

Pregnancy-Associated Deaths from Homicide, Suicide, and Drug Overdose: Review of Research and the Intersection with Intimate Partner Violence

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Abstract

The leading causes of pregnancy-associated deaths, as defined by the Centers for Disease Control and Prevention, are homicide, suicide, and drug overdose. Intimate partner violence during pregnancy has been shown to contribute to maternal mortality from pregnancy-associated deaths. In this article, we discuss these leading causes of pregnancy-associated deaths. We review the prevalence, demographic characteristics, and possible factors leading to each cause of death, as well as evidence-based methods of identification, prevention, and intervention. The review also will include data showing racial and ethnic inequities. In addition, we identify gaps and guiding questions for further research, as well as suggestions for immediate changes in practice and policy.

Keywords: pregnancy-associated deaths, female homicide, female suicide, pregnancy-associated drug overdose, intimate partner violence, maternal mortality

Introduction

AS DEFINED BY the Centers for Disease Control and Prevention (CDC), “maternal mortality” is “the death of a woman during pregnancy, at delivery, or soon after delivery.”¹ CDC defines two types of death within the category of maternal mortality. A *pregnancy-related death* is defined as “the death of a woman while pregnant or within 1 year of the end of a pregnancy—regardless of the outcome, duration, or site of the pregnancy—from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.” In contrast, a *pregnancy-associated death* is a maternal death that is attributable to a condition that is unaffected by the pregnancy and occurs within 1 year of the pregnancy.² In this article, we review

the three leading causes of pregnancy-associated deaths—homicide, suicide, and drug-related overdose—while pregnant or within 1 year from the end of pregnancy. For suicide deaths, we also included suicidality within the category of severe maternal morbidity, defined by the American College of Obstetricians and Gynecologists (ACOG) as “unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health.”³ Compared to the many studies that address maternal morbidity and mortality in relationship to clinical conditions,⁴ far fewer studies have addressed pregnancy-associated deaths from homicide, suicide, and drug overdose. Such a review is critical to understand differing prevalence, risk factors, and prevention strategies and to build future research, clinical, and policy initiatives. Intimate partner violence (IPV) during pregnancy

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has been shown to contribute to maternal mortality from these three pregnancy-associated deaths⁵; therefore, our review will include the IPV relationships to all three leading causes.

Pregnancy-Associated Homicide

Over the past 15 years, research has supported homicide as a leading cause of pregnancy-associated deaths in the United States.^{6–8} One of the few national studies was a CDC analysis of the Pregnancy Mortality Surveillance System, which links death certificate information with vital records between 1991 and 1999. The study documented that pregnancy-associated homicides made up 8.4% of reported maternal mortality deaths from all causes, with a rate of 1.7 per 100,000 live births.⁶ African American women had approximately seven times the risk of homicide as white women, and women age 19 or younger were at higher risk than those aged 30 or older, with almost 55% of the deaths caused by guns. A more recent (2005–2020) study estimated homicide rates among pregnant or postpartum women from death certificates in 37 states with enhanced pregnancy mortality surveillance. The pregnancy-associated homicide rate was 2.2 to 6.2 per 100,000 live births, compared with 2.5 to 2.6 per 100,000 for nonpregnant and nonpostpartum women.⁹

Studies in four states (Georgia, Illinois, Louisiana, and Maryland) found that pregnant and recently pregnant women, especially younger women, were at approximately twice the risk of homicide than nonpregnant women.^{10–13} Studies from cities include a 1987–1991 investigation in New York City finding that more than 25% of all maternal deaths were due to homicide.¹⁴ In a Philadelphia study of 42 pregnancy-associated deaths from 2010 to 2014, 13 (30.1%) were from unintentional injuries, 18 (42%) from drug overdose, 8 (19%) from homicide, and 3 (7%) from suicide.¹⁵ It is important to note, however, that data-linking techniques were not used by all states, thus limiting ascertainment of pregnancy status. This methodological limitation likely resulted in an undercount of the cases of pregnancy-associated deaths from all causes, including homicides. For example, homicides that occur during the postpartum period are often difficult to identify as pregnancy associated because autopsy results may not detect a pregnancy that occurred as long as a year before.

