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The Hub and Spoke Solution:
A Much-Needed Answer to Tennessee's Opioid Crisis

Ryne Tipton

Chancellor's Honors Thesis

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May 4, 2020

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Introduction

Despite fading from political discourse since the 2018 midterm elections, the opioid crisis remains one of the most serious public health crises facing the United States. Even though the country has witnessed a decrease in the rate of opioid addiction, there has been an increase in the overall number of drug overdoses.¹ Tennessee has served as no exception to the national trend, witnessing 1,818 opioid-related deaths involving in 2018—a record.² Despite a decrease in prescribing rates, Tennessee remains one of the leading states for opioid prescriptions per 100 persons, a factor that contributes to our high level of overdose deaths.³

Though the state has made some progress in tackling this crisis, including the passage of an opioid reform initiative known as TN Together, efforts at expanding treatment for those suffering from opioid-use disorder have been lackluster. Despite the fact that the TN Together initiative committed \$26 million towards the expansion of opioid-use disorder programs, including efforts to “[ensure] TennCare members with OUD have access to high-quality treatment options,”⁴ Governor Bill Lee has maintained a public policy approach that compromises the state’s already meager efforts towards providing access to opioid-use disorder treatment. This public policy approach contains two problematic components: opposition to Medicaid expansion and support for turning TennCare into a block grant. The state loses nearly

¹ *Understanding the Opioid Epidemic*, directed by John Grant (2018; Buffalo, NY: WNED-TV, 2018), <https://www.pbs.org/wned/opioid-epidemic/watch/>.

² WBIR Staff and WMC Memphis, “Tennessee Department of Health: Opioid deaths rose to another all-time high in 2018,” WBIR: 10 News, October 23, 2019, <https://www.wbir.com/article/news/local/od-epidemic/tennessee-department-of-health-opioid-deaths-rose-to-another-all-time-high-in-2018/51-a035a969-fe98-43aa-be36-a22219eaac9f>.

³ National Institute on Drug Abuse, “Tennessee: Opioid-Involved Deaths and Related Harms,” National Institute on Drug Abuse, April 2020, <https://www.drugabuse.gov/opioid-summaries-by-state/tennessee-opioid-involved-deaths-related-harms>.

⁴ Office of Inspector General, U.S. Department of Health and Human Services, “FACTSHEET: Tennessee’s Oversight of Opioid Prescribing and Monitoring of Opioid Use,” February 2019, https://oig.hhs.gov/oas/reports/region4/41800124_Factsheet.pdf.

\$1.4 billion in revenue per year due to a lack of Medicaid expansion—revenue that could aid in expanding OUD treatment.⁵ If the state’s requested block grant waiver is approved, it could permit (and even encourage) the state to eviscerate the entire program—to target benefits to certain groups at the expense of others and to eliminate entire classes of beneficiaries.⁶ Even if the \$26 million placed towards OUD treatment is maintained, it cannot be effectively utilized as hospital closures continue to plague the state, another consequence of the state government’s refusal to back Medicaid expansion.⁷ It is likely that the problem of hospital closures will be further exacerbated if TennCare is turned into a block grant; the collateral damage will be those suffering from opioid-use disorder.

It is clear that this state needs an alternative strategy in dealing with its opioid crisis. Other states have invested in Medicaid-based treatment programs with promising results. In particular, Vermont has been a national leader with its own approach towards opioid-use disorder treatment: the so-called “hub and spoke” model. In this model, opioid-use disorder treatment is handled in a manner that is analogous to infectious disease treatment: “spokes” are allowed to engage in medication-assisted therapy but deal with less complex cases while “hubs” offer intensive care and daily therapeutic support. If a patient is doing well and needs less intervention, that patient can be sent to a spoke (usually a primary care office or family medicine practice) in order to receive treatment. If a patient is in need of serious care, the patient can be sent to a hub (a center that specializes in addiction treatment) to receive care. Patients can move between hubs

⁵ Tennessee General Assembly Fiscal Review Committee, “Fiscal Note: SJR 94,” March 23, 2015, <http://www.capitol.tn.gov/Bills/109/Fiscal/SJR0094.pdf>.

⁶ Sara Rosenbaum, Alexander Somodevilla, Morgan Handley, and Rebecca Morris, “Inside Tennessee’s Final 1115 Block Grant Proposal,” *Health Affairs*, December 6, 2019, <https://www.healthaffairs.org/doi/10.1377/hblog20191205.927228/full/>.

⁷ Richard C. Lindrooth, Marcelo C. Perraillon, Rose Y. Hardy, and Gregory J. Tung, “Understanding the Relationship Between Medicaid Expansions and Hospital Closures,” *Health Affairs* 37 no. 1 (2018): 111-120, accessed April 27, 2020, doi:10.1377/hlthaff.2017.0976.

and spokes as their needs change, ensuring that they have access to care that is tailored to their needs. By implementing a “hub and spoke” model of opioid-use disorder treatment, Vermont has managed to dramatically increase enrollment in opioid treatment, from 1,751 people in January of 2014 to 3,148 in July of 2017.⁸ According to *Vox*, approximately 8,000 people participate in the program as of 2020.⁹ A preliminary analysis of the program showed reduced costs as a result, even taking into account the increased cost associated with providing patients medication-assisted therapy.¹⁰ Other states are now following suit and copying Vermont’s model, including California, Washington, and West Virginia.

The success of Vermont’s program provides Tennessee with a blueprint for public policy changes that could (and should) be made to deal with the opioid crisis. Medicaid expansion was crucial for its implementation: by absorbing the costs of new Medicaid enrollees, the federal government was able to also shoulder most of the burden in paying for medication-assisted therapy.¹¹ By allowing those suffering from opioid-use disorder to receive treatment, Medicaid expansion also helped spur an increase in the number of providers needed to prescribe buprenorphine, thereby enhancing the capacity for care overall.¹²

⁸ John R. Brooklyn and Stacey C. Sigmon, “Vermont Hub-and-Spoke Model of Care for Opioid Use Disorder: Development, Implementation, and Impact,” *Journal of Addiction Medicine* 11 no.4 (2017), accessed April 27, 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5537005/>.

⁹ German Lopez, “I looked for a state that’s taken the opioid epidemic seriously. I found Vermont,” *Vox*, October 31, 2017, <https://www.vox.com/policy-and-politics/2017/10/30/16339672/opioid-epidemic-vermont-hub-spoke>.

