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Implementation of the Hub and Spoke Model for Opioid Use Disorders in California: Rationale, Design and Anticipated Impact

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Abstract

As part of the State Targeted Response to the opioid epidemic, California has adopted the Hub and Spoke model to expand access to medications for opioid use disorder, particularly buprenorphine, throughout the state. By aligning opioid treatment programs as hubs with primary care, office-based practitioners, and other health care settings as spokes, a broader treatment model can reach more people with opioid use disorder, improve access to medications for opioid f specific activities and anticipated impact of the implementation plan in California's Hub and Spoke system. Training and technical assistance are designed to: increase the number and specific activities and anticipated impact of the implementation plan in California's Hub and Spoke system. Training and technical assistance are designed to: increase the number and capacity of waivered prescribers; enhance skills of prescribers and multidisciplinary teams; and create systems change. Activities include buprenorphine waiver trainings and provider support, a practice facilitator program, Project ECHO sessions, webinars, clinical skills trainings, and regional learning collaboratives. This overview highlights the steps California is taking to build treatment capacity to address the opioid epidemic.

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1. Introduction

To address the overdose crisis and opioid epidemic in California, the California Department of Health Care Services (DHCS) prioritized expansion of access to medication treatment for opioid use disorders (MOUD)[1]. In order to reach 20,000 new patients on MOUD over a two-year period, DHCS selected the Hub and Spoke (H&S) model, developed in Vermont (Simpatico, 2015), to create a treatment system that expands access to care for opioid use disorders (OUD). California allocated nearly half of the federal funds provided in its State Targeted Response (STR) grant (2017-2020; approximately $43 million dollars) to build its Hub and Spoke system and expand treatment capacity throughout the state. This paper describes California's adaptation and implementation of the Hub and Spoke model and elements of the implementation support for the project.

Like the Vermont H&S system, California developed collaborative regional networks of clinical services for treatment-seeking opioid users that expand service capacity, increase access to care, and promote patient placement in the most effective type and intensity of MOUD treatment. The regional networks have "hub" clinics, mainly opioid treatment programs (OTPs) that prescribe methadone, buprenorphine, and injectable naltrexone, to patients who need the high level of structure provided in these treatment settings. The OTPs then contract with a geographically distributed number of "spoke" clinics, mainly primary care, but also behavioral health and substance use disorder programs, where patients can receive office-based opioid treatment (OBOT) with buprenorphine and injectable naltrexone. The implementation activities focused on expanding access to MOUD described here have the aims of: increasing the number of waivered prescribers in the state; increasing the capacity and confidence of those prescribers; and enabling systems change to implement buprenorphine treatment across the treatment system.

1.1 The Hub and Spoke System.

Only 8% of people with a substance use disorder seek treatment at a publicly-funded substance use treatment program (SAMHSA, 2018), but many more have contact with a primary care provider. By creating an integrated network of OTP and OBOT settings, the H&S model allows more patients to access treatment wherever they enter, creating a "no wrong door" system of care. The H&S model can also increase provider capacity to treat substance use disorders (Brooklyn and Sigmon, 2017)While primary care physicians do not typically specialize in addiction medicine, so the H&S model provides a structure for treatment teams to provide medications for opioid use disorders like they do for other chronic illnesses. By creating a network of shared expertise, the H&S model can help these

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[1]Throughout this manuscript we use both the term medically-assisted treatment (MAT) which has been widely used and the term medication treatment for opioid use disorder (MOUD). MOUD is the preferred term for the authors as we believe this term more accurately reflects the nature of these pharmacotherapies.

providers begin prescribing medications like buprenorphine in OBOT settings. California has applied knowledge derived from Vermont in designing and developing its own H&S network.

The implementation of the H&S concept in the expansive and geographically diverse State of California (California is approximately 17 times larger than Vermont and its population approximately 63 times greater) requires strategies that can accommodate its much larger size. California has 58 counties, each with a different configuration of healthcare and opioid treatment services. Some counties are urban with dense populations and others are rural or frontier, with large distances creating access obstacles to care for people with substance use disorders and other chronic conditions. Because of the greater diversity in California, hubs were encouraged to create systems that best meet the needs of their communities. For example, in more rural areas without access to transportation and few providers nearby, the hubs could use funds to help spokes set up telehealth services, pay for a provider to attend a waiver training, or provide salary support for behavioral health or nursing services that are not typically funded by Medi-Cal (California's Medicaid program).

