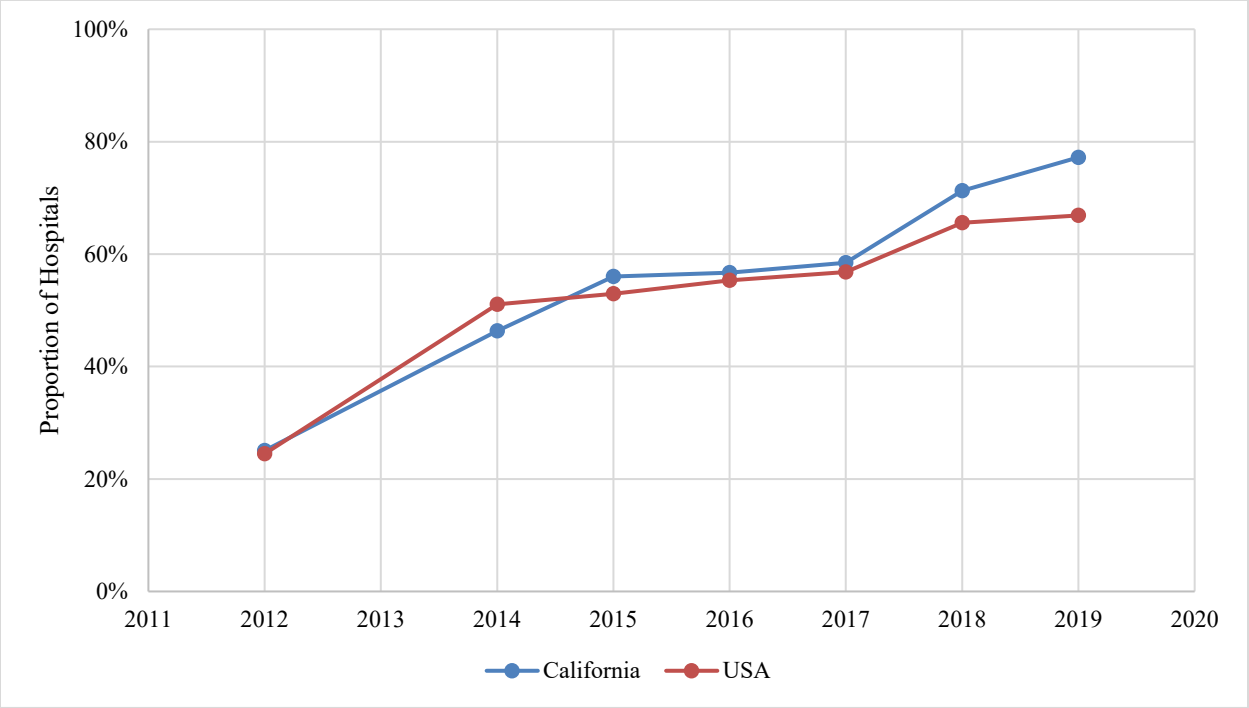
We examined the most recent data as well as data longitudinally over time, stratified by hospital demographic characteristics, and compared California hospitals to the US average.

Rates of hospital participation in regional health information organizations (HIOs) has steadily increased since 2012 and in 2019 exceeded the national average in 2019.

Table 24: Proportion of California Hospitals Participating in an HIO Compared to National Average, 2012 – 2019

Year	California	USA
2012	25.1%	24.5%
2014	46.4%	51.1%
2015	56.0%	52.9%
2016	56.7%	55.4%
2017	58.5%	56.8%
2018	71.3%	65.6%
2019	77.2%	66.9%

Figure 6: Proportion of California Hospitals Participating in an HIO Compared to National Average, 2012 - 2019

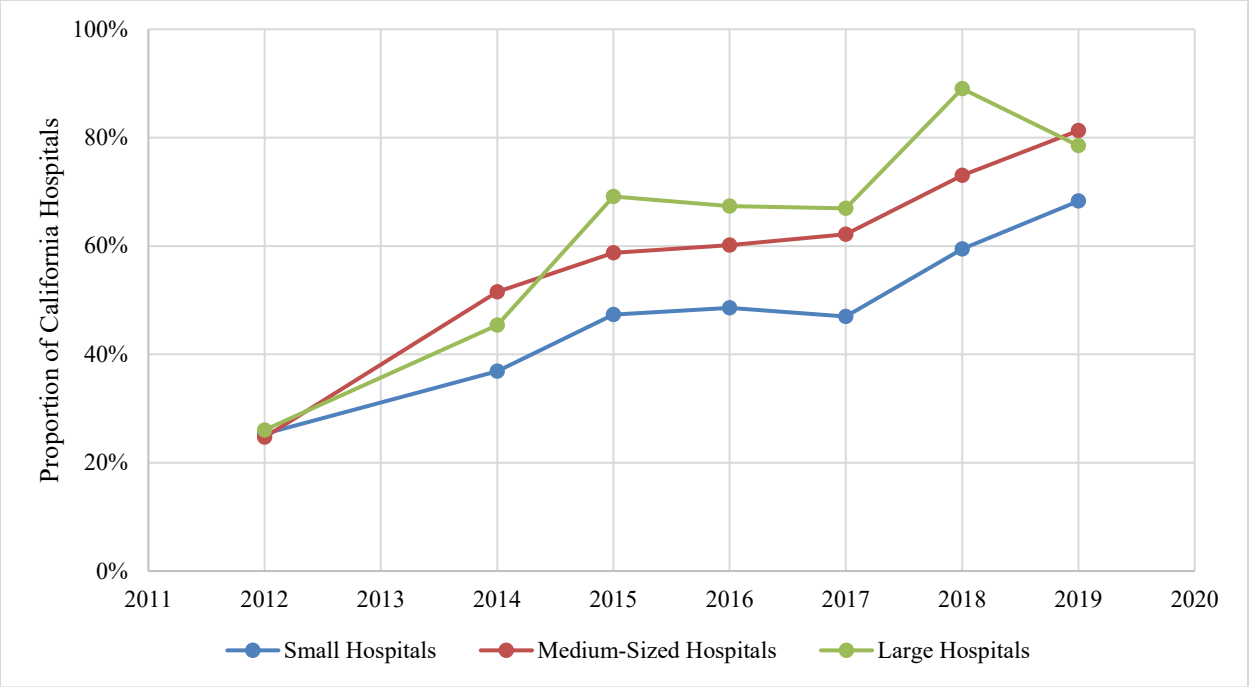


Large and medium size hospitals engage with HIOs more often than small hospitals.

Table 25: Proportion of California Hospitals Participating in an HIO – Stratified by Hospital Size, 2012 – 2019

	Small Hospitals (<100 Beds)	Medium-Sized Hospitals (100 - 399 Beds)	Large Hospitals (400+ Beds)
2012	25.3%	24.7%	26.0%
2014	36.9%	51.5%	45.4%
2015	47.3%	58.7%	69.1%
2016	48.5%	60.2%	67.3%
2017	47.0%	62.1%	67.0%
2018	59.5%	73.0%	89.0%
2019	68.3%	81.3%	78.5%

Figure 7: Proportion of California Hospitals Participating in an HIO – Stratified by Hospital Size, 2012 – 2019

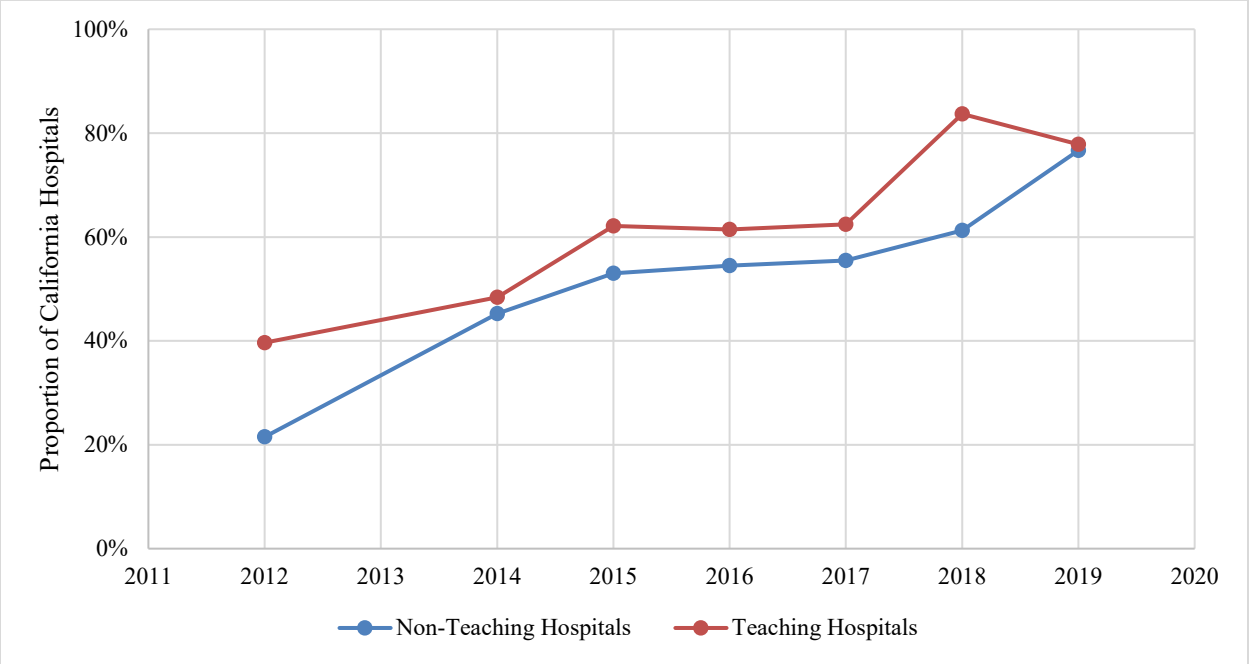


Although HIO participation by teaching hospitals has traditionally exceeded that of non-teaching hospitals, in 2019 there was no difference between them.

Table 26: Proportion of California Hospitals Participating in an HIO – Stratified by Hospital Teaching Status, 2012 – 2019

	Non-Teaching Hospitals	Teaching Hospitals
2012	21.5%	39.7%
2014	45.2%	48.4%
2015	53.0%	62.1%
2016	54.5%	61.4%
2017	55.5%	62.4%
2018	61.2%	83.7%
2019	76.7%	77.8%

Figure 8: Proportion of California Hospitals Participating in an HIO – Stratified by Hospital Teaching Status, 2012 – 2019

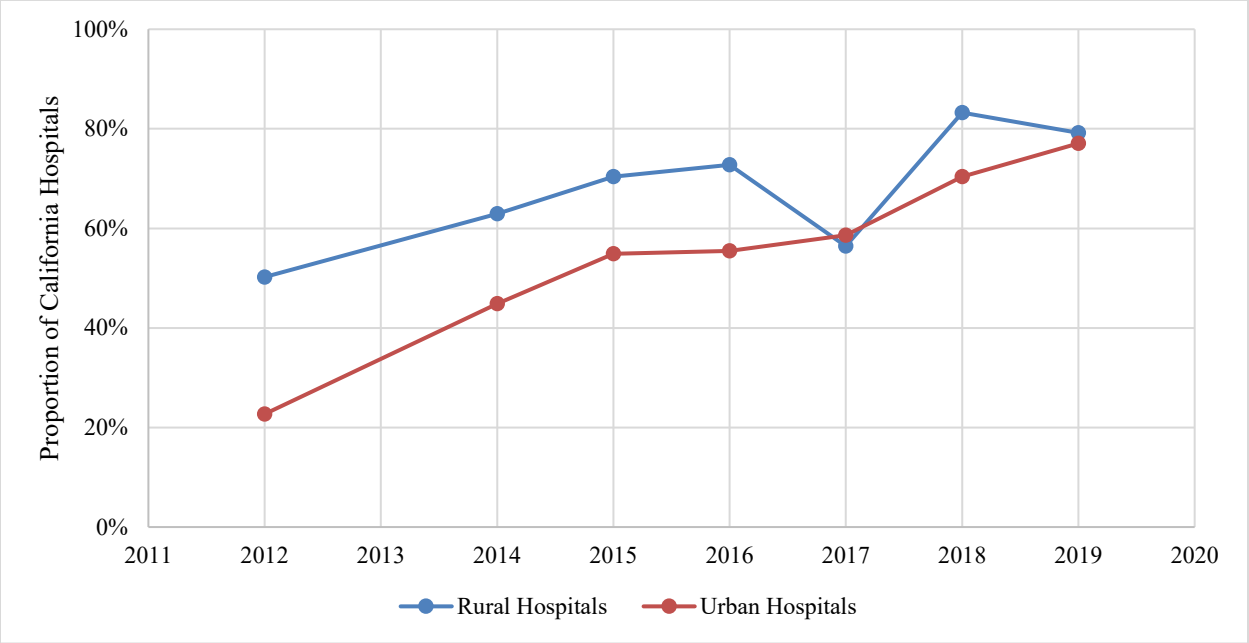


Although traditionally rural hospitals have participated with HIOs more than urban hospitals, in 2019 there was no difference.

Table 27: Proportion of California Hospitals Participating in an HIO - Stratified by Hospital Rurality, 2012 - 2019

	Rural Hospitals	Urban Hospitals
2012	50%	23%
2014	63%	45%
2015	70%	55%
2016	73%	55%
2017	56%	59%
2018	83%	70%
2019	79%	77%

Figure 9: Proportion of California Hospitals Participating in an HIO - Stratified by Hospital Rurality, 2012 - 2019

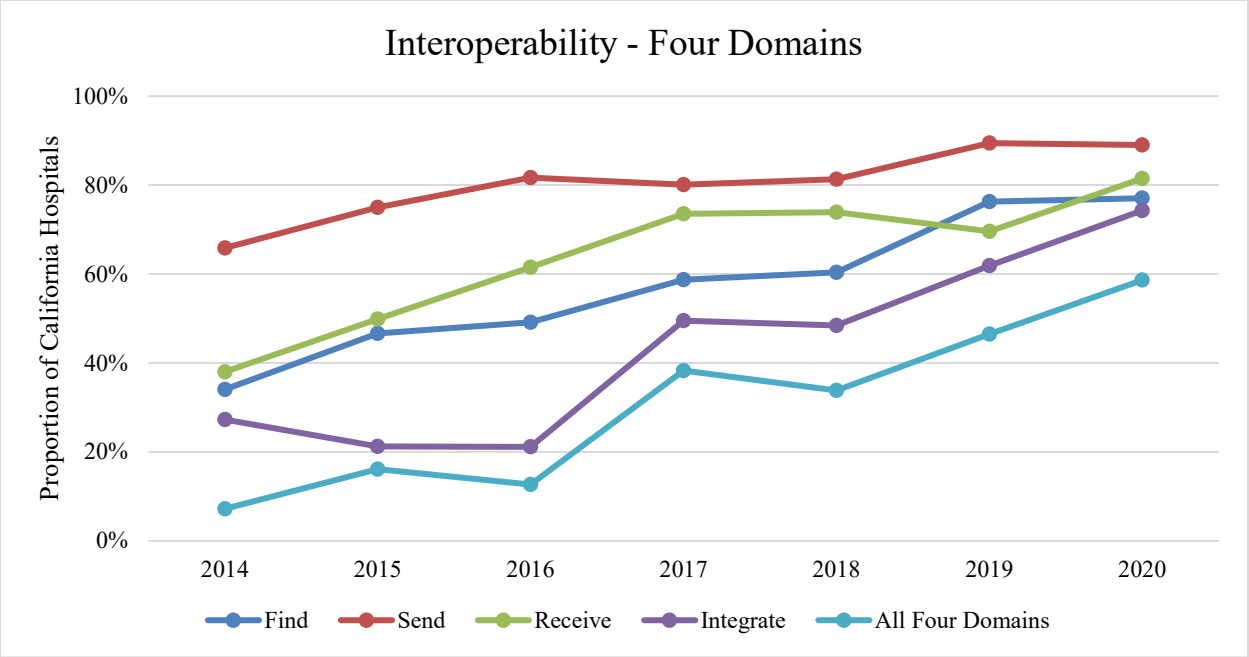


California hospitals have increased their interoperability engagement significantly, with fewer than 10% of hospitals reporting engagement in all four domains of interoperability in 2012 compared to nearly half in 2019. Sending data is the most reported capability, while integrating data is the least reported.

Table 28: Proportion of California Hospital's Engaging in Interoperability Domains – Finding, Sending, Receiving, and Integrating Data Electronically, 2014-2020

Year	Find	Send	Receive	Integrate	All Four Domains
2014	34.1%	65.9%	38.0%	27.3%	7.2%
2015	46.6%	75.0%	49.9%	21.2%	16.1%
2016	49.1%	81.7%	61.5%	21.1%	12.7%
2017	58.7%	80.1%	73.5%	49.6%	38.3%
2018	60.4%	81.3%	73.9%	48.4%	33.9%
2019	76.3%	89.4%	69.6%	61.9%	46.5%
2020	77.1%	89.0%	81.5%	74.3%	58.6%

Figure 10: Proportion of California Hospital's Engaging in Interoperability Domains – Finding, Sending, Receiving, and Integrating Data Electronically, 2014 – 2020

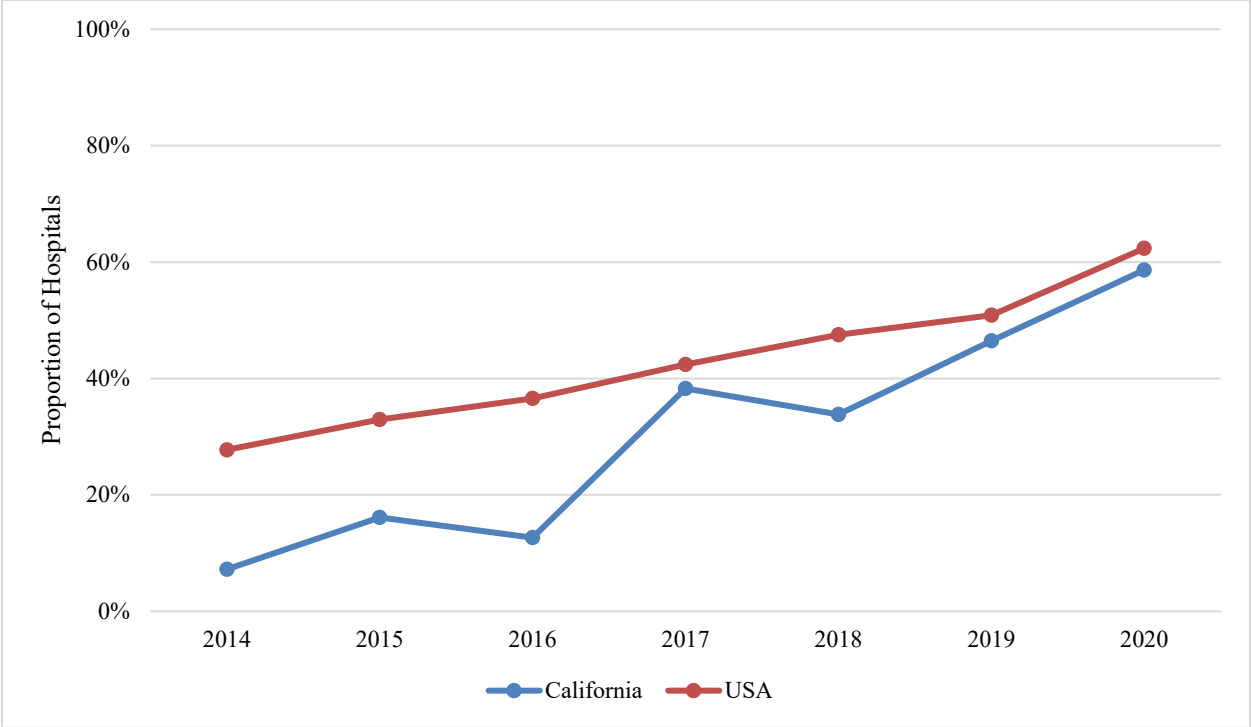


California hospitals lag slightly behind US hospitals in engagement in all four domains of interoperability, though they have closed the gap in recent years

Table 29: Proportion of California Hospital's Engaging in All Four Domains of Interoperability Compared to the National Average, 2014 – 2020

Year	California	USA
2014	7.2%	27.7%
2015	16.1%	33.0%
2016	12.7%	36.6%
2017	38.3%	42.4%
2018	33.9%	47.5%
2019	46.5%	50.9%
2020	58.6%	62.4%

Figure 11: Proportion of California Hospital's Engaging in All Four Domains of Interoperability Compared to the National Average, 2014 – 2020



Urban hospitals and large or medium hospitals are the most likely to engage in all four domains of interoperability. In 2019 non-teaching hospitals suddenly surpassed teaching hospitals in this regard. Non-teaching hospitals engaging in all four domains of interoperability increased from 28.0% in 2018 to 51.8% in 2019. However, issues with small sample size are likely responsible for this seemingly large variation. In 2018, 93 non-teaching hospitals in CA responded to the survey, compared to 86 in 2019. Therefore, this increase in engagement with the four domains of interoperability is from about 27 hospitals to about 41 hospitals.

