



LITERATURE BRIEF

Strategies to Address Perinatal Substance Use Disorders

MONTANA HEALTHCARE FOUNDATION

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Summary

This report reviews effective treatments for drug use in pregnancy based on a national review of programs and scientific evidence.

Drug use in pregnancy is a serious public health problem in Montana. Despite evidence that the problem is on the rise, Montana has a severe shortage of treatment for pregnant women with substance use disorders. The number of Montana children in foster care more than doubled since 2011: out of more than 3,200 children in foster care in 2016, 64 percent were removed from the home for reasons related to parental substance use. Among Medicaid patients, the percentage of infants with perinatal drug exposure increased from 3.7 percent (2010) to 12.3 percent (2016). Despite the apparent growth of this problem, as of 2016, only 6 percent of Montana's state-approved substance use disorder (SUD) facilities reported programs for pregnant and postpartum women, and among the nation's lowest rates of buprenorphine treatment capacity for people with opioid use disorders.¹

The Montana Healthcare Foundation (MHCF) began working on perinatal drug use (drug use during and after pregnancy) in 2015, through grants to healthcare providers for new programs, and through convening discussions among state, tribal, and healthcare system leadership. Identifying successful, evidence-based interventions was a need highlighted by many stakeholders.

MHCF contracted with the Center for Community Health and Evaluation to conduct a review of published studies, program evaluations, and clinical guidelines. The findings highlight three simple elements of programs that are improving outcomes for both moms and children:

- 1. Team-based care that pairs prenatal care with SUD treatment and care coordination:** For example, Kaiser's Early Start Program uses a standard screening questionnaire for all prenatal patients and provides intensive care coordination, counseling, and medication-assisted treatment (MAT) for women with SUDs. Program evaluations have shown increased rates of abstinence among participants, and significantly better rates of complications among infants. A 2012 cost-benefit analysis found a net savings of roughly \$6 million.² Similar programs, including Dartmouth-Hitchcock Medical Center and the Toronto Center for Drug Use in Pregnancy, also found promising results.
- 2. Collaboration among representatives of healthcare, child welfare, social services, and the judicial system:** Between 2010 and 2014 in Vermont, for example, periodic multi-disciplinary case conferences and collaborative management of at-risk patients contributed to a reduction in infants diagnosed with drug withdrawal due to opioid exposure (from 27 percent to 18 percent) and fewer infants transported to a tertiary care hospital for intensive treatment (10.1 percent versus 37.5 percent). Preliminary results from a forthcoming evaluation of a similar, MHCF-funded program in Kalispell, Montana, show similar promise for this simple approach.
- 3. Addressing unmet social needs:** Homelessness, domestic violence, lack of transportation, and other social needs often complicate SUD treatment. Care coordination provided in a team-based prenatal care setting can address many of these issues. Some programs go further, pairing affordable housing with social services. The Exodus Program in Los Angeles, California, for example, reported that over its first 6 years of operation less than 5 percent of the 264 infants born into the program had positive toxicology screens.

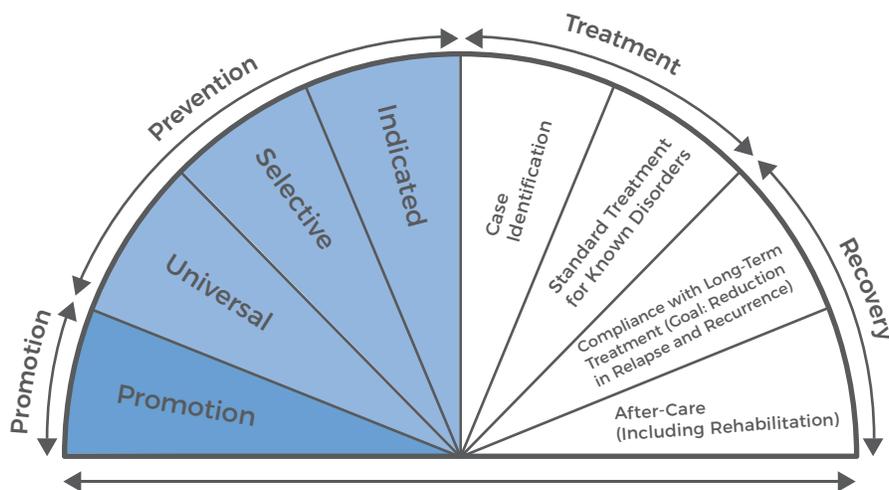
The results of this review offer a reason for hope and prompt action in Montana: a relatively simple set of low-cost, evidence-based measures can allow Montana to move the needle on what can reasonably be called a public health crisis. Coordinated action based on what we know to be effective can improve perinatal outcomes, improve child safety, keep more families together, reduce health expenditures, and give more Montana children a healthy start.



Introduction

Few women with SUDs receive the integrated perinatal care they need. While data on the prevalence of prenatal SUDs are limited, the Substance Abuse and Mental Health Services Administration (SAMHSA) estimates that 22.1 percent of women used alcohol, tobacco products, or illicit drugs during pregnancy in 2013-2014.³ Women who use drugs during pregnancy are more likely to have delayed prenatal and SUD care, which may result in poorer maternal and infant health outcomes.^{4, 5} Action informed by high-quality evidence across the continuum of care is needed to reduce harm related to perinatal SUDs and ensure the best possible maternal and infant outcomes.

