

PATHWAYS TO SUBSTANCE ABUSE TREATMENT SUCCESS IN PREGNANCY

by

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A DISSERTATION

Presented to the Department of Psychology  
and the Graduate School of the University of Oregon  
in partial fulfillment of the requirements  
for the degree of  
Doctor of Philosophy

September 2017

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Title: Pathways to Substance Abuse Treatment Success in Pregnancy

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## DISSERTATION ABSTRACT

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Doctor of Philosophy

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September 2017

Title: Pathways to Substance Abuse Treatment Success in Pregnancy

This mixed-methods dissertation considers the experiences of women who used substances during pregnancy. Retrospective interviews with 15 women, currently accessing inpatient substance abuse treatment, identify trends in women's experiences prior to accessing these services. Women report being concerned about the impact of their substance use on the developing baby, seeking information, reducing substance use outside of accessing treatment services, and engaging in healthy behaviors to protect the baby from harm. Trends related to trying to reduce harm to the baby during pregnancy are then further explored through quantitative analyses.

Data on harm reduction behaviors prior to accessing treatment were collected from an additional 54 women. A clinical and research tool for visually tracking patterns of maternal substance use over the course of pregnancy was developed. This tool identifies the high prevalence of women who decrease their substance use during pregnancy outside of accessing treatment services. Clinical use of this tool is considered.

In addition, a questionnaire, designed to identify engagement in harm reduction and health promoting behaviors, was administered. Data suggests that harm reduction and health promotion behaviors are common and tend to begin early on in pregnancy. Women report beginning to decrease their substance use, on average, beginning at the end of the

first trimester. The timing of beginning to reduce substance use is not associated with the timing of entering substance abuse treatment in relation to a given pregnancy. However, maternal mental health and perceived barriers to accessing services do predict when, in relation to pregnancy, women enter treatment.

As a whole, this research suggests that continued use of substances during pregnancy is not due to indifference towards the developing baby. Instead, women report being concerned about their babies and being engaged in the process of positive self-change. There are public health and clinical implications to these findings. This research suggests the opportunity to build upon the motivation that women have to decrease their substance use. In addition, this research suggests the importance of focusing policy and intervention efforts on addressing perceived barriers to accessing treatment services.

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## ACKNOWLEDGMENTS

I am grateful to the countless people who provided guidance, encouragement, and friendship throughout graduate school. I wish to express my sincere appreciation to my dissertation committee including Dr. Phil Fisher, Dr. Heather Scott, Dr. Jill Harrison, and Dr. Heidemarie Laurent, for their commitment to mentorship and for their assistance in the preparation of this manuscript. In particular, without the constant support and encouragement of Dr. Heather Scott, it would not have been possible to collect the sensitive data included in this dissertation. In addition, Dr. Theresa O’Neill and Brianna Delker were integral to the initial development of this project. This thesis has also been strongly impacted by Dr. Hyoun Kim and Leslie Roos who provided input and support for the analyses presented in this paper.

Beyond mentorship of this dissertation, I will always appreciate the way that my advisor and the chair of this committee, Dr. Fisher, pressed me to consider the bigger picture and nurtured developing a web of ever-expanding ideas and interests. No matter what new idea I brought into our meetings, he was always encouraging, making the possibilities of research boundless and exhilarating. In addition, over these years of graduate school, I have watched Dr. Fisher lead our lab with kindness, collegiality, and generosity, creating an environment ripe for innovation and intellectual exploration. I hope to carry these values forward with me as I travel onwards.

I am grateful to Dr. Ryann Watson-Stites, who became my clinical supervisor during my final two years of graduate school, and seemed to make life a little bit brighter. She inspired in me an absolute love of the practice of child clinical psychology and answered every question I asked with a mixture of grace, knowledge, and dedication to

teaching. She also steadily held my hand during those final years of graduate school, demonstrating how in life to be fierce while gentle, and always true to oneself.

I am so fortunate to have gained so many wonderful friends during my time in Oregon. Friends here made graduate school a marvelous destination, a time in my life that I will no doubt look back upon with extraordinary fondness.

To my family back on the east coast, thank you for providing a platform of love to stand upon. I have such incredible fortune to have been gifted these parents and these siblings. Despite living thousands of miles away, I never journeyed alone, but always together.

To Eli and Leon, I am so thankful that I get to live my life alongside the two of you. Thank you for making sure that evenings and weekends were reserved for joyous conversations around the dining room table, walks exploring the Pacific Northwest, and elaborate marble track architectural achievements. Just as much as all of the joy, thank you two for being there for the harder parts. You made the graduate school years about not just researching family relationships, but growing into our own little family. Leon, raising you as an infant and toddler helped me become a much less judgmental, and thus much improved, child clinician. And Eli, I recognize that when I have a nice long successful day at work, it is in part because you made dinner the night before and got our child to school that morning. You are the solid spine of our family. You made possible this creation.

This research was supported by the Doris Duke Fellowship for the Promotion of Child Well-Being, the Center for the Study of Women in Society at the University of Oregon, and by a grant from the National Institute on Drug Abuse, NIDA DA035763

This dissertation is dedicated to women who strive and seek and dismantle barriers to become the mothers they choose to be.

Witnessing women mother, lovingly, tirelessly, while fighting for their sobriety, inspired this work, and is a gift, for which I will eternally be grateful.

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CHAPTER I  
GENERAL INTRODUCTION

**The Negative Impact of Substance Use in Pregnancy**

Despite decades of research documenting the negative effects of substance abuse on fetal development and child outcomes, many pregnant women continue to use alcohol, tobacco, and illicit drugs. The motivations to stop using substances for pregnant women with addictions are not well understood; neither are the pathways to beginning substance abuse treatment very clear. However, the consequences of continued substance use are well documented.

Pregnant women's use of alcohol, tobacco, and other drugs is a known risk factor for long-term negative child outcomes. A large extant literature indicates that there are neurobiological effects of substance use on the developing fetus and that children of women who use substances during pregnancy are at increased risk for developmental delays, academic difficulties, and emotional and behavioral disorders (Lester et al., 2009; Weinberg, Sliwowska, Lan & Hellemans, 2008).

The effects of prenatal exposure vary tremendously and are impacted by the type of substances the mother used, as well as the timing and the amount of use. In many instances, the impact of substance exposure is subtle. For example, a meta-analysis of research on exposure to cocaine in utero by Lester, LaGasse, and Seifer (1998), suggests that prenatal exposure to this substance is associated with a small suppression of intellectual abilities. More specifically, these researchers estimate that on average, full scale IQ is suppressed 3.26 points in children who were exposed prenatally to cocaine.

Although this suppression of IQ is relatively minor, it is still associated with significant societal costs. For example, this decrease in cognitive abilities increases the need for special education services due to the higher percentage of children who require these supportive services.

In contrast to the documented subtle effect of cocaine exposure, exposure to alcohol in utero can have a much more profound and noticeable impact. Prenatal exposure to alcohol can lead to Fetal Alcohol Spectrum Disorders. Children with this diagnosis have difficulties that include changes to physical appearance, including smaller physical size and changes to the morphology of the face. In addition, these children often have notably suppressed intellectual abilities as well as behavioral and mental health difficulties that persist into adulthood. Given the strong impact on cognitive abilities, prenatal exposure to alcohol is a leading cause of intellectual disabilities in the United States (Eustace, Kang, & Coombs, 2003).

Compounding the negative impact of prenatal exposure, children of women who abuse substances are at a particularly high risk for maltreatment and involvement in the child welfare system (Murphy et al., 1991). Children with prenatal exposure often become involved in the child welfare system at birth when maternal substance use is identified in the hospital. This involvement in the child welfare system often leads to young children having multiple caregiver transitions during the critical first years of life. For children who continue to be parented by a mother who struggles with addiction, mothering while under the influence of substances can impair parenting decisions and is strongly predictive of perpetrating child abuse and neglect (Dube et al., 2001; Chaffin, Kelliner, & Hollenberg, 1996). Too frequently, by the time women begin treatment to

address their addiction, the cycle of child abuse and neglect has already impacted the next generation.

In the United States, prenatal substance use continues to be a widespread problem. Fortunately nine in ten women who use alcohol and one in two women who use illicit substances before becoming pregnant stop using early in the pregnancy and prior to their first prenatal visit (Harrison & Sidebottom, 2009). Despite the high rate of cessation, recent research estimates that 7% of women use alcohol throughout their pregnancy, 5% of women use illicit substances, and 9% of women smoke cigarettes (Finch, Vega, & Kolody, 2001).

### **Addressing Substance Addiction in Pregnancy**

Providing women with services before their children are born is a critical step in mitigating risk for prenatal exposure as well as child abuse and neglect. Despite the negative effects of continued substance use on fetal development and child outcomes, the factors underlying substance use cessation in pregnant women are not well understood. Without understanding pregnant women's motivations to stop using substances, their behaviors outside of accessing services, and their pathways to beginning treatment, we are losing the opportunity to intervene earlier in pregnancy for more women. Increased efforts to engage women in treatment will help to decrease fetal substance exposure and prepare women to become substance-free mothers.

Unfortunately, there is currently little research focused on the experiences of women who continue to use substances throughout pregnancy. Instead, the majority of research relating to substance use during pregnancy focuses on either the prevalence of

substance use during the different trimesters of pregnancy or focuses on the effects of prenatal exposure on the developing baby. The literature relating to the impact of maternal substance use on the baby is much more developed than the literature focusing on addressing the needs of pregnant women with addictions.

To effectively prevent the multigenerational transmission of prenatal exposure, trauma, and the poor outcomes that are associated with maternal addiction, there needs to be a refocus of research efforts towards informing a preventative framework. Focused efforts to gain a stronger understanding of mothers' continued use of substances in pregnancy can better inform these preventative efforts. In particular, efforts to identify the experiences of women who continue to use substances outside of accessing treatment will inform systems designed to support this population in reducing harm to their developing babies. In particular, it is essential to learn how to support women in starting inpatient and outpatient support services that increase the likelihood that women will stop using substances and be able to maintain sobriety. These efforts hold promise for decreasing the prevalence of prenatal exposure as well as preventing maternal substance use while parenting.

While pregnant women often report being concerned about the impact of their substance use on the developing baby, they face barriers to accessing the services that could help them decrease their substance use or abstain from use altogether. Women report that concern about becoming involved with child welfare or the judicial system if they disclose their substance use to health care professionals acts as a strong barrier to accessing traditional substance use treatment services (Leppo, 2012; Stengel, 2014).

In the United States, policies relating to substance use during pregnancy vary from state to state. In the past decade, the negative consequences for substance use during pregnancy have increased. Several states have changed their policies to include prenatal substance abuse as grounds for terminating parental rights. Currently, eighteen states consider use of substances during pregnancy as a form of child abuse that can lead to child welfare involvement. In addition, in 2014, the state of Tennessee became the first state to explicitly criminalize substance use in pregnancy, enabling judicial consequences in addition to child-welfare consequences (Guttmacher, 2016). Doctors and health care professionals are often mandated to report suspected use of substances during pregnancy to child welfare agencies, thus preventing women from having open conversations about their addiction with health care providers due to fear of the negative consequences that may be associated with this disclosure.

Thus, while women with addictions both have added motivation to decrease their substance use – to have a healthier pregnancy and baby, they also have increased consequences to accessing services. For pregnant women with substance abuse disorders, disclosure may pose a threat to continued guardianship of their children. Pregnant women with addictions who want to stop using substances are caught in a bind. The services they need to access to become clean and become a better parent pose a risk to their ability to parent their children at all.

In the book *Pregnant Women on Drugs* (1999), researchers Sheigla Murphy and Marsha Rosenbaum provide the most comprehensive interview-based research to date on the experiences of pregnant women with addictions. This book is based upon interviews with over 120 women who were using substances during pregnancy and not accessing

substance abuse treatment services. It describes women's concern about the ways in which their drug use damages the baby in utero, while also describing the ways that women change their behavior given this concern.

Strategies to reduce harm, briefly mentioned in this book, include switching or substituting using a substance that women considered to be less harmful, trying to cleanse their bodies of drug-related toxins (e.g. by taking prenatal vitamins, by drinking liquids like pickle juice or plum juice that they thought would have a cleansing impact), trying to engage in healthier habits like getting more sleep, and accessing prenatal care services. Following the birth of their babies, women report relief that their babies look physically healthy while also struggling with the guilt that they used throughout pregnancy. This book provides a wealth of insight into the experiences of women with addictions and strongly influenced the work presented in this dissertation.

However, since research presented by Murphy and Rosenbaum was collected, from 1991 to 1994, there have been a number of advances that may greatly impact the experiences of women who use substances during pregnancy. First, research on the impact of prenatal exposure on child outcomes has developed dramatically since the 1990s. In particular, longitudinal studies have demonstrated that the impact of substance exposure, in general, is much more subtle than was predicted in the 1980s and 1990s during the height of concern and media outcry over "crack babies" and maternal use of substances in pregnancy more generally (Lester, Andreozzi, & Appiah, 2004). Second, since that time, policies have changed to increase the legal grounds for child welfare involvement, forced interventions, and criminal prosecution related to substance use during pregnancy (Guttmacher, 2016). Third, with the widespread availability of the

Internet, women now have unparalleled anonymous access to information. Thus, more than ever before, women do not have to rely upon health care systems to access information about the way in which their substance use might impact their baby.

### **Goals and Development of this Dissertation**

The overarching goal of this dissertation is to gain a stronger understanding of the experiences of women who have an addiction during pregnancy. In an effort to build upon the current research literature, we further consider aspects of women's experiences that have been previously identified. In particular, this dissertation further develops knowledge about women's engagement in health promoting and harm reducing behaviors during pregnancy and prior to accessing treatment services. In addition, this dissertation identifies factors that impact the timing of accessing services in relation to a given pregnancy.

To accomplish this goal, we conducted a mixed-methods research project with women in recovery who used substances during the course of a recent pregnancy. All participants were currently accessing inpatient substance abuse treatment services. Thus, this research focuses uniquely on women who eventually accessed support services in an effort to cease their use of substances and parent unimpeded by addiction.

To identify women's experiences during pregnancy and prior to accessing services, this research includes initial qualitative interview-based data collection in which women retrospectively report on their experiences. Themes preliminarily identified based on these interviews then inform a subsequent broader collection of quantitative data with additional women receiving inpatient treatment.



Given the limited research pertaining to women's experiences using substances prior to accessing treatment, qualitative methods are appropriate for preliminary and open-ended research on this topic. Qualitative methods are ideal for exploring topics where there is limited research literature and for generating hypotheses that can later be tested through quantitative analyses (Palinkas, Horwitz, Chamberlain, Hurlburt, & Landsverk, 2011). Qualitative methodology also provides the opportunity to build upon the reviewed research by Murphy and Rosenbaum— identifying how the experiences of women who use substances during pregnancy have changed over the past two and a half decades.

Another benefit of qualitative methods is that interview-based data collection enables focusing on the more subjective human experience. As researchers Gergen, Josselson, & Freeman (2015) discuss in a recent article considering the promises of qualitative inquiry in psychological sciences, qualitative data enables understanding the lived experiences of others beyond a focus on measurable aspects of existence. They give the example that, “the precise measurement of an individual's behavior through time and space would never allow one to understand, for example, the way in which an individual's life is built around a search for spiritual salvation.” (p3). Qualitative inquiry uniquely enables consideration, beyond a focus on changing behaviors or cognitions, to the narrative experience of lived existence.

Given that that focus of psychological literature with this population has been primarily on the harm that women with addictions perpetrate against their children due to prenatal exposure, a shift back to women's own lived narratives and experiences is a particularly appropriate starting place. Although the latter half of this dissertation focuses

on quantifiable behaviors and beliefs, this focus is interpreted within the context of the first half of this dissertation, which gives a voice to the experience of struggling with addiction during pregnancy.

Chapter II, focusing on qualitative methods, thus explores, through interviews, the experiences of women who use drugs and alcohol during pregnancy. In particular this chapter identifies women's beliefs about the impact of substance use on the baby, women's access to information about how substance use impact the baby, and women's engagement in both harm reduction and health promoting behaviors outside of seeking services. After identifying themes from interviews, qualitative findings then inform the collection of quantitative data. In contrast to the qualitative phase of data collection, during the quantitative phase, we pilot measures and methods for tracking changes to maternal substance use that identify whether qualitative findings hold true when measured quantitatively. In addition, we develop quantitative measures that can be used by future researchers to continue to build knowledge about substance use during pregnancy. In this way, knowledge gained from qualitative interviews informs the initial development of measures that quantify and visualize behavioral change.

In Chapter III, we consider a means of visualizing changes in substance use over the course of pregnancy for individual women and consider differences in changing substance use over the course of pregnancy for a full sample. In Chapter IV, we pilot a novel questionnaire designed to identify the behaviors that women engage in prior to accessing treatment while also identifying the timing of this engagement. In this chapter, we also consider factors that are associated with the timing of beginning inpatient substance abuse treatment in relation to the timing of pregnancy.

Overall, this work provides an update and expansion of the current research literature that considers the ways in which pregnant women who have addictions alter their behaviors to have a healthier pregnancy. In addition, this research is designed to inform preventative efforts that support this population in decreasing harm to their babies through self-change and through accessing treatment services. Findings from this research agenda are situated to inform policies and interventions that build upon women's desire and attempts to get clean, creating an atmosphere in which women are more likely to disclose use, seek support, and successfully stop using substances during pregnancy.

CHAPTER II  
BELIEFS AND BEHAVIORS OF PREGNANT WOMEN WITH ADDICTIONS  
WHO ARE NOT ACCESSING TREATMENT SERVICES

**Introduction**

Pregnant women's use of alcohol and other drugs is a known risk factor for long-term negative child outcomes. A large extant literature indicates that there are negative consequences to babies who are exposed to substances in utero. Newborns who are exposed are at risk for longer hospital stays (Pan & Yi, 2013), lower birth weight (Ostrea, Ostrea & Simpson, 1997), and symptoms of withdrawal during their first few days of life (O'Donnell et al., 2009). In childhood, these children are at increased risk for developmental delays, academic difficulties, and emotional and behavioral disorders (Behnke et al., 2013; Eustace, Kang, & Coombs, 2003; Lester et al., 2009).

Maternal use of drugs and alcohol after the baby is born poses additional risks for children, increasing the likelihood that children will experience a host of negative adverse early experiences. In particular, women who abuse substances are at a high risk for perpetrating maltreatment (Murphy et al., 1991; Smith, Johnson, Pears, Fisher, & DeGarmo, 2007). Children of parents who struggle with alcohol addiction are two to three times more likely than children who do not have a parent addicted to alcohol to experience a number of negative childhood experiences including emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect (Dube et al., 2001). Too frequently, by the time that women begin treatment to address their addiction, the cycle of child abuse and neglect has already impacted the next generation. Providing

these women with services before their children are born is a critical step in mitigating child abuse and neglect.

In the United States, prenatal substance use continues to be a widespread problem. Estimates of substance use throughout pregnancy vary and can be difficult to determine. One notable study used data from the 1992 perinatal substance exposure study, which collected and analyzed urine from pregnant women in California at the time of birthing, to identify recent substance use. Results of this study estimate that 7% of women use alcohol and 5% of women use illicit substances throughout pregnancy (Finch, Vega, & Kolody; 2001). Similarly, an annual survey sponsored by the Substance Abuse and Mental Health Services Administration identified that from 2012 to 2013, approximately 5.4% of pregnant women currently were using illicit drugs, with 9% of women in their first trimester, 4.8% of women in their second trimester, and 2.4 % of women in their third trimester using illicit substances (SAMHSA, 2013).

In an effort to address the problem of maternal addiction and prenatal exposure, policies increasingly consider substance use in pregnancy to be a form of child abuse or a criminal act (Guttmacher Institute, 2014; Paltrow & Flavin, 2013). These policies are designed to decrease prenatal exposure by increasing the consequences for women who continue to use substances in pregnancy. Unfortunately, these policies have had an unintended effect. The increased consequences of substance use during pregnancy create additional barriers to accessing care, preventing women from disclosing their substance use to health care professionals and accessing substance abuse treatment. Women who are pregnant or have young dependent children often avoid disclosure of addiction and thus are prevented from accessing substance abuse treatment services because of

concerns about child welfare involvement or criminal prosecution (Flavin & Paltrow, 2010; Friedman, Heneghan, & Rosenthal, 2009; Jessup, Humphreys, Brindis, & Lee, 2003). Given this unintended effect, numerous health and mental health organizations have written position statements in opposition to increasingly criminalizing substance use in pregnancy (e.g. American College of Obstetricians and Gynecologists, 2011; American Psychiatric Association, 2001).

Women's concerns about child welfare involvement reflect the high rate of engagement that this population has with the child welfare system. It is estimated that half of mothers in substance abuse treatment have had contact with the child welfare system (Grella, Hser, & Huang, 2006). In one study with mothers undergoing hospital detoxification, only 21% of women were guardians of all of their children and approximately 1 in 5 of their children were currently living in non-relative care (Schilling, Mares, & El-Bassel, 2004). Similarly, in a study of women entering an inpatient treatment facility with services for parenting women, 65% of women were living apart from at least one of their children (Knight & Wallace, 2003). Given the high rates of separation from dependent children in this population, fears about the consequences of disclosing use are not unfounded and are often related to women's own prior experiences with the child welfare system.

Beyond fear of child welfare involvement, pregnant women and mothers with young children face additional barriers to accessing substance abuse treatment services. Despite increased recognition of the needs of women with children and recent efforts to increase the availability of treatment programs to meet these needs, services remain limited (Brady & Ashley, 2005; Brendel & Solier, 2009). It is estimated that 21% of

residential treatment facilities have dedicated programming for pregnant women and 15% provide for childcare needs (Brady & Ashley, 2005). Even when facilities allow for children to reside at the facility, there are often young age cut-offs (e.g. only children under 6) and there can be long waiting lists for admission. For women with dependent children, the practical need for caregiving is often a paramount barrier to both seeking care and having access to appropriate services. Given these barriers to accessing care, a significant proportion of women with addictions delay or altogether avoid disclosing their addiction to health care professionals and accessing traditional substance abuse services during pregnancy.