DHCS funded proposals to establish 18 H&S networks in California in June 2017. These networks provide services in 38 counties, representing 70.6% of the geographic area of California and 70.0% of the state's population. The 18 hubs represent 17 OTPs and one Federally Qualified Health Center (FQHC) with a MOUD program. In their proposals, each hub identified five or more spokes who either already had a MOUD program or were interested in developing one. Spokes could include FQHCs, other mental health and substance use disorder programs, and private practitioners with a DATA 2000 waivered to prescribe buprenorphine. The one FQHC that serves as a Hub delivers MOUD services in a county without an OTP. They contract with an OTP in a neighboring county to provide methadone and more intensive levels of care as needed, while the process was underway for an OTP to open in that county.

Figure 1 shows the geography of the 18 H&S networks across six regions, mainly defined by geography and projected number of spokes. In the RFP, the priority for funding was to cover parts of California with the highest overdose rates, which overlap with the areas of California with the fewest services for OUD, most of which are located in the rural north. As illustrated in Figure 1, the H&S networks serve most of the very rural counties of Northern California, the Sierras and the vast desert counties in Southeastern California, in addition to the urban counties of San Francisco, Los Angeles, San Diego and others.

2. Methods.

2.1. The California H&S project implementation plan

The training and implementation grant for the CA H&S program was awarded to the Integrated Substance Abuse Programs (ISAP) training department at the University of California at Los Angeles (UCLA). This experienced addiction service development and training team created an implementation plan to support the H&S efforts. The team included staff from UCLA (including the SAMHSA-funded Pacific Southwest Addiction Technology Transfer Center [PSATTC]), Stanford University faculty, members of the California Society

of Addiction Medicine (CSAM), and informal consultants from the California Health Care Foundation (CHCF) and California Primary Care Association (CPCA), with active involvement from the funder, DHCS.

The implementation plan includes a set of evidence-based dissemination and training activities meant to improve treatment capacity in order to contain and reduce the opioid overdose death rate in California. With the H&S framework as the conceptual model for the organization of treatment services, the plan promotes the expansion of MOUD access by increasing California OTPs' capacity to treat patients with buprenorphine and expanding the use of buprenorphine in primary care and other non-OTP settings. Given California's large and complex geography and scope of provider reach, the plan includes a mixture of in-person and distance learning opportunities, group learning events, and one-one-one mentorship. All activities are designed to address the state's goals of expanding the availability of MOUD, reducing opioid overdose rates, and reducing unmet treatment needs. The implementation activities can be organized into three categories: increasing the number and capacity of waivered prescribers; enhancing skills of prescribers and their treatment teams; and facilitating systems change to implement buprenorphine treatment across the treatment system. A different team at UCLA was awarded a contract to evaluate the extent to which the goals of the California STR effort produce its intended effects (Darfler, Urada, and Sandoval, under review).

2.2.   Increasing the Number and Capacity of Waivered Prescribers.

To deliver MOUD (specifically buprenorphine) in primary care settings, physicians (MDs and DOs), Nurse Practitioners (NP), and Physicians Assistants (PA) need to complete a required 8-hour (physicians) or 24-hour (NPs and PAs) course to qualify to prescribe buprenorphine by obtaining Drug Addiction Treatment Act of 2000 (DATA 2000) waiver. One major difference between the approach to H&S implementation in Vermont and California relates to the availability of buprenorphine prescribers. In Vermont there is one prescriber for every 4,000 people (640,000/160), while in California, there is one for every 11,500 (40,000,000/3500; National Technical Information Service, 2018). As such, one of the priorities of the CA H&S implementation has been to develop a larger cadre of buprenorphine prescribers. Once providers are waivered, they then need more support to promote active and expanded involvement in prescribing buprenorphine for OUD (Huhn et al., 2017; Hutchinson et al., 2014).

