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Polysubstance Use in Pregnancy: Surveillance, Interventions, and Next Steps

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Abstract

Substance use during pregnancy increases risk for a wide range of adverse maternal and neonatal health outcomes. Polysubstance use is common among people who use substances during pregnancy; however, the risks of combined substance exposures during pregnancy are poorly understood. In this report, we provide an overview of the activities of the Centers for Disease Control and Prevention (CDC) and partners and identified gaps related to (1) surveillance, (2) routine screening, and (3) prevention of polysubstance use during pregnancy. Efforts by CDC and other partners to reduce polysubstance use during pregnancy can improve the health of pregnant people and their infants and children.

Keywords

polysubstance use; pregnancy; prenatal substance exposure; alcohol; smoking; opioids

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Disclaimer

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the Agency for Toxic Substances and Disease Registry.

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Introduction*

In the united states in 2020, ~20% of pregnant people used alcohol, tobacco, marijuana (hereafter referred to as cannabis unless citing reference article terminology), or another illicit drug during their pregnancy.1 According to a national survey, from 2006 to 2014, 5.1% of pregnant people reported the use of two or more substances, also referred to as polysubstance use, during pregnancy.[2] Polysubstance use is common among pregnant people using substances during pregnancy. For example, from 2015 to 2018, 38.2% of those who reported current drinking during pregnancy (alcohol use in the past 30 days) also reported using at least one other substance,[3] and from 2005 to 2014, 88.9% of pregnant people who reported nonmedical opioid use (*i.e.*, misuse of prescription opioid pain medication or use of heroin) during pregnancy also reported using other substances.[4]

Substance use during pregnancy increases risk for a wide range of adverse maternal and neonatal health outcomes, including preterm birth, low birthweight, and maternal and child mortality.[5,6] Alcohol use during pregnancy can cause miscarriage and stillbirth and can lead to birth defects and developmental disabilities known as fetal alcohol spectrum disorders (FASDs), while cigarette smoking during pregnancy increases the risk of preterm birth, low birthweight, birth defects of the mouth and lip, and sudden infant death syndrome.[7–9] Furthermore, the use of opioids and/or other substances during pregnancy can cause neonatal withdrawal effects such as neonatal abstinence syndrome (NAS) or neonatal opioid withdrawal syndrome.[10,11]

Although the risks of many single substance exposures are well documented, the risks of polysubstance exposure during pregnancy are poorly understood. In some animal models, dual exposure to cannabis and alcohol in mice had more pronounced adverse effects on developmental outcomes in pups than single substance exposures, suggesting that polysubstance use may alter or exacerbate the effects of single prenatal substance exposure on developmental outcomes.[12,13]

The National Center on Birth Defects and Developmental Disabilities (NCBDDD) at the Centers for Disease Control and Prevention (CDC) is committed to addressing substance use during pregnancy through surveillance and prevention efforts. To this end, NCBDDD aims to better understand polysubstance use and its effects on pregnant people and their infants. In this report, we provide an overview of NCBDDD and their partners' current activities and identified gaps related to (1) surveillance, (2) routine screening, and (3) prevention of polysubstance use during pregnancy.

*Note: The following text focuses on pregnancy-related or associated events. It makes use of concepts or descriptions that align with the traditional gender definitions by using concepts such as "maternal," "pregnant women," or "women." However, the concepts described are translatable to all persons who experience a pregnancy, regardless of their gender identity or intention to parent. Wherever possible, we have used the term "people who are pregnant" to describe the individuals in this study, unless citing research studies that were conducted exclusively among pregnant women.