This research study is designed to identify the experiences of women during the time period when they were aware of their pregnancies but not yet accessing inpatient treatment services. In particular, this research examines both women's beliefs about the impact of use on the developing baby as well the protective behaviors that women engage in due to these concerns before accessing traditional services. We investigate how concern about the baby impacts their decision making— often leading women to try to reduce harm to the baby on their own outside of treatment.

Although the experiences of pregnant women with addictions who are not yet accessing treatment services is underrepresented in the literature, a few previous research studies also indicate that, during this period of time, women attempt to decrease harm to the baby on their own, outside of relationships with health care providers (e.g. Murphy & Rosenbaum, 1999; Flavin, 2002). We add to this research literature by characterizing the specific concerns about the impact of use on the developing baby and by identifying specific strategies that women use to try to protect their baby in utero from harm. In

particular, we explore women's search for information, engagement in healthy behaviors and attempts to decrease their substance use on their own, outside of accessing traditional services. All women in the sample eventually access treatment services, thus this research also uniquely considers the experiences of women who eventually require traditional support services to cease their use of substances.

## **Methods**

### **Sample Description- The Mothers**

Fifteen women currently receiving inpatient substance abuse treatment participated in the study. Participants were either pregnant (in their second or third trimester of pregnancy) or postpartum (parenting a baby under six months of age) at the time of participation. Participants ranged from age 23 to age 38 ( $M=27.3$ ,  $SD=3.84$ ), and ranged from having their first child to having their fourth. Five participants were having their first child, five were having their second child, one was having her third child, and four were having their fourth child. Eleven participants identified as Caucasian, three identified as Native American, and one participant identified as Hispanic. The women who participated had low socioeconomic status and limited financial resources. None of the women had completed an associates or bachelors degree and only nine women had completed high school or obtained a GED. All participants reported receiving government assistance including food stamps and 73% of the women reported an annual income below \$5,000.

The substance abuse treatment center where participants were recruited from is located in a medium-sized city (~150,000) located in the Pacific Northwest. This



treatment center specializes in providing integrated substance abuse treatment and parenting services to pregnant and parenting women, 18 years or older, and primarily serves a high risk and low SES demographic with most participants receiving Medicaid. Twelve to fourteen beds in the facility are dedicated to pregnant and parenting women and enable women to reside at the treatment center alongside their young children. Parenting programs as well as childcare are provided alongside comprehensive inpatient and outpatient substance abuse treatment services. The treatment center consistently serves more than 40 pregnant or postpartum women each year with a suggested 90-day length of stay. Outpatient services are also available.

Given the location of the treatment center on the west coast, where methamphetamine addiction is particularly problematic (Maxwell & Rutkowski, 2008), approximately half of the women who access treatment at this treatment center report a dependency to methamphetamines. Out of the 15 women that we interviewed, nine participants (60%) clearly identified methamphetamine as their main addiction. Most participants reported illicit poly-substance use. During the course of pregnancy, 47% of the sample reported using alcohol, 80% tobacco, 60% marijuana, 80% methamphetamine, 40% heroin, 7% cocaine, and 33% other opiates.

## **Recruitment**

Women were recruited to participate in the project in a number of ways. Researchers made announcements in parenting classes, participants were referred by treatment staff, and flyers were posted at the treatment center. The first author of this study was teaching attachment focused bi-weekly parenting classes at the treatment

center at the time of recruitment. These classes were small with approximately four to eight pregnant and parenting women attending on any given day. Classes used the Circle of Security parenting intervention, a relationship-based intervention that is designed to increase parent-child attachment (Hoffman, Marvin, Cooper & Powell, 2006). Class content included supportive parenting practices and discussions of personal parenting challenges and strengths. Although none of the participants were in the class at the time that they participated in the research study, the first author had pre-established relationships with a third of the participants from teaching this course. Having an established relationship with the treatment center and with some individual participants impacted the ability to collect data with such a high-risk population. Furthermore, these relationships impacted the quality of the data collected; interviews with participants who already knew the interviewer often had a uniquely open and honest quality.

### **Materials/Procedure**

Participation in the study included filling out questionnaires and completing a semi-structured interview. Participation occurred with the first author of the study in a private room at the treatment center and lasted between two and three hours. Participants were compensated \$40.

Administered questions included a demographic questionnaire and the Maternal Inventory of Substance Use (MISU) (Shankaran et al., 2004). The MISU is a verbally administered questionnaire that tracks a woman's use of individual substances (e.g. tobacco, alcohol, marijuana, methamphetamine, opiates, cocaine, prescription pills) from three months prior to pregnancy through all three trimesters. Participants are asked to

identify the amount and frequency of use for each substance that they used during each period of time. As a part of the MISU, a pregnancy calendar is created which notes the baby's due date and the different trimesters- calculated using a handheld gestation calculator. In addition, notable major life events including stopping using substances, entering treatment, and children's births are written on the calendar.

Women were then interviewed about their experiences using substances during pregnancy and prior to accessing care, using a semi-structured interviewing format. The MISU calendar was referred to frequently during the interview and provided a backbone for discussing key events as well as behavioral changes over the course of pregnancy. Women were asked questions about finding out that they were pregnant, their emotional reaction to being pregnant, their concerns about their baby, and their overall beliefs about the impact of using substances during pregnancy on fetal development. In addition, women were specifically asked about the behaviors that they engaged in including seeking support, seeking information, changing their substance use over the course of pregnancy, and engaging in other positive behaviors during pregnancy. Although all participants were asked the same core questions, the semi-structured nature of the interview allowed for flexibility. Thus, follow-up questions and conversation varied from participant to participant. Notably, this flexibility enabled later interviews to be informed by trends in the data. For example, initial questions about seeking information were open-ended (e.g. Where did you seek information? What information were you looking for?). However, after noticing, following the first five interviews, that participants were relying heavily on the Internet as a source of anonymous information, in later interviews

participants were specifically asked about Internet use. Questions were adding pertaining to search terms, sites visited, and hours spent online.

All interviews were audio recorded, transcribed by a research assistant and then checked by a second research assistant for accuracy. Transcripts were then imported into a qualitative data management software package (Nvivo). Data were iteratively coded to identify themes. Borrowing techniques from grounded theory, transcripts were read numerous times, key pieces of transcripts were line-by-line coded, and eventually a more focused coding scheme was developed based on these initial codes. The focused codes, when grouped together, are the major themes presented in this paper. Focused codes were checked across participants to determine the extent to which findings held true for all of the participants in the project. To protect participants' confidentiality, identifying information in quotes has been removed and/or altered as necessary.

## **Results**

The qualitative analysis yielded nine themes, clustered under four thematic categories: beliefs about the negative impact of substance use during pregnancy on the baby, seeking information about the impact of substance use, reducing substance use outside of accessing treatment services, and engaging in healthy behaviors to protect the baby from harm. Examples of participant quotes from each of the nine themes, grouped by thematic category, are presented in table format (Tables 1-4).

## **Beliefs About the Negative Impact of Substance Use During Pregnancy on the Baby**

13 of the 15 participants expressed the belief that substance use during pregnancy negatively impacts the developing baby. Two participants stated that they believed that there was not an impact of certain illicit drugs. Many participants expressed that they were concerned about the impact of use, however, these concerns were tempered with the belief that the impact of prenatal exposure is variable and that substance use in pregnancy does not always lead to negative consequences.

Concerns about the impact of using substances during pregnancy on the baby focused on the physical impact of prenatal exposure, the developmental consequences, and concerns about the intergenerational transmission of addiction. When asked to describe the impact of prenatal exposure, many women gave examples of other children that they knew whose mothers had used substances during pregnancy. In some instances, women discussed children who were physically or developmentally impacted by prenatal exposure. However, women who did not believe that prenatal exposure had a significant impact or who thought the impact was variable gave examples of women who they knew who had children who did not appear to be impacted by their use (see Table 1).

In terms of the physical impact of prenatal exposure, women described concerns about physical changes that could be detected at birth. These included babies being born with “pieces missing,” having cleft lip,” “webbed feet,” “only 9 fingers,” “lumpy head,” “funny eyes,” “deformed,” “with defects,” and being “smaller than everybody else, like a runt.” These specific physical concerns are notable in that women who were skeptical about the impact of prenatal exposure mentioned that the babies that they saw who had been prenatally exposed did not have these types of noticeable problems.

Women also described concerns about medical and developmental challenges that could result from prenatal exposure. They mentioned mental health diagnoses, medical conditions, and difficulties with learning and intelligence. Specifically, women mentioned concerns about “SIDS, “Downs Syndrome,” “ADHD,” children being “mentally retarded,” “autism,” “fetal alcohol syndrome,” “learning disabilities” “lack of oxygen when you’re developing the brain,” and children being “slow.” A few participants also expressed concerns about children growing up to have an addiction because of being exposed prenatally. Most participants expressed a number of concerns across themes 1-3. For example, when one woman was asked what kinds of problems babies can have, she responded, “They vary from respiratory problems to mental issues. Being born high, like having a tolerance level of zero... like if they use at all in their life, they have massive addiction problems.” See Table 1 for examples of participant’s quotes on this topic.

**Table 1. Examples of participants’ quotes on beliefs about the negative impact of substance use during pregnancy on the baby**

*Theme 1: Prenatal exposure can physically impact the baby*

Participant	Quote
1001	I believe that there are effects like lumpy head... I’ve noticed that children that... their mother used, they have lumpy head... like just has a lump, like it’s just shaped weird... Sometimes children have funny eyes, like their eyes, one of them might be shorter, smaller, like shut more than the other one.
1002	I talked to people and you get webbed feet from using meth.
1003	Your kid’s going to come out either dead, blind, or handicapped.
1008	My friend, she has her daughter and she’s a little cross-eyed from when she used heroin with her. She used heroin all through her pregnancy just about, and she’s got a little bit of autism.
1011	I’ve heard that if you do a hit of dope it goes straight through your bloodstream and goes through his and it can actually stop his heart. I don’t know if any of that is true.
1014	If they’ve used meth their whole pregnancy, I’ve heard that and seen

actually some babies that are born with, you know, their ears could be folded down a little bit, or their eyes, they could have trouble with their eyes. You know, clubbed foot. I mean, I've seen it and heard of it.

***Theme 2: Prenatal exposure can lead to learning and developmental problems***

Participant	Quote
1002	My [friend] did a lot of pills and alcohol and had a baby ... he was like six months old and couldn't eat on his own and it was due to drugs and alcohol. He has a feeding tube for the rest of his life and he can't really talk to you. He's very disabled.
1003	I met these twins that were born from their mom drinking through their whole pregnancy and they are crippled. They are a vegetable for the rest of their life. They are in wheelchairs. They are fed through a tube.
1005	[What does prenatal exposure lead to?] ADHD or um really hyperactive or can't concentrate on anything. Maybe autism..
1007	The consequence [of my substance use on my child] is he's slowly developing in his brain.
1008	[I had thought during pregnancy...] Oh, my baby is going to come out retarded... I was afraid it might come out with defects or something.
1009	We don't know how her brain was affected or... if it's going to affect any of her skills further down the line.
1010	Women that I know that use everyday, their babies are older than mine and they're not as aware... they don't hold their head up yet.

***Theme 3: Prenatal exposure can lead to intergenerational transmission of addiction***

Participant	Quote
1003	I'm just scared that my son's going to turn out like how I am. I don't want him to try meth. It's not a good drug.
1009	I was a quick addict. Once I started, I wasn't able to stop... I think you put that gene in your baby. When you're an addict, when you're a product of two addicts, you have a gene that gets put into you and so with your baby.
1010	Being born high, like having a tolerance level of zero... like if they use at all in their life, they have massive addiction problems.

***Theme 4: Prenatal exposure does not always have a negative impact***

1001	It's the luck of the draw. Like you're either going to be healthy or not and even if they did stop then they still have the health problems or their baby's still born early or whatever.
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- 1010 Each case is individual... I know a lot of women who have used everyday of their pregnancy and have had very healthy children... and I've known women who have used every day with their pregnancy and had very sick children. So, circumstances are individual.
- 1012 So far from what I've seen, any girl that I know that's done dope throughout their pregnancy, their kids are really overachievers. Which I'm not trying to say, 'use meth, it'll make your kids smart.' I'm just saying that the ones that I do know, there's nothing wrong with their kids. Their kids are actually overachievers and go to like special classes for being smart kids. But that, I think that just happens if it happens. I don't know anybody that's done meth that has had their kids have anything wrong with them.
- 1013 I don't personally feel like heroin or opiates really affect [children] like developmentally or physically... I really don't think that substance exposed babies [that term], I don't think that it's applicable... I just don't think that it has an effect like they say it does.
- 1015 I hate to say it but I think that a lot of babies that have been drug exposed may be more gifted, more creative and more beautiful... I guarantee you that just as many babies born to square mothers that never touched a drop of anything have problems. Learning disabilities, autism, all those things... I think that it's all just like a gamble, I mean some kids have problems and some don't, you know? And that's in a normal population too.

### **Seeking Information about the Impact of Substance Use**

Of the 15 women, 13 reported that they sought out information about the impact of their substance use during pregnancy on the developing baby. Notably, the most commonly discussed means of accessing information was through Internet searches. Eight women reported relying on Internet searches. Two women in particular described becoming fixated with using the Internet to search out information, and searching for the same information on a daily basis while continuing to use during pregnancy. In addition, women reported reading information in books, talking with friends, talking with parents, and learning about the impact of prenatal exposure during prenatal appointments.

Many women described being concerned about disclosing their addiction to health care providers. In particular, ten women explicitly reported having concerns about child



welfare becoming involved because of their substance use in pregnancy. For example, one woman explained, “I was so traumatized by DHS [child welfare] that I did not want them to be able to track me, so I didn’t want to go to the doctor.” The Internet was mentioned as an important way to access information because it provides a means of seeking specific information anonymously.

Women’s Internet searches were goal-driven in that they researched the impact of the particular substances that they were using on the developing baby or had a specific question about how their use impacted the baby. In later interviews, after noticing the frequency that women relied on the Internet for accessing information, women were asked about specific search terms that they used to find information online. They reported searching terms including, “meth babies,” “methamphetamine use while you’re pregnant,” “meth feces,” “pregnant, drugs, fetus,” “heroin and pregnancy,” and “dopamine effects.” Women often described learning that using certain substances, alcohol in particular, is especially problematic during pregnancy. They often discussed the differential impact of different substances that they were using on fetal development.

Women reported difficulties finding accurate information about the impact of substance use on the baby. In particular, women described having difficulty finding solid research on the effect of prenatal exposure to methamphetamines, noting that most of what they could find suggested that there was no impact on the baby. One woman described what happens when you look up the impact of methamphetamine use on the Internet, “First some crazy stuff comes up, then you look at the bottom and it says not actual meth babies, so they’re taking pictures of deformities that are not from meth babies. ...” Another explained, “Most of them were just opinions, most of the time it

would send me to like a forum kind of, where people like talked about it, like answered questions and such. So there's just a bunch of opinions usually." It is notable that women described being critical consumers of the information that they found through these searches. Furthermore, some of the women could discuss aspects of the differential impact of different substances that reflects the general state of the research literature. For example, some women were able to state that alcohol was more damaging to the developing baby during pregnancy than other substances. See Table 2 for examples of participant's quotes on this topic.

**Table 2. Examples of participants' quotes on seeking information about the impact of substance use**

*Theme 5: Women use the Internet to access information*

Participant	Quote
1005	Anybody on meth, they're going to tweak on it [finding out how their use impacts the baby]. So they'll spend hours on the Internet like I did. I did spend hours, so I must have been worried. Hours, hours, and hours, 20, 40, 50, 70 hours. I would Google it almost every time I got high. It would be the same stuff and I would just read it and go over it and do it all again.
1011	I would Google meth, meth babies, meth in babies, because I wanted to know if it was in his system. I put like meth feces because I wanted to know if it was in his poop because that's how they do a UA [urine analysis to check for prenatal exposure]. I wanted to know how long it's in his system, if he's high in my body, if it makes him high... [I spent] an amazing amount of hours, like to where I would make myself crazy over it. I would get so worked up and upset... Let's think, like hours and hours everyday. I would spend probably at least 2 or 3 hours on the Internet... minus the first two months [of pregnancy, when she didn't know that she was pregnant] the whole way through all the way to the end... I wouldn't stop digging and learning more stuff and hearing bad stories and bad experiences of other people.
1013	[I would Google] heroin and pregnancy. I Googled fetal heart rates and stuff, it dropped the fetal heart rate, I remember Googling that. I looked things up probably 5 or 10 times.
1014	I looked up things about dopamine and stuff like that. My mom also did a lot of searching for me too on the effects, but she didn't want to tell me a lot because I don't like to believe what I read on the Internet because

sometimes I feel like they tell you the worst outcome and it's kind of terrifying.

1015 [I searched] pregnant, drugs, and fetus. [I spent] a long time because I used drugs and I wanted to know if she was going to be okay.

***Theme 6: Specific knowledge is obtained through Internet searches about the impact of substance use on the baby***

Participant	Quote
1001	Alcohol I quit as soon as [I knew that I was pregnant]. Nothing is good to use while you are pregnant, but alcohol is the worst I think... They say that alcohol can affect them at any point in time. And fetal alcohol syndrome, you know, you just see a lot more effects with it. Like with my research on the Internet, meth they say, I don't know if its true, but they say that there's nothing they can actually attribute to meth use in the womb, like effecting the baby, except the environment... they are brought up in... That's all I could ever really find on the Internet.
1011	Mostly alcohol was really bad, but there was no proof that meth did anything to the babies, but there was some [internet sites] that said, there were some that were like really bad... I know that alcohol for sure is very very bad. It just melts your brain and your baby can be all messed up. I don't know about marijuana and I don't know about meth... I think it has to do with how they're raised.
1012	I've heard people say, and I mean, I've gotten online a little bit, here and there. And, they've never really actually come up with any concrete proof that doing methamphetamines your whole pregnancy messes up your kid.
1013	I never remember finding any alarming news about opiates other than having the poor baby being addicted when it was born and needing to be weaned off with whatever. But, as far as developmentally, I don't think I ever found anything alarming.
1014	I happened to research it because I was worried about [the impact of use on her baby]. I found that opiates have not been found to negatively affect a fetus. What negatively effects a baby is when they're born addicted to opiates and they have withdrawals. The withdrawals from opiates can negatively affect a fetus, but the opiates themselves do not. That's why they give women codeine and opiates if they need pain relief. That's why methadone is okay for pregnant women.
1015	I know that alcohol specifically is bad for babies. Cocaine is specifically bad for babies and smoking is bad for babies.

## **Reducing Substance Use Prior to Accessing Treatment Services**

All of the women interviewed described making attempts to reduce their use of substances on their own, prior to accessing treatment, in an attempt to protect their babies from harm. Women described strategies that they used to decrease their use. The most commonly described strategy was using will power to try to stop completely, often first making the decision to use one last time before not using again. Some women tried to wean themselves off of more slowly. Other women tried switching substances, for example one woman tried to decrease her use of methamphetamine by drinking coffee. When this didn't work, she tried switching to drinking alcohol, which also was unsuccessful. Another woman, after failed willpower attempts, used Suboxone, a drug used to treat opiate addiction, to successfully stop using substances while treating the withdrawal symptoms.

Women often described trying to limit their access to substances as a strategy for decreasing their use. Six of the fifteen women described physically moving locations as a means of distancing themselves from their addiction. They explained that moving away from an area where they knew how to easily access drugs and had a friend group that was using might help them stop. Others described asking friends and/or family to help them stop using by helping to limit their access to substances. Women described writing letters to family members and friends, posting notes about their home being substance free on their door, or even having family members keep their drugs under lock and key.

In addition, women described changing aspects of their substance use in an attempt to decrease the harm related to their use. For example, four women described reducing or ceasing their use of alcohol because of concerns that alcohol has particularly

negative consequences for babies, while continuing to use other substances. Two women described continuing to use methamphetamine but no longer using it intravenously. As one woman explains, “I told myself in my head, at least I’m not shooting it... At least I’m not doing that anymore.” Two women described continuing to use opiates but only using prescription pills, and not heroin, which they considered to be more harmful to the baby.

Women also described using a constant amount of specific substances, in particular opiates, due to concern that changes in the dosing of the substance could impact the baby. For example, one woman described completely stopping her use of alcohol, decreasing her use of methamphetamine, but keeping her opiate use steady because she believed this was in the best interest of the baby. “I had been using heroin straight for five years and I know that you can’t stop, and I know that it’s really bad when you’re pregnant. That it [stopping suddenly] can cause a miscarriage.” Another woman used a consistent amount of methamphetamine, explaining, “My body was so used to having it that when I just all of the sudden cut myself off, that it might affect my pregnancy more that way.” See Table 3 for examples of participant’s quotes on reducing substance use.

**Table 3. Examples of participants’ quotes on reducing substance use prior to accessing treatment services**

*Theme 7: Women try to stop using substances by trying to stop on their own prior to accessing health care services*

Participant	Quote
1001	I would only make it to a certain part of the day [not using]. I had my friend bring me a coffee maker... I was just like, well, ok, in the morning I can just drink coffee instead. And, so I tried the coffee maker thing... I drank alcohol there too for a second. I was like I will just replace that [methamphetamine] with X amount, with alcohol. It didn’t work.

- 1002 I tried to wean myself off of it, like only going to do this hit today and then tomorrow I'm not even going to do nothing, and then I'll just be good from there on out. It was never like that. I mean, I always managed to get my hit in and then after a couple of hours, I'm like, 'one more hit won't hurt.'
- 1005 I didn't want to be fucked up anymore, and I cried and I tried and I tried to stay clean. I'd go like 4 days and then I'd have to go get high. It was like I had to do it... It was just sad and I just couldn't stop no matter what I did, I couldn't stop.
- 1010 [My partner and I would] usually pick about three days of rest, and then we would just try to do more positive things. We would play guitar together. We're both very musically inclined. We would go outside. Outside is really where we find the most peace for us. I mean we really tried all these positive things. Then one of us would want to smoke, or I would be tired and I would want energy. It just always backfired within a week.
- 1012 There were a couple of times when I would be like, Okay, today is the last day. And, I have it set in my mind. Okay, today is the last day. Today is the last day. I'm going to get high today and then, you know, from tomorrow on until he's born I'm not even gonna touch it. And then, it'd always be the next day... or a few days later and then somebody would sit down and they would smoke... and then I would be like, Okay, I'll just hit it once.
- 1013 There was a couple of times I just tried stopping, just getting sick. And, I would get a day into the sickness and it would just get to the point where it's just like, fuck, you know. I'm running out the door [to get more drugs].