¹⁰ Mary Kate Mohlman, Beth Tanzman, Karl Finison, Melanie Pinette, and Craig Jones, “Impact of Medication-Assisted Treatment for Opioid Addiction on Medicaid Expenditures and Health Services Utilization Rates in Vermont,” *Journal of Substance Abuse Treatment* 67 (2016): 12-13, accessed April 27, 2020, <http://dx.doi.org/10.1016/j.jsat.2016.05.002>.

¹¹ German Lopez, “I looked for a state that’s taken the opioid epidemic seriously.”

¹² Yusra Marad, “Study Suggests Medicaid Expansion Helps Boost Access to Opioid Addiction Drug,” *Morning Consult*, August 21, 2019, <https://morningconsult.com/2019/08/21/study-suggests-medicaid-expansion-helps-boost-access-to-opioid-addiction-drug/>.

For Tennessee to successfully increase the availability of opioid-use disorder treatment, and in turn, successfully manage its opioid crisis, the state needs a well-organized program of opioid-use disorder treatment supported by Medicaid expansion. In this paper, I will establish the viability of this approach by evaluating the success of other states that have implemented a hub and spoke model, proposing a specific hub and spoke model for Tennessee, evaluating financing options for the state, and analyzing its prospects.

Methodology

In order to put together this public policy proposal, I surveyed research regarding hub and spoke models in states outside of Tennessee, analyzed reports undertaken by ITEP (a left-leaning policy think tank), studied state financial data, and took note of other research articles and news reports as necessary. This thesis project required no human subjects and all ethical guidelines, including those involving citation of outside sources, have been adhered to.

A Review of the Hub and Spoke Model in Other States

Since the introduction of the original hub and spoke model in Vermont in 2013, several other states have implemented their own hub and spoke models to expand the availability of opioid-use disorder treatment for their citizens. These states include California, Washington, and West Virginia. Each of these states have reported success, especially in increasing the number of people who receive opioid-use disorder treatment, but each model has been unique. In order to properly evaluate the success of a hub and spoke approach for opioid-use disorder treatment, the characteristics and conditions associated with each state must be taken into account. Vermont provides the starting point for a proper analysis, since it possesses the oldest program (and in turn, possesses the most data that can be analyzed). Even though the experiences of the other

states remain important, West Virginia is a particularly useful reference for understanding what a hub and spoke model could look like in Tennessee, due to its geographic location in the Upper South and its conservative political leadership.

Vermont

Following the introduction of buprenorphine to the state in 2003, the use of medication-assisted therapy to treat opioid-use disorder expanded. Vermont utilized favorable Medicaid coverage and waiver trainings provided by the American Society of Addiction Medicine to increase treatment capacity,¹³ but the state quickly ran into obstacles. The state's system of opioid-use disorder treatment was not organized in an effective manner. Though Vermont had become the leading the state in the country in office-based opioid treatment (OBOT) providers per capita, physicians were only treating a small number of patients suffering from opioid-use disorder.¹⁴ There were several challenges that limited the utilization of the state's provider capacity: problems with reimbursement, a lack of support for office-based providers in dealing with difficult patients, and a lack of psychological services for those struggling with opioid-use disorder.¹⁵ These challenges prompted the state to develop the hub and spoke model.

Hubs, or specialized drug-use treatment facilities, serve as bases of expertise that take in complex patients, providing them not only with medication but with intensive psychological therapy and coordinated care. Hubs provide support for office-based treatment settings, the spokes, by receiving patients who destabilize in these settings and providing advice to practitioners working within the spokes. Vermont's hubs are organized on a geographic basis

¹³ John R. Brooklyn and Stacey C. Sigmon, "Vermont Hub-and-Spoke Model of Care."

¹⁴ *Ibid.*

¹⁵ *Ibid.*

with each hub clinic representing one of five regions.¹⁶ Hubs are usually the first in-take point for those suffering from opioid-use disorder¹⁷; after an overdose or severe episode, patients are referred from a point of entry (a mental health home, corrections facility, emergency room, etc.) to a hub for evaluation of their medical and psychiatric needs and for treatment. Providers at the hubs link patients with providers at the spokes for referral.

The primary aim of the system is to transfer patients from hubs to spokes.¹⁸ Spokes include a variety of office-based treatment settings involving family practitioners, psychiatrists, practitioners working in FQHCs (Federally Qualified Health Centers), hospital-owned practices, and so on.¹⁹ Each spoke is staffed with a medication-assisted therapy (MAT) team including a nurse and a behavioral specialist. MAT teams play a crucial role in the system—managing insurance claims, coordinating interactions between the spokes and hubs, evaluating patient needs (including housing and food) and providing counseling as necessary.²⁰ MAT teams have also been crucial for the proliferation of new spokes. If hubs find that their patients live in an area without office-based treatment options, MAT teams from other regions are activated to mobilize physicians in that area to sign up for certification to dispense buprenorphine.²¹

Financing for the system is largely conducted through Medicaid as most opioid-use disorder patients come from an income demographic that receives health insurance through the program.²² A Section 2703 waiver (contained within the Affordable Care Act) supports the entire hub-and-spoke system, allowing the state to designate the services provided by hubs and spokes

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ Ibid.

²¹ Ibid.

²² Ibid.

as “health home” services. This allows the state to benefit from a 90/10 split for the payment of services related to the hub-and-spoke model.²³ MAT teams supplied to the spokes are also financed by a 90/10 split; the spokes incur no cost as a result.²⁴

Medicaid expansion was crucial for the overall success of the program. According to an analysis performed by the Urban Institute, states that accepted Medicaid expansion—particularly Vermont—have witnessed a significant increase in opioid addiction treatment prescriptions in comparison to states that did not opt for expansion.²⁵ According to the authors of the Urban Institute’s study, the reason for this disparity is tied to Medicaid expansion’s effects on treatment capacity.²⁶ As more people gain access to treatment, pressures arise to increase the number of providers who provide medication-assisted therapy. This can be seen in Vermont’s use of MAT teams to “proselytize” and expand coverage; as demand increased within Vermont’s hubs due to Medicaid expansion, providers were encouraged to obtain waivers and overall treatment capacity increased. In this way, Medicaid expansion not only increased access to treatment through expanded coverage; it expanded access to treatment through a concomitant capacity effect. This creates positive externalities for the system as a whole, ensuring that those who already benefit from Medicaid—but lack office-based treatment options—gain those options. Without Medicaid expansion, fewer Vermonters would have had any access to treatment options including those already benefiting from Medicaid; the hub and spoke model’s impact would have been limited.

