Barriers for Implementing the Hub and Spoke Model to Expand Medication for Opioid Use Disorder: A Case Study of Montana

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ABSTRACT

PURPOSE: Access to medication for opioid use disorder (MOUD) varies across the rural-urban continuum. The Hub & Spoke Model (H&S) emerged to address these gaps in service whereby hubs with staff expertise in MOUD support delivery of specialized care to a network of spoke locations, often located in rural communities with workforce shortages. This paper presents a case study of efforts to implement the hub and spoke model in a frontier and rural (FAR) state: Montana.

METHODS: The primary data are structured interviews with 65 MOUD program staff in hub and spoke locations within Montana. Both inductive and deductive coding were used to analyze the transcripts.

FINDINGS: Using the H&S structure to expand access to MOUD in Montana led to mixed results. There were consistent themes identified in the interviews about the reasons why hubs struggled to successfully recruit spokes, including (1) geographic barriers, (2) a lack of interest among medical providers, (3) fears about excessive demand, (4) concerns about the financial viability of the model, and (5) a preference for informal technical assistance rather than a formal H&S relationship. In addition to these 5 themes, efforts to implement H&S across different medical systems were unsuccessful, whereas the H&S model worked more effectively when H&S locations were within the same organization.

CONCLUSION: This case study identified limits to the H&S model utility in supporting states' abilities to expand access to MOUD treatment and offers suggestions for adapting it to accommodate variation across divergent rural contexts. We conclude with recommendations for strategies that may assist in expansion of MOUD in rural communities that are like those found in Montana.

KEYWORDS: Medication for opioid use disorder, opioid use disorder, hub and spoke model, drug policy

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Introduction

Since 2000, the U.S. experienced a dramatic increase in the opioid-related mortality rate.[1] Spatial disparities in the effects of the epidemic[2] are driven not only by supply factors and socioeconomic distress,[3] but also by differential access to prevention and treatment.[4,5] In particular, structural barriers make addressing opioid use disorder (OUD) more challenging in rural contexts. Addiction treatment resources and physicians are disproportionately clustered in urban areas, leaving rural patients underserved.[5,6] Moreover, the standard of treatment for medication for opioid use disorder (MOUD) often requires daily or weekly appointments, a logistical barrier that is more impactful in the rural West, where long travel distances far exceed other rural areas of the United States.

The Hub and Spoke (H&S) model of care delivery was developed to improve access to MOUD within rural communities, with the most notable success being seen in Vermont.[7] It has since been widely adopted for MOUD across other states,[8,9] yet detailed studies about the adoption and implementation processes of this model have just recently gained attention, such as those in California.[10,11] Yet, little is known about these processes for frontier states like Montana: designated as Frontier and Remote (FAR) by the federal government due to small populations and geographical remoteness.[30] Drawing on interviews with 65 staff in MOUD programs across 10 MOUD providing organizations, this paper fills that gap by chronicling the implementation of the H&S model in Montana, where the model had limited success as several hub sites were unable to establish hub-spoke partnerships, which in turn, limited the availability of MOUD.

Medication for opioid use disorder

MOUD can be used as part of comprehensive OUD treatment programs to help decrease OUD and prevent opioid-related deaths by reducing the effects of opioids and subsequently reducing cravings.[10] It has been shown to be more cost-effective than non-medication approaches.[11] Physicians wishing to use MOUD complete training and apply for waivers from the Drug Enforcement Administration (DEA) and the Substance

Abuse and Mental Health Services Administration (SAMHSA) in order to prescribe methadone, buprenorphine, buprenorphine/naloxone, and/or naltrexone as part of an OUD treatment program.[10,12]

Spatial disparities in access to MOUD have led to calls for greater integration of treatment into primary care settings to improve access, especially for rural patients.[13] To support this type of expansion, the federal government initiated several changes, including the Substance Use Disorder Prevention that Promotes Recovery and Treatment for Patients and Communities (SUPPORT) Act of 2018. It expanded eligibility for acquiring a waiver to physicians' assistants and nurse practitioners, enabling them to prescribe buprenorphine to treat OUD. Even with these changes, access to MOUD continues to be limited in many rural areas. While 98% of urban Americans live in counties with a buprenorphine prescribing provider, the same is true for only 70% of rural Americans. The disparity is greater in specific rural areas, as the bulk of counties with no buprenorphine providers are in central portions of the United States from Texas to Montana.[4]

