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Examining the state policies and external organizational ties that affect women's access to and engagement in substance use disorder treatment services

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Dissertation

**EXAMINING THE STATE POLICIES AND EXTERNAL ORGANIZATIONAL
TIES THAT AFFECT WOMEN'S ACCESS TO AND ENGAGEMENT IN
SUBSTANCE USE DISORDER TREATMENT SERVICES**

by

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DEDICATION

My work is dedicated to nameless women who have substance use disorders who do their best to combat addiction, stigma, and injustice. I may not be able to change the world, but if I can ameliorate someone's hardships or bring someone a step closer to a safe environment, then it is all worth it.

ACKNOWLEDGMENTS

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TIES THAT AFFECT WOMEN'S ACCESS TO AND ENGAGEMENT IN
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SUGY CHOI

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ABSTRACT

Women's access to substance use disorder (SUD) treatment is affected by their social status and policies that present both opportunities and barriers to treatment. Motherhood, including pregnancy, tends to increase participation in health care and thus opportunities for referral to and engagement in SUD treatment. However, the multiple challenges of motherhood along with the social and legal sanctions that may be visited on mothers who use alcohol or drugs may impede access to treatment. Moreover, motherhood and drug use lie at the focus on great public and policy concerns due to the ways it has been construed in health policy discourse. There is a moral connotation regarding the criminalization of substance use during pregnancy. Mothers' pathways to SUD treatment are complex, at turn they may be positively supported or seek to avoid opprobrium. Moreover, the opportunities and barriers continue to evolve. This dissertation sought to elucidate the contemporary settings in which mothers access SUD treatment, focusing on women's use of health and social services and macro-level public policies, particularly the expansion of Medicaid with the Affordable Care Act and state laws that specifically criminalize drug use by mothers.

In Study 1, I reviewed the literature on access to SUD treatment services among pregnant women and women who have children. I found that women have unique opportunities and barriers to access treatment services. I built a conceptual model of women's pathways into care according to the type of barriers that may encounter by each "gateway." Gateways are formal institutions or settings that may act as "gates" between pathways and may refer patients to treatment, but not all gateways may be actively referring patients. These sources became the foundation for Study 2, in which I empirically tested whether women's engagement in gateways identified in Study 1 would be an effective mechanism for promoting SUD treatment. The findings suggest that Medicaid eligibility and criminal justice involvement increased women's access to SUD treatment services. In Study 3, I examined the effects of Medicaid Expansion on medications for opioid use disorder (MOUD) and treatment completion as it relates to state laws that criminalize substance use during pregnancy among pregnant women. I found that criminalization policies prevented Medicaid expansion from realizing its full effect on increasing access to MOUD for pregnant women. Altogether, these studies elucidated the need for women-centered and life-course adjusted approaches in engaging women in treatment.

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LIST OF ABBREVIATIONS

ACA	Affordable Care Act
AFDC	Aid to Family with Dependent Children
AR-CARES.....	Arkansas Center for Addictions Research, Education, and Services
AUD	Alcohol Use Disorder
CPS	Child Protective Services
DCYF	Department of Children, Youth, and their Families
ED	Emergency Department
IRB.....	Institutional Review Board
MHPAEA.....	Mental Health Parity and Addiction Equity Act
MOUD	Medication for Opioid Use Disorder
NAS	Neonatal Abstinence Syndrome
NSDUH.....	National Survey on Drug Use and Health
OUD.....	Opioid Use Disorder
PIR	Parenting in Recovery
PSAP	Pregnancy Substance Abuse Project
SBIRT	Screening, Brief Intervention, and Referral to Treatment
SNAP	Supplemental Nutrition Assistance Program
SNAP-WIC	Supplemental Nutrition Assistance Program for Women, Infants and Children
SS	Social Security
SSI.....	Supplemental Security Income

SUD Substance Use Disorder
TANF Temporary Assistance for Needy Families
TEDS..... Treatment Episode Data Set
TUD Tobacco Use Disorder

INTRODUCTION

About half (47.7%) of the population with substance use disorder (SUD) are women (Substance Abuse and Mental Health Services Administration, 2018). However, women are less likely to seek treatment than men (Greenfield et al., 2010, 2007). They are also less likely to receive evidence-based treatment, such as medication (Busch et al., 2020). About ninety percent (89.9%) of women with SUD did not receive treatment in 2018 (Substance Abuse and Mental Health Services Administration, 2018). Although the results from prior studies investigating gender effects on SUD treatment uptake and retention are mixed, women with SUD face distinct barriers in accessing treatment for SUD such as child care. Women with SUD are often marginalized or stigmatized as they face social disadvantage (Room, 2005). The treatment gap is accentuated for women who are pregnant or parenting, as they face stigmatization of addiction and societal concern for the health of children. Due to the moral connotation in SUD, pregnant or parenting women with SUD have received special attention from media and drug control policies, which perpetuated the barriers to treatment. The rate of illicit drug use among pregnant women doubled from 4.7% in 2015 to 8.5% in 2017 (McCance-Katz, 2018) and point to the growing need for treatment services. Only 9.5% of pregnant women with SUD received SUD treatment from 2008 to 2014, indicating a substantial treatment gap (Martin et al., 2020).

This dissertation examines the roles of various agencies in communities, including health services, social welfare, and criminal justice, as well as the role of governmental policies in facilitating women's access to treatment. I develop a model that

conceptualizes the potential pathways to treatment via these agencies, evaluate the associations between engagement in the agencies and accessing treatment, and then estimate the effects of state policies on treatment received. The study is informed by the complex moral, legal, and emergent public health approaches to controlling substance use, as it examines health and welfare agencies against the backdrop of criminal justice system that women with SUD so often come in contact with. Collectively, the following chapters aim to answer the question: what opportunities and barriers can we leverage to increase access to and retention in treatment for pregnant women or mothers?

This introduction provides the conceptual basis and background of this dissertation, including an overview of the underutilization of SUD treatment, findings from the literature on motherhood, including pregnancy, and SUD, and theoretical underpinning of the studies presented in the following chapters.

In the first study, “Differential gateways, referrals, facilitators, and barriers to substance use disorder treatment for pregnant women and mothers: a scoping review,” I systematically investigated and organized previous literature on the opportunities and barriers to access treatment services. I identified gateways to treatment, sources that refer women to treatment, and how these identified institutions enable or impede women’s engagement with SUD treatment services. In the second study, “Opportunities to intervene in substance use disorder for women: Gateways to treatment access,” I empirically tested whether mothers and pregnant women were more likely to have ties to formal institutions (health and social services and criminal justice system) compared to women without children and whether their prior engagement with institutions was

associated with receipt of SUD treatment. In the third study, “The impact of state policies expanding Medicaid and criminalizing substance use during pregnancy on accessing and completing substance use disorder treatment,” I examined the effects of the Medicaid expansion and its interaction with state policies that criminalized substance use during pregnancy on medication for opioid use disorder use and retention in treatment among pregnant women. Finally, I summarize the findings of each study and present the overall conclusion and suggestions for future studies in the conclusion section.

Underutilization of Substance Use Disorder Treatment Services

About twenty-one million individuals have SUD (i.e., exclusive of tobacco, inclusive of alcohol use disorder, drug use disorder, or both), all of whom could potentially benefit from effective pharmacologic and psychotherapies (O’Brien, 2008; SAMHSA (Substance Abuse and Mental Health Services Administration), 2020). Although treatment exists, availability is limited, and only a minority of affected individuals receive it. Only a small minority (17.5%) of individuals with SUD received treatment in 2018. Currently, there are three SUDs for which FDA-approved pharmacologic treatments are available: those related to tobacco, alcohol, and opioid use disorder (TUD; AUD; OUD) (Douaihy et al., 2013). There are significant and distinct barriers to receiving pharmacologic treatment for each SUD. My dissertation focuses on AUD and other drug use disorders, including OUD and stimulant use disorder.

Treatment receipt is associated with patient-level, provider-level, and system-level factors. First, receiving SUD treatment varies widely across individuals. Treatment access is complicated, as most individuals do not recognize the need for treatment. About

85 percent of individuals with SUD did not feel that they needed treatment (SAMHSA (Substance Abuse and Mental Health Services Administration), 2020). Only 3 percent of individuals with SUD felt that they needed treatment but did not make an effort to get treatment, and 1 percent felt that they needed treatment and made an effort to get treatment (SAMHSA (Substance Abuse and Mental Health Services Administration), 2020). Individuals with SUD have their own perceptions of the substance use and their “need” for treatment, which may be at odds with the interests and intentions of providers and researchers. Patient-level socio-demographic factors like age, sex, race, ethnicity, and income status, as well as substance use characteristics like the severity of the addiction, and enabling or disabling characteristics like disparities in access to care, type of insurance, and criminal justice involvement have been associated with treatment utilization (Hser et al., 2007, 1997; Johnson et al., 2020; SAMHSA, 2015). Medicaid coverage increased the likelihood of receiving SUD treatment (Johnson et al., 2020). Community referral sources and institutional ties can facilitate treatment access, particularly the criminal justice system and employee assistance programs (Friedmann et al., 2003). For example, probation status is associated with treatment receipt (Johnson et al., 2020).

Treatment for SUD has traditionally been accompanied by significant provider-level barriers that add to the addiction treatment gap, including long waitlists, difficult admissions processes, involuntary discharges, and stigma (Richert and Johnson, 2015). Facilitating patients to treatment has been ascribed to lack of provider knowledge, misunderstanding of treatment options, and time and resources spent on determining

patient eligibility (Blevins et al., 2018). There is also limited availability of SUD treatment providers. For example, in 2018, only 33% of substance use treatment facilities provided any buprenorphine services, and 28% provided any extended-release injectable naltrexone treatment for patients who have opioid use disorder (SAMHSA (Substance Abuse and Mental Health Services Administration), 2018). There have been efforts to increase SUD treatment providers with primary care physicians receiving more education in the treatment of SUD in the form of buprenorphine waiver training (Deering et al., 2014). The changes are slow, and only a limited number of community-based physicians have the certification and are prescribing (Haffajee et al., 2018; Kissin et al., 2006; Molfenter et al., 2011).

Adding to these barriers, the stigma of SUD deters individuals from using treatment services. Recently, the “War on Drugs” mentality and enforcement practices negatively affected particularly less privileged socioeconomic status groups and black moms in the United States (Chin, 2013; Cloud and Davis, 2015). There is a moral connotation regarding the criminalization of substance use during pregnancy. In recent years, societal views of SUD have partially transformed from viewing SUD as a moral failure to a more morally neutral disease (McLellan et al., 2000; Ndasauka et al., 2017; Robinson and Adinoff, 2016). Yet, drug use has long been criminalized, and the societal adoption of SUD treatment remains quite limited, since persons who use drugs are often still treated as criminals. The prospect of criminal sanction diminishes treatment seeking (Chin, 2013; Cloud and Davis, 2015). This social perception continues to shape the current addiction treatment system where people have been coerced into treatment,

although the treatment system is evolving towards conceptualizing SUD as a disease rather than moral behavior (Bowden and Goodman, 2015; McGinty et al., 2018; SAMHSA, 2005; Scholarlycommons and Morse, 2012; Schultz et al., 2016).

Referral to SUD Treatment

There are no easy or efficient linkages to treatment for individuals who need it. Indeed, stigmatization of SUD and marginalization of the SUD population have limited access to treatment (Avery and Avery, 2019; Corrigan et al., 2017). As identification and referral remain in limited health care or criminal justice sites, marginalization has been perpetuated, systematically undermining policies and funding to improve the quality of care for SUD treatment (McGinty et al., 2018; Simon et al., 2020). Specialty treatment sites serve a small percentage of individuals with a severe SUD, and the major source of referrals to treatment comes from police or courts for those seeking care in the specialty treatment sector (Miller and Weisner, 2002). A public health approach that defines drug use as a disorder or disease (Avery and Avery, 2019) encourages multiple agents of referral to individuals moving toward treatment. A substantial body of research has identified a variety of gateways to treatment and the key agents that may facilitate a referral in health care settings as well as outside of the health care settings such as community organizations, workplaces, and social service agencies (Agerwala and McCance-Katz, 2012; Babor et al., 2007; Barata et al., 2017; Green, 2018; McPherson et al., 2009; Ting et al., 2019).

Pregnancy, Motherhood, and SUD

Pregnancy and motherhood mark special life course periods. There is a consensus about saving mothers and their children, although treatment policies remain focused more on the well-being of children and less on well-being of mothers who have SUD.

Substance use during pregnancy increases the risk for adverse health outcomes for the fetus and infants, including neonatal abstinence syndrome, fetal alcohol syndrome, poor fetal growth, and fetal death (Behnke and Smith, 2013; Denny et al., 2017; Hardt et al., 2013; Hayes and Brown, 2012; Martin et al., 2015; Roper and Cox, 2017; Shainker et al., 2012; Stover and Davis, 2015). Children of women with SUD have an increased risk of adverse childhood experiences including child maltreatment (Dakof et al., 2010), though this correlation is not causal and adverse outcomes are often tied to upstream social and economic forces (Canfield et al., 2017; Lander et al., 2013). High rates of relapse and overdose are detrimental to postpartum women and remain a significant public health problem (Forsay and Foster, 2015; Schiff et al., 2018). There is limited research that examines the risks of overdose among pregnant women, and a recent study found that younger age is a risk factor in the general population of pregnant women with OUD (Bagley et al., 2018).

Multiple factors inflate the challenges associated with increased access to treatment for pregnant women and mothers. Drug use during pregnancy has been seen as an assault or threat to the child's health and welfare. "Crack moms," or women who use cocaine and have children were one of the targeted populations in the 1990s, and substance use during pregnancy was criminalized based on the notion of a fetus's right to

be born free of birth defects related to substance exposures. Pregnant women and mothers who used cocaine were viewed as criminally irresponsible for putting their fetuses and children at risk (Beckett, 1995; Chin, 2013; Jessup et al., 2003). Criminalizing substance use during pregnancy can impede women's access to SUD treatment services (Angelotta et al., 2016). On the other hand, prior research shows that women do engage in SUD treatment longer if legal pressure is present (Ondersma et al., 2010). Policies that require mandatory reporting of perinatal substance use can complicate the patient-physician relationship as this policy too can facilitate the loss of their child's custody (Rohan et al., 2011). A total of 25 states have laws that mandate health care providers to report perinatal substance use to child protective services (CPS) (Guttmacher Institute, 2019). The number of states that have perinatal substance use reporting laws has increased over the years (Jarlenski et al., 2017). As women are vulnerable to such political, social, and institutional pressures, women's rights to make decisions regarding health care and the care of their child have been curtailed if they are known to use substances, and they may be encouraged and/or pressured into SUD treatment (Flavin and Paltrow, 2010; Paltrow, 1999). Pregnant women with substance use disorder face coercion from formal institutions (Paltrow, 1999) to engage in SUD treatment to maintain their legal rights of parenting (Jessup et al., 2003). External pressure has been associated with treatment retention for pregnant women; however, external pressure has not been associated with changes in treatment motivation, (Ondersma et al., 2010). The criminal justice system remains the major referral source for SUD treatment system among pregnant women (McCabe and Arndt, 2012).

Pregnancy is also a time of increased stress and difficulty; pregnant women who use substances report feelings of guilt and anxiety. Mothers with SUD who have young children also face a different set of barriers like child-care, (Marsh et al., 2000) child custody, and under-insurance (Grella et al., 2006). Traditionally, many barriers that impede SUD treatment utilization have not been the responsibility of the health sector. Gender differences in utilizing health services have become widely recognized, and gender-specific treatment strategies have evolved for treating SUD for women.

Because motherhood, including pregnancy, tends to increase participation in health care and opportunities for referral to and engagement in SUD treatment, the American College of Obstetricians and Gynecologists recommends screening for alcohol use and illicit drug usage to be a part of comprehensive obstetric care (“ACOG committee opinion No. 422: At-risk drinking and illicit drug use: Ethical issues in obstetric and gynecologic practice,” 2008). Prenatal care is considered an opportunity to identify alcohol or drug treatment needs; however, only about 35% of pregnant women who perceived a need for alcohol or drug treatment received services (Centers for Disease Control and Prevention (CDC), 2010).

Pregnancy increases women’s interests and motivation to engage in SUD treatment services for the well-being of herself and her child (Kuo et al., 2013; Ondersma et al., 2010). As pregnancy likely increases women’s and their child’s health concerns, indeed pregnancy has been considered as a “window of opportunity” for engaging women in SUD treatment. Pregnant women are noted to have more likely to have more treatment visits compared to non-pregnant women (Daley et al., 1998). There are many

reasons for accessing SUD treatment after becoming pregnant and using substances. Bidirectional psychological explanations exist. Pregnant women who have SUD have a higher risk of being readmitted for treatment, have a lower ability to quit their behavior, and are more dependent on drug use compared to non-pregnant women (Huang and Reid, 2006; Kuo et al., 2013). Prior research suggests that women are motivated to stop drug and alcohol use due to their concern for the child (Daley et al., 1998; Paltrow, 1999). Prior research shows that pregnant women decrease alcohol, opiates, and other intoxicants for the wellness of their child, so those who seek SUD treatment are more likely to need these services compared to non-pregnant women who have SUD (Terplan et al., 2012).

Motherhood increases the eligibility for use of social welfare services, including Medicaid (Johnston et al., 2020). Women who have SUD must navigate several siloed-systems of care (e.g., SUD treatment, primary care, mental health system, and prenatal care for pregnant women), as well as other social and welfare services like cash assistance or SNAP and Medicaid to address their multifaceted problems. Prior studies also demonstrated that cash assistance has been associated with increased access to SUD treatment services among low-income, substance-using mothers after welfare reform in the 1990s. SUDs were seen as a barrier to employment; therefore, welfare recipients have been targeted to receiving additional services such as SUD treatment and other education training programs (Pollack and Reuter, 2006). Yet, participating in social assistance programs can potentially be a pathway to identify and engage women who have SUD. Coordination of services across multiple agencies has been encouraged (Schmidt et al.,

1998), but the challenges remain.

At the policy-level, the Affordable Care Act (ACA) and subsequent Medicaid expansion increased coverage and access for mental health and substance use disorder (SUD) treatment services for vulnerable populations, including pregnant women (Beronio et al., 2014; O'Donnell and Jackson, 2017). Medicaid expansion policies that expanded Medicaid eligibility to adults with incomes up to 138% of the federal poverty level (FPL) increased insurance rates for pregnant women and increased SUD treatment coverage can facilitate women's access to treatment services (Angelotta et al., 2016). In many states, mothers are still cut off from Medicaid a couple of months after giving birth (Gordon et al., 2020). For postpartum women, access to treatment may decline.

Theoretical Context and Framework: An Integrative and Socio-political Model of Addiction Care Utilization

A life-course approach

Many people age out of substance misuse, as they mature and pass through various life transitions and turning point (Hser et al., 2007; Teruya and Hser, 2010). This general observation leads the exploration women's experiences as they pass through the treatment pathway, with a particular focus on transitions such as pregnancy and raising children (Figure 1). Health service utilization is multifaceted and dynamic as needs and dispositions related to the use of services can vary over the life course, under different circumstances. Besides, behaviors can change as individuals go through different life stages and substance-using behaviors can also change as they age out and into other stages. This mirrors the use of services reflecting changing health issues in general over

one's life course. This life-course approach (Teruya and Hser, 2010) can be applied to understanding women's pathways to access SUD treatment services as well. A big turning point is pregnancy, which affects their orientation around drug use and treatment utilization behaviors (Hser et al., 2007; Teruya and Hser, 2010). However, until the 1990s, SUD treatment literature excluded pregnant women (Greenfield et al., 2010).

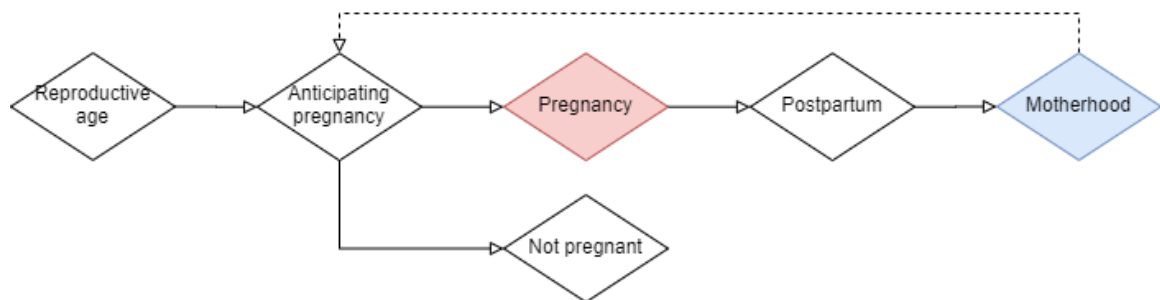


Figure 1: Life course approach for reproductive-age women

Pregnancy and motherhood mark a significant turning point that may differentially affect women's treatment engagement. Women who are pregnant and mothers may have (a) different predispositions to use health care, (b) experience changing responsibilities, and (c) changing social obligations/normative expectations. Deciphering access to SUD treatment for pregnant women and mothers going through physiologic and social change is indeed complex.

Andersen healthcare utilization model

Adding on to the life course model, Andersen's health care utilization model explicates health services use as a function of an individual's predisposition to use

services for women, factors that enable or impede use, their need for care, and the surrounding health and social policies (Andersen, 1995)— all of which can facilitate/hinder women’s access to SUD treatment. Predisposing factors such as biological or demographic characteristics that exist prior to one’s illness can affect treatment utilization. Enabling factors including insurance, public resources such as Medicaid, food stamps, income assistance, as well as one’s personal resources like financial status and residential proximity can contribute to one’s propensity for treatment utilization. The presence of enabling resources will increase the likelihood of use to take place. An individual’s perceived need is another important aspect that is essential for addiction service utilization. The Andersen model also stresses the exogenous factors that affect health service utilization. Policies can also, directly and indirectly, impact one’s care-seeking journey. Andersen asserts that the social context around how one perceives need is an essential part of modeling health services use. Health policies such as the Affordable Care Act and Medicaid expansion sought to promote health and well-being of the individuals. Other policies can also improve social or economic conditions that can lead to better health outcomes.

Personal and cognitive factors such as women’s responsibility to the fetus, guilt from using substances, social perception of what others think, and their perception of health services and policies can also influence their access to treatment utilization. The potential to bear children and its realization among women who have SUD may convey distinct advantages via treatment access (e.g., greater interest and motivation, increased preference, increased social pressure), as well as distinct disadvantages (e.g., fear of

criminal sanctions, reduced social and economic support, resistance to coercion). Finally, women's pregnancy status can interact with engagement with social services. Women can change their orientation towards accessing SUD treatment as rights and responsibilities are gained, assigned, ceded, and relinquished by women in society relative to the anticipation, duration, and cessation of child-bearing. Such enabling factors like women's ties to government services and prenatal care services can increase access and referral to SUD treatment utilization.