Results from Vermont have been positive. Vermont has managed to substantially increase its treatment capacity, while reducing wait times for treatment. The number of people in

²³ Ibid.

²⁴ Ibid.

²⁵ Yusra Marad, “Study Suggests Medicaid Expansion Helps Boost Access to Opioid Addiction Drug.”

²⁶ Ibid.

treatment expanded from under 1,000 people in January of 2013 to over 8,000 as of this year.^{27 28} From 2012 to 2016, the number of physicians with buprenorphine waivers increased by 64% (173 to 283), allowing more Vermonters to gain access to treatment.²⁹ Due to generous federal subsidization of the program, Vermont has experienced an overall cost savings. In 2014, the Department of Vermont Health Access projected a \$6.7 million cost savings from the time of initial implementation.³⁰ Researchers writing in the *Journal of Substance Abuse Treatment*, found that patients in Vermont treated through medication-assisted therapy (as a result of the state’s hub and spoke program) exhibited lower annual costs of treatment than those who did not receive medication-assisted therapy.³¹

California

Like Vermont, California recognized the inadequacies of its model of opioid-use disorder treatment. Unlike Vermont, California originally lagged behind the rest of the country in the number of OBOT physicians in 2013—ranking 24th in the nation.³² Though California managed to increase its number of waived prescribers in the following years, the state started to face the same problems as Vermont, especially in coordinating patient care. California also struggled with providing medication-assisted therapy in rural locations within the state. As a result, the state adopted a hub and spoke framework for managing opioid-use disorder therapy in 2017.

²⁷ John R. Brooklyn and Stacey C. Sigmon, “Vermont Hub-and-Spoke Model of Care.”

²⁸ German Lopez, “I looked for a state that’s taken the opioid epidemic seriously.”

²⁹ John R. Brooklyn and Stacey C. Sigmon, “Vermont Hub-and-Spoke Model of Care.”

³⁰ *Ibid.*

³¹ Mary Kate Mohlman, Beth Tanzman, Karl Finison, Melanie Pinette, and Craig Jones, “Impact of Medication-Assisted Treatment for Opioid Addiction on Medicaid Expenditures and Health Services Utilization Rates in Vermont,” 12-13.

³² Kendall Darfler, José Sandoval, Valerie Pearce Antonini, and Darren Urada, “Preliminary results of the evaluation of the California Hub and Spoke Program,” *Journal of Substance Abuse Treatment* 108 (2020): 26, accessed April 27, 2020, <https://doi.org/10.1016/j.jsat.2019.07.013>.

California's hub and spoke model has several unique features. One, the vast majority of the spokes involved in California's systems are FQHCs.³³ Two, most spokes were located in metropolitan areas and were often quite far from hubs. As a result, many spokes—particularly those located in rural areas—started to take on similar functions to hubs, including the treatment of difficult or complex patients.³⁴ Three, most of the patients involved in the program were initially treated with methadone rather than buprenorphine, though over time, there was a sharp increase in the number of patients treated with buprenorphine.³⁵ Four, initial funding for the program came from a SAMSHA (Substance Abuse and Mental Health Administration) Opioid-STR (State Target Response) Grant,³⁶ a federal grant given to states to experiment with approaches in combatting opioid-use disorder.

California's program has exhibited promising results. Treatment capacity has greatly increased since 2017. In August 2017, there were 57 spokes in California's network; by October 2018, 166 spokes had joined the system.³⁷ The number of waived providers also increased by 52.4% from August 2017 to October 2018.³⁸ From the baseline (August 2017), the number of patients treated monthly within the spokes increased from 141 to 327, a reflection of the state's expanded treatment capacity.³⁹ Even though the ability to treat those suffering from opioid-use disorder has dramatically increased, California continues to struggle with increasing the prescribing of buprenorphine among waived providers. This could be the result of the stigma

³³ Ibid, 28.

³⁴ Ibid, 29.

³⁵ Ibid.

³⁶ Ibid, 26-27.

³⁷ Ibid, 28.

³⁸ Ibid, 29.

³⁹ Ibid, 30.

associated with treatment of opioid-use disorder, fears surrounding the prescribing of buprenorphine, and legal obstacles.⁴⁰

Washington

Like California, Washington experienced problems with underprescribing of buprenorphine as well as a lack of rural OUD treatment providers. Using the same type of Opioid-STR grant as California, Washington embarked on an experimental hub-and-spoke program in 2018.

Washington's program exhibited two unique features. One, Washington allowed primary care physicians—not just addiction treatment centers—to qualify as hubs.⁴¹ Two, Washington borrowed from OUD treatment approaches other than the hub and spoke model, particularly the collaborative care model pioneered by Massachusetts. In line with the collaborative care model, Washington relied on nurse care managers to evaluate patients and monitor their progress.⁴² Both of these modifications to the hub and spoke model were used to make care more accessible. By allowing some groups of primary care physicians to be classified as hubs, Washington ensured that patients had more immediate access to medical practitioners with greater expertise; by shortening the distance that some patients would be required to travel, this approach helped to ensure patients received the treatment they needed. Likewise, reliance on nurse care managers to complement physicians ensured that more patients could be seen, treated, and monitored, thereby improving outcomes.

⁴⁰ Ibid, 29-30.

⁴¹ Sharon Reif, Mary F. Brolin, Maureen T. Stewart, Thomas J. Fuchs, Elizabeth Speaker, and Shayna B. Mazel, "The Washington State Hub and Spoke Model to increase access to medication treatment for opioid use disorders," *Journal of Substance Abuse Treatment* 108 (2020): 34, accessed April 27, 2020, <https://doi.org/10.1016/j.jsat.2019.07.007>.

⁴² Ibid, 34.

