

## EDITORIAL COMMENT

# Improving Maternal Health Is a Team Sport\*



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Maternal mortality (MM) has gained increased attention due to alarming statistics demonstrating that the United States has the highest MM rate of any high-resource country.<sup>1</sup> The MM rate continues to rise, and profound disparities persist, with Black and Native American individuals 3 times more likely to die than Whites because of pregnancy.<sup>2</sup> Cardiovascular disease (CVD) continues to be one of the leading causes of pregnancy-related deaths (PRDs), defined as deaths that occur during pregnancy or within a year after delivery that are related to pregnancy. The causes of the MM crisis in the United States are multifactorial and include the rising prevalence of CVD risk factors, both traditional and emerging, a fractured health care system, social determinants of health (SODH), and structural racism.<sup>3</sup>

In this setting, substance use disorders (SUDs) are a growing risk factor for poor maternal outcomes. Substance use (SU) accounts for 1 in 10 PRDs.<sup>4</sup> The impact of SUDs is highlighted by the most recent report which identifies mental health conditions, including SUDs and drug overdose, as the leading cause of PRDs, specifically among non-Hispanic White and Hispanic individuals.<sup>5</sup>

Evans et al utilized the Nationwide Inpatient Sample to identify all pregnant individuals with a delivery hospitalization between 2004 and 2018. The primary outcome was any acute CVD event and major adverse

cardiac events and MM were secondary outcomes. They compared 60 million pregnancies without SU to 955,531 pregnancies with SU (~1.6% of pregnancies). Those with SU were younger, were more likely to live in zip codes with lower median income, and more likely to have public insurance or no insurance. Pregnant individuals with SU had a higher burden of CVD risk factors, such as obesity, hypertension, hyperlipidemia, family history of CVD, tobacco use, and higher rates of depression or anxiety.

After controlling for patient demographics and coexisting CVD risk factors, Evans et al<sup>6</sup> demonstrated that pregnant individuals with documented use of any substance were more likely to experience a CVD event during delivery hospitalization (OR: 1.61; 95% CI: 1.53-1.70). When looking at individual CVD end points, those with amphetamine/methamphetamine use had a 9-fold higher odds of cardiomyopathy or heart failure and more than a 7-fold higher odds of cardiac arrest. Any SU was associated with a 2.6-fold increase in in-hospital MM.

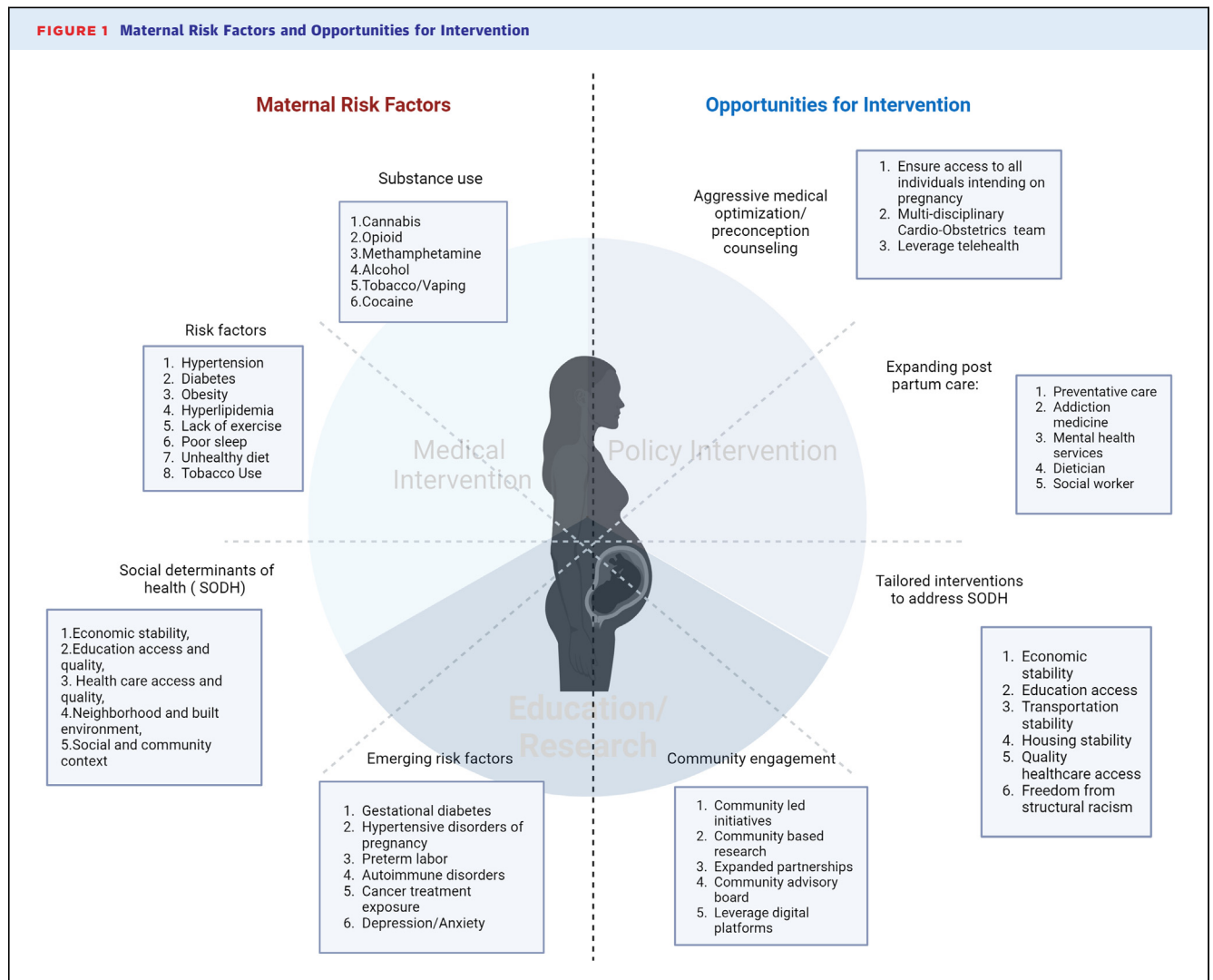
The most common documented substances were cannabis and opioids, followed by stimulant use. They demonstrated an increase in SU affecting pregnancies over time and almost a doubling of cardiac events from 2012-2014 to 2015-2018. However, this interpretation must be done carefully in the context of changing International Classification of Diseases 9 to International Classification of Diseases 10 coding during this study period.