***Theme 8: Women try to stop using by limiting their access to drugs, often by moving locations or asking friends/family members to keep substances away from them***

Participant	Quote
1002	We were trying to get out of this state. We were supposed to go to [state name] where this Church was. They were supposed to help us out and get us clean and sober, and get us jobs and a place [to live]... we did it directly for the baby.
1005	I decided to move to [city] to be with my brother, to live with my brother so that I could get away from my friends, because they're always the ones that are causing me to be the user that I was. And, miraculously, I met new friends in [city]. So I started using even heavier.
1006	I would have his [the baby's] dad not do it there or go to the bathroom and not do it [use drugs] in front of me... That worked for a couple of days but then I was like, if you're going to do it, give it to me.
1009	We moved 300 miles away from home so we know that that's not going to be a part of our life no more... That's it, just we're not willing to risk it. Up

here, it seems like we would have to look for them. We would have to try. We would have to make an adamant effort to go use now.

- 1010 I went to live with them [my parents], and they were really on top of it. No money, not letting me go out, not letting me do anything. I probably hated them back then, but I'm so in love with them now for that. I did very well. I messed up [relapsed] once and managed to get twenty dollars, smoked that, felt like crap, felt like a horrible person, horrible mother, wasn't worth it and continued to stay clean.
- 1011 We posted a big sign on the front door saying, 'No Drugs.' I mean, we told everyone to stop coming over.
- 1013 We moved up here [away from our home] and I had those few Suboxone and I ran out of the heroin the day after I got here like I intended to. And took the Suboxone and just found it in me to just do it [get clean]... I ran out [of heroin]. I waited until I got sick, I cut one of the strips [of Suboxone] in half, took it, um felt better... they last for 24 hours so the next day I took the other half of it and then the next day I cut the half in half... It took me 4 days to just get off heroin... I remember it saying something about it being rally bad to be on Suboxone while pregnant... but I felt fine about taking it for 4 days as opposed to having a baby with the heroin.
- 1014 I was trying [to stop]. My mom ended up holding my pills for me in her safe at one point. She was trying to help taper me down... She said, is that something that I would be interested in? Her holding them in her safe for me? I said yeah.

### **Engaging in Healthy Behaviors to Protect the Baby from Harm**

Alongside trying to decrease substance use to protect the baby from harm prior to accessing treatment, women also described engaging in healthy behaviors that they thought would have a positive impact on the developing baby. Women described the importance of eating healthy foods, eating on a regular basis, drinking enough water, gaining adequate weight, getting enough sleep, and being physically active. They described how daily self-care routines could become impacted by addiction. In particular, women who used methamphetamine described how it was important to eat and sleep regularly during pregnancy, because methamphetamine use can dramatically alter eating and sleeping schedules. One woman suggested that it might not be meth itself that

impacts the developing baby negatively, but the changes in behaviors associated with methamphetamine. She explained, “I think what would affect the baby more than meth is the mother not sleeping, not eating, um poor nutrition, and not taking care of themselves.”

Women also discussed taking prenatal vitamins. Notably, almost all of the participants started taking prenatal vitamins in pregnancy with at least five women taking these vitamins before accessing traditional treatment services and while still using substances (not all women were specifically asked about the timing of their prenatal vitamin use, as this question was added after the first interviews). One woman in particular continued to use prenatal vitamins after a prior pregnancy because she felt that they could have a protective effect on her body.

Women also described other ways that they tried to protect their babies from harm during pregnancy and while still using. These included decreasing their stress, taking vitamins (e.g. fish oil, iron pills, and B6), only eating organic foods, and being an “active person.” These behaviors suggest that women actively engage in positive behaviors that they believe will help protect their child from harm. See Table 4 for examples of participant’s quotes on this topic.

**Table 4. Examples of participants’ quotes on engaging in healthy behaviors to protect the baby from harm**

*Theme 9: Women engage in healthy behaviors to protect the baby from harm*

Participant	Quote
1001	I took really good care of myself as far as everything else besides using meth... I definitely always made sure I got sleep every night and I made sure that I took my prenatal vitamin, and I always ate. We always ate our meals and everything on time. They were always healthy... I’d drink water, make sure you drink water... that really helps a lot because it keeps your body working... I still stayed physically active, you know like I still rode



- 
- my bike... and I walked. I would walk when I could instead of drive a car. At least I got physical activity in and stuff.
- 1002 I started eating more frequently knowing that I'm pregnant and that it's the least that I could do, and sleeping. Even when I was on meth, I would sleep every night and I would eat. Those were two things that I made sure I always did, sleep and eat.
- 1004 There's not one thing that you do that does not affect the child and eating, obviously, is huge, that's what they're getting their nourishment from... I took prenats, I tried to eat a lot more fruit and vegetables than I would have normally. It's good because when I am pregnant, that's what I crave... like fresh food, fresh vegetables, fresh fruit... and milk, I drink a lot more milk.
- 1009 We were really sick my first trimester. I couldn't hold down water. It was really bad. Yeah, I had really really bad morning sickness that lasted all day... I would like have to eat fruit like apples and oranges and crackers and just get sick and try to hold it down... hopefully long enough for her to get nutrients out of it.
- 1010 Everything comes to me natural and organic... she's been like that her whole [life], in utero as well. As far as my eating habits and prenats and everything, it helps her. I've been organic my whole life. My daughter will be organic her whole life.
- 1012 Before [I knew that I was pregnant] I would go sometimes a day or two without eating because I would be so occupied with whatever else was going on. But, I ate everyday, and towards the last month and a half I slept almost every night too... I didn't dumpster dive as much 'cuz of the germs and the poop, cat poop, and all the things that I could catch while I was pregnant with him. So, I didn't do that as often, and I took my prenatal pills and all that kind of stuff.
- 1015 I think certain substances are going to affect the baby more. That's why I tried to stop using meth. Although... I think what would affect the baby more than meth is the mother not sleeping, not eating, um poor nutrition, and not taking care of themselves.

## **Discussion**

The study's findings suggest that in many instances women who continue to use substances during pregnancy and who are not yet accessing services believe that substance use during pregnancy can negatively impact the developing baby and, motivated by this concern, engage in positive behaviors. These behaviors include seeking

information, decreasing their substance use, and increasing healthy behaviors. Although there is variation in both the concern about the impact of prenatal exposure as well as engagement in behaviors designed to reduce harm to the developing baby, as a whole, our results suggest that continued use of substances during pregnancy is often not due to indifference towards the developing baby. In contrast, in interviews women express concern about the impact of their use on the baby coupled with a desire to stop using substances and have a healthy pregnancy. Their engagement in behaviors suggests motivation to decrease their substance use, but difficulty in accomplishing this goal.

When interpreting the results from the study, the characteristics of the sample should be kept in mind. Given that all interviews were retrospective in nature and conducted with women who were currently receiving inpatient treatment services, the sample uniquely only includes women who eventually access treatment services. Thus, this sample does not represent all pregnant women with addictions. Women who eventually access treatment may be more motivated than women who never seek treatment to address their addiction and have a healthy pregnancy. Also, this sample did not include women who were able to stop using alcohol and other drugs and thus did not need the help of inpatient services.

Although motivation to stop using would seemingly lead women to access services to address their substance addiction soon after identifying their pregnancies, the research literature, as well as our conducted interviews, demonstrate that there are unique barriers to accessing treatment for this population including concerns child welfare involvement or justice system involvement. Given the motivation to protect their unborn babies from harm and the barriers to accessing treatment, this study's findings suggest

that women often decide to take matters into their own hands, delaying accessing treatment.

On their own, the majority of women in the study describe accessing information about the impact of use on the baby in utero- often relying upon the Internet as an anonymous source of information. They seek specific information about ways that the substances that they are using impact the baby and conduct goal-oriented Internet searches. When asked about the ways that different substances impact the developing baby, women can often discuss specific aspects of current research findings. For example, noting that prenatal exposure to alcohol can have a particularly negative impact, whereas the effects of methamphetamine are less well understood and are likely more subtle. Some women described becoming fixated on searching for information about the impact of their use on the baby. Failing to be able to stop using on their own, they describe perseverating on the damage that they are causing their baby by continuing to use in pregnancy.

When asked specifically about the impact of prenatal exposure, the majority of women, all but two, stated that they believe that substance use during pregnancy has a negative impact on the baby. In particular, women state that prenatal exposure can physically effect the baby, can lead to learning and developmental difficulties, and can lead a baby to develop a substance use addiction in later life. Women often looked to examples around them, considering the impact on children that they know whose mothers used during pregnancy. In some cases these children provided evidence that prenatal exposure can cause drastic negative effects. In other cases these examples provided

evidence that the effects are variable or even that prenatal exposure to certain substances is not problematic.

In particular, two women expressed their belief that prenatal exposure to some illicit drugs was not a real thing, citing examples of children they knew whose mothers used opiates and methamphetamine throughout their pregnancy who were seemingly unaffected by prenatal exposure. Given that, when specifically asked about the symptoms of prenatal exposure, women often list dramatic effects that are unlikely to be caused by maternal substance use (e.g. being born with “pieces missing,” “webbed feet,” “deformed,” having “Downs Syndrome”) there is likely a disconnect between the expectation of how children who are prenatally exposed look and act versus the reality of the often more-subtle effects. Given that concerns about the impact of prenatal exposure likely impact women’s motivation to try to decrease their substance use, future research should further identify the predictors and consequences of variation in the beliefs about the impact of use.

Even with this variation in women’s beliefs about the impact of prenatal exposure, all women described that prior to accessing treatment they engaged in behaviors designed to reduce harm to the developing baby. In particular, each woman in the study described trying to decrease use of substances on her own, outside of accessing traditional services. Women describe changing behaviors that are easily malleable including increasing engagement in healthy behaviors and decreasing or making positive changes to their use of substances. In terms of engaging in healthier behaviors, women described making positive changes to their eating habits, increasing sleep, and taking prenatal vitamins. In terms of substance use, women describe decreasing their use of

substances and changing the ways in which they used substances. For example, women described still using methamphetamine, but smoking instead of injecting. Other women described only using opiate pills and not heroin because pills are less likely to be cut with other harmful substances. Similarly, four women in the study described decreasing their use of alcohol, a substance that they used more recreationally, after finding out that they were pregnant, while continuing to use the drugs that they were dependent upon. These strategies for reducing harm suggest that women often make the changes to their substance use that they are able to make on their own outside of accessing treatment services.

While women described being able to make some positive changes, they also described struggling to decrease their use of substances that they were dependent upon, often making unsuccessful attempts to quit. Women described two main tactics to decrease their use including trying to stop completely, and relocating away from the places where they could easily access substances. Women also described other creative attempts. One woman tried substituting coffee for methamphetamine and then tried substituting alcohol. Another bought Suboxone and treated herself medically for withdrawal symptoms. These strategies, although often unsuccessful, suggest motivation to stop using during pregnancy to have a healthy baby. Eventually, all of the women in the study accessed substance abuse treatment services, suggesting that women who eventually access inpatient treatment, before seeking these services they are likely to attempt to reduce their substance use and engage in healthy behaviors on their own. The process of positive self-change begins well before seeking inpatient treatment services.

Notably, attempts to decrease harm to the developing baby were often informed by information that women had obtained about the impact of different substances on fetal development. For example, some women describe decreasing their alcohol use because they believed that alcohol use could be particularly harmful to the developing baby. Similarly, some women described keeping their use of opiates steady because of the belief that this was in the best interest of the baby. This belief reflects practices for women with opioid addictions. For example, pregnant women with heroin addictions often receive stable doses of methadone throughout pregnancy to prevent them from going through withdrawal, which can lead to miscarriage or stillbirth (McCarthy, 2012). Overall women describe how information that they are able to access, and beliefs that they hold about the impact of substance use on the baby, guide the positive changes that they try to make.

There are some clear limitations to this research. Primarily, all interviews are retrospective with women reporting on the time before they entered inpatient substance abuse treatment. Although it would be ideal to engage women in conversation while they are using and pregnant, child welfare concerns would likely significantly impair both recruitment as well as the truthfulness of reporting for women who were still using. In addition, this sample is specific in that it includes women who eventually entered an inpatient treatment facility. Thus, this sample only includes women who were not able to cease their use without the help of traditional inpatient treatment services and who are likely more motivated to change their substance use than other women who continue to have an addiction and do not access services during the prenatal or postpartum period.

A second limitation is that this research was conducted with a small sample. However, given the dearth of research on the beliefs and behaviors of women who use substances during pregnancy, and the difficulty in accessing this population, this research provides an important contribution to the literature in this area, identifying behaviors that should be further explored through additional research studies. One additional limitation of this study is that women were recruited from one treatment center in the Pacific Northwest that serves primarily low-income women. Furthermore, the majority of women in the sample identified a methamphetamine addiction. Given the shared characteristics of the sample, regional differences in substance use and regional standards of both treatment access and child welfare involvement, findings should not be overgeneralized.

Despite these limitations, the results of this study strongly suggest that women who continue to use drugs and alcohol during pregnancy are often concerned about the impact of their use on the developing baby, and even if initially unwilling to access services, are often engaging in positive behaviors designed to decrease harm to the developing baby. Thus, this research adds to the literature that suggests that criminalizing substance use in pregnancy is often counterproductive in that it prevents women from accessing the treatment that they need to stop using drugs, leading them to engage in harm reduction behaviors on their own, while delaying seeking support systems.

In the United States, policies are increasingly criminalizing addiction in pregnancy in an attempt to discourage prenatal substance use and decrease rates of prenatal exposure. For example, in 2014 Tennessee was the first state to pass a law declaring substance use during pregnancy to be a criminal act (Guttmacher Institute, 2014). This research suggests that a new dialogue is needed about how to address

addiction in pregnancy by engaging women's motivation to stop using and building upon women's pre-existing protective behaviors towards their baby in utero.

Our research suggests that additional support is needed to help women overcome some aspects of their addiction and that continuing to use substances during pregnancy is not necessarily related to poor motivation or disinterest in the developing baby. As a 2006 report from the Institute of Medicine explains, individuals with substance use disorders face unique negative stereotypes that impact their access to supportive patient-centered care. These stigmas include the belief that individuals with addiction are not capable of making decisions about their treatment. For pregnant women with addictions this stigma is likely exacerbated due to the potential impact of substance use on the developing baby. By understanding that women are motivated to stop using substances but need assistance, as a society we can build programs that engage women's existing motivation to have a healthy pregnancy while promoting patient-centered care.

Our research suggests that women who are addicted to drugs and alcohol during pregnancy and are not seeking services are often already engaged in the process of change, but are struggling to cease their substance use on their own. Furthermore, they are often making decisions based upon the limited information that they can find without disclosing their addiction. There are strong clinical and public health implications for this finding. Understanding that women are seeking information and trying to make positive behavioral changes suggests the importance of ensuring that women have access to information and systems of support that can help them to be as successful as possible.

In addition, interviews suggest the importance of having information available anonymously, particularly on the Internet, that can support women in making positive



changes when they are unwilling to discuss their substance use with health care professionals. The need for this information is accentuated by the fact that some women describe engaging in behaviors that they think will have a protective effect on the baby, but that instead may pose added risk. For example, one woman tried substituting alcohol for methamphetamine, assuming that using alcohol would have less deleterious effects. Other women explicitly describe the ways that information about the differential impact of different substances guides their decisions to reduce their substance use.

As this research indicates, there are many opportunities to support women during pregnancy in the process of making positive changes that reduce harm to the developing baby. However, research on how to support women in making these changes is quite underdeveloped. Providing women with information and support may increase willingness to disclose addiction and seek out greater systems of support, given their motivation to have healthy pregnancies. Future directions for research should include identifying best practices for supporting women in reducing harm on their own and researching whether provision of information and harm-reduction focused support systems is associated with greater engagement in more traditional treatment services including accessing prenatal health care services and inpatient or outpatient substance abuse treatment.

Women in this chapter have clearly identified that they attempt to change their substance use over the course of pregnancy. Chapter III builds upon this knowledge by identifying a means of quantifying how the amount of substances used varies over the course of pregnancy and visually charting these changes. To accomplish this goal, Chapter III includes quantitative data collected from a larger sample of women pertaining

to substance use during pregnancy. In particular, this chapter considers the different patterns in substance use over the course of pregnancy that occur for individual women as well as across the sample for different substances. In addition, Chapter III considers the utility of developing a clinical tool for charting changes in substance use over the course of pregnancy based upon collected data.

CHAPTER III  
PATTERNS OF SUBSTANCE USE IN PREGNANT WOMEN WHO ARE NOT  
ACCESSING TREATMENT SERVICES

**Introduction**

Understanding maternal use of substances during pregnancy is a key aspect of child maltreatment prevention. Pregnancy may be considered a short window of opportunity for women with addictions to decrease their use of substances and access treatment services. During pregnancy, women describe being particularly motivated to stop using substances to protect the health of their baby (Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep). Furthermore, decreasing substance use during pregnancy has significant health benefits for both the mother and for the baby. During pregnancy, maternal and fetal health are uniquely tied together. Decreased maternal substance use can prevent prenatal exposure while enabling the mother to begin parenting while not under the influence of substances. Thus, addressing maternal addiction moves efforts upstream of child maltreatment, mitigating this risk factor for poor child outcomes.

There is accumulating evidence that women who use substances during pregnancy but are not yet seeking substance abuse treatment services often are concerned about the impact of their use on the health of the developing baby and try to decrease their substance use on their own, outside of accessing services (Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep). Women who are dependent upon illicit substances during pregnancy face unique barriers to accessing substance abuse treatment services. Concerns about child welfare involvement due to their use of substances in pregnancy or while parenting acts as a barrier to seeking treatment and disclosing use (Flavin & Paltrow,

2010; Leppo 2012; Poland, Dombrowski, Ager, & Sokol, 1993). For women who are not accessing services, their concern about the impact of their use on the developing baby often leads them to take matters into their own hands.

Use of drugs and alcohol during pregnancy can lead babies to have problems related to prenatal exposure – the exposure to drugs and alcohol in utero during critical points in fetal development. The impact of prenatal exposure varies tremendously from the debilitating impact of fetal alcohol syndrome to much more subtle effects (Eustace, Kang, & Coombs, 2003; Jones 2006; Lester, LaGasse, & Seifer, 1998). Research suggests that pregnant women with addictions who are not accessing services are generally aware that substance use in pregnancy can negatively impact their baby (Perry, Jones, Tuten, & Svikis, 2003; Van Scoyoc & Fisher, in prep). Furthermore, beyond this concern, they generally try to decrease their substance use on their own in an effort to have a healthy pregnancy (Flavin, 2002; Leppo, 2012; Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep).

Identifying variations and patterns in substance use over the course of pregnancy for women who are not accessing treatment provides additional information, beyond summary statistics, by characterizing this behavioral change over the course of pregnancy. This additional information can guide research and clinical work with this population, helping to identify behavioral patterns in substance use during pregnancy outside of accessing services, and identifying novel ways of engaging this hard-to-access population.

### **Decreasing Substance Use Outside of Accessing Services:**

Semi-structured interviews, asking pregnant women with addictions who are not accessing substance abuse treatment services about their experiences, demonstrate that women have informed beliefs about the harmfulness of different substances on babies in utero. For example, research in the 1990s demonstrated that, at the time, women had heightened concerns about the impact of crack on the developing baby. This concern reflected the media's depiction of crack-exposed children having profound physical and mental health problems (Murphy & Rosenbaum, 1999). More recent research indicates that women often use the Internet as an anonymous source of information, conducting goal-directed searches about the effects of prenatal exposure to different substances. These searches often lead to women gaining a sense of the differential impact of prenatal exposure to different substances, which can then impact their attempts to decrease their substance use and have a healthier pregnancy (Van Scoyoc & Fisher, in prep). Women describe trying to decrease their use of substances that they believe are most harmful to the developing baby (Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep).

For women who do not disclose their addiction to health care professionals, decreasing substance use often occurs through self-managed change, or decreasing substance use without the help of substance abuse treatment services. Self-managed change is a common pathway to substance abuse recovery such that the majority of people who recover from addiction do so outside of the realm of formal treatment (Bischof, Rumpf, Meyer, Hapke, & John, 2005; Copeland, 1997; for a review of self-change research see Klingemann, Sobell, & Sobell, 2010). For example, approximately three-quarters of people who have recovered from alcohol dependence do so through self-

managed change rather than accessing treatment (Dawson, Grant, Stinson, Chou, Huang & Ruan, 2005; Schutte, Moos, & Brennan, 2005).

Given the increased consequences of continued use during pregnancy as well as the unique barriers to accessing care, self-managed change may be particularly relevant during this period of a woman's life. Increased awareness of the positives and negatives of continuing to use is one of the key components of self-managed change (Sobell, Sobell, Toneatto, & Leo, 1993), and is likely heightened during pregnancy due to awareness of the effects of prenatal exposure. Although there is limited research on the impact of motivation to stop using substances on substance use behavior during pregnancy, research on smoking cessation demonstrates that higher motivation to stop using, related to concerns about having a healthy baby and being healthy during pregnancy, is associated with a greater likelihood of stopping smoking during pregnancy (Curry, McBride, Grothaus, Lando, & Pirie, 2001).

### **Patterns of Substance Use During Pregnancy**

Research on patterns of substance use at the population level demonstrates that the prevalence of continued substance use decreases over the course of pregnancy (Bailey, Hill, Hawkins, Catalano & Abbott, 2007; Morrison, Spencer, & Gillmore, 1998). Substance use during pregnancy is generally highest during the first trimester of pregnancy, and decreases over the course of the next two trimesters, with a substantial percent of women continuing to use substances over the course of all three trimesters of pregnancy (Havens, Simmons, Shannon, & Hansen, 2009). For example, an annual survey sponsored by the Substance Abuse and Mental Health Services Administration

identified that from 2012 to 2013, approximately 9% of women in their first trimester, 4.8% of women in their second trimester, and 2.4 % of women in their third trimester were using illicit substances. Furthermore this research suggests that rates of substance use are dramatically lower during pregnancy as a whole, as about 11.4% of women of childbearing age use illicit substances. Alcohol use during pregnancy follows a similar pattern, while 55.4% of women of childbearing age report drinking, 19% of women report drinking alcohol during the first trimester of pregnancy, 5% report drinking during the second trimester, and 4.4% reporting drinking during the third trimester (SAMHSA, 2013).

