Black Maternal Mortality in the US

Introduction:

Significant racial disparities in maternal morbidity and mortality have continued to increase in the United States for decades. Following decades of decline, maternal deaths began to rise in the 1990's despite advancements in medical technology and health care. By 2013, rates of maternal mortality and morbidity and pre-term births had more than doubled and now are twice that of most high-income nations (Roeder, 2020). More than half of these deaths and near deaths are from preventable causes, and black women are disproportionately affected contributing to the longstanding racial disparities in maternal and infant health outcomes (Declercq & Zephyrin, 2020). People of color are at increased risk for poor maternal and infant health outcomes, with Black women three to four times more likely to die a pregnancy-related death as compared their white counterparts (Singh & Yu, 2018). Growing research indicates that quality of healthcare, from preconception through postpartum care, may be a critical lever for improving outcomes for racial and ethnic minority women. This article reviews racial and ethnic disparities in severe maternal morbidities and mortality, underlying drivers of these disparities, and potential levers to reduce their occurrence.

Background:

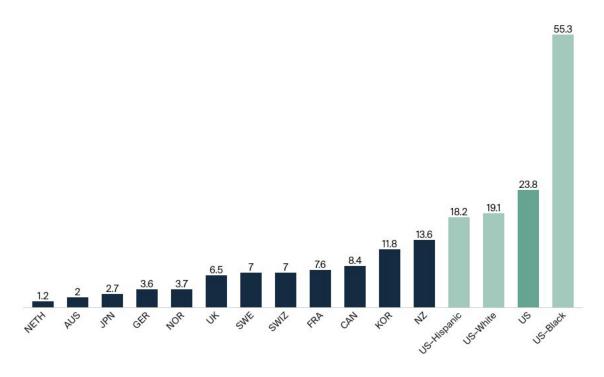
Approximately 700 women die in the U.S. each year because of pregnancy or its complications (Peterson et al. 2019). Another 500,000 people each year have unexpected outcomes of labor and delivery with serious short- or long-term health consequences. According to the CDC, a pregnancy-related death is defined as "the death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events

initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy," (CDC, 2022). For years the maternal mortality rate in the United States has exceeded that of other high-income countries. Data from the Organization for Economic Co-operation and Development and the Centers for Disease Control and Prevention demonstrates recent increasing state around the world, as well as a widening gap between the U.S. and other high-income nations (Gunja et al. 2022).

Figure 1:

New Data Shows U.S. Maternal Mortality Rate Exceeds That in Other High-Income Countries

Deaths per 100,000 live births

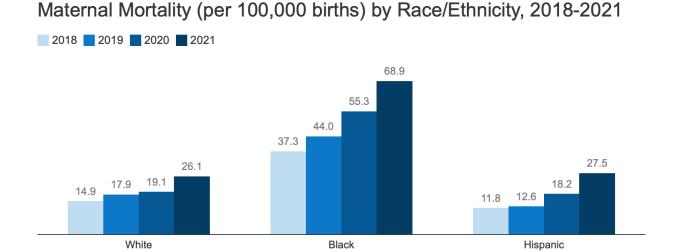


Notes: The maternal mortality ratio is defined by the World Health Organization as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. 2015 data for FRA; 2017 data for UK; 2018 data for NZ; 2019 data for SWIZ; 2020 data for AUS, CAN, GER, JAP, KOR, NETH, NOR, SWE, and US.

Source: Munira Z. Gunja, Evan D. Gumas, and Reginald D. Williams II, "The U.S. Maternal Mortality Crisis Continues to Worsen: An International Comparison," To the Point (blog), Commonwealth Fund, Dec. 1, 2022. https://doi.org/10.26099/8vem-fc65

