

4-2019

Unpacking the Opioid Epidemic: Intervention Methods and Effects on Women and Children

Olivia Miller
DePauw University

Follow this and additional works at: <https://scholarship.depauw.edu/studentresearch>



Part of the [Psychiatry and Psychology Commons](#), and the [Public Health Commons](#)

Recommended Citation

Miller, Olivia, "Unpacking the Opioid Epidemic: Intervention Methods and Effects on Women and Children" (2019). *Student research*. 116.

<https://scholarship.depauw.edu/studentresearch/116>

This Thesis is brought to you for free and open access by the Student Work at Scholarly and Creative Work from DePauw University. It has been accepted for inclusion in Student research by an authorized administrator of Scholarly and Creative Work from DePauw University. For more information, please contact bcox@depauw.edu.

Unpacking the Opioid Epidemic: Intervention Methods and Effects on Women and Children

Olivia Miller

DePauw University Honor Scholar Program

Class of 2019

Sponsor, Debra Litzelman, MA, MD

First Reader, Christina Wagner, PhD, HSPP

Second Reader, Nicole Lobdell, PhD

“Dopesick”: What is the Opioid Epidemic?

Roughly every 15 minutes, a mother gives birth to a baby suffering from opioid withdrawal in the United States (Tribble, “For Babies Of The Opioid Crisis, Best Care May Be Mom's Recovery”). Treating infants experiencing withdrawal is just half the battle of the opioid epidemic overwhelming pregnant women of the nation. According to the Centers for Disease Control and Prevention (CDC), the number of pregnant women diagnosed with opioid use disorder (OUD) in hospital labor and delivery units more than quadrupled between 1999 and 2014 (News Staff, “Number of Women With OUD in Labor/Delivery Quadruples”). Furthermore, the national average of OUD among women in this group increased from 1.5 per 1,000 delivery hospitalizations in 1999 to 6.5 per 1,000 delivery hospitalizations in 2014 (News Staff, “Number of Women with OUD in Labor/Delivery Quadruples”). The opioid epidemic has devastated all races and classes in the past decade, an undeniable fact (Bowman, “The Viral Obituary of an Opioid Addict: 'She's Just One Face' Of The Epidemic”). Yet, the government did not declare the opioid crisis a public health emergency until the end of October 2017 (Christie 5). Thousands of people are dying from drug overdoses each year, and now an increasing number of infants are facing the largely unknown consequences of opioid exposure and withdrawal.

The most striking element of the opioid epidemic is simply that these facts are not really new – the problem has been culminating for at least 20 years. It is 2019 and still the opioid epidemic claims an estimated 115 lives each day (Bowman, “The Viral Obituary Of An Opioid Addict: 'She's Just One Face' Of The Epidemic”). With vulnerable women and children making up a large portion of those suffering from the opioid crisis, it is time to overcome stigma and start examining successful and plausible solutions. Personal accounts of those brave enough to share their struggles can make profound impacts for pathways to change.

An obituary of a young woman, Madelyn Ellen Linsenmeir, that went viral in 2018, captures the raw and real story of a woman and her child battling the monster of addiction. Linsenmeir's sister, Kate O'Neill, wrote Madelyn's obituary in her honor. Linsenmeir started her fight with addiction in 2004 at the young age of 16 when she tried OxyContin at a high school party for the first time. When her son Ayden was born in 2014, her sister writes, "After having Ayden [,] Maddie tried harder and more relentlessly to stay sober than we have ever seen anyone try at anything. But she relapsed and ultimately lost custody of her son, a loss that was unbearable" (O'Neill, "Madelyn Ellen Linsenmeir"). Loss of parental rights is a huge fear many addicted mothers face, discouraging them from seeking treatment in many cases. In this obituary, O'Neill not only captures the real struggles of her sister, she accurately describes how the world around Madelyn made it even harder for her to keep fighting her addiction. O'Neill declares, "To some, Maddie was just a junkie – when they saw her addiction [,] they stopped seeing her. And what a loss for them" (O'Neill, "Madelyn Ellen Linsenmeir"). The perception of those battling addiction as "junkies" acts as a persistent barrier to proper treatment. Even physicians are not immune to biases about patients battling with addiction, which can make it increasingly difficult to connect women with the care they need. Mothers with OUD especially are seen as bad mothers who do not care about their children and should not be able to keep them in their custody. The tragic story of Madelyn Ellen Linsenmeir's battle with drug addiction identifies important gaps in the treatment of addiction in the United States, and also offers an opportunity to reevaluate health care services in a time of need.

Madelyn's obituary received a lot of heartfelt attention from the public, which her sister explains with the following reasoning: "It's their story, or the story of their neighbor, or the story of their daughter, or the story of their coworker's daughter" (qtd in Bowman, "The Viral

Obituary Of An Opioid Addict: 'She's Just One Face' Of The Epidemic”). It is easy to critique the sudden response from the public about an epidemic that has plagued the nation for so many years, but the reality is that there are so many other women and children like Madelyn and her son Ayden. If it is stories such as these that bring more national attention to a devastated part of the health sector, then more accounts and facts need to be published to fuel motivation to devote resources to researching the most successful treatment methods.

An increasing amount of literature identifies the overwhelming national opioid problem with specific foci on pregnant women and infants. However, at the same time that news articles are being released on survivor stories and promising treatment methods, statistics are still accumulating deaths from opioid overdose and misuse. Society has not progressed enough in tackling this devastating crisis. The realization that the pharmaceutical industry is largely responsible for the nation’s access to opioids in partnership with the urged shift to understand addiction as a chronic disease both have just occurred, yet a few years too late. In addition to the constructive research being published on the opioid epidemic and how society can overcome it, change must be enacted. It is time for society to face the overwhelming treatment demand and deploy underutilized resources that can provide aid to all those in need. Women of childbearing age specifically and their children face many unique and difficult challenges of the opioid epidemic. Pregnant women have been largely left out of research studies because of ethical concerns and stigma has continuously influenced women battling drug addiction to feel shame and not seek treatment. Therefore, infants are also suffering the effects of withdrawal without proper care. In consideration of all the areas of society and people the opioid epidemic damages, there cannot be an efficacious “one size fits all” treatment model. Women and children need a comprehensive treatment approach that connects them with the care they need, while also

working towards diminishing stigma and other inequalities. This literature synthesis examines a thorough timeline of the opioid epidemic, including: the history of the opioid epidemic in the United States; its notably harmful effects on women and children; systematic barriers that have left thousands of women and children struggling with drug addiction untreated in society today; and the advantages and disadvantages of an array of treatment methods that have not been predominantly successful in reducing the burden of the epidemic. The paper concludes with a case study of a pilot program that has taken an ideal, holistic approach to treating mothers and their infants.

The case study features the program *CARE Plus*, a research program located in Indianapolis, Indiana, one of the many cities facing detrimental consequences from the opioid crisis. While *CARE Plus* is one of the first of its kind specifically designed for women battling opioid use disorder, Indianapolis has also had previous successes with other peer modeled programs attempting to fill many resource gaps. *CARE Plus* is a unique treatment approach, structured from the peer model, built on women empowerment and the mission to equate substance use disorders on the same plane as all other chronic illnesses, such as diabetes or cancer. This literature synthesis concludes with a close analysis of *CARE Plus* in order to put into perspective all of the different elements discussed around holistic treatment and portray progress in efficaciously battling the opioid epidemic. *CARE Plus* could act as motivation and an example model for further reform. First, it is crucial to understand opioids, how they work, and just how seriously they have affected society.

Substance use disorders affect everyone. Societal barriers render treatment ineffective in regard to accessibility and availability for all, perpetuating the nation's opioid crisis. Policy makers, health care and social justice activists must strategically focus on the most vulnerable

populations in order to significantly reduce this epidemic's disease burden. Considering the breadth of addiction, it is seemingly impossible to determine where to begin. Pregnant women, for example, are one group of opioid victims whose struggles are even further intensified by substance use disorders. The stigma and legal ramifications that surround pregnant women and mothers who abuse drugs is at least doubled in strength because there are two lives at stake in these cases. With increased focus on addicted pregnant women, progress for reduction of the opioid crisis can be achieved for two critical groups: the nation's women and children.

According to a CDC report from 2018, since 1999 opiate overdose deaths have increased 265% among men and 400% among women ("Prescription Painkiller Overdoses"). The umbrella term *opioid* covers a wide range of addictive substances. An opioid is a drug which binds to opioid receptors in the body (Truth, "What Are Opioids?"). The term "opioids" covers illegal substances as well as prescription drugs for pain relief, ranging from heroin to hydrocodone, more commonly known as Vicodin. Opioids reduce the perception of pain but can also cause drowsiness, confusion, euphoria, nausea, and constipation, and possibly depress respiration (SAMHSA, "Substance Use Disorders"). People commonly misuse opioids by snorting or injecting them as an attempt to intensify the drug's pleasurable effects. These methods increase the risk for serious medical complications, such as HIV infection from unsterile needles or overdose (SAMHSA, "Substance Use Disorders"). Symptoms of opioid use disorders, similar to other substance use disorders, include a strong desire for opioids, inability to control or reduce use, continued use despite interference with major obligations or social functioning, increases in amounts and frequency of use, development of tolerance, focusing and spending large portions of time obtaining and using opioids, and experiencing withdrawal symptoms from stopped usage (SAMHSA, "Substance Use Disorders"). On top of the devastating physical risks of opioid use

disorder, addiction is a chronic disease often associated with intense mental health problems, such as depression, anxiety and mood disorders (O'Brien and Crowley 546).

The opioid epidemic is severe in several areas of society; politically, economically, and especially in the health care sector. Opioid use disorder, a subcategory of substance use disorders, is associated with a significant disease burden and the highest mortality among all mental and behavioral disorders (World Health Organization, "Alcohol and Drug Use Disorders: Global Health Estimates"). Long-term effects of opiates include liver and brain damage and dependence, arguably the most significant. Paired with their highly addictive qualities, opioids are easy to obtain through medical prescriptions, which is a highly dangerous partnership (Patterson, "The Effects of Opiate Use"). In 2017, the CDC estimated that roughly 70,000 people died from drug overdoses (CDC, "Opioid Overdose"); however, this number is likely low due to underreporting. Opioids are the most abused illicit drugs in the United States (Patterson, "The Effects of Opiate Use"). Today, the U.S. alone makes up 5% of the world's population but consumes almost 70% of the global opioid supply (Rieder, "The Agony of Opioid Withdrawal - and What Doctors Should Tell Patients about It"). Americans have a 1 in 96 chance of dying from an opioid overdose. For the first time in U.S. history, this probability has surpassed another leading cause of death: vehicle crashes, with the likelihood of a 1 in 103 chance of dying (Stewart, "Report: Americans are Now More Likely to Die of an Opioid Overdose than on the Road"). Women, specifically pregnant women, make up an unacceptable portion of these numbers. In addition to the direct effects of OUD, there are other comorbid complications which are important to consider in the breadth of the epidemic and efficacious treatment programs.

OUD is often comorbid with mental health illness or dangerous use of other substances. Almost half of people who experience SUD in their lifetime will also experience a mental illness

(National Institute on Drug Abuse, “Comorbidity: Substance Use Disorders and Other Mental Illnesses”). Additionally, some mental health illnesses have been established as risk factors for developing SUDs (National Institute on Drug Abuse, “Comorbidity: Substance Use Disorders and Other Mental Illnesses”). Substance use disorders in general are not well treated in American society. It has been reported that “nearly half of all Americans who have a severe mental illness fail to seek treatment” (Stephenson 325). The problems concerned with SUDs are parallel with OUDs and magnified with the current wave of the opioid crisis. To fully understand OUD, it is important to examine the pathophysiology of addiction and the overall structural inequalities that have failed to accurately address the opioid epidemic.

Addiction

Although the National Institute on Drug Abuse defines addiction as a chronic disease that can be managed and treated successfully, substance use disorders are not widely accepted as medical illnesses (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). The misconceptions of addicted persons being morally weak or lacking willpower are still very prevalent in society today (Olsen and Sharfstein, “Confronting the Stigma of Opioid Use Disorder – and Its Treatment”). The debate “Choice or illness?” still exists, even though only one side is supported by scientific evidence. This debate is intensely present amongst pregnant women and mothers, and historically has been an influential factor in portraying women as bad mothers who do not care about their children if they abuse drugs. Further, addiction treatment that utilizes medication to taper off of opioids is seen as replacing one addiction for another. Many concerns exist around new mothers taking drugs such as methadone and buprenorphine to treat opioid use disorder and effects on their infants. Evidence supports, however, that medication-assisted treatment (MAT) is safe for pregnant women (Klaman 2). Data also proves that breast milk contains minimal traces

of these treatment drugs, and breastfeeding is endorsed for new moms (Kocherlakota 554). Generally, MAT increases patient retention, and decreases drug use, infectious disease transmission, and criminal activity (Olsen and Sharfstein, “Confronting the Stigma of Opioid Use Disorder – and Its Treatment”). Addiction is not a weakness or choice, yet this is only one of the battles with stigma that people combating OUD continue to face in society today.

The American Society of Addiction Medicine defines addiction as a “primary, chronic disease of brain reward, motivation, memory and related circuitry” (ASAM, “Definition of Addiction”). Addiction is also characterized by:

...the inability to consistently abstain, impairment in behavioral control, craving, diminished recognition of significant problems with one’s behaviors and interpersonal relationships, and a dysfunctional emotional response. Like other chronic diseases, addiction often involves cycles of relapse and remission. (ASAM, “Definition of Addiction”)

Depending on the source, addiction has been characterized as either a chronic disease, a mental illness (National Institute of Mental Health), a brain disease (American Psychiatric Association), and even personal weakness. For the purpose of this paper, addiction is discussed and referred to as a medical, physiologic disease. Pregnant women face intensified stigma around drug use, pregnancy, and motherhood. Viewing addiction as a chronic disease underscores that addiction does not involve a moral problem and focuses the goal of treatment away from a “quick cure” to “long term management” (American Society of Addiction Medicine, “Treating Opioid Addiction as a Chronic Disease”). Understanding addiction is the first step in understanding opioid use disorder and how to treat it.

A substance use disorder is a cluster of cognitive, behavioral and physiologic symptoms indicating that the individual continues to use the substance despite significant substance-related problems (O'Brien and Crowley 483). An underlying change in brain circuits that can persist beyond the detox period, especially in individuals with a severe disorder is an important characteristic of substance use disorders (O'Brien and Crowley 483). Substance use disorders are chronic illnesses for which there is no cure (Olsen and Sharfstein, "Confronting the Stigma of Opioid Use Disorder – and Its Treatment"). Different types of substance use disorders include alcohol, tobacco, cannabis, stimulant, hallucinogen, and opioid use disorder. The DSM-5 from the American Psychiatric Association has moved away from terms such as "opioid abuse" and "opioid dependence" to the more current, accepted classification of the disease as "opioid use disorder."

There are 11 criteria for diagnosing a substance use and opioid use disorder. In order to be diagnosed with opioid use disorder, two of the following must occur within a year. Criteria 1-4 are categorized as impaired control, including taking the opioid in larger amounts or for longer than initially intended, having a persistent desire to reduce or control usage without success, spending a lot of time obtaining the opioid or recovering from its effects, and craving (O'Brien and Crowley 541). Criteria 5-7 are classified as social impairment, which is failure to fulfill work, school, or personal obligations, using the opioid despite social or personal problems manifesting from use of the substance, and backing out of important personal, occupational, or social events (O'Brien and Crowley 541). Criteria 8 and 9 are named risky use for using the substance when it's physically dangerous and using even with awareness of having a persistent psychological problem most probably stemming from use of the opioid (O'Brien and Crowley 541). Finally, criteria 10 and 11 are labeled as pharmacological, for developing a tolerance for

the opioid and the experience of withdrawal in someone who has maintained prolonged heavy use of the substance (O'Brien and Crowley 541). Opioid use disorders are qualified as mild, moderate, or severe, with mild classified as experiencing 2-3 symptoms, moderate experiencing 4-5 symptoms, and severe experiencing 6 or more symptoms (O'Brien and Crowley 542). There are important genetic and physiological factors that influence the risk for opioid use disorder.

The DSM-5 recognizes the important role genetic factors play, both directly and indirectly, pertaining to an individual's family, peer, and social environmental factors for risk of developing an opioid use disorder (O'Brien and Crowley 543). Impulsivity is an individual behavior that relates to the risk of developing a substance use disorder that could be genetically determined (O'Brien and Crowley 543). A study from the Department of Psychiatry at the University of Texas focusing on chronic pain patients provides evidence to support that opioid individuals are more impulsive. They found that greater impulsivity is associated with greater risk for misusing opioid analgesics (Marino 2156). Their findings suggest that impulsivity may be a risk factor for opioid misuse with direct clinical implications (Marino 2156). Beyond genetic factors, culture-related diagnostic issues also play a role in the development of addiction. The DSM-5 explains that over time, OUD is seen more often among white middle-class individuals, especially females (O'Brien and Crowley 544). This suggests that the different uses of opioids reflect the availability of the drugs and that other social factors may also impact prevalence (O'Brien and Crowley 544). The high cultural and social risk of addiction for females is important in the availability and accessibility of treatment programs for all socioeconomic classes and races.