Surveillance and Research of Polysubstance Use During Pregnancy

Routine public health surveillance can inform prevention efforts by monitoring and identifying combinations of substance use during pregnancy. NCBDDD monitors polysubstance use during pregnancy by utilizing populationbased datasets, such as the National Survey on Drug Use and Health (NSDUH), which provides national estimates and trends in substance use among civilian and noninstitutionalized adults, including pregnant people. One recent analysis of NSDUH data found that from 2015 to 2018, the prevalence of polysubstance use in the past year among pregnant respondents who reported drinking alcohol in the past month was 38.2%, and the most commonly reported substances were tobacco (28.1%) and marijuana (20.6%).[3]

Another study of NSDUH data from 2009 to 2019 found that people who are pregnant had lower odds of licit and illicit substance use in later trimesters of pregnancy compared with the first trimester, indicating that many pregnant people may reduce their substance use during pregnancy.[14] These findings can help tailor prevention activities throughout the course of pregnancy. The National Center for Chronic Disease Prevention and Health Promotion, Division of Reproductive Health, supports the Pregnancy Risk Assessment Monitoring System (PRAMS), which collects jurisdiction-specific, populationbased data on maternal attitudes and experiences before, during, and shortly after pregnancy.[15] PRAMS can be used to examine polysubstance use during pregnancy. In 2019, an optional PRAMS supplement on prescription opioid use and use of other substances during pregnancy was fielded in 32 U.S. jurisdictions.[16] Analysis of these data are currently underway to better understand the prevalence of polysubstance use such as alcohol, cigarettes, cannabis, prescription medications, and illicit substances during pregnancy.

Additionally, the COVID-19 pandemic has led to increases in substance use and interruptions in access to substance use disorder (SUD) treatment for the general population as well as for pregnant and postpartum individuals.[17–22] Therefore, NCBDDD is also conducting formative research with health care providers and individuals who reported substance use during pregnancy and postpartum to identify patterns in substance use and access to health and SUD treatment services during the COVID-19 pandemic. Findings from these studies will be used to inform future polysubstance analyses and to inform prevention planning and interventions.

Opioid use among pregnant people has risen dramatically over the last two decades, with the prevalence of opioid use disorder (OUD) at delivery quadrupling from 1999 to 2014.[23] Because of the high rates of polysubstance use (88.9%) among those who use opioids for nonmedical reasons during pregnancy,[4] CDC determined there is an urgent need to understand the effects of prenatal opioid and other substance exposure on the health and development of infants and children.[24] However, existing national and state surveillance systems collect data on limited pregnancy and birth outcomes without a clear understanding of prenatal opioid exposure and other substance use and lack data on infant and child outcomes. To address this gap, NCBDDD partnered with the Public Health Informatics Institute in 2020 to develop the MATernaL and Infant NetworK to Understand Outcomes Associated with Treatment for Opioid Use Disorder During Pregnancy (MAT-LINK).[25]

MAT-LINK is a surveillance network of seven clinics across the United States that provide integrated substance use and obstetrical care to pregnant people with OUD.

MAT-LINK clinics collect data on prenatal substance use, including alcohol, tobacco, cannabis, and other illicit drugs, in addition to details on the treatment of OUD. MAT-LINK also collects linked maternal and child health data, including maternal health and obstetric history, infant outcomes (e.g. NAS diagnoses and treatment), and early childhood diagnoses and developmental outcomes through age six years from administrative, electronic health record, pharmaceutical, and laboratory health records. By following children through 6 years and linking early childhood data with maternal data, MAT-LINK data can help identify not only adverse neonatal outcomes from prenatal opioid and polysubstance exposure, such as NAS, but also longer-term effects on child growth and development.

Because polysubstance use is known to be common among those who use opioids during pregnancy,[4] identifying the specific consequences of intrauterine exposure to opioids can be difficult due to the potential confounding effects of other substances. Further complicating matters, some developmental outcomes related to intrauterine exposure to substances, such as alcohol, may not be recognized initially, even in early childhood.[26,27] In addition to different combinations of substances, differences in the quantity, frequency, and timing of use in pregnancy may have varying effects on maternal, infant, and child outcomes. By standardizing data collection on alcohol, tobacco, cannabis, and illicit substances across multiple clinical sites, MAT-LINK can help investigators understand the potential effects of polysubstance exposure in pregnancy compared with opioid exposure alone. MAT-LINK captures more of the complexities of polysubstance use during pregnancy than cross-sectional national surveys, such as NSDUH and PRAMS.