Life course changes may be reflected in changing predispositions to perceive needs and use services. In addition, the financial changes when becoming a mother and providing for a child may be reflected in changing enabling factors. Combined with the life-course approach, as women's social status changes throughout their lifetime, especially as they age and bear children, we can expect women will increase their social service utilization and have an enhanced orientation toward SUD treatment services.

Pescosolido's Network Episode Model

Pescosolido's Network Episode Model (B. Pescosolido et al., 1998) suggests that complex social ties and the information, advice, and support shared in social networks substantially influence how people make sense of their health concerns and the action they take. Those ties include an individual's ties to public services or organizations in addition to social relationships that can lead them to health services (B. A. Pescosolido et al., 1998). In this model, Pescosolido elucidates how people's interaction with others can be categorized as "choice", "coercion" and "muddling through" in the context of research

on access to psychiatric care, which can be adapted to understanding access to SUD care. Access to care is a complex process of interaction with others and agencies in which people make choices, experience coercion, or “muddle through”. “Choice” refers to depicting the user as making the rational choice, “coercion” suggests how people may be forced into the treatment system by others, and “muddling through” is when individuals “bound around” and “off” circumstances and attempt to deal with their problems, neither resisting nor seeking treatment. By recognizing the challenges of attaining access to treatment and understanding how women “muddle through” the treatment system, we can strategize how to improve women’s pathways to SUD treatment. Patient treatment experiences, access to care, and satisfaction differ based on one’s social network. Health care providers and social workers have been involved in Screening, Brief Intervention, and Referral to Treatment (SBIRT) training to screen and refer eligible patients to SUD treatment (Wamsley et al., 2018). On the other hand, patients with SUD rely on street narratives and their social network to make their healthcare-related decisions (Gryczynski et al., 2013). Thus, help-seeking for SUD, whether it results in formal health services utilization or not, can be examined with a special focus on the role of the social network system in shaping outcomes. Although the importance of stigma’s role in the social networks of individuals with SUD and how it affects their drug use have been investigated (Luoma, 2011), how it may influence pregnant women and mothers with SUD have not been fully explicated. Recognizing the challenges of attaining access to treatment and understanding how women “muddle through” the system are critical factors that can lead to a new paradigm of thinking.

In this dissertation, I refer to the utilization of social services as a proxy for one's social support or institutional support. Such social ties demonstrate not only one's connection to the services, which can be considered as the enabling factor, but it can also change the individual's perception, which can lead to the utilization of health services. For example, interactions between women and service agents such as caseworkers, case managers, or social workers are important opportunities to recognize drug use, evaluate women's perceptions of needs, and refer for treatment. That is, these interactions may be equivalent to the SBIRT process in health care settings. Such a notion is also deeply related to women's increased likelihood of using social services and SUD treatment services (Figure 2).

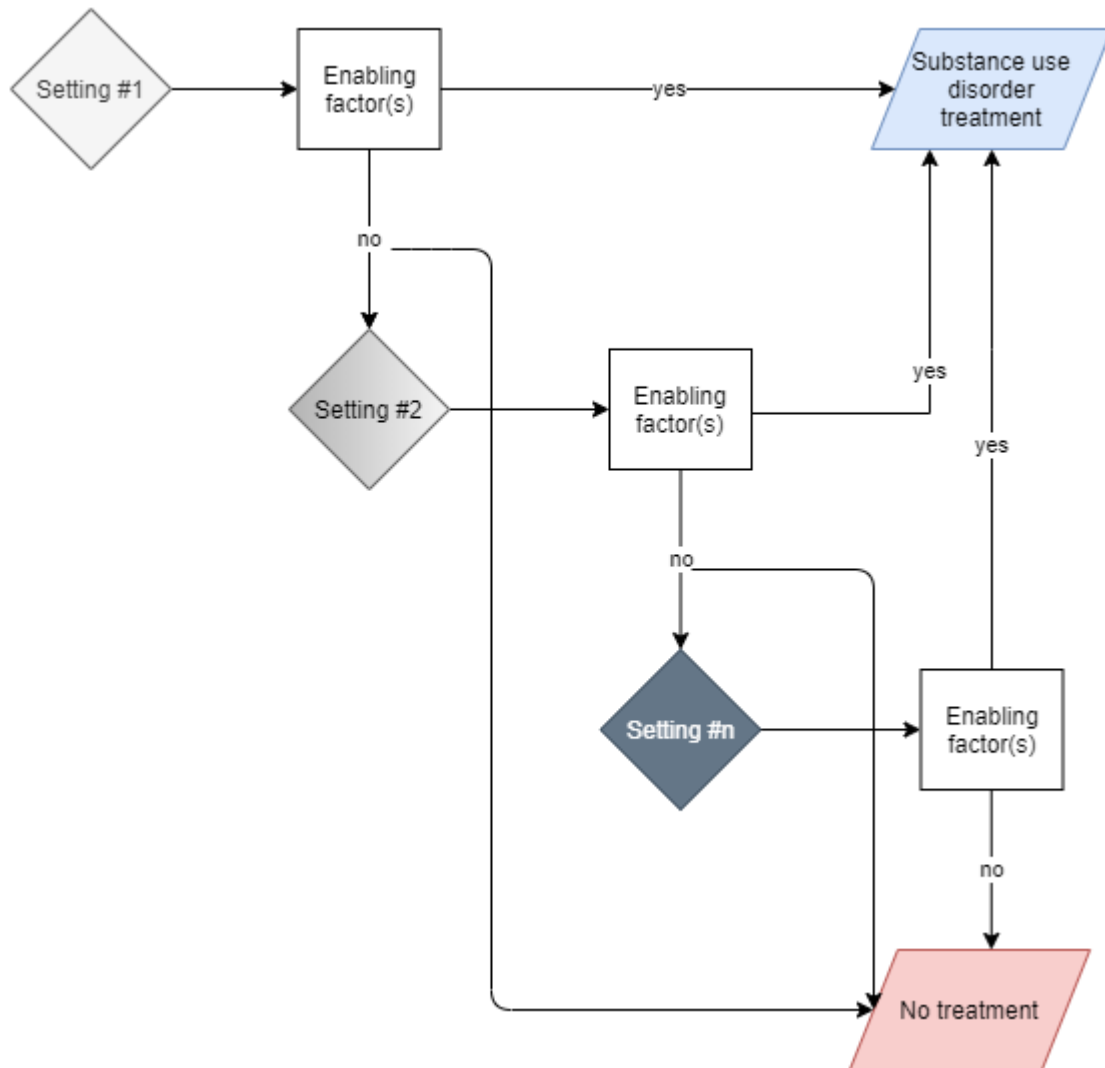


Figure 2: Application of Network Episode Model to inform SUD treatment access

Note: “Setting” refers to an agency or organization that women encounter or use, which can also be a proxy for social support or institutional support based on the context

An integrative and socio-political model of addiction care utilization

I have initially adapted the three models to fit how a woman who has SUD may engage in SUD treatment services. All three models can be applied to define potential pathways women may take to treatment, emphasizing social and contextual factors that

relate to their engagement with formal health services. The models emphasize that in using the health care system; there is more than acting upon clinical manifestations. There is more to it than focusing on the presented symptoms of the disease.

The hybrid model of the life course approach, Andersen's behavioral theory of utilization, and Pescosolido's network episode model can be applied to understand how health services, and specifically SUD treatment utilization, is a function of a woman's predisposition to use services, factors that enable or impede use including her social ties to organizations for obtaining resources, and one's need for care, which may change as a result of pregnancy status, motherhood, and societal policies (Figure 3). However, the hybrid model requires further specifications and clarifications as to how the magnitude of these relationships, avenues and policies, affects women's engagement in SUD treatment. The direction and cumulative effects of such associations have been understudied.

An integrative and socio-political model of addiction care utilization depicts women's life course events from reproductive age to pregnancy to motherhood. The life course model works with the Andersen model by suggesting turning points that predispose women to seek treatment. Andersen pointed to social norms as predisposing factors, and the life course approach helps to identify specific social norms. The model depicts how in contrast to natural life course continuation from pregnancy into motherhood, the institutional context separates and treats pregnant women differently from mothers and other non-pregnant women. For example, different social status that comes with becoming pregnant or entering motherhood marks opportunities where women may encounter changes in their lives. Thus, these opportunistic events can

interact with other enabling factors such as insurance and affect women's access to SUD treatment. In addition, different roles and/or events can interact with the state policy environment, one's personal and cognitive factors as well as enabling factors.

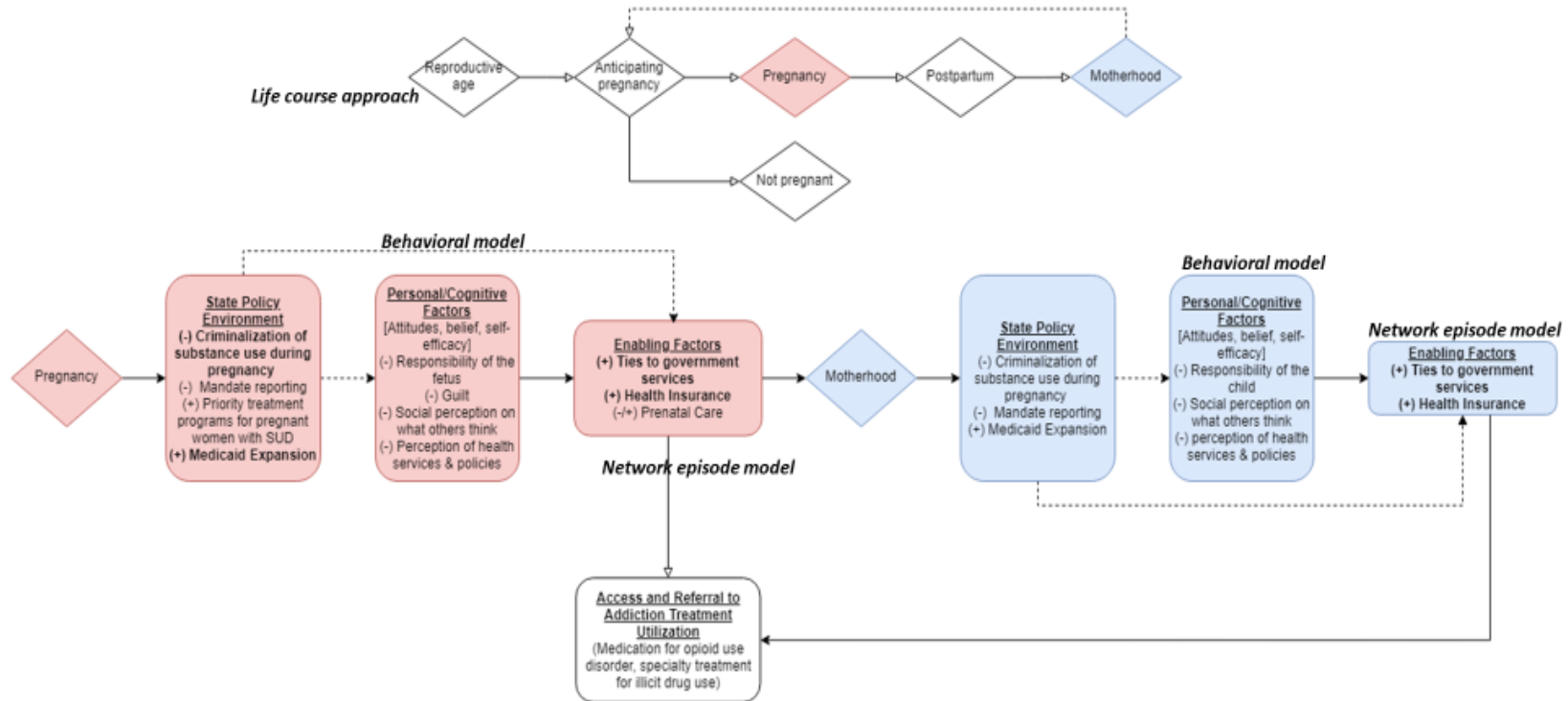


Figure 3: An integrative and socio-political model of addiction care utilization

Summary

To increase access to SUD treatment for women who have SUD, there is a need to understand the individual level and the psychosocial context. A comprehensive approach to increasing access to SUD treatment services requires collaboration among a mix of individuals with varied interests, skills, and resources, living in states with different laws. Thus, successful SUD treatment engagement should encompass ways to address women's different stages in life, and different contextual factors including general services and policies that women encounter, as illustrated in the integrative and socio-political model of addiction care utilization model. As substance use is highly stigmatized for mothers, there is a demanding need for innovative approaches to increase access and enhance the health of marginalized patients. There is a strong need to push the boundaries of health services research to include what has been traditionally the responsibility of the health sector and include other outlets that can facilitate treatment access for pregnant women and mothers with SUD.

Dissertation Aims

This dissertation seeks to explore the elements that affect access to SUD treatment services for women. In particular, I will examine the consequences of substance use-related policies and women's ties to the elements of political, health, and social systems during pregnancy, as they approach and enter motherhood. For example, this biological and sociological change has consequences for how women think about their health, their relationships with others (partners, family, friends, social workers, and clinicians), and

their emerging responsibilities for the person they are carrying and will eventually care for. Additionally, women's opportunities and social imperatives for engaging in SUD treatment change as they become mothers. Through assessment of current evidence, application of sociological and health services theoretical frameworks, and empirical analyses, this dissertation explored the complexity of potentially modifiable enabling and disabling service and policy predictors for accessing SUD treatment engagement. The effects of one's political, health, and social environment and its impact on SUD treatment services will depend on the individual characteristics and the state Medicaid and criminalization policy characteristics in which the individual resides.

Guided by the conceptual model, this dissertation examined treatment access and policy for a particularly vulnerable, understudied group of women who have SUD by 1) reviewing and synthesizing prior literature on the differential SUD treatment engagement gateways, referral sources, and organizational ties to health, social, and criminal justice systems for pregnant women and mothers and constructing a conceptual framework that explicates differential facilitators and barriers that affect engagement in SUD treatment services; 2) estimating the association of the SUD treatment engagement in varied SUD treatment gateways or engagement avenues according to the conceptual model formulated in paper 1; and 3) examining the unique contributions of the interplay of two policies—the Affordable Care Act and the state laws that penalize substance use during pregnancy—that vary by state and can differentially impact pregnant women's SUD treatment engagement.

CHAPTER 1.

Summary

Access to addiction treatment is complex, and more so for pregnant women and mothers who, despite being the focus of many drug control policies, experience unique barriers. Since the late 1990s, researchers have advocated to improve access by increasing opportunities for addiction treatment referral beyond specialty addiction treatment settings. In this chapter, I aimed to summarize contemporary findings on gateways to treatment, referrals, facilitators, and barriers to treatment for pregnant women and mothers with SUD. Multiple gateway institutions and referral settings were identified: health care settings, government social service agencies, criminal justice settings, community organizations, and employers. Some of the identified facilitators and barriers to addiction treatment were unique to pregnant women and mothers (e.g., fear of incarceration for child abuse). Both personal (emotional support and social support) and child-related factors (external pressure, loss of children, suspension or termination of parental rights, the anticipation of reuniting with children) motivated women to seek treatment. Major access barriers included fear, stigma, charges of child abuse, inconvenience, and financial hardship. Use of medication for addiction treatment and having custody of children were associated with increased retention in treatment. Many studies documented the success of obstetrical providers acting as referral sources. Outside of health care settings, criminal justice systems were the most frequently observed gateway to drug treatment. Fear of legal charges was one of the frequently cited barriers

to treatment for pregnant women and mothers. There has been progress in implementing different types of interventions and treatments that were attentive to pregnant women and mothers' needs.

Background

There were two related policy initiatives in the 1990s that sought to increase community vigilance to identify and refer people who use drugs to treatment using an integrated public health approach. Weisner and Schmidt (Weisner and Schmidt, 1995) and Babor (Babor et al., 2007) called for reforms to increase community vigilance to identify and refer people who use drugs to treatment. Prior literature shows how community agencies can be used as referral sources, and mobilized into sites of surveillance, identification, and referral to treatment. They also argued to build systemic identification and referral capabilities in the community, augmenting health care providers' referrals to SUD care (Weisner and Schmidt, 1995). Multiple gateways or pathways and sequences of events in the lives of people with SUD may lead them to treatment, and these pathways are augmented by social interactions, particularly interactions with various health and social agencies. Treatment alone is often not enough for many women, there are many unmet needs such as housing, transportation, child care, and other social and economic support (Knight et al., 2014; Ramlow et al., 1997; Terplan et al., 2015).

In recent years, progress has been made in improving access to SUD treatment. There has been an expansion of treatment settings, and health care settings have expanded referrals to SUD treatment (Meinhofer et al., 2020). Many health care settings,

including the emergency department (ED), primary care, and inpatient settings, have been identified as gateway settings to facilitate screening and referrals to SUD treatment since the specialty SUD treatment is segregated from the healthcare system (Babor et al., 2007; D’Onofrio et al., 2015; Harris et al., 2009; Tai and Volkow, 2013). One of the well-known methods to systematically screen and refer patients with SUD is SBIRT. SBIRT has focused on exploiting primary care settings to manage SUD, but it also recognized and emphasized the notion of integration and coordination of services to promote a smooth diagnostic and referral system (Babor et al., 2007). SBIRT has been implemented in health care settings including ED’s and trauma centers, and community-based settings such as faith-based organizations (Wong et al., 2018). Complementary expansion of referral settings happened outside of the healthcare setting as well. A community-based approach that emphasizes the role of interdependencies among community organizations and SUD treatment systems has been advocated for (Weisner and Schmidt, 1995). For example, the Gloucester, Massachusetts Police Department’s Angel program demonstrated that police departments can become a pivotal access point to treatment instead of arrest (Schiff et al., 2017). Additionally, attendance at various public agencies, such as welfare services, has been shown to increase one’s likelihood of accessing SUD treatment, but this can be punitive and/or voluntary in nature (Friedmann et al., 2003; Kuerbis et al., 2011; Miller and Weisner, 2002).

Yet, pregnant women and mothers experience additional barriers to treatment such as childcare and the legal implications of substance use during pregnancy. Many pregnant women and mothers are afraid of disclosing their substance use which is

considered child abuse in some states, and parental drug use has been associated with losing child custody (Marcenko et al., 2000). Given that health care providers can report suspected parental SUD that may lead to charges of child abuse or neglect, women's fear to disclose substance use in health care settings is not surprising (Haycraft, 2018; Van Boekel et al., 2013; Wright et al., 2016). Pregnant women and mothers with SUD have faced coercion from formal institutions (Paltrow, 1999) to engage in SUD treatment rather than get charged for child abuse and losing child custody (Jessup et al., 2003). Treatment for SUD remains caught in a social context that continues to view drug use as a crime (SAMHSA, 2005; Scholarlycommons and Morse, 2012). In this regard, probation status in the criminal justice system is associated with treatment receipt (Johnson et al., 2020).

Additionally, states can likewise have laws that mandate their health care providers report perinatal substance use to child welfare services or CPS. Policies that regulate drug use during pregnancy and motherhood have increased over the years (Jarlenski et al., 2017). Although external pressure has been associated with treatment retention for pregnant women, it was not associated with changes in treatment motivation (Ondersma et al., 2010). The criminal justice system remains the major referral source for pregnant women who utilize the SUD treatment system, although the Angel program in Gloucester shows that the criminal justice system can be both a carrot and a stick (McCabe and Arndt, 2012; Schiff et al., 2017). Ironically, police officers in Gloucester operated as referral agents instead of criminal justice agents, while some health care providers became surveillance agents. Women's rights to make autonomous choices have

been curtailed relative to pregnancy if they are known to use substances, and they were encouraged and/or pressured into SUD treatment (Flavin and Paltrow, 2010; Paltrow, 1999).

Examining specific mechanisms and pathways that facilitate SUD treatment during pregnancy and motherhood can pose opportunities to inform screening and treatment efforts. One potentially fruitful area for study is examining the roles of diverse health, social service, and criminal justice agencies in facilitating the identification and referral of pregnant women and mothers to treatment. However, analysis of the gateways and referral pathways to accessing SUD treatment for pregnant women and mothers remains limited, and the literature has not been marshalled into a coherent, comprehensive model. This paper contributes by systematically summarizing the previous literature on pregnant women and mothers' pathways to SUD treatment through a scoping review.

The purpose of this review is to summarize contemporary findings on gateways, referrals, facilitators, and barriers to treatment for pregnant women and mothers with SUD. I first note which settings have been marked and studied as gateways and/or referral settings for pregnant women and mothers in the literature. First, I organized previous findings on the study settings and treatment referral settings, identify agencies that operated as gateways to refer pregnant women and mothers to SUD treatment, and clarify the role of these institutions in engaging these individuals in treatment. Next, I explore how these identified settings may enable or impede women's referral to outpatient SUD treatment services in both clinical and non-clinical settings. I scrutinize

the effectiveness of interventions and explore factors that affect retention. Finally, I develop a conceptual model of SUD treatment access and barriers for pregnant women and mothers across gateways and referral settings by conducting a review of the literature to identify successful and unsuccessful efforts by staff from different settings to engage pregnant women and mothers in SUD treatment. The model addresses the complexity of potentially modifiable opportunities and barriers in the community for accessing SUD treatment access.

Methods

The scoping review strategy by Levac et al. (Levac et al., 2010) and a realist approach (Pawson, 2004) were undertaken to focus on summarizing common elements in the literature about the gateways and referral settings, facilitators, and barriers to SUD treatment services. A wide range of study designs were incorporated, including quantitative and qualitative research from randomized control trials, longitudinal cohort studies, and cross-sectional studies.