2.2.1.   Buprenorphine Waiver Trainings—In 2018, UCLA coordinated nine waiver trainings throughout the state, with a focus on rural areas. Approved faculty teach the Providers Clinical Support System (PCSS) training (www.pcssnow.org). While there are a variety of training formats for the waiver training, e.g., 8 hours online, 8 hours in-person, half in-person, half online), UCLA arranged for the "Half and Half" curriculum to provide the first half as a live training with an expert trainer. Providers received information about waiver trainings in a variety of ways, including direct outreach by hubs to their spoke providers, collaboration with medical centers to promote the training, announcements through the H&S listserve, and a list of interested providers compiled over the course of the project. From these nine training events, 132 providers received the training and instructions

on how to complete the online portion to become eligible for their x-waivers. Other waiver training efforts outside of H&S are taking place throughout the state, and the evaluation will track the total growth of waivered prescribers through publicly available databases.

2.2.2.   The Medical Education Research Fellowships (MERF) for the Treatment of Addiction (MATES)—

MERF-MATES is a sister-program to CSAM that focuses on medical education on all aspects of addiction. In the treatment of OUD, the program provides education and support for waivered providers to build their skills in prescribing buprenorphine and become more confident and competent to treat people with substance use disorders. MERF Scholars receive scholarships to attend the CSAM annual meeting and participate in a special educational track focused on treating OUD, learning from faculty and peers. During and after the conference, MERF scholars meet with a mentor who assists them in learning the basic steps in treating patients with MOUD and supporting their use of buprenorphine in their clinical practice. MERF will evaluate the impact of the program in a variety of ways. More at merfweb.org.

2.2.3.   Prescriber Facilitator Program.—

In the creation and operation of the H&S system in Vermont, the medical directors of the hubs in Vermont played a critical role. In Vermont, hub medical directors (overseeing services in 6 of the 7 hubs) were all active leaders in the H&S development process. These doctors prescribed methadone and buprenorphine in the hubs and were active "champions" for buprenorphine in primary care settings. They led community training sessions with new prescribers and were available to provide mentoring for doctors in spokes on the use of buprenorphine. In Vermont, most hub physicians view themselves as experts in addiction medicine with a responsibility for helping to build overall MOUD capacity in Vermont. They do not see their role as limited to being the prescriber in the OTP setting.

In California OTPs, the medical directors have a more limited scope of responsibility. Most are experienced practitioners on the use of methadone for OUD. At the time of the initiation of the California H&S, many of the hub doctors had little, if any experience with buprenorphine and no experience in providing mentoring to prescribers outside of their OTP/hub settings. Unlike Vermont, the medical personnel in most of the hubs in California were not able to help the spoke doctors become proficient with the use of buprenorphine or with other aspects of MOUD treatment.

As the California H&S system progressed, it became clear that many spokes faced challenges in implementing MOUD expansion among new or beginning x-waivered providers, in part due to the gap of medical expertise and mentorship that was present in the Vermont model. To address this need, an "Implementation Facilitation" model based on the work of the Veterans Health Administration was used to engage experienced waivered physicians to mentor, coach, and advise the new and prospective spoke providers (Ritchie et al., 2017).

The Implementation Facilitation model stems from an identified need to assist and encourage providers to use a new practice (in this case MOUD) and, through the development of interpersonal relationships, addresses challenges in adoption through

interactive problem solving and support (Stetler et al., 2006). Implementation facilitation has been shown to have a positive impact on organizations that, like the California H&S system, face significant challenges in implementation of evidence-based practice in clinical settings (Ritchie, Parker, Edlund, & Kirchner, 2017; Kirchner et al., 2014). The H&S project is using this model to provide new spoke doctors with this support in a Prescriber Facilitator program.