Figure 1. Behavioral Health Continuum of Care⁶



SUD Epidemiology

Women with SUDs during pregnancy are more likely to be young, low-income, and have histories of childhood trauma or intimate partner violence.⁷ Comorbid conditions such as mental illness and Hepatitis B and C are common in this vulnerable population.⁸ Unhealthy alcohol consumption and use of tobacco products remain, by far, the substance use problems most prevalent during pregnancy.¹ Among pregnant women in 2013-2014, an estimate of 9.3 percent used alcohol (2.3 percent binge use), 13.4 percent used tobacco products, and 5.3 percent used any illicit drugs (2 percent excluding marijuana).¹ The prevalence of self-reported substance use is progressively lower in later stages of pregnancy.¹ Factors such as substance type and timing, frequency, and quantity of substance use are important predictors of birth outcomes and long-term effects on infants.⁴ The long-term effects (on growth, behavior, cognition, language, and achievement) of exposure in utero to drugs such as opioids and methamphetamines have not been extensively studied (See Appendix Item 1). However, fetal drug exposure can also occur among mothers who do not meet the criteria for SUDs. Taking prescription drugs or using MAT, such as methadone, to treat opioid dependence during pregnancy can have in utero effects similar to SUDs (See Appendix Item 2).

Substance Use Disorder Consequences

- **Birth outcomes:** Neonatal abstinence syndrome (NAS) (withdrawal symptoms primarily linked to opioid use; see Appendix Item 2) and adverse birth outcomes such as preterm birth and low birth weight are repercussions of substance use during pregnancy.⁹ In conjunction with the national opioid epidemic, the annual incidence of diagnosed NAS increased three-fold between 2000 and 2009, equal to approximately one infant per hour born with signs of drug withdrawal in 2009.^{4,10}
- **Healthcare spending:** The high price of NAS care is well documented: aggregate hospital charges for NAS grew from \$190 million to \$1.5 billion between 2000 and 2012, and the mean hospital charge for a NAS case was \$53,000 in 2009.^{3,11} Approximately 81 percent of these charges were paid for by Medicaid in 2012. This financial burden has spawned quality improvement initiatives aimed at reducing inpatient length of stay and related expenditures for babies with NAS.
- **Longer-term health and social welfare outcomes:** The toll of untreated addiction goes beyond the health of individuals and families who are directly affected, extending to broader social consequences. It can create parenting and family dysfunction and place children at greater risk of maltreatment and involvement with child protective services (CPS).¹² Children who grow up in drug abusing households are more likely to use drugs as adolescents or adults.¹³ Furthermore, SUDs are strongly associated with incarceration, unemployment, and poverty.¹⁴

Care Recommendations for Perinatal SUDs

SUDs during pregnancy pose significant risks to mother and child but can also be an opportunity for women, families, and clinicians to identify and address drug dependence, with its related health and behavior patterns.^{15, 16} Strategies ranging from primary prevention to NAS care are crucial to addressing perinatal SUDs. While the U.S. Preventive Services Task Force has not yet issued recommendations, many reputable national and international sources have outlined appropriate care for this population.

- **The World Health Organization** has proposed these overarching principles to guide planning, implementing, and evaluating interventions: prioritize prevention, ensure access to prevention and treatment services, respect patients and their autonomy, provide comprehensive care, and safeguard against discrimination and stigmatization.¹⁷
- **The Society of Obstetricians and Gynecologists of Canada (SOGC)** issued clinical practice guidelines to address problematic substance use in pregnancy. The guidelines stress universal SUD screening and counseling on drug use for all women of childbearing age, as well as offering recommendations on drug testing and clinical approaches that incorporate community resources. SOGC also provides MAT options to treat opioid use disorders during pregnancy, offers counseling regarding breastfeeding, and arranges protocols for anticipating and addressing NAS.¹⁸

Figure 2. SOGC Clinical Practice Guidelines for Identification and treatment of SUD in Pregnancy

1. All pregnant women and women of childbearing age should be screened periodically for alcohol, tobacco, and prescription and illicit drug use using a validated screening tool.
2. When testing for substance use is clinically indicated, urine drug screening is the preferred method.
3. Informed consent should be obtained from the woman before maternal drug toxicology testing is ordered.
4. Policies and legal requirements with respect to drug testing of newborns may vary by jurisdiction, and caregivers should be familiar with the regulations in their region.
5. Healthcare providers should employ a flexible approach to the care of women who have substance use problems, and they should encourage the use of all available community resources.
6. Women should be counseled about the risks of periconception, antepartum, and postpartum drug use.
7. Smoking cessation counseling should be considered as a first-line intervention for pregnant smokers.
8. Nicotine replacement therapy or pharmacotherapy can be considered if counseling is not successful.
9. Methadone maintenance treatment should be standard of care for opioid-dependent women during pregnancy.
10. Other slow-release opioid preparations may be considered if methadone is not available.
11. Opioid detoxification should be reserved for selected women because of the high risk of relapse to opioids.
12. Opiate-dependent women should be informed that neonates exposed to heroin, prescription opioids, methadone, or buprenorphine during pregnancy are monitored closely for symptoms and signs of neonatal withdrawal (neonatal abstinence syndrome).
13. Hospitals providing obstetric care should develop a protocol for assessment and management of neonates exposed to opiates during pregnancy.
14. Antenatal planning for intrapartum and postpartum analgesia may be offered for all women in consultation with appropriate healthcare providers.
15. The risks and benefits of breastfeeding should be weighed on an individual basis because methadone maintenance therapy is not a contraindication to breastfeeding.