This article provides additional evidence that pregnant individuals with SUD also experience higher rates of maternal adverse CVD outcomes and not just the neonate. They note significantly higher rates of depression and anxiety in pregnancies with SU which previously has been associated with a lower likelihood to receive prenatal and postpartum care.<sup>7</sup> Their findings highlight the critical support required during pregnancy and postpartum for these individuals including comprehensive medical care and social

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services, including addiction medicine access and treatment of co-occurring mental health disorders.

When looking at opioid use disorder, drug overdose mortality for this population increased 81% from 2017 to 2020. Effective treatments exist, but their utilization in pregnancy remains between 50% and 60% despite data demonstrating improved outcomes for both mother and baby. There remains differential access to medications and prescribers by neighborhood. Further, those in these rural areas may have fewer resources to pay for care, or transportation. Finally, it has been reported that pregnant people of color, not only are less likely to be treated for opioid use disorder but may face increasing stigmata, discrimination, and child welfare involvement if they are taking medications for this.<sup>8</sup>

The authors call for prenatal assessment in a multidisciplinary cardio-obstetrics team comprised of

behavioral psychologists and social workers in addition to the standard medical teams. SODH are increasingly being incorporated into cardiovascular risk assessment and this report brings up many questions as to its contribution to CVD outcomes in this population.<sup>9</sup>

Cannabis use was the most common substance in pregnancy. Its use has increased after legalization and is associated with an increased risk of fetal growth restriction, preterm birth, and neonatal intensive care unit admissions.<sup>10</sup> Evans et al do not quantify the duration or amount of exposure but among young individuals who have earlier initiation; they are at increased risk of lower levels of educational attainment, welfare dependence, unemployment, and psychotic symptomatology. Legalization may reduce criminal justice inequities but could widen gaps in health and social equity.<sup>10,11</sup>

The limitations of this study are those of using administrative databases and reliance on International Classification of Diseases-9/10 coding which may underestimate the prevalence of actual SU. The time studied includes the transition of the codes and may impact trend analysis. Cocaine and cannabis were not associated with increased MM but the actual amount of exposure was also not quantified, which would speak to the severity and chronicity of SUD. Pregnancies affected by SUD were more likely to have concurrent tobacco use but it is unclear if vaping is accounted for in this population. An important limitation was they were unable to differentiate hospitalizations for delivery that were complicated by CV events, vs hospitalizations for CV events that prompted delivery. Further, they acknowledge that these data only consider hospital events and not the postpartum period which is overwhelmingly where more than half of MM occurs. It is difficult to capture the impact of mental health disorders and treatment using this type of data, and this may also confound results. The population is predominantly in urban areas which does not account for a small fraction of deliveries that occur in rural settings, birthing centers, or at home.

This report highlights increased CVD events in pregnant individuals with SUD. Further investigations must be conducted to understand the mechanisms behind this. Untangling SODH influences on maternal SU and mental health disorders is difficult. There have been increasing data on SODH influence on CVD, how to measure it, and considerations for future research.<sup>12</sup> There needs to be a continued priority in further understanding contributors to MM and expansion of the data accessed and published by the MMRCs.

Structural racism continues to influence maternal outcomes in minorities and future investigations need to assess interventions to curb this (Figure 1). An example would be high-risk pregnancy screenings for SUD. There have been multiple national and international organizations that all have guidelines and statements on screening for SUD in pregnancy. There has been considerable debate regarding universal screening in pregnancy weighing the benefits of early initiation of treatment and support services hopefully improving maternal and neonatal outcomes against the potential punitive outcomes of removal of the newborn from the parent, disqualifier for coverage under publicly funded programs, stigma and discrimination, and legal ramifications.<sup>11</sup> More data are needed to understand the impact of operationalizing such guidance.

Interventions to address SUD must be carefully designed to be broadly available and affordable to not further widen the gap among certain ethnicities. Further, the interventions must be multifaceted to include policy, community, and individual-level interventions. In a country where health care expenditure is considerable, it is imperative to prioritize the health and outcomes of our pregnant people.

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