Implementing and sustaining MOUD outside of traditional addiction treatment centers is challenging for several reasons. Prior research has shown that provider recruitment and training,[14-16] care delivery,[14] client retention,[17] and staff support[18] are critical to a successful MOUD program. Inversely, when these elements are not done properly, they can prove to be barriers for successful implementation of MOUD programs.

Hub and spoke as a delivery model for MOUD

The H&S model was first used as an organizational approach for MOUD delivery in Vermont to improve access to addiction treatment in rural areas in both primary care settings and specialty addiction care settings.[7] The H&S model in Vermont achieved success, yielding 7 hubs and 77 spokes by 2019.[19] The hubs are typically opioid treatment programs (OTPs)—but can also be emergency rooms, community health programs, or departments of corrections—with prescriptive authority to facilitate intensive outpatient care to stabilize patients and provide continued care for patients with complex cases.[7,20] Spokes act as medical homes housed typically within primary care settings.[20] Once patients are stabilized at hubs, spokes provide office-based opioid treatment. Spokes receive consultative expertise and screening support from the hub as well as from MOUD teams—which consist of at least 1 full-time registered nurse and 1 master's level licensed behavioral health provider.[7,21]

The existing evidence-base demonstrates that in most cases, the H&S model has been successful at expanding access to MOUD, particularly in rural contexts.[8,9,30] However, there remains a gap in the scientific literature about the processes by which an H&S model is implemented within a frontier, rural state, and any associated challenges. This study examines how MOUD providers experienced the roll out of the Hub and Spoke model in Montana. The study's conclusions may aid state agencies and healthcare organizations that provide MOUD in states with the lowest waiver capacity as they consider innovations to the H&S care delivery models to further address the opioid crisis in these states.

Methods

Montana context

Relative to the nation, Montana has had a low age-adjusted rate of opioid-involved deaths, with 3.6 deaths per 100 000 persons as compared to the national average of 14.6 deaths per 100 000 persons in 2017.[22] The estimated share of Montanans with a pain reliever use disorder, however, is comparable to national estimates (0.72% and 0.63% respectively).[23] Access to prevention and treatment programming for individuals with OUD in Montana is hindered by the geography, weather, and limited OUD treatment and mental health services availability.[24,31] Montana ranks second, behind Alaska, in share of land (79%) designated as a FAR area and second, behind Wyoming, for the largest share of residents (53%) living in FAR zip codes.[31]

Within this FAR context, the State Targeted Response (STR) grant program goals were intended to efficiently and effectively utilize federal funding to ensure that the rate of opioid-involved deaths remained low, and access to treatment increased for those with an OUD. To tackle these goals, the STR grant program in Montana adopted the H&S model. Five sites were recruited as hubs. Hubs were expected to recruit between 3 and 5 spokes each, for a target goal of 20 to 30 new MOUD locations across the state. Hubs were a mixture of critical access hospitals, federally qualified health centers, and substance use disorder treatment centers. Hubs could recruit spokes that were inside or outside of their medical organization—which was dissimilar to the Vermont H&S model but paralleled approaches taken by other STR grantees, specifically the state of Washington.[9] During the recruitment phase, 3 hubs were unable to successfully recruit spokes, and 2 hubs were able to recruit spokes. The inability of all hub sites to successfully recruit spokes resulted in a lower-than-expected expansion of provider capacity and is the primary focus of this study. Hubs were freely able to recruit spokes, with support from grant-funded state agency staff. Hub staff reported to the research team that recruitment strategies included phone calls, presentations to potential spoke leadership, and distribution of educational materials about MOUD and the H&S structure. Hubs were not provided financial incentives for successfully securing spokes.