- The American Congress of Obstetricians and Gynecologists (ACOG) recommends effective screening practices, family-centered SUD treatment, counseling on pregnancy planning and contraception, and postpartum care to allow additional opportunities for continued care planning for the mother and infant.¹⁹

Figure 3. ACOG Advocacy Toolkit: Do’s and Don’ts²⁰

DOES NOT SUPPORT Healthy Outcomes for Mom & Baby	SUPPORTS Healthy Outcomes for Mom & Baby
Overtreatment of NAS in NICUs	Appropriate comfort care in low-stimuli environment and pharmacological therapy where indicated
Criminal penalties for women and doctors	Public health approaches focused on prevention and treatment
Mandatory urine testing	Screening dialogue/questionnaire with patient consent
Mandatory reporting to law enforcement or CPS	Statistical reporting to department of health or direct reporting to CPS only for actual indications of impaired parenting
Overreliance on fragmented PDMPs	Safe prescribing and initial check of PDMPs
Punitive drug treatment courts	Family-centered drug treatment programs
Restrictions on medication access and forced withdrawal	OAT with methadone or bupreorphine for women and protections for treating physicians
Misleading drug prescribing warnings	Evidence-based labeling of opioid medications
Anti-family, one-size-fits-all drug treatment programs	Family-centered, community-based, outpatient treatment
Coercive referrals for fertility control	Counseling on pregnancy planning, prevention and contraception
Losing sight of the real harms of alcohol and cigarette use during pregnancy	Continued focus on the greatest preventable health threats – alcohol and tobacco use during pregnancy

Perinatal SUDs: Need for an Integrated Continuum of Care

Systematic review of evidence shows that programs integrating on-site pregnancy, parenting, or child-related services with addiction services have a positive influence on child developmental and behavioral outcomes and parenting outcomes.²¹ Multiple combined strategies are needed to provide high-quality preventive and treatment services across the care continuum. However, certain child welfare policies limit the collaboration between medical care providers and community resources. Accessible treatment for non-pregnant women and differences in perinatal drug screening, assessment, and care practices are known to create barriers to coordinated responses.^{12, 22}

The next section describes perinatal SUD care in inpatient and outpatient health delivery settings, focusing on the local and state levels and rigorously evaluated initiatives. Residential treatment programs are addressed separately.

Local Responses

A variety of approaches have emerged at the local and state level to address SUDs in the perinatal period. While program evaluations and methods have not been published, the two programs below illustrate how healthcare systems are working collaboratively and with local communities to tackle this urgent issue.

Dartmouth-Hitchcock Medical Center Perinatal Addiction Treatment Program²³

The Dartmouth-Hitchcock Medical Center Perinatal Addiction Treatment Program serves pregnant and postpartum women with SUDs. It involves the colocation of midwifery services within a dedicated addiction treatment program. The obstetrics and gynecology and psychiatry and addiction medicine departments worked together to design a structured prenatal screening program based on a screening, brief intervention, and referral for treatment model. A multidisciplinary and inter-professional team led implementation in the prenatal clinic. The team includes the addiction treatment center director, a nurse-midwife, and registered nurses in the maternal-fetal medicine, midwifery, and general obstetrics and gynecology divisions. Resident and attending physicians, nurse practitioners, nurse-midwives, and nurses receive training in screening and brief intervention techniques, as well as background education regarding SUDs. This program uses validated questionnaires to screen all prenatal patients for drug and alcohol use. Guidelines help standardize the referral process to the perinatal addiction treatment program. A structured approach to screening and intervention for drug and alcohol use in the outpatient prenatal clinic facilitates referral to treatment at the appropriate level. Midwifery care for substance-using prenatal patients aims to enhance access to prenatal care, improve continuity of care throughout pregnancy and postpartum, and increase the availability of family planning services.

Vermont Comprehensive State Model²⁴

Efforts to coordinate multidisciplinary care for rural parts of Vermont began in 2002 when obstetricians, pediatricians, and specialists in addiction medicine were united through one high-risk pregnancy/neonatal care unit for opioid treatment in the state. Increased state financial support helped to facilitate multidisciplinary meetings which included visiting nurses, social workers, and representatives from child welfare and the judicial system as a part of the system of care. Coordinating care required substantial sharing of sensitive information, for which patient consent was requested and two Vermont statutes were passed. These statutes allowed the development of a group of empaneled professionals to share relevant patient-specific information for child safety, and the initiation of a child safety investigation within 30 days of expected delivery for women with substance abuse who were not in a treatment program. From 2010 to 2014 the percentage of opioid-exposed infants with NAS due to illicit opioid exposure decreased from 27 percent to 18 percent and fewer infants were transported to a tertiary care center for NAS evaluation or treatment (10.1 percent vs. 37.5 percent).