Approximately one third of maternal deaths occur during pregnancy, over half (56%) occur during labor or within the first week postpartum, and another 13% occur between six weeks and one-year post-partum (Creanga, 2017). The extensive timeline of complications and deaths related to pregnancy highlights the importance of access to health care throughout pregnancy and well beyond the federally mandated Medicaid coverage of 60 days. Due to variations in reporting and data collection, it is possible that the number of pregnancy-related deaths is underestimated, and that the maternal mortality rate is much higher (Hoyert & Miniño, 2020). More than 80% of these pregnancy-related deaths have been determined preventable (Trost et. al, 2022). When these statistics are sub-divided racially, significant disparities in care for black maternal health is evident. Black women are three to four times more likely to die from complications surrounding pregnancy and childbirth than non-Hispanic white women When accounting for age, education levels, and socio-economic status, these disparities persisted over time, refuting the belief that these disparities are due to poverty, as indicated in figure 1 (CDC, 2022; Peterson et al., 2019). The maternal mortality rate for college, or higher educated black women is 5.2 times higher than the rate for white women with the same educational attainment. and 1.6 times higher than the rate for white women with less than a high school diploma (Peterson et al. 2019). Furthermore, black women are more likely to deliver a baby with a low birth weight, and black newborns experience higher infant death rates that are not associated with any genetic differences nor explained by socioeconomic factors (Baciu et al. 2017).

Figure 2:



Note: Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic. Other races are not shown due to small numbers. Maternal deaths are defined as deaths that occur while pregnant or within 42 days of being pregnant. The 2021 mortality data are provisional and subject to change; however, the data are based on over 99 percent of deaths for 2021 as of August 2, 2022.

Source: United States Government Accountability Office (GAO), Maternal Health: Outcomes Worsened and Disparities Persisted During the Pandemic, GAO-23-105871 (Washington, D.C.: Oct 2022)

Leading Causes of Maternal Mortality:

Research analysis reveals the leading causes of maternal mortality across all racial and ethnic groups during pregnancy or within six weeks of delivery are embolism and preeclampsia/eclampsia. These are followed by postpartum cardiomyopathy, hemorrhage, and complications from obstetric surgeries such as cesarean sections (MacDorman et al. 2021). According to the U.S. Agency for Healthcare Research and Quality, leading causes of maternal death for black women specifically are postpartum cardiomyopathy, and preeclampsia/eclampsia, with greater severity of disease and mortality rates five times those of white women. Additionally, black women had a case-fatality rate 2.4 to 3.3 times higher than that of white women for specific pregnancy complications including preeclampsia, eclampsia, abruptio placentae, placenta previa, and postpartum hemorrhage. Pregnant and postpartum black

women are also two to three times more likely than white women to die of hemorrhage or embolism (MacDorman et al. 2021). Furthermore, late maternal deaths—those occurring between six weeks and one year postpartum—were 3.5 times more likely among Black women than white women. While postpartum cardiomyopathy is the leading cause of late maternal death among all races and ethnic groups, black women are six-times more likely to be affected than non-Hispanic white women.

Most maternal deaths are thought to be preventable. With cardiovascular conditions as the leading cause of maternal deaths including embolism, preeclampsia, eclampsia, and cardiomyopathy, increased awareness to improve diagnosis, monitoring and treatment is crucial to maternal outcomes. The substantial increased risk for maternal mortality amongst black women demonstrates the bearing of structural racism on health care and health outcomes in the US.

Factors driving disparities in Maternal Health:

The elements reinforcing disparities in maternal health are multifaceted and complex but understanding and increasing focus on the nature and contributing role/s of each is essential to addressing the problem. While differences in health insurance coverage and access to care, play a role, broader social and economic factors are critical to shaping access disparities in health.

These elements include social determinants of health, equal access to quality care, bias, and implicit bias in the healthcare system as well as structural and systemic racism and discrimination within health care and broader society?

Social Determinants of Health

Differences of maternal health outcomes are seen in the lived experience of black women in the US, compared to other races, and other nationalities. After adjusting for maternal age,

educational level, marital status, stress level, chronic hypertension, chronic diabetes, gestational diabetes, parity, smoking, and BMI, Boakye et al. (2021) found that non-Hispanic Black women born outside the US had 26% lower odds of preeclampsia compared with US-born non-Hispanic Black women. In contrast Hispanic and non-Hispanic women born outside the US, did not differ significantly in their odds of preeclampsia compared with their US-born counterparts. Moreover, duration of US residence was significantly associated with higher odds of preeclampsia among non-Hispanic Black mothers who were born outside the US. Once again, this association was not seen across Hispanic and non-Hispanic white women.