Additional health risks to OUD exist that are important to include and address in treatment programs. Because opioids can be injected for a faster high, users who inject are at increased risk

for bacterial endocarditis, hepatitis, and human immunodeficiency virus (HIV). Bacterial endocarditis is an infection caused by bacteria in the bloodstream that settle in the heart lining, a heart valve, or a blood vessel (American Heart Association, “Heart Valves and Infective Endocarditis”). Hepatitis is an inflammation of the liver. HIV is the weakening of a person’s immune system with the destruction of important cells that fight disease and infection; it does not have a cure (CDC, “HIV/AIDS”). The DSM-5 reports that HIV infection is as high as 60% among heroin users (O’Brien and Crowley 545). Further, Hepatitis C infection may occur in up to 90% of people who inject opioids (O’Brien and Crowley 545). The DSM-5 also reports the prevalence of tuberculosis (TB), a disease of the lungs, in heroin users (O’Brien and Crowley 545). Anyone who utilizes the method of injection is at risk for these severe health conditions. There are many additional serious risks that accompany OUD which are important to consider in the holistic treatment process.

Withdrawal symptoms can include a severe group of symptoms that occur from the sudden removal or abrupt decrease in drug usage (Condrón, “Drug Withdrawal”). The DSM-5 also classifies withdrawal as the administration of an opioid antagonist, such as naloxone, an overdose reversal drug, after a period of opioid use (O’Brien and Crowley 547). Withdrawal is diagnosed through the presentation of three or more of the following symptoms: dysphoric mood, nausea or vomiting, muscle aches, lacrimation or the secretion of tears, rhinorrhea or runny nose, pupillary dilation, piloerection or goose bumps, sweating, diarrhea, yawning, fever, or insomnia (O’Brien and Crowley 547). Withdrawal cannot only be very dangerous for the person enduring it, but also for the fetuses of pregnant mothers who can endure serious levels of distress. Withdrawal is not recommended for pregnant women. The dangerous physical health risks associated with withdrawal are so terrible that someone might risk death to avoid

withdrawal, National Public Radio (NPR) reports (Feldman, “Opioid Antidote Can Save Lives, but Deciding When to Use It Can Be Challenging”). Journalist Nina Feldman observes, “Many people who use drugs say withdrawal is like having the worst flu of your life, complete with cold sweats, shakes, and vomiting” (“Opioid Antidote can Save Lives, but Deciding when to Use It can be Challenging”). In many cases, withdrawal is avoided at whatever the cost. The experience of withdrawal is absolutely crucial to incorporate into treatment programs for women of childbearing age.

It is necessary to look beyond traditional biomedical treatment practices at the underlying social, emotional, and economic conditions in women’s lives that provide the context in which chemical dependency develops and in which a woman and her family can recover (Finkelstein 1298). It is crucial to remember that when analyzing these statistics, the effects of an incurable, chronic disease are the primary elements. In her discussion of preventable perinatal risks, Mary P. Abernathy, a maternal and fetal medicine doctor, defines substance abuse as a chronic disease similar to hypertension and obesity which requires ongoing treatment and management for the rest of the patient’s life (“Infant Mortality, Substance Use and Abuse in Pregnancy”). The common medical term “follow-up” becomes more than just regulatory post-treatment check-ups, but consistent positive and sustainable management. Relapse should be an expected and focused element of the treatment process; it does not mean treatment has failed. The National Institute on Drug Abuse (NIDA) compares relapse rates between substance use disorders and other chronic illness, such as hypertension and asthma. The rate of relapse for substance use disorders is between 40%-60%, and the rate of relapse for both hypertension and asthma is between 50%-70% (National Institute on Drug Abuse, “Treatment and Recovery”). Addiction is a complex disease which requires sustainable, arguably lifelong treatment programs and practices which are

equipped to deal not just with all facets of individual disorders, but also all groups of people specific to gender and class.

The Youngest, Most Vulnerable Victims: Special Needs and Challenges of Pregnant Women with Opioid Use Disorder

In the 1960s, over 80% of patients seeking treatment for opioid addiction were men living in inner city, urban areas and who used heroin (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). In 2010, however, the majority of patients entering treatment programs were middle-class women living in less urban or rural areas (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). Opioid use during pregnancy has increased nearly five-fold in recent years (Angelotta 595). Between 2007 and 2016, pregnancy-related deaths due to opioid misuse more than doubled (Gemmill 115). Additionally, from 2013 to 2014 the number of women of childbearing age, defined as ages 15-44, who reported past-month misuse of prescription pain relievers, such as OxyContin, increased to 98,000, or 5.3%, from 2011 to 2012 (Johnson and Campopiano 2). In the same period, the number of women ages 15-44 who reported past-month heroin use increased to 109,000, or 31%, in the same period (Johnson and Campopiano 2). The CDC estimates that “one-third of reproductive-age women enrolled in Medicaid and more than a quarter of those with private insurance filled a prescription for an opioid pain medication each year between 2008 and 2012” (Johnson and Campopiano 2). According to SAMHSA’s “Clinical Guidance for Treating Pregnant and Parenting Women with Opioid Use Disorder and their Infants”: “The prevalence of opioid use disorder (OUD) during pregnancy more than doubled between 1998 and 2011 to 4 per 1,000 deliveries” (Johnson and Campopiano 2).

Even with all of these published statistics, pregnant women still are rarely connected with and receiving the proper care they need. In Indiana in 2016, for example, only 69.4% of pregnant

women received prenatal care in the first trimester (Box, “Where Indiana Stands: NAS and the Opioid Epidemic). Women of reproductive age and neonates are an extremely vulnerable population to the nation’s persisting opioid epidemic. Statistics only begin to paint the picture of the battle of the opioid epidemic for the nation’s pregnant women.

Without treatment, pregnant women with OUD are at risk of preterm delivery, low infant birth weight, and transmitting human immunodeficiency virus (HIV) to their infants (Johnson and Campopiano 2). Many people with OUD who use prescription drugs switched to heroin because of cost and ease of injections, as well as the recent proximity and established drug trafficking infrastructure that has significantly reduced the price of heroin in the United States (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). It has been recorded that over 66% of pregnant women on medication-assisted treatment (MAT) report a history of heroin use, and an estimated 63% report a history of intravenous use, making HIV and other infectious diseases of extreme concern (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). Hepatitis C virus (HCV) is another common infectious disease in pregnant women with OUD because of high-risk sexual behaviors and intravenous drug use (Hand 225). As of 2017, rates of HCV among pregnant women with OUD were between 50% and 62% (Hand 225). Pregnancy is a critical opportunity to identify and evaluate HCV and HIV infections in high-risk populations (Hand 225).

Furthermore, the misuse of other substances in pregnant women with OUD including alcohol, marijuana, cocaine, and tobacco may exacerbate the symptoms of neonatal abstinence syndrome (NAS) (Hand 225; Johnson and Campopiano 47). For example, one study notes that the “concomitant use of benzodiazepines [a class of psychoactive drugs] and opioids during pregnancy is of particular concern as it increases the risk for maternal overdose and overdose

death” (Hand 62). 13% of pregnant women in the South analyzed in this study reported benzodiazepine use at enrollment (Hand 62). This portion is likely low due to other reports of benzodiazepine use in the same population amounting to as high as 70% (Hand 62). Concomitant use of other drugs, especially in pregnant women with OUD, is a critical area further supporting the need for holistic treatment options. Significantly, a tobacco-use cessation program is one of the most important therapies to begin when a woman enters OUD treatment (Johnson and Campopiano 39). Heavy daily smoking during pregnancy is associated with compromised birth outcomes and the degree of NAS the baby may experience (Johnson and Campopiano 39). The risks associated with OUD, as well as other dangerous behaviors the addiction can influence, specifically for mothers and babies, has led the nation to declare a public health crisis in response to the opioid epidemic.

Maternal substance use contributes to the 50% of infant mortality perinatal risks that are largely preventable, according to Mary Pell Abernathy, a maternal-fetal medicine doctor in Indiana (“Infant Mortality, Substance Use and Abuse in Pregnancy”). As reported by the World Health Organization (WHO), “The perinatal period commences at 22 completed weeks, or 154 days, of gestation and ends seven completed days after birth” (“Maternal and Perinatal Health”). Perinatal risk factors include women’s health and behaviors before and during pregnancy which can impact the health of their children (U.S. Department of Health and Human Services, “Child Health USA 2013”). These risks range from low birth weight, no prenatal care or lack of early prenatal care, not breastfeeding, preterm birth, smoking, substance use and abuse, diabetes, and uncontrolled hypertension (Abernathy, “Infant Mortality, Substance Use and Abuse in Pregnancy”). While NAS is rarely fatal, the condition is associated with preterm birth and low birth weight. Additionally, women with opioid use disorder are more likely to use other

substances, such as tobacco, and less likely to seek prenatal care in fear of the consequences.

Infant mortality is an important factor to consider when analyzing the severity of pregnancy and the opioid epidemic.

Indiana, for example, falls at the bottom 20% of all states regarding infant mortality, making it one of the worst states ranked for this frontline measure of health (Abernathy, “Infant Mortality, Substance Use and Abuse in Pregnancy”). Indiana was also classified by the CDC as a state showing no significant change in infant mortality between 2005-2011. However, infant mortality reduction did not become a top state priority until January of 2013 (Abernathy, “Infant Mortality, Substance Use and Abuse in Pregnancy”). Indiana’s most current infant mortality rate for 2018 of 7.4 deaths per 1,000 live births is significantly higher than the Healthy People 2020 goal of 4.5 deaths per 1,000 live births (Abernathy, “Infant Mortality, Substance Use and Abuse in Pregnancy”). The most frequent cause of infant death is low birth weight/prematurity (Indiana State Department of Health, “Indiana Infant Mortality and Morbidity Annual Report”), one of the top risks for pregnant women with OUD who do not receive treatment (Johnson and Campopiano 2). OUD is a critical disease to target in order to save and improve the lives of pregnant women battling with addiction and their newborns.

Alongside the important physical risks of substance use during pregnancy, women also face emotional trauma and stigma. For example, Amanda Hensley, a 25-year-old mother of two, was rejected by two hospitals and several clinics while struggling with a relapse during her second pregnancy, a 2016 NPR article reports (Tribble, “Pregnant and Addicted: The Tough Road to Family Health”). Even her immediate support system had abandoned her prior to her refusal from medical attention. The father of her child, Tyrell Shepherd, described his unhappiness with Hensley’s addiction: “If you don’t care about yourself, have enough common

decency to care about the baby you're carrying" (qtd in Tribble, "Pregnant and Addicted: The Tough Road to Family Health"). Without a support system that understands addiction, seeking treatment becomes infinitely harder for pregnant women who feel alone and judged.

Kelly Zimmerman, a 26-year-old mother, faced many similar struggles after the birth of her son Jaxton. Kelly was a single mom grieving the death of her husband who had died just months before the birth from a heart attack (Chatterjee and Davis, "Beyond Opioids: How A Family Came Together To Stay Together"). As a struggling woman with OUD, Kelly was receiving methadone to help treat her addiction, and her son was born with NAS (Chatterjee and Davis, "Beyond Opioids: How A Family Came Together To Stay Together"). With the help from her family and the accessibility of the program Family Group Decision Making, Kelly was able to keep the custody rights of her son and receive proper treatment for OUD, which is not possible for many pregnant women like Kelly. Society still holds unrealistic expectations for women, especially of childbearing age, that puts sole responsibility on their shoulders. Hendrée Jones, executive director at Horizons, a residential substance use disorder treatment program, succinctly explains how society views mothers with OUD: "They're supposed to automatically know how to be 'good mothers' – how to be nurturing mothers. That's like trying to teach somebody algebra when they've never even had addition" (qtd in Tribble, "For Babies of the Opioid Crisis, Best Care may be Mom's Recovery"). Amanda and Kelly are just two examples of women suffering from not just opioid use disorder, but the unrealistic expectations of society. Stigma and the emotional trauma associated with OUD do not foster a safe environment for pregnant women in America to seek treatment. This barrier prevents proper care from reaching infants with NAS as well.

Neonatal Abstinence Syndrome (NAS)

NAS is the second half of the battle that pregnant women and mothers face because of OUD. In 2014, 657 infants in Indiana were born with neonatal abstinence syndrome (NAS). A lack of data, underreporting, and a limited understanding of the effects of NAS make it likely that the true number of cases was higher (Abernathy, “Infant Mortality, Substance Use and Abuse in Pregnancy”). Neonatal abstinence syndrome, or NAS, is a result of the sudden discontinuation of fetal exposure to substances that were used or abused by the mother during pregnancy (Kocherlakota 548). NAS presents a range of potential adverse outcomes for the fetus and infant, including preterm birth, low birth weight, respiratory, gastrointestinal, and central nervous system disturbances (Falletta 126). Although NAS is rarely fatal, significant illness can occur as well as prolonged hospital stays (Kocherlakota 548). Initial symptoms of NAS include tremors, irritability, excessive crying and diarrhea (Logan 186). Seizures can also occur, but evidence shows that central nervous system signs, such as tremors and excessive crying, normally appear first (Kocherlakota 550). NAS is treated first with nonpharmacological care, then pharmacological care depending on the severity of the condition.

Unfortunately, no perfect scoring system exists to determine the severity of NAS. There are many scoring systems that have been developed, however, and the modified Finnegan Neonatal Abstinence Severity Scores is currently the most common tool used (Logan 187). Advantages of scoring for term infants include defining when and if pharmacological intervention is needed and assistance with monitoring the defined therapy (Logan 187; Kocherlakota 553). Risk factors for the severity of NAS include if the infant was born at full term, a healthy birth weight, polydrug use, male gender, and tobacco and methadone use (Kocherlakota 553). Little research has been done on the comparative cost-effectiveness of NAS scoring scales or their efficiency in identifying opioid-exposed infants at birth (Johnson and Campopiano 79), such as the Lipsitz

Tool (Neonatal Drug Withdrawal Scoring System) or MOTHER NAS (a modified Finnegan Scale). Scoring systems help with management of the neonate in the administration of both nonpharmacological and pharmacological care.

Nonpharmacological care includes practices such as gentle handling, demand feeding, swaddling and careful avoidance of waking up the sleeping infant (Kocherlakota 553). Breastfeeding is a form of nonpharmacological treatment that has many benefits for mom and baby. The benefits of breastfeeding include an increase in bonding between mother and infant, an enhancement in maternal confidence, and an encouragement in active maternal participation in caretaking of the infant (Kocherlakota 555). In fact, breastfeeding can decrease the incidence of NAS, a need for pharmacological treatment, and length of hospital stay (Kocherlakota 555). Breastfeeding is a beneficial treatment for NAS for both baby and mom. There is significant evidence to support the fact that breast milk only contains small quantities of methadone and buprenorphine (Kocherlakota 554). Although the amount of buprenorphine and methadone present in breast milk is not enough to treat NAS, breastfeeding can still be a helpful nonpharmacological practice for baby that should continue even if the baby should need pharmacological assistance. Importantly, the sudden discontinuation of breastfeeding is not associated with increased severity of NAS. In general, however, gradual weaning from breast milk is encouraged (Kocherlakota 555).

The avoidance of pharmacological care is considered a success largely for two reasons. First, earlier discharge from the hospital is probable and second, there is additional risk due to the fact that there is not a standard accepted pharmacological intervention for the management of NAS (Kocherlakota 554). Realistically, medical intervention is required for 50% to 70% of infants suffering from NAS (Logan 187). Morphine is the most common pharmacological intervention

for babies suffering from NAS, because it decreases seizures, improves feeding, eliminates diarrhea and decreases agitation (Kocherlakota 554). Evidence shows that morphine is safer and more suitable for infants with NAS (Kocherlakota 554); however, because it needs to be provided every three to four hours, it increases lengths of hospital stays and costs. Neonatologist Dr. Prabhakar Kocherlakota recommends an algorithmic approach for the management of NAS because “no single medication is suitable for every patient and no single regiment is acceptable to every patient” (554). Additionally, this approach is advantageous for community hospital settings caring for infants with NAS and their mothers (Kocherlakota 554). Treatments and assessment of both short-term and long-term damage from NAS are difficult to determine because of the little knowledge of how, exactly, infants are affected by their mothers’ use of opioids.

The pathophysiology of NAS is not completely understood (Kocherlakota 549). There is limited knowledge even in adults about the complex cellular and molecular mechanisms of opioid withdrawal (Kocherlakota 550). This process is further complicated in neonates because of their “immature neurologic development, impaired neurological processing,” and complex relationship between drug consumption and effects between mother and child (Kocherlakota 550). There are many factors that can affect opioid accumulation in the fetus. Opioids are easily transferable across the placenta to the fetus because they are water soluble, are lipophilic, or dissolvable, substances, and they have low molecular weights (Kocherlakota 550). Synthetic opiates, such as fentanyl and methadone, cross the placenta more easily in comparison to semisynthetic opiates, such as oxycodone and hydrocodone (Kocherlakota 550). According to Kocherlakota, “A lack of opioids causes increased production of norepinephrine, which is responsible for most of the signs of NAS” (550). Norepinephrine is an organic chemical in the

body that acts as both a stress hormone and a neurotransmitter, or a substance that sends signals between nerve cells (Cassata, “What is Norepinephrine?”). Norepinephrine plays a role in the infant’s experience of excessive crying, agitation and irritability.