Study recruitment and participants

All study participants were sites funded by the STR grant program and were recruited as part of a process evaluation designed

Table 1. Study locations and interviewee staff positions.

HEALTH CENTER NAME	PROVIDER PARTICIPANT ROLES
Hub A	Program Director, Program Manager, MSN, Care Coordinator, LCPC, Peer support specialist, Prescribing Provider, Prescribing Provider, LCPC, COO
Hub B	Care Manager, Grants Manager, RN, Program Manager, Support Staff resistant to MAT, LAC, Prescribing Provider, APRN, Peer support specialist
Spoke B1	APRN, CEO, Care Manager, RN, LAC
Hub C	Clinical supervisor, Receptionist, MAT Coordinator, LAC, Peer support specialist, CEO, LAC, LAC, APRN
Hub D	CEO, COO, Behavioral health manager, MAT program coordinator, Care manager, APRN, RN, MAT Director, RN, Peer support specialist, LCPC, Prescribing Provider, MA
Hub E	CEO, Behavioral Health Director, MAT Program Coordinator, Prescribing Provider, Care Coordinator, LAC, RN, Grant Manager, Peer support specialist
Spoke E1	Prescribing provider, RN, Care Coordinator, Program manager, RN
Spoke E2	Care Coordinator

to examine MOUD program implementation effectiveness at each of the STR funded treatment provider sites in Montana. The lead evaluator contacted each site by email, providing a list of staff positions who were to be interviewed. MOUD program staff were encouraged to participate by the state's program officer through a letter of support and then contacted by the study's principal investigator (PI) over email and then by phone. The list of staff to be interviewed included the care coordinator, program manager, executive leadership (CEO/COO), prescribing providers and behavioral health staff at each STR-funded site. In total, across the 8 sites, 65 interviews were completed. Table 1 breaks down the professional roles of each participant and their corresponding hub location.

Analytic procedures

Semi-structured qualitative interviews with staff at the 8 STR-funded sites in Montana were the primary means of data collection, including the 5 intended hub sites: Hub A, Hub B, Hub C, Hub D, Hub E, and 3 established spoke sites: Spoke B1, Spoke E1, Spoke E2. Each interview took approximately 1 hour and was completed in person during 2019. All interviews were audio recorded, transcribed, and coded by 2 members of the research team. The process of using multiple coders is intended to ensure a higher degree of coding reliability.[25] After an initial round of coding by each coder, coding discrepancies were addressed through a deliberative process among the coders until agreement was reached among the 2 coders.

Data were analyzed using initial coding which allowed us to "remain open to all possible theoretical directions indicated by [. . .] the data."[26] Through initial coding the coders identified the theme "Lack of Interest" for the H&S model in Montana. Then, during a second stage of focused coding, coders delineated sub-categories that helped to clarify why sites were not interested in being spokes, including: (i) geographic barriers, (ii) fear of excessive demand, (iii) financial concerns, and (iv) preference for informal assistance versus a formal H&S relationship. Initial coding also revealed "Health System" either enabled/constrained the hub and spoke relationship. Focused coding revealed (i) hubs and spokes within affiliated health systems facilitated the H&S relationship, while (ii) unaffiliated medical organizations emerged as a barrier for H&S implementation.

All results have been deidentified and the sites have been assigned letters A-E to protect anonymity. The study was submitted to Western IRB for approval and received an exempt status (Approval #: 13093595). All participants were provided with an informed consent form stating that their participation was voluntary, and verbal consent was given by all participants. Quotes presented in the body of the article have been lightly edited for clarity.

Results

The results are largely drawn from the barriers facing hub site staff who were unable to secure spokes. However, not all efforts to recruit spokes were unsuccessful, and the results section concludes with an overview of the processes by which 2 H&S relationships were established.

Lack of interest

Disinterest among potential spokes stymied the implementation of the H&S model in Montana. In the subsequent sections we elaborate on the 4, emergent, reasons for why hubs were unable to recruit spokes. Some of these, such as geographic barriers and fear of excessive demand may be unique to FAR areas, while others, such as financial concerns and preference for informal assistance are likely to be experienced more widely among potential spoke sites in any geographic location.

