

Epidemiological Determinants of Maternal Mortality and Morbidity in the United States

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Abstract: Despite significant investments in health-care delivery systems and the use of advanced health-care technologies, maternal mortality and morbidity remain major public health problems in the United States. By contrast, many high-income countries have had sustained and substantial decreases in maternal death rates, while in the United States, maternal death rates have been alarmingly high and increasing, suggesting systemic problems in the health care system. This review collates recent research to explore clinical, socioeconomic and systemic risk factors associated with maternal death and serious adverse outcomes. It concludes that both chronic health conditions and social inequalities and barriers to care are intricately involved in shaping outcomes. The policy environment sets the context for the delivery and prioritisation of care. Chronic conditions like cardiovascular disease, hypertensive disorders of pregnancy, and obesity remain major drivers of maternal mortality, and racial and ethnic inequities continue to reflect systemic inequities deeply rooted in health care systems. The risks faced by the mother are compounded by socioeconomic disadvantage, inequities in the quality of care, and inadequate access to basic health services. Moreover, behavioral and psychosocial issues such as mental health problems are increasingly acknowledged as significant factors contributing to maternal morbidity, supporting the need for a holistic approach. This review emphasizes the need for multi-level interventions to address clinical care and broader structural inequities to save preventable lives and work toward health equity in the United States.

Keywords: Maternal mortality; Maternal morbidity; Epidemiological determinants; Health disparities.

INTRODUCTION

Maternal mortality and morbidity are widely used indicators of how well a healthcare system is performing (Creanga, 2018). In the United States, these outcomes remain a concern despite the country's advanced medical resources. Maternal mortality rates are higher than in many other high-income nations, and recent trends suggest either stagnation or an increase in deaths (Collier & Molina, 2019; Howell *et al.*, 2020). At the same time, severe maternal morbidity (SMM) referring to serious, life-threatening complications during pregnancy or delivery has also risen, pointing to ongoing weaknesses in maternal care systems (Howell *et al.*, 2020).

The reasons for these outcomes are multifaceted and interconnected, involving clinical conditions, social circumstances, behavior, and health system structures (Wang *et al.*, 2023). On the clinical side, conditions such as cardiovascular disease, hypertensive disorders, obesity, and diabetes are major contributors to pregnancy-related complications (Briller *et al.*, 2024). These risks are increasingly common as more women of reproductive age live with chronic health conditions, especially when access to early and consistent prenatal care is limited.

Social and structural factors also play a major role. Persistent racial and ethnic disparities mean that Black women, in particular, face significantly higher risks of maternal death and complications

compared with White women, even when income and education levels are similar (Collier & Molina, 2019). This reflects deeper structural issues such as systemic racism, bias in care, and unequal access to healthcare services (Howell *et al.*, 2020).

Socioeconomic conditions further shape maternal health. Income level, education, employment, and insurance status all influence whether women can access timely and appropriate care. Those in lower socioeconomic groups often face delayed care, lower health literacy, and higher exposure to risk factors (Nortey *et al.*, 2025). These challenges are often intensified in rural and underserved areas, where healthcare resources and providers are limited (Creanga, 2018).

Health system factors also contribute to variation in outcomes. Differences in hospital quality, staffing levels, and access to emergency obstetric services mean that maternal outcomes can vary widely by location (Howell *et al.*, 2020). Insurance coverage and state-level policies further shape the preventability and management of maternal deaths.

In addition, behavioral and psychosocial factors are increasingly recognized as important influences. Mental health conditions such as perinatal depression and anxiety are linked to higher risks of complications, particularly in the postpartum period (Gordon *et al.*, 2025). Lifestyle factors, including nutrition, physical inactivity, and

substance use, also contribute to maternal risk profiles, highlighting the importance of more integrated approaches to care (Oware & Mensah, 2025).

Despite growing research attention, maternal mortality and morbidity remain high in the United States, suggesting that current interventions have not fully addressed the underlying drivers. Much of the existing literature still examines risk factors separately, limiting a more integrated understanding. This narrative review therefore synthesizes recent evidence to provide a clearer, more holistic view of the epidemiological determinants of maternal outcomes in the United States, with implications for policy, practice, and future research.

LITERATURE SEARCH STRATEGY AND INCLUSION CRITERIA

Relevant literature for this review was identified through structured searches of major academic databases, including Google Scholar, PubMed, Scopus, and Web of Science. The search focused on studies published between 2020 and 2026 in order to capture recent evidence, emerging trends, and evolving policy discussions on maternal mortality and morbidity in the United States. This period is particularly important given the increasing attention to maternal health disparities, rising rates of severe maternal morbidity, and ongoing efforts to improve maternal health outcomes through clinical and system-level interventions.