The preliminary results from Washington’s program have shown success. Within the first 18 months of the program, 5,000 people were treated for opioid-use disorder; the vast majority were treated with buprenorphine.⁴³ Researchers praised Washington’s approach for its flexibility. By allowing communities to “build on [their] strengths and respond to [their] needs,” efficiency was enhanced.⁴⁴ This flexibility was especially important for rural locations in which the availability of more traditional hub services were lacking and community health centers (like the FQHCs used by California) were also absent; by allowing primary care physicians in rural areas to qualify as hubs, rural locations could develop centers of expertise that best responded to their needs.⁴⁵

West Virginia

West Virginia is the state that has been the hardest hit by the opioid crisis. The state has had the highest drug overdose mortality rate in the country for over a decade, largely fueled by opioid overdose deaths.⁴⁶ The state’s crushing levels of poverty and unemployment have also contributed to a high level of opioid use, and in turn, a high rate of opioid overdose deaths. Unlike other states that have developed hub and spoke programs, West Virginia did not face low uptake in buprenorphine treatment; instead, in 2012, all of the state’s opioid treatment programs that offered buprenorphine were at eighty percent capacity or greater, and there were not enough treatment programs available to accommodate demand.⁴⁷ In 2016, 61% of rural counties (which

⁴³ Ibid, 38.

⁴⁴ Ibid, 37

⁴⁵ Ibid.

⁴⁶ National Institute on Drug Abuse, “West Virginia: Opioid-Involved Deaths and Related Harms,” National Institute on Drug Abuse, April 2020, <https://www.drugabuse.gov/opioid-summaries-by-state/west-virginia-opioid-involved-deaths-related-harms>.

⁴⁷ Erin L. Winstanley, Laura R. Lander, James H. Berry, James J. Mahoney III, Wanhong Zheng, Jeremy Herschler, Patrick Marshalek, Sheena Sayres, Jay Mason, and Marc W. Haut, “West Virginia’s model of buprenorphine expansion,” *Journal of Substance Abuse Treatment* 108 (2020): 40-41, accessed April 27, 2020, <https://doi.org/10.1016/j.jsat.2019.05.005>.

comprise the majority of counties in the state) did not have any physicians waived to dispense buprenorphine to patients.⁴⁸ Undoubtedly, West Virginia has experienced the worst crisis conditions of any state in the Union.

Using the same type of SAMSHA grant that was utilized by California and Washington, West Virginia embarked on an expansion of medication-assisted therapy under the leadership of WVU's Department of Behavioral Medicine and Psychiatry. The Comprehensive Opioid Addiction Treatment (COAT) buprenorphine treatment model, an outpatient program that combines psychosocial therapy and group-based medication management appointments, was selected as the mode of treatment to be applied across the state due to its efficiency in treating large numbers of patients. In order to deliver COAT treatments to patients, a modified hub and spoke model of delivery was selected.

The hubs were selected on the basis of three criteria: geographic proximity to areas with high rates of OUD, having a university affiliation or the ability to train providers, and expressing a high interest in delivering MAT.⁴⁹ Each hub team consisted of a prescriber, a therapist, and a case manager, and received specialized training from the WVU department that spearheaded the project; training was provided at WVU and at the hub itself, allowing staff from the university to shadow hub providers and give them written and verbal feedback.⁵⁰ Hubs have also been provided ongoing support from the university.⁵¹ Spokes were trained in a fashion similar to hubs, except in the hub-spoke relationship, hubs serve an analogous role to WVU's Department of Behavioral Medicine and Psychiatry.

⁴⁸ Ibid, 41.

⁴⁹ Ibid, 43.

⁵⁰ Ibid.

⁵¹ Ibid.

Preliminary results from West Virginia have been positive. The program was successful in training five hubs and fifty-six health professionals to use the COAT treatment model.⁵² Even though treatment capacity has increased, challenges remain—including the stigma of medication assisted therapy, the lack of stable long-term funding for care managers assigned to hubs, and the logistical problems associated with delivering treatment in rural locations.⁵³

A Specific Hub and Spoke Model for Tennessee

Four Key Components

Based on the results of other hub and spoke programs, I think the implementation of a hub and spoke model in Tennessee should include several components:

- (1) *The acceptance of Medicaid expansion.* Vermont’s experience reveals how Medicaid expansion can be crucial for an increase in the number of waived buprenorphine providers. It is also important for maintaining the long-term financial stability of the program. If the state were to rely on biyearly grants (like the STR grant) or tried to fund expanded opioid treatment without any federal assistance, it would be forced to bear the full cost of each OUD patient’s treatment—which in Vermont’s case, averages in excess of \$16,600.⁵⁴ That is simply not sustainable without a large degree of federal funding.
- (2) *Significant flexibility in the classification of hubs and spokes.* By allowing primary physicians’ offices to qualify as hubs, Washington ensured that its rural citizens, those hardest hit by the opioid epidemic, had access to high quality care. Since a large portion

⁵² Ibid.

⁵³ Ibid, 45-46.

⁵⁴ German Lopez, “I looked for a state that’s taken the opioid epidemic seriously.”

of Tennessee’s population is rural, over 33%,⁵⁵ and the state continues to be plagued by the closure of rural hospitals that would likely serve as hubs, it is important that the state’s hub and spoke strategy has similar procedural flexibility in guaranteeing OUD patients access to care.

- (3) *Utilizing university medical centers for coordination and expertise. Utilizing the talent we already possess for regional hubs. Prioritizing public resources over private resources when possible.* I believe Tennessee should adopt a model of training and monitoring that resembles West Virginia’s. This would result a single anchor institution for the state, perhaps Vanderbilt University Medical Center or the University of Tennessee Medical Center, providing training to hubs (institutions already engaged in substance abuse treatment, financed by the state). Hubs, in turn, would provide training to rural hubs and spokes (primarily physicians’ offices, though in some areas—particularly urban ones—this could include FQHCs). Though timely access to care—for example, by minimizing travel distance—is a more important criterion when determining the placement of hubs and spokes, I think federally qualified health centers should receive some priority over other institutions because FQHCs are known to save money (an average of 24% in total spending on patients compared to other facilities) while providing high quality care to low-income families.⁵⁶
- (4) *Reliance on nurse care managers to coordinate care.* Nurse care managers have been an important component of Washington’s hub and spoke model—coordinating care between

⁵⁵ Lynnise Roehrich-Patrick, Bob Moreo, and Teresa Gibson, “Just How Rural or Urban Are Tennessee’s 95 Counties?: Finding a Measure for Policy Makers,” Tennessee Advisory Commission on Intergovernmental Relations, August 2016, <https://www.tn.gov/content/dam/tn/tacir/documents/2016JustHowRuralOrUrban.pdf>.

