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Substance Use Disorders and Pregnancy-Related Mortality in the United States: Contributors, Mechanisms, and Prevention Opportunities

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Abstract: In the United States, pregnancy-related mortality is becoming a growing and underestimated issue, and the role of substance use disorders (SUDs) in it is becoming extremely important. The given traditional literature review is the synthesis of existing knowledge on the determinants, pathophysiology, and interventions in relation to SUD-related maternal mortality. Based on national statistics and other peer-reviewed sources, the review describes the increasing rates of overdose, suicide, and medically complex mortality during pregnancy and postpartum. The most notable ones are trauma, psychiatric comorbidities, housing instability, structural racism, and punitive legal systems, which tend to discourage care. Healthcare system gaps, including delayed diagnosis, fragmented services, and provider stigma, predispose physiological risks, such as cardiovascular stress, sepsis, and hemorrhage. Despite the growing convincing evidence of the effectiveness of medications, integrated perinatal-SUD care models, and trauma-informed approaches, the application of these strategies is not uniform among the population and geographical areas. There is an exceptionally high barrier to adolescents, Black and Indigenous women, or rural or justice-involved settings. The review determines significant gaps in research of long-term outcomes of maternal health, surveillance systems, and culturally based interventions. Multisectoral investment in the form of Medicaid expansion, supportive state legislation, workforce training, and non-criminalizing care models is urgently required to minimize the number of deaths that can be avoided. Addressing SUD in pregnancy must become a public health and equity priority, requiring compassionate, evidence-based strategies that respond to the lived realities of at-risk birthing people.

Keywords: Maternal Mortality; Substance Use Disorders; Pregnancy Outcomes; Opioid Use in Pregnancy; Perinatal Health Equity.

INTRODUCTION

Maternal mortality during pregnancy is a contemporary social health issue in the United States because maternal health rates remain lower than in other high-income nations (Bianchi *et al.*, 2023; Wang *et al.*, 2023). Despite the progress in obstetric care, the national maternal mortality rate has increased substantially over the past two decades, especially in historically marginalized groups, such as Black and Indigenous women (Wallace *et al.*, 2025; Carty *et al.*, 2022). The U.S. Centers for Disease Control and Prevention define pregnancy-related death as the death of a woman while pregnant or within one year of pregnancy termination from any cause related to or aggravated by pregnancy or its management (Wang *et al.*, 2020). These deaths are not only tragic, but they are usually avoidable, which explains the necessity of a more in-depth investigation of their multifactorial causes and addressing them specifically.

Substance use disorders (SUDs) are one of the risk factors that have become a critical, and increasingly visible, contributor to this crisis (Duggal *et al.*, 2025; Fuchs *et al.*, 2023). SUD refers to a relapsing chronic disease that is compulsive in nature and involves the use of substances despite their harmful effects (Cherniak *et al.*, 2025). SUD, when experienced during pregnancy, can contribute to the increased concerns of complications, including preterm labor, neonatal abstinence syndrome, and maternal overdose (Smid and Terplan, 2022; Jarlenski *et al.*, 2020). Recent statistics indicate that drug-related deaths and suicide are currently becoming the primary causes of maternal mortality in a variety of U.S. states (Goldman-Mellor and Margerison, 2019; Wallace and Jahn, 2025), which implies that the issue of SUD is inevitable to turn maternal mortality trends around.

The concept of pregnancy-related mortality is different than that of general maternal mortality, thus a more expanded period and risk exposures, including postpartum vulnerability. It shares much with maternal morbidity, which includes the physical and mental health complications in pregnancy to up to one year after childbirth (Glazer and Howell, 2021; Brown *et al.*, 2021). These issues become more interlinked with mental health problems, poly-substance consumption, and the inequity of the structure (Lu and Noursi, 2021; Ali *et al.*, 2023). The overlapping of SUD magnifies these risks with other social determinants, including prenatal care, criminalization, racism, and poverty, and

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disproportionately affects marginalized groups (Braveman *et al.,* 2021; Beatty, 2020).

This intersection is a key boundary of research, clinical change, and policy intervention due to the increasing rates of maternal mortality associated with SUD (Bianchi *et al.,* 2023; Wang *et al.,* 2023; Duggal *et al.,* 2025). Although there are many contributing factors at the individual and systemic level to this dual crisis, our current responses are based on the treatment instead of the prevention of this type of crisis (Scott *et al.,* 2023; Smid and Terplan, 2022). An in-depth audit of existing evidence, both in epidemiology and in mechanisms of mortality and preventive actions, should be conducted urgently to inform evidence-based policies and equitable care models. This literature review aims to address this gap and synthesize existing knowledge about the role of SUD in pregnancy-related mortality in the United States and offers the opportunities of preventing this issue through medical, legal, and social approaches.

Trends and Epidemiology

The latest national surveillance reports have shown disturbing statistics in maternal mortality rates, especially pregnancy-related mortality, including drug use. The CDC and state-based Maternal Mortality Review Committees (MMRCs) report that the population of maternal deaths in the United States has been rising steadily and unabated in the past decades, even with the medical progress (Wang *et al.,* 2023; Wallace *et al.,* 2025). The latter also happens in the late postpartum, where women are not observed by the medical team regularly, and when it is more difficult to diagnose and treat instances of mental health deterioration, recurrence, or overdose (Trost *et al.,* 2021). These trends support the idea that the risk to maternal health does not stop at the point of delivery and that the models of postpartum care should also change.

One of the increases in maternal mortality is the increasing role of substance use disorders (SUDs). Table 1 illustrates that the percentage of maternal deaths that involved substance use has increased more than twice in the years 2010 to 2019 between 7.2 and 13.9 (Trost *et al.,* 2021). The growth in this area is particularly dramatic among overdose-related deaths, which has become one of the major causes of pregnancy-related mortality in some states of the U.S., especially during the postpartum period (Wallace and Jahn, 2025; Goldman-Mellor and Margerison, 2019). Evidence provided by the NIH and CDC also states that a substantial proportion of these fatalities of overdose can be avoided, where women previously diagnosed with SUDs lost health insurance or lacked follow-up treatment, or were stigmatized and criminalized (Ali *et al.,* 2023; Morrison *et al.,* 2023).

The substances that are involved in maternal deaths have also changed with time. At the beginning of the 2010s, alcohol and methamphetamines, as well as prescription opioids, were usually combined (Smid and Terplan, 2022). In the recent past, the increase in the number of overdoses with fentanyl has strengthened an acute increase in death rates, where synthetic opioids are more active and readily accessible and can go undetected in drug preparations (Fuchs *et al.,* 2023; Duggal *et al.,* 2025). The changing drug situation demands multisectoral responses that are dynamic, such as real-time drug surveillance and universal toxicology testing during autopsies in maternal deaths.