This difference in outcome, exclusive to black women alludes to the role that social determinants of health in America play in perpetuating black maternal health disparities (Boakye et al. 2021). Health outcomes are influenced by numerous variables, but research has shown that health behaviors such as diet, and exercise, as well as environmental and social factors such as housing, access to care, education etc., have the largest impact (Peterson et al. 2019). When evaluating social determinants of health, evidence suggests that women who live in regions without reliable access to transportation, nutritional and inexpensive groceries, and safe public spaces for recreation are at increased risk of suffering from poor maternal health outcomes (Building U.S. Capacity etc. 2019). Black individuals are more likely than whites to live in communities with limited or no regular access to healthy and affordable food options, safe neighborhoods, and are more likely to be targeted by fast food restaurants (New York Law School, 2012; Crowe et al. 2018). Analysis of data collected by the CDC shows residential racial segregation of black Americans has historically been one of the leading causes of U.S. racial socioeconomic inequality (Popescu et al. 2018). In the early 20th century following the great depression, residential racial segregation was perpetuated by the U.S. government. Established

in 1934, the Federal Housing Administration explicitly outlined racist policies stating in their manual "incompatible racial groups should not be permitted to live in the same communities. They refused to insure mortgages in and near black neighborhoods — a policy known as "redlining." Furthermore, they subsidized the building of mass-production of home under the condition that none be sold to black people. It is these differences in residential experiences, forced segregation and lack of opportunities that has played a significant role in perpetuating racial disparities in health.

Access and Quality of Care

Disparities in maternal health, in part, reflect increased barriers to accessible and quality care for people of color. Studies have demonstrated that coverage preceding, during, and following pregnancy, enables access to care supporting healthy pregnancies, as well as positive maternal outcomes after childbirth (Ranji, 2019). Historically, black individuals are more likely to be uninsured and face additional barriers to care (Hill et al. 2022). While Medicaid facilitates coverage during pregnancy, women of color are more likely to having no coverage prior to pregnancy, and lose coverage following the 60-day Medicaid postpartum coverage period. This further puts Black women at increased risk of adverse maternal health outcomes (Ranji, 2019). Furthermore, people of color face other increased obstacles to care, including limited access to providers and hospitals due to geographic and insurance barriers and as well as lack of access to culturally and linguistically appropriate care (USHHS, 2020). Overall, health care infrastructure and services have shown to be inequitably distributed. This in turn deprives minoritized groups of the opportunity and ability to have access and receive the same quality of care as White individuals (Hoffman et al. 2016).

Bias and Implicit Bias in Healthcare

Even when people of color do attain the care they need, they are not managed and treated appropriately due to health care providers' implicit bias. Implicit bias is defined as thoughts and feelings that exist outside of conscious awareness and subsequently can affect human understanding, actions, and decisions unknowingly (Hall et al. 2015). More recently, studies and news reports have begun to bring attention to the effects of health care provider bias through the obstetric and gynecological and its contribution to racial health disparities. The failure to recognize the needs and ailments of black patients, whether it is intentional or unintentional, has the potential to affect the way obstetrician/gynecologists counsel patients about treatment options and management when it comes to obstetrical and gynecological needs. This can inadvertently lead to poor management and inequitable care with at times, devastating outcomes as a result (Saluja & Bryant, 2021). The mere desire for equal treatment of all patients is not enough; racial disparities in health care and outcomes have continued to persist for decades with little change. In part, racial disparities endure because implicit bias affects health care providers' perceptions and decisions, creating inequalities in access, patient–provider interactions, treatment decisions, and health outcomes (Feagin & Bennefield, 2014; Vedam et al. 2019). Even when health care providers do not display explicit discrimination, implicit biases remain (Feagin & Bennefield, 2014). After adjusting for medically necessary procedures, a 2012 study found that cesarean sections were more common among black and Latina women than white women. Cesarean deliveries are known to have more negative health outcomes for both mother and baby with research looking at the rising rate of cesarean deliveries a major contributor to maternal mortality and morbidity (Roth & Henley, 2012).