Opioid withdrawal affects the autonomic and peripheral nervous systems (Kocherlakota 550). Opioid withdrawal causes decreased serotonin expression, leading to sleep disturbances (550). The autonomic nervous system is in charge of subconscious bodily functions such as the control of breathing, heartbeat, and digestive system, and the peripheral nervous system controls nerves outside of the brain and spinal cord. Interestingly, the severity of NAS is decreased in preterm neonates (Kocherlakota 550). Kocherlakota explains this can be because of decreased exposure, transmission and morphine clearance (550). Withdrawal symptoms vary across neonates depending on the type of opiate their mother was taking. Importantly, no relationship has yet been found between maternal opioid dosage and NAS (Kocherlakota 549). While this is an important piece of evidence for incorporating mothers into NAS treatment, the limited knowledge surrounding the pathophysiology of NAS makes it difficult to predict long-term developmental deficits in these infants.

Although little knowledge exists surrounding long-term effects of NAS on neurodevelopment, some evidence supports that infants born diagnosed with NAS are at increased risk for deficiencies with cognitive, language and visual-motor skills. Neonatologist Stephanie Merhar’s retrospective review on neurodevelopmental outcomes in infants treated for NAS found that in comparison to the normative population, children with NAS are at risk for lower developmental scores at 2 years of age (Merhar 590). These lower scores were still within the normal range in most cases; however, the research team considered a 4-6-point difference as clinically significant (Merhar 590). This study also reported that 7 of their 87 two-year-olds (8%)

needed treatment for strabismus, or lazy eye, by age three (Merhar 591). While the risk for long-term developmental effects is nothing like the outcomes of fetal alcohol syndrome, such as a high risk of mental retardation and significant developmental delays, the evidence of long-term developmental deficiencies supports the need for early intervention in families (Tribble, “For Babies Of The Opioid Crisis, Best Care May Be Mom's Recovery”).

Another study examining the neurodevelopment of infants with NAS at six months adds to Merhar’s conclusion with evidence that “infants born to methadone-maintained opioid-dependent mothers had lower developmental scores in all areas compared to infants matched for gestation, birth weight, and postcode at delivery” (McGlone and Mactier 20). McGlone and Mactier report that 32 of their cohort of 81 (40%) drug-exposed infants who returned for follow up failed a visual assessment at six months (20). In some areas, there is strong evidence to suggest an increased focus on the treatment of NAS and follow up. Director of the Pediatrics Center for Addiction and Pregnancy at Johns Hopkins, Dr. Lauren Jansson, comments on the effects NAS: “The one solid thing we can say about children who are exposed to substances prenatally is that their mothers need treatment” (qtd in Tribble, “For Babies Of The Opioid Crisis, Best Care May Be Mom's Recovery”). The treatment of NAS cannot be successful without the incorporation of the mother.

In addition to mental and physical health risks, infants with NAS spend more time in the hospital, which in 2012 resulted in \$1.5 billion excess costs (Falletta 126). Furthermore, a 2018 study analyzing neurodevelopmental outcomes in infants treated for NAS reported that the average hospital charges for infants with NAS amount to more than five times the cost for healthy infants (Merhar 587). To provide an example, the rising number of infants born with NAS in 2000 in Indiana resulted in treatment costs of \$190 million, compared to an almost

fourfold increase of \$720 million in 2009 (Box, “Where Indiana Stands: NAS and the Opioid Epidemic). Pharmacological care is a significant factor that persists hospital stays for infants with NAS, whether in regard to the administration of medical intervention or with delays in doing so. Nonpharmacological care is associated with the most advantages for decreasing hospital stays, such as the encouragement of breastfeeding and overall supportive care (Kocherlakota 553, 555). NAS is a risky and complex condition for babies, mothers, and their families that also comes with social, economic and health care costs for society (Kocherlakota 549).

In order to develop the most successful treatment programs for women of childbearing age and infants with NAS, it is important to understand what societal factors contributed to the devastation of this epidemic. In order to move forward, the nation must first understand and learn from previous mistakes in order to develop preventative and effective treatment models.

Good Intentions Gone Wrong: How Managing Pain Lead to a Crisis and Other Root Causes of the Opioid Epidemic

Substance use disorders have increasingly worsened throughout the nation because some addictions have stemmed from doctor-prescribed medications. In 2015, Indiana providers wrote 109.1 opioid prescriptions per 100 people, which totaled to approximately 5.8 million prescriptions (National Institute on Drug Abuse, “Indiana Opioid Summary”). Travis Rieder, a bioethics research scholar, shares his story of opioid addiction after a serious motorcycle accident. Rieder describes his fourth week of opioid withdrawal: “As my brain experienced life without prescription opioids for the first time in months, I thought I would die. I assumed I would die” (Rieder, “The Agony of Opioid Withdrawal - and What Doctors Should Tell Patients about It”). The problem was created when Rieder was never properly weaned off of his

medications. Tragically, he found himself battling suicidal thoughts due to long-term mistakes in his medical care. Rieder mentions he was even turned away from a rehabilitation facility (“The Agony of Opioid Withdrawal”). The physician who prescribed him oxycodone ordered an aggressive tapering regimen and advised Rieder to go back on the medication when he was suffering immensely from withdrawal. “My initial advice to you is clearly bad,” the doctor admits when Rieder and his wife frantically ask for anything that can help them (“The Agony of Opioid Withdrawal”). There are deeply-rooted problems that need to be addressed when it comes to defeating the opioid epidemic. Drug companies and the economy have been two largely influential factors in the growth of the complex web of the opioid epidemic.

In the early 1990s in the United States, concern about undertreating pain led to increased emphasis on pain management and treatment (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). Along with blood pressure, respiratory rate, temperature, and heart rate, pain is a symptom reported in over 80% of physician visits and costs the American public over \$100 billion each year (Walid 417). Therefore, the American Pain Society introduced pain as the “fifth vital sign,” improving recognition of pain’s importance in patient outcomes (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). Physicians remained committed to holistic treatments of their patients and prescribed what the drug companies produced – highly effective pain management medications. The addictive danger of these drugs has exacerbated the country’s opioid crisis.

Today, drug companies such as Purdue Pharma, Johnson & Johnson and CVS are facing lawsuits as more evidence surfaces surrounding their inaccurate marketing of prescription drugs to the public. At the center of the criticism is Purdue Pharma, a private company based in Stamford, Connecticut. The prescribing of opioids began exploding in 1996 when Purdue

Pharma launched a campaign misinforming the medical community about the risks of opioids (Keefe, “The Family that Built an Empire of Pain”). OxyContin was developed by Purdue and released in 1995 as a medical breakthrough (Keefe, “The Family that Built an Empire of Pain”). There is evidence that Purdue Pharma funded doctors and researchers to persuade the public that opioid addiction was an exaggeration and that their drug, OxyContin, could safely treat a number of different pain problems. Other organizations like Johnson & Johnson also pushed unscientific theories about drug addiction, supposedly in order for doctors to prescribe more opioids after signs of dependency showed in patients (Mann, “Opioid Litigation Brings Company Secrets Into The Public Eye”). Even employees of the FDA were targeted.

In 1995 the FDA approved a package insert for OxyContin with the information that the drug was indeed safer than competing painkillers (Keefe, “The Family that Built an Empire of Pain”). Within two years, the FDA examiner who oversaw the process had left and accepted a job at Purdue Pharma (Keefe, “The Family that Built an Empire of Pain”). Now it is known that even before the release of OxyContin, through focus groups Purdue learned the risks of the “abuse potential” of opioids (Keefe, “The Family that Built an Empire of Pain”). In the face of losing billions of dollars in lawsuits today, “Purdue executives acknowledged that their prescription opioids are far more addictive and dangerous than the company was telling doctors (Mann, “Opioid Litigation Brings Company Secrets Into The Public Eye”). Profit in the economic sector has clearly been a driving force in the severity of the nation’s opioid epidemic.

The opioid epidemic has infiltrated all 50 states in the nation and has reached people of all genders, race and class. There have been attempts to reduce the number of deaths from overdose, such as needle exchange services and harm reduction programs. But, a “one size fits all” treatment plan would certainly not be equipped to cover all facets that the opioid epidemic

touches. This is especially true for women of childbearing age. Their treatment plans must encompass the women as individuals along with their neonates and other children. The gaps that need to be filled to overcome the opioid crisis, such as access to care, education of health care personnel, and community support, must also be unique in the treatment of women of reproductive age. Pregnancy within the opioid epidemic is a unique and important area of the crisis that requires change and intense research for imperative improvement.

Systematic Factors Perpetuating the Crisis and Preventing Recovery

There are many barriers to treatment for pregnant women and mothers with opioid use disorder. The societal stigma that accompanies OUD during pregnancy and motherhood, such as fear of child protective services and imprisonment, negatively influence women not to seek essential prenatal and postpartum care (Johnson and Campopiano 2). Misinformation and lack of knowledge in training of health care professionals in providing care for struggling women are also significant barriers (Johnson and Campopiano 2). Legal consequences can play a large role in these scenarios. Several states have statutes that sanction against pregnant women with OUD (Krans and Patrick, “Opioid Use Disorder in Pregnancy”). While the goal of these efforts is to protect the infant from opioid exposure, in reality they drive women away from seeking care, continuing to engage in care, or limit them to the availability of care (Krans and Patrick, “Opioid Use Disorder in Pregnancy”).

Accessibility

One of the core problems for women of reproductive age seeking treatment for an opioid use disorder is lack of accessibility. Imagine the life of someone like 25-year-old Amanda Hensley who battled opioid addiction during her second pregnancy. She shares her isolated struggle: ““Either I was puking from morning sickness or I was puking from being high. That’s

kind of how I was able to hide it for a while,” NPR reports (Tribble, “Pregnant and Addicted: The Tough Road to Family Health”). With the goal of getting clean, yet without the resources to do so, Hensley sought help following separation from both her mother and her baby’s father. After being rejected from two hospitals and several clinics, Hensley only received medical attention when she went into withdrawal and was sent to the emergency room (Tribble, “Pregnant and Addicted: The Tough Road to Family Health”). Upon finally receiving medically-assisted care from this hospital, both she and her baby safely tapered off of opioids.

Despite MAT being the accepted standard of care for opioid dependence treatment in pregnant women, and its crucial role in both the mother’s and infant’s recoveries, there are several important barriers to this treatment method. Although very difficult to regulate, methadone maintenance has been favored over buprenorphine because of the potential to provide access to other behavioral therapies. It has been argued that because methadone is typically dispensed from a licensed opioid treatment program, patients are more likely to participate in comprehensive treatment by attending the clinic daily (Hand 224). In contrast, buprenorphine is typically prescribed by a physician in a primary care setting requiring refill after 30 days, which may drastically reduce the element of human contact and clinic check-in (Hand 224). Access to methadone clinics, however, depends largely on geography, transportation and employment. For example, the creation of methadone clinics has been rejected by communities out of fear of bringing crime to those neighborhoods. Lack of transportation, sick leave, daycare and time for travel are major deterrents to visiting a methadone clinic. Furthermore, methadone maintenance therapy (MMT) has also come under scrutiny because many patients are in need of more intensive, residential services that explicitly decline MMT patients (Hetteema and Sorensen 468).

Because of pharmacological and societal factors, buprenorphine has become the preferred treatment medication for pregnant women.

Another misconception that argues in favor of methadone over buprenorphine raises a concern around insurance coverage. Methadone is incorrectly believed to be more readily available than buprenorphine. Medicaid is known to cover methadone in most states, while only private insurance has covered buprenorphine in the past (Hand 224). However, one 2016 study reports that Medicaid covers methadone maintenance therapy (MMT) in only 29 states, because it is not covered in most states with a law that permits child abuse charges for illicit drug use in pregnancy (Angelotta 598). In contrast, the recent expansion of Medicaid eligibility improved access to opioid use disorder treatment with a significant increase in buprenorphine and naloxone prescriptions (Saloner 1). The advantages of buprenorphine, including lower severity of NAS and lower levels of physical dependence, have encouraged treatment standards to shift towards increasing the availability of buprenorphine in addiction recovery treatment. Because Medicaid can differ state by state, insurance remains a complex and important element to consider with access to care regarding this national epidemic. Accessibility is one of the first steps in considering treatment reach to patients, but adherence is a critical measure to consider in the success of programs offered.

Adherence

The World Health Organization defines adheres as “the extent to which a person’s behavior – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider” (World Health Organization 17). Research has focused on adherence to medication specifically in the past, but the WHO has worked towards a more holistic and encompassing definition of adherence in terms of treatment.

Importantly, accurate assessments of adherence behavior are crucial not only to determine the success of treatment programs, but in order to evaluate the efficacy of treatment. As with many other areas of addiction treatment, there is no “gold standard” for measuring adherence behavior (World Health Organization 18). The WHO recognizes that while adherence measurement provides useful information that outcome evaluations alone cannot provide, adherence is only an estimate of the true behavior of a patient (World Health Organization 19). No single measurement strategy has been deemed the “gold standard,” and adherence is just one facet of program evaluation that can contribute to determining success. Moreover, adherence in regard to addiction treatment cannot be considered in black and white, for example, remaining abstinent from drugs cannot be a singular positive outcome and relapse cannot be measured only as a negative outcome. Adherence has to be calculated based on the treatment program or research study, program goals, available resources, the response burden on the patient and how the results will be used (World Health Organization 19). Adherence must be discussed with an awareness of its complex definition and without it being the center of success in evaluation of treatment programs.

Furthermore, it is crucial to analyze the timeline of medication treatment intervention. Medicaid may cover methadone and/or buprenorphine, but several studies have suggested that early treatment intervention is key for successful retention rates. Many women are only able to enroll in treatment once they become pregnant because of program availability and/or insurance coverage (O’Connor 27). Family medicine practitioner Alane B. O’Connor led a study examining the rates of treatment retention at 6 and 12 months postpartum of women in medication treatment using buprenorphine during pregnancy (O’Connor 26). The authors of this study suggested that early treatment access would improve treatment outcomes (O’Connor 28).

Early treatment was defined as either being in treatment at the time of conception or entering medication treatment prior to 13 weeks' gestation (O'Connor 26). The association between early treatment intervention and successful retention rates emphasizes the importance of expanding access of medication treatment to women of childbearing age, not just pregnant women, with opioid use disorders (O'Connor 28).

Similarly, a separate study led by perinatal psychiatrist Jessica L. Coker, retrospectively examined pregnant women with OUD treated with buprenorphine and evaluated them as adherent, moderately adherent, and nonadherent (Coker 146). This study observes that treatment adherence is essential (Coker 146). Because the findings of this study included that adherence during pregnancy was influenced by the severity of withdrawal symptoms and clinical response, the authors suggested that "more aggressive buprenorphine dosing strategies early in treatment targeting rapid control of withdrawal symptoms may enhance adherence through delivery" (Coker 147). In the use of buprenorphine, early treatment access and maintained adherence through delivery are two crucial elements of MAT that need to be addressed with pregnant women. Restrictive insurance coverage, access to clinics, transportation, employment and/or education, and programs offering MAT are all significant structural obstructive factors for women of reproductive age seeking medically-assisted care. The stigma society holds towards pregnant women and mothers who use drug users are negative attitudes interwoven within institutions, making it very difficult to overcome and change.

Stigma

The language that exists around substance use disorders continues to paint the picture that people who suffer from these disorders are poor, irresponsible "junkies" who have chosen their fate. A quote from Ohio Sheriff Walter Bender explains: "Opioids reach every part of society:

blue collar, white collar, everybody. It's nonstop. It's every day. And it doesn't seem like it's getting any better" (Nachtwey and Moakley, "See Inside the Worst Opioid Addiction Crisis in U.S. History"). It is incorrect and unjust to label people plagued by the opioid epidemic as "junkies." Sons and daughters, friends and coworkers are all at risk of developing substance use disorders. Just like Madelyn Ellen Linsenmeir's story, even though her addiction affected the way she lived, it did not define her (Bowman, "The Viral Obituary Of An Opioid Addict: 'She's Just One Face' Of The Epidemic"). Society places immense personal responsibility on addicted individuals, especially pregnant women. The reality is that addiction is not a moral problem but a medical problem that cannot be beaten alone.

Addiction is stigmatized in American society because it is inherently linked to self-worth. Semi-religious, character re-building 12-step programs were created in 1935, almost a century ago, as the only alternative other than jails or death for people with SUDs. These programs influenced society to respond to addiction in such negative ways. The language used around addiction still today, especially in the media, perpetuates negative attitudes towards addiction. Society paints the picture of an addict as "disposable" and "deserving of ridicule" (Flanagin, "The Surprising Failures of 12 Steps"). The medical field could be considered as one of the most progressive areas in regard to addiction with more treatment proposals and programs offering services that treat addiction as a chronic disease. However, according to Alcoholics Anonymous (AA), in 2017 over 2 million people were individual and group members worldwide ("Estimates Worldwide A.A. Individual and Group Membership"). Despite the minimal success and retention rates of the 12-step programs, 31% success at best and overall 5% retention rate (Flanagin, "The Surprising Failures of 12 Steps" and Glaser, "The Irrationality of Alcoholics Anonymous"), AA is still one of the most popular treatment programs for people struggling with addiction. America

believes the best solution is to never engage with the addictive substance again. While 12-step programs can be successful for some people, the overall program is not holistic and does not focus on treating addiction as another facet of health, such as a chronic disease like diabetes. The religious values behind AA and the non-medical treatment practices are significant examples of how negative attitudes of addiction are persisted as a moral problem rather than a physiological disease.