Disaggregated information also indicates significant differences based on geographical locations and race. States characterized by rural poverty, the low level of Medicaid expansion, or punitive treatment of drug use report more SUD-related maternal death (Trost *et al.,* 2021; Thomas *et al.,* 2024). Structural racism, underdiagnosed mental health issues, and later prenatal care are the intersecting barriers that face black, indigenous, and low-income women, and they exacerbate the risk of substances use and maternal mortality (Braveman *et al.,* 2021; Carty *et al.,* 2022). These inequalities demonstrate that not only are epidemiological trends biological or behavioral in nature but are also strongly interconnected with policy and equity situations.

Table 1: Maternal mortality related to substance use disorders

Year	Maternal Deaths (Total)	%SUD-related	Most Common Substances	Citation
2010	673	7.2%	Opioids, Alcohol, Meth	Trost et al. (2021); CDC
2015	700	10.1%	Opioids, Benzodiazepines, Meth	CDC; Wallace et al. (2025)

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2019	754	13.9%	Opioids, Fentanyl	Trost et al. (2021); Wallace and Jahn (2025)
2021	861	18.0%	Fentanyl, Polysubstance, Alcohol	CDC; Wallace and Jahn (2025); Duggal et al. (2025)

As can be seen in Table 1, maternal mortality related to substance use disorders (SUDs) has increased considerably in the United States in the recent decade. In 2010, around 7.2% of maternal deaths were related to substance use, and such substances were opioids, alcohol, and methamphetamines (Trost *et al.,* 2021; CDC). It may have risen almost twofold by 2019 to 13.9 percent because of the greater availability of fentanyl in the drug market (Wallace and Jahn, 2025). Temporary statistics of 2021 indicate that this increasing trend persists, and that 18 percent of maternal mortality is attributed to SUDs, and a tendency to use polysubstance is increasing (Duggal *et al.,* 2025). The substances involved have also changed in the course of time and are more representative of the national tendencies in terms of drug availability and strength. These statistics highlight a potentially devastating and alarming risk to maternal morbidity, which requires specific attention to the monitoring and intervention methods of public health.

Contributors to SUD and Pregnancy-Related Mortality

SUDs in pregnant and postpartum individuals seldom occur in a vacuum. Rather, they are influenced by a complex of biological, psychological, and social factors usually known as the biopsychosocial model. Co-occurring mental health disorders, such as post-traumatic stress disorder (PTSD), depression, and anxiety disorders, are among the most consistent individual-level factors extending the probability of substance use and relapses (Brown *et al.,* 2021; Morrison *et al.,* 2023). Mothers are the most susceptible in the postpartum period when the crisis in mental health is usually not noticed or addressed (Trost *et al.,* 2021). Another study also indicates that there is a genetic predisposition to addictive behaviors, especially in people who have a history of mental illness or substance dependence in their family (Cherniak *et al.,* 2025; Jimenez-Fernandez *et al.,* 2025). These risk factors within an individual set up a complicated topography where the risks of the use of substances and pregnancy are likely to be augmented in each other.

Nevertheless, maternal mortality data trends cannot be attributed to individual susceptibility only. Both SUD and pregnancy-related complications are closely related to social determinants of health, such as poverty, unstable housing, food insecurity, and poor access to healthcare (Wang *et al.,* 2020; Glover, 2023; Ajayi & Cudjoe-Mensah, 2025). Indicatively, women experiencing homelessness or incarceration are disproportionately affected by SUD and frequently do not receive prenatal care or medication-assisted care (King *et al.,* 2021; Knittel *et al.,* 2022). Access to care is further diminished by transportation barriers, gaps in childcare, and providers who do not provide culturally competent care (Black *et al.,* 2025; Morrison *et al.,* 2023). Patients with SUD often experience stigma or judgmental care, which is the reason they often avoid engagement or continue attending care even when it is available (Weber *et al.,* 2021).

Intertwined with these structural issues has been a historical legacy of structural racism within the U.S. healthcare and criminal justice systems. Black, Indigenous, and Latina women have higher chances of being screened against their will, referred to child protective services, and deprived of evidence-based care (Braveman *et al.,* 2021; Wang *et al.,* 2020). Such racialized practices are frequently embedded in healthcare guidelines or state policy, worsening inequity in access to SUD treatment as well as maternal survival outcomes (Carty *et al.,* 2022). Additionally, clinicians' implicit bias has been associated with diagnostic delays, less pain treatment, and the prioritization of patient-reported symptoms (Hardeman *et al.,* 2022). These differences are not coincidental; they cause avoidable deaths.

The second dominant factor is the fragmentation and failure of policy between the U.S. states. Despite increasing awareness of the role of SUD in maternal mortality, most state laws are punitive, but not preventive. As an example, certain jurisdictions make substance use during pregnancy a crime, which results in imprisonment or the loss of custody instead of a treatment attachment (Bruzelius *et al.,* 2025; Thomas *et al.,* 2024). It has been demonstrated that these methods lead to increased health system avoidance, postponements in prenatal care, deteriorating maternal and neonatal results (Patrick *et al.,* 2020; Knittel *et al.,* 2020). Conversely, supportive policies, like

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Medicaid expansion, postpartum coverage expansions, and maternal peer support initiatives, have been shown to have increased access to treatment and have led to improved maternal survival (Ali *et al.,* 2023; Lilly *et al.,* 2019).

Combining these biopsychosocial, socioeconomic, and policy-level factors, pregnancy-related mortality in the context of SUD is not only a clinical problem, but a systemic crisis. It will have to be addressed with multilevel interventions that will address the causes of vulnerability, such as trauma-informed care and housing assistance, anti-racist clinical training, and legal reform. Unless these factors are recognized and handled, the reduction of maternal mortality will remain below the desired level.

Mechanisms of Mortality Linked to SUD in Pregnancy

The physiological consequences of substance use in pregnancy may have a direct impact of increasing maternal mortality by causing harm to important organ systems. Opioids, stimulants, and alcohol interfere with normal cardiovascular, hepatic and respiratory functioning, worsening the risks of pregnancy and delivery (Edelson and Bernstein, 2019; Elgendy *et al.,* 2020). As an example, the use of stimulants like methamphetamine and cocaine is closely linked to acute myocardial infarction, a stroke, and hypertensive crisis, whereas opioids inhibit respiratory activity, exposing people to the risk of hypoxia and fetus oxygen deficiency (Smilowitz *et al.,* 2018; Ijäs, 2022). These physiological stresses are increased during labor and in the immediate postpartum period. Also, coagulation pathways are impaired due to liver toxicity caused by substances such as alcohol and benzodiazepines, which may exacerbate the outcomes in cases of postpartum hemorrhage, a frequent cause of maternal death (Wang *et al.,* 2023; Duggal *et al.,* 2025).