Culturally Sensitive Care for Diverse Populations²⁵

Local responses to SUD often rely on input from community stakeholders to provide care that is tailored to the needs of Native populations. SUD-related services for Native Americans must consider key cultural and socio-economic factors that can create barriers to successful SUD care. One study found that not only do Native American women with SUD experience common risk factors such as childhood abuse and neglect, they also suffer disproportionately from cultural displacement, family separation, and poverty over multiple generations. While strategies may vary based on the unique circumstances of diverse Native American tribes, this case study stressed that programs for Native American women should focus on relationships and trust-building, engaging entire families, and attracting Native American staff and community members that can help develop culturally responsive care models.

Most Thoroughly Evaluated Care Models

Kaiser Permanente's Early Start Program

Early Start is based in the Kaiser Permanente HMO and is one of the largest prenatal substance-abuse programs in the United States.^{26, 27, 28} It targets all pregnant women seen at Kaiser Permanente Northern California prenatal clinics, and as of 2007, screened 39,000 women annually with a confidential prenatal questionnaire (most also consent to urine toxicology screening). Around 40 percent of women who went through the full program had incomes below 25,000 a year and had a high school education or less. Their insurance coverage (public or private) was unspecified, though it is worth noting that Kaiser serves about 700,000 people enrolled in the California Medicaid Program, which is a major source of coverage for prenatal care in the state.

Early Start seeks to address substance abuse as a treatable disease with a nonjudgmental, accepting approach. The program ensures a substance abuse counselor (called an Early Start Specialist, or ESS) is in each obstetrics clinic. This staff member provides accessible one-to-one counseling to pregnant women screened at risk for alcohol, tobacco, or drug use as part of the routine prenatal care package offered to all patients. Patients whose questionnaire or toxicology screening results are positive are referred by the prenatal clinician directly to the Early Start program. A thorough psychosocial assessment is then performed; the patient is educated about risks and offered support, resources, and referrals. After the assessment, the ESS works closely with the clinician to coordinate the patient's care throughout pregnancy. If the ESS determines that the woman has chemical dependency or substance abuse, or is at increased risk for substance abuse, then follow-up Early Start appointments are continued throughout the pregnancy in conjunction with prenatal medical visits. The program leverages Kaiser Permanente's medical treatment for opiates to provide MAT when needed and makes referrals to specialty SUD care in more severe cases.²⁹

Alongside the ESS, the Early Start team is composed of a physician or nurse practitioner "champion," a nurse manager, and a medical assistant. The medical assistant monitors, books, and reschedules appointments to ensure coordinated care and case management. All prenatal clinicians are trained with standardized scripts to assist them in talking with and referring patients to the ESS, and the Early Start champion at each site is actively involved in their training, education, and support. The nurse manager is also a key player, maintaining well-coordinated and streamlined Early Start systems. The teams meet monthly at their sites to review their quality goals, improve systems, and celebrate successes. Twice a year, they meet with other region-wide teams to address obstacles and to share and develop best practices. A multidisciplinary regional team supports the local sites with an endorsement from the regional women's health leader and sponsorship and joint financial support from executive leadership.

The Early Start program's effectiveness and costs are evaluated by comparing outcomes for women who screened positive for SUDs but received no further assessment or treatment with those for women who were screened-positive, assessed, and treated. In multivariate analysis, the screened-positive-only group had significantly worse birth outcomes than the screened-positive, assessed, and treated group; for instance, women who only were screened had 2.3 times greater odds of preterm delivery and 6.8 times higher odds of placental abruption, than women who underwent full treatment. Early Start is also a cost-beneficial intervention, yielding an estimated \$500 savings per capita due mostly to reductions in preterm births. The evaluation showed that the per-infant costs for births from 33 to 36 weeks of gestation were 2.9 times higher in the screened-positive-only group (\$42,305) than in the screened-assessed-treated group (\$14,317).

Toronto Centre for Substance Use in Pregnancy³⁰

The Toronto Centre for Substance Use in Pregnancy (T-CUP) was established in 1995 to provide integrated services to pregnant women with SUDs. T-CUP is physician-led and offers a one-stop access model to provide comprehensive services for pregnant women with a history of alcohol or drug abuse, including prenatal and postnatal medical care, addiction counseling, and assistance with complex psychosocial needs in the primary care setting. These components have helped T-CUP engage and retain women in care.

T-CUP provides comprehensive treatment from prenatal care to postpartum care and incorporates obstetric, and addiction care with case management facilitated by a nurse clinician and team social worker, who also helps address any child protection concerns. Addiction disorders are managed with a variety of strategies, including medical treatment of withdrawal symptoms, maintenance pharmacotherapy to promote abstinence, and relapse-prevention counseling. Specialists in obstetrics, pediatrics, anesthesia, and psychiatry within the hospitals are integrated into care as needed. Members of the care team meet monthly to review a woman's progress and develop procedures for caring for pregnant substance-using women. Finally, T-CUP links with women-only addiction treatment programs and offers an on-site addiction group that combines prenatal/relapse prevention with facilitated access to prenatal medical care. The T-CUP program can also connect women with community services and resources, including housing and social assistance.

A retrospective chart review for 121 women who received care at T-CUP (between August 2000 and January 2006) demonstrated a high compliance rate with prenatal care attendance. Most women reported a reduction in a variety of drug use categories, with improvements most significant among women who presented earlier in their pregnancies. Neonatal outcomes were satisfactory, and approximately 75 percent of newborns were discharged home in the care of their mothers.