Furthermore, MAT-LINK focuses on the exposures and outcomes of pregnant people with OUD. More comprehensive data on substance use during pregnancy can help further our understanding of the effects of polysubstance use in pregnancy.

Identification of Polysubstance Use Through Routine Screening

Early identification of polysubstance use among pregnant people is crucial to mitigate or prevent the adverse health effects for both the birthing parent and the infant. The United States Preventive Services Task Force (USPSTF) recommends screening adults, including those who are pregnant, for tobacco and unhealthy alcohol use and providing appropriate interventions, and screening adults, including persons who are pregnant and postpartum, for unhealthy drug use when services for diagnosis, effective treatment, and appropriate care can be offered or referred.[28–30] The American College of Obstetricians and Gynecologists (ACOG) recommends routine universal screening for alcohol and other drug use[31,32] and acknowledges the likelihood of polysubstance use among those who use tobacco products during pregnancy.[33]

Although clinical recommendations include universal alcohol, tobacco, and other drug use screening in pregnancy, there are barriers to implementation, and it is not consistently applied by providers as recommended. A 2016 survey found that while 96% of obstetrician–

gynecologists reported screening adult patients for alcohol use, only 20% used a validated screening tool.[34] Additionally, while screening tools in pregnancy, such as Tolerance, Worry, Eye-opener, Amnesia, and Kut down (TWEAK), Tolerance, Annoyed, Cut down, Eye-Opener (T-ACE), and Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) for unhealthy alcohol use and 5A's for tobacco use, have been well studied and validated,[28,30,35] screening tools for illicit drug use and polysubstance use during pregnancy, such as the Parents, Partner, Past, Pregnancy (4P's Plus) and Substance Use Risk Profile-Pregnancy (SURP-P) scale, are less well-studied and validation study results are mixed or insufficient to recommend their use.[35,36] While further research can inform and help establish accurate screening tools for use of multiple substances in pregnancy, current NCBDDD activities include developing educational materials and clinical decision support tools for providers to improve the implementation of evidence-based recommendations for addressing alcohol and other substance use in pregnancy.

Additionally, because many disparities exist in access to prenatal and other health care services,[37,38] NCBDDD plans to conduct formative research among people with lived experiences of pregnancy who represent underserved populations such as people from racial/ethnic minority groups, people from sexual and gender minority groups, people living in rural areas, and people with disabilities. This project aims to identify barriers that underserved populations experience in accessing substance use screening services as well as accompanying interventions in traditional health care settings and develop innovative strategies and approaches to address these barriers.

In addition to the lack of validated screening tools for polysubstance use, punitive policies in some states such as separation of children from their mothers, loss of child custody, and criminal penalties may further deter pregnant people from accessing proper prenatal care or disclosing their substance use to providers. Furthermore, these policies are ineffective in reducing substance use during pregnancy.[39–43] Although policies can vary widely by state and type of substance use, state policies on substance use during pregnancy have generally changed over time to be more punitive.[44] Moreover, perceived stigma about substance use during pregnancy may also impede pregnant people from disclosing their substance use to providers.[41,45] Pregnant people who use specific substances during pregnancy may experience greater public stigma than other groups: for example, one study examining public stigma found mothers of children with FASDs were viewed with greater disdain and judgment compared with women with mental illness, with other SUDs, or with previous jail experience.[46]

Public stigma can be reduced through communication and education interventions[47]; thus, NCBDDD works with partners such as FASD United and March of Dimes to raise awareness and reduce stigma as part of CDC's prevention and treatment model to address substance use in pregnancy.[48,49]

Addressing Polysubstance Use Through Brief Intervention and Referral to Treatment