Pregnant women with SUD are also at a higher risk of developing complications related to infection, including sepsis. The risk of infective endocarditis, cellulitis, and bacteremia in people who inject drug is significantly higher than in those with limited prenatal care or untreated comorbidities (Adesomo *et al.,* 2020; McCrary *et al.,* 2024). Slow failure to apprehend sepsis or prompt treatment may lead to failure of the entire body organs. Additionally, there is widespread placental malfunction and intrauterine growth retardation among the fetuses exposed to opioids or stimulants, which results in preterm birth, low birth weight, and stillbirth (Coyle *et al.,* 2018; Guille and Aujla, 2019). Although they are not the immediate causes of maternal death, these complications of the fetus may cause acute stress to the mother, increase surgical interventions such as cesarean birth, and aggravate the physiological burden on the body.

In addition to somatic mechanisms, there are also psychiatric comorbidities that contribute to maternal SUD-related deaths. Pregnant and postpartum individuals with depression, bipolar disorder, PTSD, or anxiety disorders are more vulnerable to both relapse and overdose (Brown *et al.,* 2021; Morrison *et al.,* 2023). Research indicates that perinatal depression has been among the most significant predictors of maternal suicide and fatal overdose (Goldman-Mellor and Margerison, 2019; Wallace and Jahn, 2025). The psychological burden is particularly high among women with few social resources, past experiences of trauma, or exposure to intimate partner violence (Morrison *et al.,* 2023; Glover, 2023). In comparison to a lack of integrated behavioral health care, the risk of unintentional or intentional death becomes extremely high when psychosis or severe mood disorders remain undiagnosed (Wisner *et al.,* 2024; Trost *et al.,* 2021).

The maternal care system as such adds to the high mortality risks of patients with SUD. The disconnects between care continuity, such as irregular substance use screening, insufficient postpartum care, and mental health services silo lead to the delayed identification of disease and lost intervention opportunities (Byatt *et al.,* 2020; Ellick *et al.,* 2024). Obstetric care does not have warm handoffs to addiction medicine, psychiatric providers, or peer support systems when patients with SUD are discharged (Knittel *et al.,* 2020; Smid and Terplan, 2022). In addition, obstetricians, addiction specialists and mental health clinicians frequently remain fragmented. Such a delay is especially fatal during the postpartum period, as the rate of overdose and suicide peaks (Wallace and Jahn, 2025; Duggal *et al.,* 2025).

The stigma in health care also compromises successful treatment. Patients often state that they are branded as non-compliant or are viewed with suspicion, thus causing patients not to report their symptoms, drop out of treatment, or not visit healthcare environments at all (Weber *et al.,* 2021; Glazer and Howell, 2021). Providers may not screen during SUD because they feel

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uncomfortable, are untrained, or prejudiced, particularly among racially marginalized groups (Hardeman *et al.*, 2022). Such prejudices have not only led to underdiagnosis but also influence the decisions of treatment that are punitive rather than therapeutic. As an illustration, women of color with SUD are more frequently reported to child welfare agencies and less frequently being provided with the use of medication-assisted treatment (Carty *et al.*, 2022; Beatty, 2020).

To conclude, the pathways between maternal mortality and SUD are synergistic and multifactorial. Psychiatric risk and fragmentation in the healthcare system are combined with physiological vulnerabilities caused by substance use to increase the risk of death during pregnancy and postpartum. As Figure 1 indicates, the pathways to mortality are frequently initiated in a way before delivery and occur on clinical and social levels, and lead to preventable outcomes, such as overdose, suicide, sepsis, and hemorrhage. These mechanisms can be used to ensure the provision of responsive, integrated, and stigma-free maternal health interventions by understanding these mechanisms.

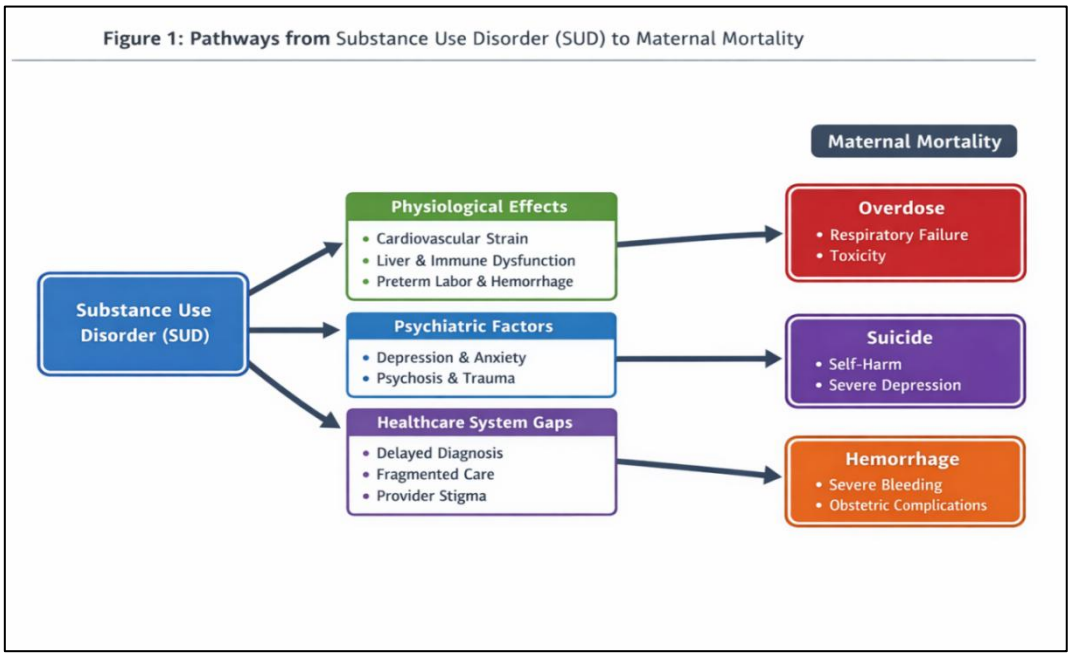

Figure 1: Pathways From Stance Use (SUD) To Maternal Mortality

Figure 1 points out the inter-relationship of mechanisms that lead to maternal mortality by substance use disorders (SUDs).This diagram categorizes these mechanisms into three main areas, which are physiological effects, psychiatric factors, and gaps in the healthcare system. Physiological effects of SUD are cardiovascular stress, dysfunction of the immune system and liver, obstetric complications (preterm labor and hemorrhage), which are directly related to fatal outcomes such as overdose or hemorrhage. At the same time, psychiatric comorbidities like depression, anxiety, trauma, and psychosis increase the risk of suicide, particularly in the postpartum period. These psychological disorders tend to go unnoticed because of the failure of the entire care system. The third pathway emphasizes the role of missing links in the healthcare system, such as delayed diagnosis, fragmentation of services and provider-related stigma, in increasing the risk of mortality by discouraging patients from obtaining or maintaining care. The flowchart highlights that these areas do not work independently, but they mutually contribute to vulnerability during the perinatal period. The authors highlight the necessity of the integrated and trauma-informed, stigma-free intervention to eliminate maternal deaths associated with SUD by visualizing the dynamic relationship between substance use, health systems, and psychosocial risk.