Search Strategy

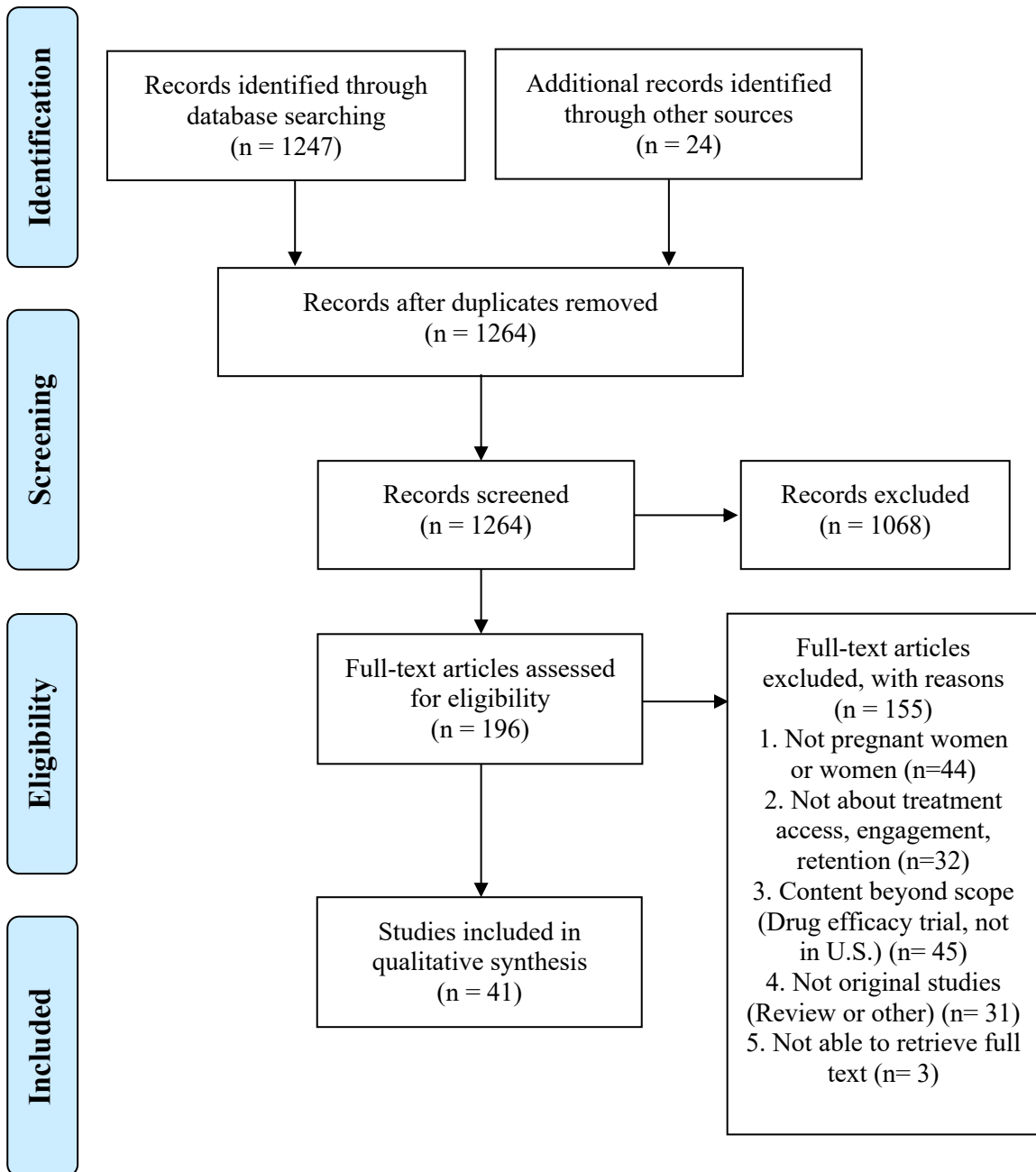
The literature search was conducted using the electronic search engines MEDLINE/PubMed, Scopus, and Google Scholar for publications from 1996 to 2019 after Weisner and Schmidt called for the expansion of the frame of SUD health services research in 1995. This scoping review conducted a preliminary assessment of potential size and scope of available literature on this topic. An initial database search for English-

language articles was carried out using the keywords (wom* OR pregnant wom* OR pregnancy OR mother* OR maternal wom* OR parenting wom* OR pregnant OR motherhood) AND (Substance-Related Disorders/therapy [Mesh]) AND (Alcohol-Related Disorders OR Opioid-Related Disorders OR Cocaine-Related Disorders) AND (drug treatment OR substance use disorder treatment OR treatment program OR detox* OR referral). References were also pulled from the “similar article” list in PubMed. I searched the reference lists of collected papers for additional papers.

Article Screening

First, I conducted a title and abstract review of all articles. Publications were reviewed to assess for inclusion criteria. I included papers of United States samples that reported on subjects related to SUD treatment access or utilization among pregnant women or mothers between ages 15 to 44 who have children. I focused on studies on alcohol use disorder, cocaine use disorder, and opioid use disorder (OUD) and excluded nicotine use disorder because currently, SUD treatment programs focus on alcohol and other drugs, generally excluding nicotine use disorder. I excluded animal studies and studies that report only on the outcomes of the children since I focused on women’s access to treatment. Furthermore, I excluded studies that did not document details on referral settings, facilitators, or barriers to addiction treatment access and/or retention. After the abstract review, I removed duplicate records and conducted a full-text review.

Figure 4 Article screening using PRISMA



Scoping and Extraction Process

During the full-text review, I recorded the exclusion reasons and extracted information from the articles (Table 1). A flow chart of the literature search and selection process was developed (Figure 4). Two authors reviewed articles and when disagreements on study inclusion occurred, and consensus could not be reached, a third reviewer was asked to determine the inclusion.

Table 1. Full text article screening data extraction elements

Extracted elements	Presented in main analysis
Study population (e.g., Pregnant women, women with children (mothers), or both)	X
Intervention description or main explanatory variable	
Sample size (N)	X
Geographic region (e.g., National, state, organization)	X
Study setting (e.g., Drug court, tertiary hospital, addiction outpatient treatment, CPS, N/A)	X
Referral setting (e.g., Drug court, tertiary hospital, addiction outpatient treatment, CPS, N/A)	X
Study design	X
Study objective(s)	X
Time period	
Main findings	X
Observed outcomes	
Process variables	
Policy factors	
Implementation factors	
Conceptual model used	
Name of the dataset used, if any	
Referral, access, retention, or effectiveness theme	X

Analysis

For the analysis, I identified treatment settings and gateways or referral sources. I analyzed women's pathway to treatment, and developed a model of treatment access sensitive to the experiences of women, highlighting the role of pregnancy and motherhood and interactions with different agencies specifically. Thematic analysis consisting of identifying and analyzing key domains was conducted following the full article review. I identified the results in relation to the domains of gateways, referrals, facilitators, and barriers to treatment access and retention for pregnant women and mothers with SUD. After the analysis, I developed a SUD treatment access model for pregnant women and mothers across multiple referral settings that demonstrated the key barriers relevant to each referral source (Figure 5).

Results

The results of this scoping study are divided into six sections: results from study screening, study trends, study design and settings, gateways or referral sources, barriers and facilitators for treatment access, factors for retention, and effectiveness of interventions.

Study screening results

Our search identified 1,271 citations. After excluding 7 duplicates, I screened titles and abstracts and excluded 1,068 studies (Figure. 4). I reviewed 196 full texts and excluded 155 studies (not about pregnant women or women) (n=44); not about treatment

access, retention, or did not have enough details about treatment (n=32); went beyond the scope of this review (i.e., drug efficacy trial, not based in US) (n= 45); not original research (review or other) (n= 31); did not have the full text available (n=3) resulting in a final sample of 41 articles (Figure 4). Information from each of the 41 articles was consolidated into Table 2, which captures information about study population, study setting, sample size, SUD inclusion, study design, study objective, and key results.

Trends in studies

Subjects of the studies showed a greater interest in pregnant women and treatment access than of women with children. Of 41 articles, 26 articles focused on samples of pregnant women, 4 focused on samples of women with children, and 11 articles focused on both pregnant women and women with children. Many studies examined the efficacy of treatment programs that targeted pregnant women and mothers (Connors et al., 2006; Dakof et al., 2010; Morgenstern et al., 2009; O'Connor and Whaley, 2007; Weisdorf et al., 1999; Whiteside-Mansell et al., 1999) and compared the characteristics of women in these treatment programs. Some studies explored the utilization of welfare services or referrals from welfare services because a large proportion of children involved in the welfare system had a parent who used substances (Dakof et al., 2010; Grella et al., 2006; Hohman et al., 2003; Kissin et al., 2001; Klein et al., 1997; Morgenstern et al., 2009). Studies discussed the role of coercion and external pressure that affected women's decisions to access or drop out from treatment (Connors et al., 2006; Nishimoto and Roberts, 2001; Ondersma et al., 2010), Homelessness (Tuten et al., 2003), and mental

illnesses (Simons, 2008) hindered retention of treatment among pregnant women and mothers.

There was a decline in the number of studies that involved community organizations or agencies from 1996 to 2019. Most of the research focused on associations between women's characteristics and treatment referral, access, and retention in SUD treatment, and examined the unmet service needs of pregnant women with SUD. Many of the interventions focused on assisting women to be engaged in treatment. Additionally, research before 2012 includes a greater variety of referral settings, and studies published after 2012 focused more on health care settings. We observed a shift from identifying the treatment need in social welfare agencies to women's health clinics. Studies published after 2012 have been taking place in other non-SUD hospital-based units such as obstetrics and gynecology (Martino et al., 2018; Mittal and Suzuki, 2017; Ondersma et al., 2018; Saia et al., 2017; Shenai et al., 2019) or primary care (Lee King et al., 2015; O'Connor et al., 2018).

Increasing access for pregnant women and mothers was still an important issue in the more recent period (post-2012 studies). Several studies focused on increasing treatment access for pregnant women and mothers (n=18) and explored factors impacting treatment access and retention (n=9). Socially vulnerable subgroups, such as women involved in the criminal justice system and/or the CPS, have been studied sporadically throughout the studied periods (Falletta et al., 2018; Kuo et al., 2013; Stone, 2015; Thompson et al., 2013; Washio et al., 2018). The number of studies on pregnant women and mothers with SUD increased dramatically in 2018, during the opioid epidemic, when

the availability of fentanyl and overdose deaths increased (Lee and Saia, 2019). Likewise, studies that focused on women with OUD proliferated during the past decade due to the opioid epidemic. I began to see innovations like computer-delivered interventions targeting women with SUD in reproductive health clinics in 2018 (Martino et al., 2018; Ondersma et al., 2018).

Gateways or referral sources

I examined the gateways or referral sources of treatment utilization for pregnant women and mothers to examine where access to the treatment system begins. I observed that pregnant women and mothers with SUD were referred to treatment from healthcare settings (Martino et al., 2018; Stone, 2015), government social service agencies (Falletta et al., 2018; Grella et al., 2006; Hohman et al., 2003; Klein et al., 1997; Morgenstern et al., 2009; O'Connor and Whaley, 2007; Pollack and Reuter, 2006; Stone, 2015), criminal justice settings (Angelotta et al., 2016; Short et al., 2018; Stone, 2015), community-based organizations (McCabe and Arndt, 2012; Thompson et al., 2013), and employers (Grella et al., 2006). I did not find studies that focused on evaluating the comparative effectiveness of referral sources for this population. All studies analyzed data from a single referral source or listed the source of referrals at the study setting.

Overall, the search revealed that treatment referrals from health care settings increased access to care and decreased substance use for pregnant women. In particular, there has been more attention paid to initiating treatment early in the prenatal period (SAMHSA, 2015). For instance, the number of pregnant women with an OUD that

received treatment after seeking care in an obstetric clinic increased over time (Saia et al., 2016). The use of a computer-delivered SBIRT tool for a referral to treatment in a reproductive health clinic decreased substance use for pregnant women and mothers during the 6 month follow-up period but did not increase treatment use (Martino et al., 2018).

Patients were referred to SUD treatment from multiple sources outside of health care settings: social welfare agencies such as CPS, Supplemental Nutrition Program for Women, Infants and Children (SNAP-WIC), Temporary Assistance for Needy Families (TANF), and the criminal justice system. A majority of pregnant women who enter SUD treatment received government support including food assistance and housing assistance (Aklin et al., 2014; Brogly et al., 2018; Ondersma et al., 2018; Thompson et al., 2013). I was not able to locate articles that directly assessed the effectiveness of referrals from public agencies. However, I found that women involved in the CPS system were more likely to experience mandated treatment by a probation officer or a CPS worker, and have an unsatisfactory exit status compared with women not involved in the CPS system (Hohman et al., 2003). In one of the studies, women involved in the CPS system were more likely to be younger, have more children, and be economically unstable compared to women not engaged in the CPS system (Grella et al., 2006). SBIRT and case management programs in government welfare service settings such as SNAP and TANF among pregnant women and mothers demonstrated successful referrals to treatment as well as improvement in abstinence rates.

For successful referrals, studies mentioned the importance of meeting women's

social needs. Many studies discussed strategies for increasing treatment participation for pregnant women such as offering vocational education, nutritional support, case management, and housing assistance (Klein et al., 1997; Morgenstern et al., 2009; O'Connor and Whaley, 2007). For example, in one study, women who received brief interventions by nutritionists for referrals experienced increases in motivation to change their alcohol use behavior after treatment utilization (O'Connor and Whaley, 2007). In another study, women who received an intensive case management service in the TANF program improved abstinence after treatment utilization (Morgenstern et al., 2009).

Studies from 1998 to 2008, the criminal justice system was the prominent source of referral for pregnant women entering treatment (McCabe and Arndt, 2012). In one study, more than half of pregnant women who were admitted to treatment reported that they had incarceration history, and a quarter of pregnant women had been arrested in the year prior to entering treatment (Connors et al., 2006). In a study that examined pregnant women who have OUD, black women were more than 10 times more likely to be reported to authorities after a positive urine screening compared to white women (Angelotta et al., 2016). Pregnant women who were referred from the criminal justice system to treatment were less likely to receive evidence-based treatment, such as medication for opioid use disorder (MOUD) (Angelotta et al., 2016; Short et al., 2018).

Community resource sites have been recommended as settings to reach more women and mothers with SUD. These are organizations like women's shelters or Planned Parenthood that offer child care, housing assistance, or jobs for women in need (McCabe and Arndt, 2012; Thompson et al., 2013). Using confidential employment assistance

services, employers can also screen and refer individuals to SUD treatment (Aklin et al., 2014). However, inefficient or non-existent connections between these referral settings and treatment programs pose challenges (Short et al., 2018; Thompson et al., 2013).

Barriers and facilitators for treatment access

Healthcare

Women who were admitted to managed withdrawal programs (detoxification) reported that acceptability and accessibility were the most common barriers to follow-up treatment (Jackson and Shannon, 2012). Acceptability captured multiple psychological barriers like the perception of the treatment environment, stigma, fear of losing children, self-denial, and pre-knowledge about treatment. For the treatment of an OUD, the rise of using buprenorphine in office-based treatment (OBOT) in settings such as primary care increased women's access to treatment (O'Connor et al., 2018). Health care navigation issues such as delays in entering treatment (Hand et al., 2017a), choosing a provider or making appointments (Martino et al., 2018), and child care (Kahn et al., 2017; Stone, 2015; Thompson et al., 2013) interfered with women's access to SUD treatment. Having other comorbid conditions such as mental health disorders can also be a barrier to treatment (Kuo et al., 2013).

Government and social services

Social service referrals raised concerns of privacy, stigma, and navigation difficulties that have been shown to hinder access (Morgenstern et al., 2009; O'Connor

and Whaley, 2007). Women did not know what treatments were available and/or did not know how to access treatment (Klein et al., 1997). Women often faced the fear of disclosing their pregnancy and SUD status (Frazer et al., 2019). I found that a woman's relationship with a social service agency can be complicated, and research has shown mixed findings on the effects of women's involvement with social service agents.

Women's relationships with CPS can be both barriers and facilitators. A qualitative study that evaluated the perspectives of women revealed that their engagement with CPS led to participation in treatment programs in order to keep custody of their children and to avoid criminal investigations (Thompson et al., 2013). Pregnant women with SUD also believed that participating in SUD treatment would help them keep their children or be reunited with their children more quickly (Dakof et al., 2010; Frazer et al., 2019; Thompson et al., 2013).

However, involvement with the CPS can turn women away from treatment. In one qualitative study, women mentioned both positive and negative experiences with their caseworkers and counselors (Kuo et al., 2013). Some women stated they were not treated with respect, which was detrimental to their recovery. The participants described their positive and negative feelings toward CPS based on their encounters with caseworkers and counselors (Falletta et al., 2018; Kuo et al., 2013). Having a good relationship with experienced coordinators/counselors was a key facilitator that increased treatment accessibility (Cochran et al., 2018; Dakof et al., 2010). In government agencies that offer welfare services, fewer direct barriers exist because these agencies meet women's socioeconomic needs through cash, food, or housing assistance, and health insurance.

Criminal justice system

Correspondingly, treatment referral experience through the criminal justice system was bidirectional. For example, women who were referred by the criminal justice system were less likely to use MOUD (Angelotta et al., 2016; Short et al., 2018); however, a large proportion of public treatment utilizers were referred from the criminal justice system (Washio et al., 2018). Women seeking referrals from criminal justice settings can face the following barriers as well: stigma from their families and communities (Angelotta et al., 2016). Another barrier to SUD treatment care-seeking was women's concerns of being reported to the criminal justice system, including the risk of criminal prosecution of child abuse (Angelotta et al., 2016; Clemans-Cope et al., 2019; Falletta et al., 2018; Hand et al., 2017a; Short et al., 2018; Stone, 2015) and fear of losing custody of children (Falletta et al., 2018; Frazer et al., 2019; Kuo et al., 2013). For some women, entering treatment is equated with losing custody of the child since most residential programs do not allow children (Falletta et al., 2018; Stone, 2015).

Employers

Accessing treatment from an employer also may hinder access to treatment due to unsolved transportation, navigation, child care issues (Aklin et al., 2014; Morgenstern et al., 2009). Employer services (employee assistance program) may pose fewer indirect barriers if employment assistance services can ensure confidentiality and anonymity (Brogly et al., 2018).

Community-based organizations

Due to women's unwillingness to disclose their SUD, referrals from community-based organizations may face their own challenges in addition to privacy concerns, transportation, money, and navigation challenges. Stone discusses how women avoid treatment due to the risk of substance use detection (Stone, 2015). At the community-level, screening and referring women with SUD may be beyond the scope of work of these institutions or sectors (Thompson et al., 2013).

Structural factors

Contextual factors have been identified to affect women's SUD treatment access as well. Structural stigma (Kuo et al., 2013; Stone, 2015) and policies on substance use during pregnancy such as mandatory reporting to CPS (O'Connor et al., 2018) or risk of criminal prosecution of child abuse (Clemans-Cope et al., 2019) can hinder or exert pressure on women to access treatment services (Ondersma et al., 2010). These punitive policies can have different effects depending on which agency or gateway women enter. For example, these policies complicate the patient-provider, social worker-client, and caseworker-client relationships (Angelotta et al., 2016; Frazer et al., 2019).

Unavailability of treatment services was another barrier as SUD treatment services were limited in capacity and there is a shortage of buprenorphine prescribers (Hand et al., 2017a; Mittal and Suzuki, 2017; Short et al., 2018). Conversely, state-funded programs that targeted pregnant women or offered priority access increased the availability of treatment services (Short et al., 2018). Pregnancy can facilitate expedited enrollment in

methadone treatment while waiting periods were longer between pregnancies (Stone, 2015). State policies like the Medicaid expansion directly increased the likelihood of insurance coverage among pregnant women for those living in the expansion states, increasing one's SUD treatment access (Clemans-Cope et al., 2019).

Factors for retention

MOUD use at the time of conception was associated with a longer length of treatment for pregnant women (O'Connor et al., 2018). Involvement with the criminal justice system and external pressure (Ondersma et al., 2010; Simons, 2008) were factors that increased treatment retention. Likewise, having custody of their children increased the likelihood of treatment retention (Nishimoto and Roberts, 2001). The availability of support groups was associated with treatment engagement (Kuo et al., 2013), as was family support (Simons, 2008). On the other hand, social vulnerability factors such as homelessness (Tuten et al., 2012), as well as mental health comorbidities, decreased the likelihood of treatment retention (Simons, 2008).

Effectiveness of interventions

Multiple interventions reduced substance use (Aklin et al., 2014; Alemi et al., 1996; Cochran et al., 2018; Connors et al., 2006; Dakof et al., 2010; Mittal and Suzuki, 2017; Whiteside-Mansell et al., 1999) and improved mental health and physical health outcomes (Alemi et al., 1996; Cochran et al., 2018; Connors et al., 2006; Dakof et al., 2010; Meyer et al., 2012; Shenai et al., 2019; Whiteside-Mansell et al., 1999). I examined

an increase in different treatment modalities, but most programs strived to be convenient (Mittal and Suzuki, 2017; O'Connor et al., 2011), practical (Dakof et al., 2010; Thompson et al., 2013), and emotionally supportive (Cochran et al., 2018; Dakof et al., 2010; Kuo et al., 2013). The treatment programs attended to the social and psychosocial needs of mothers by focusing on self-sufficiency (Conners et al., 2006), integrating family involvement and support (Saia et al., 2017), teaching parenting techniques (Conners et al., 2006; Dakof et al., 2010; Kahn et al., 2017), providing a linkage to social service agencies (Thompson et al., 2013), and offering vocational education (Aklin et al., 2014; Morgenstern et al., 2009). Programs that allow women to keep their children or that help women regain custody of their children successfully motivated women to participate in treatment (Thompson et al., 2013). Maintaining or regaining child custody motivated women to seek treatment, but for some, it deterred women from seeking treatment (Frazer et al., 2019; Kuo et al., 2013). The programs that offered parenting education were a collaborative effort among physicians, nurses, and child welfare training specialists. Such interdisciplinary interventions also add convenience. For instance, some patients attended parenting education sessions after their outpatient visit for medication treatment (Kahn et al., 2017).

The attention to enhanced convenience was evident in multiple treatment interventions: these program components included child care options (Weisdorf et al., 1999), case management (Meyer et al., 2012), and treatment coordination (Cochran et al., 2018; Morgenstern et al., 2009; Whiteside-Mansell et al., 1999). For example, a program used navigators who helped women maneuver through clinically integrated treatment

services where coordination was key to ease access for women (Cochran et al., 2018). Designing programs that are attentive to women's social contexts greatly improved access and retention to treatment. To ease the process of disclosing substance use (Hohman et al., 2003), programs pursued innovative technology to increase treatment participation (Alemi et al., 1996; Ondersma et al., 2018). Some programs focused on increasing access to clinical treatment, emphasizing outpatient treatment (Morgenstern et al., 2009; Weisdorf et al., 1999), offering medication for addiction treatment (Meyer et al., 2012; Mittal and Suzuki, 2017), providing psychosocial support (Alemi et al., 1996; Connors et al., 2006; Weisdorf et al., 1999; Whiteside-Mansell et al., 1999), and addressing comorbid diagnoses (Kuo et al., 2013; Shenai et al., 2019).