Other studies that do not use self-report data, instead relying upon detecting substance exposure through medical testing, suggest that a larger segment of the population continues to use throughout pregnancy. A study, which collected and analyzed urine from pregnant women in California at the time of birthing, estimated that approximately 7% of women use alcohol and 5% of women use illicit substances throughout pregnancy (Finch, Vega, & Kolody; 2001). Thus, research suggests that the majority of women stop using substances during pregnancy, with more and more women ceasing their use in later trimesters. However, a significant minority continues their use throughout all three trimesters.

Studies investigating the impact of prenatal substance exposure have identified differential effects of use based on the timing of exposure in pregnancy. Chasnoff and colleagues, 1989, identified that prenatal exposure to cocaine only in the first trimester is associated with fewer complications than prenatal exposure throughout pregnancy. Other studies have documented that exposure to alcohol may be particularly problematic during

the first trimester, being associated with greater behavioral difficulties in childhood and adolescence (Larkby, Goldschmidt, Hanusa & Day, 2011; O’Leary et al., 2009). Other research suggests that substance exposure across pregnancy leads to greater problematic behaviors in early adulthood than exposure in the first trimester only (Day, Helsel, Sonon, & Goldschmidt, 2013).

Patterns of substance use at an individual level have rarely been studied in the context of pregnancy. One study to date has identified the effects of distinct patterns of substance use across the duration of pregnancy for the developing baby. Shankaran and colleagues, 2004, identified six patterns of use for individual substances. They considered how substance use changed from the combined three months prior to pregnancy and first trimester period to the combined second and third trimester period. They identified whether use of each substance was consistently high, consistently moderate, consistently low, increasing, or decreasing from one time period to the next. They found that different patterns of substance use in pregnancy can impact measures of newborn health including birth weight, length, and head circumference. For example, in contrast to steady moderate use of cocaine during pregnancy, a pattern of decreasing use of cocaine over the course of pregnancy is associated with increased head circumference at birth. Similarly, low stable tobacco use during pregnancy, when compared to stable moderate and high tobacco use was also associated with a greater head circumference.

### **Goals of the Current Study**

As described, research to date suggests that women are often changing their use of substances over the course of pregnancy, on their own, outside of accessing treatment,



and that these changes have a significant impact on the health of the developing baby. This study further identifies the patterns of substance use that occur in women who are dependent upon alcohol or other drugs during pregnancy by having women in recovery retrospectively report on their prior substance use. Uniquely, this study considers changes in substance use in pregnant women with addictions who eventually access treatment services. These women represent a subsample of pregnant women with addictions.

In particular, the purpose of this study is threefold: 1. to develop a visual charting system that clearly maps changes in substance use over the course of pregnancy; 2. to identify common patterns of substance use in women who are using substances during pregnancy and; 3. to identify differences in patterns of substance use change over the course of pregnancy for different substances across participants, including changes in the use of tobacco, alcohol, methamphetamine, and marijuana.

## **Methods**

### **Participants**

Participants included 54 women who had used illicit substances during a pregnancy in the past four years and who are currently in recovery. Women were recruited from, and receiving treatment at an inpatient treatment center, located in a medium-sized city (population ~150,000) in the Pacific Northwest. This treatment center specializes in providing integrated services, including both substance abuse treatment services and pregnancy and parenting support services. It primarily serves a high risk and low SES demographic with most participants receiving Medicaid. Twelve to fourteen beds in the facility are reserved for pregnant and parenting women. This treatment center

annually serves at least 40 women who are pregnant or parenting while at the center. The suggested length of stay is 90 days although pregnant and parenting women often stay at the treatment center for a longer period of time.

Women in the study ranged from 19 to 39 years old. The mean age for the sample (N=54) was 28.09 years (SD=5.22). 19 of the 54 women were pregnant when they participated, 31 women participated following the birth of their child, and four women discussed a pregnancy that had ended in a stillbirth. 50% of the sample entered treatment following the pregnancy of interest. Women ranged from discussing a pregnancy with their first child to discussing a pregnancy with their sixth child. On average, women had 2.61 other children (SD=1.43). 15 women were primiparous, 14 women had one other child, 10 women had two other children, nine women had three other children, four women had four other children, and two women had five other children. The ethnicity breakdown was 83% European American, 5% American Indian, 2% Asian, and 9% Multiethnic. The majority of participants, 68.5% reported an annual household income below \$5,000, and no participants reported a household income above \$50,000. 90.7% of participants reported receiving Medicaid. 25.9% of the women reported having received a high school diploma, and 37% received a GED. 7.4% of women had continued their education and completed an Associates degree. No participants had completed a Bachelor's degree.

Women receiving treatment at the treatment center who expressed interest in participating in research and were eligible were offered the opportunity to participate. While filling out initial intake paperwork at the treatment center, women were asked if they were interested in research opportunities. The names of eligible individuals who had

expressed interest were then passed onto the research team. Eligibility inclusion criteria included currently receiving inpatient substance abuse treatment, being at least 18 years old, having used alcohol or other drugs during a pregnancy in the past four years, and being able to communicate in English.

The first author of the study spoke to each participant obtaining informed consent, explaining study risks, and assuring confidentiality. An NIH Certificate of Confidentiality was obtained for this research project given the sensitive nature of studying substance use during pregnancy. The Certificate of Confidentiality was explained to research subjects, noting that it provides an added layer of confidentiality in response to legal demands. The limits of confidentiality were also clearly explained, including incidences that require mandatory reporting.

Participation occurred in a quiet private room at the treatment facility at a time that was convenient for participants. Infants were welcome to stay with their mothers while they participated, although on-site childcare was also offered. Participation took approximately two and a half to three and a half hours and participants were compensated \$35.

### **Substance Use During Pregnancy**

To identify substance use during pregnancy, the Maternal Inventory of Substance Use (MISU) was administered to all participants. This measure tracks the frequency and quantity of substance use from three months prior to pregnancy through all three trimesters of pregnancy through retrospective reporting. It is administered verbally with the researcher recording responses in questionnaire format. Women are asked about their

use of individual substances including tobacco, alcohol, marijuana, methamphetamine, heroin, and other opiates.

As a part of the MISU, a pregnancy calendar is created which notes the baby's due date and the different trimesters- calculated using a handheld gestation calculator and based upon the baby's due date. In addition, notable major life events including stopping using substances, entering treatment, and children's births are written on the calendar. Women were asked to think of other notable changes in their life, for example moving living situations. These changes were also noted on the calendar. This calendar was referred to throughout the administration of the MISU to prompt memory and to help orient women to the different time periods discussed.

The MISU was originally developed based on research about self-report use of tobacco (Patrick et al., 1994) and was used as a part of the Maternal Lifestyle Study, a longitudinal study designed to identify the long-term impact of prenatal exposure on child development. It includes questions that help to identify the degree of substance exposure for individual substances throughout pregnancy (Lester et al., 2002; Shankaran, et al., 2004). The MISU has been primarily used as a tool for identifying how the timing, frequency, and amount of prenatal exposure to different substances lead to consequences for the developing fetus. In this paper we draw upon this literature and expand the use of the MISU to consider the clinical implications of tracking changes in maternal substance use during pregnancy. Rather than focusing on the consequences for the baby, we focus on identifying the behavioral changes in substance use that women make during the course of pregnancy.

There are certain benefits to using the calendar method for retrospective reporting of substance use. First, it enables identification of patterns of substance use over the course of pregnancy, with women reporting on substance use during several distinct periods of time (Bailey, Hill, Hawkins, Catalano, & Abbott, 2008). Furthermore, some research suggests that interviews about substance use during pregnancy can identify women who used substances during pregnancy more accurately than the use of biological specimens (e.g. amniotic fluid, urine, meconium, maternal hair) (Eyler et al., 2005). Given that women in this study are already receiving treatment at a substance abuse treatment facility, and reporting is retrospective, the possible child welfare and legal consequences of reporting use during pregnancy are minimal using this technique, leading to potentially more open reporting of substance use and behavioral changes over the course of pregnancy.

### **Charting Substance Use During Pregnancy**

To visually represent changes in substance use over the course of pregnancy, we charted individual participant's use of different substances from three months prior to pregnancy through the three trimesters of pregnancy. On these charts, the x-axis represents time, with the four periods (3 months prior, and the three trimesters) noted. The thickened horizontal lines indicate that a particular substance was used during the indicated period of time. The amount of each substance used per week on average during each of these four periods of time is noted below the line and is visually represented by the thickness of the horizontal line. In our visual representation, the line thickness roughly represents a scale, in that a line that is twice as thick represents twice as much

substance use. This overall amount of substances used per week on average per 3-month period was determined by calculating the average amount used on a given day during each time period by the frequency of use during an average week. Thus, an increase in thickness from one trimester to the next represents an increase in average substance use, whereas a decrease in thickness represents a decrease in average substance use.

In addition, for each participant, we note when the participant identified for certain that she was pregnant. This is noted by a vertical line and by the written in number of weeks of pregnancy. This additional information provides context, noting when the woman recognizes that she is pregnant, and thus when her knowledge of the pregnancy may begin to impact her decision to change her substance use.

## **Results**

Across the sample, all participants reported polysubstance use, reporting using at least two substances during the queried time period. Of the 54 women in the study, 87% reported using tobacco, 42.6% reported using alcohol, 68.5% reported using marijuana, 85.2% reported using methamphetamine, 37% reported using heroin, and 40% reported using opiates during at least one of the four time periods queried on the MISU. On average women reported knowing for sure that they were pregnant when they were 10.5 weeks pregnant ( $SD=7.32$ ). The majority, 81.5% of the sample reported finding out that they were pregnant during the first trimester, 13% reported finding out that they were pregnant during the second trimester, and 5.5% reported finding out in the third trimester.

Use of the system for charting individual substance use over the course of pregnancy revealed patterns of substance use. We identified four specific patterns

including patterns of decreasing substance use, substitution of one substance for another, stable substance use, and relapse. Of these four patterns, the most common pattern was for women to decrease their use of substances during pregnancy. To illustrate the charting method and the potential advantages of charting substance use over the course of pregnancy, we present exemplary examples of these four specific patterns. We chose individual examples in which women did not access substance abuse treatment until after the baby was born to demonstrate changes in substance use that were not impacted by accessing inpatient substance abuse treatment.

In addition to identifying patterns at the individual level, we will also consider differences in patterns of substance use for four key substances: tobacco, alcohol, marijuana, and methamphetamine, across all participants in this study. This enables consideration of patterns of changing substance use for the larger sample.

### **Individual Patterns of Substance Use During Pregnancy**

The most common pattern of substance use over the course of pregnancy was an overall pattern of decreased substance use as pregnancy progressed. The charts in Fig. 1 demonstrate the substance use of three women who decreased their use of substances over the course of pregnancy while not accessing traditional treatment services until after their babies were born. The first chart in Figure 1, demonstrating the substance use of Mother 1, shows a pattern in which a mother identifies that she is pregnant when she is approximately four weeks pregnant and decreases her use of all substances over the course of her pregnancy. She decreases her use of methamphetamine from the first trimester to the second trimester by approximately 80% and then further decreases her

use of methamphetamine in the third trimester. She also greatly decreases her use of cigarettes from the second trimester to the third trimester.

Mother 2 in Figure 1 also identifies that she is pregnant early in the first trimester, but over the course of pregnancy decreases her use of some substances while continuing to use a stable amount of other substances. Although she decreases her use of some substances (i.e. methamphetamine and alcohol), her use of other substances (i.e. marijuana and tobacco) remains stable throughout the pregnancy and does not appear to be impacted by her knowledge of being pregnant. This mother decreases her use of both alcohol and methamphetamine during the first trimester. She completely stops using alcohol by the second trimester, but continues to use methamphetamine, opiates, marijuana, and tobacco through the third trimester.

Mother 3 in Figure 1 identifies that she is pregnant when she is about 10 weeks along and greatly decreases her use of methamphetamine over the course of pregnancy. However, this mother does not change her use of marijuana, continuing to use a stable amount over the course of all four periods of time. She also doubles her use of tobacco from the first trimester to the second trimester. As will be discussed in a further example, this increase in tobacco may be related to a strategy of substituting one substance for another. Increasing her use of tobacco may have helped her decrease her use of methamphetamine.

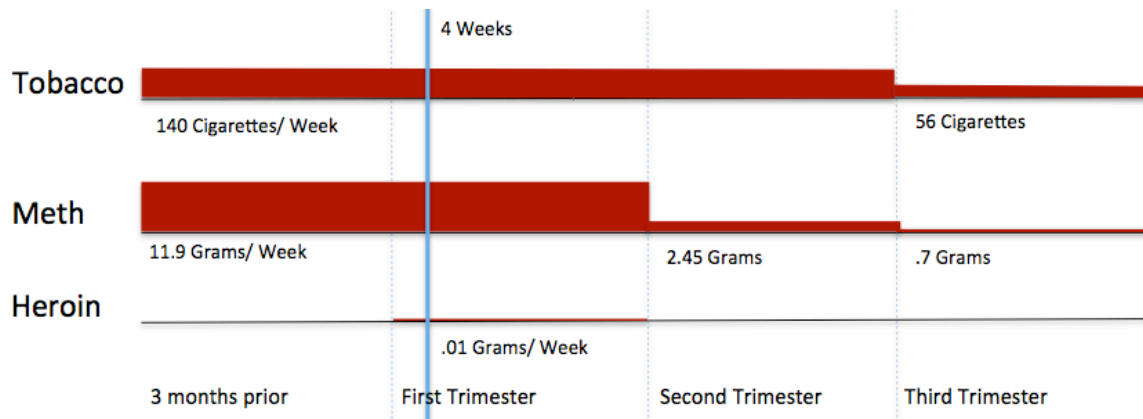
All three mothers in Figure 1 have an overall pattern of decreasing illicit substance use over the course of pregnancy. However, it is notable that all three of these women continued to use illicit substances, including methamphetamine, during the third trimester. The patterns of these three mothers' use also demonstrate that along with



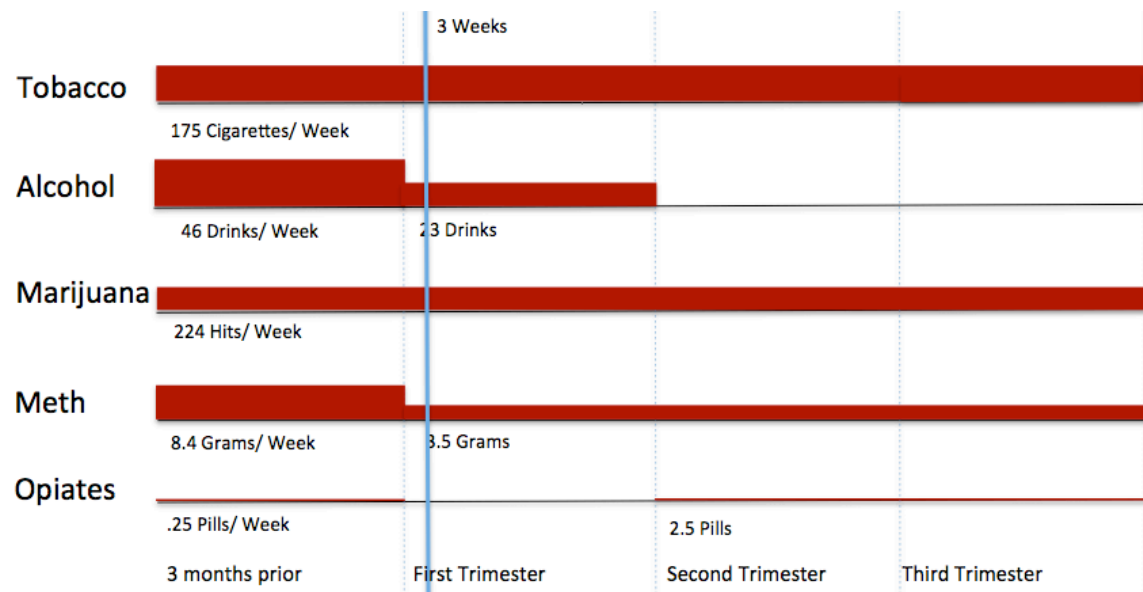
decreased use of some illicit substances, women may decrease their use of all substances, continue to use other substances at a stable rate or even increase their use of other substances.

Figure 1. Charts depicting patterns of decreased substance use during pregnancy

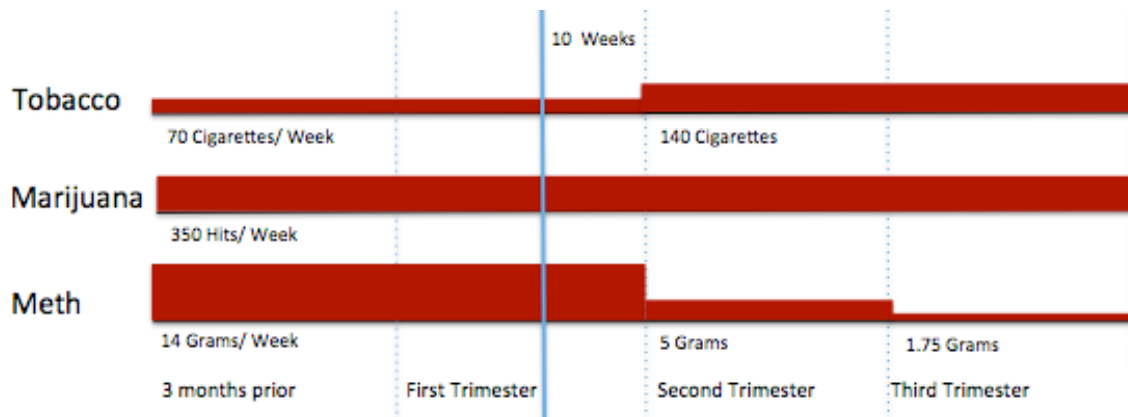
Mother 1



Mother 2

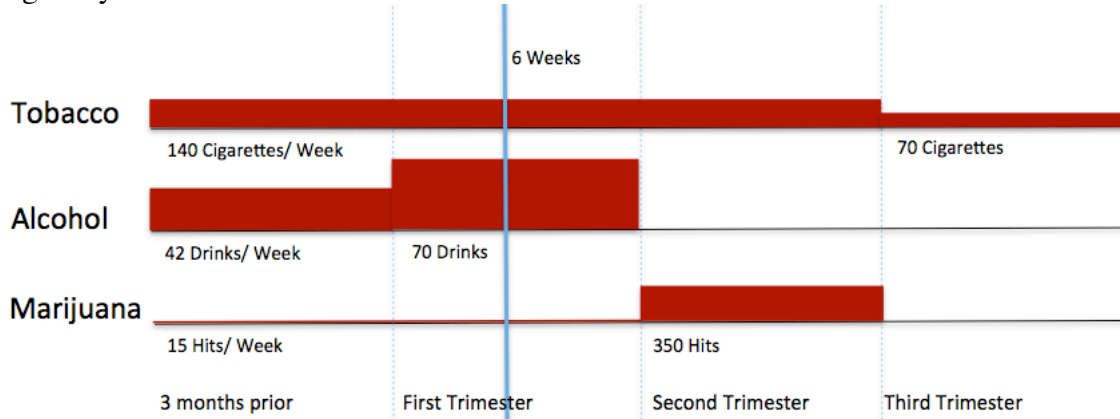


### Mother 3



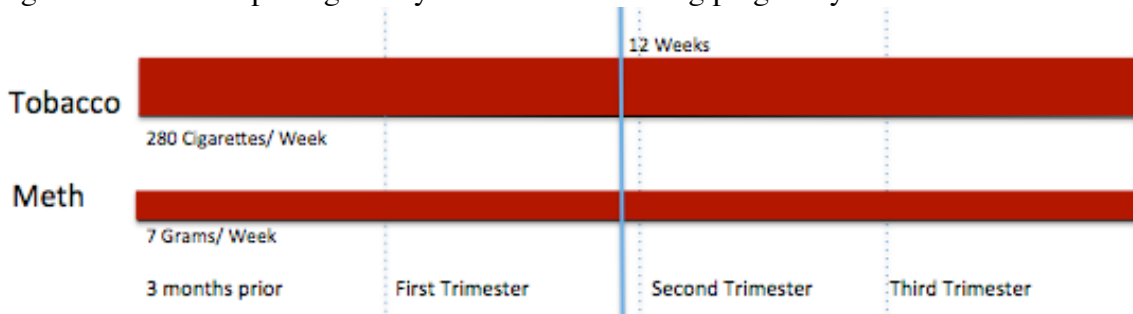
Substitution is a pattern of change in substance use in which women decrease their use of one substance while simultaneously increasing their use of another substance. As discussed above, this occurred in Mother 3, who increased her use of tobacco while decreasing her use of methamphetamine. Figure 2 provides another example of a mother who appears to have substituted one substance for another, in this case, this mother went from drinking an average of 10 drinks a day during trimester 1 to abstaining from alcohol completely by the second trimester. When this drop in alcohol occurred, this mother dramatically increased her use of marijuana from about 2 hits a day to about 50 hits a day. With the MISU data, it is impossible to infer intention, and the changes in these substances may not be related to deliberate substitution. However, this pattern of substitution reflects a strategy identified in the research literature. In interviews women describe decreasing their use of a substance that they perceive to be more harmful while increasing their use of a less harmful substance as a means of reducing harm to the developing baby during pregnancy (e.g. Murphy & Rosenbaum, 1999).