⁵⁶ Robert S. Nocon, Sang Mee Lee, Ravi Sharma, Quyen Ngo-Metzger, Dana B. Makamel, Yue Gao, Laura M. White, Leiyu Shi, Marshall H. Chin, Neida Laiteerapong, Elbert S. Huang, “Healthcare Use and Spending for Medicaid Enrollees in Federally Qualified Health Centers Versus Other Primary Care Settings,” *American Journal of Public Health* 106 no. 11 (2020): e5, accessed April 27, 2020, doi: 10.2105/AJPH.2016.303341.

hubs and spokes, providing extra assistance to physicians in evaluating patients, and managing billing. Care managers are also an important part of West Virginia's model, a "key component to the clinic structure" that "are...needed to support prescribers working with a large number of patients."⁵⁷ In order to ensure proper coordination between hubs and spokes, as well as increasing care capacity, nurse care manager positions should be financed through Medicaid and assigned to both types of institutions.

The Spatial Distribution of Hubs and Spokes

The distribution of hubs and spokes across the state should strongly reflect demand for treatment.

According to the amfAR Opioid & Health Indicators Database, even though there are a number of counties across the state that provide medication-assisted therapy, there is some misalignment between these counties and those that are particularly affected by the opioid crisis. Some counties that are particularly vulnerable, either due to the overall number of drug related deaths or the potential risk for disease outbreaks (as a result of OUD rates), possess no facilities providing medication-assisted therapy. For example, despite the fact that Sumner County reported forty drug related deaths in 2017, the county possesses no facility providing MAT.⁵⁸ Scott County, despite reporting very few (if any) deaths in 2017, is listed as a county vulnerable for HIV and Hepatitis C outbreaks yet also possesses no facilities specializing in MAT.⁵⁹ The number of providers licensed to administer buprenorphine seems to greatly exceed the number of

⁵⁷ Erin L. Winstanley, Laura R. Lander, James H. Berry, James J. Mahoney III, Wanhong Zheng, Jeremy Herschler, Patrick Marshalek, Sheena Sayres, Jay Mason, and Marc W. Haut, "West Virginia's model of buprenorphine expansion," 46.

⁵⁸ amfAR, "Opioid & Health Indicators Database: Tennessee Opioid Epidemic," amfAR, accessed April 27, 2020, <https://opioid.amfar.org/TN>.

⁵⁹ Ibid.

facilities actually providing MAT, indicating the need for treatment coordination. Color-coded maps are provided below. The map which displays counties in orange shows the counties that are vulnerable to HIV and Hepatitis C infection due to OUD rates, the map on the bottom left reveals the counties that possess MAT treatment facilities, and the on the bottom right shows which counties possess providers waived to prescribe buprenorphine (fig 4.1):

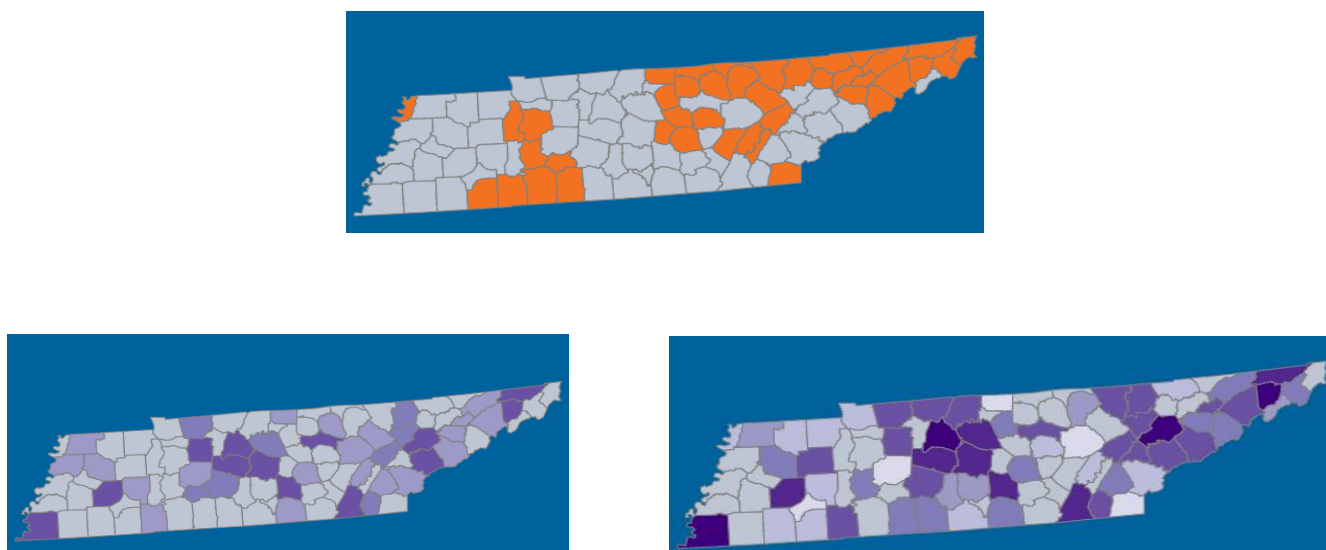


Figure 4.1. amfAR. “Opioid & Health Indicators Database: Tennessee Opioid Epidemic.” amfAR. Accessed April 27, 2020. <https://opioid.amfar.org/TN>.

The first goal for policymakers should be to ensure that every vulnerable county possesses a facility that provides medication-assisted therapy, whether that facility is a hub or a spoke. To start with, hubs should be concentrated in areas where medical practitioners already possess some expertise in delivering medication-assisted therapy. Currently, the State of Tennessee maintains a Substance Abuse Treatment Provider Directory (a list of substance abuse treatment providers which receive federal funding through Substance Abuse Prevention and Treatment grant); this should be the starting point for determining initial hubs. I recommend starting with at least a single hub for each region listed within the SATP Directory with the

stringent selection criteria that only facilities which provide buprenorphine treatment are allowed to qualify. A table listing potential hub selections that meet this criterion is provided below (fig 4.2):

SATP Directory Region	Potential Hubs
Northeast Tennessee Region 1	Comprehensive Community Services (Johnson City, TN 37604) Frontier Health (Gray, TN 37615)
East Region 2	Cherokee Health Systems (Knoxville, TN 37921) Helen Ross McNabb Center, Inc. (Knoxville, TN 37917)
Southeast Region 3	CADAS (Chattanooga, TN 37405) Volunteer Behavioral Health (Chattanooga, TN 37405)
Nashville Region 4	Lloyd Elam Mental Health Center (Nashville, TN 37208) Samaritan Recovery (Nashville, TN 37206) The Next Door (Nashville, TN 37203) Neighborhood Health* (Nashville, TN 37203) <i>*homeless only</i>
Mid Cumberland Region 5	Buffalo Valley (Hohenwald, TN 38462)
West Region 6	Pathways (Jackson, TN 38301)
Memphis Region 7	Cocaine and Alcohol Awareness Program (Memphis, TN 38118) First Steps, Downtown Memphis Ministries (Memphis, TN 38104)

	Serenity Recovery Center, Inc. (Memphis, TN 38105)
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Figure 4.2. Tennessee Department of Mental Health & Substance Abuse Services. “SAPT Block Grant Treatment Providers And Services.” July 1, 2018. <https://www.tn.gov/behavioral-health/substance-abuse-services/treatment---recovery/treatment---recovery/adult-substance-abuse-treatment.html>.