Geographic barriers. Montana is the fourth largest state in geographic size and contains a population of just over 1 million residents. Within this rural, frontier state, participants highlighted population density and geography as limiting factors for the H&S model's effectiveness. Indeed, Montana's geographic context and the historical lack of availability of integrated behavioral health (IBH) options along the continuum of care is in sharp contrast to that of Vermont's. One Hub D participant directly commented on how Montana differs from Eastern states:

> *But in terms of the Vermont model. You know I think some feedback I would give to people is if you look at our geography and look at their geography, there is just no way to even compare. I mean I know they*

think it's rural but compared to us. . . no, it's not, it's just not. And they have all these drop-in centers and they have so many more resources than we do—you know, sober living houses and I mean we just don't have anything. It's just completely different, it's just not the same at all.—Director of Behavioral Health

This participant focused on the way in which many Montana communities lack the continuum of care and wrap around services present in other states for people suffering from behavioral health complications. She further elaborates by noting how the gap in broad services may be both related to financial resources as well as the difference in what rural geography means in a state the physical size of Montana in contrast to Vermont.

Staff at each hub made multiple presentations about MOUD and engaged in extensive conversations with several potential spoke sites, but 3 of 5 hubs were unable to secure a spoke during the STR timeframe. Another participant echoed similar sentiments, saying the *"East Coast Model"* may not be well-suited to the geography and communities in Montana due to the higher degree of remoteness. For example, an LAC at hub E stated, "We provide services to a population spread across about seven and ten thousand miles, and there is very limited services within that. We have the spoke clinics but they have two providers. IHS [Indian Health Services] has very limited services and then it's Billings or it's Sheridan." For context, the geographic area referenced by this participant covers a 15-county area in Eastern Montana.

Each of these respondents expressed that although the H&S model was designed to mitigate the challenges associated with providing access to MOUD in rural areas with low population densities, and shortages of waivered providers, the Montana version of these barriers was viewed as unable to be overcome by the H&S model among potential spoke site staff.

Fear of demand. Potential spoke sites were unwilling to contract as a spoke due to a concern about the potential demand for MOUD services and a lack of staff availability and training to meet that demand. The challenge to meet the demand was substantiated by staff at spokes who experienced this reality. A waivered provider at spoke E1 stated:

When she started, we really had to go into this slowly, because we couldn't be inundated at once[. . .]I mean, we want to help as many people as possible. But we're all a little [hesitant] to advertising 'we now have a Suboxone program' because, you know, sometimes when you're successful you can't get too successful too quick because it loses the quality of the care.—Waivered provider

The demand for services, coupled with the lack of behavioral health staff dissuaded interest in becoming spokes. For example, Hub D was slated to become a hub for 2 sites, however, the lack of medical staff challenged the hub's implementation of the H&S program and neither of the planned sites materialized. This is a concern that was echoed by an active spoke care coordinator at E2, who stated:

We really struggle with staffing here. There's a lot of turnover. [. . .] Because we really do struggle here to get support from the administration to hire people. To hire more social workers or counselors.—Care coordinator

The inability of healthcare clinics in Montana's FAR regions to recruit and retain qualified healthcare professionals shaped their willingness to participate in the H&S model. In some areas, clinics struggled to retain qualified staff to provide primary care and other essential services. In other cases, potential spokes lacked interest because they feared they would transition to *only* treating addiction in their communities, causing them to neglect other important needs, a fear exacerbated by the small staff size. In a few other instances, staff feared their sites would become stigmatized as "a place for addicts." One participant from Hub A states:

It seems like the initial meeting of trying to develop the spoke, that was really hard because I know we reached out to a lot of different places at least try and say to them, "Can we at least come and talk to you guys about it?"[. . .]I think there still is a pretty big stigma, and people don't want to treat—they don't want to consistently be just treating addicts.—CEO

After developing procedures and expertise with the program, Hub A tried to recruit additional spokes but was unsuccessful after 4 separate attempts. According to participants, the lack of reliable staffing for healthcare services throughout rural Montana and potential for high demand for addiction treatment among a stigmatized population prevented many clinics from participating as spokes.