Figure 2. A chart depicting substitution of one substance for another substance during pregnancy



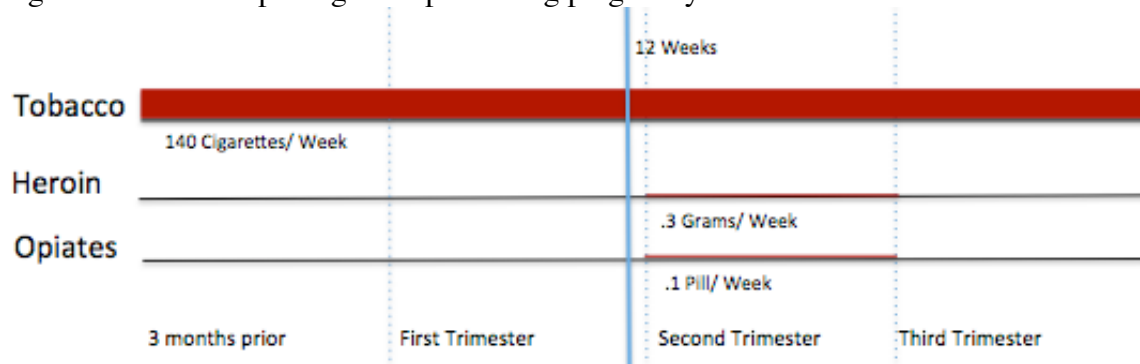
Although the majority of women in our study decreased their substance use over the course of pregnancy, a few women reported steady substance use. For example, the woman represented in the chart in Figure 3, despite learning about her pregnancy when she was 12 weeks pregnant, did not alter her use of tobacco or methamphetamine, but instead continued to use the same amount of substances throughout pregnancy.

Figure 3. A chart depicting steady substance use during pregnancy



One final pattern is a clear relapse in substance use. Figure 4 represents a woman who was not using illicit substances in the three months prior to her pregnancy or during the first trimester, but who used both heroin and opiates (although relatively small amounts of these substances) during the second trimester of pregnancy before once again abstaining from illicit substance use.

Figure 4. A chart depicting a relapse during pregnancy



### Patterns of Substance Use During Pregnancy for the Full Sample

Figures 5-8 demonstrate changes in the use of individual substances over the course of pregnancy for the 54 women in the sample. In each graph, each line represents a woman's use of the designated substance over the course of pregnancy. Similarly to the graphs of individual women's use of substances, the four periods of time queried on the MISU, three months prior to pregnancy through the three trimesters of pregnancy, are noted on the x-axis. The average amount of substances used per week during each of these four periods of time is identified and plotted for each participant who used the substance of interest.

When considering trends for the full sample, 27 of these women, or 50% of the sample, entered treatment and participated in this research after their baby was born, whereas 23 of the women entered treatment during pregnancy and 4 women discussed a pregnancy that ended in stillbirth. Thus, when considering graphs of all participants, it should be noted that for the women whose pregnancies ended in stillbirth, only data for when they were pregnant is graphed. For women whose entered treatment in pregnancy, decreases in substance use are impacted by seeking treatment services, such that their use

of some substances, if not all substances, ceases when they access inpatient treatment services. For women who were pregnant and receiving inpatient treatment during data collection, future trimesters were graphed as including no substance use, as substance use is expected to cease once women begin inpatient substance abuse treatment. For graphs of substance use that only include the women who did not access services during pregnancy, see Appendix A. For this half of the sample, graphs represent changes in substance use that is not impacted by accessing inpatient treatment services and that includes complete participant reported data from three months prior to pregnancy through the three trimesters of pregnancy.

Graphs of women's use of cigarettes, alcohol, marijuana, and methamphetamine visually portray changes in substance use over the course of pregnancy for women with addictions. Notably, for each of these graphs, both for the full sample, and for the sample that did not access treatment during pregnancy (see Appendix A) the overall trend is towards a decrease in substance use, with few women increasing their use of individual substances during pregnancy.

Looking at the graphs of each substance in comparison to one another, differences in trends for the different substances are apparent. For both cigarettes and marijuana, a significant minority of individuals uses a stable amount of these substances across pregnancy, as indicated by the parallel horizontal lines on these graphs (See Figure 5 and Figure 7). In comparison, the graph of alcohol use over the course of pregnancy demonstrates that the majority of women cease their use of alcohol during pregnancy. In addition, all women in the sample who drank than one drink a day prior to pregnancy decreased their use before their babies are born (See Figure 6). In contrast, overall sample

trends for methamphetamine are more variable, with an overall trend of decreased methamphetamine use, but with many participants continuing to use methamphetamine throughout pregnancy (See Figure 8).

Figure 5. Changes in tobacco use during pregnancy

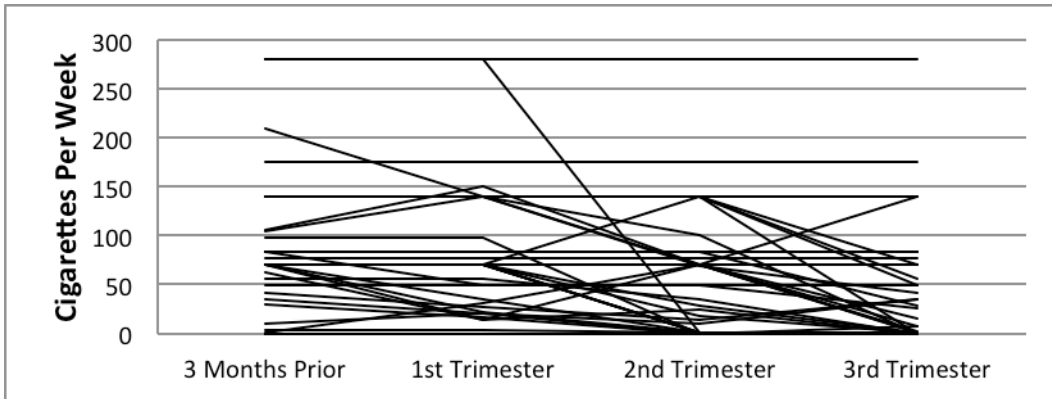


Figure 6. Changes in alcohol use during pregnancy

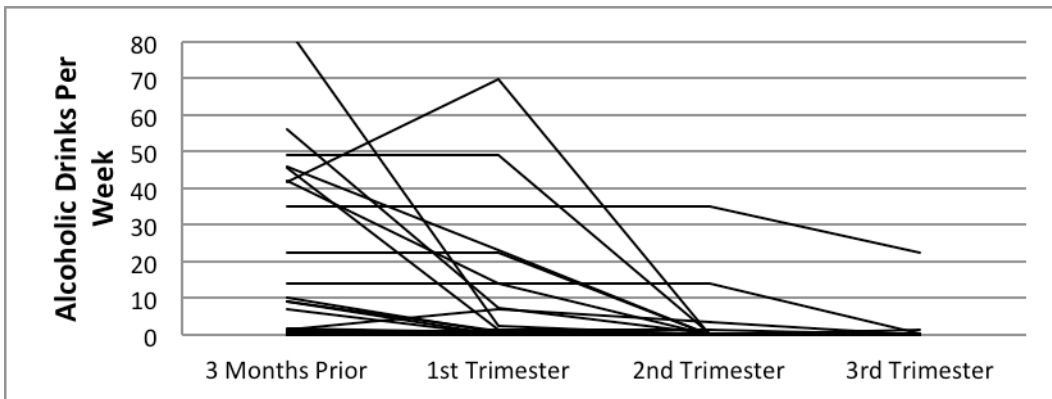


Figure 7. Changes in marijuana use during pregnancy

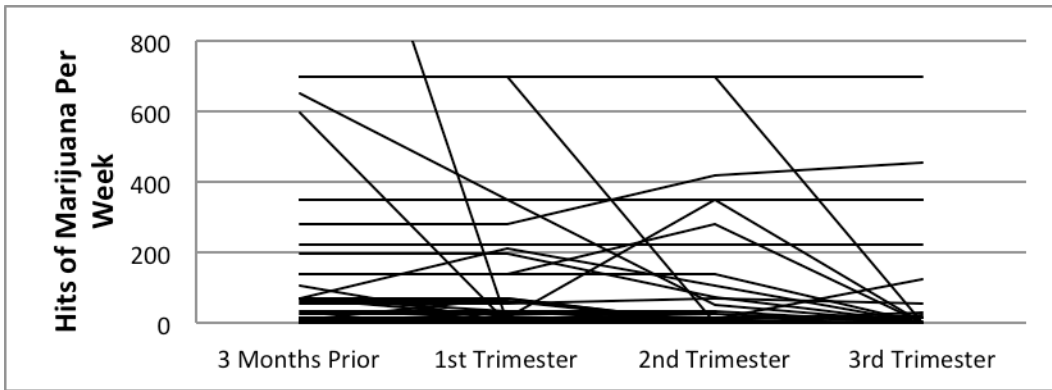
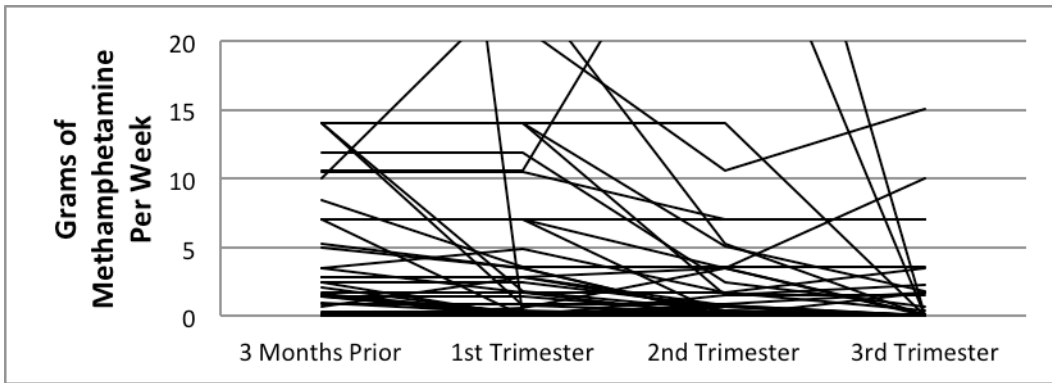


Figure 8. Changes in methamphetamine use during pregnancy



### Discussion

The charting of individual women’s substance use over the course of pregnancy demonstrates a number of important trends. First and foremost, trajectories of substance use over the course of pregnancy demonstrate that the majority of women who eventually access treatment services decrease their substance use during pregnancy. However, when looking at individual patterns of use, other notable patterns are identifiable including stable substance use, relapse, and the substitution of one substance for another. These findings provide a starting place for further research and clinical efforts related to addressing maternal addiction.

The importance of charting substance use over the course of pregnancy is demonstrated by considering the women represented in Figure 1. All three of these women dramatically decreased their use of illicit substances over the course of pregnancy, thus reducing the potential harm of prenatal exposure to their babies. However, all three women varied considerably in their use of other substances, with one woman decreasing her use of all substances, another continuing to use a stable amount of certain substances, and another increasing her use of a substance as a possible means of substitution.

In addition, all three women continued to use illicit drugs, including methamphetamine, during the final trimester of pregnancy and accessed services only after their babies were born. For these women, testing biological samples for substance exposure or asking women about their very recent use of substances provides only a glimpse of their substance use during pregnancy. By asking women about their use throughout the course of pregnancy, we gain a much more nuanced understanding of their use, demonstrating that each of these women decreased use on her own outside of accessing traditional treatment services, but was unable to completely abstain from illicit substance use during pregnancy. This more nuanced understanding suggests the possibility of supporting women in the already occurring process of changing their substance use.

This research also suggests that as a whole there are different patterns of use for different substances. When patterns of substance use for different substances were compared one to another, women were particularly likely to decrease or abstain from alcohol use after finding out about a pregnancy. In contrast, a significant minority of



women continued to use tobacco and/or marijuana steadily throughout the course of pregnancy. The use of methamphetamine was notably variable with many women decreasing their use but continuing to use lower amounts of methamphetamine through until the end of pregnancy.

The research literature corroborates findings in this study, identifying that women who use alcohol are more likely to stop drinking spontaneously when they are pregnant than women who use illicit drugs (Harrison & Sidebottom, 2009). These findings may reflect either greater difficulty in decreasing use of illicit substances in comparison to alcohol, or may reflect women's beliefs that some of these substances are less harmful to the developing baby. In particular the negative impact of fetal alcohol exposure may be well-known and impacting maternal decision-making.

Charting individual women's substance use suggests that women may carefully consider the impact of different substances when changing their use over the course of pregnancy. One of the trends identified on an individual level is that women engage in a strategy of substituting one substance for another, likely as a means of decreasing the harm of their continued use. Although, based on the MISU data, the deliberate intention to substitute one substance for another cannot be inferred, this deliberate switching of drugs has been noted in interviews with women who have a substance addiction during pregnancy (Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep). As researchers Murphy and Rosenbaum described, "One method that women used to diminish drug-related harm was to use lesser amounts of their drug of choice, often combining or substituting another drug they believed to be less harmful (p 83)." Data in our study that

visually depict substituting one substance for another lends further evidence that women are engaging in behaviors designed to decrease the harm of their substance use.

### **Considerations and Limitations**

When considering the results of this research, it is important to keep aspects of the sample in mind. In particular, all women who participated were currently accessing substance abuse treatment. Thus, this sample represents women who were not able to stop using substances on their own, and who eventually accessed traditional support services. It is likely that the sample is particularly motivated to stop using substances in pregnancy, as it is a sample of women who eventually did access treatment services and engage in the process of working towards sobriety. Not all pregnant women who have addictions access services. Thus in comparison to women who continue to use substances and do not seek services, this sample likely has higher motivation to engage in behavioral change.

In addition, all interviews are retrospective with women reporting on their prior substance use. Although using a calendar system helps with recalling the timing of changes in substance use, the accuracy of substance use during different periods is impacted by women's ability to remember and recall these details retrospectively. In addition, substance use during pregnancy is also averaged across each trimester, thus the graphs do not represent the exact timing of when women made changes to their substance use, but instead represent average use during each of the four periods of time.

A notable limitation is that this research was conducted with a relatively small sample. However, given the dearth of research on participant-reported change in

substance use during pregnancy, and the difficulty in conducting research with this high-risk and difficult to access population, this research provides an important contribution to the research literature in this area by identifying patterns of substance use that can be further explored through additional research studies.

Another limitation of this study is that women were recruited from one treatment center in the Pacific Northwest that serves a specific demographic. Women in the sample had a low SES and the majority of women in the sample reported use of methamphetamine. Given these unique sample characteristics, regional differences in substance use, and differences from one place to another in terms of both treatment access and relevant child welfare laws, findings should not be overgeneralized.

### **Implications and Future Directions:**

In contrast to a system that supports pregnant women in making positive changes in their substance use, current policies in the United States often treat women harshly for continued substance use in pregnancy. Increasingly in the United States policies have criminalized substance use during pregnancy or considered use during pregnancy to be a form of child abuse (Guttmacher Institute, 2014; Paltrow & Flavin, 2013). Harsh consequences can undermine the positive changes that women engage in and can prevent women from accessing services and information that inform their attempts to decrease substance use during pregnancy. Rather than continuing to engage women in the process of self-change, these policies punish women for not being able to completely abstain from using substances on their own and prevent them from seeking support services and information due to fear of the consequences of continued use.

Considering the women represented in Figure 1, these three women decreased their substance use during pregnancy, thus reducing harm to the developing baby. However, policies that only consider whether or not a woman is using substances in pregnancy undermine these women's self-change efforts. Instead of considering these women's success in decreasing their substance use, policies focus exclusively on their failure to achieve abstinence from substance use before the baby is born.

Beyond the research and policy implications of charting substance use during pregnancy and identifying that women who use substances are often engaging in a process of positive self-change, charting of an individual's substance use can be useful from a clinical perspective by providing an effective way of engaging this hard-to-access population in motivational and productive conversations. Rather than focusing on the harm of substance use, the charting system focuses on changes that women are making on their own in their substance use, enabling identification and reflection on women's pre-existing motivation to protect their baby from harm. Furthermore, this charting enables the identification of nuances of substance use during pregnancy, considering changes in each substance over the course of pregnancy, and visually representing change as a whole. This novel way of mapping substance use can act as a starting point for clinical conversations about the process of change that build upon women's pre-existing motivation to change their substance use behaviors and have a healthier pregnancy.

Future directions for research include continuing to investigate patterns of substance use over the course of pregnancy, and identifying whether the patterns suggested in this preliminary study hold true for a wider population. In addition, future research can focus on factors impacting decisions to change substance use. The evidence

that patterns of use differ from one substance to another suggests different motivation and/or facility of changing the use of different substances over the course of pregnancy. Likely women's beliefs about the harmfulness of different substances impact their use of these substances over the course of pregnancy. This is an area ripe for further investigation. Research that considers factors that may impact substance use decreases and cessation should consider the impact of addiction to different substances including the related intensity of symptoms of withdrawal, beliefs about the harmfulness of use during pregnancy to the baby, and concerns about the legal and child welfare consequences of continuing to use substances throughout pregnancy. Likely these different factors interplay to impact decision-making around continued substance use during pregnancy.

As a whole, trends in data suggest that the majority of women engage in harm-reduction strategies by decreasing their use of substances- suggesting that women are motivated to protect their baby from harm and engage in positive self-change during pregnancy and prior to accessing treatment services. Understanding that women are already engaging in the process of change provides a starting point for conversations and interventions to help support women in making the changes that they are already motivated to make. Conceptualizing maternal use of substances during pregnancy as malleable, informed by knowledge about the impact of prenatal exposure, and generally decreasing over the course of pregnancy can inform initiatives designed to support pregnant women with addictions. This greater consideration of women's motivation to have a healthy pregnancy and positive engagement in behavioral-change can lead to

novel ways of supporting women in both decreasing their use of substances in pregnancy and accessing treatment services.

The next chapter will build upon knowledge gained in this chapter as well as in Chapter II. Chapter II and III identify that women engage in harm reduction and health promotion behaviors during pregnancy outside of accessing traditional treatment services. Chapter IV considers the utility of a new questionnaire designed to identify engagement in these harm-reduction and health promotion strategies as well as to identify the timing of this engagement. In addition, analyses will consider factors associated with reducing substance use and factors associated with the timing of entering treatment in relationship to a recent pregnancy.

## CHAPTER IV

### HARM REDUCTION AND HEALTH PROMOTION IN WOMEN WHO USE SUBSTANCES DURING PREGNANCY

#### **Introduction**

An understudied aspect of child maltreatment prevention is focused efforts to help pregnant women with addictions access substance abuse treatment services. Children who have a mother with a substance use disorder often face unique challenges due to the combination of prenatal exposure and the impact of addiction on maternal caregiving. Helping women access treatment services during pregnancy decreases the impact of prenatal exposure to substances and enables mothers to begin parenting when they are not currently using substances. This study focuses on characterizing the health promoting and harm reduction behaviors that women engage in when they are pregnant and not yet accessing treatment services. In addition, a model for predicting the timing of this population's entrance into substance abuse treatment is developed.

#### **The Negative Impact of Maternal Addiction on Child Outcomes**

Children whose mothers used drugs and alcohol during pregnancy are at high risk for poor outcomes. These children often struggle with the impact of prenatal exposure – the exposure to drugs and alcohol in utero during critical points in fetal development. Research on prenatal exposure suggests that there are teratogenic effects of maternal substance use with poor outcomes in infancy and childhood related to the toxic effect of exposure in the womb (Irner, Teasdale, Nielsen, Vedal, & Olofsson, 2012; Lester et al.,

2002). In childhood, children who were exposed prenatally are at increased likelihood of poor attachment, developmental delays, internalizing and externalizing symptoms (Bada et al., 2007; Hellemans, Sliwowska, Verma, & Weinberg, 2010; Lester et al., 1998; Seifer et al., 2004). They also exhibit different patterns of hormonal stress reactivity and reward processing that may impact vulnerability to psychopathology (Lester et al., 2010; Müller et al., 2013; Weinberg, Sliwowska, Lan, & Hellemans, 2008).

In addition, outcomes for prenatally exposed children are also strongly impacted by the quality of the caregiving environment. For these children, prenatal exposure and environmental risk go hand in hand. Maternal substance addiction is an obstacle to meeting children's physical and emotional needs and is strongly predictive of both abuse and neglect (Chaffin, Kelleher, & Hollenberg, 1996; Kelleher, Chaffin, Hollenberg, & Fischer, 1994). Children of mothers who struggle with alcohol addiction are two to three times more likely than children who do not have a parent addicted to alcohol to experience emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, and domestic violence (Dube et al., 2001). Maternal addiction strongly influences which families become involved in the child welfare system. Current research indicates that between 40 and 80 percent of children involved in the child welfare system come from a family that struggled with drug or alcohol abuse (CWLA, 2010).

It is this interaction between prenatal exposure and negative environmental influences that characterizes accumulated risk in children with mothers who abuse alcohol or other drugs. Given that children with prenatal exposure often experience numerous environmental risk factors (e.g. child welfare involvement, placement instability, poor parenting) it can be difficult to identify which poor outcomes are related



to prenatal exposure and which are related to environmental factors (Huizink, 2009). Although parsing apart the differential effects of exposure in the womb and later environmental risk is complex, what is clear is that for prenatally exposed children, the combination of risk factors is particularly damaging.

Given the negative impact on child outcomes, addressing maternal substance addiction is imperative to child maltreatment prevention. Supporting women in their efforts to become clean will help decrease rates of prenatal exposure while enabling mothers to better provide for the needs of their children, preventing the accumulation of risk factors in this population.

### **Supporting Pregnant Women with Addictions**

Helping pregnant women either decrease harm outside of accessing treatment services or, ideally, access substance abuse treatment services, has the potential for preventing prenatal exposure and preventing parenting while under the influences of substances.

Research with pregnant women who have addictions suggests that there are unique barriers for this population in accessing substance abuse treatment. In particular, pregnant women report being concerned about losing custody of their children if they disclose their substance use during pregnancy (Harrington, Heiser, & Howell, 1999). This concern reflects current policies in the United States, which often mandate that health care providers report women who test positive for substance use during pregnancy to child welfare agencies (Guttmacher Institute, 2014). Involvement in the criminal justice system due to substance use during pregnancy has also been increasing over the decades

(Chavkin, Wise, & Elman, 1998; Paltrow & Flavin, 2013). Negative consequences for disclosing addiction to health care professionals during a pregnancy creates barriers that prevent women from accessing services through the traditional healthcare system (Friedman, Heneghan, & Rosenthal, 2009; Jessup, Humphreys, Brindis, & Lee, 2003; Lester, Andreozzi, & Appiah, 2004).