A range of keywords and search terms was used to ensure comprehensive coverage of the literature. These included maternal mortality, severe maternal morbidity, epidemiological determinants, maternal health disparities, United States, health system factors, and socioeconomic determinants. Additional terms were used to capture specific risk domains such as cardiovascular disease, hypertensive disorders of pregnancy, mental health, and healthcare access. Boolean operators (AND, OR) were applied to refine searches and improve relevance.

Studies were included if they met the following criteria: (1) focused on maternal mortality or severe maternal morbidity in the United States; (2) examined clinical, socioeconomic, behavioral, or health system determinants; (3) were published in peer-reviewed journals or produced by reputable research or government institutions; and (4) provided empirical findings, systematic reviews, or conceptual insights relevant to maternal health

outcomes. In addition, selected publications from Kler Consult were included to support discussion of broader socioeconomic, behavioral, and health system influences.

Key reports from authoritative public health and maternal health organizations were also included due to their contribution to national surveillance data and policy-relevant insights. These sources complement peer-reviewed literature by providing large-scale, population-level evidence on trends and determinants of maternal mortality and morbidity in the United States.

THEMATIC SYNTHESIS

The literature included in this review was examined using a thematic synthesis approach to identify recurring patterns related to maternal mortality and morbidity in the United States. Rather than considering risk factors in isolation, this review focuses on how clinical conditions, socio-demographic factors, and health system characteristics interact to shape maternal outcomes across different populations.

The findings show that maternal mortality and morbidity are not driven solely by obstetric complications. Instead, they are closely linked to broader contexts such as socioeconomic inequality, access to care, and systemic barriers within the healthcare system (Creanga, 2018; Collier & Molina, 2019; Wang *et al.*, 2023). Clinical conditions including cardiovascular disease, hypertensive disorders of pregnancy, and obesity remain key contributors to poor maternal outcomes (Briller *et al.*, 2024; Bromfield *et al.*, 2023; Platner *et al.*, 2021), while national data also point to a continued rise in severe maternal morbidity over time (Fink *et al.*, 2023).

Across the studies reviewed, consistent racial and ethnic disparities were evident, with minority women facing significantly higher risks of adverse outcomes (Leonard *et al.*, 2019; Howell *et al.*, 2020; Palatnik *et al.*, 2023). These differences are closely tied to structural inequities, as well as unequal access to high-quality prenatal and postpartum care (Bellerose *et al.*, 2022; Liu *et al.*, 2019). Variations in healthcare quality and the uneven distribution of resources across regions further contribute to these outcomes (Howell & Zeitlin, 2017; Snyder *et al.*, 2020).

From this synthesis, five key themes emerged, reflecting both individual risk factors and broader systemic influences that together shape patterns of

maternal mortality and morbidity in the United States.

Theme 1: Epidemiological Trends in Maternal Mortality and Morbidity

Recent evidence shows that maternal mortality and severe maternal morbidity (SMM) in the United States have followed concerning patterns over the past decade, with rates remaining higher than those observed in other high-income countries. National surveillance data suggest that maternal mortality ratios have either plateaued or increased in recent years, pointing to ongoing systemic challenges within maternal healthcare delivery (Collier & Molina, 2019; Howell *et al.*, 2020). At the same time, severe maternal morbidity has also risen, with increasing reports of life-threatening complications such as hemorrhage, sepsis, and organ failure during pregnancy and childbirth (Howell *et al.*, 2020).

These trends are not evenly distributed across populations or regions. Clear racial disparities persist, with Black women consistently experiencing the highest rates of maternal mortality and morbidity (Leonard *et al.*, 2019). Geographic differences are also evident, as rural areas and certain states report worse outcomes, often linked to limited access to care, shortages of skilled providers, and weaker health system infrastructure. Taken together, these patterns highlight that maternal health outcomes are shaped not only by individual clinical risk but also by broader structural and system-level conditions.

Over time, there has also been a shift in the leading causes of maternal death. While direct obstetric causes such as hemorrhage and infection remain important, indirect causes; particularly chronic conditions like cardiovascular disease are becoming increasingly dominant (Briller *et al.*, 2024). This change reflects broader population trends, including delayed childbearing and a higher prevalence of pre-existing health conditions. Overall, these epidemiological patterns underscore the increasing complexity of maternal health challenges in the United States and the need for integrated, multi-level approaches to reduce preventable deaths and improve outcomes.