Intimate partner homicide and pregnancy

When the perpetrator is known, the largest proportion of homicide cases during or around pregnancy occurs at the hands of an intimate partner.^{8,16–18} The National Violent Death Reporting System (NVDRS) is a repository of data on all suicides, homicides, and other forms of violent death in the United States. An analysis of 2003–2007 data from the 16 states in the NVDRS at that time found a pregnancy-associated homicide rate of 2.9 deaths per 100,000 live births—with 45.3 percent associated with IPV.¹⁹ Another study using 2003–2015 NVDRS data from 27 states found that of 8,078 female victims older than age 10 whose perpetrator was identified, 4,980 (59.2%) were killed by an intimate partner, with 98.6% of those victims killed by a male intimate partner.²⁰ Unfortunately, the study did not specifically explore the pregnancy status of these victims. NVDRS analyses to date are limited because of significant missing data in relevant fields (*e.g.*, prior reports of IPV); in addition, not all states participated in NVDRS until recently, which may have resulted in misclassifications, as well as IPV underestimates.

A case-control study published in 2002 examined police homicide records and interviews of survivors in 10 cities and found that 5% of female homicide victims were pregnant when murdered.^{21,22} Compared with women who were abused but never killed or almost killed, the risk of becoming a victim of homicide or attempted homicide was three times higher among women experiencing IPV during pregnancy. Approximately 22%–25.8% of women killed or almost killed were physically abused during pregnancy, compared to 7.7% of the control group of randomly identified abused women. A 2016 review of pregnancy-associated deaths in Philadelphia found that 50% of the homicides involved IPV.¹⁵

In studies of pregnancy-associated mortality within a specific city or state, findings vary and are limited depending on the records examined. For instance, Krulewicz et al. used autopsy charts to examine deaths of pregnant and postpartum women, aged 15–50, in the District of Columbia from 1988 to 1996.²³ They found that women who died from gunshot wounds (whether ruled a homicide or not) and homicide deaths determined to be from other causes occurred significantly more often in women whose pregnancies were less than 21 weeks gestation than among women with more advanced pregnancies and postpartum women. They were unable to determine whether the perpetrator was a partner, only noting that in “many cases” they shared the same address and/or same last name as the victim.

Several studies examining maternal deaths at the state level have shown links to IPV. In North Carolina, researchers used death certificates of women linked with live birth and fetal death certificates.²⁴ Homicide accounted for 13% of the deaths, with 12% the result of gunshot wounds. In more than half of the 41 deaths from violent trauma (including 22 homicides), obstetrical providers knew of or suspected IPV; in 50% of the homicides, the murderer was identified as an intimate partner. A study of 1990–1999 Massachusetts data found 13% of pregnancy-associated mortality attributable to homicide, a greater percentage than associated with any single medical cause and accounting for 68% of preventable pregnancy-associated deaths.²⁵ A study of maternal mortality in Maryland using linked birth and death certificates, medical examiner charts, police records, and news publications from 1993 to 2008 found that homicide ($n = 110$) was the leading cause of death during pregnancy and the first postpartum year.⁷ Women who were African American, younger than 25 years, and unmarried were at the highest risk for homicide. Firearms were the most common method of death, and a current or former intimate partner was the perpetrator in more than 50% of the homicides. Finally, in the aforementioned Philadelphia study, histories of substance abuse, serious mental illness, and prior IPV were noted as risk factors in pregnancy-associated deaths, including from homicide, even in cases where these factors were not directly related to the cause of death.¹⁵

African American women were disproportionately affected by pregnancy-associated death from homicide across studies, with increased risk ranging from more than three to seven times that of white women.^{6,14,21} In the review of more than 465,000 death certificates between 2005 and 2010 from states with enhanced pregnancy mortality surveillance, pregnancy-associated homicide victims were most frequently young, non-Hispanic black, and had less education.⁹ Women identifying as African American, mixed race, and/or Indigenous, also have the highest rates of intimate partner homicide and other forms of IPV in the United States.^{26–28}

Summary of pregnancy-associated deaths due to homicide

A recent systematic review of pregnancy-associated homicide globally corroborated the patterns described here, finding that rates of such homicide are considerably higher in the United States than in other countries.¹⁶ The review concluded that one-third to two-thirds of pregnancy-associated homicides involve IPV.