Financial concerns. Hubs were unable to demonstrate to potential spokes the financial benefits of participating in the STR program and how it would benefit their bottom line. The financial structure of the H&S model concerned Hub A's potential spokes, as staff reported that they lacked the basic information required to support a spoke site as they attempted to evaluate the financial solvency of providing MOUD. In 1 location, they reported how the potential spokes had initial interest but were unable to grasp how the financial structure would enable them to implement the program:

As I said, it's cost[. . .] and we pencil out to the point where we are, for a clinic, doing well. That means break even or a small margin for us[. . .]I think it's a huge win [knowing the financial balance]. Because I didn't have that information to go to Spoke X [. . .]I didn't have that information to go to a Spoke X or to Spoke Y or to Spoke Z and say, 'Hey, I've got something that is going to solve some of your problems, clear up some of the headache [of trying to make the financial decision].'—CEO

After the success in demonstrating financial solvency, staff at Hub A believed they may be able to be more successful at encouraging additional programs to consider being spokes or to become their own hubs, as a behavioral health director at spoke B1 site mentioned: "We are a spoke to the Hub B. And

so, money gets filtered through there. If we could be independent. . .we could definitely structure a way to maybe capture the reimbursement sources that might be out there. And two years is forever, you know? In the money world." This participant shared that while some sites lack the staffing capacity to run their own program, being a hub may have financial benefits that spokes are unable to reap.

Informal technical assistance versus H&S. Clinic staff at spokes shared how the expertise provided by hub staff during the initial implementation was invaluable and essential to their success. However, in some cases they forged a relationship around informal technical assistance as opposed to a fully adopted H&S model. For example, staff at spoke B1 shared how their frequent contact with their hub mentor, Dr. Smith, declined overtime and demonstrated their growing expertise and confidence with the program. For example, a prescribing provider described that support from the hub shifted from weekly to only being used for advice on specialty cases: *"We were talking with Dr. Smith every week and now it's every other week. And sometimes it's once a month[. . .]And really, Dr. Smith's wonderful. I've been so fortunate to be able to call Todd when I have questions, not just about Suboxone but about psychiatry."—Waivered provider*

Hub A exemplifies this adaptation toward a technical assistance model of mentorship, in contrast to formal treatment relationships. As Hub A recruited core program staff, the leadership and treatment team reported a need to quickly learn the MOUD program components. They did so by reaching out to experts at Hub E, and by engaging the technical assistance provided via STR funding by Todd and Emily Smith.

> *And so, we went there and kind of witnessed their programs [at Hub E]. And had lots of phone calls with both Dr. Smith and Emily. We were able to just bounce things back and forth. Like, "Hey, we have this issue. What do you guys think?" And so, they were really important to us getting started[. . .]So realistically, it's almost like we started as a spoke for them, but it developed and we're now on our own.—Waivered provider*

These experiences led 1 participant to highlight that rather than a H&S model across multiple health systems, the state may be better able to expand MOUD via a mentorship program for staff at smaller locations. As 1 participant at Hub A states:

> *I think you could go to not having hubs and spokes. Like I don't feel like you need to [. . .] if Hub_A_ can do it, if we can be a hub in [town name], I think you could be a hub in Glasgow, Montana[. . .]I don't know why they couldn't. They've got the same issue up there that we do[. . .]but you could keep an LAC busy in all these different areas, and you can at least have your physicians take the minimum Suboxone training.—CEO*

In this way, Hub _A_ was highlighting how the H&S program structure may not be necessary for supporting the expansion of MOUD programs in rural communities in Montana. Rather, technical assistance aimed at supporting the initial implementation of the program may be both sufficient and better suited for the needs of small, rural medical care settings.