Medical treatment for SUDs, such as methadone maintenance, is also associated with the stigma of addiction being a moral choice rather than an incurable chronic disease. It is not widely understood that methadone is a medically safe treatment medication with minimal side effects (Lowinson 619). Methadone is misunderstood and misperceived as substituting one addiction for another (Lowinson 629). This stigma is reflected in lack of funding, community opposition, and the undertreatment or no treatment of pain if patients are hospitalized for surgery (Lowinson 629). Furthermore, a study examining treatment retention in pregnant women prescribed buprenorphine, reported that as of 2017 96% of states have opioid dependence rates higher than their buprenorphine treatment capacity rates (O'Connor 27). Although many scientific studies provide evidence for the efficacy and safety of buprenorphine during pregnancy, the gap between treatment need and availability overwhelmingly remains. This stigma and inability to access care negatively affects the self-esteem of patients (Lowinson 629). The approval of buprenorphine as addiction medication has partially assisted in stigma reduction and increased accessibility; however, the nation still has a long way to go for the inclusion of pregnant women with OUD and their progression of successful treatment.

The gap between treatment demand and accessibility perpetuated by stigma can be attributed to America's historical Prohibitionist Model. The Prohibitionist Model has been

valued in American society as exemplified through the ban on alcohol throughout the 1920s and current war on drugs. However, there has been an international movement of recognizing the failure of the Prohibitionist Model and shifting towards more regulatory and reformative models. This is significant global progress. Failure of the Prohibitionist Model has become evident through the understanding that “drug prohibition is the dominant driver behind the creation of a[n] illegal market that spawns significant health and social pathologies, harmfully engages our youth, and makes impure illegal drugs widely available” (Haden 1). Making a substance illegal makes it more desirable, cheaper on the black market, and readily available in highly dangerous and potent forms. Moreover, the goals of prohibition directly oppose the goals of treatment and prevention (Haden 4). Reasons for this are that “Prohibition impairs the development of honest, factual prevention programs and prohibition marginalizes, and alienates drug users” (Haden 4). The Prohibitionist Model is directly tied to stigma. This model fuels negative attitudes towards people who break the law and use illegal substances, as well as bolsters the incorrect belief that addiction is a choice. People are less likely to come forward about their drug addictions and seek help because of the risk of criminal punishment.

Dr. Daniel Ciccarone, an ethnographic researcher and Professor of Family and Community Medicine at University of California, San Francisco Medical Center, and a dedicated fighter of the opioid epidemic, describes how the Prohibitionist Model only adds to the problem at the local level (Brown, “The Opioid Crisis is Driven by Prohibition”). Ciccarone comments that on top of the failure of prohibition on the international scale, prohibition also stigmatizes the individual and the population, with only “dysfunction” created because of this (Brown, “The Opioid Crisis is Driven by Prohibition”). Essentially on all levels, prohibition has failed. In order to overcome stigma and provide realistic and successful drug-regulating models that will reduce

the opioid epidemic rather than fuel it, America needs to progress beyond the Prohibitionist Model.

According to a study conducted by Lynn Falletta, the fear of child protective services (CPS) acts as a barrier to care for pregnant women battling addiction, with stigma in the community about CPS contributing to this. For example, Falletta suggests that “community outreach ought to provide education about the role of CPS, including helping parents understand that they may seek help for substance use issues without their children *necessarily* being removed from their care” (132). The stigma that exists within societies of CPS being an unjust organization that removes children from their parents is difficult to overcome, especially with women who are engaging in illegal activities. The current protocol is that in all states, health care workers are required to notify CPS when an infant has been identified as exposed to illicit substances in utero (Angelotta 596). Simply delivering a baby at a hospital is a risk for a pregnant woman battling addiction. Regrettably, it is estimated that up to 79% of foster care placements are the result of parental substance abuse (Falletta 126). Between 2013 and 2014, at the same time the opioid epidemic was rising, there was a 3.5% increase in children in foster care, amounting to a reported total of 415,129 children in the system (Falletta 125). Moreover, in 2015, the number of children in foster care was 428,000, the highest since 2008 (Falletta 125). There is a distinct tie between the involvement of CPS and the consequences of addiction. While some CPS cases are positive and turn out to be successful for some women, there is a grounded societal problem with stigma surrounding CPS and treatment accessibility for women with SUDs. Better education about the process of CPS and less harsh legal punishments against individuals battling addiction would improve access to and retention of treatment.

Legal Barriers

The legal ramifications that surround drug use during pregnancy are not to be underestimated. Many jurisdictions have established rigid punishments for nonviolent drug offenses, including mandatory incarceration (Crowley 1). The criminal justice system, however, fails to utilize medical judgment in the treatment of opioid use disorders (Olsen and Sharfstein, “Confronting the Stigma of Opioid Use Disorder – and Its Treatment”). Inmates are often not allotted the benefit of continuing medication-assisted treatment while incarcerated and restricted from methadone or buprenorphine. If these prisoners suffered from diabetes or other physical health conditions, however, they would still be allowed to take prescription drugs such as insulin (Olsen and Sharfstein, “Confronting the Stigma of Opioid Use Disorder – and Its Treatment”). Without opioids or the assistance of medications to taper off of the drugs, inmates face an extremely high risk for overdose if relapse occurs either in prison or following release (Olsen and Sharfstein, “Confronting the Stigma of Opioid Use Disorder – and Its Treatment”). Pregnant women face similar health consequences because of legal sanctions, with the added stress of having to abandon their families if sentenced to prison, or the high possibility of losing rights to their children because of their addiction. Obstacles such as these prevent progress towards reducing and eliminating the burden of the opioid crisis.

For example, in 2014, Tennessee passed a new law that criminalized substance use during pregnancy. This act was made with good intentions in an effort to reduce neonatal abstinence syndrome and maternal opioid use (Angelotta 596). However, the law resulted in a woman from Tennessee being charged with criminal assault if her infant was born addicted to or harmed by narcotic drug use during pregnancy (Angelotta 596). The state medical association opposed this new sanction, leading to its expiration in summer of 2016 (Angelotta 596). Although Tennessee has been the only state to explicitly make substance use during pregnancy

criminal child abuse, 18 other states put pregnant women who use narcotics at risk for civil child abuse charges (Angelotta 596 and Miranda, “How States Handle Drug Use during Pregnancy”). Charges include child endangerment, providing a minor with illicit substances via the umbilical cord, and manslaughter (Angelotta 596). Furthermore, in all states health care professionals are required to notify child protective services (CPS) when an infant is diagnosed with NAS (Angelotta 596). Combined with the devastating legal consequences and potential for a mother to have her child taken away from her, women are continuously deterred from seeking the crucial prenatal and postpartum care for themselves and their babies.

The legal battle for pregnant women battling addiction is certainly not over. In April of 2018, Pennsylvania’s court system was in the midst of battling child abuse concerns with a pregnant woman who tested positive for marijuana and suboxone, the preferred drug used with MAT, at the time of delivery (Scolforo, “Court to Decide if Drug Use while Pregnant is Child Abuse”). The infant was reportedly in the hospital for 19 days being treated for severe withdrawal symptoms. While many states have moved towards a more reformatory approach to pregnant women who use drugs, it is alarming that this question is still being grappled with in the legal system. A Superior Court judge on the case, Geoffrey Moulton, expressed his opinion on the situation that substance abuse during pregnancy “‘may constitute child abuse’ if child welfare authorities can prove she ‘intentionally, knowingly, or recklessly caused, or created a reasonable likelihood of, bodily injury to a child after birth’” (Scolforo, “Court to Decide if Drug Use while Pregnant is Child Abuse”). Unfortunately, many influential and powerful leaders in society still hold Moulton’s position. The interests of the child are undeniably one of the most important things at the top of policy makers’ and health professionals’ lists, however expansion of

treatment programs need to be taking up headlines rather than continued debates on child abuse laws.

One of the biggest issues surrounding the opioid crisis is that policy makers are years behind in their progress of adequately addressing the legal needs of the epidemic. Dr. Ciccarone comments that policy makers are four to eight years behind in the battle of the opioid epidemic (Brown, “The Opioid Crisis is Driven by Prohibition”). Dr. Ciccarone explains how policies are still attempting to attack the pill crisis of the opioid epidemic, or the prescription crisis, instead of focusing on what is happening right now with differentiating drugs on the street. When talking about a highly toxic and dangerous opioid, fentanyl, Ciccarone emphasizes:

We don’t need to just address prescribing and exuberant prescribing practices of physicians, we need to understand fentanyl is a poison...we have to stop waiting for the bodies to pile up, and toxicological reports which are telling us what’s happening in people who have died, I want to know what’s happening in people who are living.

(Brown, “The Opioid Crisis is Driven by Prohibition”)

Dr. Ciccarone is very passionate and driven about what legal changes not only need to be made, but how they could work in America. Ciccarone takes a stance away from blaming doctors and big pharma for over-prescribing, but instead investigating the root of the problem, like chronic pain. Attacking the problem at its core works at addressing real-time concerns of the opioid epidemic rather than analyzing retrospective results of “outdated data,” as Ciccarone makes reference to (Brown, “The Opioid Crisis is Driven by Prohibition”). The U.S. needs to put its efforts toward less restrictive policies.

Ciccarone is against the Prohibitionist Model, and advocates for a “decriminalization model,” otherwise known as the Portuguese Model or drug policy in Portugal. Ciccarone

explains that the Portuguese Model does not charge for possession for drugs, but instead focuses on especially those at risk for developing, or who have developed, a use disorder and connecting them with proper resources for treatment (Brown, “The Opioid Crisis is Driven by Prohibition”). Ciccarone succinctly states that what the country needs is the vision that follows through with the sentiment, “We’re going to take care of you and we’re going to help you get through this” (Brown, “The Opioid Crisis is Driven by Prohibition”). A model of this type is especially crucial for pregnant women in America. Although it currently seems like the U.S. has a long way to go in altering laws and expanding treatment in order to accept addiction as a chronic disease, there are other countries like Europe and Canada that can act as models. Changing policies is not the only act that is going to work towards reducing the opioid epidemic, a change in mindset and a normalization of addiction as a chronic disease, like diabetes or cancer, is the ultimate progression that is going to produce rational and effective results.

Opioid Use Disorder Treatment

In 2014, it was reported that 22.5 million people in the United States needed treatment for an illicit drug or alcohol use disorder, but only 4.05 million, or 18%, received any treatment (Crowley 1). This statistic is far below treatment rates for other chronic diseases such as hypertension, diabetes, or major depression, which all had treatment reports over 70% (Crowley 1). The first point of contact for women seeking help for opioid dependence is considered a crucial window and step in their treatment process. Many women become discouraged and stop seeking treatment, meaning they never receive the proper care they and their babies need. Current available treatment options for OUD include pharmacotherapy, or medication-assisted treatment (MAT), abstinence, harm reduction, comprehensive approaches that include coordinated care and women-centered services, and the peer model. While MAT is the current

standard of care for opioid dependent women, it is only one of the important elements of coordinated care that pregnant women need to diminish their and their babies' addictions. MAT has evolved in order to meet the needs of mom and baby over recent years and is an initial gateway into long-term addiction treatment for women of childbearing age.

Pharmacotherapy

All individuals with an opioid-use disorder will require some form of medication management as part of their treatment (Hand 223). Medication-assisted treatment, or MAT, is the use of Food and Drug Administration (FDA)-approved medications in combination with counseling and behavioral therapies. MAT can be described as the gold standard of pharmacotherapy for OUD and is the most common form of medication assistance. A medically-monitored switch from opioid use to opioid maintenance therapy has several advantages, such as the decrease of maternal and neonatal morbidity because of a stable opioid dosing regimen, a minimized risk for the experience of withdrawal, a reduction in risk-taking behavior, a decrease in the spread of hepatitis and HIV, and an improvement in the connection and utilization of health care services (Krans 372). The overarching goal of MAT is to provide a “whole-patient” approach to the treatment of substance use disorders [SAMHSA, “Medication-Assisted Treatment (MAT)”]. MAT is now the current standard of care for substance abuse during pregnancy, supported by the World Health Organization, the American Society of Addiction, and the American College of Obstetrics and Gynecology (Angelotta 595). Buprenorphine and methadone are both long-acting opioid medications used in MAT.

Although methadone has been used for the last 40 years in treating opioid dependence, buprenorphine was approved by the FDA in 2002 for its lower probability of overdose and evidence of lower levels of physical dependence (Older, “Buprenorphine Treatment in

Pregnancy: Less Distress to Babies”). Buprenorphine is an opioid partial agonist with beneficial pharmacological properties such as its ability to lower potential for misuse; the diminishment of the effects of physical dependency to opioids, such as symptoms and cravings; and the increased safety in case of overdoses (SAMHSA, “Buprenorphine”). A partial agonist means that, similar to opioids, buprenorphine produces comparable effects such as euphoria or respiratory depression (SAMHSA, “Buprenorphine”). However, the effects of buprenorphine are weaker than a full opioid agonist such as heroin. Buprenorphine has a “ceiling effect” (SAMHSA, “Buprenorphine”), meaning that buprenorphine’s effects increase with each dose until they level off at moderate doses, even if the dosage increases from that point on (SAMHSA, “Buprenorphine”). In simple words, there is a certain point where the effects of buprenorphine peak and do not get any stronger. In turn, buprenorphine lowers the risk of misuses, dependency, and side effects, and, because buprenorphine is a long-acting agent, patients may not have to take it every day (SAMHSA, “Buprenorphine”). Buprenorphine does come, however, with the potential for side effects including many of the symptoms of withdrawal, such as nausea, vomiting, constipation, muscle aches and cramps, cravings, sleep disturbances, distress, irritability and fever (SAMHSA, “Buprenorphine”). Importantly, evidence shows that buprenorphine is superior to methadone in reducing withdrawal symptoms in newborns (Older, “Buprenorphine Treatment in Pregnancy: Less Distress to Babies”).

Methadone historically has been the “gold standard” MAT drug of choice for pregnant women mainly because it is safe and effective when taken as prescribed (Saia 255; SAMHSA, “Methadone”). Methadone changes how the brain and nervous system respond to pain (SAMHSA, “Methadone”). The painful symptoms of opioid withdrawal are reduced, and the euphoric effects of the drugs are blocked (SAMHSA, “Methadone”). Methadone comes in

several different forms, such as pills, liquid, and water, and must be taken once a day (SAMHSA, “Methadone”). Methadone has been proven to be effective in higher doses (SAMHSA, “Methadone”). Importantly, methadone can be addictive (SAMHSA, “Methadone”). For reasons such as these and methadone’s high association with NAS, buprenorphine has become the preferred MAT drug for pregnant women (Older, “Buprenorphine Treatment in Pregnancy: Less Distress to Babies”).

A recent research project, The Maternal Opioid Treatment: Human Experimental Research (MOTHER), was one of the first studies that prospectively followed pregnant women with OUD from enrollment until at least 28 days after giving birth (Older, “Buprenorphine Treatment in Pregnancy: Less Distress to Babies”). The researchers of this study were able to closely examine the severity of NAS following prenatal exposure to methadone or buprenorphine (Older, “Buprenorphine Treatment in Pregnancy: Less Distress to Babies”). Because the women of this study reported use of heroin or prescription painkillers with low rates of other illicit drug use, NAS could be clearly related to the opioids (“Buprenorphine Treatment in Pregnancy: Less Distress to Babies”). The MOTHER study identified a medication, buprenorphine, that reduces withdrawal distress to newborns, and ways to release infants from the hospital sooner (Older, “Buprenorphine Treatment in Pregnancy: Less Distress to Babies”). MOTHER was a double-blind, double-dummy, randomized, stratified, parallel group-controlled trial which took place at eight different sites internationally and included 131 mothers and their newborns (Jones 29). Ultimately, buprenorphine is safer and superior to methadone and can be prescribed to pregnant women with OUD by a certified physician. The process of how to taper postpartum women off of partial opioid agonist medication is an additional area of importance.

Unfortunately, there is no gold standard for duration of tapering off of addiction medication. Specific individuals are likely to respond to tapering regimens differently, therefore the time spent taking buprenorphine or methadone should be analyzed and determined by a physician and their patient. In regard to buprenorphine, evidence has shown that a gradual taper off of the medication is the safest and most successful way to prevent relapse and withdrawal (Women's College Hospital 4). A general rule of thumb has been regarded as the longer a patient was addicted to opioids, the longer they should stay on buprenorphine (Women's College Hospital 4). Interestingly, one randomized study examining the tapering schedule of buprenorphine amongst the general population with participants aged 15 years and older, found that there was no advantage in prolonging the duration of taper when comparing groups at 7 and 28 days (Ling 256). This data is important when considering cost-effectiveness and insurance coverage. Tapering regimens specific and individualized to pregnant and postpartum women also require independent gold standards from the rest of the population battling OUD.