Given that fear of child welfare and criminal justice system involvement creates barriers to accessing care, numerous health and mental health agencies (including the American Medical Association, American College of Obstetricians and Gynecologists, American Psychiatric Association, American Academy of Pediatrics, and March of Dimes) have written in opposition of policies that punish women for their use of substances during pregnancy (Paltrow & Flavin, 2013). Researchers have also called for novel prevention strategies, noting that policies that punish women for using substances during pregnancy prevent women from accessing the services that they need to have healthy pregnancies. In particular, researchers recommend strategies to educate health care providers and the more general public about addiction during pregnancy while increasing access to treatment services (Flavin & Paltrow, 2010; Lester et al., 2004; Ondersma, Simpson, Brestan, & Ward, 2000).

Novel prevention strategies can be informed by research on the behaviors that women engage in outside of accessing treatment as well as factors that predict the timing of accessing treatment. Given the concern about disclosing substance use during pregnancy, many women report engaging in both harm reduction and health promoting behaviors on their own (Murphy & Rosenbaum, 1999; Flavin, 2002). In particular, women report trying to decrease their substance while engaging in healthy promoting

behaviors including eating healthier foods, and getting more sleep (Van Scoyoc & Fisher, in prep). In addition, women often report being successful in decreasing the amount of their substance use over the three trimesters of pregnancy, thus reducing the harm of prenatal exposure to the developing baby (Van Scoyoc, Kim, & Fisher, in prep).

Although there is recognition in the literature that pregnant women with addictions engage in both health promoting and harm reducing behaviors during pregnancy, there is little research characterizing the engagement in these behaviors or considering the timing of engagement in these behaviors.

### **Predicting the Timing of Treatment Seeking**

In addition to considering the health promoting and harm reducing behaviors that women engage in prior to accessing treatment, understanding the timing of when women access treatment is an important factor in child maltreatment prevention. Research indicates that reductions in substance use during pregnancy are related to more positive child outcomes (Irner et al., 2012; Shankaran et al., 2004). In addition, accessing treatment during pregnancy, rather than before a child is born, enables a mom to begin parenting when not currently using substances. In this study we consider the timing of entering treatment, in relation to a child's conception. We hypothesize that earlier engagement in health promoting and harm reduction behaviors will be associated with earlier treatment entry, as earlier engagement in these behaviors may suggest beginning the process of substance use change. In addition, we predict that experiences of early trauma, current maternal mental health, and perceived barriers to accessing care will impact the timing of accessing treatment. Research on these additional factors that informed these hypotheses is briefly considered below.

### *Childhood Trauma*

Mothers who abuse alcohol and other drugs are likely to have themselves experienced child maltreatment and other negative early life experiences. Retrospective studies in adult populations indicate that individuals with substance use disorders report higher incidents of abuse and neglect in childhood than is reported in the general population (Anda et al., 2006; Khoury, Tang, Bradley, Cubells, & Ressler, 2010; Widom, Weiler, & Cottler, 1999). There is a dose-dependent relationship between the number of adverse early experiences in childhood and the level of current substance use such that greater trauma and adversity is more predictive of addiction in adulthood (Anda et al., 2006; Khoury et al., 2010).

Research with individuals who are receiving substance abuse treatment services provides further evidence that trauma and substance addiction tend to co-occur. Research suggests very high rates of early maltreatment and trauma in individuals who are accessing treatment services. In one study of individuals receiving detoxification services, more than 50% of women reported early experiences of physical abuse and/or sexual abuse (Brems, Johnson, Neal, & Freemon, 2004). Furthermore, it is estimated that up to 95% of individuals in treatment have more broadly experienced a traumatic event (Read, Brown, & Kahler, 2004).

There is relatively little research on the relationship between early traumatic experiences and treatment access. However, some researchers have identified that the experience of early life trauma may impact willingness to access some treatment services. In particular, women who have experienced early sexual and physical abuse may be hesitant to enter mixed-gender treatment programs, adding an additional barrier to

accessing services (Grella, 1997). Experiences of trauma that have lead to post-traumatic stress disorder may also impact treatment seeking. Research suggests that women with posttraumatic stress are more likely to seek out treatment services (Brown, Recupero, & Stout, 1995).

### *Comorbid Psychiatric Diagnoses*

Beyond being associated with early maltreatment, substance use disorders are also highly comorbid with other psychiatric diagnoses such that the majority of women who have a substance use disorder meet criteria for an additional psychosocial diagnosis (Burckell & Shelley, 2009). Depression, posttraumatic stress and affective disorders are highly comorbid with substance use disorders in women (Kessler et al., 1997). In one study of women in substance abuse treatment, 50% of study participants met criteria for posttraumatic stress disorder at treatment entry (Read et al., 2004). Some of the best estimates on substance use comorbidity within the general population come from the National Epidemiologic Survey on Alcohol and Related Conditions, which includes a large nationally representative sample. Of women in this sample who met criteria for a substance use disorder, 29.7% met criteria for a comorbid mood disorder and 26.2% met criteria for an anxiety disorder. The increased comorbidity for women who met criteria for drug dependence is particularly striking with 68.0% of drug-dependent women also meeting criteria for a mood disorder and 54.8% also meeting criteria for an anxiety disorder (Goldstein, 2009).

Research suggests that disturbances of mood are associated with greater treatment seeking. For example, among individuals with alcohol use disorders, having a comorbid

mood disorder is predictive of accessing alcohol treatment services (Cohen, Feinn, Arias, & Kranzler, 2007). Other research studies have documented that comorbid mental health and substance use disorders more generally are associated with greater treatment seeking (Mojtabai, Olfson, & Mechanic, 2002; Wu, Ringwald, & Williams, 2003). Given the reviewed research, we anticipate that in our analyses of mood disturbance will be associated with accessing treatment earlier in relationship to the timeframe of a recent pregnancy.

*Perceived Barriers to Accessing Treatment:*

Research on barriers to accessing treatment services suggests that women experience a number of unique barriers in comparison to men. One of the primary barriers to accessing substance abuse treatment services is childcare responsibility (Allen, 1995; Copeland, 1997; Grant, 1997). Women with substance use disorders who have children tend to consider their role as caregiver to be a fundamental and central part of their lives (Baker & Carson, 1999; Murphy & Rosenbaum, 1999). Logistical concerns about how children will be cared for while in treatment are of central importance and pose challenges for women who do not know about treatment services that provide care for children or who lack access to such services.

In addition to concerns about the logistics of caring for children, as mentioned above, fear of the consequences of disclosing substance use while parenting is another important barrier to accessing treatment. Women who are either pregnant or have dependent children often avoid disclosure and subsequent treatment because of concerns about child welfare involvement including fear of losing custody of their children

(Friedman, Heneghan, & Rosenthal, 2009; Jessup, Humphreys, Brindis, & Lee, 2003). Given these unique barriers, in comparison to men, women are less likely to access treatment services for a substance use disorder (Brady & Ashley, 2005). We anticipate finding that greater perceived barriers to accessing substance abuse treatment will be associated with accessing treatment later in relation to the timeframe of a recent pregnancy.

### **Research Goals**

There are two main goals of this paper. The first goal is to characterize the harm reduction and health promoting behaviors that occur in pregnant women who have addictions and who will eventually access treatment. We consider a novel tool, based upon our prior research with this population (e.g. Van Scoyoc & Fisher, in prep; Van Scoyoc, Kim & Fisher, in prep) that is designed to identify both which health promoting and harm reduction behaviors women are engaging in during pregnancy as well as the timing of this engagement. We will also consider the reliability of this novel questionnaire, the Harm Reduction and Health Promotion in Pregnancy Questionnaire. We will identify whether engagement in health promoting behaviors in pregnancy co-occurs with reducing substance use, reflecting an overall behavioral change process occurring during pregnancy prior to accessing treatment.

Second, we will conduct preliminary analyses to identify how factors impact the timing of entering substance abuse treatment in relation to a recent pregnancy. We will first consider whether the timing of entering treatment is associated with the timing of reducing substance use prior to accessing these services. We predict that there will be a

positive association in that women who begin to reduce substance use on their own are beginning to engage in the process of positive change and thus are more likely to begin treatment services earlier during pregnancy. In addition, we will consider other variables including experiences of childhood trauma, maternal mental health, and perceived barriers to accessing treatment that likely impact the timing of when women enter treatment.

## **Methods**

### **Participants**

54 women who used illicit substances during pregnancy participated in the study. All participants were receiving inpatient substance abuse treatment at a treatment center that is located in a medium-sized city (population ~150,000) in the Pacific Northwest that primarily serves a high risk and low SES population. This treatment center includes specialized services for women who are pregnant or parenting. Women are able to stay at the treatment center with their young children. During the daytime, childcare is provided on site, enabling women to fully participate in their treatment. Ten beds at the facility are reserved for pregnant and parenting women, and annually at least 40 pregnant or postpartum women are served at this facility.

Women in the sample ranged from 19 to 39 years old (mean age= 28.09 years, SD=5.22). 19 of the 54 women were pregnant when they participated, 31 women participated following the birth of their child, and four women discussed a pregnancy that had ended in a stillbirth. Half of the sample entered treatment after their baby was born. Women ranged in the number of children that they had, with some women discussing



their first pregnancy and others discussing their sixth. On average, women had 2.61 other children ( $SD=1.43$ ). 15 women were primiparous, 14 women had one other child, 10 women had two other children, nine women had three other children, four women had four other children, and two women had five other children. 83% of the sample self-identified as European American, 5% as American Indian, 2% as Asian, and 9% as Multiethnic. 68.5% of participants reported an annual household income below \$5,000, and no participants reported a household income above \$50,000. The overwhelming majority (90.7% of participants) reported being on Medicaid. 25.9% of the women reported having a high school diploma, 37% reported having a GED, and 7.4% of women reported having an Associates degree. None of the participants had completed a Bachelor's degree.

## **Procedure**

Upon intake into the treatment center, women were asked if they were interested in learning about opportunities to participate in research studies. Women who expressed interest and who were eligible to participate in this research project were contacted and provided with information about the study. To be eligible to participate women had to currently be receiving inpatient substance abuse treatment, have a history of using substances (alcohol or illicit drugs) during a pregnancy in the past four years, be able to communicate in English, and be at least 18 years old.

The first author obtained informed consent from each participant, explaining study risks, and discussing confidentiality. An NIH Certificate of Confidentiality was obtained for this research project given the sensitive nature of studying substance use

during pregnancy. The Certificate of Confidentiality was explained to research subjects, noting that it provides an added layer of confidentiality in response to legal demands. The limits of confidentiality were also clearly explained.

Women participated at a time that was convenient for them in a private room at the treatment center. Although childcare was provided, women were also welcome to have their infants with them while they participated. Participation lasted approximately two and a half to three and a half hours. Participants were compensated \$35.

## **Materials**

### *Harm Reduction and Health Promotion in Pregnancy Questionnaire*

A 22 item measure of harm reduction and health promotion behaviors was developed and administered to all participants. This questionnaire was informed by the Health Practices Questionnaire-II (Lindgren 2001, 2005). Dr. Lindgren developed the Health Practices Questionnaire to specifically measure pregnancy-related health practices. The Health Practices Questionnaire-II was not, however, designed to specifically be administered to women who have addictions, and includes few questions pertaining to substance use. When developing the Harm Reduction and Health Promotion in Pregnancy Questionnaire, we built upon the final set of questions in the Health Practices Questionnaire-II, which asks about behaviors that have changed during pregnancy. We identified items that would be relevant to women with addictions and added additional items specific to women with addictions, informed by our preliminary research on harm reduction and health promotion behaviors within this population (see Van Scoyoc & Fisher, in prep; Van Scoyoc, Kim & Fisher, in prep).

Thus, the Harm Reduction in Pregnancy Questionnaire includes both items about engaging in health promoting behaviors (e.g. getting more sleep, being more active, taking prenatal vitamins) and items about decreasing substance use (e.g. decreasing my use of cigarettes/nicotine, decreasing my use of alcohol). Women were asked to identify whether each listed behavior changed during the course of pregnancy, and if so, the month of pregnancy that the behavior changed (from month 1 to month 9). For the complete Harm Reduction in Pregnancy Questionnaire, see Appendix B.

To help women complete the Harm Reduction and Health Promotion in Pregnancy Questionnaire with greater accuracy, women's pregnancies were first visually charted on a pregnancy calendar by the researcher alongside each participant. The pregnancy calendar notes the baby's due date and the different trimesters- calculated using a handheld gestation calculator from the due date. In addition, notable major life events including stopping using substances, moving locations, relationships beginning and ending, entering treatment, and children's births were written on the calendar to help women remember the different months of pregnancy. The months of pregnancy were noted on the pregnancy calendar, and this calendar was referred to throughout the administration of the Harm Reduction in Pregnancy Questionnaire to prompt memory and help women identify the specific month that they first changed the queried behaviors.

In addition, the directions for completing the Harm Reduction and Health Promotion in Pregnancy Questionnaire were verbally explained with at least the first few items completed with help from the experimenter. In particular, the experimenter explained that participants should only respond that an item as "not applicable" if the behavior was not one that could be changed. The example that a participant could not

increase their seat belt use if they never rode in a car during pregnancy was given for clarification.

### *Timing of Accessing Treatment*

A variable that identifies when women enter treatment in relation to the timing of the target pregnancy was created. The sample of women in this study is quite heterogeneous in terms of the timing of entering treatment, in that women entered treatment in early pregnancy, late pregnancy, and following the birth of their child. To capture this variability, this variable considers the number of weeks between the time that the baby was conceived and when women first report entering treatment. The conception date was calculated based on the baby's due date with a gestation calculator. This continuous variable is applicable for women who entered treatment during pregnancy as well as women who entered treatment following the birth of their baby.

### *Adverse Childhood Experiences*

To measure potentially traumatic events occurring in childhood, participants were administered the Adverse Childhood Experiences questionnaire (Anda et al., 2006; Chapman et al., 2004). This questionnaire lists potentially traumatic experiences that children may have experienced in childhood asking participants whether they experienced each type of event. Questions query whether, before age 18, individuals experienced emotional abuse, physical abuse, sexual abuse, emotional neglect, physical neglect, their mother being treated violently, household substance abuse, household mental illness, parental separation or divorce, and having an incarcerated household member. The number of these unique types of potentially traumatic events is then

calculated for each participant, thus ranging from having not experienced any to having had all ten types of experiences. Research suggests that the accumulation of stressful early experiences has a dose-response relationship to future health and mental health outcomes in that the greater the number of types of negative early experiences, the greater the long-term psychosocial impairment (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Higgins & McCabe, 2001), the higher the depressive and trauma symptomatology, (Chapman et al., 2004; Turner, Finkelhor, & Ormrod, 2010) and the poorer the physical health outcomes (Anda et al., 2006, Felitti et al., 1998).

#### *Allen Barriers to Treatment Instrument*

To measure perceived barriers to accessing substance use treatment, participants were administered the Allen Barriers to Treatment Instrument (Allen, 1994). This instrument was designed to identify the barriers to treatment that exist for women who have addictions. It includes 30 self-administered items. Ten barriers relate to treatment program characteristics (e.g. the far distance of treatment programs from my home, having to wait for an opening because the program is full). Ten barriers relate to personal beliefs, feelings, and thoughts (e.g. I feel ashamed when I admit to having this problem, I have responsibilities at home as a mother, wife, or partner). Ten barriers relate to other issues that prevent women from accessing care (e.g. the fear that my admission of this problem could be used by someone to take my children away, needing alcohol and/or drugs to deal with the stress of daily life in my community). However, the validity of this three subscale factor structure has not been replicated by additional research (Rinker, Lindsay, Schmitz & Green, 2009). Thus, for our analyses, we only consider the full scale.

For each item women are asked to rate how much each barrier kept them from getting help. Answers are on a 4 point likert scale including not at all=1, a little=2, an average amount=3, and a lot=4. To identify overall perceived barriers to accessing care for individual participants, responses to the 30 items are combined. Preliminary analyses suggest that this scale has good internal consistency reliability and validity (Allen & Dixon, 1994).

### *Maternal Mental Health*

To identify aspects of current maternal mental health, participants were administered the Beck Depression Inventory-II and the Beck Anxiety Inventory. The Beck Depression Inventory-II (BDI-II) (Beck, Steer & Brown, 1996) is a self-report questionnaire that measures common symptoms of depression including the cognitive symptoms (e.g. hopelessness, negative cognitions, sadness) and the more physical symptoms of depression (e.g. weight loss or gain, fatigue). The BDI-II contains 21 questions, which are each scored on a likert scale. The total score for the BDI-I ranges from 0-63 (each item is scored from 0-3) with higher total scores indicating greater symptoms of depression.

The Beck Anxiety Inventory (BAI) (Beck & Steer, 1993) is a self-report questionnaire that measures common symptoms of anxiety. Somatic symptoms are emphasized on the BAI (e.g. feeling hot, unsteady, shaky, feelings of choking). The other items consider the more cognitive aspects of anxiety (e.g. fear of losing control, fear of the worst happening). Participants are asked to rate how much 21 symptoms of anxiety have bothered them in the past week including today on a likert scale from 0 to 3. The

total score for the BAI ranges from 0-63 with higher total scores indicating greater severity of anxiety symptoms.

## **Results**

### **Harm Reduction and Health Promotion in Pregnancy**

98.15% of the sample, or all but one woman, reported engaging in at least one harm reduction or health promoting behavior during pregnancy. On average, women reported engaging in 10.43 of the 22 listed behaviors (SD=4.61; range=0-19). Women reported that they began to engage in health promoting behaviors (not including decreasing substance use) when they were on average 2.65 months pregnant, (SD=1.48) and in substance use reduction behaviors (i.e. decreasing their use of marijuana, other illegal drugs, alcohol, or cigarettes) when they were 2.90 months pregnant (SD=1.82). When considering all of the different behaviors queried on the Harm Reduction and Health Promotion in Pregnancy Questionnaire, 79.7% of participants report engaging in at least one of these behaviors during the first three months of pregnancy and 96.5% of participants report engaging in at least one of these behaviors during the first six months of pregnancy.

Women report engaging in each of the behaviors listed in the questionnaire. However, items ranged from being reportedly applicable for all participants (i.e. making healthier food choices, drinking adequate amounts of water, being more active, getting more sleep, increased relaxation, and going to prenatal care visits) to being not applicable for the majority of the sample (i.e. decreasing use of alcohol, refraining from risky sexual practices, no longer using drugs intravenously, limiting contact with a romantic partner

who is physically violent, and limiting contact with other people who are physically violent).

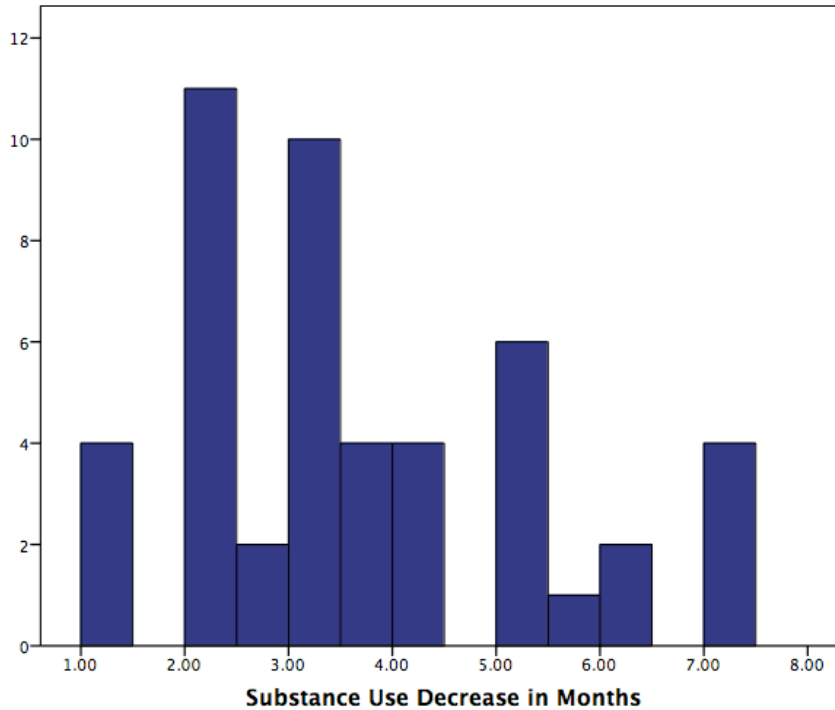
Cronbach's alpha for the 22 categorical items, (identifying whether or not individuals engaged in each behavior or whether the behavior was not applicable) was .70 suggesting overall acceptable reliability. The reliability increases to .72 if the decreasing use of alcohol item is deleted. Notably, the decreasing alcohol item appears to act a bit differently than the other items on the scale in that the vast majority of individuals for whom this item is applicable changed their behavior. Only 3.7% of the sample, or two participants, reported using alcohol and not decreasing their use during pregnancy. Women also reported decreasing their use of alcohol, on average, earlier than changing any of the other behaviors queried on the Harm Reduction and Health Promotion in Pregnancy Questionnaire. See Table 5 for individual item details.

Testing reliability for the timing of changing behaviors in pregnancy was complicated by the fact that this data was only available for a subset of participants- those who changed the identified behavior. To increase power, an aggregate variable was created that identifies when each woman, on average, decreases her substance use. This variable averages the timing that women report decreasing their use of tobacco, alcohol, marijuana, and other illicit substances. Thus, if a woman only decreases one of these substances, the month that that substance changed was used, however if a woman decreases two or more of these types of substances, the average month that these changes occurred is calculated. This aggregate variable includes data for when 48 of the 54 participants (or 88.89% of the sample) who reportedly decreased their substance use. Six women reported not reducing their use of these substances use during pregnancy. This



aggregate decreasing substance use variable was normally distributed with variance in women's responses in terms of when they began to decrease their substance use (See Figure 9 for histogram of responses).

Figure 9. Histogram of decreasing substance use during pregnancy



To maximize power, we conducted a reliability analysis using this average substance use harm reduction variable along with four other variables that had a high overlap in participants. Items included in this analysis include behaviors that are generally recommended for all women to engage in to have a healthier pregnancy, and that are not related to substance use. The four items include: getting more sleep, taking prenatal vitamins, making healthier food choices, and going to prenatal visits. Cronbach's alpha for these 5 items was .89 and included data from 21 participants or 38.9% of the sample, notably a small subset of the sample. This alpha suggests good reliability for the

timing of behavioral change for women who are making these five behavioral changes.