Intersectional Vulnerabilities

Women of color, especially Black and Indigenous women have an unequal burden of SUD-related maternal mortality; this is caused by the intersection of structural racism, underdiagnosis, and access gaps to treatment. Studies indicates that Black women are less likely in accessing SUD screening during pregnancy, less likely to obtain

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evidence-based treatment, and more inclined to be criminalized with substance use than White women (Wang *et al.,* 2020; Braveman *et al.,* 2021). The maternal mortality rates among indigenous women, particularly American Indian and Alaska Native (AI/AN) populations, are also at very high rates, both due to untreated SUD and due to the lack of culturally competent care and isolation (Sharma *et al.,* 2023). These differences cannot be attributed to socioeconomic status alone, suggesting that systemic prejudice, historical trauma, and institutional neglect are important factors operating alongside socioeconomic inequities (Hardeman *et al.,* 2022; Valerio *et al.,* 2023; Ajayi & Cudjoe-Mensah, 2025). Notably, race and SUD, when merged, produce a twofold stigma that pushes most of the affected women to abandon care, which means that they are denied a chance to prevent it (Carty *et al.,* 2022; Beatty, 2020).

Maternal mortality further progresses based on geography, with women in the rural environment experiencing substantially diminished access to medications for opioid use disorder (MOUD), special obstetric care, and mental health care. In rural hospitals, the clinicians are not always trained in addiction; there are no reproductive psychiatrists, and integrated care infrastructure is sometimes unavailable, and pregnant women may either travel far or even skip the treatment (Patrick *et al.,* 2019; Hansen *et al.,* 2023). By contrast, the urban centers can possess greater resources but still display disparities in access between racial and insurance lines (Jones *et al.,* 2021; Ellick *et al.,* 2024). Importantly, the rural communities have a higher number of pregnant individuals with SUD who are incarcerated, and this may be because of the punitive policies that exist and the lack of community-based treatment opportunities (Knitel *et al.,* 2022; Morrison *et al.,* 2023). These urban-rural inequalities increase the impact of geographic inequality on maternal survival and indicate the signals of more significant issues within the U.S. healthcare system.

One of the less explored areas of the SUD and maternal mortality is the adolescent mothers and the justice-involved women, who are especially vulnerable groups. Teenagers have a lower chance of undergoing prenatal care and are also prone to stigmatization by both health care professionals and their families, which postpones diagnosis and care access (Guille *et al.,* 2019; Peters *et al.,* 2019). In the meantime, the incident of MOUD discontinuity in impregnated and recently incarcerated women is common, and the threat of overdose is especially high in the postpartum period (King *et al.,* 2021; Knittel *et al.,* 2020). It also increases the risk of homelessness, psychiatric illness, and child welfare among justice-involved individuals, something that further disrupts maternal health (Frankeberger *et al.,* 2025; Winkelman *et al.,* 2020). Addressing intersectional vulnerabilities demands a deliberate shift away from one-size-fits-all policies and toward responsive, community-informed interventions that account for race, geography, age, and justice-system exposure (Ugwu *et al.,* 2025a).

Current Interventions and Where They Fail

Opioid use disorder (MOUD) medications, including buprenorphine and methadone, have been proven to be life-saving treatments in pregnancy, and when administered regularly, they have a significant effect by reducing the risk of overdose, premature birth, and neonatal complications (Sanjanwala and Harper, 2019; Karakus *et al.,* 2025). Nevertheless, even in areas where they are effective, MOUD has not been highly used, especially in the rural and racially isolated populations in the U.S. Accessibility is also limited by reluctance by providers, old federal regulations on prescribing drugs, stigmatization of pregnant patients, and a general misunderstanding that MOUD replaces another addiction (Titus-Glover *et al.,* 2021; Knittel *et al.,* 2022). Furthermore, a significant portion of imprisoned or uninsured females is suddenly discontinued on MOUD in incarceration, delivery hospitalization, and/or increases their susceptibility to postpartum relapse and mortality (King *et al.,* 2021; Knittel *et al.,* 2020). The persistent lack of integration of MOUD into obstetric care is a symptom of a system-wide failure to see SUD as a long-term medical problem that needs follow-up and is not an ethical issue.

The blueprints in emergent models of integrated perinatal-SUD care, like Project Nurture in Oregon, hold promise through the co-location of addiction treatment, prenatal care, and social services. Such models are not only associated with better maternal and neonatal outcomes but also lead to enhanced trust in the patient and less stigmatization during a healthcare interaction (Jones *et al.,* 2021; Moss *et al.,* 2025). Nevertheless, these programs are small and narrow, with many being restricted to academic institutions or pilot projects without long-term funding. Moreover, even though community-based doulas and harm-reduction-informed care (Black *et*

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al., 2025; Debbink *et al.,* 2025) are proven to be culturally acceptable and effective among Indigenous and structurally marginalized groups, they are unstable in terms of funding and institutional support. Consequently, many pregnant women with SUD are still provided with disjointed, intermittent care as opposed to holistic, trauma-informed services that can be used to decrease mortality.

Policymaking wise, Medicaid is both a major opportunity and a major source of weakness. Even though it encompasses almost half of all U.S. births and offers SUD treatment benefits, most states still end coverage only 60 days after childbirth instead of the recommended 6-12 months after birth (Cohen and Daw, 2021; Patrick *et al.,* 2020). Despite the existence of postpartum extensions, MOUD, mental health therapy, or supportive housing services that have demonstrated effectiveness in preventing relapse and re-hospitalization are subject to coverage gaps (Ali *et al.,* 2023; Kittaneh et al, 2025). The inconsistency of state-level Medicaid waivers and the implementation of parity legislation have placed a patchwork of accessibility, with survival for a woman potentially largely reliant on her zip code as opposed to her medical requirement.

Importantly, the existing federal and state programs tend to emphasize punitive surveillance instead of supportive care, and even the jurisdictions criminalizing substance use during pregnancy or requiring providers to report it do not always invest in the treatment infrastructure (Thomas *et al.,* 2024; Bruzelius *et al.,* 2025). Such actions are not only deterring expectant people to get care but also do not lower mortality. On the contrary, they strengthen fear and distrust of healthcare professionals, as well as disproportionately impact women of color and low-income backgrounds (Scott *et al.,* 2023; Wallace *et al.,* 2020). And until a paradigm shift is made, regarding punishment to equity-driven interventions, focused on recovery rather than punishment, the current interventions will not be enough to turn the tide of preventing maternal deaths, which are currently increasing because of substance use disorders.

Prevention Opportunities

Maternal deaths associated with substance use can be prevented by early diagnosis and regular screening, but this is not uniformly applied in healthcare facilities. The SBIRT model - Screening, Brief Intervention, and Referral to Treatment - has been proven to be effective in the context of prenatal and postpartum care aimed at recognizing people at risk and connecting them with the services at an early stage (Wouldes *et al.,* 2021; Fitzgerald *et al.,* 2025). Despite these advantages, the use of SBIRT is uncommon because of time limitations, billing problems, and dissatisfaction of the providers, especially in the OB-GYN clinics. Furthermore, screenings are often non-selectively used, whether by race or perceived socioeconomic status, and this adds to the current care and outcome disparities (Byatt *et al.,* 2020; Lisenko *et al.,* 2022). Non-punitive and universal screening protocols, which are incorporated into the regular obstetric practices, present a platform that is underutilized and could be utilized as the basis of saving lives.