Pregnant women participating in MAT should continue methadone or buprenorphine maintenance during labor and delivery (Krans 374). MAT during pregnancy and following delivery is critical because pregnancy-specific dosing recommendations result in a significantly greater mean buprenorphine dose at the time of delivery (Krans 5). Drug metabolism is significantly altered in pregnancy because of the physiologic changes necessary to support the fetus (Krans 5). There is a need to increase the dose of buprenorphine as well as the frequency of dosing compared to nonpregnant patients (Krans 5). Additional doses of short-acting opioids could be needed for women who undergo cesarean sections, for example, in addition to MAT (Krans 374). A study evaluating women with OUD reported a 70% increase in opiate analgesics following C-sections for women maintained on methadone and a 47% increase for women on

buprenorphine maintenance therapy (Krans 375). Postpartum women require close monitoring in regard to MAT because doses required during pregnancy could exceed requirements after delivery. (Krans 375). Consequently, tapering regimens must reflect this.

In comparison, similar advice has been given regarding methadone tapering. Individual patients may have differing responses to their prescribed tapering regimen, in partnership with emotional fears about developing withdrawal and eliminating their opioids in general (Kral 4). Ultimately, unless there is a pressing need for a rapid taper, a slower taper is tolerated much better and is safer (Kral 3). Because withdrawal is highly discouraged for pregnant women, a gradual taper would reduce the risk of this and help prevent relapse during the postpartum period. Opioid withdrawal is associated with an increased risk of spontaneous abortion, preterm labor, fetal distress and continued illicit drug use (Krans 372). A study evaluating 95 women who elected inpatient opioid detoxification during pregnancy reported that 42, or 44%, relapsed and used illicit drugs before delivery (Krans 372). Yet, income level, insurance coverage, occupation, access to care, and other barriers to treatment are important to consider in suggesting a preferred method of pharmacotherapy treatment.

In conclusion, even with the established efficacy of MAT, it is important to remember it is only one facet of a multivariable treatment formula. For example, MOTHER, beginning only about 15 years ago was one of the first studies following opioid-dependent pregnant women from enrollment until at least 28 days after giving birth (Jones 248). As this study, which began in 2005, was essentially the first of its kind, only recently has the health care community has officially examined medication-assisted treatment as an ethical and viable option for pregnant women with OUD. MOTHER was designed to gain experience with the use of buprenorphine during pregnancy, and ultimately provided evidence of its safety and advantages for pregnant

women and their fetuses. Moreover, the timeline of this study affirms that there has been a short period for the development of alternative and additional ways to treat addiction other than MAT. Despite the recent emergence of discussions and research dedicated to opioid addiction treatment for pregnant women, barriers such as the vast exclusion of pregnant women from pharmacological and preventive trials (Blehar 40), the stigma associated with drug use during pregnancy, and the lack of an acceptance of addiction as a disease continue to act as deterrents for long-term, successful treatment options for women of childbearing age.

Abstinence

Abstinence has been the most popular and widely accepted treatment for substance use disorders in the research and medical fields until relatively recently. Programs that assist with maintaining abstinence were created alongside the debate of addiction being a moral or medical problem, although society has made large leaps towards assessing and treating addiction as a chronic disease today. Alcoholics Anonymous (AA), Narcotics Anonymous (NA), Cocaine Anonymous (CA), Crystal Meth Anonymous (CMA), Heroin Anonymous (HA), and others are 12-step programs designed for drug users in general or specific addictions. 12-step programs were once recognized as the only viable treatment options for people battling addiction, and still are commonly recommended and utilized today, according to the American Addiction Centers. However, there have been many critiques against the program's success and feasibility. The 12 Steps were designed to maintain abstinence on a largely individual level, operating as a "one size fits all" model. The program's largely personal commitment and the religious influences associated with the 12 steps have been the biggest criticisms against the model. Because AA was created parallel to Christian values, its religious and spiritual affiliation has remained present in the goals of the organization.

Following the 12-step model will yield mental and emotional transformative practices and tools (Thomas, “12 Step Drug Rehab and Alcohol Treatment Programs”). A few examples of goals of the 12 steps are as follows:

- The ability to recognize and admit that one is experiencing an addiction problem
- Self-observation and awareness of the behaviors that were part of and arose from the addiction, as well as those that help promote self-restraint
- A chance to practice that restraint and build self-esteem in one’s positive capabilities (Thomas, “12 Step Drug Rehab and Alcohol Treatment Programs”)

The 12 Steps have a large focus on the individual self and process of spiritual awakening.

Although there are 12 main base steps outlined in the original *Big Book* of AA, different groups have altered and adapted them to fit unique needs. Since 12 step programs are anonymous and because AA is the main publisher of its results, it is difficult to determine an accurate success rate. However, the American Addiction Centers reports that 40% of attendees drop out within the first year (Wagener, “What is the Success Rate of AA?”). Because the 12 Steps are centered on maintaining abstinence, addiction is perpetuated as an active choice rather than a chronic disease. Although relapse is accepted through the 12-step process, it is viewed more as a matter of strength and even morality rather than a physiological disease. AA does work for some people, however, poor retention rates and serious criticisms of 12 step programs must be taken into consideration and act as motivation in the development of holistic and collaborative models. 12 step programs are one treatment option exhorting abstinence. In contrast, harm reduction is another treatment option which accepts drug use and implements ways to keep it as safe as possible.

Harm Reduction

Harm reduction is a set of principles that defines abstinence from drug use as just one of several means of reducing drug-related problems (Lowinson 1083). The core of harm reduction shifts the focus away from idealized long-term goals, such as abstinence from all drug use, and re-centers importance on more attainable short-term goals which include safer behaviors (Lowinson 1083). Because harm reduction is designed to serve drug users based on specific individual and community needs, there is no universal definition or formula on how to carry out these practices (Harm Reduction Coalition, “Principles of Harm Reduction”). Harm reduction is not widely encouraged from public health officials and policy makers in fear of the message encouraging increased drug use among current users and the creation of new users (Lowinson 1086). However, there is no direct evidence showing that harm reduction strategies such as safer-drug using practices, needle-exchange programs, or greater access to treatment increase drug use (Lowinson 1086). Those who practice harm-reduction strategies disapprove of their drug use but accept the inevitability of it (Lowinson 1084). Harm reduction is ultimately a social justice movement “built on a belief in, and respect for, the rights of people who use drugs” (Harm Reduction Coalition, “Principles of Harm Reduction”). A number of different strategies are practiced nationwide in order to minimize harms brought about by drug use, even if the drug use itself can’t be stopped (Lowinson 1085).

Syringe exchange programs, or SEPs, also referred to as syringe services programs (SSP), are “community-based programs that provide access to sterile needles and syringes free of cost and facilitate safe disposal of used needles and syringes” (CDC, “HIV/AIDS”). SEPs were put in place in the early years of the acquired immunodeficiency syndrome (AIDS) epidemic in the United States (Lowinson 1236). SEPs yielded benefits such as distributing information on the risks of HIV/AIDS and helping clients connect to social and legal services as well as drug

treatment (Lowinson 1236). SEPs have faced many challenges in the U.S. for a variety of different reasons. There has not been enough funding, police harassment has occurred, and even activists have been criminally prosecuted for being “caught” distributing syringes (Lowinson 1236). In fact, today many American SEPs operate illegally (Lowinson 1237). As of 2003 the U.S. still prohibits the use of federal funds to go towards SEPs (Lowinson 1237). In reality, these criminal sanctions create greater harm than good.

One illegal harm reduction organization continues to operate because of the devastating number of opioid overdose deaths in the nation. The Church of Safe Injection hands out clean drug-use supplies in eight states across the U.S., with 18 chapters in total. Bangor, Maine, is one city represented by this church. Even though it is illegal in Maine to have more than ten hypodermic syringes in an individual’s possession, except for certified needle exchanges, church volunteers operate near a bus stop with free coffee, clean syringes and Naloxone (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Naloxone, also known as Narcan, is an opioid antagonist that counters the effects of opioid overdose (Harm Reduction Coalition, “Understanding Naloxone”). Naloxone is meant to be administered in order to counteract life-threatening depression of the central nervous system and respiratory system, which occurs from overdose, in order for the overdose victim to breathe normally (Harm Reduction Coalition, “Understanding Naloxone”). One of the most significant advantages to Naloxone is that it can be administered by minimally trained laypeople in emergency situations. Additionally, Naloxone has no potential for abuse (Harm Reduction Coalition, “Understanding Naloxone”). The Church of Safe Injection operates at the risk of their own volunteers’ arrests to save the lives of others and provide alternative treatment options.

The founder of the Church of Safe Injection, Jesse Harvey, has worked in addiction recovery and started the church because of his frustration by the deaths from drug use and barriers to treatment (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Although there is skepticism around the enabling of drug use that can arise from the availability of Naloxone, there are also questions such as, if someone isn’t able or just not ready to go to treatment, should they die? (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Naloxone saves lives, reduces serious health risks, and provides an alternative to dangerous drug use until a user is ready to seek proper treatment. The Church of Safe Injection has a clear message that it does not support the legalization of drugs (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Rather, their beliefs are centered upon moral and spiritual duties to violate unjust laws because drug users do not deserve to die when there are so many ways to help them (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”).

The police force of Bangor, Maine, is aware of the church and their actions but chooses discretion over conflict because they share the same goal: to save lives (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). In contrast, the police force of Lewiston, Maine, a city located two hours from Bangor, has warned the church not to operate there because it’s against state law (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Yet, there are only six certified needle exchange programs in the state of Maine, none of which are in Lewiston (Inskeep, “‘Church of Safe Injection’ Offers Needles, Naloxone to Prevent Opioid Overdoses”). Accessibility is a significant barrier to treatment in the case of drug addiction not only in Maine, but similarly across other states.

Although the Church of Safe Injection can be seen as a controversial organization when it comes to considering successful practices in combating the opioid epidemic, it focuses on one important and primary strategy of the whole process: saving lives. Harm reduction is one initial step that can help those suffering from OUD prepare for more holistic and long-term treatment plans. Motivational interviewing, for example, is a patient-centered behavioral counseling technique that positively helps people with OUD taper their drug usage and engage in healthier lifestyles.

Motivational Interviewing

Motivational interviewing, or MI, is a form of psychotherapy developed specifically to promote healthy behaviors (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Motivational interviewing is evidence-based, client-centered therapy designed to enhance intrinsic motivation by exploring and resolving client ambivalence in order to promote change (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). An accurate and succinct way to describe MI is that the therapy is collaborative rather than confrontational (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Some of examples of MI practices include reflective listening, rolling with resistance, and eliciting change talk (Resnicow and McMaster 5). The goal of eliciting change from within a client rather than focusing on what is right from the therapist's point of view builds trust and rapport between client and counselor. The therapist aims to draw out their client's underlying needs for change, instead of telling them why they should change (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*).

Another way to describe this core principle is the difference between autonomy and authority (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Patients and clients are able to determine their own pathways in changing towards more healthy behaviors. An autonomous technique such as this reduces client dropout rates because of fear they might feel facing disappointment from a judgmental therapist. While MI shows evidence of being most effective in individuals who are initially resistant to change (Resnicow and McMaster 5), when any client is shown respect and empathy, they are more likely to open up and be honest about their lives and behaviors (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Motivational interviewing is a successful and strengthening practice to address and combat drug addiction.

Reflective listening is one of the key components of MI. Reflective listening allows the counselor to portray to their client that they have understood what they said, affirm what the client is feeling and thinking, importantly without judgment, and help the client dig deeper into their process of self-discovery (Resnicow and McMaster 5). Reflective listening statements begin with phrases such as, "Given what you said about..." or "It sounds like..." (Resnicow and McMaster 5). The use of these phrases first allows the counselor to summarize what they understood the client shared with them, gives space to clarify or correct any misunderstandings, and ultimately allows the client to reflect on what they are feeling or experiencing with support from their counselor. Reflective listening is beneficial because it eliminates bias that could come from the therapist with questions that stem from their interest or experience rather than the client's (Resnicow and McMaster 5). Reflections can have several levels of complexity and depth, but each step holds the purpose of building trust amongst client and counselor and guiding the client to deeper self-discovery and understanding.

Rolling with resistance is another core technique of MI. To roll with resistance means that the therapist refrains from personal urges of concern and telling the client what to do (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). “Dancing” with the client rather than “wrestling” with them is an illustrative analogy to represent rolling with resistance (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Rolling with resistance is all about refraining from judgment. The client can feel comforted rather than confronted. Rolling with resistance is essentially agreeing with the client even if the statement is not the healthiest behavior or is factually incorrect (Resnicow and McMaster 5). Examples of practicing rolling with resistance are affirmations such as, “You really enjoy smoking weed. Giving it up seems very difficult,” or “Eating at McDonald’s is a real treat for you. It’s cheap, convenient, and really works given your busy schedule” (Resnicow and McMaster 5). These phrases are shared without judgment or negative confrontation.

Rolling with resistance is a practice of MI that captures the client’s inability to change and allows them to express their resistance without pressure or judgment to change (Resnicow and McMaster 5). Instead of criticizing the client’s negative behaviors, the counselor can help the client learn to acknowledge and celebrate small successes, which are motivations to keep moving forward (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Even if a client’s efforts don’t result in success, the goal is to celebrate commitment rather than view it as failure (Resnicow and McMaster 5). Every step, no matter how small, is key in any client’s treatment path and should be recognized. Rolling with resistance is an essential part of MI to fully understand a client’s current unhealthy behaviors in order to figure out the best way to change them towards healthier behaviors.

Overall, MI yields more positive treatment outcomes, a better quality of life for patients, stronger client engagement and treatment retention, and further, increased staff satisfaction and job retention (Lecture 3.1). MI is a mutually beneficial technique for both counselors and clients. While specific, individual MI techniques can vary across counselor-patient relationships, there are four underlying principles of MI that shape the practice: empathy, identifying discrepancies, rolling with resistance, and supporting self-efficacy (Hillman, *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*). Motivational interviewing is a successful first intervention method for client's battling addiction, and an important way for patient and counselor to establish a positive relationship. MI is used in many comprehensive treatment programs for addiction.

Comprehensive Approaches

In 2015, an evaluation of 13,000 substance abuse treatment facilities across the United States found that only 40% offered women-centered programming and 81-95% of women had an unmet need for women-centered treatment services (Krans 5). Many of the problems that exist around treatment for women in the U.S. have been ongoing for several decades. For example, a literature review on current treatment systems for pregnant and parenting women with SUDs from 1993 identifies many similar problems society continues to face today in regard to treatment connection. This review highlights that “during the 1960s and 1970s, opiate addiction in pregnant women became a cause for concern,” further emphasizing how opioid addiction and women of reproductive age is not a new dilemma in American society (Finkelstein 1276). One of the main goals of this review is to emphasize the vast literature base that exists that should aid in developing successful treatment programs which include women. Finkelstein identifies that many treatment models are either male or individual-based, failing to take into account the needs

of women, pregnant women, and mothers with children (1280). Finkelstein observes that comprehensive care programs are the most effective models and identifies guidelines for care based on an analysis of existing comprehensive programs. These guidelines include programs that are family-centered, women empowering, community-based, utilizing coordination and collaboration of services, multi-dimensional, unique and sustained, and ranging in levels of care (Falletta 1286-1289). Falletta includes a table comparing the existing comprehensive treatment programs of the time, highlighting which services they did or did not offer, but does not go into a more in-depth analysis. The table is composed of 9 programs, followed by suggestions for improvement within comprehensive models and which areas require the most emphasis. Falletta's review provokes many areas of discussion in regard to comprehensive treatment approaches for women of reproductive age and the opioid epidemic.

Although outdated, this review provides valuable insight into important elements of a comprehensive care model, an identification of the lack of focus dedicated to pregnant and parenting women that remains today, and a discourse around the persistence of barriers to care that have not been settled in current society. It was innovative for Falletta to identify current comprehensive programs for pregnant women with SUDs, but disadvantageous to exclude an analysis of them. The literature base can be vast in supporting the launch of successful, long-term treatment programs, however, specific reviews of current and past programs and their unique failures and successes are also crucial in the continued development of holistic models. Falletta's identification of components necessary for comprehensive models is important, as well as the recognition that "there is not necessarily a single blueprint for a successful treatment program" (1292). Ongoing analyses and conversations about successful programs, failed programs, and all the methods in-between are essential in maintaining the truth that not one size

fits all. Society must be dedicated to providing coordination of care services that can fit the needs of many individuals.

Bernstein et al. conducted a study testing brief motivational intervention during a clinic visit in regard to reduction in out-of-treatment cocaine and heroin use (Bernstein 49). The investigators aimed to test abstinence from cocaine and/or heroin at 6-months post-enrollment (Bernstein 50). Their measure of abstinence came from a hair drug test (Bernstein 50). This study was a randomized controlled trial and took place in the outpatient clinics of an urban teaching hospital (Bernstein 49). The structure of the study's motivational intervention included five bilingual peer coaches, who were trained CHWs in recovery themselves, three of whom were the principal interventionists and the other two acted as research assistants (Bernstein 50). Incentives were included for participation in this study, in which all participants received a reimbursement of \$15 at the time of enrollment, \$25 for the first follow-up visit, and \$35 for the second follow-up visit (Bernstein 52). Interestingly, the results of this study reported "relatively good agreement between self-reported [drug] use and biochemical test results at baseline" (Bernstein 54). Motivational intervention practices that were utilized in this study included trust building, conforming to the patient's preference on readiness for change, conversations around the advantages and disadvantages of drug use, as well as about goal quality of life (Bernstein 52). The authors of this study ultimately concluded that "brief motivational intervention in the clinical setting can reduce heroin and cocaine use" (Bernstein 58). Although not specific to pregnant women, positive motivational intervention practices for individuals with OUD are important in the discussion of the most successful treatment programs. The limitations of this study's usage of MI techniques and reimbursements is important to consider in developing efficient comprehensive models.