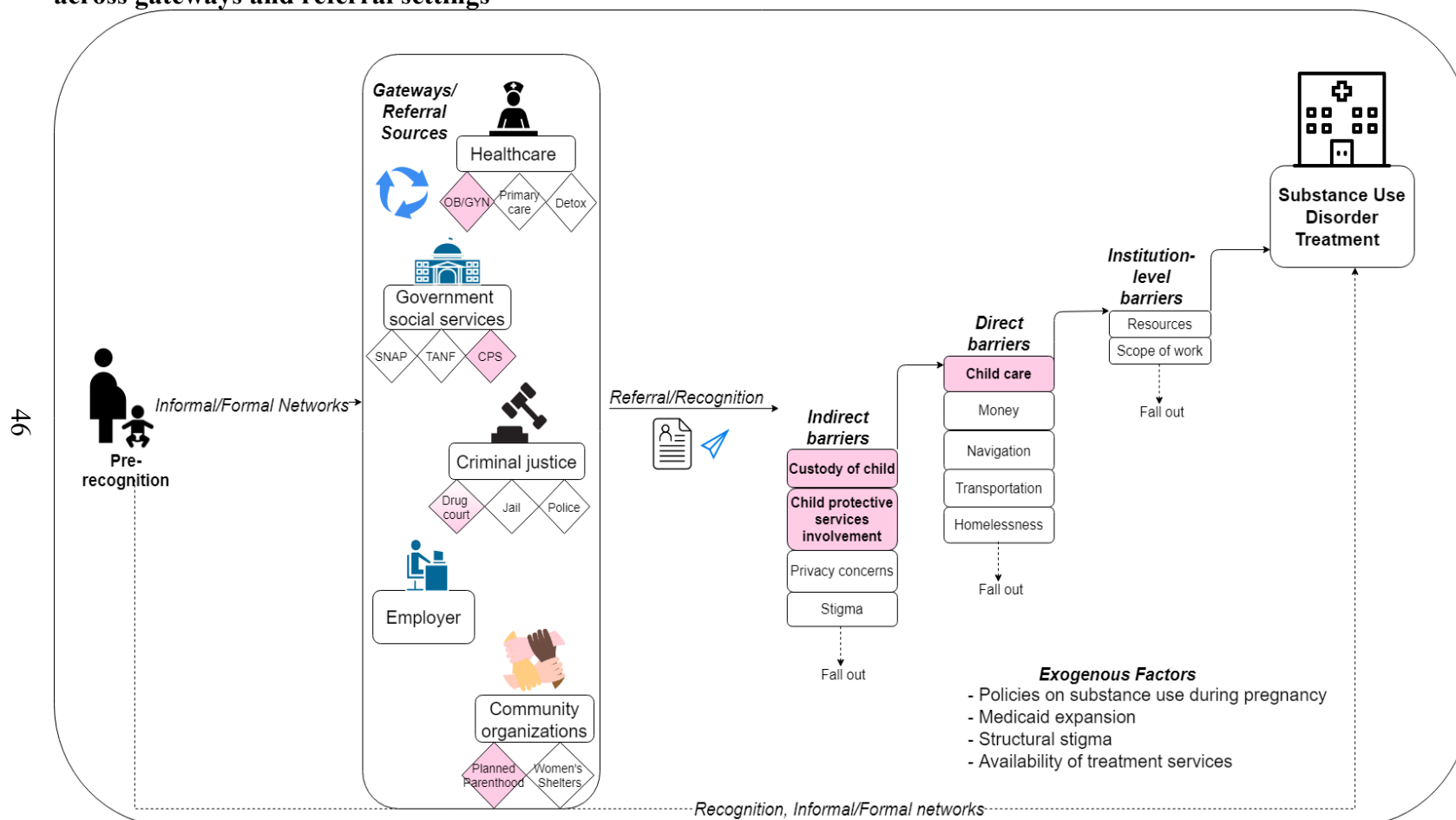
One of the challenges of implementing interventions was identifying pregnant women who use drugs when they are not willing to disclose their use (Ondersma et al., 2010; Washio et al., 2017). Institutions or programs also faced challenges like coordinating urgent referrals and scheduling appointments (Mittal and Suzuki, 2017).

Conceptual Model

Based on the findings, I developed an empirically testable conceptual model that illustrates pregnant women's and mother's pathways to treatment by mapping gateways and/or referral sources (Figure 5). In describing pregnant women and mothers' access to treatment, I considered their informal or formal networks, gateways and/or referral sources, and the referral itself. The model highlights the potential barriers women may encounter based on the use of gateways and/or referral sources. Accessing treatment

occurs in the context of socioeconomic and other social determinants, which can lead women into gateways and/or referral sources. For example, these settings include the healthcare system, government services, the criminal justice system, employers, and community organizations. One of the important assumptions of a model of pathways to SUD treatment is that women with SUD will accept the referral and that treatment is available upon referral. Women's treatment "pathways" include three levels of barriers (indirect barriers, direct barriers, and institutional barriers) and exogenous factors that can hinder treatment access. I observed many individual-level barriers to treatment including, privacy concerns (Frazer et al., 2019; Shenai et al., 2019), disbelief that treatment is effective (Stone, 2015), loss of intimate relationships and having a lack of social capital (Kuo et al., 2013; Shenai et al., 2019; Thompson et al., 2013), medical comorbidities (Kuo et al., 2013; Short et al., 2018), stigma (Clemans-Cope et al., 2019; Saia et al., 2016), potential CPS involvement (Clemans-Cope et al., 2019; Hand et al., 2017a; Nishimoto and Roberts, 2001; O'Connor and Whaley, 2007; Short et al., 2018), and legal concerns of keeping custody of their children (Klein et al., 1997; Stone, 2015). These indirect barriers demonstrate that pregnant women and mothers are worried about confidentiality issues and negative social and system-level interactions. In the direct barrier domain, not having access to transportation (Brogly et al., 2018; Kuo et al., 2013), money (Brogly et al., 2018; Grella et al., 2006; Klein et al., 1997; Kuo et al., 2013; Shenai et al., 2019), and child care for treatment (Brogly et al., 2018; Kuo et al., 2013), and having a hard time navigating the complex treatment system (Martino et al., 2018; Shenai et al., 2019).

Figure 5. Conceptual model of substance use disorder treatment access and barriers for pregnant women and mothers across gateways and referral settings



Note: Pink denotes mother-specific settings or barriers

Some of the identified barriers to SUD treatment were unique to pregnant women and mothers (e.g., potential CPS involvement or legal concerns). These indirect and direct barriers can be personal (e.g., emotional support, social support) and child-related factors (e.g., keeping custody, child care). The difference in characterizing by personal and child-related factors is conditional on whether the observed factors are organized around the needs and interests of the woman or the child. Institutional-level barriers to accessing treatment exhibit the limitations of the institution's capacity to change, such as not having enough manpower or resources. Additionally, becoming the gateway and/or referral source may exceed the institution's scope of work. Finally, exogenous factors also influence women's treatment pathways: the structural stigma, policies on substance use during pregnancy, availability of treatment services, Medicaid expansion, and more. In contrast, women can directly enter treatment without going through these gateways and/or referral settings. Women can also be involved with multiple agencies, and the pathway can have a reciprocal relationship (e.g., a SUD treatment facility may refer women to a social service agency). The relationship between gateways and treatment is also complex, and not fully shown in the model, but will be discussed in the following section. The conceptual model can be used to understand women's unique pathways to treatment and to address the identified barriers to increase efficiency in the referral process and treatment access. The model can also serve as a decision tool or a protocol to assess the needs of women, and to plan for assisting them in accessing treatment.

Discussion

In this scoping review, I identified 41 peer-reviewed articles that explored various treatment referral settings and treatment access concerns for pregnant women and mothers with SUD. I organized and presented the effectiveness of interventions that have targeted pregnant women and mothers to engage them in treatment services, identified multilevel barriers and facilitators that women may encounter in their gateway-specific pathways to treatment, and distinguished treatment retention characteristics. The conceptual model of SUD treatment access for pregnant women and mothers across multiple referral settings presented in this review can guide intervention planning according to settings and should inform future studies.

The review indicated that recent research paid more attention to pregnant women compared to mothers with SUD. This may be an indication that social policy is more focused on a fetus than mothers. This may be due to the increased alert on the increasing number of pregnant women with OUD and due to potential fetal health outcomes (Haight et al., 2018).

Articles that investigated the relationship between criminal justice referrals and treatment access show disparities in access to evidence-based treatment for pregnant women. Pregnant women who were referred from the criminal justice system to treatment were less likely to receive evidence-based treatment, such as MOUD (Angelotta et al., 2016; Short et al., 2018). Inefficient or non-existent connections between the criminal justice system and treatment programs may explain why the criminal-justice referred women were less likely to receive MOUD (Saia et al., 2017). However, a recent study

reported that pregnant women who were referred by the criminal justice system were more likely to complete SUD treatment (Smith, 2020).

Limited treatment availability poses a great concern since such specialty agencies serve a small part of the persons who use substances and need treatment (Weisner and Schmidt, 1995). However, I observed that treatment settings began to encompass women's socioeconomic needs and their social contexts. Treatment programs that integrated services had positive outcomes. Some patients attended parenting education sessions after their outpatient visit for medication treatment (Kahn et al., 2017). The programs that offered parenting education were a collaborative effort among physicians, nurses, and child welfare training specialists. The addition of child care and "parenting education" suggests an approach attentive to psychosocial needs or possibly a moral focus on "responsible motherhood."

More recently, there has been an increase in the number of studies conducted in other non-SUD treatment health care settings. The importance of the obstetric providers' role in engaging pregnant women and mothers with SUD in treatment has been documented (Jones et al., 2014), and integrating SBIRT in prenatal care has attracted attention (Hostage et al., 2020; Wright et al., 2016). Obstetricians can identify and refer patients to SUD treatment or become waived-practitioners for prescribing buprenorphine for patients with OUD. This shift may be reflective of increasing interest to find women at opportune turning points, and policy efforts to increase insurance coverage for women and SUD, such as the federal Mental Health Parity and Addiction Equity Act (MHPAEA) and the Patient Protection and Affordable Care Act (ACA)

(Beronio et al., 2014; Frank et al., 2014). Our findings suggest the need for focusing on the treatment and health care experience of women. Negative provider-patient interactions may be barriers when women are trying to access the treatment system from health care settings (Lee King et al., 2015; Stone, 2015). A recent qualitative study corroborated these findings and explicated the need for increasing beneficial encounters that are recovery-based, accepting, and effective (Renbarger et al., 2020).

Although there has been some interest in bridging the siloed behavioral and physical healthcare systems (Miller and Weisner, 2002) since the 2000s, the literature indicates that there is a dearth of literature on referrals, particularly from non-healthcare settings. Since referral settings are understudied, more research should investigate the effectiveness and mechanisms of referral sources that can promote pregnant women's and mothers' pathways to treatment. However, studies conducted to improve screening and referral to treatment across settings may offer some insight (Anthony et al., 2010; Kennedy et al., 2004; Stead et al., 2017). Gateways and referral settings for SUD treatment have different levels of sensitivity to women's pregnancy statuses. Expanding the entry points to treatment can be valuable, but understanding differences across the settings is indispensable. For instance, agencies have different historical backgrounds and missions, and standards of success and failure for SUD treatment. Leveraging partnerships across agencies can be an important step in identifying and referring women to SUD treatment services.

Less progress has been made to enhance the interrelationships between these women and existing social service institutions. A majority of women who enter SUD

treatment were already receiving food assistance, housing assistance, and other government support (Aklin et al., 2014; Brogly et al., 2018; Ondersma et al., 2018; Thompson et al., 2013). This suggests that a majority of women come into contact with social service providers before they are screened or referred to treatment by other sources. This is in line with previous literature that noted how one's trajectory of drug use can change based on interactions with social service agencies (Allen et al., 2004). For example, few studies suggest that social welfare agencies can successfully refer women to treatment. However, our findings raise the potential problems of identifying and referring women to treatment from welfare offices due to organizational inefficiency: for example, identification and referral services can burden the workers at welfare offices (Metsch and Pollack, 2005). In this case, aligning divergent priorities and goals of treatment providers and agency workers or social workers must be considered. This can be addressed by training providers as well as implementing policies that mandate the expansion of the role of social service agencies. In particular, social workers have a wide variety of practice possibilities when it comes to addressing the health needs of patients with SUD, from performing evidence-based psychosocial treatment to refer women elsewhere for treatment. However, the absence of SBIRT in social service organizations, and the absence of trained social workers in making a referral to appropriate alternative treatment sources is a concern (Wamsley et al., 2018). Increasing training opportunities in SBIRT and SUD can facilitate collaborative SUD care, only if organizational issues, such as job definitions and scopes of responsibility in social service agencies are changed. The role of agents has been known to greatly influence women's motivation to

enter treatment services (Kuo et al., 2013). Therefore, more research to understand how to best train agents is desirable.

Other community agencies like women's shelters and Planned Parenthood (McCabe and Arndt, 2012) that focus on reducing stigma and advocating for women's rights can be utilized as entry settings to link women in need of treatment services. I was not able to find studies that evaluated referral patterns from these types of agencies, and more research is warranted in such community settings that are known to engage vulnerable pregnant women and mothers with SUD without stigma. Since many community agencies' missions are more likely to be sensitive toward stigma and confidentiality, recruiting patients may be more easily achieved. This scoping review revealed several research priorities to increase treatment access for women by developing women-focused interventions that account for economic and social needs. There is a need for historical assessment of policies that affected women's access to treatment. Our results indicate there are opportunities to leverage various social service programs as well as health care settings to address treatment needs; therefore, there is a need for innovative design and implementation of strategies to develop efficient referral avenues. Finally, we need more research that attends to the unique needs of individual women, in particular how to mobilize their social relationships and support network.

Some gaps in the literature were identified. First, more policy-level research on increasing treatment referrals for pregnant women and mothers with SUD is needed. The welfare reform in the mid-1990's mandated drug testing of TANF recipients, and drug-testing policies reduced the number of women with SUD in the welfare system.(Pollack

and Reuter, 2006) The effects of such policies can be important to provide insight to guide the development of future interventions and policies. Additionally, studies have not investigated the drug testing policies in the post-ACA era, and their impact on pregnant women and mothers' access to SUD care, where Medicaid expansion may have expanded access to treatment.

Second, we need more research that focuses on the longitudinal dimensions of treatment access for women. I found that less research on SUD treatment access focused on women with children compared to pregnant women. This is not surprising given that prior research prioritized fetal safety over maternal health (Flavin and Paltrow, 2010; Paltrow, 1999). Women-centric programs are needed as many programs' points of view center around the fetus or the baby. On a similar note, a recent study that evaluated a women-centered SUD treatment program demonstrated that such treatment programs may reduce gender-specific barriers to treatment, especially during pregnancy (Krans et al., 2018). Studies on women have been categorizing them into different groups based on pregnancy, which is an important turning point that affects their life afterward. Future research should consider women-centered research that integrates multiple turning points over the life course.

It is important to note that many studies discussed the importance of social relationships, which can be bidirectional in terms of their influence on treatment access. This is an important support factor for women as they decide to access the treatment system. Whether it is friends, family members, or a caseworker, women's network ties can influence women's decisions to enter or delay treatment (Kuo et al., 2013; Shenai et

al., 2019; Thompson et al., 2013). A study of breast cancer patients demonstrated that patient navigators played a larger role in supporting patients with less well-integrated social support networks (Gunn et al., 2017).

To facilitate referrals, future research should focus on assessing the feasibility of implementing interagency collaborations. Although screening and referring women with SUD may be beyond the scope of work at many institutions, the efforts of treating SUD can coincide with addressing the main missions of some public agencies. Regulatory environments have been associated with an inability to implement evidence-based treatment approaches in SUD treatment settings (Marsh et al., 2011). Patient-centered and integrated services can lessen potential duplications, and promote appropriate need-based care for women. Furthermore, the notion of coercion and the receipt of social welfare is complicated and warrants more research, at different socioecological levels like the individual, provider, organizational, state, and regional levels. Offering comprehensive and evidence-based interventions to address the stated needs of women across many settings can reduce the barriers to SUD treatment. Low-socioeconomic status – poverty, poor education, inadequate housing, unemployment, and difficulties with transportation and childcare – will need to be addressed to optimize treatment entry. Women’s prior experiences that may affect treatment access such as adverse childhood events, trauma, and interpersonal violence also have not been addressed. Adapting the interventions to meet essential socioeconomic and psychosocial needs can be an important step toward increasing access to effective SUD treatment for pregnant women and mothers.

There are limitations to this study. The literature search has been restricted to

women, thus the results do not reflect the experience of trans men, non-binary people, or others who do not identify as “women” or “mothers”, but can conceive and bear children. Men with SUD also have difficulties with access to care, but women have additional barriers and having children add more barriers on top of that. Publication bias may be present. Convenience bias is likely present, since women’s characteristics are captured in a setting in which they sought treatment. Limiting the review to the US settings can reduce generalizability. I have not identified non-peer-reviewed state reports or pilot program evaluations since I searched for peer-reviewed original investigations. Finally, our conceptual model shows a unidirectional relationship between a referral source and treatment access, but treatment pathways can be cyclical in reality.

Table 2. Characteristics of included studies

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Alemi et al., 1996(Alemi et al., 1996)	Effectiveness	Pregnant women	Clinical setting, not specified (n=179)	Health care provider, not specified	Cocaine	Prospective cohort; Qualitative interview	Assess the intervention that used computer services to inform and motivate patients	<ul style="list-style-type: none"> • The intervention did not lead to significant change in patients' health status, drug use, or utilization of services; however, it did increase SUD treatment engagement • SUD treatment engagement did not reduce drug or alcohol use
Messer et al., 1996(Messer et al., 1996)	Access	Pregnant women	Prenatal care clinic (n=182)	Health care provider	Alcohol or other drugs	Cross-sectional	Explore the characteristics of pregnant women who used SUD treatment service vs. women who declined to participate	<ul style="list-style-type: none"> • 51% of eligible pregnant women participated in the SUD treatment service • Among women with low SES, Black women, women with more children, women with greater severity of SUD, cocaine-users, and women who have previously received SUD treatment were more likely to participate in this SUD treatment service

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Klein and Zahnd, 1997(Klein et al., 1997)	Referral; Access	Pregnant women	Public agencies and community organizations (n=401)	Families with Dependent Children, health clinics, SNAP, refuges, jails, and programs for teenagers	Alcohol or other drugs	Qualitative interview	Explore alcohol and drug use patterns, and problems and unmet service needs (including treatment)	<ul style="list-style-type: none"> • More than half of the sample came from the Aid to Families with Dependent Children (AFDC), followed by health clinics, SNAP, and refuges, jails, and programs for teenagers • The following service needs were found: job placement, educational programs, and housing • 64% had not participated in formal treatment or 12 step program • Among women who were not in treatment, they did not want treatment due to: financial barriers, legal problems, did not know what treatment was available/how to get into treatment, and/or had no transportation or child care.

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Whiteside et al., 1999(Whiteside-Mansell et al., 1999)	Effectiveness	Pregnant women and mothers	SUD treatment (n=105)	N/A	Alcohol or other drugs	Prospective cohort	Assess the Arkansas Center for Addictions Research, Education, and Services (AR-CARES)	<ul style="list-style-type: none"> • The AR-CARES evolved over a 5-year period and responded to the needs of the target population (pregnant women and parenting women with SUD) • Added residential facilities, mental health counseling, child care, early intervention for children, and transportation to the treatment program • Decreased maternal substance use and lowered incidence of premature labor and maternal infections

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Weisdorf et al., 1999(Weisdorf et al., 1999)	Retention; Effectiveness	Pregnant women	SUD treatment (n=500)	N/A	Cocaine	Retro-spective cohort	Evaluate the Pregnancy Substance Abuse Program (PSAP)	<ul style="list-style-type: none"> • The PSAP increased treatment retention • Successful factors include: counselor continuity, treatment coordination and group continuity across levels of care, pregnancy and women specific treatment groups, child-care options, and increased emphasis on outpatient treatment
Kissin et al., 2001(Kissin et al., 2001)	Access	Pregnant women	SUD treatment (n=240)	Social services	Opioid or cocaine	Cross-sectional	Explore the characteristics of pregnant women in SUD treatment	<ul style="list-style-type: none"> • Participants were likely to be black, low income, urban women with opioid use disorder in their late twenties who voluntarily entered treatment • They were surrounded by others, often family members, with substance use disorder problems • They were less likely to have a full-time employment and many received income from the Department of Social Services

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Nishimoto et al., 2001(Nishimoto and Roberts, 2001)	Retention	Pregnant women and Mothers	SUD treatment (n=252)	Child Protective Services (CPS), local hospitals, social services, self-referrals	Alcohol or other drugs	Randomized controlled trial	Examine the relationship between various indicators of coercion and treatment retention and whether those relationships vary by treatment modality	<ul style="list-style-type: none"> 83% of the sample were referred from the CPS; 8% from local hospitals; 6% from social agencies; 2.8% were self-referrals Women who had custody were more likely to stay in treatment compared to women who did not have custody
Hohman et al., 2003(Hohman et al., 2003)	Referral	Pregnant women	SUD treatment (n=678)	CPS	Alcohol or other drugs	Retro-spective cohort	Describe the demographic, substance use, and treatment variables and to compare these variables based on CPS status	<ul style="list-style-type: none"> Mandated status, unsatisfactory exit status, and cocaine use were associated with CPS referrals CPS has additional requirements beyond the treatment requirements

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Tuten et al., 2003	Retention	Pregnant women	SUD treatment (n=235)	Social services	Alcohol or other drugs	Cross-sectional	Compare homeless and domiciled pregnant women with SUD on treatment outcomes	<ul style="list-style-type: none"> • Homeless women with SUD had lower retention rates, received only 65% of the social services income compared to domiciled women • Homeless pregnant women with SUD may be lacking resources compared to domiciled women

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Grella et al., 2006 (Grella et al., 2006)	Referral	Mothers	SUD treatment (n=4,156)	Healthcare provider, CPS, social services, employer	Alcohol or other drugs	Cross-sectional	Compare the characteristics of mothers in treatment who were and were not involved with child welfare services	<ul style="list-style-type: none"> • Women engaged in child welfare services were younger, had more children, had lower levels of addiction severity, but were more likely to be economically unstable compared to women not engaged in child welfare services • Women who were involved with child welfare services were less likely to cite an individual (i.e., self, family, or friends) or another treatment provider as the source of referral to treatment, and had a higher rate of being referred by another organization or service provider (i.e., health care provider, child welfare, social services, employer)

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Conners et al., 2006 (Conners et al., 2006)	Retention; Effectiveness	Pregnant women and mothers	SUD treatment (n=305)	Criminal justice system	Alcohol or other drugs	Prospective cohort	Evaluate AR-CARES program on women in the areas of substance use, consequences of use, employment, legal involvement, mental health symptoms, risky sexual behavior, and parenting attitudes.	<ul style="list-style-type: none"> • AR-CARES improved LOS and resulted in positive outcomes (lower substance use, higher self-sufficiency, improved parenting attitudes, and fewer symptoms of depression and PTSD) • About 33% of women were legally pressured to enter treatment • Most women entered treatment with a criminal record, and more than half (59.5%) were arrested in the year before intake, a quarter (24.3%) were rearrested after treatment
Pollack & Reuter, 2006 (Pollack and Reuter, 2006)	Referral; Effectiveness	Pregnant women and mothers	National Survey	CPS, social services	Alcohol or other drugs	Retro-spective cohort	Evaluate the association between welfare receipt and treatment	<ul style="list-style-type: none"> • Welfare settings are important access points to treatment for low-income women (Temporary Assistance for Needy Families (TANF))

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
O'Connor & Whaley, 2007 (O'Connor and Whaley, 2007)	Effectiveness; Referral	Pregnant women	Supplemental Nutrition Program (n=255)	Social services, Community programs	Alcohol	Randomized controlled trial	Examine the efficacy of brief intervention	<ul style="list-style-type: none"> • Brief intervention by nonmedical professionals (i.e., nutritionists) successfully increased pregnant women's motivation to change alcohol drinking behavior • Community programs like Public Health Foundation Enterprises Management Solutions Special Supplemental Nutrition Program for Women, Infants, and Children (SNAP-WIC) can be instrumental in preventing alcohol-exposed pregnancies