- **Responding to unmet needs**, such as housing and social services, can be a key component of programs addressing perinatal SUDs.¹² Along with T-CUP, an example of this approach is the Exodus Program developed by SHIELDS for Families of Los Angeles, California, which provides comprehensive services including counseling, physical and mental healthcare, family support and reunification, and child development. Further, SHIELDS allows families to remain in housing for one year post-completion of the program to offer stability to recovering families. In 2002-2007 SHIELDS reported an 81.2 percent program completion rate, a 67 percent rate of entry into prenatal care, and generally increased parental knowledge and skills. Less than 5 percent of the 264 infants born into the program had positive toxicology screens.
- **Residential treatment programs** are a possible care option for people who are withdrawing from drug use. In Burlington, Vermont, a residential treatment center known as the Lund Center is part of a group of agencies serving women with opioid addiction and their families during pregnancy and infancy.¹⁷ The Lund Center allows babies to be housed with their mothers as they undergo treatment, an arrangement that embodies the center's 'wrap around' approach ensuring care for the whole family.
- **Home visiting programs** for perinatal SUDs can offer comprehensive support for vulnerable families. In Washington, the Parent-Child Assistance Program (PCAP) serves high-risk mothers who are heavy users of drugs or alcohol during pregnancy. Case managers work with 16 families at a time over the course of three years, providing home visiting to encourage mothers and connect them with supportive services such as SUD care, mental health resources, and housing services within their communities to foster stability. Evaluations show that PCAP participants have a higher rate of SUD treatment initiation and completion, a lower rate of subsequent substance exposed births, and are less likely to depend on child welfare or social services over an extended period than are non-participants.³¹

Centering Pregnancy

Centering Pregnancy is a group prenatal care model promising to deliver high patient satisfaction and perinatal outcomes that are comparable to or better than those obtained with individual visits, including decreased incidence of preterm birth, increased birth weight, improved weight gain during pregnancy, increased adequacy of prenatal care and greater prenatal knowledge.³² The Centering Pregnancy method brings together 8-12 women of similar gestational age for prenatal group sessions comprised of individual check-ups (conducted in the group setting), followed by facilitated discussions on prenatal health topics that give women the opportunity to share their experiences and concerns, receive peer support, and teach one another.^{33, 34} Partners and significant others can also attend. The method emphasizes risk assessment, education, social support for participants, and shifts authority away from the provider to the women in the group.^{35, 36, 37}

There is some evidence that prenatal group visits support successful perinatal outcomes in pregnant women with SUDs, although the literature on this topic is limited. In one study, opioid-addicted women participating in Centering Pregnancy had greater compliance with scheduled prenatal care and fewer emergency room obstetrical triage visits than counterparts who saw providers one-on-one. Research indicating that Centering Pregnancy may be an effective model to address the psychosocial needs of pregnant adolescents, an especially vulnerable group, and of disadvantaged black and Hispanic women suggests the potential for a positive impact on other high-risk populations, such as drug-addicted women.³⁹

At least two states, Montana and South Carolina, have launched efforts to expand Medicaid coverage and improve access to group prenatal care modeled on Centering Pregnancy.

- In Montana, the **Promising Pregnancy Care Program** sponsored by the Department of Public Health and Human Services, includes culturally sensitive training for providers working with Native American populations based in part on a group prenatal care curriculum, *The Coming of the Blessing*, developed by the March of Dimes. Among the topics covered in the instructional materials for sessions facilitators are risks factors and consequences for mother and baby of alcohol, tobacco, and other drug use during pregnancy.⁴⁰ Outcome data from the program were not immediately available.
- The **South Carolina Birth Outcomes Initiative** creates incentives for group prenatal care through enhanced Medicaid reimbursement.⁴¹ A retrospective five-year cohort study of low-risk Medicaid enrollees attending group prenatal sessions demonstrated sizable, statistically significant reductions in risk of premature birth, the incidence of low-birth weight, and risk of NICU stay. The costs savings from improved outcomes of Centering Pregnancy compared with individual care generated a return on investment for the state of nearly \$2.3 million.⁴²



Summary & Conclusion

It is increasingly clear that interventions are needed along the continuum of care to prevent drug dependence and improve access to comprehensive SUD treatment for affected families.¹² Data are limited for implementation/feasibility factors for integrated perinatal SUD care programs in the peer-reviewed literature.⁴³ However, healthcare innovations that succeed tend to be those that stakeholders view as advantageous over existing practices, compatible with local values and needs, easy to implement, and low-risk.¹⁶

The programs reviewed here share some key elements that could account for the successful outcomes being reported. These interventions:

1. **Are family-centered and trauma-informed.** Most well-documented programs aim to involve partners (Centering Pregnancy) and other family members (SHIELDS). The Lund Residential Program espouses family support as part of its mission, but no aggregate outcome data are available. Because many women develop SUDs to cope with trauma-related symptoms, access to trauma-informed interventions is important at every stage of a woman's life.⁴⁴ Programs that are sensitive to the needs of traumatized women have a higher retention rate, enabling participants to maximize positive treatment outcomes.^{45, 46}