Table 30: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Size, 2014 – 2019

	Small Hospitals (<100 Beds)	Medium-Sized Hospitals (100 - 399 Beds)	Large Hospitals (400+ Beds)
2014	0.0%	8.7%	20.1%
2015	3.7%	20.1%	34.4%
2016	6.8%	14.1%	27.2%
2017	35.7%	35.1%	58.9%
2018	19.5%	38.0%	44.9%
2019	36.5%	50.4%	51.4%

Figure 12: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Size, 2014 - 2019

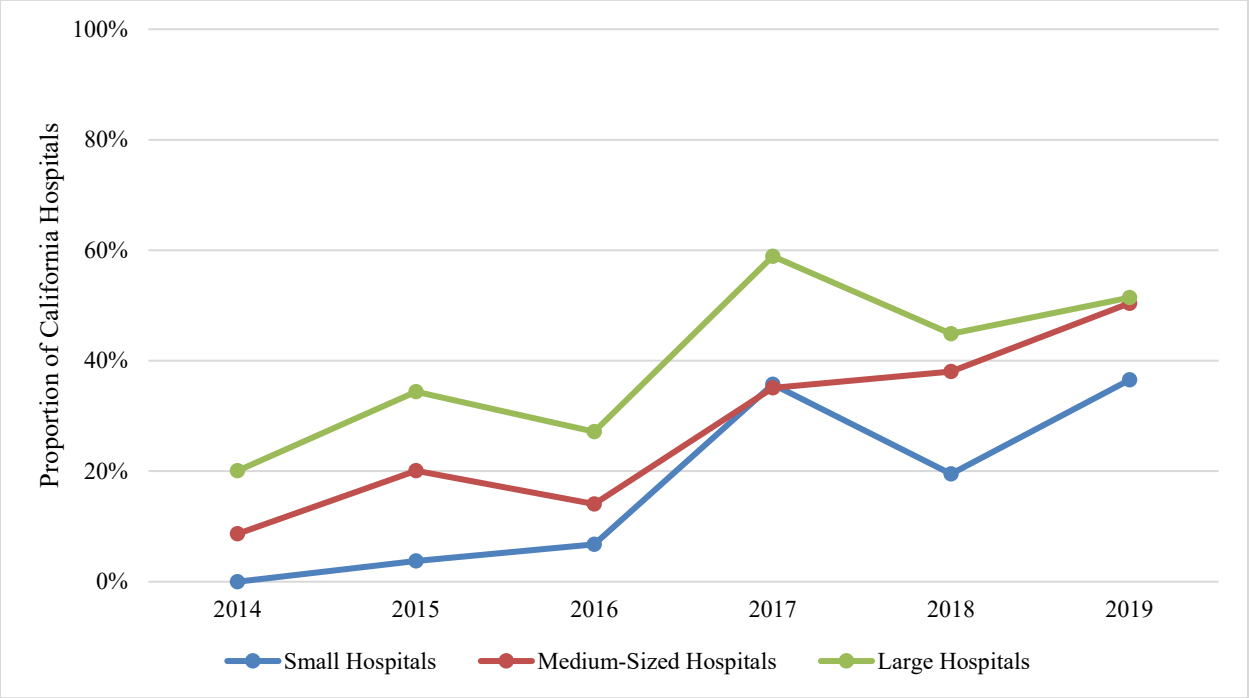
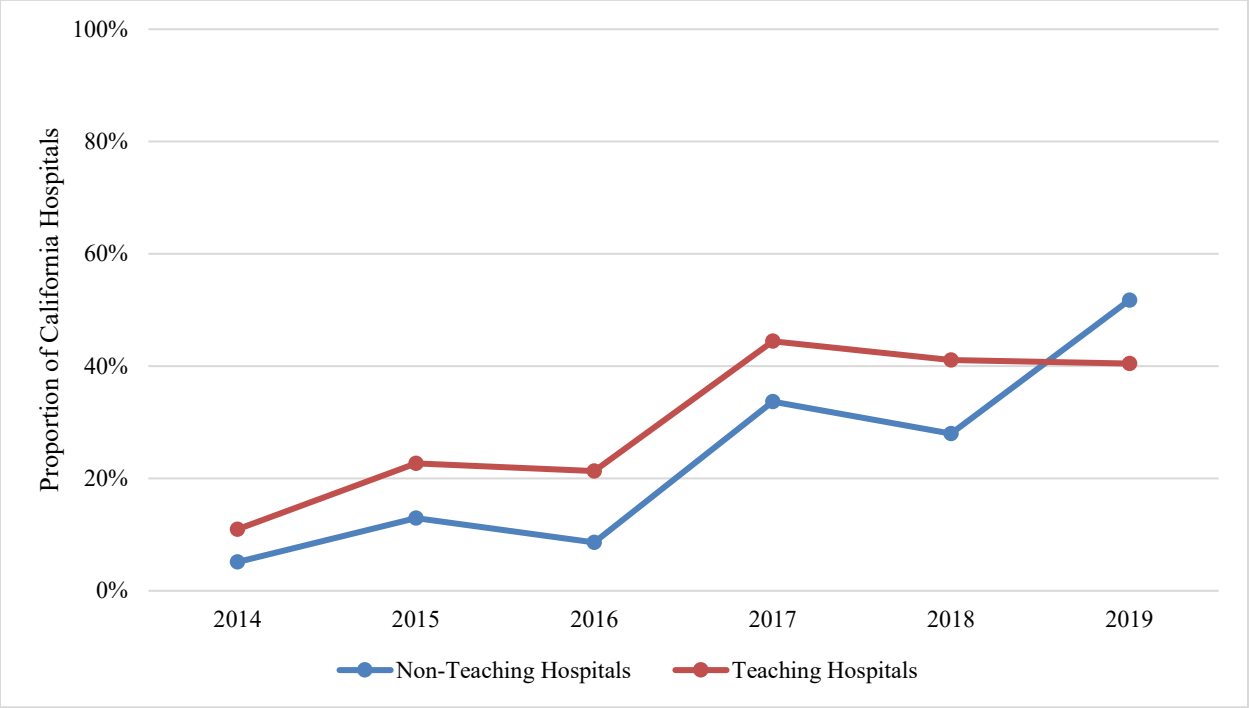


Table 31: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Teaching Status, 2014 – 2019

	Non-Teaching Hospitals	Teaching Hospitals
2014	5.1%	11.0%
2015	12.9%	22.7%
2016	8.6%	21.3%
2017	33.7%	44.4%
2018	28.0%	41.1%
2019	51.8%	40.4%

Figure 13: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Teaching Status, 2014 - 2019

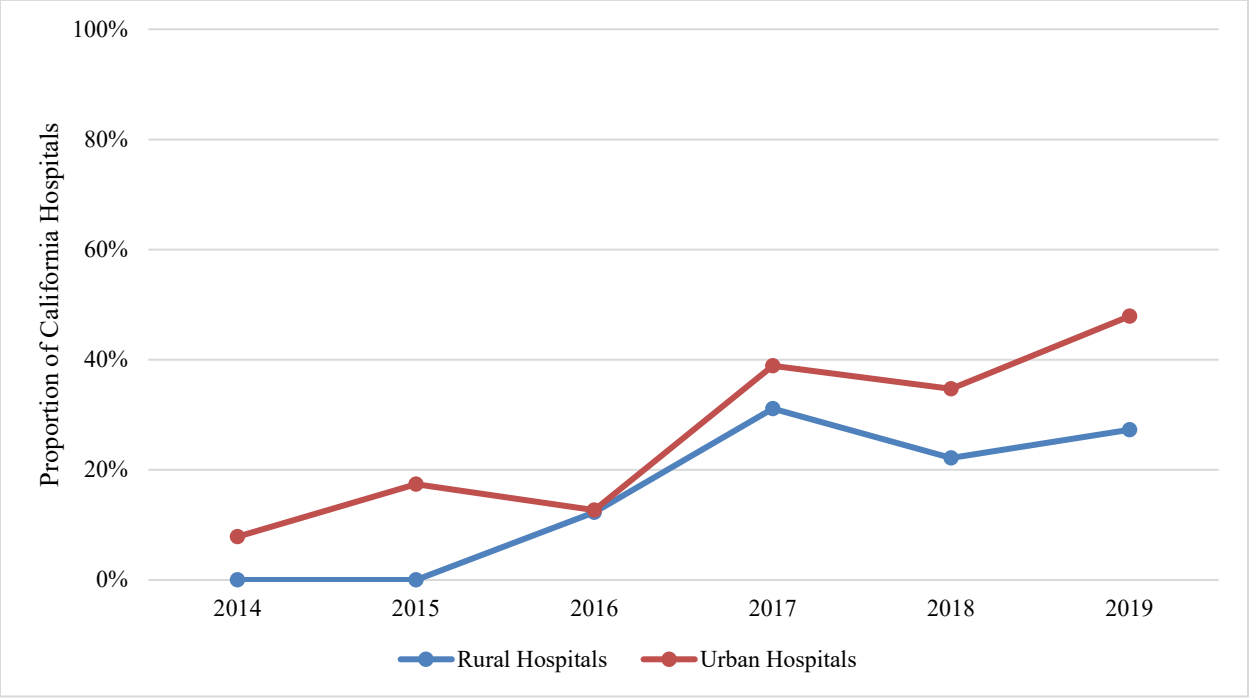


Rural hospitals had relatively high rates of HIO participation, exceeding 80% of rural hospitals that participated by 2018, but comparatively low rates of interoperability engagement, suggesting that rural hospitals struggled with aspects of interoperable data exchange that HIOs may not directly facilitate, such as last-mile integration of data into the EHR.

Table 32: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Rurality, 2014 – 2019

	Rural Hospitals	Urban Hospitals
2014	0.0%	7.9%
2015	0.0%	17.4%
2016	12.3%	12.7%
2017	31.1%	38.9%
2018	22.1%	34.7%
2019	27.3%	47.9%

Figure 14: Proportion of California Hospital's Engaging in All Four Domains of Interoperability – Stratified by Hospital Rurality, 2014 - 2019



Promoting Interoperability Program

Eligible Hospitals

Using Medi-Cal Promoting Interoperability Program Attestation data for the years available, we calculated averages, medians, and standard deviations for three HIE-related measures: proportion of summary of care records sent electronically, proportion of patients with data available electronically, and proportion of patients that accessed data electronically for view / download / transmitting.

The mean proportion of summary of care records sent electronically stayed between 31 – 33% from 2015 – 2018, with no statistically significant changes between years. Similarly, the proportion of patients with data available electronically stayed relatively constant, but at a much higher level – between 88 – 91%. However, the proportion of patients actually accessed that data was much lower, between 10 and 12%.

Table 33: Eligible Hospitals Medi-Cal Promoting Interoperability Attestation - Summary of Care Records Sent Electronically, 2015-2018 (California)

Program Year	Number of Hospitals	Mean	Median	Standard Deviation
	n	%	%	%
2015	199	32.91	24.98	21.07
2016	215	32.28	26.68	19.07
2017	215	31.29	25.00	18.67

2018	190	31.73	27.00	17.54

Table 34: Eligible Hospitals Medi-Cal Promoting Interoperability Attestation – Patients with Data Electronically Available, 2015-2018 (California)

Program Year	Number of Hospitals	Mean	Median	Standard Deviation
	n	%	%	%
2015	199	88.74	93.88	12.70
2016	215	89.27	96.52	13.56
2017	213	88.90	96.00	15.54
2018	190	90.77	96.00	11.64

Table 35: Eligible Hospitals Medi-Cal Promoting Interoperability Attestation – Patients Accessing Data Electronically, 2015-2018 (California)

Program Year	Number of Hospitals	Mean	Median	Standard Deviation
	n	%	%	%
2015	198	11.58	9.18	10.28
2016	215	11.30	5.36	14.74
2017	177	10.49	4.00	14.91
2018	172	11.87	7.00	14.13

Eligible Professionals

For our focal health information exchange measure for Eligible Professionals, many EPs participating in the Medi-Cal Promoting Interoperability Program did not meet the required number of transitions of care. Eligible Professionals with under 100 such transitions of care during the EHR reporting period were able to claim an exemption from the measure. We calculated the proportion of EPs who claimed an exemption in each year of the Medi-Cal Promoting Interoperability Program.

The majority of EPs, between 77.3% - 86.3%, claimed an exemption in each year of the Medi-Cal Promoting Interoperability Program on the HIE measure for sending summary of care records electronically.

Table 36: Eligible Professionals Medi-Cal Promoting Interoperability Program Attestation – Exemptions Claimed to Summary of Care Records Sent Electronically, 2014-2021 (California)

Program Year	Reported Data		Claimed Exemption	
	n	%	n	%
2014	52	14.6%	305	85.4%
2015	311	19.0%	1,323	81.0%
2016	1,006	20.8%	3,834	79.2%
2017	1,038	20.6%	3,996	79.4%
2018	1,025	22.7%	3,484	77.3%
2019	239	17.4%	1,133	82.6%
2020	225	13.7%	1,421	86.3%
2021	173	16.6%	871	83.4%

Cal-HOP Data

Across all HIE contractors, 390 qualifying provider organizations (QPOs) reached the first milestone, onboarding onto the Cal-HOP program. 349 (89.5%) reached milestone 2a, admission/discharge/transfer (ADT) alerts, while 348 (89.2%) reached milestone 2b, linking with the California CURES prescription drug monitoring (PDMP) program. 341 (87.4%) reached milestone 3, adoption of advanced interfaces.

Table 37: Number of Qualifying Provider Organizations (QPOs) Reaching Each Milestone by HIE Contractor in Cal-HOP

Contractors	# of QPOs @ Milestone 1	# of QPOs @ Milestone 2a	# of QPOs @ Milestone 2b	# of QPOs @ Milestone 3
	(Cal-HOP Onboard)	(ADT)	(CURES PDMP Link)	(Advanced Interfaces)
LANES	67	64	66	62
Manifest MedEx	213	188	190	186
OCPH HIE	45	39	39	39
OCPHIO	1	1	1	1
Sac Valley MS	21	18	14	15
San Mateo HIE	11	11	10	10
Santa Cruz HIE	32	28	28	28
Totals	390	349	348	341

Practices with 10 or more providers had a higher rate of completing all 3 milestones (90.3%) compared to practices with fewer than 10 providers (85.7%), while ambulatory providers had a higher rate of achieving all 3 milestones (89.0%) compared to hospitals (79.4%).

Table 38: Cal-HOP Milestone Achievement by Practice Size and Type

	Achieved All 3 Milestones	Achieved at least 1 but not all 3 Milestones
Practice Size		
Practices with Fewer than 10 Providers	85.7%	14.3%
Practices with 10 or More Providers	90.3%	9.7%
Practice Type		
Ambulatory Provider	89.0%	10.9%
Hospital	79.4%	20.6%

Cal-HOP Interviews

Achievement of Cal-HOP Goals

The goals of Cal-HOP were to:

- Increase the number of Medi-Cal providers that can exchange patient data via a Health Information Organization (HIOs);
- Expand the data-exchange capabilities of Medi-Cal providers already participating in HIOs; and
- Facilitate Medi-Cal providers' access to the Controlled Substance Utilization Review and Evaluation System (CURES) prescription drug monitoring database.

Cal-HOP HIOs described that the program was highly successful in increasing the number of provider organizations that can exchange data via an HIO. This success was largely attributed to the Cal-HOP funding that allowed HIOs to offset the onboarding costs that frequently prohibit these organizations from engaging in HIE. Many Cal-HOP HIOs stated that the increase in participants simply would not have been possible without the additional funding. While the first goal of the program was clearly met, there was also strong agreement that the increase could have been greater (with the associated barriers described below). The second goal of the program was also described as met, particularly moving organizations from “view only” participation (via portal) to establishing data feeds, as well as expanding the number of data elements providers were sharing. The third goal of the program was also described as met in terms of HIOs facilitating linkage to the CURES prescription drug monitoring database. However, in other stakeholder interviews, participants described the CURES database as challenging to use.

Table 39: Achievement of Cal-HOP Goals

Theme	Supporting Quotes
Cal-HOP funding gave HIOs the ability to reduce organizations' onboarding costs and onboard more providers, as well as expand data-exchange capabilities of current participants.	"While we have two hospital systems here, the vast majority of providers are in smaller or solo practices or FQHCs. So even getting $10,000-$15,000 out of them for anything is hard. They often have to rely on their own grants or some other funding source. So when we could come to them and say 'Hey this data exchange work you've been wanting for a long time is possible and we have the funding to cover it, it was a godsend both to us and the participants here." "One of the largest hurdles of getting some organizations onboarded, no matter how they thought it would benefit them, was that onboarding cost. So that [the Cal-HOP program] was a huge help and a huge benefit for us to be able to get a lot of very pertinent organizations in our area onboarded to HIE." "I think it [Cal-HOP] got us additional major players that weren't contributing data…It allowed us to expand on the data were getting from current membership. I would say it probably grew us about 40% at least." "The thing the was really appealing about the program was that it allowed us to do a far broader implementation than we had initially envisioned absent the program…Specifically this allowed us to onboard small provider practices in our region that participate in Medi-Cal. That was not initially on our radar but the resources that were made available also helped us with our effort to onboard our charter members which are FQHCs. Having access to those resources to help offset the onboarding costs…we couldn't have done it without that support."
Cal-HOP was successful, and could have been even more so.	"It was hugely successful, but it could have been even more successful." "The fact that we made as much progress as we did in a year, in the middle of a pandemic, is an extraordinary accomplishment…I'm just so sad that we didn't start earlier because we could have gotten so much more done." "It worked as designed. It just had some things that we could do better on next time. So I think that's the takeaway I would say, it accomplished a lot and I think it required a lot of creativity on the end of HIOs to make it

Theme	Supporting Quotes
	work. I'd prefer probably to use a little less creativity, but it worked." "It was such a great program, great effort, but just [needed] more hooks in there for these people to make them join…Funding is one way. Mandatory reporting, I think has gone over pretty well with COVID."