A first step in developing the prescriber facilitator program was to identify a cohort of experienced physicians who actively prescribe buprenorphine in primary care settings throughout California. The UCLA/Stanford team, along with advisors, identified prescribers in all geographic areas of the state that had a hub. Candidates were experts in the use of buprenorphine and have an interest in teaching other prescribers and championing the development of MOUD use in primary care settings. Each hub works with a Prescriber Facilitator, a MOUD champion in the community experienced in providing MOUD in primary care and trained on the facilitation model. The facilitators work with hub administrators to perform implementation activities including planning, leading, managing and sustaining change, and monitoring progress (Ritchie et al, 2015; Ritchie et al, 2017; Dogherty, Harrison, Graham, & Keeping-Burke, 2014). Facilitator activities include mentoring, coaching, and support of new or perspective spoke providers. Facilitators meet with spoke doctors, as "dyads," virtually or face to face, field phone calls, and provide consultation as needed. Introductory phone calls and webinars provide a review of expectations and the model. Since the facilitator program launch in September of 2018, two webinars have occurred in addition to meetings with each dyad completed at program onset. The two webinars consisted of initial training on and introduction to practice facilitation for the dyads and an internal call between the practice facilitators. The immediate next steps for the program will include creation of an interactive platform for facilitator exchange and a third convening of all dyads.

The facilitator program is intended to increase the number of active buprenorphine prescribers within the spokes of the 18 H&S networks. It is anticipated that the H&S networks with the most active facilitators will see the largest increase in new prescriber activity and patients in treatment with buprenorphine. Qualitative interviews planned in the final year of the project will query spoke doctors on their views of the usefulness of the prescriber facilitator program.

2.3. Enhancing skills of prescribers and their treatment teams.

In addition to increasing the number of waivered prescribers, along with their prescribing activity, implementation efforts include enhancing the skills of other members of the treatment team, including nurses, behavioral health specialists, case workers, administrators and other professionals involved in developing MOUD programs and delivering services. The implementation team has designed a variety of learning activities that support this process, including Project ECHO, Clinical Skills trainings, and community-wide MOUD webinars.

2.3.1.   Project ECHO—Project ECHO (Enhancing Community Health Care Outcomes) uses a web-based, video conferencing platform to provide a "lifelong learning and guided practice model that revolutionizes medical education and exponentially increases workforce capacity to provide best-practice specialty care and reduce health disparities." (Project ECHO, 2019). Expert teams lead virtual ECHO clinics providing primary care doctors, nurses, and other clinicians an opportunity to learn how to provide evidence-based specialty care in their own communities. A number of studies have investigated the impact of Project ECHO on pain management and opioid prescription rates as well as management of substance use disorders generally (Carey, Frank, Kerns, Ho & Kirsh, 2016; Katzman et al., 2014; Chaple et al., 2018). Currently, a limited number of studies have investigated the impact of Project ECHO on opioid use disorder patient-level outcomes and/or buprenorphine prescriptions (Komaraomy et al., 2016; Korthuis et al., 2017).

The CA H&SS project offers monthly 1-hour, web-based sessions, called MAT ECHO Clinics, led by medical and addiction experts with a curriculum designed to meet the needs of the CA H&SS programs and providers. The topics and curricula were developed by experts at the ECHO Institute at the University of New Mexico and adapted by H&SS staff to meet the needs of California providers (Project ECHO, 2019). CEs and CMEs are available for certified and licensed participants. The MAT ECHO topics have included: Introduction to Project ECHO® and to Opioid Use Disorder; Treatment of Opioid Use Disorders; Risk Reduction: Overdose Prevention and Management of Prescribed Opioids; Hepatitis C Virus (HCV) & Infectious Disease 101 for Hubs & Spokes; Medication Assisted Treatment (MAT) and Pregnancy; MOUD and Polysubstance Use; Nurse Care Model; Talking to Patients about MOUD; Adverse Childhood Experiences and SUDs.

The primary role of Project ECHO within the California H&S implementation plan is to provide a venue for waivered providers and the treatment team to learn evidence-based practices and have an opportunity to present and get feedback on clinical cases. Cases are presented by prescribers, nurses, and mental health providers, mainly from the spokes. As of May 2019, nine sessions have been offered, and the reach of these virtual case conferences has been 30-50 people per session.

2.3.2.   Webinars and Clinical Skills Trainings—The knowledge and skills needed to provide treatment to individuals with OUD are substantial. It is beyond the scope of this implementation project to provide comprehensive knowledge and skills training to all the clinical staff working within the California H&S project. However, with input from H&S clinicians and advisors, the implementation team prioritized a set of topics perceived to be of greatest importance to the success of the treatment efforts in the H&S service delivery system. The funder was also interested in reaching providers outside the H&S network, so the implementation plan includes a series of community-wide webinars open to anyone interested. Face to face clinical skills training sessions are offered twice per year to enable participants to learn and practice important skills in a more in-depth training experience.