Once hubs are selected and approached for participation in the program, teams would be sent out from a central coordinating hub—either Vanderbilt University Medical Center or the University of Tennessee Medical Center—to assist hubs in their practice of medication-assisted therapy, to help them coordinate activities with local physicians’ offices and FQHCs (i.e. institutions that would become spokes or rural hubs), and to establish information sharing. As Medicaid expansion takes place and hubs increase their intake of patients suffering from OUD, hubs will be encouraged by the central coordinating hub to use their teams to “proselytize” to ensure that locations lacking in waived buprenorphine providers can increase their treatment capacity.

Both spokes and hubs will be provided with fully subsidized nurse care manager positions to ensure proper coordination of care. The data seems to indicate that there are many more waived prescribers than facilities providing MAT; they also possess a more even geographic distribution. As stated previously, one of the main reasons for state failure in utilizing waived buprenorphine providers has been a lack of support for complex patients; proper coordination via nurse care manager positions provided at each hub and spoke would minimize this tendency and allow the state to increase its utilization of already existing treatment capacity (while continuing to expand it).

Financing the Hub and Spoke Model

Securing Federal Funding

Due to its high cost, implementation of a full-fledged hub and spoke model will not be viable without federal support. I suggest that federal funding should be secured for the program in three different ways:

- (1) *A Section 2703 Waiver.* A Section 2703 Affordable Care Act waiver would allow the state to receive an enhanced 90% FMAP (Federal Medical Assistance Percentage) for Medicaid-financed services provided within the hub and spoke framework. This is the same waiver that has been used by Vermont to secure financing for their own hub and spoke services. Securing this waiver has been critical for the financial stability of their program. In 2020, nearly 8,000 patients utilized Vermont's services at an average of \$16,600 per patient.⁶⁰By receiving a Section 2703 waiver, Vermont is saving approximately \$120,000,000 on the current cost of patient care.
- (2) *Leveraged funding for nurse care managers.* Vermont not only utilized a Section 2703 waiver to finance its program, but also secured an additional 90/10 funding split from the Center for Medicaid and Medicare Services to finance MAT teams provided to spokes. In my proposal, subsidized nurse care managers play an important role—facilitating the transmission of patients between hubs and spokes, increasing care capacity, and dealing with administrative tasks like billing. Without their presence, proper coordination that is essential for utilizing the state's treatment capacity could not occur.

⁶⁰ German Lopez, "I looked for a state that's taken the opioid epidemic seriously."

(3) *Medicaid expansion.* Medicaid expansion will not result in the financing of any particular services, but it is absolutely necessary so that low-income residents, disproportionately impacted by the opioid crisis, have access to care. It is also necessary in order to act as the engine for further expansion of treatment capacity.

Securing New Revenue: Revenue Estimate

In order to estimate the revenue needed for a hub and spoke program in Tennessee, I am going to rely on a back-of-the-envelope calculation based on the average cost of opioid treatment for Vermont hub and spoke participants, the opioid overdose death rates for both states, and population estimates. In 2018, Vermont witnessed an opioid overdose death rate of 22.8 per 100,000 persons.⁶¹ In 2018, Tennessee witnessed an opioid overdose death rate of 19.9 per 100,000 persons.⁶² In 2018, Vermont's population was 623,989. If we take the opioid overdose death rate and multiply it by the total population, we arrive at the total number of opioid overdose deaths, 127. If we take the opioid overdose death rate for Tennessee and multiply it by Tennessee's population in the same year (6,772,000), we arrive at 1,347 deaths. Assuming that Vermont's rate of opioid overdose deaths corresponds to its rate of OUD and that usage of treatment within the hub and spoke system is reflective of the overall level of OUD, a death rate of 22.8 per 100,000 persons or 127 deaths corresponds to 8,000 Medicaid recipients in need of treatment. If this same logic is applied to Tennessee, 1,347 deaths would imply 84,850 Tennesseans are in need of treatment. At an average cost of \$16,600 per patient, the total cost for the state of Tennessee would be \$1,408,510,000. If the federal government were to pay 90% of

⁶¹ National Institute on Drug Abuse, "Vermont: Opioid-Involved Deaths and Related Harms," National Institute on Drug Abuse, April 2020, <https://www.drugabuse.gov/opioid-summaries-by-state/vermont-opioid-involved-deaths-related-harms>.

⁶² National Institute on Drug Abuse, "Tennessee: Opioid-Involved Deaths and Related Harms."

the cost of treatment for those enrolled in the hub and spoke program, the cost to the state would be \$140,851,000. For 2019-2020, Tennessee's state budget was \$38.5 billion,⁶³ meaning the implementation of a hub and spoke program with support from a Section 2703 waiver would represent a 0.366% increase from current state spending. I project that this should serve as the minimum projected cost for the program in the absence of more sophisticated budgeting analysis.

Securing Revenue: Reinstating the Hall Income Tax

The Hall income tax is a Tennessee state tax levied on investment income, specifically interest and dividend payments. Since 1937, 37.5% of each dollar collected from the tax has been appropriated to the counties and municipalities in which Hall income tax payers reside, making it a critical source of revenue for some local governments.⁶⁴ Despite its importance for local budgets, the state legislature passed legislation in 2016 (House Bill 534/Senate Bill 1221) that paved the path for its elimination. The Hall income tax rate, originally 6% for investment income in excess of \$2,500 (\$1,250 for single filers) was reduced to 5% for 2017 taxpayers. Further single percentage point reductions have been scheduled until the repeal date: January 1, 2021.