Theme 2: Clinical Determinants of Maternal Mortality and Morbidity

Clinical factors remain some of the most direct and measurable contributors to maternal mortality and morbidity. A substantial body of evidence identifies cardiovascular disease as the leading cause of pregnancy-related deaths in the United

States, followed by hypertensive disorders, hemorrhage, infection, and thromboembolic events (Briller *et al.*, 2024). The growing impact of cardiovascular conditions is closely tied to broader population-level changes, including increasing rates of obesity, hypertension, and diabetes among women of reproductive age (Bromfield *et al.*, 2023).

Hypertensive disorders of pregnancy, such as preeclampsia and eclampsia, are particularly important contributors to severe maternal outcomes. When not promptly recognized and managed, these conditions can escalate into serious complications including stroke, organ failure, and death (Briller *et al.*, 2024). In a similar way, postpartum hemorrhage continues to be a major cause of maternal mortality, especially in settings where timely and effective emergency care is not readily available (Collier & Molina, 2019).

Recent literature has also placed greater emphasis on multimorbidity. Women living with multiple chronic conditions face substantially higher risks during pregnancy, as overlapping health issues can complicate both clinical management and recovery. Broader epidemiological evidence reinforces multimorbidity as an important predictor of adverse outcomes, highlighting the value of early identification and preconception care in reducing risk (Oware *et al.*, 2025).

Importantly, clinical factors rarely operate in isolation. Their impact is strongly influenced by access to care, quality of healthcare services, and the timeliness of clinical response (Bellerose *et al.*, 2022). Many deaths related to conditions such as hemorrhage and hypertensive disorders are considered preventable when appropriate care is delivered without delay (Bromfield *et al.*, 2023). This underscores that clinical risk is deeply intertwined with health system performance and access to timely, high-quality maternal care.

Theme 3: Socioeconomic and Structural Determinants

Socioeconomic and structural determinants play a central role in shaping maternal health outcomes and often interact with clinical risks to influence overall vulnerability. Key factors such as income, education, employment status, and insurance coverage strongly affect access to healthcare services and the ability to obtain timely and appropriate maternal care (Palatnik *et al.*, 2020). Women with lower socioeconomic status are more likely to encounter barriers such as financial hardship, transportation difficulties, and limited

availability of healthcare providers, all of which can delay or restrict access to essential services (Nortey *et al.*, 2025).

Among structural determinants, racial inequality remains one of the most persistent and significant contributors to maternal health disparities in the United States. Black women continue to experience disproportionately higher rates of maternal mortality and morbidity compared with other racial groups, and this disparity persists even after adjusting for socioeconomic status (Creanga, 2018). This pattern points to the influence of structural racism, including systemic bias within healthcare delivery and broader social inequities that shape health outcomes over time (Howell *et al.*, 2020).

Broader social conditions such as housing stability, neighborhood environment, and chronic exposure to stress also contribute to maternal risk. These factors accumulate over time and can significantly affect health during pregnancy, increasing the likelihood of complications. For instance, long-term stress linked to disadvantage and discrimination has been associated with higher rates of hypertension and other pregnancy-related conditions (Nicholls-Dempsey *et al.*, 2023).

Overall, socioeconomic factors should not be viewed as background influences alone, but as active determinants of maternal health. They shape access to care, influence health behaviors, affect stress levels, and impact adherence to medical guidance. This underscores the importance of addressing social and structural conditions as part of comprehensive strategies to improve maternal health outcomes.

Theme 4: Health System Factors

Health system characteristics are key drivers of maternal mortality and morbidity, shaping both access to care and the quality of services received (Wang *et al.*, 2023). Differences in hospital quality, availability of skilled healthcare professionals, and how maternal health services are organized all contribute to variations in outcomes across regions (Snyder *et al.*, 2020).

Access to care remains a major concern, particularly for women living in rural and underserved areas. Limited availability of obstetric services, long travel distances to healthcare facilities, and shortages of specialized providers can delay essential care, increasing the risk of complications (Fink *et al.*, 2023). Telehealth has been introduced as one approach to improving access to prenatal and postpartum services,

especially in underserved communities (Hoffman, 2022). However, unequal access to digital tools and inconsistent infrastructure can limit its overall impact.

Insurance coverage also plays a significant role in shaping maternal health outcomes. Women without adequate insurance are less likely to receive timely prenatal care and are at greater risk of adverse outcomes (Bellerose *et al.*, 2022). Policy measures such as Medicaid expansion have improved access in some settings, although gaps between states remain (Oware *et al.*, 2025).