Advantages of affiliated health system

None of the hubs in Montana implemented the H&S model consistent with the Vermont model's structure: centralized hub sites completing inductions and spokes providing ongoing care. However, 2 of Montana's hubs were able to successfully start spokes where they cultivated administrative relationships and provided staffing support via telehealth. Overall, interview participants concluded that the adapted H&S model worked best within a single health system with multiple locations. As this rural Behavioral Health Manager at Hub E described "The reason we are set up as a spoke within just our own agency's sites is that we knew we needed to maintain that control: quality control, information control, patient care control. So, our spoke cites are [our] sites." The observation that sites within the same organization exert more control over treatment procedures aligns with the experiences of hubs unable to recruit spokes from other health system organizations. A care team member from Hub D commented on the challenges facing unaffiliated health systems: "We reached out to a few. And we've tried to figure out how to partner, and that would've been a challenge because, right now, their pharmacy will only accept prescriptions written by a tribe." Creating hub and spoke partnerships within 1 health system eliminates bureaucratic complications such as those with Indian Health Services described by the care team member at Hub D. One health system also simplifies billing and eliminates concerns over competition for STR grant funds while providing much needed staff support and technical expertise to isolated care locations.

Discussion

The effort to expand access to MOUD in Montana through a H&S delivery model was largely unsuccessful and highlights the challenges facing FAR areas seeking to expand MOUD access. Montana's lack of healthcare infrastructure, low staff capacity for behavioral health care providers, unique geographic barriers, and low population density create differential access to prevention and treatment, as is consistent (or if more extreme) than prior patterns observed in studies on rural access to MOUD.[5,18] Mitigating the concern about the effects of these barriers proved to be the most significant barrier in efforts to expand MOUD access through H&S relationships. The geographic distances that are required for individuals to complete an intake at a hub and then have their care transferred to a spoke was immediately dismissed as being impractical for patients in Montana. This finding is consistent with recent system evaluations of the implementation of the H&S model in California where geography also proved to be a barrier.[10] The inability of hubs and potential spokes to reconcile this conflict

further exacerbates the lack of care available in Montana and is a pattern that is also affecting other rural areas.[4-6]

Just as geography limits the amount of care available in FAR areas, the spatial disparities surrounding access[13] also contribute to fears of excessive demand, which paradoxically limited the willingness of potential spokes to participate in the grant program. Participants in this study shared that the fear of not being able to handle the demand for OUD treatment with their limited staff, both made it difficult to recruit spokes, and remained a concern even among sites that decided to participate as a spoke. This specific finding aligns with broader observations made by Andrilla et al[18] who have found that staff support is critical to a successful MOUD program. As others have found, expanding treatment is predicated on having adequate, qualified healthcare staff.[14,15] Participants shared administrative concerns about overburdening staff, and changing the perceptions of their clinic toward 1 that treated "addicts" contributed to spokes choosing to not participate in the program. This concern about stigma echoes recent findings in other western states where urban hubs failed to recruit rural spokes.[11] Administrators at healthcare organizations that serve FAR regions are aware of the risk to their workforce and view new care delivery models through the lens of concern about decreasing staff support due to MOUD expansion.

The concerns participants in this study shared about how potential spokes focused on the financial model of MOUD was not unexpected and aligns with existing knowledge about challenges providing behavioral healthcare, especially in rural communities.[27] As noted by 1 participant, spoke collaboration may hinge on hub sites providing financial details to potential spokes during the recruitment phase. Many hubs struggle to disclose ever-present changes and adjustments made to the healthcare billing structure and reimbursement bundle rates for OTP providers in state Medicaid programs during the recruitment phase. State agencies and federally funded technical assistance centers may be better positioned to provide general overviews of MOUD billing and program financing to hubs, who can complement these resources with their organizational experiences. This theme—the presence of financial challenges within the functioning H&S sites—is consistent with existing studies of H&S networks.[19]

One of this study's key findings was the strong preference for spokes to receive informal support in the form of direct technical assistance rather than entering a formal H&S relationship. The assistance came in the form of how they should structure the program, with the ability of prescribing providers to have occasional consults for complex patients. Sites shared a desire to retain the latitude of independent providers and orient themselves around becoming independent providers with autonomy and little reliance on the hub. This provides some insight into the type of support that rural providers, especially primary care settings, could use in future efforts to expand MOUD access in FAR areas. A bridge model wherein rural spokes rely upon the hub location during the implementation phase and then transition to become independent providers may work better in FAR locations where new buprenorphine prescribers show an interest in mentorship before developing independence.[11]