2. **Offer integrated services, including screening, assessment, treatment, and referral process protocols.** Virtually all the programs highlighted strive to offer accessible, coordinated services that stretch from the prenatal to the post-partum period and include both pregnancy and SUD related care. The Dartmouth-Hitchcock Medical Center program also improves the availability of family-planning services.
3. **Address unmet social needs.** T-Cup and SHIELDS both help women and families with housing, and T-Cup works to connect program enrollees with social services in the community.
4. **Are non-stigmatizing.** Early Start, the Kaiser Permanente program, exemplifies an accepting, non-judgmental approach to care. The universality of the ES approach, which targets all women receiving prenatal care at Kaiser clinics, works to combat the stigma associated with SUDs.
5. **Operate at both the individual/family and policy levels.** Pregnant women and their families are usually the primary intervention targets, however in at least three cases commitment by state administrators and elected officials enabled special statutes, dedicated budget allocations (Vermont’s Comprehensive State Model), and changes to Medicaid reimbursement rules (South Carolina Birth Outcomes Initiative) in support of innovative programs.
6. **Are multi-disciplinary.** T-Cup, Dartmouth-Hitchcock, and Vermont’s Comprehensive State Model all rely on collaboration – and sometimes co-location – of inter-professional teams of providers with expertise ranging from obstetrics and gynecology to psychiatry, addiction medicine, and social work.

Many of these features are consistent with published best practices. As the social and health repercussions of SUD during pregnancy grow heavier, robust evaluation efforts will be crucial to validate early positive results and build a strong evidence base for effective policies and care strategies.²⁶

Literature Review Method

- Search of English-language articles performed in March 2017 using Web of Science and PubMed and these key terms: pregnancy OR perinatal OR prenatal AND “substance use” AND maternal OR drug OR addiction OR abuse OR neonatal abstinence AND care OR integrate OR coordinate.
- Articles limited to publication dates 2006-2017.
- Non-random sampling of grey literature performed through internet search.

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Appendix

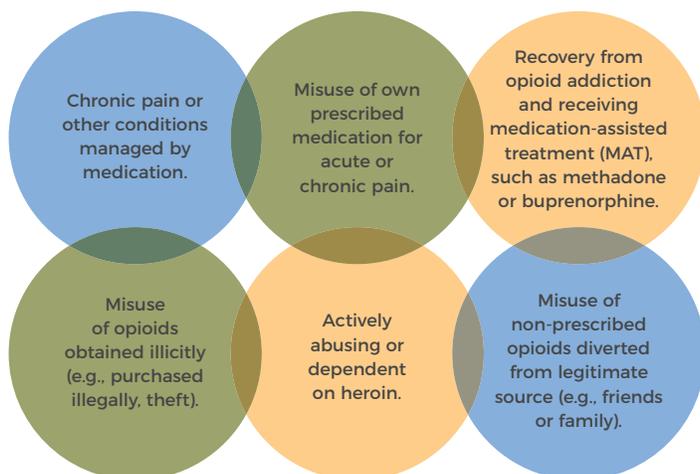
1. Source: Behnke, M., Smith, V. C. (2013). Prenatal substance abuse: short-and long-term effects on the exposed fetus. *Pediatrics*, 131(3)

TABLE 2 Summary of Effects of Prenatal Drug Exposure

	Nicotine	Alcohol	Marijuana	Opiates	Cocaine	Methamphetamine
Short-term effects/birth outcome						
Fetal growth	Effect	Strong effect	No effect	Effect	Effect	Effect
Anomalies	No consensus on effect	Strong effect	No effect	No effect	No effect	No effect
Withdrawal	No effect	No effect	No effect	Strong effect	No effect	*
Neurobehavior	Effect	Effect	Effect	Effect	Effect	Effect
Long-term effects						
Growth	No Consensus on effect	Strong effect	No effect	No effect	No consensus on effect	*
Behavior	Effect	Strong effect	Effect	Effect	Effect	*
Cognition	Effect	Strong effect	Effect	No consensus on effect	Effect	*
Language	Effect	Effect	No effect	*	Effect	*
Achievement	Effect	Strong Effect	Effect	*	No consensus on effect	*

* Limited or no data available.

2. Source: Neonatal Abstinence Syndrome, State Public Health, ASTHO. (2017). Astho.org. Retrieved 12 March 2017, from <http://www.astho.org/Prevention/Rx/NAS/>