This suggests that in this subsample of the population, reduction in substance use occurs alongside engagement in health promoting behaviors.

Table 5. Individual harm reduction and health promotion variables

Scale	Behavior	N who changed behavior	% who changed behavior	% who did not change behavior	% behavior not applicable	Month change occurred M ± SD
Decreasing Substance Use	Decreasing use of alcohol	19	35.2	3.7	61.1	2.32 ± 1.42
	Decreasing use of illegal drugs (other than marijuana)	39	72.2	18.5	9.3	3.51 ± 1.88
	Decreasing use of marijuana	23	42.6	25.9	31.5	3.57 ± 2.04
	Decreasing use of cigarettes	25	46.3	40.7	13.0	3.96 ± 1.99
	Aggregate Substance Use Harm Reduction *	48	88.89	11.11	0	3.50 ± 1.70
Health Promoting Behaviors	Drinking less caffeine	15	27.8	63	9.3	2.40 ± 1.06
	Wearing seat-belt more frequently	10	18.5	72.2	9.3	2.50 ± 1.51
	Refraining from risky sexual practices	10	18.5	9.3	72.2	2.80 ± 1.75
	Taking prenatal vitamins *	45	83.3	13.0	3.7	3.2 ± 1.73
	Making healthier food choices *	31	57.4	42.6	0	3.23 ± 1.69
	Drinking adequate amounts of water	33	61.1	38.9	0	3.24 ± 1.62
	Avoiding exposure to dangerous substances	23	42.6	35.2	22.2	3.26 ± 1.69
	Being more active	15	27.8	72.2	0	3.38 ± 2.13
	No longer using drugs intravenously	16	29.6	18.5	51.9	3.47 ± 2.24
	Seeking to gain appropriate weight	26	48.1	50.0	1.9	3.58 ± 1.96
	Getting more sleep *	34	63.0	37	0	3.65 ± 1.84
	Increased relaxation	27	50.0	50.0	0	3.67 ± 1.94
	Going to prenatal care visits *	33	61.1	38.9	0	3.76 ± 1.85
	Increasing contact with supportive friends/family	35	64.8	33.3	1.9	4.00 ± 2.3
	Limiting access to illegal	35	64.8	29.6	5.6	4.03 ± 1.92

drugs					
Limiting contact with romantic partner who is physically violent	13	24.1	7.4	68.5	4.08 ± 2.33
Limiting contact with people who are using	33	61.1	31.5	7.4	4.14 ± 2.28
Limiting contact with people (besides romantic partner) who are physically violent	6	11.1	7.4	81.5	4.33 ± 2.16

Items are ordered by earliest average timing of behavior change

\* Denotes item included in Cronbach's Alpha analyses for timing of health promotion reliability

### **Exploratory Analyses of the Timing of Reducing Substance Use during Pregnancy**

Exploratory analyses were conducted to identify the relationship between the timing of reducing substance use and other variables of interest, with the intention of identifying correlates with this variable. We considered variables including general demographic information (e.g. education, income, age), timing of entering treatment, the number of other children, early adversity, depression, and anxiety.

Before conducting analyses, we examined each variable for skew, kurtosis, and potential outliers. None of the variables had problematic skew or kurtosis. A couple of variables had notable outliers that were more than 2.5 standard deviations from the mean. On the Beck Anxiety Inventory, one value was winsorized, changing the value from 51 to 42. Similarly, one participant was an outlier in terms of the number of weeks since conception that she entered treatment, having entered treatment 267.14 weeks since conception. This value was winsorized to 198 weeks since conception.

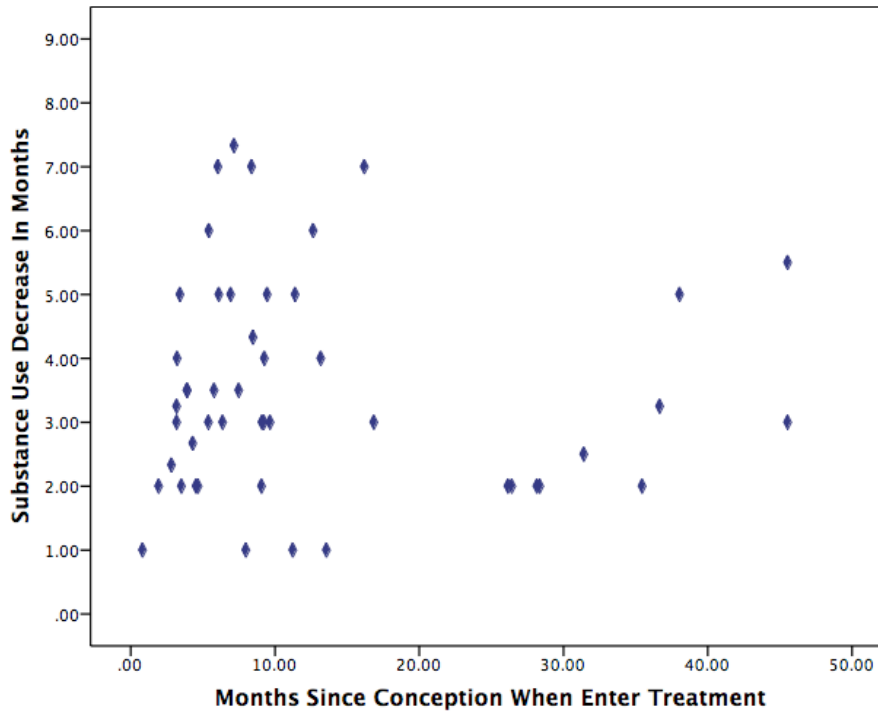
Initial correlational analyses identified that the timing of reducing substance use during pregnancy was not associated with demographic variables or with the number of children that a woman had. The correlation with maternal age in years at the time that the

baby was conceived was not significant  $r(53)=.02$ . Timing of reducing substance use also was not correlated with educational attainment (completed high school or not)  $r(53)=-.05$  or income (income above or below 5,000 a year)  $r(53)=.11$ .

We had hypothesized that the timing of substance use reduction would be associated with the amount of time, since conception that women entered treatment, such that earlier attempts to reduce substance use would be associated with earlier treatment entry. In contrast, timing of reducing substance was not significantly correlated with the timing of entering treatment,  $r(46)=-.04$  (n.s.). See Figure 10.

Similarly, the timing of reducing substance use was not correlated with past history of trauma based on the Adverse Early Experiences Scale  $r(47)=-.05$  (n.s.), depression as measured by the Beck Depression Inventory  $r(45)=.13$  (n.s.), anxiety, as measured by the Beck Anxiety Inventory  $r(45)=-.05$  (n.s.), or barriers to accessing substance abuse treatment as measured by the Allen Barriers to Treatment Instrument  $r(47)=-.10$ . We also examined overall reliability of the Allen Barriers to Treatment Instrument and identified reliability of .86 for the 30 items.

Figure 10. Scatterplot of the timing of decreasing substance use and the timing of entering treatment



### **Predicting When Women Access Treatment Services Given a Recent Pregnancy**

We conducted additional analyses to identify predictors of when women enter treatment given a recent pregnancy. After removing the aforementioned outlier, on average women entered treatment 63.39 weeks following conception, however there was great variability in this timing ( $SD=50.81$ ). Women in the sample entered treatment from early pregnancy until their child was almost four years old (minimum=3.57 weeks, maximum=189.86 weeks since conception).

A multiple linear regression was calculated to predict when a woman entered treatment given a recent pregnancy. Variables related to early adversity, current mental health, and perceived barriers to entering treatment were included in the model.

Preliminary correlational analyses examined covariates of income, education, and maternal age with the timing of entering treatment. None of these correlations were significant. Thus, these covariates were not included in follow up multivariate analyses. To identify predictors of the timing of entering treatment, we entered variables in a stepwise manner. In the first model we considered adverse early experiences. In the second model we added measures of maternal mental health including both anxiety and depression. In the third model, we included a measure of perceived barriers to treatment.

Regression analyses indicated that the first model including only adverse childhood experiences was not significant  $F(1, 50) = .624$ ,  $MSe = 2637.98$ , (n.s.), with an  $R^2$  of .01. The second model, which also included a measure of depression and anxiety was marginally significant  $F(3, 48) = 2.67$ ,  $MSe = 2384.11$ ,  $p = .06$ , with an  $R^2$  of .14. The third model, which also included a measure of perceived barriers to treatment was significant  $F(4, 47) = 5.89$ ,  $MSe = 1892.17$ ,  $p < .01$ , with an  $R^2$  of .33. Predicted timing of entering treatment, in weeks since conception, is equal to  $-8.38 - 2.02$  (Adverse Childhood Experiences)  $+ 1.25$  (Anxiety)  $- 2.73$  (Depression)  $+ 1.96$  (Perceived Barriers to Treatment). In this final model depression, and perceived barriers to treatment were significant predictors of when a woman entered treatment given a recent pregnancy. Anxiety was a marginally significant predictor. Early adversity was not a significant predictor. See Table 6 for details of this regression analyses.

Given that childhood trauma was not a significant predictor of when a woman entered treatment in relation to a recent pregnancy, we ran an additional multiple linear regression that did not include this variable. Again, we conducted analyses in a stepwise manner. For this two step model, in step 1 we included measures of maternal mental

health (the BDI and BAI), and in step two, we also included the measure of perceived barriers to accessing treatment.

Regression analyses indicated that the first model, including only measures of maternal mental health, was significant  $F(2, 49)= 3.77$ ,  $MSe=8894.44$ ,  $p<.05$ , with an  $R^2$  of .13. In this model both depression and anxiety were significant predictors. The second model, which also included a measure of perceived barriers to treatment, was also significant  $F(3, 48)=7.75$ ,  $MSe=14527.20$ ,  $p<.001$ , with an  $R^2$  of .33. In this model both depression and barriers to entering treatment were significant predictors of when a women entered treatment in relation to a recent pregnancy. Anxiety was a marginally significant predictor. See Table 7 for details of regression analyses. See Figure 11 for a scatterplot of the relationship between perceived barriers to accessing treatment services and the timing of accessing treatment

Table 6. Time to enter treatment- Impact of trauma, depression, anxiety, and perceived barriers

Step	Predictor	t	R <sup>2</sup>	F
Step 1			.01	$F(1, 50)= .62$
	Childhood Trauma	.79		
Step 2			.14	$F(3, 48)=2.67$
	Childhood Trauma	.74		
	BAI	1.80+		
	BDI	-2.60*		
Step 3			.33	$F(4, 47)=5.89^{***}$
	Childhood Trauma	-.74		
	BAI	1.99+		
	BDI	-3.41***		
	Perceived Barriers	3.67***		

\*significant at the .05 level

\*\*\*significant at the .001 level

+significant at the .1 level

Table 7. Time to enter treatment- Impact of depression, anxiety, and perceived barriers

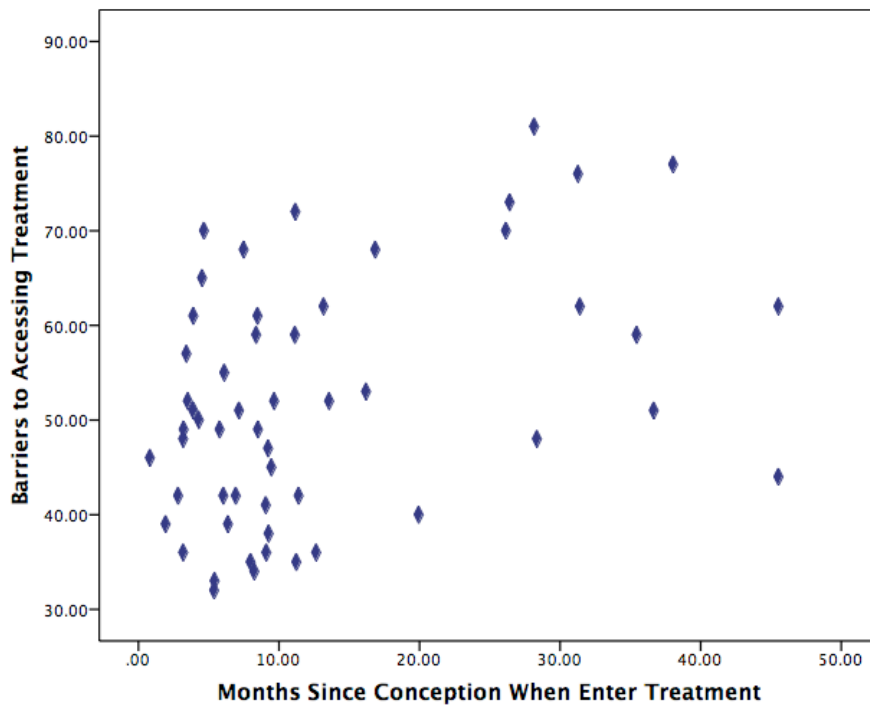
Step	Predictor	t	R <sup>2</sup>	F
Step 1			.13	$F(2, 49)=3.77^*$
	BAI	2.06*		
	BDI	-2.57*		
Step 2			.33	$F(3, 48)=7.75^{***}$
	BAI	1.89+		
	BDI	-3.43***		
	Perceived Barriers	3.71***		

\*significant at the .05 level

\*\*\*significant at the .001 level

+significant at the .1 level

Figure 11. Scatterplot of perceived barriers to accessing treatment and timing of entering treatment





## Discussion

### Harm Reduction During Pregnancy

Our results indicate that almost all of the women in our sample report engaging in harm reduction or health promoting behaviors during pregnancy with almost 90% of individuals reporting reducing their substance use during the course of pregnancy. The majority of women (79.7%) also report beginning to engage in a harm reduction or health promoting behavior during the first trimester of pregnancy, and almost all participants (96.5%) report engaging in one of these behaviors by the end of the second trimester. These results suggest that, for women who use drugs and alcohol during pregnancy and eventually access treatment, engagement in health promoting and harm reduction behaviors during pregnancy is common. It is rare for women to not try to change their behaviors to try to have a healthier pregnancy.

When considering these results, the specific sample characteristics should be considered. Women who eventually access inpatient treatment services are likely more motivated to make changes in their substance use than women who do not access treatment. They also may have more difficulty changing their substance use behavior than women who do not access treatment services because they are not able to stop using substances on their own.

Responses to individual items administered on the Harm Reduction and Health Promotion in Pregnancy Questionnaire demonstrate variation in engagement in different types of behavior. Notably, almost all of the women who used alcohol in pregnancy reported changing this behavior (with only 3.7% of the sample not changing their alcohol use), and this behavior was changed particularly early on during pregnancy. In contrast,

women who used cigarettes were much less likely to engage in behavioral change (40.7% reported not changing their use). Changes in cigarette use occurred on average over a month and a half after changes in alcohol use. Women who reported decreasing their alcohol use on average started this decrease when they were 2.32 months pregnant, whereas decreasing use of cigarettes occurred when women were on average 3.96 months pregnant.

Our research suggests that women make different decisions about changing their use of different substances. However the reasons for these differences are currently unclear. That women are more likely to decrease their alcohol use, and do so particularly early in pregnancy, may reflect greater concern about the impact of alcohol use on the developing baby. Some research suggests that substance-using populations may be particularly aware of the negative impact of alcohol use on fetal development (Van Scoyoc & Fisher, in prep). Increased concern about the impact of alcohol exposure on the baby may impact women's substance use (Testa & Reifman, 1996). Differences in changing the use of different substances may also reflect variation in withdrawal symptoms and varying addictiveness.

Future research may consider the factors that impact women's decision to change their use of different substances prior to accessing treatment services. This area of research could have implications for public health initiatives. For example, if the reduction in alcohol use is driven mainly by women's concern about prenatal exposure, this suggests the importance of public education campaigns focusing on the impact of substance use on fetal development.

Our research suggests that the Harm Reduction and Health Promotion in Pregnancy Questionnaire has utility for identifying both the behaviors that women engage in as well as the timing of these behaviors. This measure is acceptably reliable in terms of overall engagement in behaviors. Both items pertaining to decreasing substance use and promoting health in pregnancy appear to measure a consistent construct relating to positive behavioral change. In addition, the timing of engagement in both reducing substance use and a subset of health promoting behaviors (e.g. getting more sleep, taking prenatal vitamins, making healthier food choices, and going to prenatal visits) has adequate reliability. This measure is the first measure that specifically considers decreasing substance use and increasing health promoting behaviors during pregnancy. Our analyses suggest the importance of considering both a wide range of behaviors that women engage in due to concern about the developing fetus, while also considering the timing of engagement in these behaviors.

We had anticipated that women's timing of reducing their substance use during pregnancy would be associated with the timing of entering treatment. We hypothesized that earlier engagement in these behaviors would represent the beginning of self-change and thus predict earlier access to substance abuse treatment. However, our analyses suggest that the timing of decreasing substance use is not associated with the timing of entering treatment. Similarly, analyses indicate that the timing of reducing substance use is not associated with maternal depression, anxiety, or experiences of early adversity. This result suggests that although women tend to decrease their substance use, this engagement in substance use decrease is commonplace and not associated with timing of entering treatment. Notably, the Harm Reduction and Health Promotion in Pregnancy

Questionnaire asks about engagement in change without qualifying the amount of change that takes place. Thus, women may be reporting that they are changing their substance use, when that change is minimal.

Future research on reducing substance use outside of accessing treatment may further consider the characteristics of women who do not try to decrease their use during pregnancy. In our sample, 6 women reported not decreasing their use of substances. In a larger sample, it would be possible to identify predictors of this unaltered use. In addition, our sample was recruited from women who were currently accessing substance abuse treatment. A larger sample including women who did not end up accessing services may help to better identify the relationship between engagement in harm reduction behaviors with the timing of accessing treatment.

In this study sample, women had, on average 2.6 other children, suggesting the possibility of having multiple children while continuing to struggle with addiction. Another area for future research is considering interventions designed to help women reduce harm to their babies during subsequent pregnancies. Helping women develop a plan for accessing services during subsequent pregnancies could be a part of inpatient services, akin to preparing women for the possibility of substance use relapse.

### **Predicting the Timing of Treatment**

We conducted additional analyses testing a model that predicts the timing of when women enter treatment in relationship to pregnancy. Analyses indicated that, in contrast to our prediction, childhood trauma was not predictive of when women entered treatment. Current mental health, however, did have predictive power. Higher maternal anxiety was

associated with later treatment entry whereas higher maternal depression was associated with earlier entry into treatment in relation to the timing of a given pregnancy. In addition, women's reports of perceived barriers to accessing substance abuse treatment were highly predictive of the timing of accessing treatment.

Previous research suggests that greater severity of mental health symptoms, and greater mood disturbance is associated with treatment seeking behaviors (Mojtabai, Olfson, & Mechanic, 2002; Wu, Ringwald, & Williams, 2003). However, maternal mental health may have a different impact on treatment seeking in the context of an addiction during pregnancy. The consequences for seeking treatment are heightened in pregnant women with addictions due to potential child welfare and justice system involvement. In this context, anxiety may act as a barrier to accessing services due to heightened concerns about the negative consequences of treatment seeking. This could explain the preliminary and unanticipated finding that in pregnant women with substance abuse disorders, increased symptoms of depression predict earlier treatment access and symptoms of anxiety predict later treatment access in relation to the timing of pregnancy.

### **Limitations**

There are some clear considerations and limitations to this research. Primarily, this research was conducted with a relatively small sample. In addition, this sample is relatively diverse in that some women were currently pregnant and other women reported on a past pregnancy during which they had used substances. The diversity of this sample in terms of the timing of accessing treatment enabled unique analyses. However,

differences in the time since pregnancy may also impact retrospective reporting, with some women reporting on a much more recent pregnancy than other women.

Women also reported on barriers to accessing treatment as well as behavioral changes retrospectively, as all women were currently receiving inpatient substance abuse treatment services. Thus, this sample represents a subsample of women who use substances during pregnancy- only including women who eventually accessed treatment services. Likely this subsample has greater overall motivation to change their substance use than women who used substances during pregnancy and did not access services.

Although it would be ideal to collect data related to harm reduction and health promotion with women who are still using and pregnant, child welfare concerns would likely significantly impair both recruitment as well as the veracity of reporting for women who were still using. In addition, measures of mental health were administered while women were in treatment and may vary from their mental health during pregnancy. Thus, the measures that we obtained for depression and anxiety should be interpreted with consideration of this limitation.

One additional limitation of this study is that women were recruited from one treatment center in the Pacific Northwest that serves a relatively specific demographic. The majority of women in the sample reported using methamphetamine (which is particularly prevalent in the Northwest) and reported low-income. Given the shared characteristics of the sample, which may not generalize to other areas of the country, or to all women who use substances during pregnancy, findings should not be overgeneralized. Similarly, the sample uniquely represents women who used substances

during pregnancy and were not able to cease their use without the help of treatment services. This aspect of the sample should also be considered when interpreting results.

Despite these limitations, given the dearth of research on participant-reported change in substance use during pregnancy, and the difficulty in accessing this population, this research provides an important contribution to the research literature in this area. In particular, this research identifies both changing behaviors during pregnancy and predictors of accessing treatment that can be further explored through additional studies.

### **Clinical and Public Health Implications**

This research is well situated to inform efforts to engage women in accessing substance abuse treatment services during pregnancy. Our research suggests that women often engage in the process of positive self-change on their own during pregnancy, but often delay accessing the treatment that they need in part due to barriers to accessing care. Policies designed to decrease prenatal exposure and increase access to treatment services should consider that perceived barriers to accessing services have a strong relationship to when women access treatment services.

Fortunately, perceptions of the barriers to accessing treatment services are highly malleable and are ideal targets for policy change and intervention. Efforts to address these barriers can include focusing on aspects of treatment programs that are known to impact treatment access. For example, providing for the needs of women with dependent children, developing transportation to services, and financially supporting women who access these services will decrease known barriers to care.

The research literature also clearly demonstrates that current policies related to substance use during pregnancy create barriers to accessing treatment services. Policies designed to decrease prenatal exposure by increasing the consequences for women who continue to use in pregnancy have had the unintended effect of creating barriers to care for pregnant women due to concerns about child welfare involvement and criminal prosecution. These policies should be reconsidered in light of the accumulating evidence that increased consequences for substance use in pregnancy prevent women from accessing treatment.