One of the greatest limitations of this study is the speculation that potential participants are solely seeking reimbursement in return for participation. Money in the form of cash could in theory help people battling SUDs obtain their immediate needs, whether it be food or transportation, however investigators are usually extremely cautioned when utilizing the element of incentives when it comes to research designs. It is better to offer incentives in the form of material goods clients could really use, such as car seats or bus vouchers, instead of directly handing cash to the participants. This could skew the motives of participation and the results of any study, such as the case in this research which found “self-report of improvements in drug use in this sample was shown to be highly inflated” (Bernstein 57). Incentives can be an important element of research studies, most significantly because they can offer clients expensive items which the study otherwise would not be able to offer them, however the design needs to be executed in such a way that clients are receiving the most benefits possible. To conclude, the data from this investigation exemplified that contact with peer coaches in recovery who also held important hospital jobs “may have served as a powerful motivating example for both groups” (Bernstein 58). Future comprehensive models can learn from the risk of using incentives and build on the success of peer addiction recovery coaches.

Recovery coaching has a lot of supportive data for success in many aspects of society, such as reduction in drug use, legal involvement and costs. The Vermont Recovery Network released a report summarizing findings on recovery coaching at one of the Vermont Recovery Network’s Recovery Centers. Although a small sample size of 52 individuals, the data reported found “a potential for recovery coaching to reduce social costs associated with addictive and co-occurring disease,” a reduction in the use of detoxification programs paired with hospital and ER visits, as well as an increase in use of primary care providers (Kamon and Turner 2). This report

also stated that participants disclosed 118 sober days from alcohol and other drugs at the start of Recovery Coaching (Kamon and Turner 3). Recovery coaching has had successful initial results which is important for the development and deployment of future resources. Furthermore, “the use of costly services such as hospitals, emergency rooms, and detoxification programs decreases” (Kamon and Turner 4). The findings of this report portray optimism but emphasize the need for future research that investigates these advantages across unique populations and different sample sizes.

Additional to the need for accessibility of comprehensive treatment programs that holistically treat individuals, specifically women of reproductive age, is close attention not to duplicate resources but instead to coordinate differing care services. Shepherd-Banigan’s study investigating the question of whether or not maternity care coordination services encourage use of behavioral health treatment amongst pregnant women on Medicaid brings significant attention to this issue (Shepherd-Banigan 449). According to Shepherd-Banigan and her team, Maternity care coordination (MCC) “is a program run by local health departments that connects Medicaid-eligible women to services and education” (449). Shepherd-Banigan and her investigative team focus on the comorbidities of substance use disorders, specifically mental health illnesses, and argue that MCC is an opportunity to increase access to behavioral health treatment services. According to the study authors, “The most widely recognized mental health disorder is perinatal depression” (Shepherd-Banigan 450). Depression during the pregnancy process is a struggle any woman can be susceptible to, and an intense yet under-focused problem in the health care field.

Importantly, depressive symptoms before and after birth are directly correlated with substance dependence during the postpartum period (Shepherd-Banigan 450). Therefore, comorbidities and an aim to coordinate care services are crucial in comprehensive treatments for

women of childbearing age. Shepherd-Banigan’s study examined a random sample of 8,000 women from Medicaid claims in North Carolina. Ultimately, the researchers conclude that “MCC may present an opportunity to build on maternal motivation and, in conjunction with sufficient system supports, engage pregnant women in behavioral screening and treatment services” (Shepherd-Banigan 453). Not only does coordination of care services avoid duplicating efforts, it can connect women to the comprehensive care they need for a range of difficulties that accompany SUDs.

There is an overwhelming amount of comprehensive treatment models that have either been developed or both developed and deployed, as well as published for the betterment of the health care community and society. It has been established that women in general, but especially pregnant women, have been largely excluded from a lot of important research and only the central focus of a minority percentage of treatment programs because of stigma and legal barriers. Ultimately, a comprehensive treatment model is going to be the only successful solution to reduce the burden of the opioid epidemic for women and children. The evaluation and alteration of preexisting comprehensive models, both for the general population and specifically for women, must be taken into account for the development of future programs. The solution to such a complex and intense problem becomes increasingly hard to answer through the acceptance that no one size can fit all. However, the understanding of methodologies such as the use of recovery coaches and coordination of care services are elements that are going to be the most beneficial in creating a largely successful, holistic, long-term treatment program that is flexible to the needs of unique women and their children.

The Peer Model

Even with the presence of pharmacological and comprehensive treatment programs, legal barriers, including mothers' fears of having their children taken away, rejection from clinical programs, financial status, accessibility to treatment facilities, possibly even intimate partner violence are all serious deterrents that persistently push women with OUD away from the care they and their newborns need. Valerie Chandler, former program director of the Berks Parents Services Collaborative Program, puts herself in the shoes of a mother with OUD and succinctly sums up a looming threat they face:

So, you're a new mom. You were using opiates, and now, you know, the hammer's coming: The county's coming to get you; your family is going to be all over you. You're going to lose this child, and you screwed up. Throw in some new-mom hormones," Chandler says, "and you're a basket case. Oh, and by the way, don't use drugs anymore. Right? Your one coping skill is gone. (Chatterjee and Davis, "Beyond Opioids: How A Family Came Together To Stay Together")

Mothers with OUD fight this nearly unwinnable battle all the time. The blatant lack of support perpetuates the high percentage of addicted women not receiving treatment. Her community is abandoning her, her family is giving up, her new baby has to leave her, and she is faced with the prospect of quitting the one thing that has helped her cope: her addiction. Society expects women to fight the many battles that come with opioid addiction all on their own. This lack of understanding addiction leaves a huge gap in not only women-centered support services, but also generally in sufficient human resources, leaving too many women and their children alone and uncared for. Women of reproductive age are lost and left with questions about whom to trust when it comes to caring for their babies and themselves. However, all it takes is one person to believe you. Community intervention methods that utilize peer addiction recovery coaches are

new, successful ways to help women of reproductive age with OUD navigate the resources available to them while improving both their and their babies' health in a safe, understanding environment at a pace comfortable for the woman.

The peer recovery intervention worker is similar to the community health worker which is shown to be effective in multiple health care and public health settings (Watson 16). Community health workers (CHWs) are lay people in communities trained to provide some part of health services (Mutamba 1). Lay community health workers (LHWs) are used to fill the gap left by a lack of sufficient human resources in the public sector and to link communities to the formal health services through “task shifting” (Mutamba 1). LHWs are utilized in the recognition that service needs, particularly in remote and underprivileged communities, are not met by existing health services (Mutamba 1). The use of LHWs has been significantly successful in many low- and middle-income countries (LMIC), such as India and South Africa. The key profile of an LHW is that their training is relatively informal. It does not form part of a tertiary education certificate (Mutamba 2). Education levels of LHWs can range from limited schooling with the ability to read and write to completion of secondary school or university education (Mutamba 2). This purposeful minimalized training strategy is used because LHWs can be deployed faster, as well as their services complement and support those provided by other health workers (Mutamba 2). Peer workers can be volunteered or paid. In many LMICs, LHWs are often volunteers elected by community members. Because of the peer recovery model, there have been several improvements in substance use treatment exemplified in different societal aspects.

Utilizing peer coaches in health care settings not only helps fill many gaps within the health care system, community worker and client relationships can start off successfully just on

the basis of the level of understanding that can preexist. For example, as mentioned, CHWs are elected by other community members in certain countries and cultures, or they are hired based on their unique backgrounds and experience with different community groups. CHWs can have their GEDs or a college education. The key characteristic that makes the use of CHWs so successful is that they possess not only an understanding of what their targeted clients experience, but an empathy for them because of their own personal experience. CHWs are hired and deployed because of their commitment to their job and their patients, their abilities to understand, and the mindset to see success in every effort and even failure. Clients and CHWs themselves have had many profound and significant experiences in these relationships that could never be replicated in a traditional medical setting.

Angelina Rivera Richart, a parent mentor engaging in the peer recovery model, truthfully paints the picture of the positive effect of community engagement:

On the second day, I met Ruth Taylor who facilitated a weekly parent support group. Ruth believed in me when no one else did, until I could believe in myself...I started to believe in myself and realize that I was my best advocate; I had the power to change my life story. (Taylor 20)

Peer addiction recovery is the key for many women and their children's path to a healthy lifestyle by overcoming many barriers posed by society.

Because maternal substance use is associated with a range of environmental factors that are risks for healthy child development, such as mental health problems, poverty, unstable housing and more, the postpartum period is a critical factor in child outcomes and when many women resume substance use (Watson 16). The Peer Recovery Worker Intervention Model is an evidence-informed home-visiting practice that employs staff with backgrounds that mirror those

of their clients to engage and support pregnant women and mothers of substance-exposed newborns. (Watson 15). Peers working with pregnant and postpartum women have promoted a vast number of positive health-related outcomes, such as positive maternal health outcomes, infant health, and positive interaction between mother and child, longer breastfeeding, and prevention of unplanned repeat pregnancies (Watson 15-16). Peer recovery intervention workers provide emotional support, linkages to resources and assistance in maintaining and/or beginning substance use treatment (Watson 16).

Arguably, the most significant attribute of the peer recovery worker is their ability to empathize with their clients. Although not all recovery coaches are in recovery themselves, a coach's personal relationship with addiction of their own, a family member or loved one provides them the unique ability to engage with and empower women, increasing the use of substance use treatment services and promoting relapse prevention (Watson 16). *A Helping Hand: Mother to Mother (AHH)*, a project of the Massachusetts Department of Public Health and *Project Family Early Advocacy and Treatment (FEAT)* in Lane County, Oregon, both have goals of providing comprehensive care for substance-exposed newborns and their families and view peers as a central part of their project (Watson 15). Peer recovery workers intervene as a bridge between barriers associated with legal services, such as child welfare, and coordinated care for women of reproductive age struggling with addiction.

Whether an addiction recovery coach or a general community health worker, these peer coaches add something to the health care world that no medical setting could ever achieve, which is consistent support. Peer coaches are employed and target a specific population that has endured different kinds of adverse childhood experiences (ACE) and have not experienced human attachment in a healthy way. Peer coaches work with clients who push them away and

indicate a lack of trust because of their past, which makes establishing trust between coach and client a major process in the peer model. Peer coaches give patients what general doctors and nurses cannot, from home visits to responsiveness that encourages continued participation and meetings. The main messages that peer coaches aim to send to their clients is “I’m here for you, I’m not going away, and I understand what you are going through.” Patients will not experience any wait periods or rejection that might come with traditional medical settings. CHWs add a level to health care that is unique and successful in not just filling gaps but improving the health of communities at large.

Meeting the treatment demand of the opioid epidemic is one of the hardest obstacles that society is battling. Accessibility, adherence, stigma, and legal barriers are the main deterring factors preventing women of reproductive age from getting treatment. Analyzing these elements and providing solutions as to how to overcome them is a key step in fighting the opioid epidemic. *CARE Plus* is a peer-based treatment program that operates progressively and aims to offer the most holistic services available. *CARE Plus* has built the essential components to understanding and treating the opioid epidemic into its core values, such as understanding addiction as a chronic disease, overcoming stigma, accepting relapse as a part of treatment, focusing on reform rather than punishment, and including children in treatment. While not perfect, *CARE Plus* is a significant step towards progress in comprehensively battling the opioid epidemic. Reaching vulnerable and isolated women, *CARE Plus* helps women battle their addictions while also focusing on their health as a whole.

CARE Plus: A Community-based Addiction Reduction plus Policy

Indianapolis, Indiana intensely battles the opioid epidemic like many other cities across the U.S. The number of babies born with NAS is steadily climbing. According to unpublished data

from the *CARE Plus* grant, in 2016 over 450 infants were born with NAS in Indiana (SAMHSA, “Substance Abuse Treatment: Addressing the Specific Needs of Women”). “In 2017, nearly 500 infants with NAS were born in [Indianapolis,] Indiana, 160 of whom were delivered at Indiana University Health (IUH) Methodist Hospital” (Litzelman and Chambers 2). This number represents a 12% increase from 2015 (Litzelman 2). Furthermore, treatment options are very limited. In Central Indiana there are only two methadone clinics. Because many women who receive a prescription for MAT from their obstetrician during pregnancy lose Medicaid coverage after delivery, they are extremely vulnerable to relapse (Litzelman 3). A critical need exists for greater accessibility to treatment in the Indianapolis area. While significant steps have been made to increase treatment options and coverage for women of all backgrounds across Indiana and the United States, a large gap still exists between demand and sustainability. *CARE Plus*, an innovative, Community-based, Addiction Reduction plus Policy Innovations Program for Indiana is a pilot program with the purpose of filling the defined gap with resources to provide tools for women with OUD to best care for their infants (Litzelman and Chambers 2). *CARE Plus* aims to keep women in treatment and help mothers and their infants lead healthy lives.

The *CARE Plus* program team applied for and was awarded a grant from the Richard M. Fairbanks Foundation of Indianapolis. They are an extremely new program, just beginning official operations around January 2019. *CARE Plus* builds on two existing community partnership programs, *WeCare* and *Circle of Security-Parenting*® (*COS-P*). *WeCare* is a combination of “health care, public health, and community organizations that aims to reduce infant mortality in Indiana’s Central and Eastern Regions through outreach, health coaching, community engagement, and mobile health (mHealth) messaging technology” (Litzelman and Chambers 4). *WeCare* deploys community health workers (CHWs), lay workers who serve as

peer coaches and organize mHealth messaging, to offer “trusted, timely, and on-going support and guidance to women considered at-risk for poor pregnancy and/or post-partum outcomes” (Litzelman and Chambers 4). In comparison, *COS-P* is an “evidence-based, therapeutic intervention for parents, including addicted mothers, which has demonstrated improvements in parental reflective abilities, post-partum depression, and attachment security between parents and their children” (Litzelman and Chambers 4). *CARE Plus* builds on *WeCare* and *COS-P* in partnership with IDEO, a human-centered design team, to successfully meet the unique, individualized needs of mothers with SUDs, opioid use disorder in particular. A focus on the attachment process in mother-infant dyads and resource connection and coordination are two crucial components of *CARE Plus*. The main goals of *CARE Plus* are to improve mental health treatment access and engagement in long-term substance abuse treatment, improve long-term outcomes of mothers with OUD and their infants, and ultimately develop a better understanding for psychological, social and biological factors that contribute to outcomes of interventions with mothers with OUD and their infants.

CARE Plus utilizes the peer-structured model with the training and deployment of addiction recovery coaches (ARC) to recruit and maintain relationships with mother/infant dyads, in which the mother has OUD and their infant was born with NAS. Addiction recovery coaches are similar to community, or lay, health workers (CHW/LHW), with additional training in addiction recovery and personal experience with addiction. It is not crucial that an ARC has battled addiction personally, but important that they have had an intimate experience with addiction, with a family member or loved one, for example. Currently *CARE Plus* has two fully trained and certified ARCs, with three more coaches waiting to take their official certification.

The second core component of *CARE Plus* is the *Circle of Security-Parenting*® attachment process. The ARCs' goals are not to "cure" their patients' addictions. Because of the qualitative knowledge learned from *WeCare* as well as *COS-P*, mothers who struggle with addiction have most likely had a negative life experience concerning trust, which can affect their attachment process to their infant. ARCs are sources of consistent attachment and aim to provide never-ending support for their clients. They understand and empathize through motivational interviewing practices that advance patients towards healthy life goals and attempt to provide the easiest coordination and connection to resources for women that will never run out. The program coordinators of *WeCare*, *COS-P*, *CARE* and *CARE Plus* through experience and research have learned that the best coaches take the recruitment and treatment process slow. The coaches first develop a relationship with a potential participant through four to five encounters before even introducing the program, enrollment protocol and benefits for the women. The relationships culminated through peer coaches and patients are unique because they are unattainable in a traditional medical setting, but they produce significant levels of success in high-risk populations.

One of the overarching goals of *CARE Plus* is to normalize addiction care into the health field just as any other treatment of a chronic illness, such as diabetes or cancer. People struggling with SUD are just like anyone else, they have an area of their health that needs individualized, long-term treatment. *CARE Plus* also focuses on the stress of parenting with *COS-P*, a part of motherhood or fatherhood that every parent experiences, not just individuals who might be struggling with a SUD. One of the most difficult things to overcome in today's society is making the point that all mothers go through hardships and that a comorbidity such as postpartum depression, for example, can affect anyone. However, *CARE Plus* is dedicated to sending the

message that struggling does not define a bad mother in order to establish trust and empathize. *CARE Plus* aims to level addiction on the same plane as diabetes medicine, food insecurity, housing insecurity, mental health, all inequalities and health disparities that affect large populations in America. The core values of *CARE Plus* are that there is no shame, no blame, nor guilt in seeking and receiving treatment and assistance for anything. Despite *CARE Plus* being a pilot program, its foundational research and holistic, fundamental values can result in a successful and effective treatment program.