References

- ¹ Grady, A., Bachrach, D., Boozang, P. (2017, March). Medicaid's Role in the Delivery and Payment of Substance Use Disorder Services in Montana. Retrieved from <https://mthcf.org/wp-content/uploads/2018/01/Medicoids-Role-in-the-Delivery-and-Payment-of-SUD.pdf>.
- ² Early Start Perinatal Substance Abuse Program – Kaiser Permanente Northern California. (2016, September) Retrieved from <https://earlystart.kaiserpermanente.org/wp-content/uploads/2016/09/Early-Start-Program-Description.pdf>
- ³ Center for Behavioral Health Statistics and Quality. (2015). 2014 National Survey on Drug Use and Health: Detailed Tables. Substance Abuse and Mental Health Services Administration, Rockville, MD.
- ⁴ Metz, V., Köchl, B., & Fischer, G. (2012). Should pregnant women with substance use disorders be managed differently? *Neuropsychiatry (London)*, 2(1), 29-41.
- ⁵ Kotelchuck, M., Cheng, E. R., Belanoff, C., Cabral, H. J., Babakhanlou-Chase, H., Derrington, T. M., . . . Bernstein, J. (2016). The Prevalence and Impact of Substance Use Disorder and Treatment on Maternal Obstetric Experiences and Birth Outcomes Among Singleton Deliveries in Massachusetts. *Matern Child Health J.*
- ⁶ Prevention of Substance Abuse and Mental Illness | SAMHSA - Substance Abuse and Mental Health Services Administration. (2017). *Samhsa.gov*. Retrieved 21 April 2017, from <https://www.samhsa.gov/prevention>
- ⁷ Metz, V., Kochl, B., & Fischer, G. (2012). Should pregnant women with substance use disorders be managed differently? *Neuropsychiatry*, 2(1), 29-41.
- ⁸ Sylvestre, D. L., Loftis, J. M., Hauser, P., Genser, S., Cesari, M. H., Borek, N., ... & Francis, H. (2004). Co-occurring hepatitis C, substance use, and psychiatric illness: treatment issues and developing integrated models of care. *Journal of Urban Health*, 81(4), 719-734.
- ⁹ Behnke, M., Smith, V. C. (2013). Prenatal substance abuse: short-and long-term effects on the exposed fetus. *Pediatrics*, 131(3)
- ¹⁰ Patrick, S. W., Schumacher, R. E., Benneyworth, B. D., Krans, E. E., McAllister, J. M., & Davis, M. M. (2012). Neonatal abstinence syndrome and associated healthcare expenditures: United States, 2000-2009. *JAMA*, 307(18), 1934-1940. doi:10.1001/jama.2012.3951
- ¹¹ Patrick, S. W., Davis, M. M., Lehmann, C. U., & Cooper, W. O. (2015). Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. *Journal of Perinatology*, 35(8), 650-655.
- ¹² Young, N. K., Boles, S. M., & Otero, C. (2007). Parental substance use disorders and child maltreatment: Overlap, gaps, and opportunities. *Child maltreatment*, 12(2), 137-149.
- ¹³ Messina, N., Calhoun, S., Conner, E., & Miller, M. (2015). Improving the outcomes of children affected by parental substance abuse: a review of randomized controlled trials. *Substance Abuse And Rehabilitation*, 15. doi:10.2147/sar.s46439
- ¹⁴ Werner, D., Young, N. K., Dennis, K., & Amatetti, S. (2007). Family-centered treatment for women with substance use disorders: History, key elements, and challenges. Substance Abuse and Mental Health Services Administration Department of Health and Human Services.
- ¹⁵ Chang, G. (2014). Screening for alcohol and drug use during pregnancy. *Obstet Gynecol Clin North Am.* Jun;41(2):205
- ¹⁶ World Health Organization. (2014). Management of substance abuse. Substance use in pregnancy. Guidelines for the identification and management of substance use and substance use disorders in pregnancy. Available from http://www.who.int/substance_abuse/activities/pregnancy_substance_use/en/. Accessed May 17th, 2017.

- ¹⁷ World Health Organization. (2014). Management of substance abuse. Substance use in pregnancy. Guidelines for the identification and management of substance use and substance use disorders in pregnancy. Available from http://www.who.int/substance_abuse/activities/pregnancy_substance_use/en/. Accessed May 17th, 2017.
- ¹⁸ Wong, S., Ordean, A., Kahan, M., Gagnon, R., Hudon, L., Basso, M., ... & Farine, D. (2011). Substance use in pregnancy. *Journal of Obstetrics and Gynaecology Canada*, 33(4), 367-384.
- ¹⁹ Academy of Obstetricians and Gynecologists. Toolkit on state legislation: Pregnant women & prescription drug abuse, dependence and addiction. (2017). [Acog.org](https://www.acog.org/-/media/Departments/Government-Relations-and-Outreach/NASToolkit.pdf). Retrieved 12 March 2017, from <https://www.acog.org/-/media/Departments/Government-Relations-and-Outreach/NASToolkit.pdf>
- ²⁰ Academy of Obstetricians and Gynecologists. Toolkit on state legislation: Pregnant women & prescription drug abuse, dependence and addiction. (2017). [Acog.org](https://www.acog.org).
- ²¹ Niccols, A., Milligan, K., Smith, A., Sword, W., Thabane, L., & Henderson, J. (2012). Integrated programs for mothers with substance abuse issues and their children: a systematic review of studies reporting on child outcomes. *Child abuse & neglect*, 36(4), 308-322.
- ²² Coates, S. and Jarvis, A. (2016). "Pregnancy and Opioid Treatment: Beyond the Hub and Spoke." (2017). [Uvm.edu](http://www.uvm.edu). Retrieved from <http://www.uvm.edu/medicine/mededucation/enews/documents/Opioid-Treatment-in-Pregnant-Women.pdf>
- ²³ Goodman, D. (2015). "Improving Access to Maternity Care for Women with Opioid Use Disorders: Colocation of Midwifery Services at an Addiction Treatment Program." *J Midwifery Womens Health* 60(6): 706-712.
- ²⁴ Meyer, M. and J. Phillips (2015). "Caring for pregnant opioid abusers in Vermont: A potential model for non-urban areas." *Prev Med* 80: 18-22.
- ²⁵ Peterson, S., Berkowitz, G., & Brindis, C. (2002). Native American women in alcohol and substance abuse treatment. *Journal of Health Care for the Poor and Underserved*, 13(3), 360-378.
- ²⁶ Goler, N. C., et al. (2012). "Early start: a cost-beneficial perinatal substance abuse program." *Obstetrics & Gynecology* 119(1): 102-110.
- ²⁷ Goler, N. C., et al. (2008). "Substance abuse treatment linked with prenatal visits improves perinatal outcomes: a new standard." *Journal of Perinatology* 28(9): 597-603.
- ²⁸ Taillac, C., Goler, N., Armstrong, M. A., Haley, K., & Osejo, V. (2007). Early start: an integrated model of substance abuse intervention for pregnant women. *The Permanente Journal*, 11(3), 5-11.
- ²⁹ Goler, N.C. (2012). "Improving Birth Outcomes: Integrated SBIRT Approaches to Care." [Samhsa.gov](https://www.samhsa.gov). Retrieved from https://www.samhsa.gov/sites/default/files/programs_campaigns/women_children_families/womens-health.pdf
- ³⁰ Ordean, A. and M. Kahan. (2011). "Comprehensive treatment program for pregnant substance users in a family medicine clinic." *Canadian Family Physician* 57(11): E430-E435.
- ³¹ Washington Alcohol and Drug Abuse Institute, University of Washington. (2015). Parent-Child Assistance Program, 1991-present. Retrieved from http://depts.washington.edu/pcapuw/inhouse/PCAP_Summary_of_Evidence_Feb_2015.pdf
- ³² Lathrop B. A systematic review comparing group prenatal care to traditional prenatal care. *Nurs Womens Health*. 2013 Apr-May;17(2):118-30
- ³³ Novick G1, Sadler LS, Knafel KA, Groce NE, Kennedy HP. In a hard spot: providing group prenatal care in two urban clinics. *Midwifery*. 2013 Jun;29(6):690-7. doi: 10.1016/j.midw.2012.06.013.
- ³⁴ Lathrop B. A systematic review comparing group prenatal care to traditional prenatal care. *Nurs Womens Health*. 2013 Apr-May;17(2):118-30
- ³⁵ Lathrop B. A systematic review comparing group prenatal care to traditional prenatal care. *Nurs Womens Health*. 2013 Apr-May;17(2):118-30