Beyond access, the quality of care within healthcare facilities is equally important. Evidence shows that women treated in lower-quality hospitals face higher risks of severe maternal morbidity and mortality (Collier & Molina, 2019; Bellerose *et al.*, 2022; Fink *et al.*, 2023; Wang *et al.*, 2023). Variations in clinical protocols, staff training, and resource availability help explain these differences (Snyder *et al.*, 2020). Overall, these findings highlight that improving maternal outcomes requires not only expanding access but also strengthening and standardizing the quality of care across health systems.

Theme 5: Behavioral and Psychosocial Determinants

Behavioral and psychosocial factors are increasingly being recognized as important and sometimes underappreciated contributors to maternal mortality and morbidity (Wang *et al.*, 2023). Mental health conditions such as depression, anxiety, and substance use disorders are particularly significant, as they have been consistently linked to higher risks of adverse maternal outcomes, especially during pregnancy and the postpartum period (Gordon *et al.*, 2025). These conditions can shape how individuals engage with the healthcare system, influencing whether they seek care promptly, follow medical advice, and maintain consistent follow-up, all of which are critical during and after pregnancy (Wang *et al.*, 2023).

Lifestyle-related behaviors also play a meaningful role in maternal health. Factors such as poor nutrition, low physical activity, and substance use can significantly increase the risk of complications (Collier, A. R. Y., & Molina, R. L. (2019)). For example, inadequate nutrition and sedentary behavior contribute to obesity and metabolic conditions, which in turn elevate pregnancy-related risks, while alcohol and drug use are strongly associated with adverse maternal and

neonatal outcomes (Platner *et al.*, 2021). These modifiable behaviors are important because they represent areas where targeted interventions can meaningfully reduce risk and improve outcomes (Wang *et al.*, 2023).

Social support further shapes maternal health experiences in important ways. Women with strong and reliable support networks are generally more likely to access care, adhere to treatment recommendations, and report better psychological well-being during and after pregnancy (Shin & Park, 2023). In contrast, limited social support can increase feelings of isolation and stress, which are themselves linked to higher rates of complications and poorer outcomes (Nortey *et al.*, 2025).

Importantly, these behavioral and psychosocial influences do not occur in isolation. They often interact with broader socioeconomic and structural conditions (Nicholls-Dempsey *et al.*, 2023). For example, economic hardship and systemic disadvantage can increase stress, limit coping resources, and restrict healthy behaviors, highlighting the need to address both individual factors and broader social conditions in maternal health (Nortey *et al.*, 2025).

Conceptual Synthesis of Epidemiological Determinants

Taken together, the literature shows that maternal mortality and morbidity are shaped by a complex, layered set of interacting factors rather than a single cause. Clinical conditions such as pre-existing diseases and pregnancy-related complications increase biological risk, while socio-demographic factors like race, income, and education influence both exposure to these risks and the ability to manage them effectively. Alongside this, health system factors—including access to care, quality of services, and how quickly treatment is provided—play a major role in determining outcomes.

These influences are closely connected and often reinforce one another. For instance, an individual with underlying health conditions may face worse outcomes if they also experience barriers to accessing timely, high-quality care. When structural inequalities are added to this mix, delays in diagnosis and treatment become more likely, which can significantly increase the risk of severe complications or maternal death.