Cal-HOP Strengths

HIOs were generally positive about the design of the program and the support received from DHCS. In particular, participants thought the milestones were specific and logical, and that the dollar amounts tied to the milestones were adequate and fair. Moreover, participants appreciated the flexibility that was built into the program in terms of how milestones could be achieved and how money could be used. This flexibility allowed the HIOs to make different implementation decisions in order to fit their and their participants specific needs, goals, and financial situations.

Table 40: Cal-HOP Strengths

Theme	Supporting Quotes
Cal-HOP was well-designed and DHCS provided strong support to HIOs once the program began.	"It was a validly designed program. I liked the milestones and the way they attached dollar amounts to the milestones and that they allowed us to administer and weren't specific [about amounts/how money had to be used]. So, I just want to compliment them on the way it was designed." "I felt it was very fair and I liked how after each milestone you got paid…it worked out very, very well in my opinion how funding was distributed, and I thought it was very fair amounts too." "They made it really easy to meet the milestones because they had so many different ways to do it which I thought was really good…So there was a really large breadth of choices that could be made." "The milestones were really clear cut which we liked." "After the launch of the program, DHCS really did try to be really flexible and accommodating."

Barriers and Challenges

There were several barriers that HIOs encountered during Cal-HOP that impeded their ability to achieve better results. All HIOs, first and foremost, cited the program's delayed

start, which resulted in a shortened implementation timeline. There was a large gap in time between when the program was introduced to the HIOs by DHCS and when HIOs could begin work under the program. HIOs did not know why there was such a long delay with DHCS and CMS approval of the program. This shortened timeline had many negative repercussions. It resulted in HIOs being unable to onboard as many new participants as they otherwise could have. HIOs described that onboarding requires lead time in order to get into the EMR vendors work queue, to conduct complex onboarding testing or configuration at sites, and to work with practices (particularly small, under-resourced ones) that had limited technical capacity. Many HIOs described a steep learning curve, such that later implementations went more quickly and that the program ended just as they were realizing these economies of scale.

A second challenge that compounded the first challenge was that the program launched during the early months of the COVID-19 pandemic. This resulted in many hospitals and practices that were previously interested in joining HIOs deprioritizing their onboarding. More broadly, HIOs described ongoing hesitancy from hospitals and ambulatory practices to participate in HIE, due to a lack of awareness about HIE and minimal incentives to join. With a lack of strong incentives or mandates for providers to participate in HIE, engagement efforts fell largely on the HIOs, and some struggled to engage Cal-HOP eligible participants. Lastly, some HIOs found the administrative and reporting requirements of Cal-HOP to be burdensome and resource intensive. Several HIOs described allocating an unreasonable amount of effort to administrative tasks, rather than allocating it to onboard additional providers.

Several California health IT stakeholders who were interviewed also commented on the Cal-HOP program and largely agreed with the barriers described by the HIOs. They also expressed an impression that Cal-HOP did not advance bidirectional data exchange, such that Medi-Cal providers (particularly those in small and solo practices) could both send and receive data through HIOs.

Table 41: Cal-HOP Barriers & Challenges

Theme	Supporting Quotes
Delayed program start impeded the ability of HIOs to onboard interested providers	"The only challenge was the timeline. It was just too compressed and then COVID happened. Even if COVID hadn't happened it would have been too compressed. Which was disappointing to me because I had been tracking this since before it became legislation and to watch the state sit on the program for almost two years was extremely distressing." "The program was delayed for a year and a half or more and then the technical assistance program was pulled out which really impacted our ability to onboard smaller solo practices into the program." "It was presented to us in January of 2019 and we didn't end up getting contracts for like a year. And so people

Theme	Supporting Quotes
	were expecting it and they were like 'well are you going to do this?' 'we've been waiting for this' and it kind of put our reputations in a little bit of a bind…We didn't really have signed contracts from DHCS until March or April of 2020 and we started pitching the program when they told us to in January of 2019. So that 14-month gap, it hurt in that it didn't give us a lot of time to onboard some really complex interfaces that sometimes could take a couple months of testing at a time. And then some things had to be designed at the EMR level and those can take up to 6 months so there wasn't enough lead time to do some of the things correctly, so we ended up not doing those things." "When you have larger vendors like Epic and Cerner, those are specialized teams that work with people all over the country and all over the world. So, to get their attention to do some little place out here in Northern California in a really rural area, it's not a priority to them. Unless you can say here's nine months in advance." "One of the barriers was competing priorities…if we can get communication out there and we can say 'plan for this and put it in your roadmap for what we're going to do 12 months from now' then I think we could have aligned things and people could have had competing priorities more easily managed…but because we kept not knowing when is this going to come to fruition and when is it going come to life, everyone kept bumping and we wound up bringing some people on very late in the game…We actually had to turn a couple people down…because we could not commit to the resources needed to get them done in the timeframe they could get done. Communication and timing I think is critical and we just can't have delays in that. So communication really needs to be upfront and accurate."
HIOs struggled to engage some hospitals and practices as COVID-19 became the priority issue.	"We had some trouble with the hospitals and that was mostly COVID driven because COVID had all the financial implications and that sort of thing. One of the hospitals said they weren't going to do anything except for COVID work. And that also bled over into the budgets." "There was definitely competing against COVID."

Theme	Supporting Quotes
The technical capacity of practices, particularly small practices, limited their ability to onboard to HIOs.	"The ambulatory providers have close to zero capacity to engage technically and no amount of technical assistance is going to fix that…that has really big implications for the future in terms of what you should fund." "Don't underestimate the level of technical assistance that these small practices need to connect with the HIE. And that means that not only the hand holding that they need but also the funding that they need to have those components like encryptions [that enable them to pass a security and risk assessment]."
Cal-HOP's administrative and reporting requirements felt burdensome	"I will say that the reporting aspect of it [the milestone-based program], the paperwork aspect of it, the administrative aspect of it was really resource intensive. A significant chunk of the resources that were made available to do this onboarding, it was necessary to use them just for the administration of being able to provide the information necessary to get reporting. Being able to get all the signatures on the attestation and all the paperwork and energy and stuff that goes behind that…To do the invoicing we had to jump through, what we felt were, extraordinary hoops to be able to prove or demonstrate that the work was done and that it was implemented. I kind of feel like that was money that could have been used to onboard additional providers...It seemed pretty burdensome." "The attestation process was labor intensive…the fact that we decided to do all the milestones before we invoiced [rather than invoicing by milestone] really reduced our administrative tasks."
Cal-HOP's success was limited by a lack of strong interest in HIE.	"There is still a great lack of awareness and frankly hesitancy to participate for both ambulatory providers and hospitals…We don't have the policy conditions, or didn't at the time, that lead to a great willingness to participate." "It was such a great program, great effort, but just [needed] more hooks in there for these people to make them join…Funding is one way. Mandatory reporting, I think has gone over pretty well with COVID." "It should have been longer, the onboarding lane, and there should have been more specific entry points for public health and especially with COVID and everything that happened, there was no real push to make public

Theme	Supporting Quotes
	health departments join up and that was a huge opportunity that was lost."

Cal-HOP Enabled Advancement of HIOs and HIE in the State
Cal-HOP had broad benefits for both participating HIOs and the greater state HIE landscape. Several HIOs described that their activities under Cal-HOP helped strengthen the value proposition for participating in HIE, and that many providers and patients are beginning to see the benefit of data exchange through improved care coordination. HIOs also described their desires to begin exchanging additional data from other spheres including public health, behavioral health, and population health.

While all HIOs benefitted from Cal-HOP, smaller HIOs noted the particular progress they were able to make by filling in "white space" in their communities via onboarding new participants. These HIOs also noted that, while Cal-HOP helped onboard more providers to HIE, without continued investment and supportive policies, they will struggle to sustain and build upon the progress they made under Cal-HOP.

Table 42: Cal-HOP Impact & Future Directions

Theme	Supporting Quotes
Cal-HOP strengthened the value proposition for participating in HIE and providers and patients are beginning to benefit from data exchange.	"I think it [HIO's activities under Cal-HOP program] strengthened the relationship and value proposition with the stakeholders. I think it improved care coordination and it got a more complete patient longitudinal record for the patients." "People are actually starting to use the data, they're seeing the value in the data. And now they're wanting to kind of get the picture of data the way they want to digest it…how do they use it more meaningfully, how is it presented in a way that can be ingested by the provider, and more interesting to the provider. Those are the things were seeing as a result, and people are wanting to do coordinated care more and use direct messaging more"
Cal-HOP put HIOs in a stronger position but long-term sustainability depends on ongoing support.	"I think it also provides us with a more solid opportunity for sustainability in the long run…Instead of us coming up and being in production with 8 participants we have over 40." "[We were] in the lucky position to have enough revenue to support the work but we basically had to get rid of the whole infrastructure and capacity the minute the program ended because there's no funding source…so expecting a program like this to have impact in the long term is quite short sighted…you can't continue to support the infrastructure [without the funding]."

Theme	Supporting Quotes
	"We want to sustain what we've built so far…whether or not we can sustain it beyond that point [September 2022] we're just not sure. We've got to figure out a way to sustain what we've built…Whatever comes out, in terms of federal or state initiatives around HIE, has to involve both provider incentives and also earmarking funding to support the HIEs, the basic, general operation of the HIE. Implementation and onboarding resources like Cal-HOP brought they're great and they definitely help, no question, but I think we can't overlook the need of the operational expenses that are needed to keep it all going."
Future HIE priorities include data sharing mandates, provider incentives and further funding to support HIO operations.	"My hope for future is that we have a combination of data sharing mandates through AB133. I very much hope we have a set of data sharing incentives – that doesn't exist yet in policy – but I'm hoping we can get there…And then a variety of other policy nudges that get the providers to the table so the HIEs aren't bearing the brunt of all of that work, frankly, in an economic environment where there are a lot of forces running against you." "We continue to seek support from the payers for incentivizing providers and health systems to join through quality incentive programs. Payers can be an influence the same as other entities." "I think that giving small grants to continue what we've already done – we've got these regional HIOs and if you gave small grants to each organization that then wanted to connect to it, just to pay for that connection – that would be the most helpful in terms of expanding it. That and looking into expanding it into the public health sphere rather than just the medical sphere." "I would love to see continued funding to keep this up and running and to offer incentives for people to join their local, regional QHIO." "I think the pandemic is really a key thing that has people ready to participate more now…we can see public health departments coming onboard with Cal-HOP now, they're way more interested in coming on with a program like Cal-HOP now than they ever were… And with AB133 coming out, that's still to be determined how it will shake out, but with these couple things that have come out, I

Theme	Supporting Quotes
	think the landscape is very ripe to engage and really take a second level of Cal-HOP to the state and I think we would probably double if not triple what we could do with this grant." "I think we have a huge opportunity in California now because CalAIM does provide the policy driver. And so in the past I've always said it wasn't a clear storyline…it wasn't connected to other goals that people were connected on. When we look at CalAIM, that is the driver, but you need to connect the dots and pull the right levers and create the conditions. It doesn't magically happen…You actually have to create the conditions that will create the success of the program… If you want to have population health managements be the cornerstone of CalAIM and you're building this new kind of service at the state level, but yet there's no strategy – Cal-HOP ended, people got laid off, we made as much progress as we're going to make. We're really encouraged by the stuff that came out of the data exchange advisory group a few weeks ago that says we want to look at new funding programs and new initiatives. I would just say like really connect the dots…We need a little more systemic planning."

Topic A7: HIO Activities in California

HIO Survey

This set of analyses captures California HIO activities, including which services HIOs offer and barriers to their further development. Data comes from the HIO Survey conducted by CLIIR. The survey was fielded from May 2019 and February 2020 to capture data from HIOs as of January 1, 2019.

The percentages show the percent of HIOs in each region that report having that type of stakeholder in their network, broken down by how the stakeholder participates (contributing data to the HIO, viewing or receiving data from the HIO, paying to participate in the HIO). The data reveal that California HIOs report providers paying to participate at notably lower rates than at the national level.

California HIOs also offer certain services at lower rates than nationally – receiving C-CDAs, alerting services, messaging with Direct Protocol, patient consent management, and a provider directory. However, they offer advanced care planning and quality metric generation at much higher rates compared to the national data..

Table 43: Proportion of Stakeholders Participating in an HIO by Type of Participation (California vs. National)

Participation by Type of Stakeholder	National Data (N=89)			California Data (N=12)		
	Contribute Data (% HIOs)	View or Receive Data (% HIOs)	Pay to Participate (% HIOs)	Contribute Data (% HIOs)	View or Receive Data (% HIOs)	Pay to Participate (% HIOs)
Private Medical/Surgical Acute Care Hospital	93%	91%	97%	92%	92%	83%
Hospital-Owned or Health System-Owned Physician Practice	82%	92%	92%	75%	83%	58%
Community Health Center or Federally Qualified Health Center	78%	90%	92%	92%	92%	67%
Independent Physician Practice or Practice Groups (e.g., IPAs)	76%	89%	89%	58%	75%	50%
Publicly-owned Hospital (e.g., state, county)	63%	71%	74%	58%	67%	58%
Independent Laboratory	65%	24%	65%	67%	25%	17%
Behavioral Health Provider (e.g., community mental health, SUD/OUD)	53%	80%	80%	50%	75%	58%
Long-Term Care Provider (e.g., nursing home, skilled nursing facility)	53%	66%	70%	33%	42%	17%
Private Psychiatric, Rehabilitation, or Long-Term Acute Care Hospital	48%	54%	57%	42%	42%	33%

Public Payer (e.g., Medicare, Medicaid)	43%	58%	66%	50%	58%	58%
Public Health Department	38%	69%	71%	33%	67%	42%
Private Payer (e.g., Blue Cross)	36%	56%	61%	42%	42%	42%

Table 44: Proportion of HIOs Offering Specified Service Types (California vs. National)

Services Offered	National Data (N=89)	California Data (N=12)
Receiving C-CDAs (Consolidated-Clinical Document Architecture: a standardized template for clinical information)	88%	58%
Alerting services (e.g., gaps in care) and/or event notification (e.g., Admit-Discharge-Transfer)	83%	67%
Community Health Record: Aggregation of health information from across the community served by the HIE	81%	83%
Messaging using the Direct Protocol	72%	42%
Parse and store data elements from a CCDA	67%	67%
Consent Management	52%	25%
Record Locator Service	48%	42%
Provider Directory	45%	17%
Transform other document types or repositories into CCDAs (e.g., MDS, OASIS, Community Health Record)	44%	42%
Connection to prescription drug monitoring program (PDMP)	38%	42%
Integrating claims data	34%	33%
Prescription fill status and/or medication fill history	31%	33%
Provide data to third party disease registries (e.g., Wellcentive, Crimson)	28%	25%
Advanced care planning (i.e., POLST/MOLST)	25%	42%

Table 45: Proportion of HIOs Offering Services Related to Value-Based Payment Models (California vs. National)

Services Offered: Related to Value-Based Payment Models	National Data (N=89)	California Data (N=12)
Providing data to allow analysis by networks/providers	53%	33%
Analytics (e.g., risk stratification)	39%	25%
Generating quality measures	34%	50%
Reporting quality measures to payers/programs on behalf of participants	30%	33%

Validating quality measures	22%	25%
Operating as a clinical registry including a qualified clinical data registry (QCDR)	17%	17%

California's HIOs generally report fewer barriers than national HIOs. However, more than a third report competition from HIT vendors offering HIE solutions, developing a sustainable business model, integration of HIE into provider workflow, and limitations of current interface standards as significant barriers to development.

Table 46: HIO Self-Reported Barriers to Development (California vs. National)

Barriers to Development	National Data (N=89)	California Data (N=12)
Competition from health IT vendors offering HIE solutions	63%	75%
Integration of HIE into provider workflow	51%	33%
Competition from other HIE efforts	42%	0%
Developing a sustainable business model	37%	42%
Managing complexity of consent models	34%	17%
Stakeholder concerns about their competitive position	29%	25%
Ability to hire/retain staff	24%	8%
Lack of resources to implement interface standards	22%	17%
Limitations of current interface standards	19%	33%
Addressing technical barriers	17%	25%
Stakeholder concerns about privacy and confidentiality	15%	0%
Accurately linking patient data/patient matching	12%	17%
Addressing governance issues	7%	0%

Topic A13: HIO's Connectivity Approach & Reach

HIO Survey

These tables show California HIOs' connectivity approach and reach. The HIO survey assessed if and how they interact with other HIOs, both within and outside of California. It also measured participation in Patient Centered Data Home and in national networks including eHealth Exchange and Direct Trust.

California HIOs do not differ greatly from national trends regarding their connectivity approach and network participation.

Table 47: Proportion of HIOs Using Specified Connectivity Approach (California vs. National)

Connectivity Approach	National Data (N=89)	California Data (N=12)
Connect to other HIEs in SAME state	57%	67%
Connect to other HIEs in DIFFERENT state(s)	53%	42%
Sell/provide your infrastructure to other HIEs	24%	17%
Buy/use infrastructure from another HIE	13%	17%

Table 48: Proportion of HIOs Participating in a Specified National Network (California vs. National)

Network Participation	National Data (N=89)	California Data (N=12)
e-Health Exchange	67%	75%
DirectTrust	46%	42%
SHIEC Patient Centered Data Home	38%	33%
Carequality	15%	17%
Surescripts	13%	8%
CommonWell	13%	8%
CareinAlliance	2%	0%
Digital Bridge	2%	0%
ANY OF ABOVE	83%	83%
NONE OF ABOVE	17%	17%

Topic A14: Public Health Data Exchange

AHA IT Supplement

This set of analyses captures hospital-reported barriers to reporting data to public health agencies. Using questions derived from the AHA survey beginning in 2017 through 2019, we identify the proportion of California hospitals reporting each barrier and compare them to national numbers reported by the Office of the National Coordinator for Health Information Technology, as well as stratifications by hospital demographic characteristics. Understanding the barriers to interoperable data exchange with public health agencies is especially critical after the onset of the COVID-19 pandemic highlighted the US health care system's difficulties with sharing and aggregating data across multiple stakeholders. Note that several response options were added to the survey in 2018, so data is unavailable for those questions in 2017.

The most commonly reported barrier in California hospitals, as well as in hospitals across the US, is that public health agencies are unable to receive data electronically. This decreased slightly from 2017 – 2019.

Table 49: Hospital-reported Barriers to Electronically Reporting Health Information to Public Health Agencies, 2017-2019 (California)

Challenge Reported	2017	2018	2019
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	1.4%	1.9%	2.2%
Public health agencies lack the capacity to electronically receive the information	46.7%	45.1%	44.9%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	9.9%	4.5%
Difficulty extracting relevant information from EHR	--	12.5%	20.2%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	33.9%	30.3%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.8%	11.3%	10.2%
Other challenges	13.4%	5.5%	4.0%
NA (e.g. not participating in CMS EHR incentive program)	--	9.5%	11.1%

Note: dashes represent years that data wasn't available

While there was variation across barriers, large hospitals and teaching hospitals were less likely to report common barriers and reported fewer barriers in most years. Urban hospitals were also less likely to report that public health agencies were unable to receive data electronically, which may suggest public health agencies located in urban areas are more likely to have the resources to invest in technology to receive data electronically, as well as great access to a workforce of IT professionals able to support those systems compared to public health agencies in more rural areas. California hospitals reported this barrier slightly less than hospitals nationally.