Trauma-informed care is also another urgently needed component as it acknowledges high levels of interpersonal violence, childhood trauma, and systemic harm in the case of pregnant individuals with SUD (Glazer and Howell, 2021; Morrison *et al.,* 2023). These models of care are primarily focused on psychological safety, empowerment, and nonjudgmental communication, which enhance their engagement and adherence. However, there are a few cases when trauma-informed frameworks are adopted uniformly in the system of maternal health or addiction treatment. Most programs have no infrastructure, training, or cross-sector partnership to move beyond risk-based surveillance to fully healing settings (Debbink *et al.,* 2025). Given that trauma is a central pathway between SUD and suicide or overdose, failing to address it represents a major missed prevention opportunity.

The most effective levers are legal and policy changes that will impact the population. The developing evidence demonstrates that non-criminalizing and supportive policies, including Medicaid expansion, family-focused models of treatment, and continuation of MOUD after delivery, have an impact on the reduced maternal mortality rates (Thomas *et al.,* 2024; Bruzelius *et al.,* 2025). Contrarily, the states with punitive prenatal drug use policies show poorer results, such as reduced prenatal care attendance and higher prevalence of not having a birth attendant (Patrick *et al.,* 2020). Reducing legal barriers to meet the evidence of public health, rather than ideology, should become a national concern (Ugwu *et al.,* 2025b). This is characterized by the abolition of automatic referrals to child welfare when substance use happens alone and the

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expansion of family preservation programs that are non-punitive by treating pregnant and postpartum people with SUD (Scott *et al.,* 2023; Versen *et al.,* 2024).

Transformation of the workforce is also important in effective prevention. Midwives, OB-GYNs, and nurses frequently complain that they are not well-equipped to address pregnancy-related addiction, and they are deterred by the lack of training, concerns about liability, and personal biases (Titus-Glover *et al.,* 2021; Ellick *et al.,* 2024). Addiction medicine and trauma-informed practice education are yet to be adopted universally in medical or nursing programs, and there are gaps in provider readiness. Additionally, implicit and explicit provider stigma remains a cause of care avoidance, particularly in women of color and in women who have previously been involved in child welfare systems (Wallace *et al.,* 2020; Weber *et al.,* 2021). The necessary step is to invest in specialized SUD training in the field of maternal health to address the delivery of fragmented and judgmental care with relational and lifesaving care.

Lastly, there must be long-term interagency coordination to prevent meaningful intervention. It involves integrating housing, mental health, social services, and addiction of care into an integrated perinatal care system. Examples of programs which provide wraparound services like Drug-Free Moms and Babies (Lilly *et al.,* 2019) and CEREMONY in Indigenous communities (Debbink *et al.,* 2025) can illustrate the ability of localized, culturally grounded programs to stabilize women at risk and minimize preventable fatalities. However, to be scalable, these efforts require consistent funding and protection of policies. The U.S. will keep experiencing increasing maternal deaths due to completely preventable causes unless structural investment is made in prevention.

Table 2. Summary of Interventions Addressing SUD-Related Maternal Mortality

Intervention	Effectiveness Summary	Cited References
SBIRT (Screening, Brief Intervention, Referral to Treatment)	Proven to improve early detection; underused due to provider discomfort and systemic inconsistencies	Wouldes *et al.,* 2021; Byatt *et al.,* 2020
Trauma-Informed Care Models	Improves engagement and safety, especially among trauma survivors; rarely implemented at scale	Glazer and Howell, 2021; Debbink *et al.,* 2025
Medications for Opioid Use Disorder (MOUD)	Reduces overdose, relapse, and preterm birth; underutilized, especially in rural and justice-involved populations	Sanjanwala and Harper, 2019; Knittel *et al.,* 2020
Integrated Perinatal-SUD Programs (e.g., Project Nurture)	Improves maternal and neonatal outcomes; limited scalability and funding	Jones *et al.,* 2021; Moss *et al.,* 2025
Postpartum Medicaid Extension	Prevents coverage cliffs and reduces late postpartum deaths; variably implemented across states	Cohen and Daw, 2021; Ali *et al.,* 2023
Non-Criminalizing Substance Use Policies	Associated with lower maternal mortality and improved care-seeking; not widespread due to political resistance	Thomas *et al.,* 2024; Patrick *et al.,* 2020
Workforce Training in Addiction Medicine	Reduces stigma and improves clinical outcomes; currently insufficient across OB-GYN training programs	Titus-Glover *et al.,* 2021; Ellick *et al.,* 2024
Culturally Adapted Community-Based Programs	Effective among high-risk populations; often pilot-based and underfunded	Lilly *et al.,* 2019; Debbink *et al.,* 2025

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FUTURE DIRECTIONS AND RESEARCH GAPS.

Even though increased awareness is building the connection between substance use disorders and pregnancy-related mortality, there are still considerable gaps in research that restrict effective prevention and care strategies. The absence of longitudinal studies that follow up maternal health after the immediate postpartum period is one of the significant limitations. Most data sources include results as far as 42 or 60 days after delivery, even though it has been shown that overdose, suicide, and relapse are common within 6-12 months of delivery (Wallace and Jahn, 2025; Cohen and Daw, 2021). More studies should be conducted to determine the effects of prenatal and early postpartum SUD treatment, medications, behavioral therapy, and social supports on long-term maternal health outcomes, especially in high-risk groups (which include but are not limited to) co-occurring mental illness or trauma history).

The other important area is standardization of maternal death surveillance systems. The existing data infrastructure is divided by states, and the reporting guidelines are not uniform, and substance-related variables in maternal mortality are under-recorded (Trost *et al.*, 2021; Fuchs *et al.*, 2023). There is a necessity to harmonize the activity of Maternal Mortality Review Committees (MMRCs) and make full and consistent data on SUD-related mortality to promote policy change and resource distribution. Enhanced surveillance should also cover non-obstetric mortality, such as suicide, overdose, and cardiovascular complications that tend to take place due to untreated SUD but are not captured by definitions of narrow maternal mortality (Davidson *et al.*, 2024; Wang *et al.*, 2020).

Finally, culturally responsive and community-based research on intervention is urgent and especially needed by marginalized populations, such as Black, Indigenous, rural, and justice-involved women. Programs, such as CEREMONY and Drug-Free Moms and Babies, are capable of being valuable templates but are under-evaluated and underfunded (Debbink *et al.*, 2025; Lilly *et al.*, 2019). To determine the scalability, acceptability, and sustainability of such models, there should be more application of science and equity-based evaluation. In the future, it is urgent to prioritize the lived experience, consider opposing oppressions, and develop maternal SUD prevention based on healing and not punishment.