Routine assessment and brief counseling for IPV during reproductive health visits and as a component of prenatal and postpartum care contribute to preventing pregnancy-associated deaths from homicide.²⁹ These services are part of covered women's preventive services, with no additional cost sharing,³⁰ and are recommended by the U.S. Preventive Services Task Force (USPSTF);³¹ ACOG;³² Association of Women's Health, Obstetric, and Neonatal Nurses; and American College of Nurse-Midwives.³³

Pregnancy-Associated Suicide

Lindahl et al. summarized data from published and unpublished reports worldwide to estimate the prevalence of suicidality during pregnancy and postpartum periods.²⁹ Their findings suggest that suicides may account for up to 20% of postpartum deaths, while suicidal ideation during pregnancy and postpartum ranged from 5% to 14%. Underlying depression was one of the most significant comorbid factors during the perinatal period that increased these suicidal tendencies. A 2019 expert review by Mangla et al. recognized depression, IPV, and substance use disorder (SUD) as three of the most common risk factors for pregnancy-associated suicide.³⁴ Three longitudinal studies suggest a strong link between IPV and suicide.^{35–37}

Current data on pregnancy-associated maternal deaths can be extrapolated from the NVDRS, as was previously discussed. Since 2018, the NVDRS has included data from all 50 states, Puerto Rico, and the District of Columbia, but there are no studies of pregnancy-associated death as yet using the full data set.³⁷ An earlier study carried out by Palladino et al. analyzed 2003–2007 NVDRS data from female victims of reproductive age in 17 states.¹⁹ More than half (54.3%) of pregnancy-associated suicides in this study involved intimate partner conflict, which may have contributed to the suicide event. Another study by Adu et al. used 2003–2012 NVDRS data from 18 states to assess suicide among pregnant and postpartum women.³⁸ Recent altercations with intimate partners and a history of IPV were significant factors that increased the odds of suicide for rural- and urban-dwelling women who were pregnant or postpartum. Austin et al. linked North Carolina's 2005–2011 Violent Death Reporting System data to CDCs NVDRS and identified 29 suicide cases among pregnant and postpartum women, or 2.3 deaths per 100,000 live births.³⁹ Precipitating factors included, but were not limited to, interpersonal relationship conflicts and chronic mental health challenges.

Previous suicide attempts and suicidal ideation can be risk factors for suicide completion. A number of studies have focused on suicidal ideation during pregnancy. Gelaye et al. selected 57 articles from an epidemiologic review of more than 2,600 articles for closer examination and found IPV as a recurring risk factor, along with other mental health and sociodemographic factors.⁴⁰ Alhusen et al. looked at suicidal

ideation among a sample of 166 low-income pregnant women receiving prenatal care at a university clinic from 2009 to 2010.⁴¹ Results indicated an overall prevalence of suicidal ideation at almost 23%. Depression during pregnancy was significantly associated with an increased risk of antenatal suicidal ideation in multiple logistic regression modeling; for women with IPV experiences, the odds were nine times greater. While the sample size was small, it is noteworthy that nearly one in four women in this study had reported suicidal thoughts in the previous week.

Differences in race and ethnicity for pregnancy-associated deaths from suicide

Data on racial and ethnic differences in pregnancy-associated deaths from suicide are limited. In contrast to pregnancy-associated deaths from homicide, which are significantly more common among African American women, one national study found that pregnancy-associated suicide occurred mostly among older non-Hispanic white women.⁹

Review committees

Maternal Mortality Review Committees have been instrumental in raising awareness of pregnancy-associated suicide. These multidisciplinary groups, which meet at the state or local level to review deaths of women during or within a year of pregnancy, bring attention to factors that significantly contribute to maternal deaths. A 2018 report from nine Maternal Mortality Review Committees noted IPV as one of several psychosocial and environmental risk factors associated with maternal suicide, along with other depression and trauma-related events.⁴² Increases in perinatal mental health and IPV screenings by trained providers and referrals to community-based organizations are among the listed recommendations.

Women who consider, attempt, and/or carry out suicide often have recent interactions with health care providers before their deaths.⁴³ In 2018, ACOG published updated clinical guidance for women's health providers to screen patients at least once during the perinatal period for depression and anxiety using standardized, validated tools. During postpartum visits, more extensive emotional health assessments and referrals may be indicated.⁴⁴ USPSTF also recommends that clinicians provide brief counseling or refer pregnant and postpartum women at increased risk of perinatal depression to behavioral health services.⁴⁵ Pregnant and postpartum women in abusive relationships may come to see suicide as a solution to end the abuse. Such tragic outcomes can be avoided with strong policies and evidence-based interventions.