Table 50: Hospital-reported Barriers to Electronically Reporting Health Information to Public Health Agencies by Hospital Size, 2017-2019 (California)

Small Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	2%	5%	5%
Public health agencies lack the capacity to electronically receive the information	35%	44%	46%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	22%	10%
Difficulty extracting relevant information from EHR	--	20%	19%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	33%	28%

We use different vocabulary standards than the public health agency, making it difficult to exchange	22%	14%	4%
Other - challenges	22%	5%	5%
NA (e.g. not participating in CMS EHR incentive program)	--	17%	9%
Medium Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.9%	0.8%	1.2%
Public health agencies lack the capacity to electronically receive the information	52.8%	47.3%	48.5%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	6.4%	1.8%
Difficulty extracting relevant information from EHR	--	10.1%	23.9%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	36.5%	36.3%
We use different vocabulary standards than the public health agency, making it difficult to exchange	16.6%	9.0%	13.5%
Other - challenges	10.1%	6.1%	3.2%
NA (e.g. not participating in CMS EHR incentive program)	--	6.4%	10.5%
Large Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	3.2%	0.0%	0.0%
Public health agencies lack the capacity to electronically receive the information	44.6%	36.9%	24.1%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	0.0%	4.6%
Difficulty extracting relevant information from EHR	--	7.8%	4.4%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	23.9%	4.0%
We use different vocabulary standards than the public health agency, making it difficult to exchange	14.8%	17.8%	8.1%
Other - challenges	9.2%	3.1%	4.6%
NA (e.g. not participating in CMS EHR incentive program)	--	7.8%	20.0%

Note: dashes represent years that data wasn't available

Table 51: Hospital-reported Barriers to Electronically Reporting Health Information to Public Health Agencies by Hospital Teaching Status, 2017-2019 (California)

Non-Teaching Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.0%	3.5%	4.1%

Public health agencies lack the capacity to electronically receive the information	39.1%	49.0%	51.9%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	13.1%	6.3%
Difficulty extracting relevant information from EHR	--	15.4%	26.5%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	34.8%	44.2%
We use different vocabulary standards than the public health agency, making it difficult to exchange	18.3%	13.2%	7.6%
Other - challenges	15.7%	5.7%	4.3%
NA (e.g. not participating in CMS EHR incentive program)	--	12.1%	6.3%
Teaching Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	3.4%	0.0%	0.0%
Public health agencies lack the capacity to electronically receive the information	56.8%	40.2%	37.0%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	6.0%	2.5%
Difficulty extracting relevant information from EHR	--	8.9%	13.1%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	32.9%	14.4%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.3%	9.0%	13.1%
Other - challenges	10.4%	5.3%	3.5%
NA (e.g. not participating in CMS EHR incentive program)	--	6.3%	16.5%

Note: dashes represent years that data wasn't available

Table 52: Hospital-reported Barriers to Electronically Reporting Health Information to Public Health Agencies by Hospital Rurality, 2017-2019 (California)

Rural Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	0.0%	0.0%	12.6%
Public health agencies lack the capacity to electronically receive the information	36.9%	63.8%	52.0%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	11.5%	12.6%
Difficulty extracting relevant information from EHR	--	39.0%	22.7%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	52.4%	41.7%

We use different vocabulary standards than the public health agency, making it difficult to exchange	19.6%	11.5%	10.7%
Other - challenges	35.6%	0.0%	10.7%
NA (e.g. not participating in CMS EHR incentive program)	--	9.7%	0.0%
Urban Hospitals			
Challenge Reported	**2017**	**2018**	**2019**
We do not know to which public health agencies our hospital should send the information to meet CMS reporting requirements	1.6%	2.1%	1.4%
Public health agencies lack the capacity to electronically receive the information	47.5%	43.7%	44.4%
We lack the capacity (e.g., technical, staffing) to electronically send information.	--	9.8%	3.9%
Difficulty extracting relevant information from EHR	--	10.6%	20.1%
Interface-related issues (e.g., costs, complexity) make it difficult to send the information	--	32.6%	29.5%
We use different vocabulary standards than the public health agency, making it difficult to exchange	17.7%	11.3%	10.2%
Other - challenges	11.6%	5.9%	3.5%
NA (e.g. not participating in CMS EHR incentive program)	--	9.5%	11.9%

Note: dashes represent years that data wasn't available

Topic B1: HIT Trends in Additional Settings

SNF Data

This set of analyses captures the state of EHR adoption and HIE among providers that were not eligible for the Medi-Cal Promoting Interoperability Program. In this section, we examine skilled nursing facilities and analyze results from a 2019 SNF survey. We produce descriptive statistics to assess the extent of EHR adoption among SNFs. We also looked at responses that help show the electronic health information sharing capabilities of SNFs with acute-care hospitals.

Descriptive statistics of California SNFs do not differ greatly from those nationwide. On average, California SNFs report slightly better interoperability with hospital EHRs. For each operation listed in Figure 19, at least 50% of SNFs report at least partially using electronic methods to execute it. Similarly, 48%, 39%, and 29% of SNFs report using an online portal for patients to view their referrals, discharge documents, and inpatient records, respectively.

Table 53: Descriptive Statistics of California SNF Respondents Compared to National SNF Respondents

	National Respondents (N=261)	**California Respondents (N=18)**

Part of a Larger Organization	66.0%	66.7%
Located in Hospital	3.4%	5.6%
Bed Count (mean)	112.36	110.28
STAR Ratings		
Overall Rating	3.28	3.33
Quality Rating	3.47	4.00
Staffing Rating	3.25	3.56
RN Staffing Rating	3.51	3.56

Figure 15: SNF-reported Degree to Which the Hospital EHR is Interoperable with SNF EHR (California vs. National)

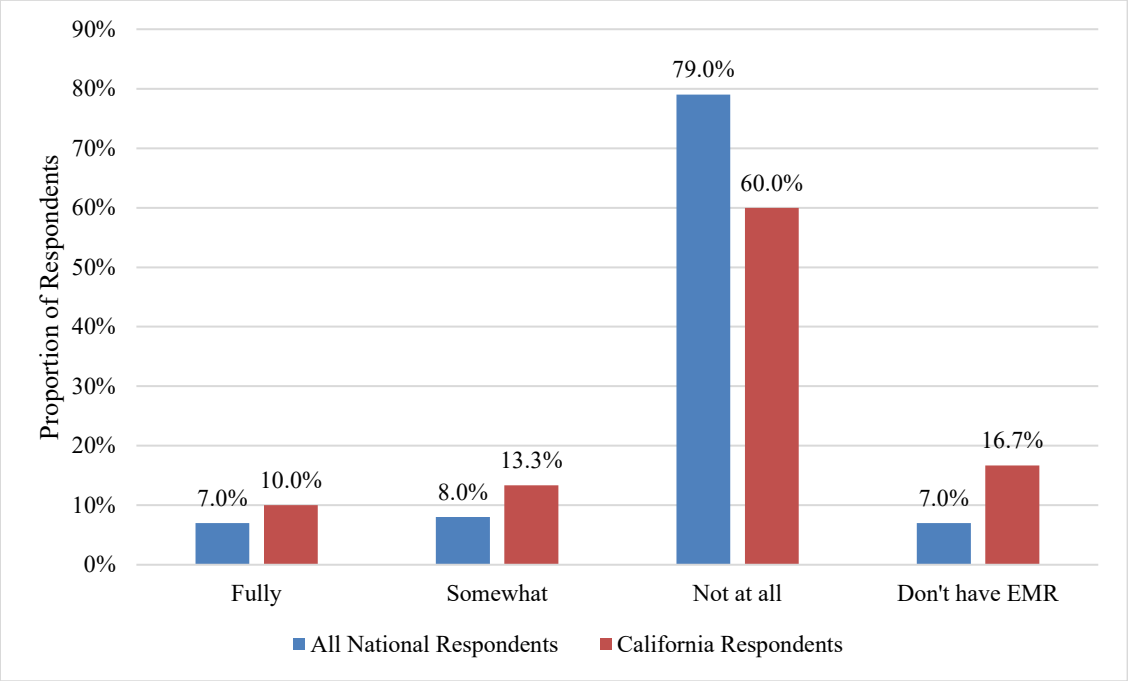


Figure 16: SNF-reported EHR Vendor Used (California vs. National)

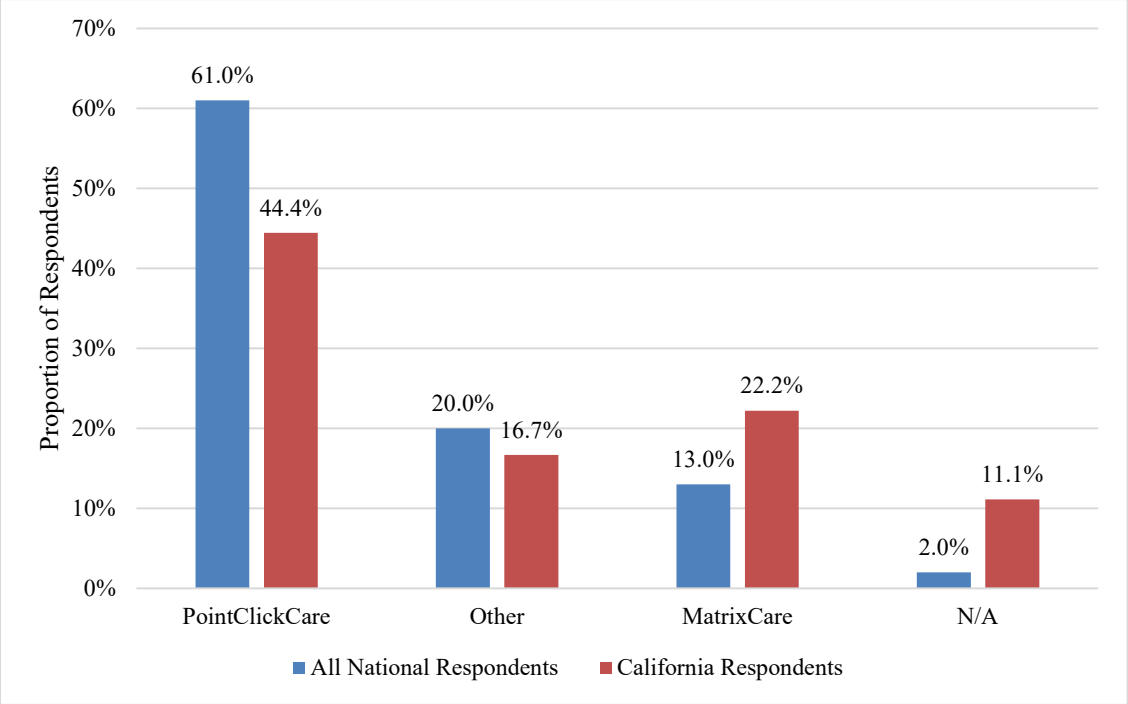


Figure 17: SNF-reported Location of Physician Documentation (California vs. National)

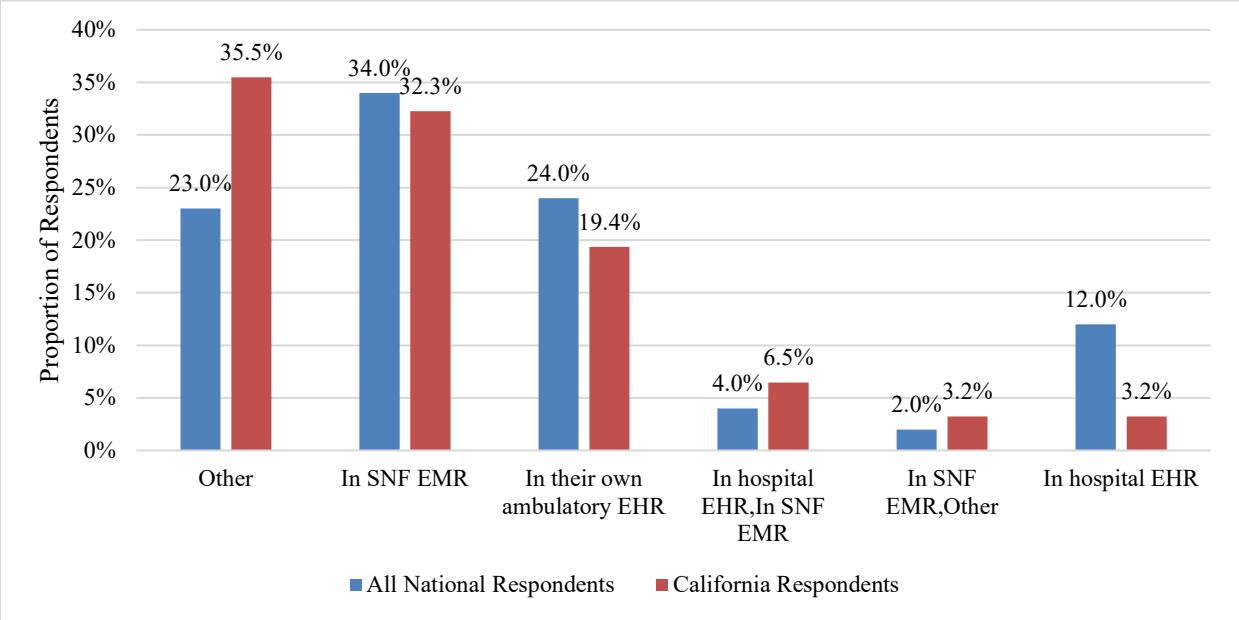


Figure 18: SNF-reported Use of Computerized Functions (California)

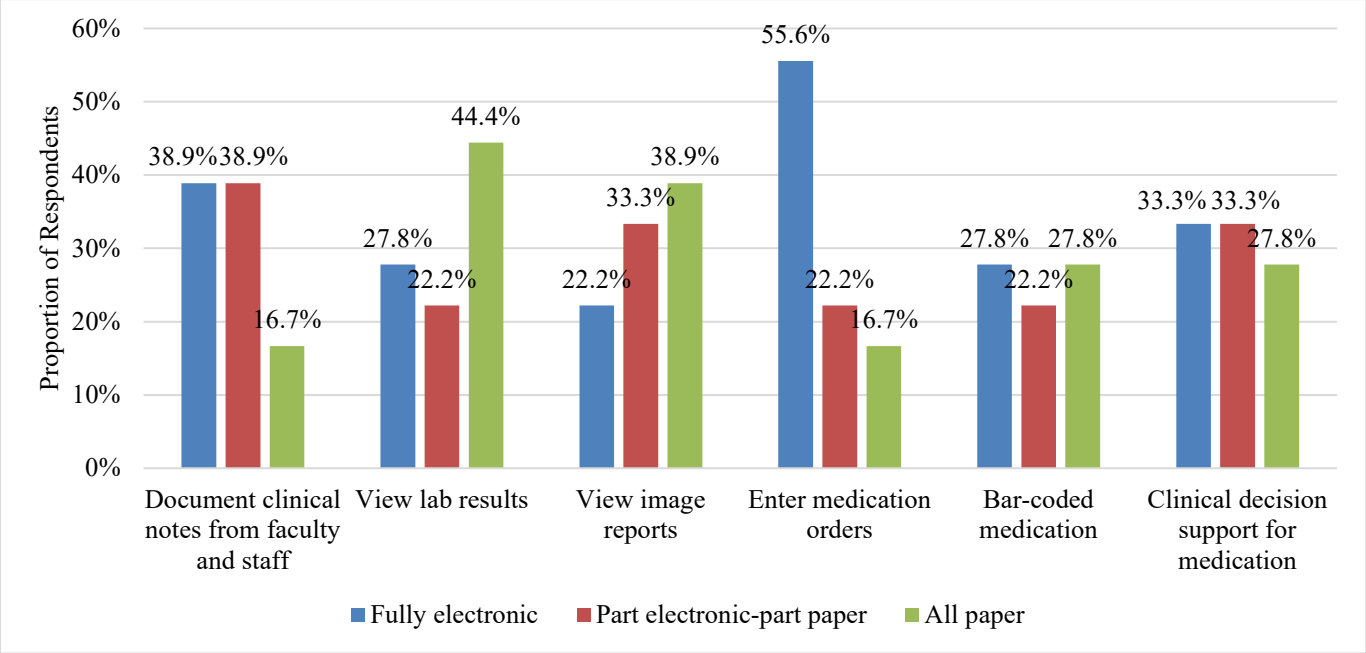
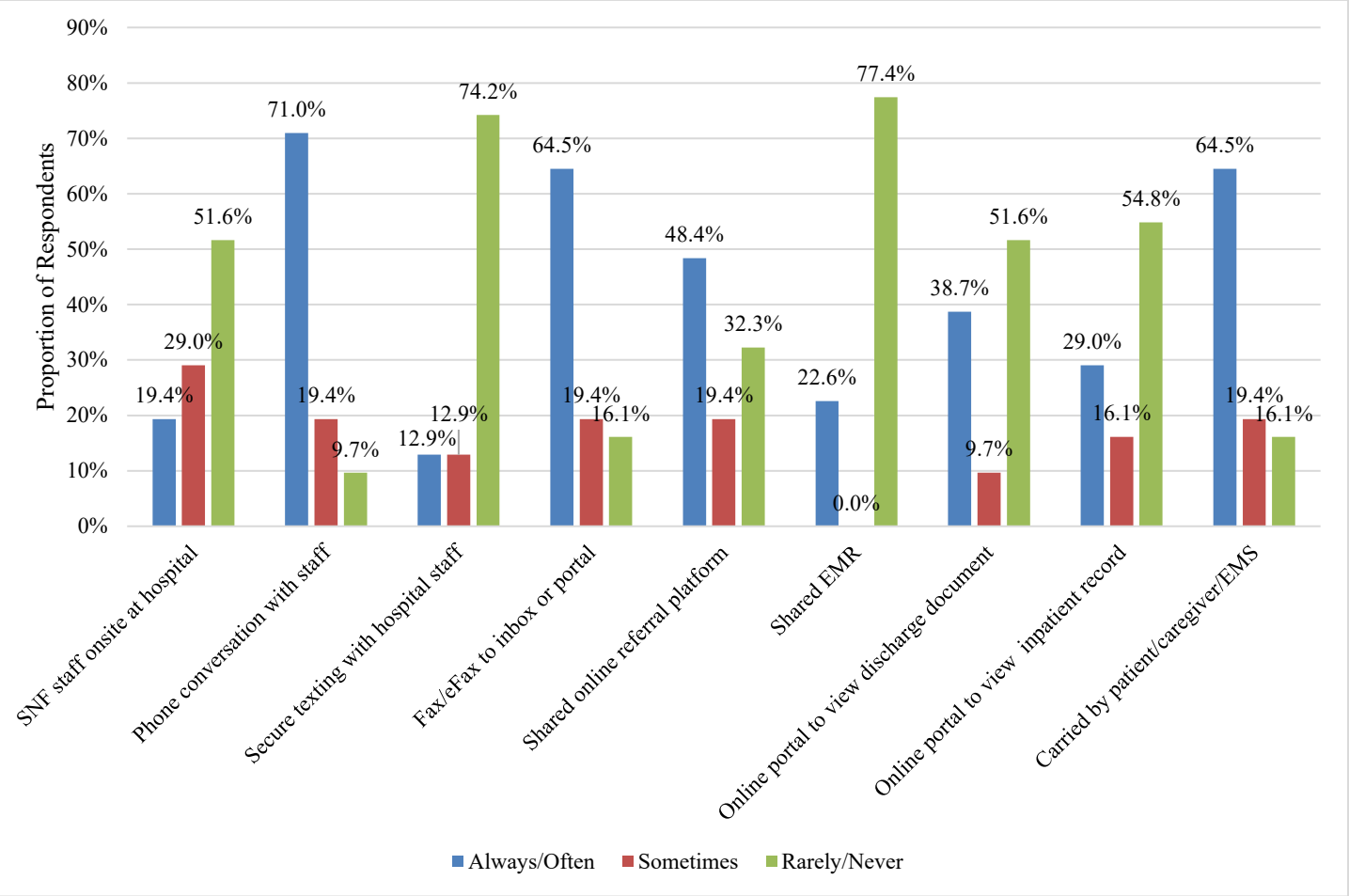


Figure 19: SNF-reported Facility-Level Approach to Receive Information from Hospital upon Transfer (California)



Substance Use Disorder Treatment Facility Data

In this section, we examine health IT adoption among substance use disorder treatment facilities. We produce descriptive characteristics of California substance use disorder treatment facilities as well as their integration of HIT into routine operations. The survey asked about the modality of 14 separate health information exchange functions. We examined the responses and compared methods of storing and maintaining health records to nationwide responses.