2.3.2.1.   Community-Wide Webinars: Every quarter, the project team delivers a webinar that is open to the public to provide evidence-based education on various aspects of opioid use disorder to anyone interested in the topic. This allows those in the H&S as well as

interested individuals outside the H&S system to engage in learning opportunities that may facilitate MOUD expansion in other areas of the state. Potential participants receive announcements about these sessions through the H&S communication channels, as well as the PSWATTC List serve and distribution by affiliate organizations, such as CSAM, CPCA, and CHCF. Topics for these sessions have included: MOUD 101: An Overview of MOUD; Providing Medications for Opioid Use Disorder in Integrated Settings; Coordinating Care with a MOUD Team (featuring experts from a Vermont MOUD Team); Stigma and MOUD; Stimulants, Opioid Use Disorders and Patients on MOUD.

Sessions have been developed to include a variety of stakeholder perspectives. For example, the Stigma and MOUD webinar included a presentation by a family medicine physician who talked about the stigma she has seen working with pregnant patients with opioid use disorders. That session also included a consumer in long-term recovery from Opioid Use Disorder who discussed how stigma impacted his ability to start and maintain treatment. As of May 2019, 60-100 people have attended each of the six sessions.

2.3.2.2.   Clinical Skills Training: Bi-annual clinical skills trainings are provided for H&S personnel in multiple sites throughout the state. These sessions are designed to: 1) Review the most significant clinical challenges faced in the specified region. 2) Present evidence based/best practices known to be useful to address these challenges, and 3) Provide practice and role playing of clinical skills to promote use of the techniques presented. The first training focused on teaching motivational interviewing (MI) skills to all levels of personnel working in the H&S system. In year 2, the clinical skills trainings were designed to address two treatment challenges that continued to arise in Learning Collaboratives: how to address pain in patients on MOUD; and how to treat pregnant women with OUD. These evidence-based trainings were designed to include a presentation on the science of treating patients with OUD; a presentation on the clinical practice of applying evidence-based care; and a question and answer session. Three trainings on Pain and OUD and five trainings on Pregnancy and OUD were offered in different geographic regions throughout the state with attendance of 25-50 participants in each session.

2.4.   Facilitating Systems Change.

Implementing a successful MOUD program requires a number of systems and attitudinal changes. An integrated care model where OTPs, primary care providers, mental health programs, and others work together is a shift from the more typical "siloed" models of care available in health care systems. The implementation plan includes Learning Collaboratives to address those systems changes.

2.4.1.   Learning Collaboratives—Learning collaboratives (LCs) gather stakeholders together as an established strategy for reducing practice variation, caring for complex patients, and implementing relevant practice guidelines in healthcare settings (Institute for Healthcare Improvement, 2003). Learning collaboratives increase engagement in and completion of clinical training programs (Nadeem et al, 2016), increase positive attitudes toward empirically based treatment, and sustainability of evidence-based clinical practice over time (Haine-Schlagel, Brookman-Frazee, Janis, & Gordon, 2013). The LC was a core

component of the Vermont H&S system (Nordstrom et al., 2016). Based upon the increases in expanding MOUD access (Brooklyn & Sigmon, 2017) and positive clinical outcomes documented in Vermont (Rawson et al., 2019), the LC strategy is a central element in the California implementation plan.

In view of the large distances of California and the size of the project (18 hubs and over 200 spokes), the 18 H&S networks were grouped into six regional LCs, mainly organized by geography, to enable greater in-person participation and relevance. The LCs provide a venue for prescribers, other clinicians, and administrators from the hubs and spokes to learn important topics related to prescribing buprenorphine and provide opportunities for interactive problem solving. OTP/hub personnel use this opportunity to meet and become more familiar with the personnel and processes in their spoke networks. Because the "cultures" in OTPs and primary care settings are so different, it is a useful setting for all stakeholders to learn more about the procedures and operational issues of the spokes and vice versa. Refer to Figure 1, above, for the map of the six LC regions, by color.