Technical packages of evidence-based strategies to prevent suicide and IPV among pregnant and postpartum women

The CDC has published a technical package of evidence-based strategies to prevent suicide; however, information targeted to pregnant and postpartum women needs to be included.⁴⁶ A similar CDC technical package to prevent IPV across the lifespan highlights the role of home visiting programs for women at risk.⁴⁷ These technical packages could be combined in a version specifically for prenatal and postpartum care, with new strategies for preventing IPV, suicide, and homicide during these critical periods.

Drug Overdose During Pregnancy and Pregnancy-Associated Death

Drug overdose is the intentional or unintentional use of one or more licit or illicit substances leading to serious harm or death. Although research is sparse, it is increasingly recognized that drug overdose during pregnancy is a major risk factor for pregnancy-associated death. Estimates of pregnancy-associated deaths due to overdose vary among states. For example, from 2005 to 2014 in Utah, 26% of pregnancy-associated deaths were drug related.⁴⁸ In Maryland, the 2019 Annual Report of the Maternal Mortality Review Committee showed that 38% of pregnancy-associated deaths resulted from substance use and unintentional overdose, and for five consecutive years (2012–2017), unintentional drug overdose was the leading cause of pregnancy-associated death.⁴⁹ In a recent review from 2007 to 2016 in the 22 states that had adopted the pregnancy checkbox on death certificates, it was found that pregnancy-associated mortality involving opioids more than doubled in terms of both the rate (1.3–4.2/100,000 live births) and the percentage of all pregnancy-associated deaths (4%–10%).⁵⁰ Pregnancy-associated deaths for substance overdose deaths are more common among white women, while non-Hispanic black women are at significantly higher risk of pregnancy-associated deaths due to homicide.⁵¹ The overdose deaths for pregnant and postpartum women have not been calculated comparably in every state and territory. New CDC surveillance strategies may lead to improved measurement.

Overprescription of opioid pain medications and increases in the use of heroin and potent synthetic opioids, such as fentanyl, have contributed to the sharp rise in opioid-related overdose deaths in the general population, including pregnant women.^{52–54} Although almost all pregnancy-associated deaths from drug overdose involve opioids, most include more than one drug. The risk of fatal overdose is substantially increased when opioids are combined with benzodiazepines or alcohol.^{49,55}

Risk factors of pregnancy-associated death by drug overdose

Multiple risk factors make the perinatal period vulnerable for overdose. Having an unrecognized SUD or not receiving medication for an opioid use disorder (OUD) contributes to pregnancy drug-induced overdose deaths.^{48,51} Despite the evidence that comprehensive pharmacotherapy (*e.g.*, methadone, buprenorphine treatment) is the current standard of care for treating OUD during pregnancy and an effective way to prevent opioid overdose in the general population, nearly half of pregnant women with OUD who are receiving treatment in publicly funded centers in the United States are not receiving these medications.⁵⁶ Opioid detoxification is not indicated during pregnancy because of risks to the mother and fetus from relapse and overdose, yet, some pregnant women are pressured by relatives, partners, children's protective services, and health care providers to detoxify from OUD pharmacotherapy.⁵⁷ Lack of access to OUD treatment during pregnancy may be a barrier to effective care. Significant variations in pharmacotherapy utilization exist by geographic, demographic, substance use, and treatment characteristics. For example, reports indicate that providers in Appalachia frequently do not accept any insurance or do

not treat pregnant women, even though the region is highly affected by the opioid epidemic.⁵⁸

Psychiatric concerns increase the risk of pregnancy-associated overdose death. A significant number of pregnant women with SUDs have one or more psychiatric diagnoses, which can exacerbate substance use.^{59,60} One study found that 77% of pregnant women who died of a drug-induced overdose had a psychiatric condition.⁴⁸