Descriptive statistics reveal that the majority of substance use disorder treatment facilities in the state of California are not affiliated with a hospital and are private, non-profit, and outpatient institutions. About half of facilities use both electronic and paper modalities for communicating and documenting health information. Billing, progress monitoring and treatment plan documentation are the functions for which substance use disorder treatment facilities are most likely to use electronic methods. Facilities use only electronic methods at the lowest rates for sending and receiving client health information. Compared to nationwide substance use disorder treatment facilities, those in California use only electronic methods to store and maintain health information at higher rates and only paper methods at lower rates.

Table 54: Descriptive Characteristics of Substance Use Disorder Treatment Facilities (California)

Descriptive Characteristics		Count
ALL		1311
Affiliation	Hospital affiliated	4.8%
	Not affiliated	95.2%
Operator	Federal	2.5%
	Local	8.4%
	Private, for-profit	33.8%
	Private, non-profit	53.3%
	State	0.4%
	Tribal	1.6%
Facility Type	Inpatient	2.2%
	Residential	37.4%
	Outpatient	70.3%
Opioid Treatment	No opioid treatment	89.4%
	Opioid treatment	10.6%

Table 55: Substance Use Disorder Treatment Facilities' HIE Functions by Method (California N = 1,311)

Substance Use Disorder Treatment Facilities' HIE Functions by Method (California N = 1,311)				
HIE Function	**Both**	**Electronic Only**	**Paper Only**	**Missing**
Intake	64.3%	19.7%	15.5%	0.5%
Scheduling Appointments	45.7%	29.0%	22.3%	3.1%
Assessment	53.1%	28.6%	17.5%	0.8%
Treatment Plan	47.0%	35.8%	16.3%	0.9%
Progress Monitoring	47.6%	35.3%	16.5%	0.6%
Discharge	53.9%	29.4%	15.8%	0.9%
Referrals	57.0%	15.3%	25.8%	1.9%
Issue/Receive Lab Results	47.1%	22.0%	17.5%	13.4%
Billing	48.4%	34.7%	8.4%	8.5%
Outcomes Management	49.9%	25.2%	12.7%	12.2%
Prescribing/Dispensing	28.8%	12.1%	13.4%	45.8%
Store/Maintain Health Records	50.2%	17.8%	14.5%	17.5%
Send Client Health Information	44.5%	8.1%	24.3%	23.0%
Receive Health Information	51.9%	6.7%	21.5%	19.8%

Figure 20: Substance Use Disorder Treatment Facilities' Method of Storing, Sending, and Receiving Health Information (California)

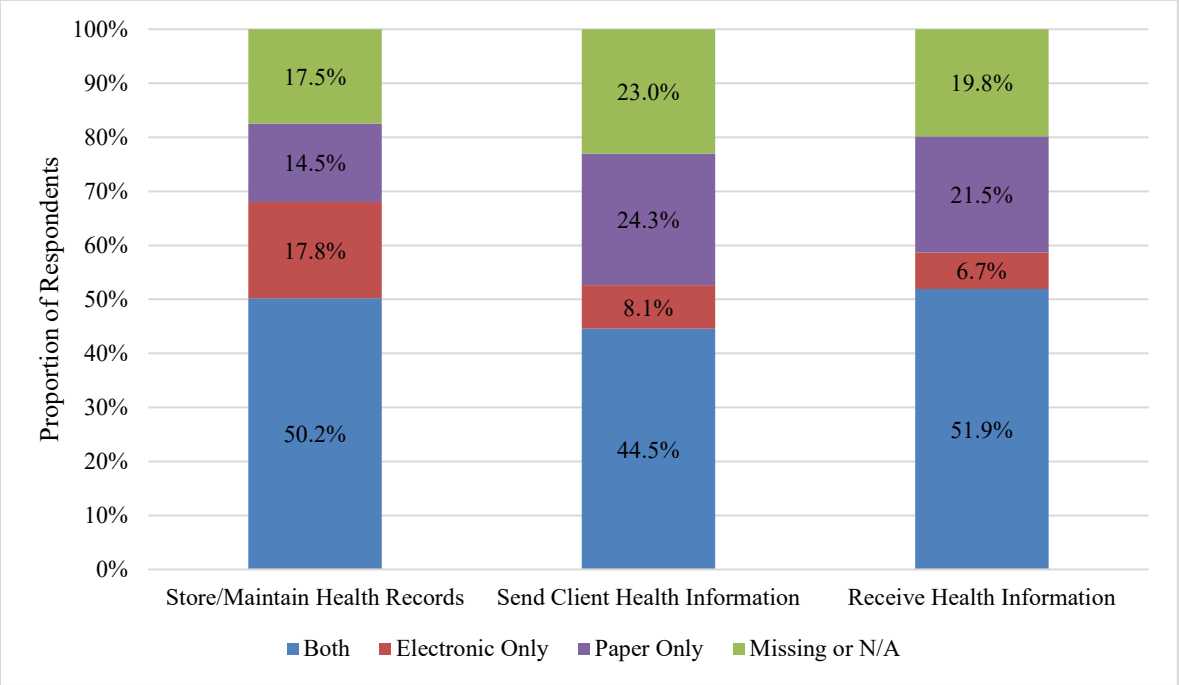
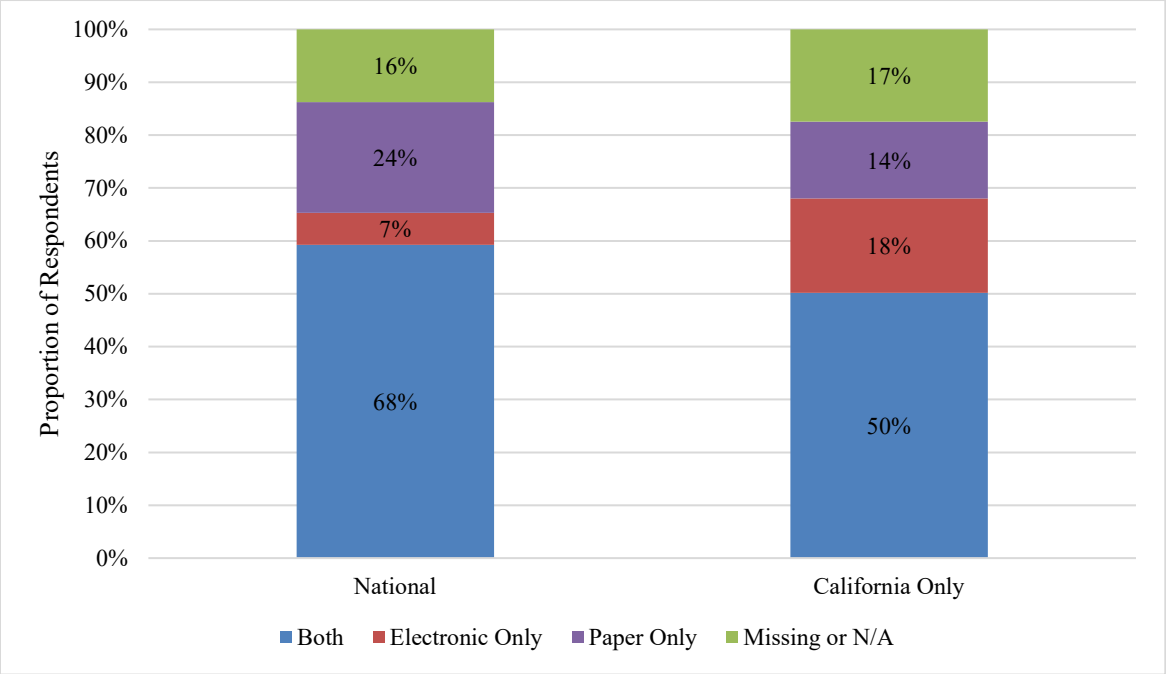


Figure 21: Comparison of Method to Store and Maintain Health Records between National (N=13,585) and California (N=1,311) Substance Use Disorder Treatment Facilities



Ineligible Provider Interviews

Impact of Promoting Interoperability Program and Related Programs
Most organizations did not perceive that the Medi-Cal Promoting Interoperability Program, and the associated increase in EP and EH adoption of EHRs, had an impact on their work or members. One behavioral health representative received support through the Promoting Interoperability Program for their medical services, which allowed them to implement an EHR that they will soon be replacing through a partnership with OCHIN. However, they described that their behavioral health services did not experience any impact or benefits from EHR adoption on their medical services side. Additionally, one long term support services representative reported that some of their members received support through the Promoting Interoperability Program, which allowed them to adopt more robust EHR systems like Epic and Cerner, however the success varied by size of organization. The remaining organizations reported no spillover effects of the Promoting Interoperability Program to their work or members. One behavioral health representative pointed to specific challenges arising from the incompatibility between certified EHR technologies and solutions offered by vendors in the behavioral health space, as well as lack of alignment around a minimum core dataset and communication standards.

Current Documentation & Interoperability Challenges
Electronic documentation is a major pain point among ineligible providers – specifically that documentation is fragmented, inefficient, duplicative, and burdensome. One behavioral health representative also noted challenges documenting in poorly designed systems that lack alignment with actual workflows, as well as a lack of vendor responsiveness to their needs. A long term support services representative reported that their biggest documentation pain point is resistance from staff to use technology for documentation and a general lack of technology savviness among their workforce.

In general, interoperability was described as a significant pain point and nearly all representatives indicated that the inability of systems to communicate with each other caused challenges sharing and receiving needed information. A social services representative also indicated that that inflexibility of certain systems, as well as the specific confidentiality laws they are governed by, create added challenges for data exchange. Several representatives indicated that without a relationship to a specific hospital, it is much harder to access clinical information about patients, which makes transitions of care and care planning more challenging. Behavioral health representatives additionally reported a lack of willingness from primary care, Medicaid managed plans, and HIEs to engage in data sharing with behavioral health systems. They also indicated that working with multiple county systems is frustrating since they all have separate data exchange processes, which contributes to redundancies and extra work.

Prioritized State and Federal Actions
There is a strong desire for policy action at the state and/or federal level to address ongoing challenges with health IT. Prioritized actions include revising outdated policies (particularly around documentation requirements), continuing pandemic-related telehealth policies, providing funding for adoption of EHR systems, providing more technical assistance, expanding broadband, developing new reimbursement models for SNFs and

Home Health, and moving towards statewide data sharing capabilities. Representatives from long term support services and behavioral health described the need for outdated policies to be revised, including restrictions on consent for substance use disorder treatment and home care documentation requirements. There was also broad support for extending pandemic-related policies that expand the capabilities and reimbursement of telehealth services. The need for general health IT and telehealth-specific technical assistance programs were also deemed priority areas by multiple representatives, along with the need for expanded broadband infrastructure, particularly in rural areas and state-funded, affordable housing communities. Long term support services representatives also advocated for new reimbursement models for SNFs and Home Health which would allow for greater adoptions of health IT and more opportunity for innovation and digital transformation. Lastly, a behavioral health representative prioritized the need for a state-wide HIE with proper data segmentation to reduce variability among counties.

Current IT Priorities (including under CalAIM)

Table 56: Summary of Key Challenges and IT Priorities

Sector	Summarized Priorities	Supporting Quotes
Long Term Support Services	EHR adoption (for facilities that have not yet adopted, many of which are small, rural) and expanding the capabilities of EHRs (for facilities that have already adopted) in order to promote better and complete documentation and participate in data exchange. Better information sharing from hospitals to nursing homes/home health in order to improve care coordination and quality tracking and improvement. Interoperability with acute care systems like Epic and consistent standards across vendors/platforms. Better broadband infrastructure. Ability to incorporate new technologies into their facilities (e.g., Safely You fall prevention technology, Obie - gaming platform for seniors).	"Some of our people still need to get EHRs…but without the additional funding that was available to the hospitals, organizations were left to their own funds to make that happen. And some were able to, and some were not. Over half probably have a solid EHR, others have bits and pieces. For those that have a good EHR system, the next step would be integrating and accessing the local HIEs so that way they can have a better conversation with referral sources and in the transition of their patients." "An underlying priority is better and complete documentation. I think that's one of the reasons why people move to EHR so that you can't miss and skip things, there are bells and whistles that tell you if someone missed something or didn't chart something. Providers are looking for that ability so we can take the human error out of the care that we're providing and have a little bit more guided activity for staff. It also helps with improved information sharing for continuity of care, data

Sector	Summarized Priorities	Supporting Quotes
	Improving tech savviness of workforce. Establishing better reimbursement models for remote visits/telehealth services. Advocating for updated home health regulations. Promote data sharing and interoperability between home health and other care settings.	retrieval, quality tracking and improvement." "Hospitals only need of the nursing home is to take patients. And beyond that there isn't a lot of positive collaboration…The hospitals only care if you take their patients. If you don't get all the information, they're not super worried about it. Most of the nursing homes only have the ability to communicate with the discharge planners. So whatever they're wanting to give you is what you get. And beyond that you're really restricted and that's really frustrating on the part of the nursing home because there are things that don't get shared. So, it's very frustrating when you have patients that are struggling and there's information we know we should have [but don't]." "[The priority has] always been around interoperability issues that we've had as the long-term care segment, and assisted living…We have too many vendors, they don't work well together, and they don't connect to the big systems and us to the larger picture." "Workforce capacity and training is really an important element. Because a lot of older workers or low-income workers have not had access to the kind of technology that other people have. So, they are at high risk for not being able to use technology without some training." "I think the biggest one is the reimbursement for either remote visits, telemonitoring, telemedicine…We have this amazing technology that would help the goal and whole point of care at home, but without the advocacy for

Sector	Summarized Priorities	Supporting Quotes
		reimbursement we kind of languish on the side lines. And because we're not associated with larger groups, for the most part we don't have access to these kinds of systems." "[Previously], we couldn't achieve enough efficiency to integrate it [remote visits/telehealth] as a line item [for payer reimbursement] that would balance the cost of the equipment with the efficiency that we were going to get, because of the regulations. For example, in a home health agency a nurse is required to do a supervisory visit of a home health aide every 2 weeks and this is something that could in many circumstance be done remotely…and so we were able to get a waiver from both CMS and the state of California during the pandemic for about a year that allowed us to do those kinds of visits remotely and to do regular nurse visits remotely…so we were able to do that and guess what, it was incredibly successful and everyone loved it. And now the waiver has gone away as of September 30th and we've tried to petition to the state of California…but the state has not seen that as an option for them. So now everyone is back to this [in person] even though we thought we finally had the data and really good outcomes to say that this actually does work" "It tough to manage antiquated regulations. Department of Public Health has not changed their Title XXII regulations for home health since 1992, I believe. So, it's over 20 years that we're relying on regulations that don't even match the client, the patient, the environment and the technology…It's the regulatory burden

Sector	Summarized Priorities	Supporting Quotes
		that kind of keeps us in this somewhat antiquated environment" "If I'm a standalone [not associated with a health system] and have a software system, I have no ability to interact with any other patient database that's in the hospital or anywhere else, and often times even physician offices. So we use fax."
Behavioral Health	Continued support for telehealth for populations that don't have access – they are currently piloting telehealth rooms and hope to continue and expand this work. Improved integration and ease of working with external systems such as primary care practices and county billing and data control systems. Better quality improvement and quality assurance analytics, client care analytics and clinical care support. Implementation of a centralized EHR across counties, followed by digital transformation to ensure technology is being used to its fullest capability. Increased technical capacity for data exchange and analysis leading to improved data-driven decision making. Increased willingness for other entities to share data with behavioral/mental health providers.	"A big point of emphasis over the last few years has been telehealth and client engagement. So really working to have more asynchronous communication and real time communication with clients...[We opened] up telehealth rooms where they have access to all the equipment they need so they can see outside specialists, meet with a case manager etcetera, not just the folks we have at that facility." "We would love to be more integrated with external systems and things like that, but a few things obviously cause issues with that; one is that we work in substance use so you have limitations around sharing information as well as all the bias that comes with mental health and substance use care. It would be great if we could collaborate with their primary care doctors… The larger issue that we're seeing [with data sharing] is the county by county distinctions…Each county has not only their own system, some of them have two systems, some of them have two systems plus invoicing, and it's a different protocol for submitting information, for what information needs to be submitted, in what format it needs to be submitted, how we bill, what we bill for, is different for every single county…So that has created huge issues with our ability to share

Sector	Summarized Priorities	Supporting Quotes
	Increased vendor responsiveness to behavioral health needs and alignment of EHR workflows with real workflows.	information in an efficient way because we are spending so much time just doing county by county [data] nitpicking" "Another one [priority] that's been really big has been around real time client care analysis and clinical decision support. So pulling information from our EHR around key assessments and outcome measures. We want to use all of that to drive clinical decision support…We've also been using our data infrastructure in order to also do QI/QA and program health analysis. So we take a look at how are we're doing on access metrics, on engagement metrics…and slicing that by demographics." "We heard over and over [from counties] that there were some real challenges around using data for decision making. So not having the local technical capacity to get what they want from EHRs, and then a lot of vendor manipulation, and a lack of local talent around configuration and optimization. So our vision in pulling all these resources together [in a centralized EHR] is that we can do things like add in AI around coding procedures, that no one could achieve individually." "There's a lot of management that we do [for patients with mental illness]. So the lack of willingness for primary care or Medicaid managed care plans to share data with us is really challenging." "My joke back in the day was that 'I can't meaningfully use anything you [vendors] put out here for meaningful use.' So it was things like the feds said

Sector	Summarized Priorities	Supporting Quotes
		have these four data variables, so the vendors would put these data variables on a separate form, but it doesn't match the cognitive flow of how people worked."
Social Services	Ability to participate in data exchange to produce reports/dashboards that indicate if welfare agencies are meeting their expectation in terms of their beneficiaries getting health/health-related services. (They don't want HIPAA-covered or identified data, but instead aggregate data on whether visits or certain assessments are occurring).	"There is room to try to make sure our systems can better match things up to assess how we are doing in terms of things like, are kids in foster care being seen by health providers? Are they getting preventative care? Are they getting mental health assessments? Are they getting treatment as they need that?...The existing data systems don't make it easy to answer that question…How do we not necessarily bring the information from one system to the other, but how do we produce reports or dashboards or information to get a sense for are we meeting our expectations? Are we not meeting our expectations? Are we exceeding our expectations in terms of getting people the services they actually need?"