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Simons, 2008 (Simons, 2008)	Retention	Pregnant women and mothers	SUD treatment (n=80)	N/A	Alcohol or other drugs	Retro-spective cohort	Measure differences in characteristics and outcomes between treatment completers versus non-completers	<ul style="list-style-type: none"> • Women who completed treatment had higher rates of alcohol consumption, arrests for public intoxication, family support, lower mental health problems, higher rates of childhood emotional neglect, and higher rates of medication. • Mental health comorbidity is a big barrier to treatment completion, especially among black women
Morgenstern et al., 2009 (Morgenstern et al., 2009)	Effectiveness; Referral	Mothers	Temporary Assistance for Needy Families (TANF) (n=452)	Social services	Alcohol or other drugs	Randomized controlled trial	Evaluate the impact of intensive case management program among women with SUD receiving TANF.	<ul style="list-style-type: none"> • Intensive case management program increased abstinence rates through 24 months of follow-up, and improved full-time employment rates among women receiving TANF • Treatment likely improves abstinence, which impacts later employment

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Dakof et al., 2010 (Dakof et al., 2010)	Effectiveness	Mothers	Drug court, (n=62)	Criminal justice system, CPS	Alcohol or other drugs	Randomized controlled trial	Evaluate the Engaging Moms Program (EMP) intervention	<ul style="list-style-type: none"> • EMP increased the likelihood of positive child welfare dispositions • Decreased substance use • Increased family functioning and enhanced parenting practices • Improved maternal mental and physical health
Ondersma et al., 2010 (Ondersma et al., 2010)	Retention	Pregnant women	SUD treatment, (n=200)	N/A	Alcohol or other drugs	Randomized controlled trial	Analyze external pressure on retention in treatment and substance use	<ul style="list-style-type: none"> • Pregnant women who had external pressure were more likely to remain in treatment, attend more treatment sessions, less likely to use substances (less tested positive or report fewer days of use)
Jackson and Shannon, 2012 (Jackson and Shannon, 2012)	Access	Pregnant women	Tertiary hospital, detox (n=85)	Health care provider	Alcohol or other drugs	Cross-sectional	Identify barriers to treatment	<ul style="list-style-type: none"> • Over 80% of the sample reporting having experienced any barrier to treatment and the majority indicated having more than two barriers • The majority experienced acceptability and accessibility barriers

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
McCabe et al., 2012 (McCabe and Arndt, 2012)	Access	Pregnant women	SUD treatment, (n=1,724,479)	Criminal justice system, health care provider	Alcohol or other drugs	Repeated cross-sectional	Characterize pregnant women entering SUD treatment	<ul style="list-style-type: none"> Pregnant women were more likely to be younger, minority, never married, less educated, homeless, on public-assistance or have no income than nonpregnant women
Meyer et al., 2012 (Meyer et al., 2012)	Effectiveness	Pregnant women	Tertiary hospital, (n=149)	Health care provider	Opioids	Cross-sectional	Determine whether increased access to medication for opioid use disorder and improved coordination of ancillary services for pregnant women improved perinatal outcomes	<ul style="list-style-type: none"> The number of pregnant women receiving treatment increased Improved maternal and perinatal outcome in the nonurban setting Development of coordinated team care may improve outcomes

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Thompson et al., 2013 (Thompson et al., 2013)	Access	Mothers	CPS, (n=27)	CPS	Alcohol or other drugs	Qualitative interview	Evaluate the perspective of participants in the Parenting in Recovery (PIR) program	<ul style="list-style-type: none"> • Motivations behind participation include 1) the program would allow them to keep their children or be reunited with their children more quickly 2) to avoid a criminal investigation, arrest or jail
Kuo et al., 2013 (Kuo et al., 2013)	Access; Retention	Pregnant women and mothers	SUD treatment, (n=18)	Social services, CPS	Alcohol or other drugs	Qualitative interview	Explore factors impacting treatment outcomes and needs	<ul style="list-style-type: none"> • Self-motivation, pregnancy, navigating family relationships, availability of community support (support groups and program for outpatient treatment) can facilitate treatment • Social support does not always facilitate treatment; agencies like Department of Children, Youth, and Their Families (DCYF) can be facilitative or challenging • Programs that address dual-diagnoses are promising

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Aklin et al., 2014 (Aklin et al., 2014)	Effectiveness	Pregnant women and mothers	SUD treatment, (n=40)	N/A	Opioids, cocaine	Randomized controlled trial	Evaluate the effects of a therapeutic workplace social business on drug abstinence and employment	<ul style="list-style-type: none"> • More cocaine- and opiate-negative urine samples than controls • Less money spent on drugs • More days employed • Higher employment income
Lee King et al., 2015 (Lee King et al., 2015)	Access; Retention	Pregnant women	Primary care, (n=2,729)	Health care provider	Alcohol or other drugs	Cross-sectional	Determine clinical profiles of pregnant women in treatment for co-occurring disorders with current interpersonal abuse	<ul style="list-style-type: none"> • Pregnant women more likely to demonstrate social vulnerability than nonpregnant women • Less income
Stone, 2015 (Stone, 2015)	Referral; Access	Pregnant women and mothers	Community (Multiple settings including transportation hubs and healthcare settings) (n=30)	N/A	Alcohol or other drugs	Qualitative interview	Explore the experiences of substance-using mothers in health and criminal justice settings	<ul style="list-style-type: none"> • Women managed their risk of detection by health or criminal justice authorities, including isolating themselves from others, skipping treatment appointments, or avoiding treatment altogether

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Angelotta et al., 2016 (Angelotta et al., 2016)	Access; Referral	Pregnant women	SUD treatment, (n=8,292)	Individual, Health care provider, Criminal justice system, Community	Opioids	Repeated cross-sectional	Analyze the relationship between the use of medication for opioid use disorder (MOUD) and state laws that criminalize substance use during pregnancy	<ul style="list-style-type: none"> • Half of pregnant women with opioid use disorder received MOUD • Pregnant women referred to treatment by the criminal justice system were least likely to receive MOUD
Kahn et al., 2017 (Kahn et al., 2017)	Effectiveness	Pregnant women and mothers	SUD treatment, (n=75)	N/A	Opioids	Qualitative interview	Evaluate parenting education at MAT clinic	<ul style="list-style-type: none"> • Educational content was useful • Participants appreciated the social support provided by the groups
Mittal et al., 2017 (Mittal and Suzuki, 2017)	Effectiveness	Pregnant women	Obstetric clinic, (n=14)	Health care provider	Opioids	Qualitative interview	Evaluate collaborative care treatment with buprenorphine	<ul style="list-style-type: none"> • Intervention is feasible • High retention rates • Only 6.9% had aberrant urine opioid screen at delivery
Hand et al., 2017 (Hand et al., 2017a)	Access	Pregnant women	SUD treatment, (n=8,656)	Criminal justice system	Alcohol or other drugs	Repeated cross-sectional	Characterize pregnant women entering treatment by geographical regions	<ul style="list-style-type: none"> • Women living in South are more likely to use benzos compared to those in other regions; less likely to use MOUD; less likely to use heroin and be injection drug users

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Washio et al., 2018 (Washio et al., 2018)	Access	Pregnant women	SUD treatment, (n=166,863)	Criminal justice system	Alcohol	Repeated cross-sectional	Characterize pregnant women who reported alcohol use entering treatment	<ul style="list-style-type: none"> • Pregnant women who use alcohol were more likely to be referred by the criminal justice system • Marijuana was the most popular co-used substance among pregnant women
Saia et al., 2017 (Saia et al., 2017)	Access	Pregnant women	Obstetric clinic, (n=310)	Health care provider	Opioids	Cross-sectional	Describe prenatal care and neonatal outcomes after the implementation of buprenorphine treatment at the clinic	<ul style="list-style-type: none"> • Increase in the volume of pregnant women treated and children with neonatal abstinence syndrome over time
Brogly et al., 2018 (Brogly et al., 2018)	Access	Pregnant women	SUD treatment, (n=113)	N/A	Opioids	Cross-sectional	Characterize pregnant women with OUD entering treatment	<ul style="list-style-type: none"> • Over half had been incarcerated in the past, 30% currently involved in legal proceedings, 15% have unstable housing

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Short et al., 2018 (Short et al., 2018)	Access; Referral	Pregnant women	SUD treatment, (n= 88,241)	Criminal justice system, self-referral	Opioids	Repeated cross-sectional	Analyze trends and disparities in receipt of MAT	<ul style="list-style-type: none"> MOUD utilization is less likely among the employed, those in intensive outpatient or residential programs, referred from criminal justice or have co-occurring mental health illnesses
Falletta et al., 2018 (Falletta et al., 2018)	Access; Referral	Pregnant women	SUD treatment, (n= 16)	CPS	Opioids	Qualitative interview	Understand currently or recently pregnant women's perceptions of CPS in treatment	<ul style="list-style-type: none"> Both positive and negative feelings toward CPS exist CPS is client-focused and provides support but needs are not met and resources are not provided Patient and caseworker relationship is important
Ondersma et al., 2018 (Ondersma et al., 2018)	Effectiveness	Pregnant women and mothers	Delivery unit, (n=500)	Health care provider	Prescription opioids, marijuana	Randomized controlled trial	Evaluate the efficacy of the computer-delivered brief intervention	<ul style="list-style-type: none"> No evidence of efficacy for an indirect, single-session, computer-delivered, brief intervention designed as a complement to indirect screening

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Martino et al., 2018 (Martino et al., 2018)	Effectiveness; Referral	Pregnant women and mothers	Reproductive health clinic, (n=439)	Health care provider	Alcohol or other drugs	Randomized controlled trial	Evaluate the efficacy of electronic or clinician based screening and brief interventions for referral to treatment	<ul style="list-style-type: none"> • Both e-SBIRT and SBIRT significantly reduced days of primary substance use over the follow-up period compared to usual care • No interaction with pregnancy
O'Connor et al., 2018 (O'Connor et al., 2018)	Retention	Pregnant women	Primary care, (n=190)	Health care provider	Alcohol or other drugs	Retro-spective Cohort	Characterize pregnant women's treatment retention	<ul style="list-style-type: none"> • MOUD utilization before conception would likely improve treatment outcomes
Cochran et al., 2018 (Cochran et al., 2018)	Effectiveness	Pregnant women	SUD treatment, (n=21)	Health care provider	Opioids	Prospective cohort	Optimize and evaluate patient navigation intervention	<ul style="list-style-type: none"> • Significantly improved illicit opioid use abstinence and decreased in drug use and depression

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Clemans et al., 2019 (Clemans-Cope et al., 2019)	Access	Pregnant women	Health care setting, (n=72,086)	Health care provider	Opioids	Retrospective cohort	Analyze maternal and infant care, Medicaid costs, and outcomes related to maternal OUD	<ul style="list-style-type: none"> • 75% of women with OUD had at least some treatment related to substance use but treatment was not continuous • Health care costs were higher for women with OUD than those with other substance use disorders
Frazer et al., 2019 (Frazer et al., 2019)	Access	Pregnant women	SUD treatment, (n=20)	Friend/partner, Health care provider, Criminal justice system	Alcohol or other drugs	Qualitative interview	Identify motivators and barriers to treatment	<ul style="list-style-type: none"> • Motivators: readiness to stop using, concern for the baby's health, concern about custody of the baby or other children, wanting to escape violent environments or homelessness, and seeking structure • Barriers: fear of loss of custody, not wanting to be away from children/partner, concern about stigma or privacy, and lack of childcare and transportation

Study	Referral, Access, Retention, Or Effectiveness	Population Focus	Study Setting, Sample Size	Gateway or Referral source	Type of Substance Use Disorder	Study Design	Objective(s)	Key Results
Shenai et al., 2019 (Shenai et al., 2019)	Effectiveness	Pregnant women	Antepartum unit, (n=31)	Health care provider	Alcohol or other drugs	Prospective cohort	Evaluate the efficacy of a brief education session	<ul style="list-style-type: none"> • All women reported multiple lifetime traumatic experiences • Session improved their knowledge about diagnoses • Increased likelihood of pursuing further dual treatment

CHAPTER 2

Summary

Less than 10% of women pregnant women with SUD received treatment, demonstrating a great need to facilitate access to SUD care for mothers and pregnant women. Motherhood and pregnancy increase women's use of health and social services, presenting opportunities to identify and refer women with SUD to treatment. This study explored 1) how mothers' and pregnant women's SUD status is associated with the use of health and social services and, 2) how their ties to organizations and systems—health services (Emergency department, hospitalization, outpatient), social services (Medicaid, SNAP, TANF, etc.), and criminal justice involvement—are associated with the SUD treatment utilization. The positive association between motherhood, pregnancy, and participation in social service programs was accentuated for women who have SUD; this suggests that social services can serve as gateways for mothers and pregnant women to enter treatment. Additionally, access to Medicaid increased the use of SUD treatment for mothers and pregnant women who have SUD.

Background

For two decades, policymakers have called for heightened attention, identification of women in need, and referral to treatment. The study of women who have SUD has received much attention in recent years, and women-specific strategies for treating SUD have evolved (SAMHSA, 2015, 2009). Yet, only 9% of pregnant women received SUD treatment, with lesser access for parenting women, due to the absence of childcare in

treatment facilities (Frazer et al., 2019; Jansson and Velez, 2012). Despite the effort, treatment engagement for mothers and pregnant women has had little impact. Pregnant and parenting bring women to health care for themselves and their children, increasing their chances of being referred to other medical services; one would expect that pregnant and parenting women would be more likely to be referred to and receive SUD treatment, yet this has not occurred.

Attention to implementing universal screenings for alcohol and other drug use in women of reproductive age (Wright et al., 2016), such as screening and brief interventions for referral and treatment (SBIRT) in both clinical and non-clinical settings, has grown. SBIRT has relied primarily on health care providers. Weisner advocated “increasing the frame” to capitalize on diverse community agencies as screening and referral sites (Weisner and Schmidt, 1995). Subsequent research and policy developments have reinforced the idea of capitalizing on community agencies as referral sources (Agerwala and McCance-Katz, 2012; Babor et al., 2007; Green, 2018; McPherson et al., 2009; Ting et al., 2019). A recent study showed that women were more likely to seek SUD treatment in primary care and mental health settings than in specialty SUD treatment programs; yet care outside of specialty settings may result in poor treatment outcomes (Green, 2006). On the other hand, due to the opioid epidemic and the concerns for rising substance use during pregnancy, a recent body of literature has focused on the criminalization of perinatal substance use and its coercive role in treatment engagement (Atkins and Durrance, 2020; Faherty et al., 2019; Goodman et al., 2019).

Pregnancy and parenting often increase engagement with social services, as health

needs increase, responsibility for the care of children increases, and women become eligible for new resources. Multiple agencies may be involved in identifying and referring women to SUD treatment. Although social services outside of the specialty SUD treatment system may play important roles in directing women towards SUD treatment, these roles have received only modest attention. Prior literature demonstrates that after the welfare reform in the 1990s, receipt of cash assistance was associated with accessing SUD treatment services among low-income mothers with SUD (Pollack and Reuter, 2006). SUDs were seen as a barrier to employment; therefore, welfare recipients were targeted to receiving additional services such as SUD treatment, education and vocational training, and care management (Pollack and Reuter, 2006). Among women who have SUD receiving TANF, intensive case management increased treatment initiation, engagement, retention, and abstinence (Morgenstern et al., 2006).

Coordination of services across multiple agencies has been encouraged (Schmidt et al., 1998); hence, the question: have social services played an increasing role in the past 20 years?

Methods

Study population and data

The analyses are based on 64,346 women of reproductive age (18–44) included in the National Survey on Drug Use and Health (NSDUH) from 2015 to 2018 (pooled data). NSDUH is administered by the Substance Abuse and Mental Health Services Administration (SAMHSA) annually to estimate the prevalence of substance use, its

treatment, and related health issues in about 70,000 households that are nationally representative of the population aged 12 and older (“National Survey on Drug Use and Health | CBHSQ Data,” n.d.). The Boston University Medical Campus Institutional Review Board (IRB) determined that this study was deemed IRB exempt (Appendix A).

Measures

Substance use, including SUD, abuse, and dependence are ascertained in the survey by respondent self-report of symptoms defined by Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria and coded by NSDUH analysts (“National Survey on Drug Use and Health | CBHSQ Data,” n.d.). Motherhood (one or more children younger than 18 in the household) and pregnancy were defined by the respondent’s reported status at the time of the survey.

For the first objective, our outcomes included the participation of women in one or more social services (supplementary security income (SSI), social security (SS) or Railroad Retirement payments, welfare services like job placement or child care, food stamps, public assistance, TANF, or Medicaid), the use of one or more health services (emergency department (ED) visit, hospitalization, outpatient visit), the use of mental health treatment in the past year, and criminal justice involvement (arrested or taken into custody) in the past year.

For the second objective, the outcome was the receipt of SUD treatment during the past year. SUD treatment was defined by NSDUH as receiving treatment at any location for illicit drug use or alcohol use. Women’s ties to organizations and systems

were represented by dichotomous variables identifying whether an individual received social services (SSI, SS payments, welfare/job placement/child care, SNAP, TANF, or Medicaid) or had involvement in the health services in the past year (ED, hospitalization, outpatient visits), mental health treatment, or had involvement in the criminal justice system in the past year. As a post-hoc analysis, I also examined the association between the number of social service use in the past year.

Covariates

I included measures of individual-level characteristics to adjust for observed differences in services and treatment use between subgroups of women. Demographics included: age group (18–25, 26–34, 35–44), race and ethnicity (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), ever been arrested (yes, no), residence area location (metro, small metro, non-metro), and survey year (2015–2018).

Statistical analyses

Descriptive statistics show women’s demographic characteristics, social and health services utilization stratified by SUD status then further by motherhood or pregnancy status: nonpregnant women without children and mothers and pregnant women. Mothers or pregnant women are typically more likely to use health and social services (Table 4). Thus, stratification by motherhood and pregnancy status enabled us to characterize service use relative to the typical pattern. I used the recommended survey

weights and standard errors by NSDUH. Univariate odds ratios were calculated to estimate the associations between women's demographic characteristics and encounters with services within each stratum by SUD status. I determined whether mothers' and pregnant women's use of social and health services utilization were substantially different from nonpregnant women without children by SUD status. I also compared the differences of odds ratios obtained that examined the association of motherhood and pregnancy and service utilization between the SUD and non-SUD group.

Next, I used multivariable logistic regression models to estimate the interaction of women's social status and SUD status with health services, social services, mental health treatment utilization, and criminal justice involvement in the past 12 months. The base model was adjusted for the aforementioned covariates. Model 2 fitted additional service use covariates: health and social service use, mental health service use, and criminal justice involvement. I conducted sensitivity analyses to examine the differences among pregnant women and women who have children (Appendix B). First, I examined the interaction effect of pregnancy and substance use disorder on the use of services after adjusting for the covariates. Second, I examined the interaction effect of having a child on the use of services after adjusting for the covariates.

Finally, I examined the association between women's ties to different health and mental health services, social services, and criminal justice system use, and SUD treatment utilization among women who have SUD by social status using logistic regression. Weighted logistic regression models assessed SUD treatment utilization controlling for the aforementioned Model 1 covariates and additional service use

covariates listed in Table 4 with NSDUH sampling weights. The subgroup analyses were extended by also fitting an interaction term between social status and each type of service utilization on SUD treatment utilization. For sensitivity analysis, I replicated the analysis to examine the association between the use of services and SUD treatment utilization for pregnant women. All analyses were conducted in STATA version 15 (StataCorp, LLC).

Results

Characteristics of mothers and pregnant women by SUD status

Of the 64,346 respondents, 58,076 did not have SUD, and 6,270 were identified as having SUD. Among the SUD population, many had children (41.6%; n=2,470), a few were pregnant (3.4%; n=253), and most were nonpregnant women without children (55.0%; n=3547). Demographic data are summarized in Table 3. Women who had SUD were younger (more than 40% aged 18–25) and more likely to be white (64.9% vs. 54.4%) compared to women who did not have SUD. Women who had SUD were more likely to have less than \$20,000 income (26% vs. 19.9%). Women who had SUD were nearly 3 times as likely to have an incarceration history (28.9% vs. 10.1%) while 8.5% were involved with criminal justice in the past year, compared with only 1.2% of women without SUD. Among women who have SUD, mothers and pregnant women were older (30.2 vs. 26.0), white (58.4%), lived in a non-metro area (12.7%), and were more likely to have criminal history (33.5%) compared to nonpregnant women. A similar trend was observed for pregnant women and nonpregnant women without SUD. Mothers and pregnant women were older, primarily black and Latinx, lived in a non-metro area, and

were more likely to have been arrested compared to nonpregnant women.

Table 3. Descriptive characteristics of reproductive age women by substance use disorder diagnosis and motherhood and pregnancy, National Survey on Drug Use and Health, 2015–2018

	No SUD 2015–2018			SUD 2015–2018		
	Nonpregnant women without children %	Mothers and pregnant women %	Total No SUD %	Nonpregnant women without children %	Mothers and pregnant women %	Total SUD %
Age group						
18–25	43.5	20.3	28.5	51.8	32.2	43.0
26–34	32.7	35.3	34.4	31.4	35.0	33.0
35–44	23.8	44.4	37.1	16.8	32.8	24.0
Median age	27.8	32.5	31.6	26.0	30.2	29.6
Race/ethnicity						
Non-Hispanic White	60.2	51.3	54.4	70.2	58.4	64.9
Non-Hispanic Black	12.9	14.9	14.2	8.6	16.0	11.9
Latinx	14.9	24.3	21.0	12.5	18.5	15.2
Others	12.0	9.6	10.4	8.8	8.0	8.0
Income						
Less than 20k	22.8	18.4	19.9	28.6	22.9	26.0
20k–49,999	29.9	30.6	30.3	29.6	31.6	30.5
50k–74,999	16.0	15.6	15.7	14.7	14.5	14.6
75k or more	31.4	35.5	34.0	27.1	31.0	28.9
County metro status						
Large metro	60.8	57.2	58.5	61.4	58.5	60.1
Small metro	28.7	29.4	29.2	29.4	28.8	29.1
Non-metro	10.4	13.4	12.3	9.2	12.7	10.8
Ever been arrested	8.7	10.9	10.1	25.1	33.5	28.9
N	22433	35643	58076	3547	2723	6270
%	35.3%	64.7%		55.0%	45.0%	
(95% CI)	(34.8%, 35.9%)	(64.2%, 65.2%)		(43.2%, 46.8%)	(43.2%, 46.7%)	

Notes. All estimates used survey weights to adjust for the complex survey design of the NSDUH and to generate nationally representative estimates.