A crucial additional element of *CARE Plus* is also “coaching the coaches.” Health worker burnout is highly plausible and common, especially in employees working so closely with their patients, on irregular schedules, and with serious cases such as addiction or domestic violence. Several studies support the claim that health care workers “are exposed to a variety of severe occupational stressors, such as time pressure, low social support at work, a high workload, uncertainty concerning patient treatment, and predisposition to emotional responses due to exposure to suffering and dying patients” (Portoghese 152). Health workers are at risk for burnout on a uniquely sensitive level. A focus of the *CARE Plus* team is to save time for discussions that focus on the coaches rather than the patients, and to practice teamwork in developing solutions for particularly hard situations. Coaches also need reassurance along with their patients if relapse occurs, for example, that they did not fail and that it happened as part of the treatment process. A program that considers the wellbeing of all participants involved is well structured for long-term overall success.

CARE Plus just began official operations in January of 2019. There is not currently published nor sufficient data to work with, however the principal investigator (PI) of the study, Dr. Debra Litzelman, has theorized about the prevalent trend in lacking retention for *CARE Plus* at two

months. Currently, in order to gain traction for the program, the protocol for enrollment to gain a solid number of participants is for a research assistant to enroll women at IU Health Hospital. Dr. Litzelman speculates that once they have more certified ARCs to recruit, and that the ARCs are establishing relationships with women participants from the start, retention rates will increase. As of March 2019, *CARE Plus* has 7 mother/infant dyads, and has recorded 3-4 refusals. The general rule of thumb with refusals for this program is if after three attempts the woman is confident in her decision not to participate, the research assistant or health coach will cease contact. However, it is not uncommon that potential candidates take time to think about enrolling or express insecurities about participation. At this point, the unique role of the health coach can prevail successfully by starting to build trust with the client and making sure she is aware of all the benefits that will result from the program. *CARE Plus* will be a fascinating model for evaluation when the program is truly underway, even just at six months operating.

While it is currently difficult to determine the true potential for *CARE Plus*, based on the success of *WeCare*, *COS-P* and the urgent treatment demand in regard to the opioid epidemic, the Indianapolis community can be optimistic about this pilot program. More cities nationwide need to launch similar pilot programs that aim to fill resource gaps and treat addiction on a more intimate level. It is important that communities are not duplicating efforts but providing ways in which available resources can be connected to the right people in an efficient process. Minimally, *CARE Plus* is a way to empower women and bring communities together utilizing all resources to combat the opioid epidemic. Expectedly, *CARE Plus* can serve as a model or inspiration for future treatment programs.

“Beyond Opioids”: Enacting Momentous Change in American Society

Ultimately, this literature synthesis has argued that women of reproductive age and children are two of the most important and crucial populations of the opioid epidemic. Furthermore, this paper examined the advantages and disadvantages of the different approaches to treatment for women of reproductive age battling OUD and their children. The notion that “one size fits all” has been strongly refuted. The opioid epidemic is a wave of a drug crisis that cannot be evaluated as one singular problem. There are a staggering number of elements that are associated with substance abuse, including the fact that opioids are not the worst nor the end of drug use catastrophes in America. America needs to critically consider its drug policies and negative criminal punishments following illicit drug use. If addiction were viewed more widely as a chronic disease, by more areas than just the health care field, this belief would assist in developing alternative treatment programs for all people battling SUD. In consideration of the treatment demand gap and low efficacy of existing approaches, it is arguably disappointing that there is a small minority of holistic and comprehensive treatment programs that are specific to women of reproductive age. The preexisting models, no matter how successful, however, can act as examples for the rest of the country and motivate the addition of many more programs. There is so much unknown and at risk with the long-term cognitive, social and academic consequences of the opioid epidemic on women and children. Society has already overloaded existing resources and organizations, such as the foster care system, and needs to look more seriously at preventive methods. Therefore, accessibility to efficient and successful treatment must be the utmost concern for American institutions and society at this point in time.

The encompassing goal of this literature synthesis was to argue for a change in understanding of addiction amongst the general population. Although many areas of the health care field accept addiction as a chronic disease, the rest of the nation does not necessarily agree.

It is not so simple to argue that addiction is just like any other chronic disease, like diabetes or hypertension; a shift has to occur in society to continue to allocate resources to drug epidemics with this perception in mind. Conclusively, what is going to save the lives of women and children everywhere is a decrease in legal restrictions and the implementation of reformatory policies and programs. Dr. Debra Litzelman, PI of *CARE Plus*, puts the innovative ideology of addiction in brief yet truthful words: “No shame, no blame, no guilt.” Although this is in opposition to the norms of American society, it is the necessary change that is going to save the lives of thousands of women and children.

Limitations

There are limitations to this review that need to be addressed. Firstly, this literature synthesis could not encompass all of the data and studies available in specific regard to women of reproductive age and substance use. As an individual student conducted the research, literature review, and publication drafting singularly, the timeframe of less than seven months was not suitable to conduct an overarching systematic review of all the published literature related to this topic. Furthermore, the opioid epidemic is an ongoing public health crisis, with new information arising every day. This synthesis could not include all of the most current data surrounding the epidemic.

A second limitation to discuss is the student author’s background. With minimal experience in the science and medical field, it is important to keep in mind that the student interpreted scientific studies to the best of her ability. Her background in Global Health, with small concentrations in Anthropology and Sociology, allowed an advantage for her to evaluate the human-centered elements of the crisis. Sections discussing the pathophysiology of NAS and addiction were produced from the investigations of primary sources. Her experience on an infant

mortality reduction study, *WeCare*, as mentioned in the *CARE Plus* section, however, allowed for personal and local insight on the epidemic in a specific rural location of the U.S. The student's expertise is important to take into account when critiquing the literature synthesis.

Finally, this literature synthesis was limited to a national drug problem. The war on drugs was not discussed nor largely researched to contribute to data on an international dilemma. Furthermore, a discussion of international models was not included. This can be seen as a disadvantage through the exclusion of potential successes and learned failures from experiences in other countries. An analysis of the international approach to drug abuse will ultimately be very important in determining one of or some of the best approaches to treatment for some of the most remote populations.

Future Research

The conclusions of this literature synthesis suggest that *CARE Plus* should be evaluated by external organizations minimally at six-month and one-year checkpoints. Progress can be analyzed, and other models can be considered in different areas of the U.S. that utilize *CARE Plus's* successes. It would be irresponsible to think that America is going to eradicate opiate drug use, therefore a semi-constant evaluation and development of new treatment models must be part of the plan. The nation cannot fall into a similar pattern of immobility, as has been analyzed with the failure of the Prohibitionist Model. Dr. Ciccarone, a credible opioid epidemic expert, succinctly describes how harmful the opioid crisis has become, by labeling it as an “out of control epidemic” (Brown, “The Opioid Crisis is Driven by Prohibition”). What is most difficult to comprehend is that the opioid epidemic is not the end. Dr. Ciccarone rationalizes, “We need to treat it like a rolling epidemic. Three waves and now we've got a fourth wave coming, and for that we need real time data, on the ground, direct observation, and courageous out of the box

solutions” (Brown, “The Opioid Crisis is Driven by Prohibition”). The fourth wave he refers to is the disconcerting fact that stimulants such as cocaine are drugs that are going to directly follow the opioid epidemic if policy and legislation continue to operate years behind current data. These facts can be directly related back to the Prohibitionist Model of America, which has been rooted in society despite its many national and international failures. Society cannot afford any more time or mistakes. Now is the time to start not only adopting change but enacting it.

The “courageous out of the box solutions” Dr. Ciccarone refers to are exactly the kind of solutions necessary to facilitate significant change in American society. It could be argued that one of the most difficult things to achieve, even more so than deploying enough accessible successful treatment programs, is first adapting the way society perceives addiction and individuals who battle SUD. Addressing societal roots is not an easy nor immediate task, however the more discussions that occur and the more suggested novel treatment programs that are proposed are ways to push communities towards different ways of thinking and operating. In the interest of women of reproductive age specifically, these shifts should have happened years ago. Future research must be intense in order to get the legal system, the health care field, the government, and entire communities on new and improved pathways to combating the opioid epidemic.

Acknowledgments

I cannot thank my Honor Scholar committee enough for their hard work and immense contributions to this undergraduate thesis. Many thanks to my sponsor Dr. Debra Litzelman, my first reader Dr. Christina Wagner, and my second reader Dr. Nicole Lobdell. I am very grateful to have had them dedicate so much time and work so hard alongside me throughout the production of this work. Each of their unique background and expertise contributed brilliantly to

the development and focus of this literature synthesis. This thesis was created as part of the undergraduate Honor Scholar Program at DePauw University during the academic school year of fall 2018 to spring 2019. I would like to recognize the director of the Honor Scholar Program Dr. Kevin Moore, the Associate Director Amy Welch, Tonya Welker and the rest of the Honor Scholar community as well for their support and organizational direction.

Works Cited

- Abernathy, Mary Pell. "Infant Mortality, Substance Use and Abuse in Pregnancy." *HealthLinc*, HealthLinc, 22 Sept. 2017, www.healthlinc.org/uploads/1/1/7/6/117602662/obstetrics-care-dr.-mary-abernathy-brandi-brinkerhoff.pdf.
- Alcoholics Anonymous. "Estimates Worldwide A.A. Individual and Group Membership." *Alcoholics Anonymous: Estimates Worldwide A.A. Individual and Group Membership*, Alcoholics Anonymous World Services, Inc., 2019, www.aa.org/assets/en_US/aa-literature/smf-132-estimates-worldwide-aa-individual-and-group-membership.
- American Heart Association. "Heart Valves and Infective Endocarditis." *Heart*, American Heart Association, 31 Mar. 2017, www.heart.org/en/health-topics/heart-valve-problems-and-disease/heart-valve-problems-and-causes/heart-valves-and-infective-endocarditis.
- American Society of Addiction Medicine. "Treating Opioid Addiction as a Chronic Disease." *The Voice of Addiction Medicine*, American Society of Addiction Medicine, 7 Nov. 2014, www.asam.org/docs/default-source/advocacy/cmm-fact-sheet---11-07-14.pdf.
- Angelotta, Cara, et al. "A Moral or Medical Problem? The Relationship between Legal Penalties and Treatment Practices for Opioid Use Disorders in Pregnant Women." *Women's Health Issues*, Elsevier, 20 Oct. 2016, www.sciencedirect.com/science/article/pii/S1049386716301694.
- Bernstein, Judith, et al. "Brief Motivational Intervention at a Clinic Visit Reduces Cocaine and Heroin Use." *Drug and Alcohol Dependence*, vol. 77, no. 1, 2005, pp. 49–59., doi:10.1016/j.drugalcdep.2004.07.006.

- Blehar, Mary C., et al. "Enrolling Pregnant Women: Issues in Clinical Research." *Women's Health Issues*, vol. 23, no. 1, 2013, doi:10.1016/j.whi.2012.10.003.
- Bowman, Emma. "The Viral Obituary of an Opioid Addict: 'She's Just One Face' Of The Epidemic." *NPR*, NPR, 20 Oct. 2018, www.npr.org/2018/10/20/659122537/remembering-madelyn-linsenmeir.
- Box, Kristina. "Where Indiana Stands: NAS and the Opioid Epidemic." *Indiana CTSI*, Indiana University Bloomington, 25 Apr. 2018, www.indianactsi.org/wp-content/uploads/Kristina-Box_Where-Indiana-Stands-NAS-and-the-Opioid-Epidemic.pdf.
- Brown, Caleb O. "The Opioid Crisis is Driven by Prohibition." Audio blog post. Cato Daily Podcast. Cato Institute. 1 Apr. 2019. Web. 3 April 2019.
- Bruce, Giles. "Where Are Drug Overdose Deaths Happening in Northwest Indiana?" *Nwitimes.com*, 15 Apr. 2018, www.nwitimes.com/news/special-section/opioids-in-nwi/where-are-drug-overdose-deaths-happening-in-northwest-indiana/article_e8396967-02e6-59b7-bf71-ba6ec554701e.html#2.
- Cassata, Cathy. "What Is Norepinephrine?" Edited by Robert Jasmer, *EverydayHealth.com*, 11 Dec. 2015, www.everydayhealth.com/norepinephrine/guide/.
- CDC. "HIV/AIDS." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 23 July 2018, www.cdc.gov/hiv/basics/.
- CDC. "Opioid Overdose." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 19 Dec. 2018, www.cdc.gov/drugoverdose/data/statedeaths.html.
- CDC. "Prescription Painkiller Overdoses." *Centers for Disease Control and Prevention*, National Center for Injury Prevention and Control, Division of Unintentional Injury

Prevention, 4 Sept. 2018,

www.cdc.gov/vitalsigns/prescriptionpainkilleroverdoses/index.html.

CDC/National Center for Health Statistics. "National Center for Health Statistics." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 15 Jan. 2019,

https://www.cdc.gov/nchs/pressroom/sosmap/infant_mortality_rates/infant_mortality.htm

Chatterjee, Rhitu, and Rebecca Davis. "Beyond Opioids: How A Family Came Together To Stay Together." *NPR*, NPR, 19 June 2018, www.npr.org/sections/health-shots/2018/06/19/619243268/an-alternative-to-foster-care-for-babies-born-to-opioid-addicted-moms.

Christie, Chris, et al. "The President's Commission on Combating Drug Addiction and the Opioid Crisis." *The White House*, The White House, 1 Nov. 2017, www.whitehouse.gov/sites/whitehouse.gov/files/images/Final_Report_Draft_11-1-2017.pdf.

Coker, Jessica L., et al. "Buprenorphine Medication-Assisted Treatment during Pregnancy: An Exploratory Factor Analysis Associated with Adherence." *Drug and Alcohol Dependence*, vol. 192, 15 Sept. 2018, pp. 146–149., doi:10.1016/j.drugalcdep.2018.07.042.

Condron, Patrick. "Drug Withdrawal." *DrugAbuse.com*, DrugAbuse.com, 4 Jan. 2018, drugabuse.com/drug-withdrawal/.

Crowley, Ryan, et al. "Health and Public Policy to Facilitate Effective Prevention and Treatment of Substance Use Disorders Involving Illicit and Prescription Drugs: An American

- College of Physicians Position Paper.” *Annals of Internal Medicine*, vol. 166, no. 10, 16 May 2017, doi:10.7326/m16-2953.
- Falletta, Lynn, et al. “Perceptions of Child Protective Services among Pregnant or Recently Pregnant, Opioid-Using Women in Substance Abuse Treatment.” *Child Abuse & Neglect*, vol. 79, 2018, pp. 125–135., doi:10.1016/j.chiabu.2018.01.026.
- Feldman, Nina. “Opioid Antidote Can Save Lives, but Deciding When to Use It Can be Challenging.” *NPR*, NPR, 29 Oct. 2018, www.npr.org/sections/health-shots/2018/10/29/660640838/opioid-antidote-can-save-lives-but-deciding-when-to-use-it-can-be-challenging.
- Finkelstein, Norma. “Treatment Programming for Alcohol and Drug-Dependent Pregnant Women.” *International Journal of the Addictions*, vol. 28, no. 13, 1993, pp. 1275–1309., doi:10.3109/10826089309062189.
- Flanagin, Jake. “The Surprising Failures of 12 Steps.” *The Atlantic*, Atlantic Media Company, 25 Mar. 2014, www.theatlantic.com/health/archive/2014/03/the-surprising-failures-of-12-steps/284616/.
- Gemmill, Alison, et al. “Trends in Pregnancy-Associated Mortality Involving Opioids in the United States, 2007–2016.” *American Journal of Obstetrics and Gynecology*, vol. 220, no. 1, 2019, pp. 115–116., doi:10.1016/j.ajog.2018.09.028.
- Glaser, Gabrielle. “The Irrationality of Alcoholics Anonymous.” *The Atlantic*, Atlantic Media Company, Apr. 2015, www.theatlantic.com/magazine/archive/2015/04/the-irrationality-of-alcoholics-anonymous/386255/.
- Haden, Mark. “Controlling Illegal Stimulants: a Regulated Market Model.” *Harm Reduction Journal*, vol. 5, no. 1, 23 Jan. 2008, pp. 1–8., doi:10.1186/1477-7517-5-1.

- Hand, Dennis J., et al. "Substance Use, Treatment, and Demographic Characteristics of Pregnant Women Entering Treatment for Opioid Use Disorder Differ by United States Census Region." *Journal of Substance Abuse Treatment*, vol. 76, 2017, pp. 58–63., doi:10.1016/j.jsat.2017.01.011.
- Hand, Dennis J., et al. "Treatments for Opioid Use Disorder among Pregnant and Reproductive-Aged Women." *Fertility and Sterility*, vol. 108, no. 2, 2017, pp. 222–227., doi:10.1016/j.fertnstert.2017.06.011.
- Harm Reduction Coalition. "Principles of Harm Reduction." *Harm Reduction Coalition*, Firefly Partners, 2018, harmreduction.org/about-us/principles-of-harm-reduction/.
- Harm Reduction Coalition. "Understanding Naloxone." *Harm Reduction Coalition*, Firefly Partners, 2018, harmreduction.org/issues/overdose-prevention/overview/overdose-basics/understanding-naloxone/.
- Hillman, Jennifer. *Instructor's Resource Manual to Accompany Leslie Frazier's Healthy Psychology*. 1st ed., Worth Publishers, 2018.
- Indiana Population. "Indiana Population 2018." *Indiana Population 2018 (Demographics, Maps, Graphs)*, World Population Review, 7 Sept. 2018, worldpopulationreview.com/states/indiana-population/.
- Indiana State Department of Health. "Indiana Infant Mortality and Morbidity Annual Report." *Labor of Love*, Indiana State Department of Health, 2016, www.in.gov/laboroflove/files/2016-annual-report.pdf.
- Inskip, Steve. "'Church Of Safe Injection' Offers Needles, Naloxone to Prevent Opioid Overdoses." *WUNC North Carolina Public Radio*, WUNC, 14 Feb. 2019,

www.wunc.org/post/church-safe-injection-offers-needles-naloxone-prevent-opioid-overdoses.