Finally, the 2 Montana hubs that successfully implemented the H&S model illuminate how organizational alignment can affect H&S success: both H&S relationships took place within a single health system that had multiple office locations. This occurred even though Montana's primary strategy was to support the development of H&S networks across health system boundaries to promote MOUD access in high-risk areas. This finding is consistent with prior work,[28] as they recognized that the relationships among H&S networks require a shared understanding of program design, structure and billing which may be easier to accomplish among sites that belong to the same medical organization.

Limitations

This study is limited by the focus on a single state and Montana's unique characteristics. The findings indicate that the H&S model, while found to be successful in other states,[7,11] was largely not successfully implemented in this frontier and rural state. The findings and recommendations may not be generalizable to other FAR areas and states, but they may provide clarity for why other large, sparsely populated frontier states struggle to establish MOUD programs.[4] One way to strengthen this study's findings would have been to interview staff from potential spokes who declined the opportunity to partner with hubs; instead, due to the design of the original study, our findings largely encompass the perspectives of hub staff who failed to recruit spokes. This limitation is, in part, due to the origin of the study, as the qualitative data used for this analysis was included in a process evaluation of the *successful* hubs and spokes in Montana.

Implications

The findings from this paper yield several considerations for policy and program implementation. First, while the H&S model was largely successful in Vermont, large, sparsely populated FAR regions and states are likely going to need to adapt the model as a strategy for expanding access to MOUD. The most appropriate model should be *place specific*, and take into account "available expertise, the population being served, proximity to an addiction center of excellence, reimbursement policies, and geography."[29] Second, while adapting the model to fit particular contexts may be advantageous, in the case of Montana, easing requirements for H&S partnerships between different types of organizations, and instead focused on geography, may have created additional burdens for the recruitment process. Third, medical providers should consider potential adaptations of the H&S model whereby established sites provide the much-desired technical assistance to satellite providers without the commitment of a formal partnership. Fourth, more

attention should be given to easing providers concerns about stigma and the interaction stigma has with fear of burdening a small workforce. The extent to which provider and expert engagement with leaders of healthcare sites in FAR region communities could ameliorate stigma and negative perceptions is 1 area of potential opportunity.[32] Finally, implementation of the H&S model was limited by a lack of information about the mechanisms of MOUD integration in primary care settings, specifically funding and the financial model. Since the STR grant period began, integration of MOUD into primary care settings has greatly increased across the country, as has the total number of eligible medical providers with a waiver for prescribing MOUD medications (specifically, Buprenorphine). States that continue to work to expand access to MOUD could benefit from spoke recruitment resources for hubs that are based upon the growing scientific literature on the structure of MOUD program models as well as clearer documentation of MOUD financing.

Conclusions

The attempt to use the H&S structure to expand access to MOUD in Montana led to mixed results. Hub staff who engaged potential spoke sites during the exploration phase shared how concerns about geographic barriers, fear of demand, financial concerns, and program structure limited their ability to recruit spokes. These difficulties resulted in zero spoke sites recruited to coordinate with 3 of 5 hub sites. H&S pairs within single health systems did solidify relationships in multiple underserved locations. For these H&S networks, no sites reported true replication of the Vermont model with the hub providing intake and the spoke providing ongoing care. This was due, in our assessment, to both the geographic barriers of implementing H&S in a large, frontier state, and the expansion through the SUPPORT Act of what types of medical providers could gain a waiver for buprenorphine. Expanding access to the waiver decreased the demand for a centralized prescribing provider. The findings suggest that the value of the expansion may be greater in rural communities, as many primary care offices are staffed with nurse practitioners, rather than medical doctors. As the state of Montana has continued to support sites, the technical assistance model of support has remained invaluable, offering insight into dynamics and factors that other states should consider as they expand MOUD to rural clinics and providers.

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