By slashing the Hall income tax, the state has jeopardized the fiscal stability of some municipalities, forcing them to raise property taxes. For example, in 2017, the Hall income tax made up 20% of the city budget for Lookout Mountain.⁶⁵ In 2018, due to the scheduled decrease in the tax rate, Hall income tax revenue for the city fell from \$572,455 to \$477,145, forcing the

⁶³ State of Tennessee, "The Budget: Fiscal Year: 2019-2020," March 4, 2019, <https://www.tn.gov/content/dam/tn/finance/budget/documents/2020BudgetDocumentVol1.pdf>.

⁶⁴ Stanley Chervin and Harry A. Green, "Hall Income Tax Distributions and Local Government Finances," Tennessee Advisory Commission on Intergovernmental Relations, April 2004, 3, https://www.tn.gov/content/dam/tn/tacir/documents/Hall_Income_Tax.pdf.

⁶⁵ Dave Flessner, "Phase out of Tennessee's Hall income tax hits some cities in Hamilton County," Chattanooga Times Free Press, April 26, 2019, <https://www.timesfreepress.com/news/business/aroundregion/story/2019/apr/26/phase-out-hall-income-tax-hits-some-cities/493514/>.

city to raise its property tax rate from \$1.83 for \$100 of assessed value to \$1.89.⁶⁶ These effects were predicted well in advance by economists. In 2016, the Institute on Taxation and Economic Policy (ITEP), a left-leaning think tank, argued that the state legislature's decision to progressively repeal the Hall income tax could have negative consequences, including an increase in local property taxes and a reduction in public services.⁶⁷

The effect of the tax's repeal extends beyond municipal budgets. According to ITEP, the Hall income tax is one of the only progressive features of Tennessee's state tax system.⁶⁸ Due to the state's reliance on sales taxation, low-income families, those in the lowest 20% of the income distribution, pay 10.5% of their income in state and local sales tax, while those in the top 1% pay 2.8% as of 2018.⁶⁹ This means that Tennessee possesses the sixth most regressive state and local tax system in the country.⁷⁰ By proceeding with the elimination of the Hall income tax, the state is making its tax system even more regressive. It is projected that by eliminating the tax, the top 1% of Tennesseans, those earning more than \$1.2 million per year, will receive an additional \$5,222 annually, while most Tennesseans will receive few, if any, benefits.⁷¹ It is important to note that this projection does not take into account potential property tax increases which have already harmed many middle and working-class families across the state.⁷² The effect of repealing the Hall income tax can be summed up by a simple aphorism: what works for Belle Meade does not work for Blountville.

⁶⁶ Ibid.

⁶⁷ ITEP, "Tennessee Hall Tax Repeal Would Overwhelmingly Benefit the Wealthy, Raise Tennessean's Federal Tax Bills by \$85 Million," ITEP, February 2016, <https://itep.org/wp-content/uploads/TN-Hall-Tax-Repeal.pdf>.

⁶⁸ ITEP, "Tennessee: Who Pays? 6th Edition," ITEP, October 17, 2018, 117, <https://itep.org/wp-content/uploads/itep-whopays-Tennessee.pdf>.

⁶⁹ Ibid, 116.

⁷⁰ Ibid, 117.

⁷¹ ITEP, "Tennessee Hall Tax Repeal Would Overwhelmingly Benefit the Wealthy."

⁷² Ibid.

In order to finance Tennessee’s hub and spoke model, I suggest that the state legislature should pass legislation reversing the Hall income tax’s repeal. The Hall income tax rate should be gradually increased from 1% back to its original rate of 6%, with an additional solidarity surtax of 2% for investment income in excess of \$150,000. The timetable for the tax’s reinstatement, as well as the tax schedule for 2025-2026 is listed below (fig 5.1 and fig 5.2):

Figure 5.1

Hall Income Tax Phase-In Schedule
2% for tax years beginning January 1, 2021 and prior to January 1, 2022
3% for tax years beginning January 1, 2022 and prior to January 1, 2023
4% for tax years beginning January 1, 2023 and prior to January 1, 2024
5% for tax years beginning January 1, 2024 and prior to January 1, 2025
6% for tax years beginning January 1, 2025 and prior to January 1, 2026; 8% for tax years beginning January 1, 2025 and prior to January 1, 2026 for income in excess of \$150,000

Figure 5.2

Hall Income Tax Schedule Filing Jointly (2025-2026)	
Investment Income*	Tax Rate
\$0 – \$2,500	0%
\$2,501 – \$150,000	6%
\$150,001 +	8% (includes 2% surtax)
*Taxpayers older than 65 years of age who make less than \$37,000 (for single filers) or \$68,000 (for those filing jointly) will remain exempt from the tax.	

Past revenue estimates from the Hall income tax suggest that a phased reinstatement of the tax from its current rate of 1% to 6% (with an additional surtax) would provide enough revenue for the state to finance a hub and spoke OUD treatment program. The tax provided the state with \$322,356,000 in revenue from 2015-2016, the last fiscal year before the introduction

of phased-in reduction rates.⁷³ Even in the midst of severely depressed economic conditions in 2009-2010, the Hall income tax garnered \$172,473,800 (\$111,785,400 for the state's general fund).⁷⁴ With an additional surtax of 2% on investment income in excess of \$150,000, it is highly conceivable that the state would obtain enough revenue to finance \$140,851,000 or more in hub and spoke spending.

It is important to note that the amount of revenue needed reflects the treatment of OUD patients once the system has been in place for several years. Vermont's program took 7 years to increase its number of treated patients from 1,000 to 8,000. Any implementation of a hub and spoke program in Tennessee would similarly result in a gradual increase in patient numbers over several years; this means that a slowly phased-in tax increase would likely provide the revenues to keep up with patient demand.

Prospects for a Hub and Spoke Solution

Prospects for Securing Federal Funding

The current prospects for securing federal funding are quite weak. The Trump Administration has made it clear that it wants to shift the burden of paying for the cost of healthcare onto the states via block granting.⁷⁵ President Trump and his appointees within the Department of Health and Human Services, particularly Secretary Alex Azar, have been active in

⁷³ State of Tennessee, "The Budget: Fiscal Year: 2017-2018," January 30, 2017, A-64, <https://www.tn.gov/content/dam/tn/finance/budget/documents/2018BudgetDocumentVol1.pdf>.

⁷⁴ State of Tennessee, "The Budget: Fiscal Year: 2011-2012," March 14, 2011, A-73, <https://www.tn.gov/content/dam/tn/finance/budget/documents/11-12BudgetVol1.pdf>.