Table 57: Summary of CalAIM Priorities

Sector	Summarized CalAIM Priorities	Supporting Quotes
Long Term Support Services	Improve health plans' understanding of the LTC/SNF business and promote consistency of health plan employees/staff who deal with LTC. Ensure the CalAIM implementation of the Enhanced Care Management (Community Supports) and In	"One of the challenges we've seen so far is that the health plans have a hard time understanding this business [long term care]. They also have had a long history of assigning long term care facilities in the health plan to a rotating set of employees and staff and that has been a challenge as well. So, one of the things we've been trying to do is make sure that there's consistency in the health plans in whose dealing with

Sector	Summarized CalAIM Priorities	Supporting Quotes
	Lieu of Services are well thought-out and coordinated. Inclusion of home health care in CalAIM planning efforts. Improved care coordination and transfer of care, ideally via a central repository of data that only the appropriate people could access.	long term care. I think it's a real opportunity" "We do have some members who are home care or PACE providers, so more on the home care provider side who are looking at participating in CalAIM. And there is some confusion right now, not just amongst our members but among others, about how the in lieu of services is actually going to be implemented. There's clear indication of how it will be implemented if you look on and read the directions but at the same time there's not a central coordinating body that been identified to oversee in lieu of services." "Our members are going to be really involved in the Enhanced Care Management, called Community Supports now, for the In Lieu of Services. Our big focus is making sure that the plans see us as a resource and that we're at the table in those discussions. So even talking to CAHP, the California Association of Health Plans, to make sure we're tied into what they're doing, especially the county plans." "Unfortunately, in home care, were always kind of at the end of the list. My wish would be that we are at the table at least." "It will be incredibly helpful to have a central repository where anyone that was appropriate to be able to access that information could. That it would be in a platform that I could share, and then I could discuss with the doctor at Kaiser or the physical therapist that's doing outpatient, so that we could have

Sector	Summarized CalAIM Priorities	Supporting Quotes
		a coordinated response to any patient population. Especially as we start to try to incorporate social determinants of health and those kinds of things, I think it's really important to all be on the same page…if we just had it in a database that everyone could tap into it would just make life incredibly wonderful."
Behavioral Health	Alignment of mental and behavioral health services, easier sharing of information, and streamlining of documentation processes. Opportunity to allow coverage of variable length of treatment based on client need, especially for mental health services. Payment reform for public behavioral health. Behavioral health documentation redesign and inclusion of CPT coding. Inclusion of pre-defined outcomes and sufficient money for Enhanced Care Management program. Without this, the current structure may not lead to meaningful results for the populations of interest.	"Some of the things that are pretty interesting are the alignment of mental health and behavioral health services and really trying to align those services so they aren't as divergent as they currently are and reducing the documentation load on treatment plans. Right now, there's such a heavy emphasis on how you write the treatment plan versus the actual content of the treatment plan that we have to spend weeks training providers [on how to fill out the treatment plans]. It takes way more time than actually teaching them clinically how to create a good care plan for their clients…So the pieces about alignment and sharing of information, I think that sounds great and streamlining documentation requirements rather than having so many divergent ones – I love all of that." "My one area of concern is really around pushing for these standard lengths of treatment when we know we would never expect that on the medical side…My biggest concern is that they're going to decide that the outcome measure is percentage of clients you have out in 30 days which is not really encouraging good care." "There's a paradigm shift that we're trying to achieve by taking the next

Sector	Summarized CalAIM Priorities	Supporting Quotes
		leap with technology [getting centralized, updated EHR]. Because it just hasn't served the average clinician or client well. As well as for public behavioral health leveraging the changes associated with CalAIM, significant documentation redesign, and then changing to CPT coding…and that will coincide with payment reform for public behavioral health" "[With ECM], managed care plans are getting a little chunk of money to manage a population they're unfamiliar with without predefined outcomes. The money being really insufficient to actually serve that population…It feels really convoluted and I don't think that the way that it's been structured will actually lead to progressive, true results."
Social Services	Development of a comprehensive data exchange framework that enables health services and human services to participate in exchange despite different confidentiality laws and disparate data systems. Emphasis on pre-enrollment for people who are incarcerated to ensure they are connected to the support they need upon release.	"We wanted to have some engagement with [the data exchange framework] because of the dialogue around tying it into human services as well…Our main thinking around that is that if we ultimately want something that is going to exchange data with human services programs we need to be there from the start because we do have such different rules around confidentiality and around what we can exchange" "Pre-enrollment for people who are incarcerated and trying to make sure that as they are released they have all the support and services they need and connections to health. So that's another place where we're pretty actively engaged."

Appendix

Ineligible Provider Interview Guide

Section 1: Background & Current State

1. Can you briefly describe your organization?
2. Can you briefly describe your/your members' Information Technology (IT) priorities?
3. What IT systems do you/your members focus on/use and for what purposes?
    - What systems do you (or your members) currently use to document health-related information about clients?
        - What is still documented on paper?
        - What are your biggest pain-points related to information documentation?
4. Is data sharing with organizations outside of your sector a priority?
    - What systems do you (or your members) currently use to access/share health-related information?
        - Do you participate in any of the health information exchanges in the state? If yes, which ones and what types of information do you share or receive? If not, why not?
        - What is still accessed/shared via fax/phone/mail?
        - What are your biggest pain-points related to information access/sharing?
5. Are there any relevant policies that impact your IT priorities – either positively or negatively?
    - To what extent have *federal policy efforts* around health IT (including telehealth) helped or made your work harder? Specify the policy efforts.
    - To what extent have *state policy efforts* around health IT (including telehealth) helped or made your work harder? Specify the policy efforts.
6. How familiar are you with the Promoting Interoperability Program? How, if at all, has the program impacted the work of you/your members?

Section 2: Future State

7. Do you have a specific strategy for pursuing IT improvements over the next few years?
    - What would be most helpful to support your efforts?
        - Technology
        - Technical assistance for system selection, implementation, optimization
        - Workforce capacity and training on IT
        - Data sharing
8. What types of new policies could help support your IT priorities?
    - If you could prioritize the 1-2 most impactful state-level actions to advance IT infrastructure, what would they be?
        - If those actions were pursued, what specifically would be improved as compared to current state?
9. Are telehealth services a part of your/your members service offerings?
    - If so, how do you anticipate using telehealth over the next few years?
    - Does current broadband bandwidth support your efforts?

- What policies or implementation efforts would be useful to expand your telehealth services?

10. Are you familiar with the California Advancing and Innovating Medi-Cal (CalAIM) initiative?
    - If so, will you/your members be participating in some way?
    - If so, how do you anticipate that it will impact your/your members' IT priorities?
    - Are there specific domains within CalAIM that you/your members consider most helpful to prioritize?
        - Data exchange framework advisory group
        - DHCS population health management program to support population health for CalAIM.
        - CalAIM and local implementation of Enhanced Care Management and In Lieu of Services.

Cal-HOP Interview Guide

Cal-HOP Program

1. How would you describe the goals of the Cal-HOP Program?
2. In what ways have these goals been fulfilled? In what ways have they fallen short?
3. To what extent did these goals align with the broader goals of the HITECH Programs?
4. How did you identify and engage Cal-HOP participants?
5. How would you characterize progress moving participants from enrollment through the milestones? What challenges impeded such progress?
6. What were the strengths and challenges of the overall design and structure of Cal-HOP?
    1. Program eligibility?
    2. Milestones?
    3. Reporting requirements?
    4. Support?
7. Do you feel that the program was administered efficiently and fairly?

HIO Activities & Experiences

8. Can you summarize the key activities of your organization under Cal-HOP?
9. What trends did you identify among organizations that participated in Cal-HOP through your HIO? Were practice size, specialty, or location major factors?
10. What have been the essential factors that enabled or hindered progress?
    1. Which, if any, are unique to your setting, organization, etc. (e.g., maturity, size, technological approach)?
11. Were there any barriers or obstacles to participation?
    1. In terms of your HIO?
    2. In terms of participating organizations?

Impact and Future Directions

12. How has participation in Cal-HOP impacted your organization?
13. What are the biggest opportunities for the lessons learned from Cal-HOP to influence broader HIE activities moving forward?
    1. For your HIO?
    2. For HIE participants?
    3. For the state/DHCS?
14. What long term plans does your organization have for continuing to expand connectivity?
15. What should be prioritized at the state-level to facilitate more organizations joining HIOs?

CA Stakeholder Interview Guide

Context

1. Can you briefly describe your organization and its involvement with HITECH programs, CalAIM, and/or other health IT work in California?

Reflections on HITECH

1. In what areas do you think California made the most or least progress under HITECH?
    a. EHR adoption? In what setting(s)?
    b. Health Information Exchange? For which use case(s)?
    c. Workforce development?
    d. Convening and coordination?
    e. Other?
2. How would you characterize the benefits or value of this progress?
3. What aspects of HITECH program goals remain unfulfilled in California?
    a. Why was progress in these domains more challenging?
    b. Health sectors that were not included?
    c. What is the impact of these remaining gaps?
4. What are the biggest opportunities for the lessons learned from HITECH to influence health IT activities moving forward?
    a. From the experiences in California
    b. From others states and/or nationally

CalAIM

1. How familiar are you with the CalAIM program?
2. In what ways is CalAIM positioned to leverage and extend the advancements made under HITECH?
3. Are there shortcomings in state or local health IT infrastructure that may impede the State's ability to be successful in achieving the goals of CalAIM?

   a. Do you see recognition of these gaps? Are there strategies to address them?

Priorities Moving Forward

1. Does your organization have a specific strategy for pursuing IT improvements over the next 5 years?
   a. What priorities are your organization working to advance?
   b. What would be most helpful to support your efforts?
2. What future trends do you see emerging in the health IT domain that California should prepare for?
3. If you could prioritize the 1-2 most impactful state-level actions to advance IT infrastructure, what would they be?
   a. If those actions were pursued, what specifically would be improved as compared to current state?

APPENDIX 3: CALIFORNIA EHEALTH PARTNERS/ORGANIZATIONS

(Asterisks denotes program received ARRA/HITECH funding)*

Beacon Grantee—UC San Diego*

The Beacon Community Cooperative Agreement Program provided funding to communities to build and strengthen their health information technology (health IT) infrastructure and exchange capabilities to demonstrate the vision of the future where hospitals, clinicians and patients are meaningful users of health IT, and together the community achieves measurable improvements in health care quality, safety, efficiency, and population health. The UC San Diego Health System received a $15 million grant aimed at partnering with local health entities to improve patient care, safety and efficiency through information technology in the San Diego community.
For more information, go to the University of California, San Diego News Center.

Cal eConnect*

Cal eConnect was the governance entity designated by the state to provide leadership and implement, with public input, Strategic and Operational Plans already developed by the state. Cal eConnect was also charged with developing a sustainable business model, establishing ground rules and policies to ensure safety and security within HIE, engaging patients (particularly those who are vulnerable and underserved), identifying core HIE services, and arranging for provision of such services.
(*No website available).*

Cal eRx

Cal eRx was an organization promoting e-prescribing (eRx) as part of an electronic health record (EHR) as the standard of care. Its objectives were to inform a statewide plan in order increase provider adoption of e-prescribing, promote payer provision of eligibility and other information, increase pharmacy productivity, and raise confidence and demand amongst consumers and purchasers.
(*No website available).*

CalHIPSO*

Founded by clinical providers from the California Medical Association, the California Primary Care Association, and the California Association of Public Hospitals & Health Systems, the California Health Information Partnership and Services Organization (CalHIPSO) is a non-profit organization that offers a variety of programs and services designed to help clinical providers transition from a paper-based practice to one that successfully uses electronic health records. CalHIPSO is responsible for a wide range of activities related to identifying and signing up physicians for EHRs, vendor vetting, workforce development, regulatory activities, reporting, developing and implementing privacy and security best practices, and group purchasing. CalHIPSO provides services to all of California, except for Los Angeles and Orange counties.

California Department of Public Health

The California Department of Public Health (CDPH) is working together with state departments, agencies, local health departments, and other organizations to establish safe and secure health information exchange. Our departmental goal is to align public health programs to meet federal requirements for MU. We are assessing programs to be able to receive electronic laboratory and syndromic surveillance data from eligible providers and hospitals. We are also researching solutions to improve immunization information exchange between providers and immunization registries within the state. In addition, CDPH is continuing to identify public health programs that are impacted by MU and to explore implications to improve public health efficiencies and outcomes.

California Health Workforce Alliance (CHWA)*

The California Health Workforce Alliance (CHWA) seeks to develop and support activities that will educationally and professionally develop more than one million persons. Through a public-private partnership to implement strategies to meet California's emerging health workforce needs, the alliance will link state, regional, and institutional workforce initiatives to reduce duplicated efforts, develop a master plan, and advance current health workforce needs. In the next 30 years, CHWA will develop initiatives that educationally and developmentally prepare more than one million healthcare workers.

California Telehealth Network (CTN)*

The California Telehealth Network (CTN) is a program funded by the Federal Communication Commission's Rural Health Care Program. Its aim is to significantly increase access to acute, primary and preventive health care in rural America through the use of telecommunications in healthcare settings.

Center for Data Insights & Innovation (CDII)*

The Center for Data Insights and Innovation (CDII), as of 2021, includes the California Office of Health Information Integrity (CalOHII). CDII develops new privacy and security standards to enable the adoption and application of HIE in California. CDII is also engaged in the expansion of broadband throughout California, the implementation of telehealth, and providing support to the Health Information Technology Financing study. Facilitated by CDII, the Privacy and Security Advisory Board (PSAB) develops and recommends the new standards. Adoption of privacy and security standards for HIE will ensure that a person's critical health information can move safely and securely to the point of care.

CalOptima Regional Extension Center (COREC)*

Through a $4.6 million federal grant, CalOptima will serve as Orange County's Regional Extension Center (REC), providing education and technical assistance to primary care physicians as they make the move to the new technology.

CAHIE

The California Association of Health Information Exchanges (CAHIE) is an association of individuals and organizations focused on securely sharing health information in pursuit of the triple aim. CAHIE was formed to promote collaboration to solve difficult policy and technology problems, and to facilitate statewide health information sharing through voluntary self-governance. CAHIE developed the California DURSA, a multi-party data sharing agreement which allows participants to interoperate using recognized standards and launched the California Trusted Exchange Network (CTEN).

eHealth Coordinating Committee*

The eHealth Coordinating Committee was a multi-stakeholder committee created to coordinate various HITECH and eHealth initiatives. The Coordinating Committee, with counsel from five workgroups, identified services that may be shared by participants and propose plans to fund and coordinate their delivery. This body's goal was to identify barriers to success for the various partners and propose solutions, providing direct assistance where possible and desired.
(*No website available)*

eHealth Advisory Board

The eHealth Advisory Board supports coordinated and collaborative efforts among a diversity of healthcare stakeholders to adopt HIT, exchange health information, and develop and comply with statewide policy guidelines. The Board also seeks to maximize California's competitiveness in applying for federal HIE implementation funding and ensure accountability and transparency in the expenditure of public funds. Finally, the Board aims to improve public health using health information exchange through stronger public health surveillance and emergency response capabilities.
(*No website available)*

HITEC-LA*

HITEC-LA is the exclusive federally-designated HIT Regional Extension Center (REC) for Los Angeles County, charged with helping doctors and primary care providers purchase, implement and use electronic health records in a meaningful way. HITEC-LA will help providers assess their technology needs, as well as offer education, training, and on-site technical assistance.

Medi-Cal Promoting Interoperability Program (formerly the Medi-Cal EHR Incentive Program)*

The Health Information Technology for Economic and Clinical Health Act (HITECH Act) established programs under Medicare and Medicaid to provide incentive payments to eligible professionals and eligible hospitals as they demonstrate meaningful use of certified EHR technology. Beginning in 2011, eligible Medi-Cal providers and hospitals will be able to receive incentive payments to assist in purchasing, installing, and using electronic health records in their practices. Additional program information is available on the State Level Registry for the Medi-Cal PIP.

Object Health

Object Health is a consulting group that assists health care organizations, communities, and government agencies adopt and implement health information technologies to improve the effectiveness of community health care delivery. Object Health is a service partner of HITEC-LA.

Western Regional HIT Consortium*

To address the need for qualified healthcare workers, the Western Regional HIT Consortium worked to rapidly create or expand health IT academic programs at community colleges in the Western region, consisting of Arizona, California, Hawaii, and Nevada. Efforts included educating health IT professionals that facilitated the implementation and support of EHRs.
(No website available)

APPENDIX 4: DENTAL MEANINGFUL USE (MU) TIP SHEET

Medi-Cal Electronic Health Record (EHR) Incentive Program

Tips for Dental Providers

General Program and Participation Requirements

Eligibility Requirements

- Be a licensed dentist in the State of California.
- Have 30% or more patient volume attributable to Medi-Cal patients in a 90-day period in the preceding calendar year.
- Participation in the Medi-Cal EHR Incentive Program prior to 2017.
- Program year participation does not need to be in consecutive years.

Meaningful Use

- A dentist can receive $8,500 per year by demonstrating meaningful use.
- To date, only 9% of dentists in the program have taken advantage of available meaningful use funds.
- It's not as hard as you think! Dentists can utilize many tips and work-arounds, including using exclusions, to attain meaningful use.

MU Objective (Stage 2)	Tips
Protect Patient Health Information	• Required for providers based on HIPAA requirements for the protection of electronic person health information (ePHI). • This can be done by internal staff or by a vendor.
Clinical Decision Support	• Exclusion available for drug-drug and drug-allergy interactions if an EP writes fewer than 100 medication orders.
Computerized Provider Order Entry (CPOE) for Medication, Lab, and Radiology Orders	• Individual exclusions available if EP writes fewer than 100 medication, lab, or radiology orders during the EHR reporting period.
Electronic Prescribing (eRX)	• Exclusion available for a dentist who writes fewer than 100 permissible prescriptions during the EHR reporting period.
Health Information Exchange	• Exclusion for less than 100 transitions of care during the EHR reporting period. • Applicable when patients are referred for additional dental services.
Patient-Specific Education	• Exclusion available for a dentist who has no office visits during the EHR reporting period.
Medication Reconciliation	• Exclusion available for a dentist who was not the recipient of any transitions of care during the EHR reporting period.

MU Objective (Stage 2)	Tips
Patient Electronic Access	• Encourages the use of a patient portal to view, download, or transmit health information. Only 5% or greater of patients need to access information. • Exclusion may apply for dentists in counties with low broadband access.
Secure Electronic Messaging	• Encourages use of secure messaging to improve communication between the patient and the office. Only 5% or greater of patients need to receive messaging. • Exclusion available for dentists in counties with low broadband access.
Public Health Reporting	• Exclusions available if a dentist does not give immunizations, practice in county with syndromic surveillance or participates in a specialized registry. This may include most dentists.