The perinatal period is also a time of unique vulnerability for overdose due to the potential for intensified IPV and accompanying mental health issues.¹⁵ Significant numbers of pregnant women in SUD treatment report abuse during their pregnancy (41% emotional, 20% physical, 7% sexual).⁶¹ Women frequently report using substances to reduce negative mood states and traumatic memories.⁵⁵ Chronic pain is more common in women with abuse histories, potentially leading to use and misuse of opioid-containing pain relievers and OUD.^{62,63} Although the causal relationship between IPV and drug overdose among women in general has not been fully established, one study of abused women found an increased risk of overdose among those who had witnessed overdose, had lifetime drug use-related hospitalization, and had a relative or friend who experienced overdose.⁶⁴

The postpartum period may be a time of additional risk for pregnancy-associated overdose. Fatal and nonfatal overdose events decrease during the third trimester of pregnancy, with increased risk occurring at 7 to 12 months postpartum.^{48,51} One suggested contributing factor for the increasing risk of maternal overdose is having a newborn with a diagnosis of neonatal abstinence syndrome (NAS), a dysregulation syndrome that can predispose infants to irritability, difficulty with reading cues, and neurobehavioral problems.⁶⁵ Another relevant factor is the impact of insurance loss or the conclusion of pregnancy-related SUD treatment after delivery on treatment access and engagement, which can lead to increased overdose risk during the postpartum period. The increase in pregnancy-associated mortality involving opioids both pre and postpartum has been higher in non-Hispanic white women than in non-Hispanic black women.⁶⁵

Discrimination and stigma are pervasive toward women with SUDs, especially those who are pregnant or parenting.⁶⁶ Punitive approaches for women who use drugs during pregnancy, as well as for those receiving medication for OUD, are frequent, ranging from jail to termination of parental rights, and vary by state.⁶⁶ Such approaches can dissuade treatment participation even when available and contribute to the risk of increased drug use and overdose.

Prevention of pregnancy-associated death by drug overdose

Given the multiple clinical and psychosocial challenges of preventing pregnancy-related overdose, the care of women at risk requires a multipronged approach. Interventions should be individualized and comprehensive and should emphasize nonjudgmental treatment. In addition, interventions should include universal screenings for SUDs, psychiatric comorbidity, and IPV during the perinatal period. Care should be nonbiased and without stigma and include the infant. Measures should be implemented to ensure equity in access to evidence-based treatment and medications for OUD.

This requires an interdisciplinary team that provides pharmacotherapy, trauma-informed mental health treatment, obstetric and medical care, and parenting support. In addition, treatment should include a plan for overdose prevention that involves counseling about harm reduction and includes the provision of take-home naloxone and education on administration.^{67,68} Myriad factors may contribute to risk for each woman, ranging from unrecognized SUD or OUD, lack of access to appropriate treatment or medications for OUD, stigma or fear of prosecution, psychiatric comorbidities, IPV and other violence exposure, and maternal stress due to an infant with NAS. Prevention of pregnancy-associated deaths from overdose begins with nonbiased, trauma-informed, and comprehensive care and harm reduction strategies.

Summary and Recommendations

Pregnancy-related and pregnancy-associated deaths from homicide, suicide, and drug overdose can be overlooked when compared with other factors that contribute to maternal mortality in the United States. Pregnancy-associated deaths are preventable causes of death⁴⁹ and a public health concern of major importance and urgency due to the potential devastating consequences for the mother, fetus/child, and family.⁵⁵ Data from the National Center for Health Statistics death records of 32 states and the District of Columbia from 2005 to 2010 included a temporal pregnancy item on death certificates (“the pregnancy check box”) to calculate pregnancy-associated homicides and suicides.^{9,50} Rates were 2.2 to 6.2 per 100,000 live births for homicide and 1.6 to 4.5 per 100,000 for suicide deaths. Both of these rates are slightly higher than those for pregnancy-associated mortality involving opioid overdoses, although those rates are increasing. For each condition, contributing factors, access to evidence-based interventions, and preventive measures need to be considered. Increasing numbers of studies have drawn attention to the intersection of IPV and premature deaths from all three causes, as well as other mental health issues for all three. Other important risk factors need to be addressed, the most important being prior suicidality for the suicides and prior SUD for the overdose deaths.