In addition to addressing treatment barriers, efforts can focus on impacting the perception of these barriers by increasing access to information about these services. For example, efforts could focus on providing information about the availability of treatment, particularly for women who have dependent children. In addition, efforts could focus more broadly on educating the public about addiction science and best practices for successful treatment of addiction during pregnancy. These suggested efforts and other efforts focused on ameliorating barriers to accessing care and supporting pregnant women with addictions have a strong potential for helping women access treatment services during pregnancy. Given the negative impact of maternal addiction on child outcomes, increasing support for accessing treatment with the goal of helping women abstain from substance use during and after pregnancy is key component of promoting maternal and child health and well-being.



## CHAPTER V

### CONCLUDING SUMMARY

#### **Health Promotion during Pregnancy and Pathways to Treatment**

Qualitative research presented in Chapter II suggests that prior to accessing traditional treatment services, women who use substances during pregnancy, and who will eventually access treatment services, generally report having been concerned about the impact of their use on the developing baby. Given this concern, women often seek out information about the impact of their use and engage in behaviors designed to decrease harm to the baby in the period before accessing treatment services. In particular, women report engaging in efforts to decrease their substance use as well as efforts to increase health promoting behaviors that they believe will enable them have a healthier pregnancy. Notably, all 15 women interviewed describe trying to reduce their substance use, and many tried to quit using, although failed in this endeavor. Thus, these interviews suggest that women who use substances during pregnancy and eventually access treatment services are not indifferent to their developing babies. Instead, despite their continued substance use during pregnancy, most women recognize that their use could be harming their child, and engage in behaviors with the goal of having a healthier pregnancy. However, they describe difficulty in being able to cease their use out substances without the support of traditional treatment services.

To better understand the ways that women's behaviors change over the course of pregnancy, we then collected quantitative data with a larger sample of women in

recovery. This provided the opportunity to further investigate behavioral changes that were identified through interviews. Specifically, by collecting data on changing substance use over the course of pregnancy, we developed a method for visually charting these changes and piloting a new measure, The Harm Reduction and Health Promotion in Pregnancy Questionnaire. This new measure operationalizes the positive behaviors that were identified through initial interviews.

In Chapter III, we present the developed system for charting and visualizing women's substance use over the course of pregnancy. This visualization identifies that the majority of women decrease their substance use outside of accessing treatment services. In addition, we identified other patterns of substance use change including substitution, stable substance use, and relapse. We also considered how patterns of substance use over the course of pregnancy vary among commonly used substances. In particular, graphs visually depict that women seem particularly likely to decrease their use of alcohol early on in pregnancy. In contrast, women are more likely to use marijuana and cigarettes throughout pregnancy. Patterns of methamphetamine use are more variable but women often seem to decrease but then continue to use lesser amounts of methamphetamine throughout pregnancy.

Chapter III further explores changes in substance use and health-promoting behavior. Piloting of The Harm Reduction and Health Promotion in Pregnancy Questionnaire identifies that women tend to engage in health promoting and harm reduction strategies early on in pregnancy. Unexpectedly, analyses indicate that earlier timing of reducing substance use is not predictive of accessing treatment earlier in relation to the timeframe of pregnancy. In contrast, women's mental health as well as

perceived barriers to accessing treatment predict when women access substance abuse treatment services.

As a whole, this research suggests that continued use of substances during pregnancy is not due to indifference towards the developing baby. Instead, women report being concerned about their babies and being engaged in the process of positive change. Furthermore, our research suggests that women likely begin to engage in positive self-change on their own, well before they access treatment services. This is at least in part due to perceived barriers to accessing treatment that prevent women from disclosing their substance use and accessing supportive services. As our research indicates, barriers to accessing treatment play a large role in when, in relation to the timing of pregnancy, women with addictions access these services. Women who perceive fewer barriers are likely to access these services earlier.

Thus, results from quantitative analyses reflect the sentiment described by women in initial interviews. Both interviews and quantitative data analyses provide evidence that pregnant women with addictions often are engaged in positive behavioral change while still continuing to use substances, and before accessing treatment services. In addition, both interviews and analyses identify the importance of barriers to accessing treatment. Women describe specific barriers, including concerns about child welfare involvement, as preventing them from accessing services and leading them to try to reduce their substance use on their own. Similarly, quantitative analyses indicate that women who perceive that there are greater barriers to accessing treatment services enter treatment later in relation to a given pregnancy than women who perceive fewer barriers.

## **Implications**

This research suggests that women who use substances during pregnancy face unique challenges in their path to decreasing their substance use and accessing supportive services. Fortunately, many of the challenges that women face are malleable and can be addressed with novel policy initiatives. Policies that provide information and support to this population and that decrease barriers to accessing care are likely to have a positive impact, enabling more women to access the services that they need to have healthier pregnancies. In particular, our research indicates that pregnant women, who will eventually access treatment services, are already engaging in the process of positive change, and that systems that support this change are likely to be successful. In addition, our research suggests the importance of decreasing perceived barriers to accessing traditional support services.

To secure better outcomes for mothers and their children, policies should consider efforts to increase access to substance abuse treatment services. Research on women in need of treatment who are of childbearing age demonstrates that the vast majority of women who are addicted to alcohol or other drugs are not accessing treatment. Of women of childbearing age who have problematic substance use, only an estimated 10.4% receive treatment (Substance Abuse and Mental Health Services Administration, 2007).

For women who are addicted to alcohol and other drugs, current treatment options available in the United States tend to require a commitment to completely abstaining from use. This “high threshold” approach is a barrier to treatment access in effect preventing all but the most committed individuals from entering treatment of their own volition (Marlatt, 1998). In addition, as considered throughout this dissertation, pregnant

women and women with dependent children face unique barriers to accessing care due to concerns about child custody. Even if they women are motivated to get clean, pregnant women are often are fearful of the consequences of disclosing use. Thus, for pregnant and parenting women there is an even higher threshold for seeking care.

One way to help women have greater access to services is to provide programs that are low threshold and non-judgmental. One framework for low threshold services is a harm reduction framework that focuses on providing services and resources to help individuals with substance use disorders decrease the harm associated with their use. Within a harm reduction framework, individuals are offered information and support to help them make their own decisions around substance use. Harm reduction focuses on identifying where clients are in their addiction, including where they are in the process of self-change, and supporting them at that stage. In contrast to abstinence-based treatment, to receive services clients do not need to commit to behavioral changes such as completely abstaining from use. Harm reduction has the benefits of increasing access to services by having a low-threshold for clients who can be served and by helping individuals empower themselves to change their behaviors (Marlatt, 1998).

Although a harm reduction framework has generally been utilized in terms of reducing harm to the user (e.g. through strategies for decreasing use and maintaining safety while continuing to use), a harm reduction framework is applicable to pregnant and parenting women where the welfare of their children is strongly impacted by their substance use. Harm reduction strategies may be particularly effective during pregnancy when the mother's safety and the child's safety are intrinsically intertwined.

Women who find themselves pregnant may be particularly motivated to make changes in their substance use given concerns about the baby. However, prior to learning about a pregnancy, they may not have been ready to change their substance use. Thus, women who had not planned to stop using, may experience a complicated mix of emotions around changing substance use. In addition, changing substance use becomes suddenly time sensitive during pregnancy. Our research, as well as the research literature, suggests that pregnant women with addictions are often motivated to stop using and, even if not seeking treatment, are often engaging in harm reduction and health promotion strategies of their own volition. Despite not disclosing use to health care providers or other professionals, they often attempt to decrease harm to their baby by decreasing their substance use and engaging in healthy behaviors (Flavin, 2002; Murphy & Rosenbaum, 1999; Van Scoyoc & Fisher, in prep). Access to low threshold services may enable women to access support well before they would be willing to disclose to treatment providers that expect complete cessation of use.

Thus, for pregnant women, programs that have a harm reduction focus should be designed to address the unmet need of providing information and support to women who otherwise do not disclose their use or seek treatment. Programs can provide reliable information about the harm of using during pregnancy and can offer useful strategies for increasing health-promoting behaviors and decreasing substance use that are most likely to have a positive impact on the baby.

Harm reduction programs can also focus on educating pregnant women about accessing support services without fear of negative consequences. For example, it may be particularly helpful for women to learn about places where they can access treatment

services without fear of child removal following the baby's birth. Increasingly integrated treatment programs provide both substance abuse treatment and parenting support, enabling women to stay at the treatment center with their infants and young children. However, concerns about child welfare involvement or other negative consequences often prevent women from learning about the types of programs that better provide for their needs. Thus, supportive strategies can build upon women's internal motivation to stop using substances. Numerous researchers have noted that these supportive strategies are likely to be more effective than the heavy-handed policies towards pregnant women that create barriers to seeking treatment and disclosing use (e.g. Flavin & Paltrow, 2010; Lester et al., 2004; Ondersma, Simpson, Brestan, & Ward, 2000).

Information about accessing these types of supportive services can also be provided to women while they are already receiving inpatient treatment. In the quantitative studies only 15 out of 54 women were primiparous. It is likely that many of these women struggled with substance use during previous pregnancies and that many will struggle with substance use during a subsequent pregnancy. Providing information about accessing support services during subsequent pregnancies can be a part of inpatient treatment programming, ensuring that women to have a plan in place for having a healthy pregnancy if they find themselves once again pregnant at a time when they are using alcohol or other drugs. Just as treatment centers help women plan for the possibility of relapse, treatment centers can also help women plan for the possibility of relapse during a subsequent pregnancy.

Providing a safe place where women trust that they can access resources without judgment and negative consequences is an important aspect of helping women who are

unable to stop using drugs and alcohol on their own, receive care. In focus groups with this population, women have described the importance of having a non-judgmental and non-punitive atmosphere where they feel comfortable disclosing information about their use. This type of an atmosphere increases both treatment seeking and treatment retention (Lefebvre et al., 2010).

Although harm-reduction programs can act as a gateway to accessing more intensive treatment services, providing support and harm reduction services can be effective, even without being tied to other treatment providers. Self-managed change is a common pathway to recovery (Bischof, Rumpf, Meyer, Hapke, & John, 2005; Copeland, 1997). For pregnant women and mothers, harm reduction interventions can help women understand the effect of their use on their family and build up motivation to change.

Understanding that women engage in positive self-change can inform these clinical practices with pregnant women. Rather than focusing on the harm of substance use, clinical conversations can begin by asking women about the ways in which they have tried to have a healthy pregnancy. In this way, conversations can build upon the motivation that women already have to decrease their substance use and protect their developing baby from harm. In addition, these programs can provide accurate information about the ways that women can best reduce harm to their developing babies. Although intensive services are helpful for many individuals, support for self-managed change through low threshold services is also likely to reduce harm within this population and increase rates of abstinence.

In addition to providing access to non-judgmental treatment services, our research suggests that other strategies are also likely to be successful. In interviews, considered in



Chapter II, women often described accessing information anonymously through Internet searches. A cost-effective and likely effective way of helping women access information about reducing harm could be creating an easily accessible Internet site with comprehensive and accurate information designed to support women with substance use disorders in making positive changes. Such a website could provide accurate information about prenatal exposure, information about seeking supportive services, information about how to reduce harm outside of accessing services, and motivational stories about changing substance use over the course of pregnancy. Our research suggests that women are already seeking out similar information through their own Internet searches. This is a clear opportunity to provide useful information to women who are not willing to disclose their use to health care providers.

In addition to focusing on providing new programs and novel means of helping women accessing pertinent information, policy change in the United States that decreases barriers to accessing services would also likely lead to more positive outcomes for women and their children. Decades of research indicate that policies that increase the child welfare and judicial consequences of substance use during pregnancy are counterproductive. These policies were designed to motivate women to stop using substances in pregnancy, however, they have created barriers to women disclosing their substance use and accessing treatment services.

These policies are based upon the false assumption that increased consequences will motivate women to stop using substances during pregnancy. Too often, the compulsive nature of addiction is forgotten when developing programs and policies that address substance addiction. Continued use despite negative consequences to daily living

is a key characteristic of addiction and one of the criteria for diagnosing a substance use disorder using the Diagnostic Statistical Manual V (American Psychiatric Association, 2013). Given the widespread negative consequences of addiction (e.g. prenatal exposure, difficulties caregiving, poor health, deteriorating social relationships) it is unlikely that further increasing the consequences of use will pregnant women to stop using substances.

As emphasized by Dr. Sellman (2010) in his article detailing the ten most important things that are known about addiction, “Addiction is fundamentally about compulsive behavior... the normal flexibility of human behavior guided by neocortical ‘higher power’ appears to become increasingly eroded towards a dehumanized state of compulsive behavior,” (p 6). Compulsive drug seeking that begins outside of consciousness is a hallmark characteristic of addiction, thus added consequences for continuing to use substances are unlikely to lead women changing their behaviors. As our research indicates, many women are already motivated to change their substance use and trying to make this change on their own but unable to abstain from use prior to seeking traditional treatment services. It is not motivation that is preventing women from stopping their use, but difficulty in accomplishing their goal of abstaining from using. Thus, policies that focus on helping women access needed systems of support are likely to be much more successful at mitigating continued use of substances during pregnancy than policies that increase the consequences for continued use.

In addition to policy change, it would also be helpful to focus efforts on changing public discourse around substance use during pregnancy. Women who use substances during pregnancy face an incredible amount of stigma. Too often it is assumed that women continue to use substances during pregnancy due to lack of concern about the

developing baby, lack of motivation, or personal character flaws. These misconceptions should be addressed.

Qualitative research with this population is particularly well suited to engender support and empathy for women with addictions. More narrative research enables the telling of a different story, decreasing the chiasm between peoples, and enabling greater understanding of another's experience (Gergen, Josselson, & Freeman, 2015). Educating the public about addiction science and the difficulties that pregnant women face in trying to stop using substances would help decrease stigma attached to addiction during pregnancy. Changes in the general public's understanding of addiction can enable greater public support for programs that help women stop using substances during pregnancy.

In conclusion, a more nuanced understanding of both women's behavioral patterns in pregnancy as well as the factors that impact treatment seeking can promote positive change for women with addictions. This understanding has clear implications for supporting pregnant women with addictions in reducing harm outside of accessing treatment and in supporting women in accessing traditional services. Understanding that while women are continuing to use substances during a pregnancy they may also be trying to reduce harm to the developing baby puts into perspective the complicated nature of addiction during pregnancy. It provides a basis for considering the complex needs of this population and for beginning a new dialogue based around providing compassionate care. In addition, efforts to support pregnant women with addiction are an important aspect of promoting child well-being. Helping women stop using substances during pregnancy enables women to begin bonding with their infants without the interference of

substances, increasing the likelihood that their children grow up in nurturing environments unimpeded by substance abuse.

## APPENDIX A

### SUBSTANCE USE FOR THE 27 WOMEN WHO DID NOT ACCESS SUBSTANCE ABUSE TREATMENT SERVICES DURING PREGNANCY

Figure 1. Changes in cigarette use during pregnancy for women not accessing treatment services

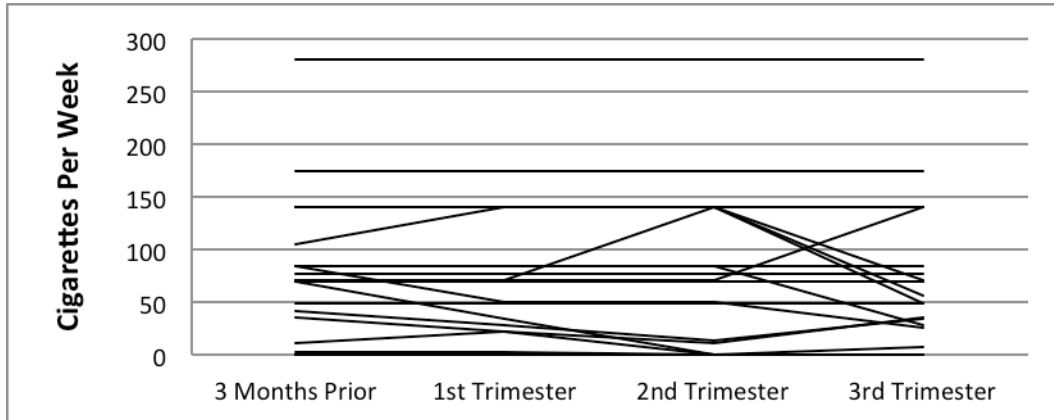


Figure 2. Changes in alcohol use during pregnancy for women not accessing treatment services

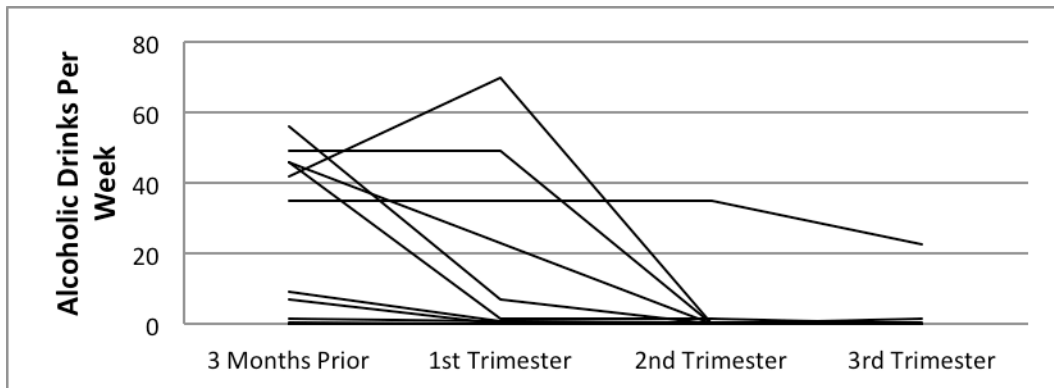


Figure 3. Changes in marijuana use during pregnancy for women not accessing treatment services

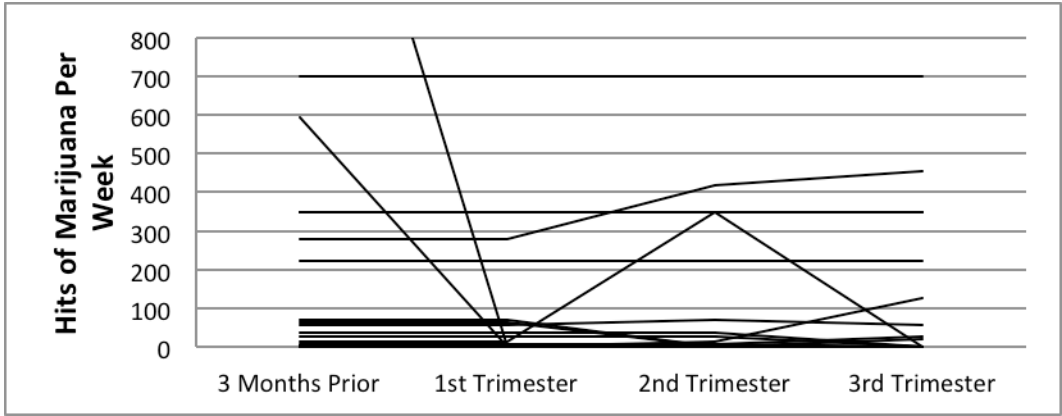
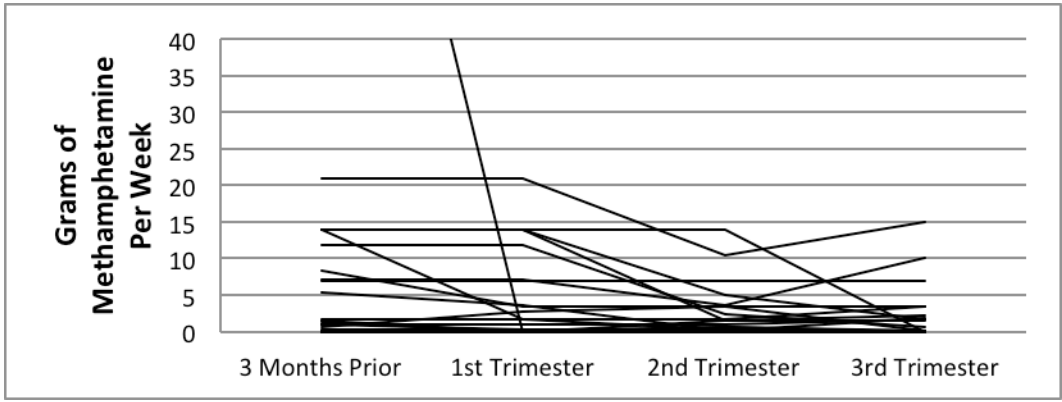


Figure 4. Changes in methamphetamine use during pregnancy for women not accessing treatment services



## APPENDIX B

### HARM REDUCTION AND HEALTH PROMOTION IN PREGNANCY QUESTIONNAIRE

*Which of the following behaviors have you adopted or **changed** during your pregnancy?  
Check all the behaviors that you have **changed** during your pregnancy. If a behavior  
changed, at what month during pregnancy did this behavior first change?*

Item	Did behavior change?	Month this behavior first changed
Getting more sleep	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Being more active (e.g. walking more often, biking, exercising etc)	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Wearing my seat-belt more frequently	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Drinking less than 2 caffeinated beverages a day	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Decreasing my use of marijuana	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Decreasing my use of illegal drugs (other than marijuana)	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Decreasing my use of cigarettes/nicotine	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Decreasing my use of alcohol	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Refraining from risky sexual practices	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Avoiding exposure to dangerous substances (for example cleaning products or other chemicals)	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Taking prenatal vitamins	Yes/No/Not	Month 1, 2, 3, 4, 5, 6, 7, 8, 9

	Applicable	or Not Applicable
Making healthier food choices	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Increased relaxation/relaxing activities	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Seeking to gain an appropriate amount of weight	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Drinking adequate amounts of water	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Going to prenatal care visits	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
No longer using drugs intravenously	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Limiting contact with people who are using	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Limiting access to illegal drugs	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Limiting contact with a romantic partner who is physically violent	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Limiting contact with people (besides a romantic partner) who are physically violent	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable
Increasing contact with supportive friends and family	Yes/No/Not Applicable	Month 1, 2, 3, 4, 5, 6, 7, 8, 9 or Not Applicable



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