CONCLUSION

A comorbidity of substance use disorder (SUD) and maternal mortality in pregnancy is one of the most pressing yet solvable issues in maternal health in the United States. As the present review shows, the downstream consequence of a complicated interplay of physiological vulnerabilities, psychiatric comorbidities, social marginalization, and systemic neglect is SUD-related deaths, which cannot be addressed as individual tragedies. Women of color, Aboriginal and rural women, teenagers, and those with justice involvement are at increased risk because of underdiagnosis, stigma, and avoidance of care. Regardless of the improvement of screening tools, opioid use disorder medications, and integrated care models, their adoption has been disjointed and unevenly distributed. The outcome is a highly unjustifiable cost of avoidable death entirely skewed to the already structurally marginalized.

To turn this tide, it takes an evidence-based, multisectoral effort on the grounds of equity and compassion. The policy makers should focus on facilitating rather than punitive legal systems, broaden Medicaid and postpartum care, as well as invest in culturally based and community-based programs. The healthcare system needs to institutionalize and embed trauma-informed care, enhance education on addiction among perinatal health care providers, and pledge to minimize stigma across all levels of care. On their part, researchers must fill long-standing gaps in surveillance and outcomes of data, particularly postpartum beyond the first three months. The deaths of mothers that are related to substance use are not predetermined; it is where our systems are weak. Immediate, long-term, and justice-based intervention has the potential to turn this avoidable crisis into a national accountability opportunity and healing.

REFERENCES

1. Adesomo, A., Gonzalez-Brown, V., & Rood, K. M. "Infective endocarditis as a complication of intravenous drug use in pregnancy: a retrospective case series and literature review." *American Journal of Perinatology Reports* 10.3 (2020): e288–e293. https://doi.org/10.1055/s-0040-1716732
2. Ajayi, A. A., & Cudjoe-Mensah, Y. M. "Impact of socioeconomic factors on health outcomes." (2025).
3. Ajayi, A. A., & Thompson, M. A. "Community-based approaches to mental

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health support in the United States." *International Journal of Frontline Research in Pharma and Bio Sciences* 4.1 (2025): 1–7.
4. Ali, M. M., West, K. D., & Blanco, M. "Variation Across States in Loss of Medicaid Coverage Among Pregnant Beneficiaries with Substance Use Disorders." (2023). https://www.ncbi.nlm.nih.gov/books/NBK606602
5. Beatty, L. "Women of Color Too? Ensuring All Women Receive Recommended Drug Abuse Treatment." *Women's Reproductive Health* 7.3 (2020): 172–175. https://doi.org/10.1080/23293691.2020.1780401
6. Bianchi, D. W., Clayton, J. A., & Zenk, S. N. "Addressing the public health crisis of maternal mortality: a national research agenda." *JAMA* 330.18 (2023): 1729–1730. https://jamanetwork.com/journals/jama/article-abstract/2810926
7. Black, E., Liddell, J. L., Garnsey, A., Glover, A., Reese, S., & Piskolich, E. "Adapting the role of doulas to enhance supports for perinatal people with substance use disorders." *Journal of Evidence-Based Social Work* 22.2 (2025): 149–170. https://doi.org/10.1080/26408066.2024.2444300
8. Braveman, P., Dominguez, T. P., Burke, W., Dolan, S. M., Stevenson, D. K., Jackson, F. M., et al. "Explaining the Black-White disparity in preterm birth: a consensus statement from a multi-disciplinary scientific work group convened by the March of Dimes." *Frontiers in Reproductive Health* 3 (2021): 684207. https://doi.org/10.3389/frph.2021.684207
9. Brown, C. C., Adams, C. E., George, K. E., & Moore, J. E. "Mental Health Conditions Increase Severe Maternal Morbidity By 50 Percent And Cost $102 Million Yearly In The United States." *Health Affairs* 40.10 (2021): 1575–1584. https://doi.org/10.1377/hlthaff.2021.00759
10. Bruzelius, E., Prins, S. J., Bates, L. M., Underhill, K., Jarlenski, M., & Martins, S. S. "Prenatal drug use criminalization and health system avoidance: Evidence from births in Alabama, South Carolina, and Tennessee, 1989–2019." *Social Science & Medicine* (2025): 118716. https://www.sciencedirect.com/science/article/pii/S0277953625010470
11. Byatt, N., Masters, G. A., Bergman, A. L., & Moore Simas, T. A. "Screening for mental health and substance use disorders in obstetric settings." *Current Psychiatry Reports* 22.11 (2020): 62. https://doi.org/10.1007/s11920-020-01182-z
12. Carty, D. C., Mpofu, J. J., Kress, A. C., Robinson, D., & Miller, S. A. "Addressing racial disparities in pregnancy-related deaths: an analysis of maternal mortality-related federal legislation, 2017–2021." *Journal of Women's Health* 31.9 (2022): 1222–1231. https://doi.org/10.1089/jwh.2022.0336
13. Cherniak, V., Turner, S., & Wyne, A. "Substance use disorder in pregnancy: A review." *Canadian Journal of General Internal Medicine* 20.2 (2025): 91–104. https://doi.org/10.3138/cjgim.2024.0035
14. Cohen, J. L., & Daw, J. R. "Postpartum cliffs—missed opportunities to promote maternal health in the United States." *JAMA Health Forum* 2.12 (2021): e214164. https://jamanetwork.com/journals/jama-health-forum/fullarticle/2787275
15. Coyle, M. G., Brogly, S. B., Ahmed, M. S., Patrick, S. W., & Jones, H. E. "Neonatal abstinence syndrome." *Nature Reviews Disease Primers* 4.1 (2018): 47. https://www.nature.com/articles/s41572-018-0045-0
16. Davidson, K. W., Terry, M. B., Braveman, P., Reis, P. J., Timmermans, S., & Epling Jr, J. W. "Maternal mortality: a National Institutes of Health pathways to prevention panel report." *Obstetrics & Gynecology* 143.3 (2024): e78–e85. https://doi.org/10.1097/AOG.0000000000005488
17. Debbink, M. P., Tanana, H., Murray, J. L., Blosser, P., Horse, L., Monroy, C., et al. "Culturally Engaged REcovery–MOms connected through Native CommunitY (CEREMONY)." *Substance Use & Addiction Journal* 47.1 (2026): 233–242. https://doi.org/10.1177/29767342251336550
18. Duggal, R., Allshouse, A. A., Small, M., & Smid, M. C. "Substance Use Disorder as a Contributing Factor to Pregnancy-Associated Deaths." *O&G Open* 2.2 (2025): e076. https://doi.org/10.1097/og9.0000000000000076
19. Edelson, P. K., & Bernstein, S. N. "Management of the cardiovascular complications of substance use disorders during pregnancy." *Current Treatment Options*