LCs are held quarterly, and each session includes: A CME topic presentation; a "case study," which can be clinical or administrative; and a presentation of quality improvement measures based on specified data collected from the hubs and spokes. Each group has a facilitator and includes a presentation by a local practice expert. The implementation team, with input from H&S administrators and clinicians and consumers and an informal advisory group, created the agenda of topics, including: Introduction to the Learning Collaborative: Building a System of Care for Persons with OUD; Talking to Patients about MOUD; Effective Implementation of the Hub and Spoke Model: Prescribers and MAT Teams; Best Practices in Interdisciplinary Care; MOUD and Comorbid Substance Use; Best Practices in Treatment Retention. Twenty-five to 50 participants attend each session in each of the six regions.

3.   Discussion and Future Directions

California has developed a Hub and Spoke system of care intended to increase access to life-saving medications that reduce overdose deaths. The efforts in California and other states addressing the opioid epidemic through these and other projects funded by the federal State Targeted Response and State Opioid Response grants will result in a greater understanding of how to best address the opioid crisis. The Hub and Spoke model offers a significant change of practice in the health care system. Ongoing evaluation of the programmatic elements and implementation activities of these projects will highlight which aspects are most important to these efforts, especially as integrated treatment approaches become more common in community health centers and other primary care settings. Preliminary results indicate that more prescribers are becoming waivered, but they would like more mentorship and support in order to get started and/or treat more patients (Darfler, Urada, and Sandoval, under review). A recent report (Rowan, 2019) indicates that buprenorphine prescriptions in California have increased nearly four-fold from 2014-2018, while methadone prescriptions have remained stable, yet still prescribed at much higher levels than buprenorphine. According to these data, access to treatment is expanding for OUD.

The implementation plan for H&S has been responsive to the needs of the network, as topics and requests arise especially during Learning Collaboratives, where hub and spoke staff problem-solve challenges and generate solutions to issues that arise when implementing MOUD in their programs. The questions of how to address pain in someone taking a partial or full agonist medication for opioid use disorder and how to address treatment in pregnant women both arose multiple times across regions and training events as important topics requiring more training. Providers benefit from the opportunity to interact with one and other, ask questions to more experienced colleagues, and learn from their peers. Another area that has continued to arise as an important topic is stigma. Even after many trainings and discussions of stigma, people working in the treatment community and health care system still believe that taking medications for opioid use disorder is "substituting one drug for another," and "patients should be tapered from medication as soon as possible." Trainings will continue to emphasize empirically-supported best treatment practices, address addiction as a chronic disease (McLellan et al., 2000) and use person-first, non-stigmatizing language (Ashford et al, 2018) when speaking about substance use disorders.

As the H&S project continues, implementation support and technical assistance will focus on the needs of the spokes. Feedback from stakeholders and survey data suggest technical assistance will focus on these areas: continue to support new prescribers with mentoring by expert facilitators and case consultation on Project ECHO; develop and refine systems to increase sustainability, e.g., with the nurse care model (LaBelle, Han, Bergeron, and Samet, 2016) that maximizes the effectiveness of the multidisciplinary team and more coordinated systems of care; educate more pharmacists about buprenorphine to remove pharmacy barriers to patient access to medications; provide more training on treating comorbid psychiatric disorders, so mental health clinicians and treatment systems can better address the complex mental health needs of people with OUD.

The H&S model is increasing access to MOUD across California, with a comprehensive implementation plan to support prescribers, treatment teams, and health care settings create the changes needed to save lives in their communities. Further evaluation (Darfler, Urada, and Sandoval, under review) will determine the overall impact over time.