Clinicians and researchers have identified several drivers of the gaps and disparities in maternal mortality during pregnancy and the postpartum period.⁶⁹ To address pregnancy-related and pregnancy-associated deaths and the intersection of IPV, steps can be taken at the patient, provider, and system levels to reduce health disparities.⁷⁰ The federal Health Resources and Services Administration (HRSA) developed the HRSA Strategy to Address IPV (2017–2020), a 3-year initiative promoting partnerships between federal stakeholders and nonfederal stakeholders. The Strategy strengthens existing programs and creates new activities, and is a model for whole system approaches. This innovative work created activity momentum aligned with 4 priorities and 10 objectives, including the development of a new collaborative improvement and innovation network under the Maternal, Infant, and Early Childhood Home Visiting Program.⁷¹

The socioecological model highlights the importance of social determinants and includes patient factors (*e.g.*, socioeconomic status, race and ethnicity, sex/gender, behaviors, beliefs, biology, and genetics), community and neighborhood factors (*e.g.*, social networks, built environment, and

housing), provider factors (*e.g.*, knowledge, implicit bias, and communication), and system factors (*e.g.*, access to high-quality care, structural racism, social and political policies, and health care institutions). All these factors play a role in the presence or absence of clinical comorbidities and pregnancy complications, which may contribute to severe maternal morbidity or mortality. See Table 1 for a summary of how these factors may be addressed.

Further discussion of issues related to inequities at each level is needed. At the patient level, patients from historically discriminated against groups may be mistrustful of providers based on these historic structural bias factors. The possible reluctance of women, especially those from marginalized groups to report IPV, acknowledge addiction problems, and

TABLE 1. SUMMARY OF RECOMMENDATIONS TO DECREASE PREGNANCY-ASSOCIATED DEATHS DUE TO HOMICIDE, SUICIDE AND DRUG OVERDOSE FOR PATIENTS, PROVIDERS AND SYSTEMS

Patients	
•	Consider patient literacy, first language, educational background
•	Consider patient family, social networks, support systems
•	Consider patient age, SES, and insurance coverage options
Providers	
•	Universal screening and referral for IPV, SUD, depression, and anxiety
•	Improve identification of pregnant/postpartum women in the first year (or longer) after delivery who go to the emergency department or hospital and may be at risk for homicide, suicide, or drug overdose
•	Identify alternatives for use of opioids for treatment of chronic pain.
•	Build training programs on use of naloxone and other components of comprehensive treatment for substance use
•	Employ referrals to trauma informed community services
Systems	
•	Train providers to address unconscious bias (race, stigma of addiction and mental health conditions)
•	Support a more diverse health care workforce.
•	Develop standardized, culturally appropriate patient education materials that explain the link between mental health conditions, IPV and SUD with pregnancy-associated deaths
•	Improve integrated care systems with obstetricians, primary care, pediatricians and behavioral health providers
•	Discuss social, economic, and cultural challenges faced by pregnant and postpartum women and translate findings into specific recommendations at the regional- and systems-levels
•	Improve surveillance and monitoring of pregnancy-associated deaths at the national-level
•	Develop policies that prioritize treatment for SUDs rather than punitive approaches
•	Expand insurance coverage and decrease insurance barriers (<i>e.g.</i> , reimbursement) for treatment of SUDs and mental health services among pregnant and postpartum women
•	Expand access to naloxone, with supporting education about its use among first responders, community, and family members

share other mental health issues is often due to fear of the information being reported to child protective services or other authorities. Combined with inadequate training on the part of health care providers on how to screen and provide appropriate and “warm” referrals to care, such factors may hinder the identification and intervention of these conditions.⁷² Immigrant women also may be reluctant to disclose these issues because of fear of deportation for themselves or their partners.⁷³

At the provider level, significant evidence exists that providers may be influenced by underlying inherent bias related to the patient’s race or ethnicity, use of drugs during pregnancy, staying with an abusive partner, or difficult behaviors due to mental health problems. Among the recommendations given by the Society for Maternal-Fetal Medicine to reduce racial and ethnic disparities in maternal morbidity and mortality are assessing providers’ knowledge and attitudes, implicit biases, and awareness of disparities in health outcomes.⁷⁴ Effective modalities to educate providers are also recommended.

At the system level, higher rates of uninsurance or underinsurance among black and Hispanic women may impede access to primary care, which is critical during the postpartum period. Structural racism and other forms of bias in health care delivery systems also contribute to these premature deaths in as yet unaddressed ways.