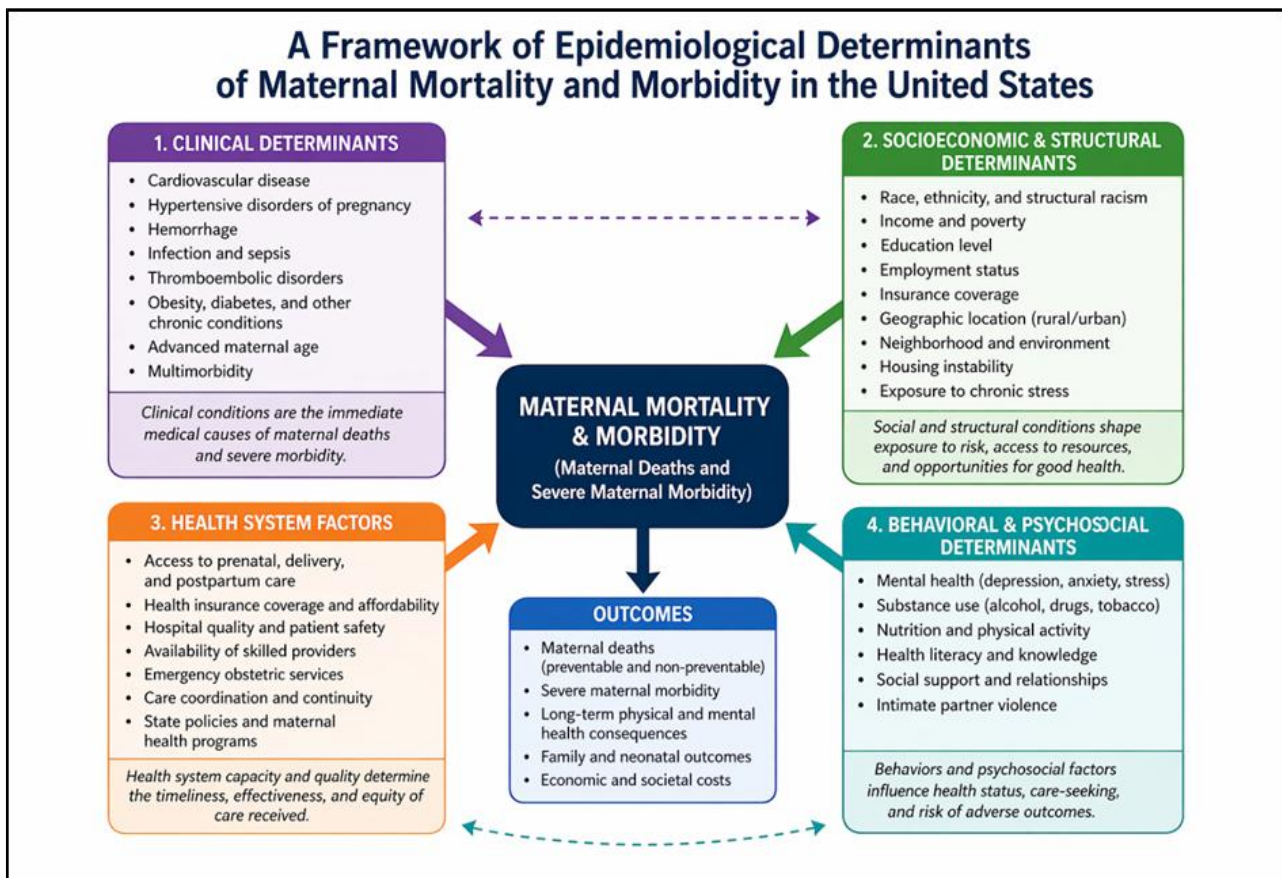


Figure 1: Conceptual model of epidemiological determinants influencing maternal mortality and morbidity in the United States.

Source: Author's construct, 2026.

This integrated framework suggests that maternal mortality and morbidity are best understood as the result of interconnected epidemiological pathways rather than isolated risk factors. It underscores the need for interventions that address not only clinical conditions but also the broader social, economic, and health system contexts within which women access and experience care.

CONCLUSION

This comprehensive review highlights that maternal mortality and morbidity in the United States result from a complex and interconnected set of epidemiological factors rather than isolated clinical events. The evidence consistently shows that poor maternal outcomes emerge from the combined influence of clinical conditions such as cardiovascular disease, hypertensive disorders, obesity, and other chronic illnesses, alongside deeply rooted socioeconomic, structural, behavioral, and health system challenges.

A key insight from this synthesis is that clinical risk factors alone cannot fully explain the persistently high rates of maternal mortality in the United States. These medical risks are significantly intensified by disparities in income, education, insurance coverage, and access to timely, high-quality healthcare. Racial and ethnic inequities, particularly the disproportionate burden experienced by Black women, further highlight the lasting effects of structural racism and systemic bias within healthcare systems. In addition, weaknesses in health system performance such as inconsistent hospital quality, limited access to skilled obstetric care, and delays in emergency response continue to contribute to preventable deaths and complications.

The review also underscores the growing importance of behavioral and psychosocial factors, including mental health conditions, substance use, lifestyle behaviors, and the availability of social support. These factors often interact with broader structural disadvantages, increasing vulnerability during pregnancy and the postpartum period. Importantly, these influences do not act independently but instead reinforce one another, creating cumulative pathways of risk that shape maternal outcomes across populations.

Overall, maternal mortality and morbidity in the United States should be understood as a multi-level public health challenge shaped by the interaction of biological, social, and systemic forces. Addressing this issue effectively therefore requires integrated strategies that go beyond

clinical care alone to include improvements in health system equity, socioeconomic conditions, and broader structural determinants of health.

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