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in Cardiovascular Medicine 21.11 (2019): 73. https://doi.org/10.1007/s11936-019-0777-5
20. Elgendy, I. Y., Gad, M. M., Mahmoud, A. N., Keeley, E. C., & Pepine, C. J. "Acute stroke during pregnancy and puerperium." *Journal of the American College of Cardiology* 75.2 (2020): 180–190. https://doi.org/10.1016/j.jacc.2019.10.056
21. Ellick, K. L., Kroelinger, C. D., Chang, K., McGown, M., McReynolds, M., Velonis, A. J., et al. "Increasing access to quality care for pregnant and postpartum people with opioid use disorder." *Journal of Substance Use and Addiction Treatment* 156 (2024): 209208. https://www.sciencedirect.com/science/article/pii/S294987592300259X
22. Fitzgerald, H., Frank, M., Kasula, K., Krans, E. E., & Krishnamurti, T. "Usability and acceptability of a pregnancy app for substance use screening and education." *JMIR Pediatrics and Parenting* 8.1 (2025): e60038. https://pediatrics.jmir.org/2025/1/e60038/
23. Frankeberger, J., Coulter, R. W., Jarlenski, M., Krans, E. E., & Mair, C. "Multilevel Factors Associated With Hospitalizations in the First-Year Postpartum Among Persons With Opioid Use Disorder." *Substance Use & Addiction Journal* 46.4 (2025): 994–1005. https://doi.org/10.1177/29767342251341171
24. Fuchs, J. R., Schiff, M. A., & Coronado, E. "Substance use disorder-related deaths and maternal mortality in New Mexico, 2015–2019." *Maternal and Child Health Journal* 27.4 (2023): 473–481.
25. Glazer, K. B., & Howell, E. A. "A way forward in the maternal mortality crisis: addressing maternal health disparities and mental health." *Archives of Women's Mental Health* 24.5 (2021): 823–830. https://doi.org/10.1007/s00737-021-01161-0
26. Glover, C. F. "Exploring the Social Determinants of Health Among Pregnant Women with Substance Use Disorder." (Doctoral dissertation, University of Pittsburgh, 2023). http://d-scholarship.pitt.edu/44834/
27. Goldman-Mellor, S., & Margerison, C. E. "Maternal drug-related death and suicide are leading causes of postpartum death in California." *American Journal of Obstetrics and Gynecology* 221.5 (2019): 489.e1–489.e9. https://www.sciencedirect.com/science/article/pii/S0002937819307471
28. Guille, C., & Aujla, R. "Developmental consequences of prenatal substance use in children and adolescents." *Journal of Child and Adolescent Psychopharmacology* 29.7 (2019): 479–486. https://doi.org/10.1089/cap.2018.0177
29. Hansen, A., Schoenberg, N., & Oser, C. "Insights from obstetric providers and emergency medical technicians on determinants of maternal morbidity and mortality among underserved, rural patients in the United States." *SSM - Qualitative Research in Health* 4 (2023): 100320. https://www.sciencedirect.com/science/article/pii/S266732152300104X
30. Hardeman, R. R., Kheyfets, A., Mantha, A. B., Cornell, A., Crear-Perry, J., Graves, C., et al. "Developing tools to report racism in maternal health for the CDC Maternal Mortality Review Information Application (MMRIA)." *Maternal and Child Health Journal* 26.4 (2022): 661–669. https://doi.org/10.1007/s10995-021-03284-3
31. Ijäs, P. "Trends in the incidence and risk factors of pregnancy-associated stroke." *Frontiers in Neurology* 13 (2022): 833215. https://doi.org/10.3389/fneur.2022.833215
32. Jarlenski, M., Krans, E. E., Chen, Q., Rothenberger, S. D., Cartus, A., Zivin, K., & Bodnar, L. M. "Substance use disorders and risk of severe maternal morbidity in the United States." *Drug and Alcohol Dependence* 216 (2020): 108236. https://www.sciencedirect.com/science/article/pii/S0376871620304014
33. Jones, C., Duea, S., Griggs, K., Johnstone Jr, W., & Kinsey, D. "Improving outcomes of mothers with opioid use disorder using a community collaborative model." *Journal of Primary Care & Community Health* 12 (2021): 21501327211052401. https://doi.org/10.1177/21501327211052401
34. Karakus, M., Welch, R., Tucker, M., Rao, T., Lee, P., Ilie, C., & Ghose, S. S. "Associations between maternal opioid use disorder treatment and pregnancy outcomes." *Journal of Perinatology* (2025): 1–5. https://www.nature.com/articles/s41372-025-02480-1
35. King, Z., Kramer, C., Latkin, C., & Sufrin, C. "Access to treatment for pregnant incarcerated people with opioid use disorder: perspectives from community opioid treatment providers." *Journal of Substance Abuse Treatment* 126 (2021): 108338. https://www.sciencedirect.com/science/article/pii/S0740547221000647