While routine universal screening can identify polysubstance use in pregnancy, it is highly recommended that positive screenings be followed by an evidence-based intervention based on the severity of substance use.[28–30] The USPSTF recommends providing all adults, including pregnant people, who screen positive for tobacco or alcohol use with behavioral counseling interventions, and brief interventions administered in a single or a few short sessions can be effective in increasing tobacco smoking cessation and alcohol abstinence during pregnancy.[28,30] Brief interventions can provide patients with personalized counseling related to substance use and adverse health outcomes, particularly when counseling is adapted from motivational interviewing, or referral to treatment when necessary. Traditionally, screening and brief intervention (SBI) are conducted face to face in health care settings, but brief interventions can also be administered successfully using computers, tablets, and cellphones, in a wide range of community settings.[50]

Studies have found electronic SBI (e-SBI) can be effective in increasing smoking and alcohol abstinence during pregnancy,[51,52] and switching to electronic methods of delivery may help address implementation challenges of traditional SBI, such as providers' lack of time and inconsistent delivery of SBI.[53,54]

Although some studies provide support for e-SBI during pregnancy, further research may help confirm these findings. Current SBI and e-SBI approaches tend to follow the same set of principles, with insufficient research examining the utility of each specific component or whether effects can be improved by adding other elements.[55,56] More research can help identify when, with whom, and for what substances e-SBI is effective. Although some studies have found positive results for e-SBI for drug use among adults being treated in reproductive health settings and postpartum populations,[57,58] most trials of brief interventions for drug use have not shown positive effects in these populations.[59–61] Additionally, pharmacotherapy for OUD is the standard of care for people who are pregnant.[59] Effective pharmacotherapies exist for other substances such as nicotine and alcohol, although these treatments are underutilized during pregnancy due to limited studies among persons who are pregnant and concerns about potential adverse effects for the fetus.[59,60]

Although there are clinical recommendations for screening, brief interventions, and referral to treatment for unhealthy single substance use during pregnancy, there is currently no guidance for polysubstance use in this population. For example, does polysubstance use moderate the efficacy of brief interventions? Should brief interventions focus on a single substance, multiple substances simultaneously, or multiple substances sequentially? In September 2021, the Substance Abuse and Mental Health Services Administration released an evidence-based resource guide for clinicians on treating concurrent substance use among adults.[62] Although this guide includes some recommendations for treating OUD during pregnancy, specific and detailed clinical guidance for addressing polysubstance use during pregnancy is needed. In nonpregnant populations, polysubstance use is associated with

worse treatment outcomes than single substance use, yet most treatment studies examine single substance use in isolation, often excluding those who report polysubstance use.[63]

CDC is currently conducting analyses to examine polysubstance use in pregnant populations using various datasets, but data are limited, and more research can inform clinical effects of interactions between substances on patients, including pregnant individuals who engage in polysubstance use, and to improve the efficacy of treatment for SUDs.[63]

Summary and Conclusion

Polysubstance use is common among those who use substances during pregnancy, however, the long-term impacts of polysubstance use during pregnancy on the pregnant person and the fetus are unknown. Furthermore, little is known about how best to address polysubstance use and treat multiple SUDs in pregnant people. NCBDDD's surveillance activities, such as MAT-LINK, were designed to promote better understanding of trends in polysubstance use during pregnancy and health effects among birthing people, infants, and children. While clinical guidance specific to pregnant people with polysubstance use is needed, NCBDDD works with partner organizations to develop strategies to reduce stigma associated with substance use in pregnancy, measure maternal and infant outcomes among those who experience substance use in pregnancy, and use e-SBI technology to implement evidence-based practices for polysubstance use during pregnancy. NCBDDD is also enhancing efforts to impact prenatal substance exposure more broadly by moving away from a single-substance perspective and toward a polysubstance perspective in its existing surveillance and prevention activities.

As an indicator of high-level CDC engagement in these issues, NCBDDD and their partners presented an overview of these surveillance, research, and communication activities at CDC's Public Health Grand Rounds on August 18, 2020 (https://www.cdc.gov/grand-rounds/pp/2020/20200729-reducing-polysubstance-pregnancy.html). The combined efforts of NCBDDD and other partners to improve clinical care and reduce polysubstance use during pregnancy can improve the health of pregnant people and their children.

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