Motherhood and pregnancy status and the odds of accessing health and mental health, social services, and criminal justice system by SUD status

Health and mental health, social service, and criminal justice system utilization characteristics are shown in Table 4. Motherhood and pregnancy status had no significant association with outpatient visits in both groups of women, those with SUD and those who did not. However, motherhood and pregnancy status was associated with greater use of emergency departments, and the association was slightly stronger in women with SUD (AOR=1.52 [95% CI= 1.30, 1.79] vs. 1.21[95% CI= 1.14, 1.29]). Motherhood and pregnancy status was also associated with inpatient admissions (AOR=1.75 [95% CI= 1.43, 2.13]). However, the difference between women with SUD and those without was inverted. The association was much stronger in women who did not have SUD (AOR=2.61 [95% CI= 2.38, 2.87]). Among women who had SUD, mothers and pregnant women and nonpregnant women had similar overall health service utilization patterns (any use=88.9%, 88.4%), but mothers and pregnant women who had SUD were more likely to use ED and get hospitalized (45.4%, 13.8%) compared to nonpregnant women who have SUD (35.4%, 8.4%). SUD treatment utilization was higher among mothers and pregnant women who had SUD compared to nonpregnant women who had SUD (12.9%, 8.5%).

Table 4. Health and mental health services, social services, and criminal justice system utilization among reproductive age women by substance use disorder diagnosis and motherhood and pregnancy, National Survey on Drug Use and Health, 2015–2018

Prior year service utilization	No SUD n=58076			SUD n=6270		
	Nonpregnant women without children n=22433 %	Mothers and pregnant women n=35643 %	Odds Ratio [95% CI]	Nonpregnant women without children n=3547 %	Mothers and pregnant women n=2723 %	Odds Ratio ^{††} [95% CI]
Health services[†]						
Emergency department visit [†]	26.2	30.0	1.21 [1.14–1.29]	35.4	45.4	1.52* [1.30–1.79]
Hospitalization [†]	5.7	13.7	2.61 [2.38–2.87]	8.4	13.8	1.75* [1.43–2.13]
Outpatient visit [†]	82.3	81.0	0.91 [0.88–0.95]	84.2	84.1	0.99 [0.82–1.21]
Any general health services	86.0	85.8	0.98 [0.93–1.04]	88.9	88.4	0.96 [0.76–1.20]
Mental health visit	20.3	15.6	0.73 [0.69–0.77]	37.7	37.4	0.99* [0.87–1.12]
SUD treatment use	0.7	0.7	0.99 [0.77–1.27]	8.5	12.9	1.59* [1.28–1.96]
Social services						
Supplementary security income (SSI)	5.1	6.5	1.29 [1.15–1.44]	4.7	8.8	1.95* [1.54–2.47]
Social security or RR payments	10.1	8.7	0.86 [0.79–0.92]	8.6	11.4	1.37* [1.10–1.70]
Welfare/job placement/child care	1.7	4.4	2.58 [2.16–3.09]	2.4	8.1	3.53 [2.41–5.16]
Food stamps	10.3	26.5	3.12 [2.95–3.30]	13.8	35.5	3.42 [2.88–4.06]
Public assistance	0.9	3.6	4.14 [3.35–5.11]	1.4	6.7	4.89 [3.24–7.39]
Medicaid	14.4	26.3	2.12 [2.00–2.24]	16.8	36.3	2.83* [2.46–3.26]
Any social service	26.3	41.6	2.00 [1.91–2.10]	28.0	52.4	2.82* [2.44–3.27]
Criminal justice involvement	1.1	1.3	1.16 [0.97–1.38]	8.1	9.2	1.15 [0.92–1.43]

Notes. All estimates used survey weights to adjust for the complex survey design of the NSDUH and to generate nationally representative estimates. [†] total n size differs due to missing or refused answers
^{††} The comparison of ORs between the SUD and non-SUD group has been noted with * when p < 0.05

Mothers and pregnant women were more likely to use social services and the association was stronger in women with SUD. For instance, mothers and pregnant women who had SUD were more likely to use social services such as SSI (8.8% vs. 4.7%), welfare (8.1% vs. 2.4%), food stamps (35.5% vs. 13.8%), public assistance (6.7% vs. 1.4%), social security (11.4% vs. 8.6%), and Medicaid (36.3% vs. 16.8%) compared to nonpregnant women. Motherhood and pregnancy status was associated with a higher odds of Medicaid coverage compared to nonpregnant women without children, regardless of SUD status (AOR=2.12 [95% CI= 2.00, 2.24]; AOR=2.83 [95% CI: 2.46, 3.26]). More than half of pregnant women who had SUD used at least one social service in the prior year (52.4%). A similar pattern was observed for women without SUD, and I observed a smaller association between pregnancy and the use of social services in women without SUD. Mothers and pregnant women without SUD were more likely to use social services such as SSI (6.5% vs. 5.1%), welfare (4.4% vs. 1.7%), food stamps (26.5% vs. 10.3%), public assistance (3.6% vs. 0.9%), and Medicaid (26.3% vs. 14.4%) compared to nonpregnant women without SUD. The only exception was for social security (8.7% vs. 10.1%). Women who had SUD were more likely to have been involved in the criminal justice system, and mothers and pregnant women had slightly elevated criminal justice involvement compared to nonpregnant women (9.2%, 8.1%) during the past year.

Motherhood and pregnancy status and use of health, mental health, and social services and criminal justice system

No difference was observed for use of health services, but mothers and pregnant women who had SUD were more likely to use mental health services compared to non-

mothers who did not have SUD (AOR=1.48 [95% CI=1.22, 1.79]). Mothers and pregnant women who had SUD were more likely to use social services compared with nonpregnant or mothers and pregnant women who did not have SUD (AOR=1.40 [95% CI=1.19, 1.65]). No difference was observed for involvement in the criminal justice system between mothers and pregnant women who have SUD and nonpregnant women who do not have SUD (AOR=0.84 [95% CI=0.62, 1.13]) (Table 5). Sensitivity analyses replicated similar results to the primary analyses with one exception. Pregnancy and substance use disorder status were not statistically significantly associated with the increased use of mental health treatment (Appendix B).

Table 5. Association between motherhood and pregnancy and social services, health and mental health services, and criminal justice system utilization among reproductive age women, National Survey on Drug Use and Health, 2015–2018

	Any use of health services in the past 12 mo	Any use of mental health services in the past 12 mo	Any use of social services in the past 12 mo	Criminal justice involvement in the past 12 mo
	Adjusted odds ratio [95% CI interval)	Adjusted odd ratio [95% CI interval)	Adjusted odd ratio [95% CI interval)	Adjusted odd ratio [95% CI interval)
Mothers and pregnant women				
X Substance use disorder status				
(Ref=non-mothers in who do not have SUD)	0.96 [0.76, 1.20)	1.41 [1.21, 1.64]	1.48 [1.22,1.79]	0.85 [0.63, 1.13]
Model 1	0.90 [0.70, 1.14)	1.40 [1.19,1.65]	1.48 [1.22,1.79]	0.84 [0.62, 1.13]
Model 2				

Notes. Model 1 adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), Residence area location (metro vs small metro vs. non-metro), ever been arrested (yes, no), and survey year (2015–2018). Model 2 added the service utilization variables (recent criminal justice involvement (yes, no), recent social service use (yes, no), recent health service use (yes, no), and recent mental health service use (yes, no)

Service use characteristics associated with receiving SUD treatment

Mental health treatment utilization (AOR=1.94 [95% CI= 1.29, 2.93]) was associated with increased odds of receiving SUD treatment among mothers and pregnant women. General health service utilization was not associated with receiving SUD treatment. Of all social services, receipt of Medicaid (AOR=2.48 [95% CI= 1.64, 3.76]) increased the odds of receiving SUD treatment for mothers and pregnant women. Finally, criminal justice system involvement also increased the odds of receiving SUD treatment for mothers and pregnant women (AOR=3.38 [95% CI=1.97, 5.80]) (Table 6). Mothers and pregnant women who had an ED visit and hospital admission were less likely to use SUD treatment compared with nonpregnant women without children who did not use ED or hospital inpatient services (AOR=0.55 [95% CI= 0.34, 0.90]; AOR=0.48 [95% CI= 0.25, 0.95]). The following factors were associated with increased odds of receiving SUD treatment among nonpregnant women without children: hospitalization (AOR=2.90 [95% CI= 1.65, 5.10]); mental health treatment utilization (AOR=3.17 [95% CI= 2.38, 4.21]); receipt of Medicaid (AOR=2.07 [95% CI= 1.31, 3.27]); and criminal justice involvement (AOR=3.57 [95% CI=2.03, 6.28]. Full model results can be found in Appendix C, and results for pregnant women can be found in Appendix D. The results for pregnant women replicated similar statistical significance in the primary analysis but should be interpreted with caution due to the limited sample size. Our post-hoc analyses found that the more ties to different social services, the more likely both mothers and pregnant women and non-pregnant women without children were to receive SUD treatment (Appendix E).

Table 6. Association between health and mental health services, social services, and criminal justice system utilization and substance use disorder treatment utilization by motherhood and pregnancy status

Outcome: SUD treatment utilization in the past year	Nonpregnant women without children n=3547 AOR [95% CI]	Mothers and pregnant women n=2723 AOR [95% CI]	Interaction with Motherhood and pregnancy n=6270 AOR [95% CI]
Health services			
Emergency Department visit	1.39 [0.94, 2.07]	1.02 [0.74–1.39]	0.55 [0.34–0.90]
Hospitalization	2.90 [1.65, 5.10]	1.75 [1.09, 2.80]	0.48 [0.25–0.95]
Outpatient visit	1.24 [0.71–2.14]	0.97 [0.58–1.61]	0.63 [0.32–1.26]
Mental health treatment			
	3.17 [2.38, 4.21]	1.94 [1.29, 2.93]	0.67 [0.42–1.07]
Social services			
Supplementary security income (SSI)	0.85 [0.44, 1.65]	1.07 [0.57, 2.02]	0.91 [0.40–2.04]
Social security or RR payments	0.88 [0.45–1.72]	0.61 [0.36–1.06]	0.66 [0.31–1.43]
Welfare/job placement/child care (SNAP)	1.14 [0.45, 2.86]	0.57 [0.32–1.02]	0.43 [0.17–1.13]
(TANF)	1.26 [0.77–2.06]	1.57 [1.01, 2.46]	0.93 [0.55–1.55]
Medicaid	1.94 [0.71–5.31]	1.59 [0.93, 2.69]	0.64 [0.23–1.77]
	2.07 [1.31, 3.27]	2.48 [1.64, 3.76]	0.93 [0.57–1.52]
Criminal justice involvement			
	3.57 [2.03, 6.28]	3.38 [1.97, 5.80]	0.88 [0.45, 1.69]

Notes. Adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), residence area location (metro vs small metro vs. non-metro), ever arrested (yes, no), and survey year (2015–2018)

Discussion

I explored the potential role of health and social service receipt as a gateway in facilitating access to treatment for mothers and pregnant women who have SUD. I found the prominence of health services and the criminal justice system over non-health welfare services in increasing access to treatment for mothers and pregnant women. Mothers and pregnant women who have SUD were more likely to be found in different settings (e.g., social welfare, criminal justice, mental health, health services) than non-pregnant women who do not have children, speaking to a bifurcation of the SUD population at motherhood as a turning point and that they may be more likely to encounter complex navigation experiences at multiple siloed-systems. Our results indicated that the criminal justice system had been a prominent source of referrals and having Medicaid was associated with SUD treatment access. Future outreach activities should explore opportunities to make use of various health and social service programs as gateways or referral points since many mothers and pregnant women who have SUD are often found in these settings.

Our results are consistent with previous findings. Prior work has documented that individuals in SUD treatment have been in jail, received welfare, and were less likely to have been referred by health providers (Weisner and Schmidt, 1995). Our findings also indicate that a larger proportion of women with SUD had a prior criminal justice involvement compared to women without SUD. Despite only a tenth of mothers and pregnant women studied were recently involved in the criminal justice system, recent criminal justice involvement was the strongest factor associated with treatment use. Prior

literature has shown that women who accepted treatment were more likely to be on probation, parole, or had pending court dates, and were likely to enter treatment to avoid jail time (Haller et al., 2003). Although the criminal justice system may seem to be an efficient mechanism for identifying and referring women to treatment, it may not be suited to provide patient-centered treatment. For instance, individuals who were mandated to treatment often expressed their lack of need for treatment and frustration about lack of choice (Rosenberg et al., 2019). Prior studies also demonstrate that criminal justice populations are less likely to receive evidence-based care (Krawczyk et al., 2017). Pregnant women with opioid use disorder with criminal justice referrals were less likely to receive medications than women referred through other sources (Winkelman et al., 2020).

Medicaid enrollment was associated with SUD treatment utilization, regardless of women's motherhood or pregnancy status. Since insurance coverage is associated with health care utilization, I was not surprised by the observed association between Medicaid on treatment use (Greenfield et al., 2007). Mental health treatment utilization and hospitalization were strongly associated with SUD treatment utilization for women. This may suggest that mental health clinicians and inpatient consult services may be referring both groups of women to SUD treatment (Pollini et al., 2006; Tai and Volkow, 2013). Yet, mothers and pregnant women who had a hospitalization were less likely than nonpregnant women to access SUD treatment services. Mothers and pregnant women may be avoiding SUD treatment referrals because they fear that the detection of drug use can result in punitive actions such as losing custody or they are not able to due to lack of

child care (Falletta et al., 2018; Frazer et al., 2019; Hand et al., 2017b; Stone, 2015).

Our results highlight that contact with social services had little or no effect on the use of SUD treatment. Motherhood may render women more likely to use social services due to increased contact with agencies that can offer resources for the health and welfare of their children. In addition, federal and state health and welfare programs target pregnant women and children, which may increase pregnant women's and mothers' use of services (Hill, 1992; Patton et al., 2019). Although mothers and pregnant women who have SUD were more likely to receive social services—more than half of mothers and pregnant women who have SUD received at least one social service— other than Medicaid, women's participation in other social services like TANF and SNAP was not associated with SUD treatment use. Further, the social services were not effective gateways to SUD treatment services. Our results extend prior research, suggesting that social welfare programs must increase the reach of the social safety net to find women in need of treatment. The need for broadening outreach efforts beyond the health care system is as relevant today as it was in the 1990s when there was an increase in advocacy for less coercive treatment after welfare reform (Pollack and Reuter, 2006; Schmidt and McCarty, 2000). Innovative approaches to engage women in SUD treatment according to their social status and needs are needed. The focus of the outreach efforts can take place in particular settings where they are most likely to appear. There is more to learn about how to integrate services to meet the social and treatment needs of mothers and pregnant women with SUD.

Moreover, children render women eligible for services that women without

children may be unable to access, as welfare is mostly aimed at children, not adults. The welfare system has been criticized for favoring women who matched the gender stereotype (Abramovitz, 2017), which may partly explain why I note that the use of services was greater with mothers and pregnant women in the SUD group. This may be due to increased “need” or it may be due to increased access, again with services aimed at children of women with SUD, probably not the women themselves. Nevertheless, we need ongoing work examining the etiology of disparities in social welfare receipt for nonpregnant women and how it may affect treatment access.

Implementation of screening and referring to SUD treatment outside of health care settings has many and complex challenges. However, as part of the National Institute on Drug Abuse (NIDA)’s strategic plan, addiction health services researchers should seek to increase the “Real-World Relevance of Research” by proactively tackling relatively neglected and challenging issues such as non-treatment-seeking populations, patients with complexities (e.g., pregnant women), and the impact of social factors (e.g., poverty, racism, housing, and educational inequality, etc.) (National Institute on Drug Abuse, 2016). I propose that future research should address both healthcare and social services data, and should take into account social determinants of health by identifying the needs of mothers and pregnant women who have SUD. For example, expanding and integrating services that focus on social needs such as housing, education, jobs, and child care can transform the treatment model. In turn, social service providers can also become effective gateways, innovators in service delivery to improve access to effective treatment programs. Future research should map the pathways to treatment for mothers and

pregnant women with SUD, dissect patterns of service usage and identify needs, and engage women in treatment early.

The study has limitations. Foremost, NSDUH is a cross-sectional survey; therefore, the analyses identified the associations, and cannot be interpreted as causal. Due to the sample changes in 2015, data starting in 2015 were pooled. The results may be different from prior survey years. These analyses were not able to assess the effects of having younger children on access to treatment. I was also not able to adjust for other confounders such as marital status due to missing values. Due to the small sample size of pregnant women in NSDUH, statistical power may be low for supplementary analyses of pregnant women. Finally, I was unable to include community-level variables that may be associated with SUD treatment utilization.

CHAPTER 3

Summary

Medications for Opioid Use Disorder (MOUD) decrease adverse maternal and neonatal outcomes, yet MOUD utilization by pregnant women remains low and subject to countervailing policies that affect women's access to health care. Medicaid expansion extended coverage for mental health and addiction treatment services for pregnant women. However, states' imposition of civil or criminal child abuse sanctions for drug use during pregnancy could inhibit access to treatment. This study estimated the effects of criminalization in reducing the effect of Medicaid expansion on pregnant women's MOUD use. Medicaid expansion was associated with the increased use of MOUD among pregnant women in states that did not criminalize substance abuse in pregnancy, but not in states that criminalized substance use during pregnancy. Criminalization policies may prevent Medicaid expansion to take its full effect on pregnant women from benefiting from MOUD.

Background

Opioid use disorder (OUD) during pregnancy is a dangerous and costly public health concern (Winkelman et al., 2018). OUD during pregnancy is associated with adverse maternal and neonatal outcomes such as maternal fatalities, neonatal abstinence syndrome (NAS), and poor fetal growth, including low birth weight (Behnke and Smith, 2013; Hardt et al., 2013; Hayes and Brown, 2012; Martin et al., 2015; Roper and Cox,

2017; Shainker et al., 2012; Stover and Davis, 2015). Medications for opioid use disorder (MOUD) are the standard care for treating OUD (Bagley et al., 2020; Kampman and Jarvis, 2015; Laroche et al., 2018; Volkow et al., 2019) and is known to decrease adverse outcomes in pregnant women and neonates (O'Donnell and Jackson, 2017). For instance, MOUD use reduced overdose rates among pregnant women in the early postpartum period compared to women who did not use MOUD (Schiff et al., 2018), as well as the opioid withdrawal stress level of both mother and fetus and the prevalence of low birth weight babies (Klaman et al., 2017; McCarthy et al., 2017). Despite recommendations for pregnant women with OUD from the American Society of Addiction Medicine, MOUD utilization remains low among pregnant women (American Society of Addiction Medicine, 2017; Klaman et al., 2017).

While MOUD use remains low overall, pregnancy has been considered a distinct window of opportunity by service providers and drug policymakers, as pregnancy likely increases women's and their child's health concerns (Yang et al., 2019). Pregnancy can increase women's motivation to engage in treatment services for the sake of their child (Kuo et al., 2013). However, the presence of an opportunity for engagement has also brought coercive ways to engage women into addiction treatment (Paltrow, 1999), such as to maintain the legal rights of parenting (Jessup et al., 2003). Indeed, women engage in SUD treatment longer if legal pressure is present (Ondersma et al., 2010). A recent study revealed that pregnant women referred to treatment through criminal justice were more likely to complete SUD treatment programs compared to referrals through another source (29).

Policies have been developed to address substance use during pregnancy, based on the probabilities of harm to a fetus or infant, and the intentions and justifications are indeed complex (Bishop et al., 2017; Kampschmidt, 2015; Thomas et al., 2018). Prior research demonstrates that most policies regarding substance use during pregnancy are punitive, and the most frequent policy across states is prosecuting pregnant women based on child abuse and child neglect statutes (Thomas et al., 2018). Policies that criminalize substance use during pregnancy can deter women from prenatal care and impede women's access to addiction treatment services (Angelotta et al., 2016; Hui et al., 2017; Jessup et al., 2003). A qualitative interview revealed that 73% of women feared being identified as substance users and avoided prenatal care to evade the detection of drug use. Although the intent of criminalization may have been to protect infants, ironically, such criminalization poses a structural barrier for pregnant women to access care, including SUD treatment services. For example, Angelotta et al. found that state policies that criminalize substance use during pregnancy were associated with decreased access to MOUD among pregnant women using TEDS-A from 2014 (Angelotta et al., 2016). Similarly, a recent study demonstrated that punitive state policies toward prenatal substance use deterred pregnant women from entering SUD treatment, and did not reduce maternal narcotic exposure at birth using data from 2000 to 2014 (Atkins and Durrance, 2020). The number of states that criminalize prenatal substance use has grown over the years. As of 2019, 20 states and Washington DC criminalize substance use during pregnancy (Guttmacher Institute, 2019).

Medicaid expansion resulted in a decrease in the proportion of uninsured women

of reproductive age and increased the likelihood of continuous enrollment in Medicaid among pregnant women (Patton et al., 2019; Wen et al., 2015). The ACA and Medicaid expansion increased coverage for mental health and SUD treatment services for vulnerable populations, including pregnant women (Angelotta et al., 2016; Beronio et al., 2014; O'Donnell and Jackson, 2017). Previous research demonstrates that the ACA and Medicaid expansion increased the access to SUD treatment services as well as the pharmacological treatment use for OUD (Feder et al., 2017; Meinhofer and Witman, 2018; Mojtabai et al., 2019; Wen et al., 2017). However, increasing access to treatment services will be truly functional if pregnant women were to use health care services without the fear of arrest (Kampschmidt, 2015). Therefore, I sought to understand the relationship of the two distinct and potentially countervailing policies on treatment access and engagement. These two policies, Medicaid expansion and criminalization of opioid use during pregnancy, can respectively open and close opportunities to promote MOUD. Dynamic state policy environments and their effects on the use of MOUD in pregnant women with OUD have been understudied. Yet these two sets of policies exist together. Expanding the eligibility for Medicaid and increasing OUD treatment services can increase the use of treatment services and treatment completion rates. However, a punitive policy environment could decrease treatment utilization.

Ample research has studied the effects of the Medicaid expansion for the general population without a special focus on pregnant women who have OUD. Moreover, prior studies have not looked at the interactive effects of Medicaid expansion and criminalization of substance use during pregnancy. This study examines the effects of the

ACA Medicaid expansion and its interaction with the state policy that criminalize substance use during pregnancy and MOUD and the completed substance use disorder treatment status among pregnant women. I hypothesized that the potential positive effects of Medicaid expansion would be dampened by policies that criminalize substance use during pregnancy.

Methods

Study design and data

Using repeated cross-sectional data from the Treatment Episode Dataset (TEDS) provided by the Substance Use and Mental Health Agency (SAMHSA), I estimated models of treatment episodes (“events”) before and after the implementation of Medicaid expansion. TEDS is a national survey of publicly subsidized treatment events that are reported annually by states to the federal government. It includes information about patient demographics and treatment history (e.g., number of prior treatment episodes), and treatment episodes (treatment across all service settings including outpatient, detoxification, and residential settings), and substance use disorder diagnoses and treatment, including information about MOUD, that can be used to analyze trends in substance use treatment over time. These data are published as a public use file of event admissions (TEDS-A) or event discharges (TEDS-D). Although TEDS is not a nationally representative sample as it only includes episodes from publicly funded facilities, prior research shows that the demographics of individuals in the TEDS are comparable to the nationally representative sample of individuals who received addiction treatment from the

NSDUH (Batts et al., 2014). I included state-level policy data on criminalization of substance use during pregnancy from 2010 to 2017 from the Guttmacher Institute (Guttmacher Institute, 2019). States' Medicaid expansion status was retrieved from the Kaiser Family Foundation ("Status of State Action on the Medicaid Expansion Decision | The Henry J. Kaiser Family Foundation," n.d.).