⁷⁵ Jessica Schubel, Hannah Katch, Judith Solomon, and Aviva Aron-Dine, "The Trump Administration's Block Grant Guidance: Frequently Asked Questions," Center on Budget and Policy Priorities, February 6, 2020, <https://www.cbpp.org/research/health/the-trump-administrations-medicaid-block-grant-guidance-frequently-asked-questions>.

seeking to impose financial caps on Medicaid coverage and new copays on Medicaid recipients.⁷⁶ The Center for Medicare and Medicaid Services Administrator Seema Verma has also been active in these efforts by approving Section 1115 waivers; these waivers allow states to impose work requirements and cost-sharing increases on Medicaid recipients.⁷⁷ Since the Secretary is tasked with the responsibility of signing Section 2703 Affordable Care Act waivers,⁷⁸ it is unlikely that the state would be able to receive an expansion in federal funding that is commensurate with Vermont's hub and spoke financing. Likewise, attempts to negotiate subsidized payments for nurse care manager positions are likely to stall.

Prospects in Tennessee

The legislative prospects for any of the elements of a hub and spoke plan, particularly Medicaid expansion, are grim. One needs to look no further than former Governor Bill Haslam's inability to pass his own proposal which sought to expand coverage without relying on traditional Medicaid. A GOP dominated state Senate committee would not even allow his Insure Tennessee bill to come to a floor vote; a state House committee would not even vote on the legislation.⁷⁹ Strong opposition has not deterred advocates from continually bringing similar coverage expansion bills before the state legislature, including Democrats and even some Republicans. Rep. Ron Travis, R-Dayton and Sen. Richard Briggs, R-Knoxville introduced a

⁷⁶ Bertha Coombs, "HHS Secretary Azar defends Trump budget cuts to Medicaid, NIH programs," CNBC, March 13, 2019, <https://www.cnbc.com/2019/03/13/hhs-secretary-azar-defends-trump-budget-cuts-to-medicaid-nih-programs.html>.

⁷⁷ Tarun Ramesh, "Undermining Medicaid: How Block Grants Would Hurt Beneficiaries," Center for American Progress, August 7, 2019, <https://www.americanprogress.org/issues/healthcare/reports/2019/08/07/472879/undermining-medicaid-block-grants-hurt-beneficiaries/>.

⁷⁸ U.S. Congress, House, *The Patient Protection and Affordable Care Act*, HR 3590, 111th Congress, 2nd session, introduced in the House September 17, 2009, 201-205, <https://www.govtrack.us/congress/bills/111/hr3590/text>.

⁷⁹ Chris Kardish, "Why Medicaid Expansion Has Reached a Standstill," *Governing*, April 2015, <https://www.governing.com/topics/health-human-services/gov-medicaid-expansion-standstill.html>

plan earlier this year that would have adopted Medicaid expansion, while continuing with the Governor's plan to block grant Medicaid,⁸⁰ but prospects for this plan's passage are next to nothing. Since Insure Tennessee was proposed in 2015, the state legislature has seen significant turnover in which legislators have become increasingly right-wing, unlikely to approve any legislation that smacks of expanded government.⁸¹

For advocates of a hub and spoke strategy, I think there are several avenues that could be pursued in coalition building, even though the chance of passing any legislation (especially legislation partly financed by restoration of the Hall income tax) is remote:

- (1) *Reaching out to the original supporters of Insure Tennessee.* Particularly business lobbies and hospitals that were convinced to support the plan. One of these included the Tennessee Hospital Association, which had pledged to cover \$74 million of the cost in expanded coverage.⁸²
- (2) *Reaching out to municipalities that have been affected by the opioid crisis. Reaching out to state legislators whose districts have particularly suffered.*
- (3) *Reaching out to municipalities that have struggled as a result of the Hall income tax phase-out.* Many municipal leaders were strongly opposed to elimination of the Hall income tax due to its revenue impacts. A specific example is Mayor Andy Burke of Chattanooga who condemned its impacts on his own city in 2016.⁸³ Municipal leaders

⁸⁰ Joel Ebert and Brett Kelman, "Tennessee Medicaid expansion bill introduced by Republican lawmaker," *The Tennessean*, February 5, 2020, <https://www.tennessean.com/story/news/politics/2020/02/05/tennessee-medicaid-expansion-bill-introduced-republican-lawmaker/4657634002/>.

⁸¹ *Ibid.*

⁸² Erik Schelzig, "Hospital group takes longer approach to Insure Tennessee," *Associated Press*, January 27, 2016, <https://www.timesnews.net/News/2016/01/27/Hospital-group-takes-longer-approach-to-Insure-Tennessee>.

⁸³ Andy Sher, "Chattanooga to lose roughly \$5 million annually after state lawmakers repeal Hall income tax," *Chattanooga Times Free Press*, April 23, 2016, <https://www.timesfreepress.com/news/politics/state/story/2016/apr/23/anti-tax-groups-celebrate-cities-crige-lawma/361745/>.

could be used to put pressure on the state legislature to consider at least a partial restoration of the Hall income tax, especially if general fund revenues are going to help these same communities that have suffered financially with their OUD patients (in other words, a double win).

(4) *Appealing to the public.* A Vanderbilt University poll in the spring of 2019 showed that 60% of Tennesseans are in favor of Medicaid expansion with only 35% opposed.⁸⁴

Advocates for a hub and spoke solution should consider engaging in a mass marketing campaign that links together Medicaid expansion with tackling OUD. This serves as another means of placing pressure on GOP legislators to consider a hub and spoke solution.

Conclusion

Despite the reluctance of Tennessee politicians to embrace an intensive publicly-funded approach to dealing with the opioid crisis, evidence from other states shows that a hub and spoke solution, facilitated by Medicaid expansion, helps enlarge treatment capacity for OUD patients. Even though it is unlikely that a hub and spoke model of care will be considered by state legislators in the near future, activists, particularly those involved in Medicaid expansion efforts, should emphasize the need for a comprehensive approach in tackling state's opioid crisis. Without a more comprehensive and coordinated approach to care, thousands of Tennesseans suffering from OUD will continue to lack the care they so desperately need; overdose deaths will continue to increase, and costs to the general public will intensify. Surely the Volunteer State can do better, but we can only do better when activists and political actors, armed with the right

⁸⁴ Joel Ebert and Brett Kelman, "Tennessee Medicaid expansion bill introduced by Republican lawmaker."

information and a plan, try to affect change. I hope this document will play a productive role in the ongoing effort to affect change and secure health justice for all Tennesseans.

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