Acknowledgements

Acronyms

DATA 2000	Drug Addiction Treatment Act of 2000
DHCS	Department of Health Care Services
FQHC	Federally Qualified Health Center

H&S	Hub and Spoke
OBOT	Office Based Opioid Treatment
OTP	Opioid Treatment Program
MOUD	Medications for Opioid Use Disorders
MAT	Medication Assisted Treatment
UCLA	University of California Los Angeles

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Highlights

- California's Hub and Spoke model increases access to opioid use disorder treatment

- Prescribers and treatment teams receive implementation support

- Activities focus on increasing number and skills of prescribers and teams

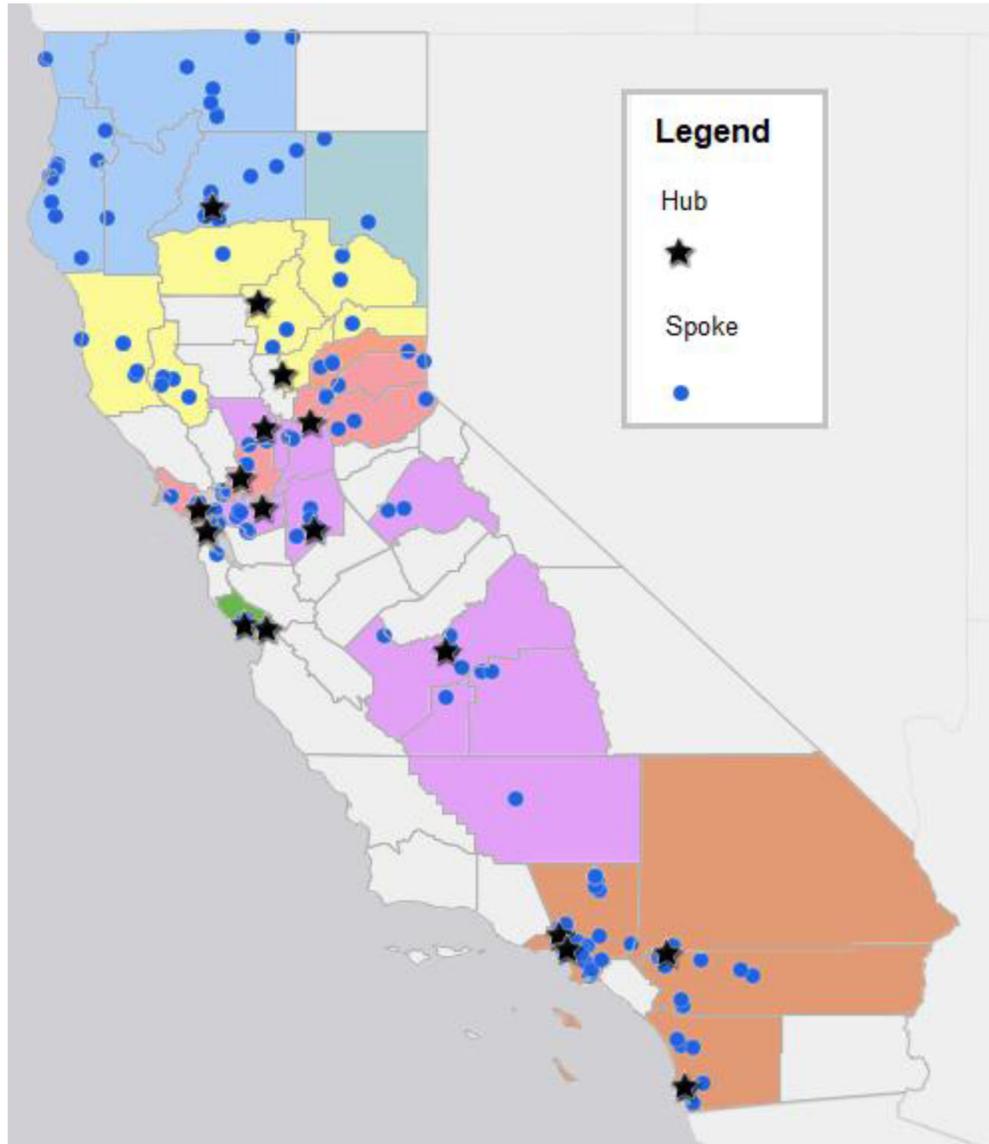- Training and technical assistance include in person and distance learning

Figure 1.
Map of California's Hub and Spoke system, by region
Map illustrates the geographic reach of the California Hub and Spoke system. Shading
represents the six regions. Stars represent the 18 Hubs and dots represent spoke locations.