- **The link to the CMS Fact Sheet has been included for each MU Objective listed above.**
- **Program information is available on the State Level Registry at: http://ehr.medi-cal.ca.gov/**
- **Additional Stage 2 details are available at: https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Downloads/2015_EHR2015_2017.pdf**

APPENDIX 5: LIST OF ACRONYMS

A&I	Audits and Investigations
AB	Assembly Bill
ACA	Affordable Care Act
ACPPE	Advanced Community Pharmacy Practice Experience
ACS	Affiliated Computer Services
ADT	Admission, Discharge, and Transfer
AHA	American Hospital Association
AHA	American Heart Association
AI/AN	American Indian/Alaskan Native
AIU	Adopt, Implement, Upgrade
APC	Use of Multiple Concurrent Antipsychotics in Children and Adolescents
API	Application Programming interface
APM	Metabolic Monitoring for Children and Adolescents on Antipsychotics
APP	Use of First-Line Psychosocial Care for Children and Adolescents on Antipsychotics
ARRA	American Recovery and Reinvestment Act of 2009
ASA	American Stroke Association
ASAM	American Society of Addiction Medicine

B

BAA	Business Associate Agreement
BEACH	Beacon Education, Analytic, and Collaboration Hub
BHIE	Behavioral Health Information Exchange
BMFEA	Bureau of Medi-Cal Fraud and Elder Abuse
BPM	Business Process Management
BTOP	Broadband Technology Opportunities Program

C

C-CDA	Consolidated-Clinical Document Architecture
Cal-HOP	California Health Information Exchange Onboarding Program
CA-MMIS	California Medicaid Management Information System
CBAS	Community-Based Adult Services
CAH	Critical Access Hospitals
CAHIE	California Association of Health Information Exchanges
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CalHEERS	California Healthcare Eligibility, Enrollment and Retention System

CalHIPSO	California Health Information Partnership and Services Organization
CAIR	California Immunization Registry
CalDURSA	California Data use and Reciprocal Support Agreement
CalHHS	California Health and Human Services Agency
CalLIMS	California Laboratory Information Management System
CalOHII	California Office of Health Information Integrity
CalPERS	California Public Employee's Retirement System
CalPSAB	California Privacy and Security Advisory Board
CalREDIE	California Reportable Disease Information Exchange
CalRHIO	California Regional Health Information Organization
CalSAWS	California Statewide Automated Welfare System
CAPH	California Association of Public Hospitals
CAPMAN	Capitation Payment Management System
CBO	Community-based Organization
CBTF	California Broadband Task Force
CCC	Council of Community Clinics
CCD	Continuity of Care Document
CCHA	California Children's Hospital Association
CCI	Coordination Care Initiative
CCP	California Coverdell Program
CCR	California Cancer Registry
CCS	California Children's Services
CDA	California Dental Association
CDC	Centers for Disease Control and Prevention
CDPH	California Department of Public Health
CDSS	California Department of Social Services
CEHRT	Certified Electronic Health Record Technology
CENIC	Corporation for Education Network Initiatives in California
CHCF	California HealthCare Foundation
CHDP	Child Health and Disability Prevention Program
CHeQ	California Health e-Quality
CHILI	California Health Information Law Index
CHIP	Children's Health Insurance Program
CHPL	Certified HIT Product List
CHSDA	Contract Health Services Delivery Areas
CHWA	California Health Workforce Alliance
CIS	Clinical Information System
CLIA	Clinical Laboratory Improvement Amendments
CLPPB	Childhood Lead Poisoning Prevention Branch
CMA	California Medical Association
CMR	Confidential Morbidity Reports

CMRI	California Medicaid Research Institute
CMS	Centers for Medicare and Medicaid Services
CMSO	Center for Medicaid & State Operations
CNM	Certified Nurse Midwife
CFR	Code of Federal Regulations
COREC	CalOptima Regional Extension Center
COTS	Commercial Off-the-Shelf
CPCA	California Primary Care Association
CPOE	Computerized Physician Order Entry
CPS	Child Protective Services
CQM	Clinical Quality Measure
CRC	Caregiver Resource Center
CRIHB	California Rural Indian Health Board
CS	Connectivity Services
CSI	Client & Service Information
CSR	California Stroke Registry
CSRHA	California State Rural Health Association
CTAP	California Technical Assistance Program
CTCP	California's Tobacco Control Program
CTEC	California Telemedicine and eHealth Center
CTEN	California Trusted Exchange Network
CTF	California Trust Framework
CTN	California Telehealth Network
CTRC	California Telehealth Resource Center
CURES	Controlled Substance Utilization Review and Evaluation System
CURES 2.0	California's Controlled Substance Utilization Review and Evaluation System
CWC	Child Welfare Council
CWS/CMS	Child Welfare Services/Case Management System
CYC	California Youth Connection

D

DARs	Desk Audit Reviews
DCDC	Division of Communicable Disease Control
DHCS	Department of Health Care Services
DLT	Distance Learning and Telemedicine
DMC-ODS	Drug Medi-Cal Organized Delivery System
DMH	Department of Mental Health
DPH	Designated Public Hospital
DO	Doctor of Osteopathic Medicine
DOD	Department of Defense

DOJ	Department of Justice
DTI	Dental Transformation Initiative

E

ECHO	Expanding Capacity for Health Outcomes Act
ECM	Enterprise Content Management
eCR	Electronic Case Reporting
eCQM	Electronic Clinical Quality Measure
EDR	Electronic Dental Record
EFT	Electronic Funds Transfer
EH	Eligible Hospital
EHR	Electronic Health Record
EITS	Enterprise Innovation Technology Services
eICR	Electronic Initial Case Report
ELR	Electronic Laboratory Reporting
ELINCS	EHR-Lab Interoperability and Connectivity Specification
ELPD	Entity Level Provider Directory
ELR	Electronic Lab Reporting
ELVIS	Elevated Lead Visual Information System
EMS	Emergency Medical Services
EMSA	Emergency Medical Services Authority
eMAR	Electronic Medication Administration record
EP	Eligible Provider
EPCS	Electronic Prescribing of Controlled Substances
EPMI	Enterprise Master Patient Index
ESAR-VHP	Emergency System for Advance registration of Volunteer Health Professionals
ETL	Extract, Transform, Load

F

FAB	Financial Audits Branch
FADS	Financial Audits Data System
FARs	Field Audit Reviews
FATS	Financial Audits Tracking System
FAQ	Frequently Asked Questions
FCC	Federal Communications Commission
FFS	Fee-For-Service
FFY	Federal Fiscal Year
FHL	Ventura County Foster Health Link

FI	Fiscal Intermediary
FICOD	Fiscal Intermediary Contracts Oversight Division
FHIR	Fast Health Interoperability Resources
FTPS	File Transfer Protocol Software
FQHC	Federally Qualified Health Centers

G

GAGAS	Generally Accepted Governmental Auditing Standards
GDSP	Genetic Disease Screening Program
GHS	Girls Health Screen
GHJI	Girls Health and Justice Institute
GPRA	Government Performance and Requirements Act
GWTG	Get with the Guidelines

H

HCAI	California Department of Health Care Access and Information
HCF	Healthcare Connect Fund
HCFA	Health Care Financing Administration
HCCN	Health Center Controlled Networks
HEDIS	Healthcare Effectiveness Data and Information Set
HFP	Healthy Families Program
HHS	Health and Human Services
HHP	Health Homes Program
HIE	Health Information Exchange
HIMD	Health Information Management Division
HIO	Health Information Organization
HIPAA	Health Insurance Portability and Accountability Act of 1996
HIT	Health Information Technology
HITEC-LA	Health Information Technology Extension Center for Los Angeles County
HITECH	Health Information Technology for Economic and Clinical Health
HITEMS	Health Information Technology for Emergency Medical Services
HMOS	Health Maintenance Organizations
HRSA	Health Resources and Services Administration
HAS	Human Services Agency
HSAG	Health Services Advisory Group

I

I-APD	Implementation Advanced Planning Document

I-APD-U	Implementation Advanced Planning Document Update
IA	Interagency Agreement
IB	Investigations Branch
ICEC	Interstate Consent Engine Collaborative
IdAM	Identity Access Management
IDN	Integrated Delivery Networks
IEHP	Inland Empire Health Plan
IEHIE	Inland Empire Health Information Exchange
IHA	Integrated Healthcare Association
IHS	Indian Health Services
HIS-CAO	Indian Health Services- California Area Office
IHP-ODS	Indian Health Program Organized Delivery System
ILPD	Individual Level Provider Directory
IPA	Independent Practice Association
IPHI	Institute for Population Health Improvement
IZ	CAIR Immunization Registry

L

LACDMH	Los Angeles County Department of Mental Health
LEA	Local Educational Agencies
LEC	Local Extension Center
LFS	Lab Field Services
LGHC	Let's Get Healthy California
LHD	Local Health Departments
LOINC	Logical Observation Identifiers Names and Codes

M

MARS	Management & Administrative Reporting System
MCQMD	Managed Care Quality and Monitoring Division
MCP	Managed Care Plan
MD	Doctor of Medicine
MDL	Medical Diagnostics Labs
MEDS	Medi-Cal Eligibility Data System
MFR	Master File Room
MH/SU	Mental Health and/or Substance Use
MHSA	Mental Health Services Act of 2004
MHP	Mental Health Program
MIS/DSS	Management Information System/Decision Support System
MITA	Medicaid Information Technology Architecture

MMIS	Medicaid Management Information System
MOA	Memorandum of Agreement
MPI	Master Patient/Person Index
MRB	Medical Review Branch
MSO	Management Service Organization
MSSP	Multipurpose Senior Services Program
M-TIP	MITA Transition and Implementation Plan
MU	Meaningful Use

N

NAMCS	National Ambulatory Medical Care Survey
NASMD	National Association of State Medicaid Directors
NATE	National Association for Trusted Exchange
NCHS	National Center for Health Statistics
NCPDP	National Council for Prescription Drug Programs
NCQA	National Committee for Quality Assurance
NDC	National Drug Codes
NHIN	Nationwide Health Information Network
NLR	National Level Repository
NSRHN	Northern Sierra Rural Health Network
NSSMPP	National Study of Small and Medium-Sized Physician Practices
NP	Nurse Practitioner
NSP	Newborn Screening Program
NTIA	National Telecommunications and Information Administration
NQS	National Quality Strategy for Quality Improvement in Health Care

O

OCPRHIO	Orange County Partnership Regional Health Information Organization
OD	Doctor of Optometry
OHB	Occupational Health Branch
OHP	Oral Health Program
OHIT	Office of Health Information Technology
OLPPP	Occupational Lead Poisoning Prevention Program
ONC	Office of the National Coordinator
OOH	Out-of-Home
OSHPD	Office of Statewide Health Planning and Development

P

P-APD	Planning Advanced Planning Document
P-APD-U	Planning Advanced Planning Document Update
PA	Physician Assistant
PIP	Promoting Interoperability Program
PACES	Post-Adjudicated Claim and Encounter System
PAVE	Provider Application and Validation for Enrollment
PCP	Primary Care Physicians
PED	Provider Enrollment Division
PETS	Provider Enrollment Tracking System
PD	Parkinson's disease
PHA	Public Health Agencies
PHR	Personal Health Record
PMF	Provider Master File
POLST	Physician Orders for Life-Sustaining Treatment
PPOS	Preferred Provider Organizations
PPS	Prospective Payment System
PL	Public Law
PRIME	Public Hospital Redesign and Incentives in Medi-Cal
pSCANNER	Patient-Centered Scalable National Network for Effectiveness Research
PULSE	Patient Unified Lookup System for Emergencies

Q

QIPS	Quality Improvement Projects
QRDA	Quality Reporting Document Architecture

R

RAND	Research and Development Corporation
RASSCLE	Response and Surveillance System for Childhood Lead Exposure
REC	Regional Extension Center
RFP	Request for Proposal
RHC	Rural Health Clinic
RPMS	Resource and Patient Management System
RTI	Research Triangle Institute

S

S-HIE	Social-Health Information Exchange
SaaS	Software as a Service
SACWIS	State Automated Child Welfare Information System

SAFR	Search, Alert, File, and Reconcile
SAMHSA	Substance Abuse and Mental Health Services Administration
SB	Senate Bill
SCA	Service Component Architecture
SCHIE	Santa Cruz Health Information Exchange
SCHIP	State Children's Health Insurance Program
SCO	State Controller's Office
SDE	State Designated Entities
SDBC	San Diego Beacon Community
SDHC	San Diego Health Connect
SDRHIE	San Diego Regional Health Information Exchange
SFTP	Secure File Transfer Protocol
SHA	Staying Healthy Assessment
SHIG	State Health Information Guidance
SIM	State Innovation Model
SLR	State Level Registry
SPA	State Plan Amendment
SMD	State Medicaid Directors Letter
SMI	Serious Mental Illness
SMHP	State Medicaid Health Information Technology Plan
SNF	Skilled Nursing Facility
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SOM	School of Medicine
SON	School of Nursing
SOP	School of Pharmacy
SQL	Structured Query Language
SR	Services Registry
SS-A	State Self-Assessment
SSW	Superior Systems Waiver
SSIS	SQL Server Integration Services
SUDs	Substance Use Disorders
SURS	Surveillance and Utilization Review Subsystems

T

TA	Technical Assistance
TAR	Treatment Authorization Request
TCP	The Children's Partnership
THP	Tribal Health Provider
TPL	Third Party Liability

TRC	Telehealth Resource Center

U

UCSF	University of California, San Francisco
UIHP	Urban Indian Health Programs

V

VA	Veterans Administration
VASDMC	Veterans Administration San Diego Medical Center
VDH	Virtual Dental Home
VHIE	Veteran Health Information Exchange
VLER	Virtual Lifetime Electronic Records
VistA	Veterans Health Information Systems and Technology Architecture

W

W&I Code	Welfare and Institutions Code
WHIN	Western Health Information Network
WIR	Wisconsin Immunizations Registry
WPC	Whole Person Care
WRHealthIT	Western Region Health IT Program
WSC	Western States Consortium

X

XML	Extensible Markup Language

APPENDIX 6: SECURITY RISK ANALYSIS DOCUMENTATION

You must upload a copy of your security risk analysis (SRA) or a letter containing the information specified in the SRA Letter Template on the following page. An uploaded SRA must specify the location and date of administration or review. CMS has issued the following guidance[74] regarding SRAs for eligible professionals (EPs):

- EPs must conduct or review a security risk analysis of CEHRT, including addressing encryption/security of data, implement updates as necessary at least once each calendar year, and attest to conducting the analysis or review.
- It is acceptable for the security risk analysis to be conducted outside the MU reporting period; however, the analysis must be unique for each MU reporting period, the scope must include the full MU reporting period, and it must be conducted within the calendar year of the MU reporting period.
- An analysis must be done upon installation or upgrade to a new system and a review must be conducted covering each MU reporting period. Any security updates and deficiencies that are identified should be included in the EP's risk management process and implemented or corrected as dictated by that process.
- The security risk analysis requirement under 45 CFR 164.308(a)(1) must assess the potential risks and vulnerabilities to the confidentiality, availability, and integrity of all ePHI that an organization creates, receives, maintains, or transmits. This includes ePHI in all forms of electronic media, such as hard drives, floppy disks, CDs, DVDs, smart cards or other storage devices, personal digital assistants, transmission media, or portable electronic media.
- At minimum, EPs should be able to show a plan for correcting or mitigating deficiencies and that steps are being taken to implement that plan.

You may use the free tool available on the HealthIT website but other formats are acceptable. Sensitive information may be redacted from the uploaded copy in order to protect patient privacy or data security. A copy of the actual un-redacted SRA must be retained by the professional or group/clinic for 7 years for DHCS auditing purposes. Submission of the SRA does not guarantee that it will be considered acceptable upon audit.

If you choose not to upload a copy of your SRA, a letter containing the information specified below must be uploaded.

[74] Centers for Medicaid & Medicare Services, Medicaid Promoting Interoperability Program Eligible Professionals Objectives and Measures for 2019, Objective 1 of 8: Protect Electronic Health Information. Accessed January 28, 2020.

SRA Letter Template

(Note: The tab key may be used to move to the next form field or line. Additional pages may be attached if the space provided below is insufficient.)

Date SRA completed or reviewed: _____

Name of person or entity that conducted or reviewed the SRA:

_____

Describe the SRA. Specify its source (such as Health IT website, EHR vendor, private security firm, etc.) Also describe how it was administered and security areas it addressed.

_____

_____

_____

_____

_____

_____

Briefly summarize any risks or deficiencies identified and any plans for mitigation or correction, without revealing sensitive information that would compromise patient privacy or data security.

_____

_____

_____

_____

_____

_____

_____

_____

NPI of eligible professional or group/clinic: _____

Are you an eligible professional or group/clinic representative? Specify one.

( ) Eligible professional ( ) Group/clinic representative

Name and signature of eligible professional or group/clinic representative:

Name: _____

Signature: _____ Date: _____

APPENDIX 7: CALHHS DATA EXCHANGE FRAMEWORK ADVISORY GROUP MEMBERS

The California Health and Human Services Agency shall convene a stakeholder advisory group no later than September 1, 2021, to advise on the development and implementation of the California Health and Human Services Data Exchange Framework. Stakeholder Advisory Group Members include:

Chair

Mark Ghaly, MD, MPH. Secretary of the California Health & Human Services Agency

Stakeholder Organizations

- **Jamie Almanza**, Bay Area Community Services
- **Charles Bacchi**, California Association of Health Plans
- **Andrew Bindman** (*delegate for Greg A. Adams*), Kaiser Permanente
- **Michelle Doty Cabrera**, County Behavioral Health Directors Association of California
- **Carmela Coyle**, California Hospital Association
- **Joe Diaz** (*delegate for Craig Cornett*), California Association of Health Facilities
- **Rahul Dhawan** (*delegate for Don Crane*), MedPoint Management (representing America's Physician Groups)
- **David Ford** (*delegate for Dustin Corcoran*), California Medical Association
- **Liz Gibboney**, Partnership HealthPlan of California
- **Michelle Gibbons** *(delegate for Colleen Chawla*), County Health Executives Association of California
- **Lori Hack**, California Association of Health Information Exchanges
- **Sandra Hernández**, California Health Care Foundation
- **Cameron Kaiser** (*delegate for Karen Relucio*), County of San Diego (representing the California Conference of Local Health Officers)
- **Andrew Kiefer** (*delegate for Paul Markovich*), Blue Shield of California
- **Linnea Koopmans**, Local Health Plans of California
- **Matt Legé** (delegate for Tia Orr), Service Employees International Union California
- **David Lindeman**, UC Center for Information Technology Research in the Interest of Society

- **Amanda McAllister-Wallner** (*delegate for Anthony E. Wright*), Health Access California
- **DeeAnne McCallin** (*delegate for Robert Beaudry*), California Primary Care Association
- **Ali Modaressi**, Los Angeles Network for Enhanced Services
- **Erica Murray**, California Association of Public Hospitals and Health Systems
- **Janice O'Malley** (*delegate for Art Pulaski*), California Labor Federation
- **Mark Savage**, Savage & Savage LLC
- **Kiran Savage-Sangwan**, California Pan-Ethnic Health Network
- **Cathy Senderling-McDonald**, County Welfare Directors Association
- **Claudia Williams**, Manifest MedEx
- **William York**, 211 San Diego/Community Information Exchange

State Departments

- **Ashrith Amarnath**, California Health Benefit Exchange
- **Mark Beckley**, Department of Aging
- **Scott Christman**, Department of Health Care Access and Information
- **David Cowling**, California Public Employees' Retirement System
- **Kayte Fisher**, Department of Insurance
- **Brent Houser**, California Department of State Hospitals
- **Cheryl Larson** *(delegate for Diana Toche)*, Department of Corrections and Rehabilitation
- **Julie Lo**, Business, Consumer Services & Housing Agency
- **Dana E. Moore**, Department of Public Health
- **Nathan Nau**, Department of Managed Health Care
- **Linette Scott**, Department of Health Care Services
- **Jim Switzgable** *(delegate for Nancy Bargmann),* Department of Developmental Services
- **Julianna Vignalats**, Department of Social Services
- **Leslie Witten-Rood**, Emergency Medical Services Authority

APPENDIX 8: TELEHEALTH UTILIZATION BY MEDI-CAL BENEFICIARIES BY BROADBAND COVERAGE IN CALIFORNIA

Introduction

The increasingly important role of telehealth as a mode of effective healthcare delivery in the United States was highlighted during the COVID-19 public health emergency when telehealth services were extensively utilized in the prevention, diagnosis, and management of almost all non-emergency conditions. The patient-centric nature of telehealth, increased access to different kinds of healthcare service providers, especially specialists, and reduction in costs associated with in-person healthcare visits made telehealth attractive, efficient, and cost-effective during the global crisis.