Finally, in May 2020, the USPSTF announced a new study to update the evidence base around recommendations for screening and treatment of depression and suicide risk. As part of this study, USPSTF researchers are engaged in identifying evidence related to screening for and treatment of anxiety disorders and combination approaches that address more than one of these conditions. Pregnant and postpartum women are included in key research questions guiding the systematic review. Results are expected later in 2020, and may include cross-screening among any demonstrated intersecting risks for IPV, suicidality, and substance abuse. In other words, all three screenings will be conducted individually; if one screening is positive, interventions for that issue will include continuing assessment for the other two issues. Postpartum depression intervention guidelines should include IPV assessment, given the strong evidence behind this association.^{75,76}

Finally, the National Quality Forum, in collaboration with a multistakeholder group of experts and funded by the Department of Health and Human Services, is currently overseeing a 24-month effort addressing maternal morbidity and mortality. Social determinants—including suicide, drug overdose, and IPV—have been included in the project environmental scan to date. Final project deliverables also will include a recommendations report with measurement frameworks.⁷⁷

Further research using CDC’s NVDRS full database, which includes all 50 U.S. states Puerto Rico, and the District of Columbia as of 2018, is needed. It is important that all states include the pregnancy and IPV fields so that a more comprehensive picture emerges. Technical assistance to states also is needed in terms of NVDRS coding and fields because many states are still developing their processes.

Another important part of surveillance includes a focus on State Maternal Mortality Reviews.⁴³ Illinois’ State Maternal Mortality Review Committee is forming a subcommittee with expertise in IPV, homicide (including intimate part-

ner homicides), suicide and suicidality during pregnancy, substance abuse during pregnancy, and overdose deaths to review all forms of pregnancy-associated and pregnancy-related deaths. The Maryland State Health Department’s Maternal Mortality Review Committee also reviews pregnancy-associated and pregnancy-related deaths with the goal of making recommendations for prevention.⁴⁹ CDC’s Maternal Mortality teams could provide technical assistance to states in setting up these more comprehensive Review Committees.

Additional recommendations for further research include, but are not limited to, the following:

- Expanded surveillance strategies, including IPV-related modules, substance use, and mental health questions, as part of participating state Pregnancy Risk Assessment Monitoring System surveys. IPV-related modules that include reproductive coercion also should be carefully considered.
- Development and testing of trauma-informed training to build trust between pregnant patients and health care providers.
- Replication and dissemination of culturally tailored, evidence-informed interventions to prevent suicide among women. One example of this type of intervention for suicidality has been supported by a randomized control trial among African American women experiencing IPV.⁷⁸
- Further examination surrounding dimensions of access to care, such as availability, affordability, accessibility, accommodation, and acceptability of services⁷³ for all marginalized groups of women, including sexual minority women. Addressing these dimensions for underserved women across rural and urban settings is also an important consideration.
- Identification of relationships between pregnancy-associated deaths and IPV for Native American women and promising practices to address these cases.
- Identification of the impact of generational IPV, trauma, and psychiatric disorders on risk of suicide and suicidal ideation among pregnant and postpartum women in general and, more specifically, among groups of women already at high risk for maternal morbidity and mortality, including African American and Native American women.
- Further study about the prevalence of IPV-associated traumatic brain injury among abused pregnant and postpartum women as a pregnancy-associated severe morbidity.

Conclusion

Pregnancy-associated deaths due to homicide, suicide, and drug overdose are preventable during pregnancy.⁴⁸ These deaths are a public health concern of major importance and urgency because of the potentially devastating consequences for the mother, fetus/child, and family.⁵⁵ Access to evidence-based, trauma-informed, and culturally appropriate interventions from the perinatal through postnatal periods need priority consideration. Future research should evaluate and address known and unknown factors related to the intersection of IPV and pregnancy-related and pregnancy-associated deaths, test new models, and scale prevention strategies and programs that reach individual women, providers, and communities.

Authors' Contributions

All authors contributed to the development and writing of this article.

Disclaimer

The findings and perspectives in this article are those of the authors and do not necessarily represent the official position of the Johns Hopkins University, the University of Virginia, the U.S. Department of Health and Human Services, Health Resources and Services Administration, or the National Institutes of Health.

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