Johnson, Brandon T., and Melinda Campopiano. “Clinical Guidance for Treating Pregnant and Parenting Women with Opioid Use Disorder and Their Infants.” *Clinical Guidance for Treating Pregnant and Parenting Women with Opioid Use Disorder and Their Infants*, SAMHSA, 2018, store.samhsa.gov/shin/content/SMA18-5054/SMA18-5054.pdf.

Jones, Hendrée E., et al. “Treatment of Opioid-Dependent Pregnant Women: Clinical and Research Issues.” *Journal of Substance Abuse Treatment*, vol. 35, no. 3, 2008, pp. 245–259., doi:10.1016/j.jsat.2007.10.007.

Kamon, Jody, and Win Turner. *Recovery Coaching in Recovery Centers: What the Initial Data Suggest*. Evidence Based Solutions, LLC, 2019, pp. 1–4, *Recovery Coaching in Recovery Centers: What the Initial Data Suggest*.

Keefe, Patrick Radden. “The Family That Built an Empire of Pain.” *The New Yorker*, The New Yorker, 30 Oct. 2017, www.newyorker.com/magazine/2017/10/30/the-family-that-built-an-empire-of-pain.

Klaman, Stacey L., et al. “Treating Women Who Are Pregnant and Parenting for Opioid Use Disorder and the Concurrent Care of Their Infants and Children.” *Journal of Addiction Medicine*, vol. 11, no. 3, May 2017, pp. 178–190., doi:10.1097/adm.0000000000000308.

Kocherlakota, P. “Neonatal Abstinence Syndrome.” *Current Neurology and Neuroscience Reports.*, U.S. National Library of Medicine, Aug. 2014, www.ncbi.nlm.nih.gov/pubmed/25070299.

- Kral, Lee A. “Opioid Tapering: Safely Discontinuing Opioid Analgesics.” *Pain Treatment Topics*, Pain Treatment Topics, Mar. 2006, www.nhms.org/sites/default/files/Pdfs/Safely_Tapering_Opioids.pdf.
- Krans, Elizabeth E., and Stephen W. Patrick. “Opioid Use Disorder in Pregnancy.” *Obstetrics & Gynecology*, vol. 128, no. 1, 2016, pp. 4–10., doi:10.1097/aog.0000000000001446.
- Krans, Elizabeth E., et al. “The Pregnancy Recovery Center: A Women-Centered Treatment Program for Pregnant and Postpartum Women with Opioid Use Disorder.” *Addictive Behaviors*, vol. 86, 21 May 2018, pp. 1–6., doi:10.1016/j.addbeh.2018.05.016.
- Ling, Walter, et al. “Buprenorphine Tapering Schedule and Illicit Opioid Use.” *Addiction*, vol. 104, no. 2, Feb. 2009, pp. 256–265., doi:10.1111/j.1360-0443.2008.02455.x.
- Litzelman, Debra, and Joanna Chambers. *CARE Plus: An Innovative, Community-Based Addiction Reduction Program*. CARE Plus Program, 2018, pp. 1–12. Unpublished manuscript.
- Litzelman, Debra, et al. *CARE Plus: A Community-Based Addiction Reduction plus Policy Innovations Program for Indiana*. CARE Plus Program, 2018, pp. 1–18. Unpublished manuscript.
- Logan, Beth A., et al. “Neonatal Abstinence Syndrome.” *Clinical Obstetrics and Gynecology*, vol. 56, no. 1, 2013, pp. 186–192., doi:10.1097/grf.0b013e31827fcea4.
- Lowinson, Joyce H., et al. *Substance Abuse: A Comprehensive Textbook*. 4th ed., Wolters Kluwer Health, 2004.
- Mann, Brian. “Opioid Litigation Brings Company Secrets Into The Public Eye.” *NPR*, NPR, 13 Mar. 2019, www.npr.org/sections/health-shots/2019/03/13/702665619/opioid-litigation-brings-company-secrets-into-the-public-eye.

- Marino, Elise N, et al. “Impulsivity but Not Sensation Seeking Is Associated with Opioid Analgesic Misuse Risk in Patients with Chronic Pain.” *Addictive Behaviors*, vol. 38, no. 5, May 2013, pp. 2154–2157., doi:10.1016/j.spinee.2013.05.006.
- McGlone, Laura, and Helen Mactier. “Infants of Opioid-Dependent Mothers: Neurodevelopment at Six Months.” *Early Human Development*, vol. 91, no. 1, 2015, pp. 19–21., doi:10.1016/j.earlhumdev.2014.10.006.
- Merhar, Stephanie L., et al. “Retrospective Review of Neurodevelopmental Outcomes in Infants Treated for Neonatal Abstinence Syndrome.” *Journal of Perinatology*, vol. 38, no. 5, 7 Mar. 2018, pp. 587–592., doi:10.1038/s41372-018-0088-9.
- Mozes, Alan. “Opioids Increasingly Tied to Deaths of Pregnant Women.” *U.S. News & World Report*, U.S. News & World Report, 20 Nov. 2018, [health.usnews.com/health-care/articles/2018-11-20/opioids-increasingly-tied-to-deaths-of-pregnant-women](https://www.health.usnews.com/health-care/articles/2018-11-20/opioids-increasingly-tied-to-deaths-of-pregnant-women).
- Mutamba, Byamah Brian, et al. “Roles and Effectiveness of Lay Community Health Workers in the Prevention of Mental, Neurological and Substance Use Disorders in Low- and Middle-Income Countries: a Systematic Review.” *BMC Health Services Research*, vol. 13, no. 1, 2013, doi:10.1186/1472-6963-13-412.
- National Institute on Drug Abuse. “Comorbidity: Substance Use Disorders and Other Mental Illnesses.” *National Institute on Drug Abuse*, NIH, Aug. 2018, www.drugabuse.gov/publications/drugfacts/comorbidity-substance-use-disorders-other-mental-illnesses.
- National Institute on Drug Abuse. “Indiana Opioid Summary.” *NIDA*, National Institute on Drug Abuse, 28 Feb. 2018, <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/indiana-opioid-summary>

- National Institute on Drug Abuse. "Treatment and Recovery." *NIDA*, July 2018, www.drugabuse.gov/publications/drugs-brains-behavior-science-addiction/treatment-recovery.
- News Staff. "Number of Women With OUD in Labor/Delivery Quadruples." *AAFP News*, American Academy of Family Physicians, 21 Aug. 2018, www.aafp.org/news/health-of-the-public/20180821oudlabor-delivery.html.
- O'Brien, Charles P, and Thomas J Crowley. "Substance-Related Disorders." *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*, 5th ed., American Psychiatric Association, 2013, pp. 483–590.
- O'Connor, Alane B., et al. "Predictors of Treatment Retention in Postpartum Women Prescribed Buprenorphine during Pregnancy." *Journal of Substance Abuse Treatment*, vol. 86, 5 Dec. 2017, pp. 26–29., doi:10.1016/j.jsat.2017.12.001.
- O'Neill, Kate. "Madelyn Ellen Linsenmeir." *Burlington Free Press*, Legacy.com, 14 Oct. 2018, <https://www.legacy.com/obituaries/burlingtonfreepress/obituary.aspx?n=madelyn-ellen-linsenmeir&pid=190469930>
- Older, Stephanie. "Buprenorphine Treatment in Pregnancy: Less Distress to Babies." *National Institutes of Health*, U.S. Department of Health and Human Services, 9 Dec. 2010, www.nih.gov/news-events/news-releases/buprenorphine-treatment-pregnancy-less-distress-babies.
- Olsen, Yngvild, and Joshua M. Sharfstein. "Confronting the Stigma of Opioid Use Disorder—and Its Treatment." *Jama*, vol. 311, no. 14, 2014, p. 1393., doi:10.1001/jama.2014.2147.
- Patterson, Eric. "The Effects of Opiate Use." *DrugAbuse.com*, American Addiction Centers, Inc, 25 Nov. 2018, drugabuse.com/opiates/effects-of-use/.

- Portoghese, Igor, et al. "Burnout and Workload Among Health Care Workers: The Moderating Role of Job Control." *Safety and Health at Work*, vol. 5, no. 3, 2014, pp. 152–157., doi:10.1016/j.shaw.2014.05.004.
- Resnicow, Ken, and Fiona McMaster. "Motivational Interviewing: Moving from Why to How with Autonomy Support." *International Journal of Behavioral Nutrition and Physical Activity*, vol. 9, no. 1, 2 Mar. 2012, doi:10.1186/1479-5868-9-19.
- Rieder, Travis. "The Agony of Opioid Withdrawal - and What Doctors Should Tell Patients about It." *TED: Ideas Worth Spreading*, TED, 2017, www.ted.com/talks/travis_rieder_the_agony_of_opioid_withdrawal_and_what_doctors_should_tell_patients_about_it.
- Saloner, Brendan, et al. "Changes in Buprenorphine-Naloxone and Opioid Pain Reliever Prescriptions After the Affordable Care Act Medicaid Expansion." *JAMA Network Open*, vol. 1, no. 4, 17 Aug. 2018, pp. 1–13., doi:10.1001/jamanetworkopen.2018.1588.
- SAMHSA. "Buprenorphine." *SAMHSA*, SAMHSA, 31 May 2016, www.samhsa.gov/medication-assisted-treatment/treatment/buprenorphine.
- SAMHSA. "Medication-Assisted Treatment (MAT)." *Stages of Community Readiness | SAMHSA*, U.S. Department of Health and Human Services, 7 Feb. 2018, www.samhsa.gov/medication-assisted-treatment.
- SAMHSA. "Methadone." *SAMHSA*, SAMHSA, 28 Sept. 2015, www.samhsa.gov/medication-assisted-treatment/treatment/methadone.
- SAMHSA. "Substance Abuse Treatment: Addressing the Specific Needs of Women." *NCBI*, Substance Abuse and Mental Health Services Administration (US), 2009, www.ncbi.nlm.nih.gov/pubmed/22514859.

SAMHSA. "Substance Use Disorders." *Substance Use Disorders | SAMHSA - Substance Abuse and Mental Health Services Administration*, SAMHSA, 27 Oct. 2015,

<https://www.samhsa.gov/find-help/disorders>

Sawyer, Bradley, and Selena Gonzales. "How Does Infant Mortality in the U.S. Compare to Other Countries?" *Peterson-Kaiser Health System Tracker*, Kaiser Family Foundation, 7 July 2017, www.healthsystemtracker.org/chart-collection/infant-mortality-u-s-compare-countries/#item-infant-mortality-higher-u-s-comparable-countries.

Scolforo, Mark. "Court to Decide If Drug Use While Pregnant Is Child Abuse." *U.S. News & World Report*, U.S. News & World Report, 9 Apr. 2018, www.usnews.com/news/best-states/pennsylvania/articles/2018-04-09/court-to-decide-if-drug-use-while-pregnant-is-child-abuse.

Shepherd-Banigan, Megan, et al. "Do Maternity Care Coordination Services Encourage Use of Behavioral Health Treatment among Pregnant Women on Medicaid?" *Women's Health Issues*, vol. 27, no. 4, 2017, pp. 449–455., doi:10.1016/j.whi.2017.02.006.

State of Indiana. "Opioid Epidemic." *Opioid Epidemic - MPH: Management Performance Hub*, State of Indiana, 2018, <https://www.in.gov/mph/930.htm>

Stephenson, Joan. "Mental Disorders Undertreated." *Jama*, vol. 283, no. 3, 2000, p. 325., doi:10.1001/jama.283.3.325-jha90011-2-1.

Stewart, Ian. "Report: Americans Are Now More Likely To Die Of An Opioid Overdose Than On The Road." *NPR*, NPR, 14 Jan. 2019, www.npr.org/2019/01/14/684695273/report-americans-are-now-more-likely-to-die-of-an-opioid-overdose-than-on-the-ro.

Taylor, Ruth, et al. "In Their Own Voices: Why Peer-to-Peer Mentoring Works." *The Source*, The National Abandoned Infants Assistance Resource Center, 2010, www.womenhiv.org/wp-content/uploads/2010/03/TheSourceSpring2010.pdf#page=17.

Thomas, Scot. "12 Step Programs for Drug Rehab & Alcohol Treatment." *American Addiction Centers*, 2019, americanaddictioncenters.org/rehab-guide/12-step.

Tribble, Sarah Jane. "For Babies Of The Opioid Crisis, Best Care May Be Mom's Recovery." *NPR*, NPR, 8 May 2018, www.npr.org/sections/health-shots/2018/05/08/605358266/for-babies-of-the-opioid-crisis-best-care-may-be-moms-recovery.

Tribble, Sarah Jane. "Pregnant And Addicted: The Tough Road To Family Health." *NPR*, NPR, 28 Mar. 2016, www.npr.org/sections/health-shots/2016/03/28/471580034/pregnant-and-addicted-the-tough-road-to-family-health.

Truth. "What Are Opioids?" *Truth*, Truth, 12 June 2018, opioids.thetruth.com/o/articles/what-are-opioids?source=OP_1HFY19_SEARCH_GOOGLEGRANTS_ACQUIRE_SITEACTION_TEXTAD_KNOWMORE.

United Health Foundation. "Explore Infant Mortality in Indiana | 2018 Annual Report." *America's Health Rankings*, United Health Foundation, 2019, www.americashealthrankings.org/explore/annual/measure/IMR/state/IN.

U.S. Department of Health and Human Services. *Child Health USA 2013*. Rockville, Maryland: U.S. Department of Health and Human Services, 2013, <https://mchb.hrsa.gov/chusa13/perinatal-risk-factors-behaviors/perinatal-risk-factors-behaviors.html>.

- Wagener, Dan. "What Is the Success Rate of AA?" *American Addiction Centers*, 14 Feb. 2019, americanaddictioncenters.org/rehab-guide/12-step/whats-the-success-rate-of-aa.
- Walid, Mohammad Sami, et al. "The Fifth Vital Sign-What Does It Mean?" *Pain Practice*, vol. 8, no. 6, 2008, pp. 417–422., doi:10.1111/j.1533-2500.2008.00222.x.
- Watson, Enid, et al. "Using the Peer Recovery Model with Mothers of Substance-Exposed Newborns Identified through CAPTA Requirements." *The Source*, The National Abandoned Infants Assistance Resource Center, 2010, www.womenhiv.org/wp-content/uploads/2010/03/TheSourceSpring2010.pdf#page=17.
- Women's College Hospital. "Starting Buprenorphine Therapy: A Guide for Patients." *Women's College Hospital*, Women's College Hospital, 5 Jan. 2018, www.womenscolleghospital.ca/assets/pdf/MetaPhi/Buprenorphine%20book%2018.01.05.pdf.
- World Health Organization. "Alcohol and Drug Use Disorders: Global Health Estimates." *WHO Forum on Alcohol, Drugs, and Addictive Behaviors*, World Health Organization, 2015, https://www.who.int/substance_abuse/activities/fadab/msb_adab_2017_GHE_23June2017.pdf?ua=1
- World Health Organization. "Defining Adherence." *World Health Organization*, World Health Organization, 2003, www.who.int/chp/knowledge/publications/adherence_Section1.pdf.
- World Health Organization. "Maternal and Perinatal Health." *World Health Organization*, World Health Organization, 22 Oct. 2013, www.who.int/maternal_child_adolescent/topics/maternal/maternal_perinatal/en/.

Appendix

Acronyms

AA	Alcoholics Anonymous
ACE	Adverse childhood experience(s)
AHH	A Helping Hand: Mother to Mother
AIDS	Acquired immunodeficiency syndrome
ARC	Addiction recovery coach
ASAM	American Society of Addiction Medicine
CA	Cocaine Anonymous
CARE	A <u>C</u> ommunity-based <u>A</u> ddiction <u>R</u> eduction
CDC	Centers for Disease Control and Prevention
CHW	Community health worker
CMA	Crystal Meth Anonymous
COS-P	Circle of Security-Parenting
CPS	Child protective services
DSM	Diagnostic and Statistical Manual of Mental Disorders
FEAT	Family Early Advocacy and Treatment
FDA	Food and Drug Administration
HA	Heroin Anonymous
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
IUH	Indiana University Health
LHW	Lay community health worker

LMIC	Low- and middle-income country
MAT	Medication-assisted treatment
MCC	Maternal care coordination
MI	Motivational interviewing
MMT	Methadone maintenance therapy
MOTHER	Maternal Opioid Treatment: Human Experimental Research
NA	Narcotic Anonymous
OUD	Opioid use disorder
PI	Principal investigator
NAS	Neonatal abstinence syndrome
NPR	National Public Radio
SAMHSA	Substance Abuse and Mental Health Services Administration
SEP	Syringe exchange program(s)
SSP	Syringe services program(s)
SUD	Substance use disorder
TB	Tuberculosis
WHO	World Health Organization