Studies demonstrated that weekly telehealth utilization during the COVID-19 pandemic increased dramatically, sometimes as much as 5,803%, from pre-pandemic levels[1]. Reasons behind this rapid rise of telehealth use over the past decade in general and during the pandemic specifically are multifactorial, however, two important factors stand out. First, the American Recovery & Reinvestment Act of 2009 established the Health Information Technology for Economic and Clinical Health (HITECH) Act, leading to a significant expansion of health information technology and increasing the meaningful use of Electronic Health Records (EHR) by providers[2]. During the pandemic, when movements were restricted to prevent coronavirus spread, integrating telehealth delivery with EHRs increased efficiencies and created bidirectional communication systems that assisted in continued healthcare delivery despite the disruptions. Second, the evolution and widespread availability of cellphones and other portable electric devices by patients has made it possible to easily access healthcare through telehealth from the location of their choice. This became vital during the pandemic when they used their devices to virtually see their providers thus ensuring continuity in their care. Despite these enabling elements, many barriers have prevented the universal adoption of telehealth, especially by those living in rural and underserved areas. Of these, easy and equitable access to high-speed internet through broadband technology is the most important[3]. Per the Federal Communications Commission (FCC) report, it is estimated that there are approximately 14 million Americans without broadband access, which is defined by the FCC as a speed of at least 25 MBPS down and 3 MBPS up[4,5]. This estimate includes 17% of Americans living in rural areas and 21% in tribal areas[4]. The population health impact of internet connectivity and broadband availability is so deep that the FCC, which is an agency that implements and enforces communication laws and regulations, has an independent task force named Connect2HealthFCC that attempts to understand the role of broadband and technology in advancing healthcare in the United States[6].

In the state of California, when the Telehealth Advancement Act (AB 415) was passed in January 2012, telemedicine and workforce laws were updated to be more inclusive of advanced telehealth technologies and practices[7]. Keeping in line with AB 415 and

subsequent bills (AB 809, AB 1174, and AB 744), Medi-Cal expanded telehealth services for its beneficiaries. In addition, Medi-Cal increased the adoption of telehealth by its providers by allowing flexibility for its fee-for-service providers to decide the mode of telehealth service and by updating reimbursement policies for location. Parallel to these policy changes, the California Department of Technology's Office of Broadband and Digital Literacy established the California Broadband Council, an advisory body to oversee the expansion of and promote affordable and equitable broadband coverage in the state. As a result of these efforts, 94.1% of Californians have access to wired broadband, also known as terrestrial broadband[5, 8] .

When the COVID-19 public health emergency was declared in California, the Department of Health Care Services introduced changes in Medi-Cal telehealth policies that further increased telehealth access and utilization for its beneficiaries to avoid disruption of services[9]. In most counties across the state, this increased utilization was supported by existing broadband infrastructure. However, there are no definitive studies that have compared the changes in telehealth utilization by broadband coverage across various counties in California during the pandemic. In this report, we have attempted to outline the differences in pre-pandemic and current telehealth service utilization by broadband coverage in all counties in the state.

Methods

Sample and Dataset

We obtained the data for telehealth utilization in Medi-Cal from the DHCS Management Information System/Decision Support System (MIS/DSS) and included all Managed Care and Fee-For-Service encounters between January 2019 and September 2021. Data for broadband coverage is released by the FCC twice a year. However, the data is released with an approximately 18-month delay. Hence for more up-to-date information, we utilized data available through BroadbandNow, an organization that has created a comprehensive dataset of broadband coverage utilizing information from the FCC and Census Bureau as well as broadband data submitted directly to them by internet service providers across the nation[8, 9].

Definition of Variables

Dependent Variable

Telehealth utilization is defined as the number of unique monthly outpatient telehealth encounters among all certified eligible Medi-Cal beneficiaries. It is presented as counts per 1,000 beneficiaries per month in each county. Our dependent variable was monthly outpatient telehealth encounters by certified eligible Medi-Cal beneficiaries.

Independent Variables

Broadband coverage is represented by the percentage of the population in each county, with access to wired broadband with a minimum speed of 25 MBPS down and 3 MBPS up. For this report, we divided broadband coverage by quartiles that are defined in Table 1 below and utilized the quartiles as ordinal independent variables.

Data Analysis

We used descriptive statistics, comparison of means by t-test with one-way ANOVA, and simple linear regression for our analysis. We considered all P values <0.05 to be significant. All analyses were conducted in SAS Enterprise 7.1 and Microsoft Excel 2016.

Results

During 2019, approximately 475,000 telehealth visits were conducted among Medi-Cal beneficiaries corresponding to 3.1 visits per 1,000 beneficiaries. In contrast close to 14.4 million visits were conducted in 2020 and 12.3 million visits were conducted in 2021 as of September 2021. This corresponds to 92.5 and 97.6 visits per 1,000 beneficiaries respectively. Broadband coverage ranged from 2.3% in Sierra County to 99.8% in San Francisco County. Table 1 outlines the range of broadband coverage in each quartile and the counties included in each quartile.

The yearly average telehealth encounters per 1,000 beneficiaries and broadband coverage in each county and the state of California are presented in Table 2. As evident in the table, beneficiaries in all counties, as well as the state, had a statistically significant increase in average telehealth utilization from 2019 through 2021 and though there were differences seen in average telehealth utilization between 2020 and 2021 as well, the result was not statistically significant.

When compared by percentage of broadband coverage, telehealth utilization was higher among those counties with higher broadband coverage, year notwithstanding (Figure 1).

When comparisons were made by quartiles of broadband coverage, telehealth utilization in 2019 was not significantly different between the four quartiles. For example, in 2019, the average telehealth utilization among counties in the lowest quartile of broadband coverage was 5.6 encounters per 1,000 beneficiaries while the average among counties in the highest quartile was 3.4 encounters per 1,000 beneficiaries. However in 2020 and 2021, there was a statistically significantly higher telehealth utilization among counties in the higher quartiles of broadband coverage compared to counties in the lower quartiles. For example, in 2020 there was an average of 53.8 encounters per 1,000 beneficiaries in counties in Quartile 1 while there was an average of 106.8 encounters per 1,000 beneficiaries in counties in Quartile 4.

For all quartiles of broadband coverage, there was a statistically significant increase in average telehealth utilization between 2019 and 2020. Between 2020 and 2021, there was a small decrease in telehealth utilization in Quartile 1 and 2 however the decrease was not statistically significant. For quartile 3, the telehealth utilization increased between 2020 and 2021 but this increase was not statistically significant. For those with the highest broadband coverage, i.e. for those in Quartile 4, telehealth utilization continued to statistically significantly increase even between 2020 and 2021 (Figure 2). In fact, for every increase in the quartile of broadband coverage, the difference in average telehealth utilization between 2019 and 2020 increased by a factor of 17.9. The same increased by a factor of close to 20.6 for the year 2021.

Discussion

Telemedicine as a mode of service delivery could be a solution to reduce health disparities by improving access to care in rural and underserved communities. However, telehealth services largely depend on broadband availabilities in an area, and the degree of broadband coverage is a significant factor in the adoption and expansion of telehealth services. If there is a digital divide, i.e. a gap in technology coverage including broadband access, it could severely impact those communities that would benefit the most from telehealth services.

During the pandemic, there was a rapid increase in telehealth utilization by Medi-Cal beneficiaries across various counties. These counties had a wide range of broadband coverage creating a perfect opportunity to test if the degree of broadband coverage affected the use and expansion of telehealth services. We found significant differences in telehealth utilization between different quartiles of broadband coverage during the period that expanded from 2019 (pre-pandemic) to 2021. Medi-Cal beneficiaries in counties in the higher quartiles utilized more telehealth services compared to those in counties in lower broadband quartiles. This unequal utilization could be a function of unequal access to healthcare caused by the digital divide across the counties. Further, during the pandemic, when the rates of telehealth utilization went up significantly across all counties, the increase in rates was directly related to the degree of broadband coverage. This finding can have major implications while planning for telehealth service expansion to provide whole person care for Medi-Cal beneficiaries especially as DHCS transitions to California Advancing and Innovating Medi-Cal (CalAIM) delivery system.

Limitations

Though the findings from the study have significant policy implications, we recognize that the study has some limitations. First, we have assumed that all Medi-Cal beneficiaries living in a county have similar access to broadband. However, even within the same county, broadband network deployment and speeds may be uneven leading to unequal access to the internet within the same area. Second, we have not accounted for

disparities in demographics, income, education level including familiarity with technology, rural vs urban locations as well as access to a healthcare system that has telehealth facilities. Third, the quality of broadband can affect telehealth uptake. We have assumed that speeds of 25 MBPS down and 3 MBPS up are appropriate for seamless video visits. Further, we have assumed that the broadband quality is the same in each county.

Conclusion

Telehealth services are heavily dependent on broadband coverage as demonstrated by higher average telehealth utilization by Medi-Cal beneficiaries in areas with higher broadband coverage. Broadband coverage plays a role even in the expansion of telehealth services with higher expansion seen in areas with higher broadband coverage. California is expanding broadband services equitably and affordably across all counties to bridge the digital divide. These changes will facilitate an increase in the utilization of telehealth services by Medi-Cal beneficiaries thus improving their access to healthcare.

Tables and Figures

Table 1: Definitions of quartiles of broadband coverage in California

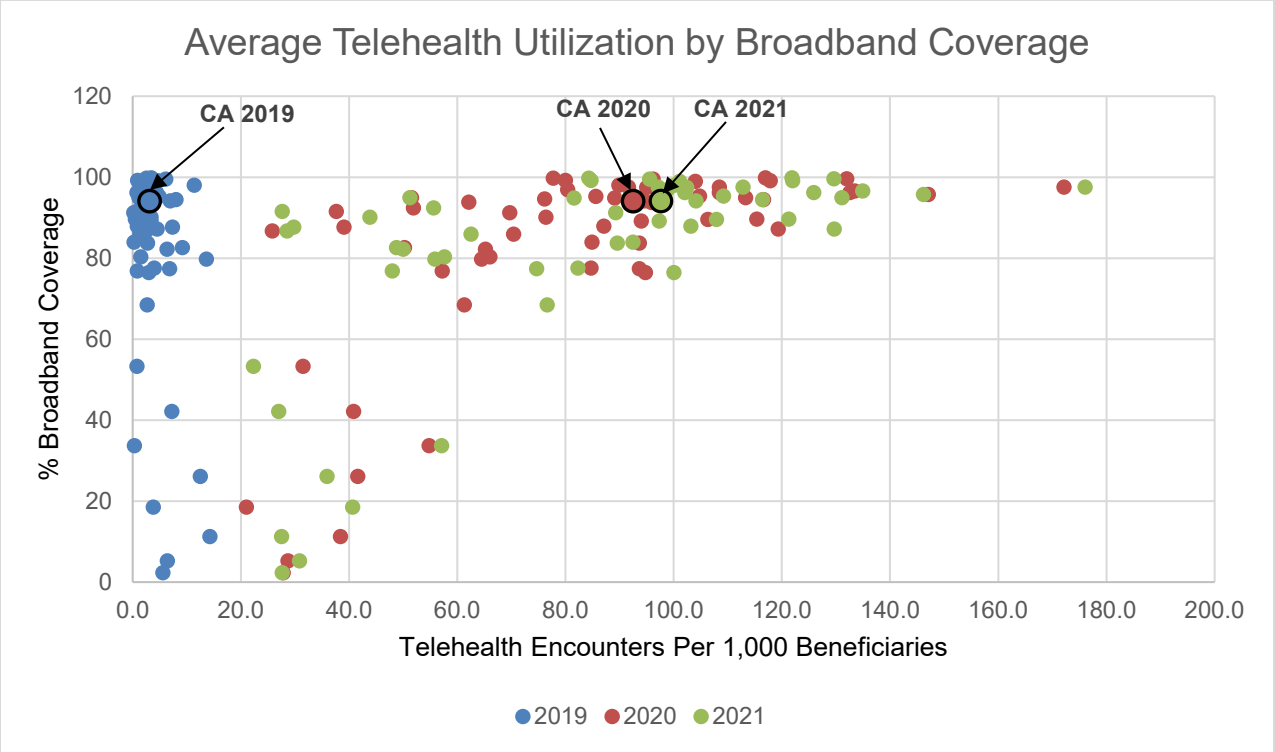
Quartile	% Broadband Coverage	Counties		
1	2.3-80.8	Alpine Colusa Glenn Lassen Mariposa	Mendocino Modoc Nevada Plumas Shasta Sierra	Siskiyou Tehama Trinity Tuolumne
2	80.8-91.20	Butte Calaveras El Dorado Humboldt Imperial	Lake Madera Merced Inyo Kings	San Benito San Luis Obispo Tulare Yuba
3	91.2-96.2	Amador Del Norte Fresno Kern Marin	Mono Monterey Napa Placer San Joaquin Santa Barbara	Santa Cruz Stanislaus Sutter Yolo
4	96.2-99.80	Alameda Contra Costa Los Angeles San Bernardino Orange	Riverside Sacramento San Diego San Francisco San Mateo	Santa Clara Solano Sonoma Ventura

Table 2: Telehealth Utilization and Broadband Coverage in Individual Counties

-	Average Telehealth Encounters per 1,000 beneficiaries by Year			% Broadband Coverage	Broadband Coverage Quartile
-	2019	2020	2021	-	-
Alameda	4.7	117.8	122.0	99.1	4
Alpine	3.8	21.1	40.7	18.5	1
Amador	2.9	51.9	55.6	92.4	3
Butte	3.4	76.4	43.9	90.1	2
Calaveras	9.2	50.3	48.8	82.6	2
Colusa	0.3	54.8	57.1	33.7	1
Contra Costa	6.1	96.2	95.5	99.5	4
Del Norte	8.0	116.6	116.4	94.4	3
El Dorado	6.4	65.2	50.0	82.2	2
Fresno	3.6	62.1	97.9	93.8	3
Glenn	1.5	66.0	57.6	80.3	1
Humboldt	4.5	119.3	129.7	87.2	2
Imperial	0.5	115.4	121.3	89.6	2
Inyo	7.4	39.1	29.8	87.6	2
Kern	2.9	76.2	91.6	94.6	3
Kings	0.3	84.9	92.5	83.9	2
Lake	3.4	94.0	97.3	89.1	2
Lassen	7.2	40.9	27.0	42.1	1
Los Angeles	2.5	77.8	84.3	99.7	4
Madera	2.5	25.8	28.5	86.7	2
Marin	0.8	108.5	102.0	96.2	3
Mariposa	2.7	61.3	76.6	68.4	1
Mendocino	3.0	94.8	100.0	76.4	1
Merced	2.5	106.3	107.9	89.5	2
Modoc	6.4	28.7	30.8	5.2	1
Mono	0.8	37.6	27.6	91.5	3
Monterey	2.4	95.9	93.2	93.7	3
Napa	1.2	113.3	131.1	94.9	3
Nevada	6.8	93.7	74.7	77.4	1
Orange	0.9	80.0	84.7	99.2	4
Placer	6.9	94.6	104.1	94.1	3
Plumas	14.3	38.4	27.6	11.2	1
Riverside	1.8	108.5	112.8	97.5	4
Sacramento	11.4	89.9	100.1	98	4
San Benito	0.2	69.7	89.3	91.2	2

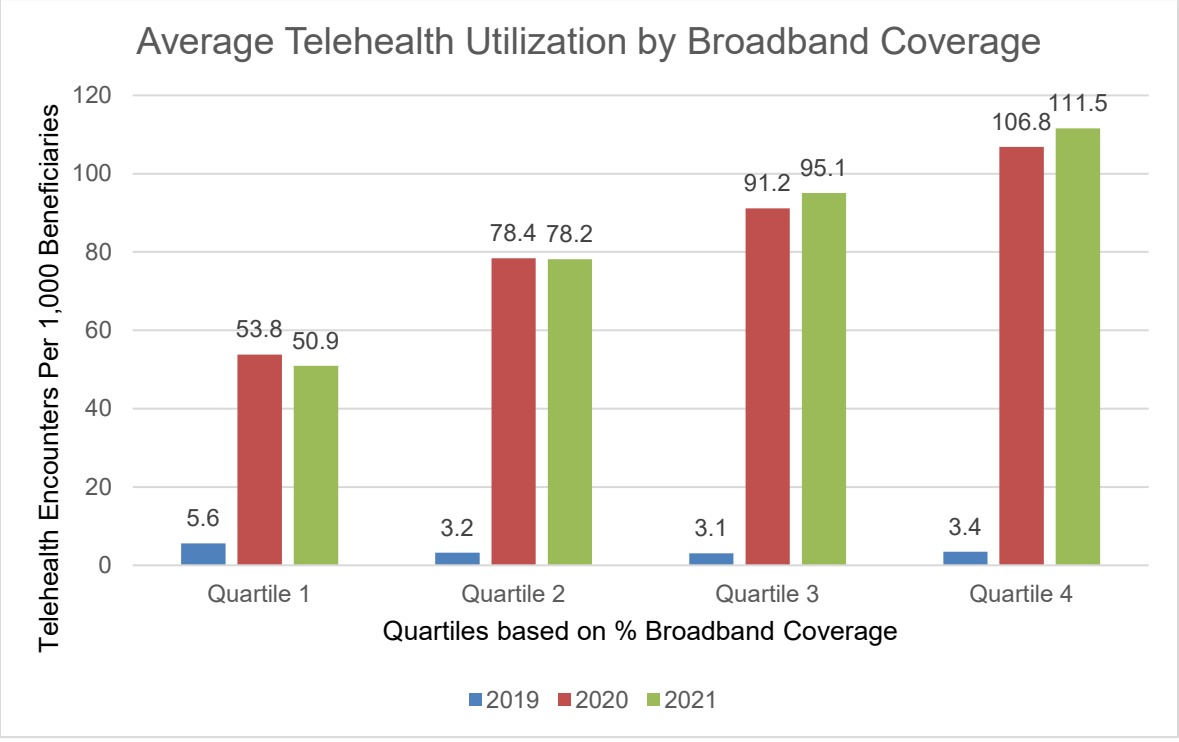
-	Average Telealth Encounters per 1,000 beficiaries by Year			% Broadband Coverage	Broadband Coverage Quartile
-	2019	2020	2021	-	-
San Bernardino	3.1	95.0	102.4	97.4	4
San Diego	2.9	133.5	134.9	96.6	4
San Francisco	3.4	117.0	121.9	99.8	4
San Joaquin	4.9	85.6	92.2	95.2	3
San Luis Obispo	1.4	70.4	62.5	85.9	2
San Mateo	2.5	132.0	129.6	99.6	4
Santa Barbara	1.2	51.6	51.3	94.9	3
Santa Clara	3.1	91.7	97.2	97.5	4
Santa Cruz	2.8	147.1	146.2	95.7	3
Shasta	4.0	84.7	82.3	77.5	1
Sierra	5.6	27.8	27.7	2.3	1
Siskiyou	13.6	64.5	55.9	79.7	1
Solano	1.6	80.4	98.9	96.9	4
Sonoma	2.8	172.1	176.1	97.5	4
Stanislaus	4.4	132.6	125.9	96.2	3
Sutter	1.4	89.1	81.6	94.8	3
Tehama	0.8	31.5	22.3	53.3	1
Trinity	12.5	41.6	35.9	26.1	1
Tulare	0.9	87.1	103.2	87.9	2
Tuolumne	0.9	57.2	48.0	76.8	1
Ventura	1.3	104.0	101.1	98.9	4
Yolo	1.7	104.8	109.2	95.3	3
Yuba	2.8	93.7	89.6	83.7	2
STATE	**3.1**	**92.5**	**97.6**	**94.1**	**3**

Figure 1: Correlation between average Telehealth Encounters per 1,000 Beneficiaries per year by Broadband Coverage



Individual dots on this scatterplot represent a county in the state of California

Figure 2: Average Telehealth Encounters per 1,000 Beneficiaries by Quartile of Broadband Coverage



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APPENDIX 9: ACKNOWLEDGEMENTS

We would like to extend our thanks to the many team members that contributed to the success of our HITECH programs over the years.

Team Members, 2018, from left to right.

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