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36. Kittaneh, A. A., & Crockett, S. A. "Maintaining Recovery with Contingent Housing Payments: A Pilot Program for Women with Children Who Completed Residential Substance Use Disorder Treatment." *Medical Research Archives* 13.5 (2025).
37. Knittel, A. K., Swartzwelder, R. A., Zarnick, S., Tsujimoto, T. H. M., Horne, T., Lin, F. C., et al. "Medications for opioid use disorder during pregnancy: Access and continuity in a state women's prison facility, 2016–2019." *Drug and Alcohol Dependence* 232 (2022): 109308. https://doi.org/10.1016/j.drugalcdep.2022.109308
38. Knittel, A. K., Zarnick, S., Thorp Jr, J. M., Amos, E., & Jones, H. E. "Medications for opioid use disorder in pregnancy in a state women's prison facility." *Drug and Alcohol Dependence* 214 (2020): 108159. https://doi.org/10.1016/j.drugalcdep.2020.108159
39. Lilly, C. L., Ruhnke, A. M., Breyel, J., Umer, A., & Leonard, C. E. "Drug free moms and babies: qualitative and quantitative program evaluation results from a rural Appalachian state." *Preventive Medicine Reports* 15 (2019): 100919. https://doi.org/10.1016/j.pmedr.2019.100919
40. Lu, M. C., & Noursi, S. "Summary and conclusion: framing a new research agenda on maternal morbidities and mortality in the United States." *Journal of Women's Health* 30.2 (2021): 280–284. https://doi.org/10.1089/jwh.2020.8877
41. McCrary, L. M., Cox, M. E., Roberts, K. E., Knittel, A. K., Jordan, R. A., Proescholdbell, S. K., & Schranz, A. J. "Endocarditis, drug use and biological sex: A statewide analysis comparing sex differences in drug use-associated infective endocarditis with other drug-related harms." *International Journal of Drug Policy* 123 (2024): 104280. https://doi.org/10.1016/j.drugpo.2023.104280
42. Morrison, P. K., Yourish, E., Chang, J. C., Krans, E., & Pallatino-Trevelline, C. "Barriers to care for pregnant and post-partum women experiencing co-occurring intimate partner violence and opioid use disorder." *Journal of Family Violence* 38.8 (2023): 1625–1637. https://doi.org/10.1007/s10896-022-00466-7
43. Moss, R. A., Locke, E., Injeian, A., & Hall, K. S. "Opportunities to sustain matricentric models of community and person-centered care for perinatal substance use in the post Dobbs Deep South." *Frontiers in Psychiatry* 16 (2025): 1646213. https://doi.org/10.3389/fpsyt.2025.1646213
44. Patrick, S. W., Richards, M. R., Dupont, W. D., McNeer, E., Buntin, M. B., Martin, P. R., et al. "Association of pregnancy and insurance status with treatment access for opioid use disorder." *JAMA Network Open* 3.8 (2020): e2013456. https://doi.org/10.1001/jamanetworkopen.2020.13456
45. Rodriguez de Lisenko, N. C., Gray, H. L., & Bohn, J. "Optimizing outcomes: A systematic review of psychosocial risk factors affecting perinatal Black/African-American women with substance use disorder in the United States." *Maternal and Child Health Journal* 26.10 (2022): 2090–2108. https://doi.org/10.1007/s10995-022-03503-5
46. Sanjanwala, A. R., & Harper, L. M. "Opioid use disorder in pregnancy." *Clinical Obstetrics and Gynecology* 62.1 (2019): 191–207. https://doi.org/10.1097/GRF.0000000000000419
47. Scott, K. A., Shogren, M., & Shatzkes, K. "Reducing fear to help build healthy families: Investing in non-punitive approaches to helping people with substance use disorder." *Maternal and Child Health Journal* (2023). https://doi.org/10.1007/s10995-023-03772-8
48. Sharma, G., Kelliher, A., Deen, J., Parker, T., Hagerty, T., Choi, E. E., et al. "Status of maternal cardiovascular health in American Indian and Alaska Native individuals: a scientific statement from the American Heart Association." *Circulation: Cardiovascular Quality and Outcomes* 16.6 (2023): e000117. https://doi.org/10.1161/HCQ.0000000000000117
49. Smid, M. C., & Terplan, M. "What obstetrician–gynecologists should know about substance use disorders in the perinatal period." *Obstetrics & Gynecology* 139.2 (2022): 317–337. https://doi.org/10.1097/AOG.0000000000004657
50. Smilowitz, N. R., Gupta, N., Guo, Y., Zhong, J., Weinberg, C. R., Reynolds, H. R., & Bangalore, S. "Acute myocardial infarction during pregnancy and the puerperium in the United States." *Mayo Clinic Proceedings* 93.10 (2018): 1404–1414. https://doi.org/10.1016/j.mayocp.2018.04.019

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51. Thomas, K. A., Struble, C. A., Stenersen, M. R., & Moore, K. "The Association Between State-Level Prenatal Substance Use Policies and Rates of Maternal Mortality in the United States: A Legal Epidemiology Study." *Journal of Law, Medicine & Ethics* 52.S1 (2024): 75–80. https://doi.org/10.1017/jme.2024.67
52. Titus-Glover, D., Shaya, F. T., Welsh, C., Qato, D. M., Shah, S., Gressler, L. E., & Vivrette, R. "Opioid use disorder in pregnancy: leveraging provider perceptions to inform comprehensive treatment." *BMC Health Services Research* 21.1 (2021): 215. https://doi.org/10.1186/s12913-021-06182-0
53. Trost, S. L., Beauregard, J. L., Smoots, A. N., Ko, J. Y., Haight, S. C., Moore Simas, T. A., et al. "Preventing Pregnancy-Related Mental Health Deaths: Insights From 14 US Maternal Mortality Review Committees, 2008–17." *Health Affairs* 40.10 (2021): 1551–1559. https://doi.org/10.1377/hlthaff.2021.00615
54. Ugwu, D., Ajayi, A. A., & Oware, E. "Developing and implementing programs for chronic disease prevention and management at the community level: A systematic review." *International Journal of Frontline Research in Life Science* 3.1 (2025): 1–7.
55. Ugwu, D., Ajayi, A. A., & Kaiser, F. "Strategies to improve health equity through targeted public health initiatives." *International Medical Science Research Journal* 5.2 (2025): 9.
56. Versen, E., Everson, C. L., Hwang, S. S., & LeBoeuf, W. "Risk and protective factors associated with child welfare involvement among maternal-infant dyads affected by prenatal substance use." *Children and Youth Services Review* 160 (2024): 107574. https://doi.org/10.1016/j.childyouth.2024.107574
57. Wallace, M. E., & Jahn, J. L. "Pregnancy-Associated Mortality Due to Homicide, Suicide, and Drug Overdose." *JAMA Network Open* 8.2 (2025): e2459342. https://doi.org/10.1001/jamanetworkopen.2024.59342
58. Wallace, J., Mohamoud, Y. A., Guarino, A. S., & Rohan, A. "Perinatal Quality Collaboratives and Patient Safety Bundles: Key Contributors to Improving Maternal Health Care Quality across the United States." *Obstetrics and Gynecology Clinics* (2025). https://doi.org/10.1016/j.ogc.2025.09.003
59. Wang, E., Glazer, K. B., Howell, E. A., & Janevic, T. M. "Social determinants of pregnancy-related mortality and morbidity in the United States: a systematic review." *Obstetrics & Gynecology* 135.4 (2020): 896–915. https://doi.org/10.1097/AOG.0000000000003762
60. Wang, S., Rexrode, K. M., Florio, A. A., Rich-Edwards, J. W., & Chavarro, J. E. "Maternal mortality in the United States: trends and opportunities for prevention." *Annual Review of Medicine* 74.1 (2023): 199–216. https://doi.org/10.1146/annurev-med-042921-123851
61. Weber, A., Miskle, B., Lynch, A., Arndt, S., & Acion, L. "Substance use in pregnancy: identifying stigma and improving care." *Substance Abuse and Rehabilitation* (2021): 105–121. https://doi.org/10.2147/SAR.S319180
62. Winkelman, T. N., Ford, B. R., Shlafer, R. J., McWilliams, A., Admon, L. K., & Patrick, S. W. "Medications for opioid use disorder among pregnant women referred by criminal justice agencies before and after Medicaid expansion." *PLoS Medicine* 17.5 (2020): e1003119. https://doi.org/10.1371/journal.pmed.1003119
63. Wisner, K. L., Murphy, C., & Thomas, M. M. "Prioritizing maternal mental health in addressing morbidity and mortality." *JAMA Psychiatry* 81.5 (2024): 521–526. https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2814936
64. Wouldes, T. A., Crawford, A., Stevens, S., & Stasiak, K. "Evidence for the effectiveness and acceptability of e-SBI or e-SBIRT in the management of alcohol and illicit substance use in pregnant and post-partum women." *Frontiers in Psychiatry* 12 (2021): 634805. https://doi.org/10.3389/fpsyt.2021.634805

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