- ³⁶ Moos MK. Prenatal care: limitations and opportunities. *J Obstet Gynecol Neonatal Nurs*. 2006 Mar-Apr;35(2):278-85.
- ³⁷ Carlson NS1, Lowe NK. CenteringPregnancy: a new approach in prenatal care. *MCN Am J Matern Child Nurs*. 2006 Jul-Aug;31(4):218-23.
- ³⁸ Adams J1 , Kenny T1 , Frantz K1 , Craig M1 , Eden R1 , Bellante A1 , Silber A1 , McCarroll ML1,2*, von Gruenigen VE1,2 and Gothard MD3. 2016. Comparison of Outcomes in Maternal Opioid Medical Support Using Centering Pregnancy Versus Maternity Care Home. *J Preg Child Health* 2016, 3:4.
- ³⁹ What works for Health: Policies and Programs to improve Wisconsin's Health. University of Wisconsin Population Health Institute. Available from <http://whatworksforhealth.wisc.edu/program.php?t1=22&t2=16&t3=133&id=433>, accessed on May 19th, 2017.
- ⁴⁰ Montana DPHHS. Maternal and Child Health Block Grant. Promising Pregnancy Care Information. Available from <http://dphhs.mt.gov/publichealth/MCH#148435768-promising-pregnancy-care-information>. Accessed on May 19, 2017.
- ⁴¹ Centering Pregnancy Institute. New Study Finds Medicaid Savings and Better Outcomes through CenteringPregnancy. Available from <https://www.centeringhealthcare.org/news/new-study-finds-medicaid-savings-and-better-outcomes-through-centeringpregnancy>, accessed May 19th, 2017.
- ⁴² Gareau S, López-De Fede A, Loudermilk BL, Cummings TH, Hardin JW, Picklesimer AH, Crouch E, Covington-Kolb S. 2016. Group Prenatal Care Results in Medicaid Savings with Better Outcomes: A Propensity Score Analysis of CenteringPregnancy Participation in South Carolina. *Matern Child Health J*. Jul;20(7):1384-93.
- ⁴³ Henderson, J., Milligan, K., Niccols, A., Thabane, L., Sword, W., Smith, A., & Rosenkranz, S. (2012). Reporting of feasibility factors in publications on integrated treatment programs for women with substance abuse issues and their children: a systematic review and analysis. *Health research policy and systems*, 10(1), 37.
- ⁴⁴ Center for Substance Abuse Treatment. (2009). *Substance Abuse Treatment: Addressing the Specific Needs of Women*. Rockville (MD): Substance Abuse and Mental Health Services Administration (US). Chapter 7: Substance Abuse Treatment for Women. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK83257/>, accessed May 23, 2017.
- ⁴⁵ Center for Substance Abuse Treatment. (2009). *Substance Abuse Treatment: Addressing the Specific Needs of Women*. Rockville (MD): Substance Abuse and Mental Health Services Administration (US). Chapter 7: Substance Abuse Treatment for Women. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK83257/>, accessed May 23, 2017.
- ⁴⁶ Gatz, Margaret, et al. "Effectiveness of an integrated, trauma-informed approach to treating women with co-occurring disorders and histories of trauma: The Los Angeles site experience." *Journal of Community Psychology* 35.7 (2007): 863-878.