Study population

Using the TEDS-D (2010–2018), I identified treatment episodes for pregnant women with an OUD diagnosis. For our primary analysis, I included initial substance use treatment discharges; clients had no prior substance use treatment episodes. I restricted the analysis to episodes from the states that had data on whether MOUD was received during the treatment episodes (or not) and in which the client was identified as pregnant at the time. Records with missing data were excluded from the analysis. The final analytic sample included 14,526 discharges of pregnant women who had an OUD diagnosis from 49 states during 2010 to 2018.

Measures

The primary outcome measure, receipt of outpatient MOUD, was defined by whether methadone or buprenorphine was part of a client's OUD treatment plan in an outpatient setting, without receipt of medications from detoxification or residential setting immediately prior. I used another outcome measure that indicated receipt of MOUD across all service settings including outpatient, detoxification, and residential

settings. The third outcome measure, completed treatment status, indicated whether the client completed treatment at discharge across all service settings including outpatient, detoxification, and residential settings. I categorized all other reasons for discharge classification (e.g., dropped out of treatment, treatment termination, transferred to another service, incarceration, and death) as not having completed treatment.

I assessed whether the state adopted Medicaid expansion (yes/no) and defined criminalization as whether states considered substance use during pregnancy to be child abuse under civil child-welfare statutes or not. The individual state classification on the Medicaid expansion status by criminalization of substance use during pregnancy can be found in Figure 6. I excluded expansion year (or 2014 for non-expansion states) as a wash-out period (Sommers et al., 2014). Covariates included age (18–24, 25–29, 30–34, 35–39, and 40+), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, and Other/Unknown), educational attainment (Less than High School, High School Graduate or GED, and Higher Education), and unemployment status (Yes, No).

Statistical analysis

I calculated descriptive statistics for all episodes, by residence in states with criminalization policies. I estimated Chi-square statistics to compare groups. I compared receipt of MOUD and completed treatment status among pregnant women residing in expansion and non-expansion states before and after Medicaid expansion implementation (2014 except in 5 states that expanded in 2015 or 2016, refer to Figure 6), by residence in states with policies that criminalized substance use during pregnancy.

Figure 6. State expansion status by state criminalization policy on substance use during pregnancy

	Expansion States (n=10059)	Non-expansion States (n=4467)
Substance use during pregnancy not considered child abuse (n=10601)	Alaska (2015) Arkansas Arizona California Connecticut Delaware District of Columbia Hawaii Kentucky* Maryland Massachusetts Michigan Montana (2016) North Dakota New Hampshire New Mexico New Jersey New York Ohio Oregon Pennsylvania (2015) Vermont Washington West Virginia (n=7949)	Georgia Kansas Oklahoma Idaho Maine Missouri Mississippi Nebraska North Carolina Tennessee Wyoming Utah (n=2652)
Substance use during pregnancy considered child abuse (n=3925)	Colorado Illinois Iowa Indiana (2015) Louisiana (2016) Minnesota Nevada Rhode Island (n=2110)	Alabama Florida South Carolina South Dakota Texas Virginia (n=1815)

Note: year of expansion noted in parentheses; *included in sensitivity analyses

I excluded one state in which TEDS-D data suggested a very different and sharp decline in the number of pregnant women with OUD from pre to post, Kentucky. However, Kentucky instituted several changes along with Medicaid expansion (e.g., 1115 Medicaid expansion waivers to support the Kentucky Opioid Response Effort (KORE) and the State Targeted Response to the Opioid Crisis Grants (Opioid STR) (Bevin, 2019; “Grants State Years | SAMHSA,” n.d.; Seibert et al., 2019)), that expanded access to OUD treatment in ways that ways not captured by TEDS. As a result, TEDS data for Kentucky may introduce selection bias that could affect our results. I analyzed two separate difference-in-differences linear regression models with state fixed-effects, year fixed-effects, and linear time trends and to test whether the Medicaid expansion was associated with changes in outcomes for pregnant women who have OUD based on state policies on substance use during pregnancy. The maximum likelihood estimator was used instead of logistic models because the latter are known to underestimate standard errors in a setting with high dimensional fixed effects (Greene, 2004). I clustered our standard errors at the state level.

$$Y_{sit} = \alpha + \eta(\text{Exp}) + \sigma C_t + ST_t + ST_s + Y_t + Z_{st} + \varepsilon_{ist}$$

Where Y_{sit} represents an outcome for women living in states s , expansion status of the states i , during year t . The variable Exp is a binary indicator where if state s had expanded Medicaid in year t it would equal 1 and zero otherwise. η is the DID estimate. I include a vector of time-varying controls (C_t and ST_t), state fixed effects (ST_s), year fixed effects (Y_t), and linear time trends (Z_{st}).

$$Y_{sit} = \alpha + \eta_1(\text{Exp}) + \eta_2(\text{Crim}) + \eta_3(\text{Exp} \times \text{Crim}) + \sigma C_t + ST_t + ST_s + Y_t + Z_{st} + \varepsilon_{ist}$$

I also estimated the interaction between Medicaid expansion and criminalization policy status, evaluating the differences in respective outcomes for pregnant women in states with and without criminalization of substance use during pregnancy after Medicaid expansion. A p-value <0.05 was determined to be statistically significant. To aid the interpretation of coefficients, I converted the linear regression coefficients to present the estimates in percentage points. I conducted event study models, where I replaced the main exposure term with a series of binary variables denoting leads and lags of Medicaid expansion ranging from one or more years before expansion to one or more years after. Various robustness and sensitivity models were also estimated. I replicated the analyses including the data from Kentucky (Appendix F). I also conducted logistic regression models as sensitivity analyses (Appendix G). I replicated the analysis after removing states that expanded from 2015 to 2018 and found consistent results (Appendix H). I also replicated the analysis including previously omitted years of the eight states that recently adopted prenatal criminalization policies for pregnant women and found similar results (AZ: 2016–2018, DC: 2016–2018, MD: 2016–2017, MS: 2016–2018, OH: 2017–2018, UT: 2017–2018, WA: 2016–2018) (Appendix I). Using these eight states, I also conducted supplementary analyses to estimate the effect of passing a criminalization statute on the outcome measures (Appendix J). Analyses were conducted using STATA version 15 MP (StataCorp, TX).

Results

Of thirty-one expansion states, eight states had statutes that criminalize substance use during pregnancy. Of eighteen non-expansion states, six states had statutes that criminalize substance use during pregnancy.

I describe the study episode characteristics in Table 7. There were more young women (ages 18 to 24) living in non-expansion states compared to the expansion states. There were more young women (ages 18 to 24) living in states that non-criminalization states compared to the states that criminalize substance use during pregnancy. Most women were 25 to 40 years of age in expansion and non-expansion states (74.9%, 77.3%). Most pregnant women who utilized substance use treatment were Non-Hispanic white, and the proportion was higher in non-expansion states (82.8%). The unemployment status was higher among pregnant women living in non-expansion states compared to expansion states (57.5% vs. 42.0%).

Table 7. Descriptive statistics for pregnant women who have opioid use disorder, 2010–2018

	Expansion states	Non-expansion states	p-value[†]	Criminalization states	Non-criminalizing states	p-value[†]
	%	%		%	%	
Age group						
18–24	21.0	18.7	0.003	19.2	20.7	0.037
25–29	34.6	37.2		36.2	35.1	
30–34	27.9	28.5		29.2	27.6	
35–39	12.4	11.6		11.2	12.5	
40–44	4.1	4.1		4.2	4.1	
Race/ethnicity						
Non-Hispanic White	71.8	82.8	<0.001	75.6	75.0	<0.001
Non-Hispanic Black	6.5	6.3		6.5	6.4	
Hispanic	8.6	5.8		9.0	7.2	
Other/Unknown	13.2	5.2		9.0	11.4	
Education level						
Less than High School	30.1	28.5	<0.001	30.3	29.4	<0.001
High School Graduate (GED)	68.0	68.2		66.0	68.8	
Higher Education	1.9	3.3		3.8	1.8	
Unemployment status	42.0	57.5	<0.001	56.6	43.2	<0.001
Region			<0.001			<0.001
Northeast	31.7	6.0		2.9	31.6	
Midwest	22.6	15.0		37.5	13.9	
South	7.0	71.7		49.3	18.6	
West	38.9	7.3		10.3	35.9	
N	10059	4467		10601	3925	

† P values were derived from chi square tests.

The proportion of treatment episodes that indicated outpatient MOUD utilization was higher in expansion states compared to non-expansion states. In states that did not have policies that criminalize substance use during pregnancy, 15.3% of women in expansion states and 14.3% of episodes in non-expansion states included MOUD in the treatment plan in an outpatient setting during the baseline period. In states that have policies that criminalize substance use during pregnancy, a third of episodes included MOUD in the treatment plan in an outpatient setting in expansion and non-expansion states during the baseline period (33.9%, 32.6%). MOUD utilization across all treatment settings was higher in expansion states compared to non-expansion states among pregnant women who have OUD in states that do not criminalize substance use during pregnancy but similar in states that criminalize substance use during pregnancy. In states that did not have policies that criminalize substance use during pregnancy, 49.4% of women in expansion states and 22.7% of episodes in non-expansion states included MOUD across all settings during the baseline period. In states that have policies that criminalize substance use during pregnancy, a higher percentage of episodes included MOUD across all settings in expansion and non-expansion states during the baseline period (41.5%, 36.8%). The proportion of treatment episodes that indicated treatment completion was higher in non-expansion states that criminalize substance use during pregnancy. In states that have policies that criminalize substance use during pregnancy, a higher percentage of episodes had a completed treatment status in expansion and non-expansion states during the baseline period (22.2%, 35.3%) compared to non-criminalization states (21.2%, 30.6%) (Table 8).

Table 8. Changes in use of medication for opioid use disorder (MOUD) and treatment completion status among pregnant women with opioid use disorder by state criminalization and expansion status, 2010–2018

	Non-criminalizing states				Criminalization states			
	Expansion states		Non-expansion states		Expansion states		Non-expansion states	
	Pre %	Post %	Pre %	Post %	Pre %	Post %	Pre %	Post %
MOUD in an outpatient setting	44.8	50.9	15.3	14.3	33.9	36.0	32.6	17.4
MOUD utilization across all settings	49.4	60.1	22.7	19.4	41.5	48.3	36.8	23.7
Treatment completion status (completed)	21.1	22.8	30.6	27.3	22.2	21.8	35.3	44.6
N	3766	4183	1173	1479	1080	1030	864	951

Note: For non-expansion states, pre-period includes data from 2010 to 2013 and post-period includes data from 2015 to 2018.

The adjusted linear regression coefficients from the difference-in-differences models are presented in Table 9. Estimates are expressed as percentage changes. In states that do not criminalize substance use during pregnancy, MOUD use in outpatient treatment settings increased by 7.3 percentage points among pregnant women who lived in expansion states (95% CI=2.5, 12.2). MOUD use in all treatment settings also increased by 10.0 percentage points in expansion states, which demonstrates that most of these increases are attributable to the increases in the outpatient settings (95% CI= 4.7, 15.3). Overall, the completed treatment rate did not change in expansion states (-0.4%, 95% CI=-3.7, 2.8). In states that criminalize substance use during pregnancy, MOUD use in outpatient treatment settings increased by 4.7 percentage points among pregnant women that lived in expansion states, but it was not statistically significant (95% CI=-0.0, 9.5). However, MOUD use across all treatment settings increased by 10 percentage points (95% CI= 2.8, 17.3). The completed treatment rate decreased by -3.4 percentage points in expansion states, but it was not statistically significant (95% CI= -10.2, 3.5). Furthermore, the interaction of expansion and criminalization status for MOUD use in outpatient settings showed that women living in expansion and criminalization states were less likely to use MOUD, but it was not statistically significant (95% CI=-10.8, 6.5). Figure 7a–c shows the event study estimates for each outcome by the substance use during pregnancy criminalization status of the state. Each graph compares the adjusted coefficient estimate for each point in event time relative to the reference period, between pregnant women living in expansion states versus pregnant women living in non-expansion states.

Table 9. Expansion effects by state criminalization status among pregnant women who have opioid use disorder and interaction estimates

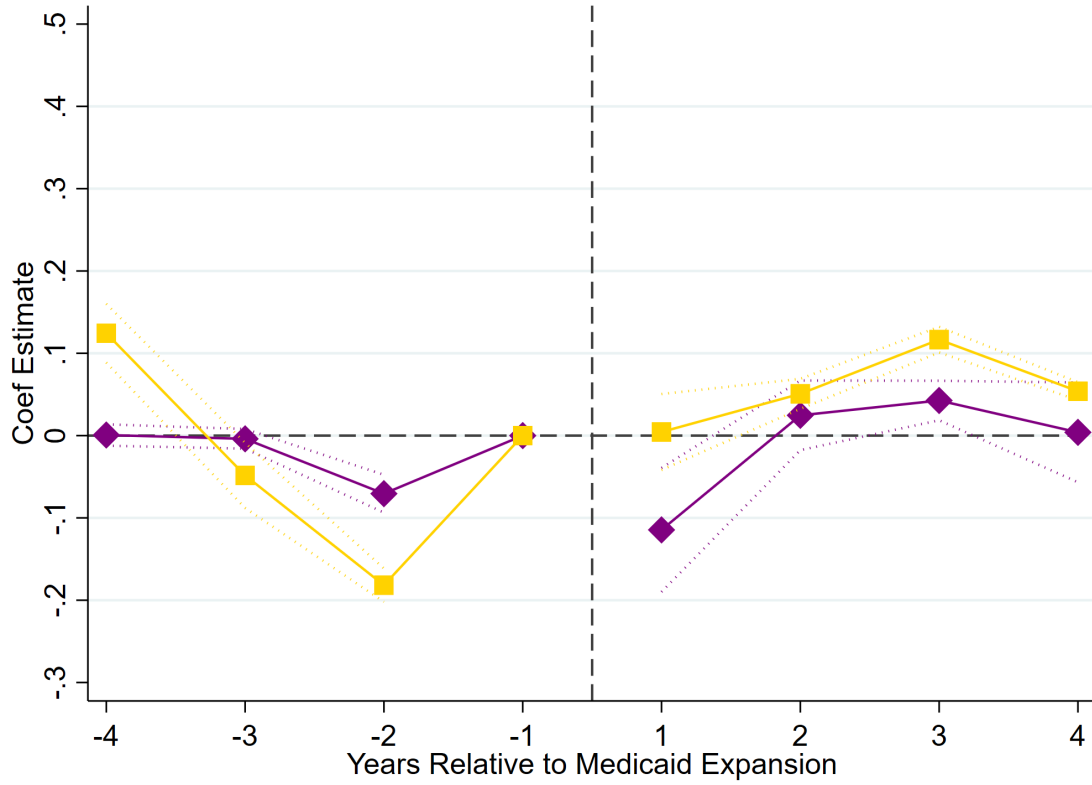
	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Women living in non-criminalizing states (N=10,601)			
Difference-in-differences estimate	+7.3%	+10.0%	-0.4%
95% CI	2.5, 12.2	4.7, 15.3	-3.7, 2.8
p-value	0.004	<0.001	0.784
Women living in criminalization states (N=3,925)			
Difference-in-differences estimate	+4.7%	+10.0%	-3.4%
95% CI	-0.0, 9.5	2.8, 17.3	-10.2, 3.5
p-value	0.053	0.010	0.313
Total (n=14,526)			
Interaction of expansion and criminalization status	-2.1%	0.0%	-3.0%
95% CI	-10.8, 6.5	-10.5, 10.6	-10.1, 0.04
p-value	0.132	0.996	0.398

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: For five states that had recently criminalized substance use during pregnancy, I excluded post criminalization policy data (AZ: 2016–18, MS: 2016–18, OH: 2017–2018, UT: 2017, WA: 2016–2018). Refer to Appendix H for results that include these states.

Figure 7. Event study estimates by state criminalization of substance use during pregnancy

a. Medications for OUD in outpatient settings

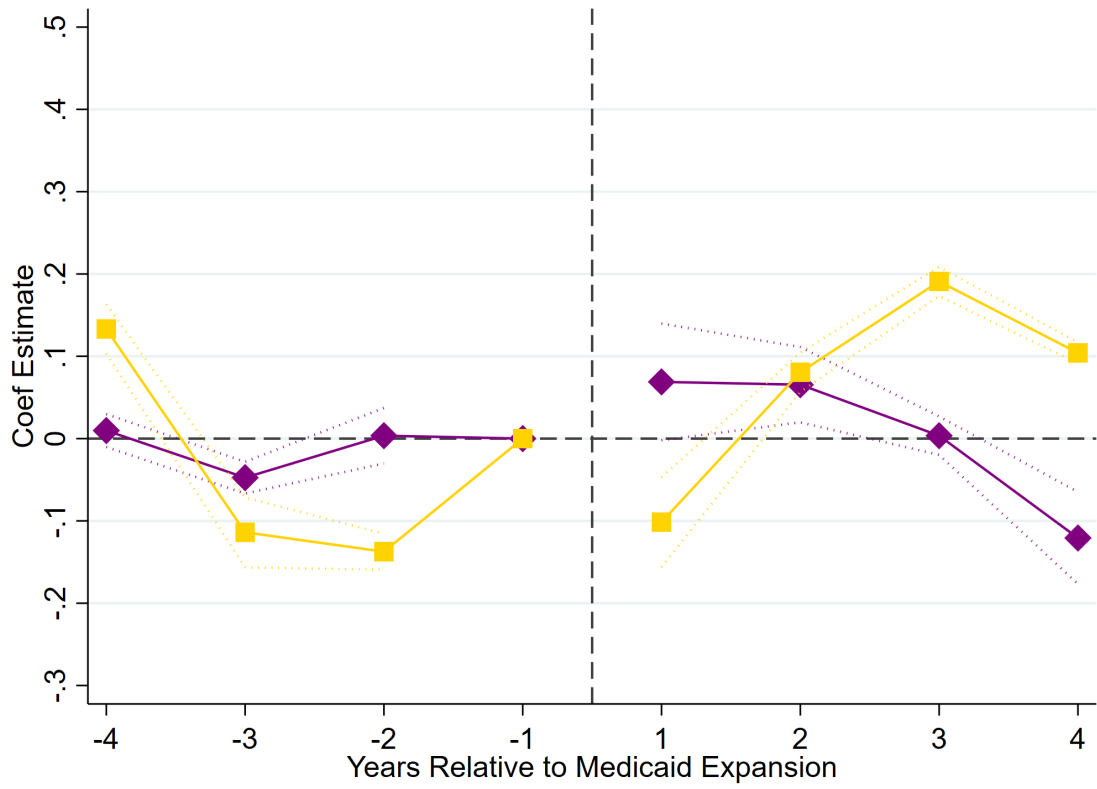


Notes:

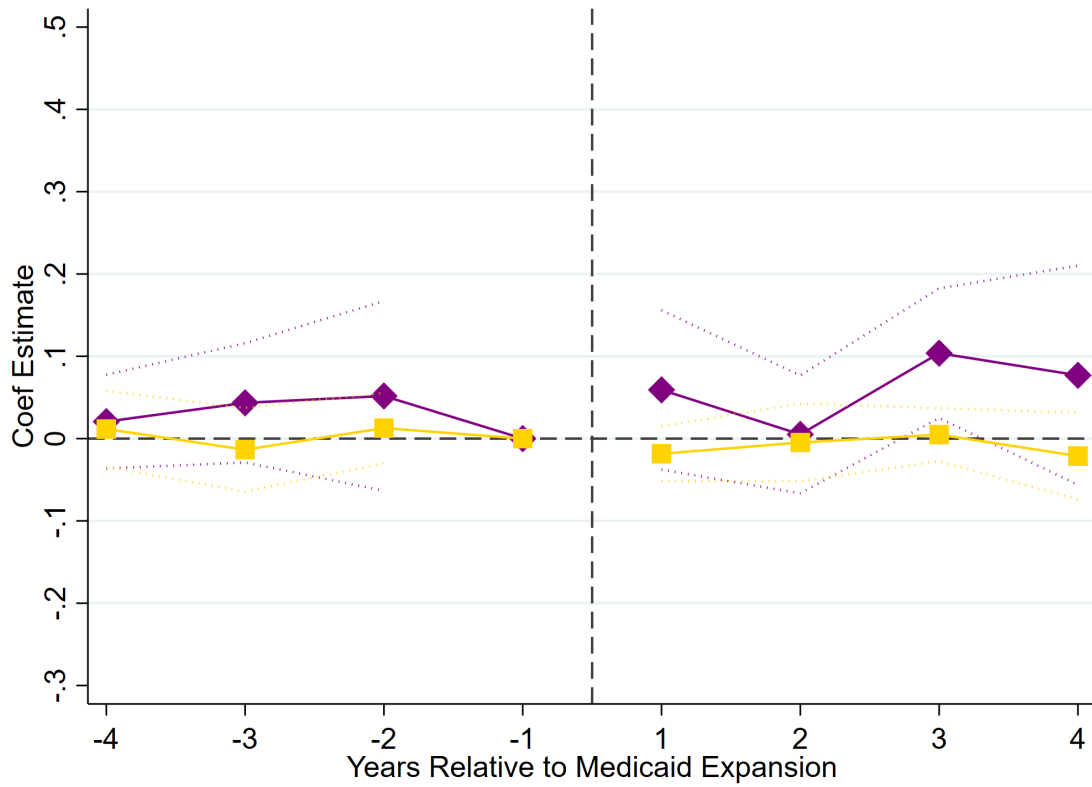
Purple: States that criminalize substance use during pregnancy

Yellow: States that do not criminalize substance use during pregnancy

b. Medications for OUD across all settings



c. Treatment completion status (completed)



Notes: The purple diamonds compare the difference in the prevalence of the outcome for each point in event time relative to the reference period, for those living in states that criminalize substance use during pregnancy, between individuals living in states that expanded Medicaid versus individuals living in states that did not expand Medicaid. The yellow squares compare the difference in the prevalence of the outcome for each point in event time relative to the reference period, for those living in states that do not criminalize of substance use during pregnancy, between individuals living in states that expanded Medicaid versus individuals living in states that did not expand Medicaid. The dotted lines represent 95% confidence intervals, which account for clustering at the state level.

Discussion

I sought to better understand the effect of Medicaid expansion on treatment utilization (MOUD in both outpatient and across all settings and treatment completion status) among pregnant women who have OUD and whether criminalization of substance use during pregnancy moderated the effect. In terms of MOUD, I examined the countervailing forces of Medicaid expansion and criminalization of substance use during pregnancy and found that the effect of Medicaid expansion on MOUD utilization was dampened by the criminalization policy. I found that Medicaid expansion was positively associated with both outpatient MOUD, where MOUD is most likely to be administered and MOUD across all settings among pregnant women in states that do not criminalize substance use during pregnancy. However, the expansion did not affect MOUD use in outpatient settings in states that criminalize substance use during pregnancy. Additionally, Medicaid expansion did not improve treatment completion rates in states in both criminalization and non-criminalization states.

Our results are in line with a recent study where higher MOUD utilization after the ACA was observed as a result of an increase in insurance coverage among women of reproductive age (Johnston et al., 2018). A large proportion of our sample consisted of the episodes from expansion states. Despite the higher baseline rate, a large increase in MOUD was observed. Thus, Medicaid expansion indeed enabled more pregnant women to access MOUD across different settings. I observed an increased utilization of MOUD across all settings, but not among outpatient visits in states that have criminalization policies for substance use during pregnancy. This may suggest that more MOUD are

being used in other settings such as hospital inpatient, detoxification, or rehabilitation services. This gain is still important but may suggest the need to increase access to MOUD in outpatient settings in criminalization states. These differences highlight the need to account for complex policy environments when conducting the analyses at the national level.

Interestingly, non-expansion states that do not criminalize substance use during pregnancy had lower rates of MOUD compared to non-expansion states that criminalize substance use during pregnancy. External pressure, which can be found in mandated treatment programs in states that criminalize substance use during pregnancy, has been associated with a higher treatment utilization for pregnant women (Ondersma et al., 2010). Requiring mandatory treatment and potentially coercive measures can lead to a higher proportion of women to use the treatment system and successfully complete it as a part of a legal mandate: women may adhere to treatment to keep or regain the custody of their child (Kozhimannil et al., 2019).

Although the observed gains from the expansion in criminalization states are promising, prior studies have shown that punitive prenatal policies have negative externalities. For example, termination of parental rights has been recognized as potential barriers to access substance use treatment among pregnant women who have OUD (Andrews et al., 2018; Hand et al., 2017a; Thao et al., 2018). In the midst of a growing opioid epidemic, the number of states that criminalize substance use during pregnancy has increased over the years (Jarlenski et al., 2017). Efforts to study additional policies that could produce involuntary treatment use, such as mandatory reporting of perinatal

substance use to child protective services or social welfare benefits, warrants attention.

In developing policies to combat the opioid epidemic and increasing OUD cases among pregnant women, policymakers and researchers need to consider a variety of policy contexts related to how pregnant women and women with children are affected by policy and legal factors that limit or increase the accessibility of SUD treatment services. We need to consider prior history on the war on drugs, the discourse on the protection of fetal and infant health as it relates to women's rights, and uncover the relationships between a range of policies and their impact on treatment access, retention, and health outcomes (Kampschmidt, 2015). Understanding the complex policy context can help design and improve existing policies or consider policy alternatives.

Several limitations are inherent to the data available and the study design. TEDS data is recorded at the episode-level, and I was not able to capture individual-level effects. There may be omitted variable bias that has not been addressed, including the severity of OUD and unobserved provider-level characteristics that may affect MOUD utilization. I also restricted our analysis to those diagnosed with OUD, which is a conservative estimate compared to expanding the study population to include those whose primary substance use is opioids. As TEDS captures discharge records from substance use treatment facilities that are licensed or certified by a state substance abuse agency, it may not include office-based buprenorphine treatments. Additionally, states had different reporting procedures and data quality. Most importantly, I did not consider the availability of treatment in the analysis but used fixed effects and linear trend models to account for the state-differences and treatment use over time. Future studies should

explore how the availability of outpatient MOUD or other substance use treatment settings can modify the expansion efforts. Finally, well-known differences exist between states in the implementation of the Medicaid expansion and criminalization policies.

CONCLUSION

Summary

The life transition and status of motherhood that most women experience may prompt women who have SUD to change their use of substances and seek treatment. It is an opportune time in the lives of women to intervene in SUD. Pregnancy and motherhood transition occurs in multi-level contexts. Those contexts often involve social and health services, as well as criminal justice agencies. These involvements are determined by social, economic, and political factors that define the status of mothers who have SUD. Pregnancy and motherhood can change their eligibility for social and health services as well: mothers with SUD were more likely to use social services that increased their odds of accessing SUD treatment. Thus, engaging women at these gateways can be strategic. We found that successful referrals to SUD treatment were observed in settings that focused on meeting women's social needs such as housing assistance, vocational education, nutritional support, case management, and cash assistance. Gateways that offer supportive services can address potential barriers to treatment while referring women to SUD treatment. Likewise, the number of gateway use was associated with increased treatment access. At the policy level, Medicaid expansion status was associated with increased access to medications for pregnant women who have OUD, especially in states that do not criminalize substance use during pregnancy. Whether it is due to intrinsic motivation or if it comes from having more responsibilities, or whether it is due to the facilitative or coercive nature of these policies, pregnancy and motherhood bring salience to many factors that may affect women's SUD treatment utilization.

Discussion

Persistent stigma, discrimination, and attachment of blame on women demonstrate the need to call for effective ways of destigmatizing addiction in order to increase access to treatment. One of the ways to destigmatizing substance use addiction is to remake it as a health issue. Moving away from a moral frame for addiction to a medical frame has had multiple benefits. In this section, I focus on explicating two potential ways to increase the presence of the medical frame which can influence treatment access and outcomes.

First, supporting health care access by promoting social policy such as Medicaid expansion can destigmatize both clinical and societal perceptions. Expanding Medicaid has a larger public health effect as it can integrate the SUD treatment into healthcare systems more directly. The latter two chapters discussed Medicaid coverage as one of the important facilitators to increase access to SUD treatment for pregnant women and mothers with SUD. These findings have policy implications for non-expansion states, who should consider expanding eligibility to increase access to SUD treatment. Such shift toward the public health approach, in turn, can improve drug control policies by moving away from the moral perspectives of punishing women for having SUD. The public health approach can be as effective or possibly more effective than prosecuting women for using substances during pregnancy. In Chapter 4, the expansion efforts were decreased in states that have punitive policies toward pregnant women who have SUD, demonstrating that facilitating women's access to SUD treatment via health services can be more effective than criminal sanctions. Policymakers should consider solutions that

focus on creating a supportive and safe environment for women who have SUD. Past studies have shown that stigma in health care settings may reduce not only treatment access for pregnant women and mothers who have SUD but also perinatal care service access for pregnant women (Frazer et al., 2019; Nichols et al., 2020; Renbarger et al., 2020; Stone, 2015).

Second, designing and fostering appropriate clinical practices (e.g., multimodal, convenient, child care, etc.) and policies that support mothers are better at enabling access and retention in SUD treatment. A women-centered approach is needed to create more opportunities to help increase women's access to treatment services. Referral and treatment settings may want to consider tailoring their efforts to meet the specific needs of the mothers. As the conceptual model of SUD treatment access and barriers for pregnant women and mothers across gateways and referral settings in Chapter 2 illustrates, women face multiple unique barriers when accessing SUD treatment. Treatment programs that have addressed socioeconomic and psychosocial needs have been successful. Finally, policies in general that support women, rather than just their fetuses/children may be far more effective means of accomplishing drug control.

Future Directions

This dissertation presents several areas of future research regarding how to increase treatment access and also ensure quality care for mothers who have SUD. First, more research is needed to focus on women with children, especially young children that need ongoing child care. Gateways such as the CPS or family drug court are sites to recruit women who have young children and examine how they navigate the treatment

pathway. In addition, longitudinal studies that encompass periods beyond pregnancy are needed. Such longitudinal research designs can also scrutinize the subsequent treatment pathways and complex treatment patterns that reflect repeated treatment encounters, exits, and re-entries.

Next, the results have shown that motherhood brings unique challenges and opportunities for women. However, currently, there is no standardized way of measuring these factors. Being able to estimate the needs will help determine the predictive value of treatment access, overdose, or its association with other longer-term health outcomes. Such metrics can also inform future use by providers or other contacts like social service agents to decide on the most appropriate treatment outreach strategy for their patients.

Addiction health services researchers may want to study current implementation challenges with SBIRT in both healthcare and non-healthcare settings and consider ways to best engage pregnant women and mothers. This may require considering solutions that are adaptive to different referral settings such as social service agencies, community-based organizations, and criminal justice systems. Policymakers may want to consider using mandates to refer, in order to increase referral practices, by counteracting punitive policies and stigma that demotivate and frighten women from accessing SUD treatment. More research is needed to study new approaches to tailor or create treatment programs that best serve women's needs. Community-participatory approaches or other strategies to voice women's needs and interests can instigate women-centered interventions and increase the participation of other stakeholders (Cornwall and Jewkes, 1995; Nieweglowski et al., 2018).

Chapter 2 revealed the importance of innovative approaches that support mothers in ways that recognize their manifold responsibilities for their children. Due to the unprecedented COVID-19 pandemic, our society is beginning to conceptualize the needs of mothers differently. The pandemic has also changed the clinical practices of SUD treatment providers. The expanding role of telehealth and take-home medications can change the existing treatment paradigm for mothers with SUD (Guille et al., 2021; Joseph et al., 2021). Such clinical practices can reduce the need to come to clinics when women are taking care of children. Policymakers, researchers, and providers should apply lessons learned from the pandemic, and tailor future clinical practices such as transferring some in-person visits to telehealth settings to assist women along the pathway to addiction treatment.

Conclusion

In conclusion, mothers and pregnant women with SUD experience multiple barriers to accessing SUD treatment. Ending discrimination toward SUD and mothers with SUD by changing the moral frame of treatment are the ways to facilitate their pathway to recovery. The findings in this dissertation point to expanding Medicaid policy and leveraging gateways to inform the design and target of interventions to improve women's access and engagement in SUD treatment.

APPENDICES

Appendix A: Institutional Review Board review letter

Boston Medical Center • School of Medicine • School of Public Health • Goldman School of Dental Medicine



Institutional Review Board
72 E. Concord St., Robinson 4 – Suite 414
Boston, Massachusetts 02118-2307
Tel: 617-358-5372

Title of Study: Dissertation Study: Examining the state policies and external organizational ties that affect women's access to and engagement in substance use disorder treatment services

IRB Number: H-40386

RE: Initial Review Submission Form

Determination: Not Human Subjects Research

Date of Action: 06/23/2020

Funding Source: Student research with no external funding

June 23, 2020

Dear Sugy Choi,

A qualified member of the Institutional Review Board (IRB) staff has reviewed the above referenced submission and has determined that the study qualifies as not human subjects research (NHSR) based on the definitions of human subject and research under the policies and procedures of the Human Research Protection Program (<http://www.bumc.bu.edu/ohra/hrpp-policies/hrpp-policies-procedures/#10.2.5>).

This determination corresponds with the versions of the application and attachments in the electronic system most recently given an outcome of 'Reviewed' as of the date of this letter.

Protocol Specific Determinations

No PHI collected, accessed, used or distributed under 45 CFR 164.514

All determinations regarding this project have been made based on the information submitted by the investigator. Any modifications to the research plan that would possibly change the Not Human Subjects Research (NHSR) determination must be submitted to the IRB for review and confirmation of NHSR status prior to initiation of the change. **PLEASE NOTE:** Minor changes to the study that do not affect the NHSR determination do not need to be submitted to the IRB.

You may retain this letter in your files as documentation of this decision by the IRB. No progress reports are required for this project as long as no changes are made to the study. **As principal investigator, you are reminded that you must comply with the responsibilities listed here** <<http://www.bumc.bu.edu/irb/maintaining-irb-approval/responsibilities-of-the-principal-investigator/>> with the exception of point #13.

Sincerely yours,

Appendix B: Association of pregnancy and having children on health and mental health, social services, and criminal justice system utilization among reproductive age women, National Survey on Drug Use and Health, 2015–2018

	Any use of health services in the past 12 mo	Any use of mental health services in the past 12 mo	Any use of social services in the past 12 mo	Criminal justice involvement in the past 12 mo
	Adjusted odd ratio [95% CI interval]	Adjusted odd ratio [95% CI interval]	Adjusted odds ratio [95% CI interval]	Adjusted odd ratio [95% CI interval]
Pregnant X Substance use disorder status (Ref=non-mothers in who do not have SUD) †	1.38 [0.70,2.73]	1.42 [0.96, 2.10]	1.93 [1.28, 2.92]	0.85 [0.42, 1.70]
Having child(ren) X Substance use disorder status (Ref=non-mothers in who do not have SUD) †	1.02 [0.81, 1.28]	1.40 [1.20, 1.64]	1.47 [1.21, 1.78]	0.79 [0.59, 1.05]

Notes. Adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), ever arrested (yes, no), residence area location (metro vs small metro vs. non-metro), and survey year (2015–2018)

† in addition to the above covariates, also adjusted for pregnancy (yes, no) or having children (yes, no) status for models

Appendix C. Full model results including covariates for the association between health and mental health services, social services, and criminal justice system utilization and substance use disorder treatment utilization by social status

Outcome: SUD treatment utilization in the past year	Nonpregnant women without children n=3547 AOR [95% CI]	Mothers and pregnant women n=2723 AOR [95% CI]	Interaction with Motherhood and pregnancy n=6270 AOR [95% CI]
Health services			
Emergency Department visit	1.39 [0.94, 2.07]	1.02 [0.74–1.39]	0.55 [0.34–0.90]
Hospitalization	2.90 [1.65, 5.10]	1.75 [1.09, 2.80]	0.48 [0.25–0.95]
Outpatient visit	1.24 [0.71–2.14]	0.97 [0.58–1.61]	0.63 [0.32–1.26]
Mental health treatment	3.17 [2.38, 4.21]	1.94 [1.29, 2.93]	0.67 [0.42–1.07]
Social services			
Supplementary security income (SSI)	0.85 [0.44, 1.65]	1.07 [0.57, 2.02]	0.91 [0.40–2.04]
Social security or RR payments	0.88 [0.45–1.72]	0.61 [0.36–1.06]	0.66 [0.31–1.43]
Welfare/job placement/child care (SNAP)	1.14 [0.45, 2.86]	0.57 [0.32–1.02]	0.43 [0.17–1.13]
(TANF)	1.26 [0.77–2.06]	1.57 [1.01, 2.46]	0.93 [0.55–1.55]
Medicaid	1.94 [0.71–5.31]	1.59 [0.93, 2.69]	0.64 [0.23–1.77]
Criminal justice involvement	2.07 [1.31, 3.27]	2.48 [1.64, 3.76]	0.93 [0.57–1.52]
	3.57 [2.03, 6.28]	3.38 [1.97, 5.80]	0.88 [0.45, 1.69]
Covariates			
Age group			
18–25	Reference	Reference	Reference
26–34	1.14 [0.80, 1.64]	1.62 [1.09, 2.42]	1.49 [0.91, 2.44]
35–44	1.25 [0.78, 2.00]	1.88 [1.10, 3.21]	1.46 [0.73, 2.92]
Race/ethnicity			
Non-Hispanic White	Reference	Reference	Reference
Non-Hispanic Black	1.07 [0.58, 1.98]	0.26 [0.14, 0.48]	0.27 [0.12, 0.60]
Latinx	0.91 [0.50, 1.65]	0.43 [0.23, 0.80]	0.52 [0.22, 1.21]
Others	1.09 [0.59, 2.02]	0.44 [0.23, 0.83]	0.42 [0.18, 1.01]

County metro status			
Large metro	Reference	Reference	Reference
	0.83	0.85	1.11
Small metro	[0.57, 1.22]	[0.60, 1.22]	[0.69, 1.78]
	0.75	0.62	0.88
Non-metro	[0.39, 1.46]	[0.38, 1.00]	[0.43, 1.82]
	2.22	2.17	0.98
Ever been arrested	[1.37, 3.60]	[1.33, 3.55]	[0.60, 1.59]
Income			
Less than 20k	Reference	Reference	Reference
	0.75	0.98	1.33
20k–49,999	[0.48, 1.16]	[0.61, 1.58]	[0.72, 2.45]
	1.09	1.29	1.35
50k–74,999	[0.65, 1.83]	[0.68, 2.42]	[0.55, 3.29]
	0.84	0.92	1.24
75k or more	[0.58, 1.23]	[0.46, 1.84]	[0.59, 2.62]

Notes. Adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), residence area location (metro vs small metro vs. non-metro), ever arrested (yes, no), and survey year (2015–2018)

Appendix D. Association between health and mental health services, social services, and criminal justice system utilization and substance use disorder treatment utilization by pregnancy status

Outcome: SUD treatment utilization in the past year	Pregnant women n=253 AOR [95% CI]	Interaction with pregnancy n=6270 AOR [95% CI]
Health services		
Emergency Department visit	0.90 [0.19, 4.24]	0.37 [0.08–1.64]
Hospitalization	0.05 [0.00, 0.58]	0.02 [0.00, 0.15]
Outpatient visit	0.62 [0.10–3.81]	0.45 [0.08, 2.62]
Mental health treatment	7.34 [1.71, 31.57]	1.03 [0.27–3.89]
Social services		
Supplementary security income (SSI)	0.51 [0.05, 5.17]	1.85 [0.39–8.82]
Social security or RR payments	11.07 [1.76–69.48]	2.04 [0.30, 13.93]
Welfare/job placement/child care	1.01 [0.08–13.58]	0.88 [0.12–6.55]
(SNAP)	1.48 [0.40, 5.47]	0.87 [0.26–2.94]
(TANF)	0.71 [0.46, 11.04]	0.67 [0.11, 4.00]
Medicaid	9.90 [1.98, 49.64]	3.26 [0.66, 16.1]
Criminal justice involvement	3.55 [0.91, 13.86]	0.21 [0.25, 1.83]

Notes. Adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), residence area location (metro vs small metro vs. non-metro), ever arrested (yes, no), and survey year (2015–2018)

Appendix E. Logistic regression results comparing the association between the number of social service use and substance use disorder treatment utilization by motherhood and pregnancy status

Outcome: SUD treatment utilization in the past year	Nonpregnant women without children n=3465 AOR [95% CI]	Mothers and pregnant women n=2641 AOR [95% CI]
Total number of social service utilizations (SSI, Social security or RR payments, Welfare/job placement/child care, SNAP, TANF, Medicaid)	1.33 [1.13, 1.56]	1.37 [1.19, 1.57]

Notes. Adjusted for age group (18–25, 26–34, 35–44), race (non-Hispanic white, non-Hispanic black, Latinx, other), income (20k–49999, 50k–74999, 75k+), health services utilization (ED, hospitalization, outpatient, mental health), recent criminal justice involvement (yes, no), residence area location (metro vs small metro vs. non-metro), and survey year (2015–2018)

Appendix F. Expansion effects and interaction estimates including Kentucky

	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Women living in non-criminalizing states (N=19,545)			
Difference-in-differences estimate	9.5%	8.5%	1.5%
95% CI	5.0, 14.1	5.0, 12.1	-1.1, 4.1
p-value	<0.001	<0.001	0.270
Total (n=23,470)			
Interaction of expansion and criminalization status	-8.1%	-3.6%	-3.7%
95% CI	-17.2, 0.9	-12.7, 5.6	-10.2, 2.9
p-value	0.077	0.434	0.269

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: For seven states that had recently criminalized substance use during pregnancy, I excluded post criminalization policy data (AZ: 2016–18, DC: 2016–2018, MD: 2016–2017, MS: 2016–18, OH: 2017–2018, UT: 2017–2018, WA: 2016–2018)

Appendix G. Sensitivity analysis for the expansion effect and interaction estimates for pregnant women who have opioid use disorder using adjusted odds ratio

	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Women living in non-criminalizing states (N=10,601)			
Difference-in-differences estimate	2.38	1.75	0.91
95% CI	2.24, 2.54	1.64, 1.86	0.66, 1.26
p-value	<0.001	<0.001	00.583
Women living in criminalization states (N=3,925)			
Difference-in-differences estimate	1.69	2.01	0.55
95% CI	0.93, 3.04	1.11, 3.65	0.27, 1.12
p-value	0.084	0.021	0.100
Total (n=14,526)			
Interaction of expansion and criminalization status	0.67	0.73	0.60
95% CI	0.32, 1.44	0.34, 1.55	0.28, 1.29
p-value	0.308	0.405	0.192

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: For seven states that had recently criminalized substance use during pregnancy, I excluded post criminalization policy data (AZ: 2016–18, DC: 2016–2018, MD: 2016–2017, MS: 2016–18, OH: 2017–2018, UT: 2017–2018, WA: 2016–2018)

Appendix H. Expansion and interaction effects after removing five states that expanded during 2015–2017

	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Women living in non-criminalization states (N= 10,249)			
Difference-in-differences estimate	10.3%	7.0%	-0.06%
95% CI	4.8, 15.8	1.9, 12.2	-4.0, 2.9
p-value	0.001	0.009	0.746
Women living in criminalization states (N=3,675)			
Difference-in-differences estimate	5.1%	10.7%	-3.3%
95% CI	-0.5, 10.6	2.4, 18.9	-10.7, 4.1
p-value	0.072	0.015	0.353
Total (n=13,924)			
Interaction of expansion and criminalization status	-1.8%	0.3%	-2.9%
95% CI	-11.0, 7.5	-11.1, 11.6	-10.3, 4.5
p-value	0.702	0.964	0.439

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: I excluded following states that expanded after 2014: AK, MT, PA, IN, LA

Appendix I. Expansion and interaction effects including states that were previously omitted due to change in the criminalization status in 2016 and 2017

	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Women living in criminalization states (N=4,158)			
Difference-in-differences estimate	2.8%	6.9%	-3.6%
95% CI	-2.5, 8.20	2.0, 11.7	-10.2, 2.97
p-value	0.278	0.008	0.261
Total (n=15,532)			
Interaction of expansion and criminalization status	-4.8%	-3.7%	-3.5%
95% CI	-13.3, 13.8	-12.5, 5.2	-10.4, 3.3
p-value	0.061	0.412	0.305

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: I also replicated the analysis including previously omitted years of the 7 states (AZ: 2016–18, DC: 2016–2018, MD: 2016–2017, MS: 2016–18, OH: 2017–2018, UT: 2017–2018, WA: 2016–2018) that began to criminalize substance use in 2016 or 2017

Appendix J. Additional analysis of criminalization effects in states that began to criminalize substance use in 2016 and 2017

	Medications for opioid use disorder (MOUD) use in outpatient settings	Medications for opioid use disorder (MOUD) use across all settings	Treatment completion status (completed)
Total (n=2,030)			
Criminalization	14.5%	14.7%	3.9%
95% CI	7.9, 21.1	6.5, 22.8	-5.6, 13.4
p-value	0.004	0.008	0.318

*All estimates were adjusted for age, race/ethnicity, education level, unemployment status, state fixed effects and state-specific linear time trends.

Note: I only included following states that began to criminalize substance use during pregnancy (2016: AZ, DC, MD, MS, WA; 2017: OH, UT), and excluded the year of implementation as a wash-out period.

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CURRICULUM VITAE