In reviewing case reports of maternal mortality, attention has been raised to the disproportionate number of near misses and maternal deaths among women of color due to

providers' lack of attention or slow to respond to patient concerns (Hill, Artiga & Ranji, 2022). One study noted inexplicably higher rates of mistreatment among Indigenious, Hispanic and Black women including but not limited to scolding, shouting, refusal to listen or help through their pregnancy (Vedam et al. 2019). The stark difference in care and treatment throughout pregnancy resulting in exploitation of women of color has led to significant discrepancies in health outcomes and loss of lives. Hoffman et al. (2016) found that 50% of white medical students and residents reported false beliefs rooted in scientific racism. Some of these false beliefs included believing that blacks nerve endings are less sensitive than whites, or that blacks' skin is thicker than whites', as well as believing that black people's blood coagulates more quickly than whites. These beliefs and more have led individuals to be more likely to rate a black patient's pain as lower than that of white patients and recommend inadequate treatments. As a result, black patients' reports of symptoms are often ignored and dismissed regardless of socioeconomic status (Hoffman et al. 2016; Bailey et al. 2017). Unknowingly, implicit biases have created discrepancies in offered and delivered services affecting care that people of color receive (Biacu et al. 2016).

Institutionalized Racism

The literature highlights the role that historic and ongoing racism and discrimination plays in driving racial disparities in maternal health. Institutionalized racism, also referred as systemic racism, is defined as the macrolevel system, social forces, institutions, ideologies, and processes that interact with one another to generate and reinforce inequities among racial/ethnic groups (Powell, 2007). Institutionalized racism is highly intertwined with maternal health, negatively impacting black individual's ability to access and receive care and increasing their risk health adversities. The social and economic forces driven by structural racism set Black and non-

Hispanic white women on distinct trajectories, with long-term consequences for their health and the health of their future children (Lu & Halfon, 2003). As seen in Boakye et al's (2021) study, there is a unique aspect of the lived experience of black women in America contributing to their higher risk of preeclampsia compared to non-native black women. Among non-Hispanic Black women, those born in the US tend to have a higher accumulation of stress over a lifetime, from prolonged exposure to systemic racism, neighborhood poverty, and residential segregation throughout their life course that negatively affects their health (Boayke et al. 2021). Systematic racial bias affects experiences of black individuals ultimately compromising health outcomes (Novoa & Taylor, 2018). In addition to the residential racial segregation noted earlier, black families are offered fewer acceptable housing opportunities than non-Hispanic white families despite being equally qualified when evaluating wages and credit scores (Demby, 2013). A national pair testing study conducted by Department of Housing and Urban Development evaluated the difference in housing opportunities between races. Individuals were paired as one black person and one white person, each called visited a real estate office to ask about an available property for rent or sale. Each pair tester shared about the same income, assets, and employment with the real estate agent. While both testers were greeted politely and given appointments to look at properties only white clients were told about and shown more units and were more likely to be offered lower rent than their testing partners. While data demonstrates that the most blatant forms of discrimination have declined since passage of the 1968 Fair Housing Act, disparities in housing opportunities have continued to persist. The forms of discrimination that this study documents are very subtle and hard to detect and perhaps are even rooted in implicit biases, often with individual unaware that they are being affected, making it difficult to address (Turner et al. 2013).

An additional factor is that black families are more likely to experience housing instability and eviction as well as exposure to environmental toxins such as lead that can compromise healthy development (Wodtke et al. 2022). Beyond the social and environmental effects, institutionalized racism has constructed barriers hindering Black individuals' ability to receive the care they need and deserve. As racism exists in various forms affecting environmental exposures, economic opportunities, psychosocial trauma, and access to healthcare, these exposures accumulate, penetrating through generations, affecting health outcomes before an individual has even lived (Bailey et al. 2017).

Institutionalized racism has played a major role in the adverse experiences of Black individuals in the US, negatively affecting health outcomes. Research has noted the negative impact racism and bias has played in the disproportionately high incarceration rate, unemployment rate, and poverty across the Black populations, and the potential role these experiences play in health (Bailey et al. 2017; Felitti et al. 1998). According to the Adverse Childhood Experience's (ACEs) study conducted by the CDC and Kaiser Permanente, experiences, or ACEs such as these noted, put individuals at increased risk for adverse health outcomes (Felitti et al. 1998). From this, it is apparent that structural racism has setup Black individuals to have more adverse experiences, predisposing them to increased risk for poorer health outcomes such as heart disease, cancer, Alzheimer's, depression etc. (Felitti et al. 1998). It is health outcomes such as these that impact a woman's wellbeing, as well as her pregnancy and ability to carry to term. Furthermore, the chronic psychosocial stress associated with societal mistreatment that can contribute to the disparate birth outcomes (Baciu et al. 2016; Bailey et al. 2017). The cumulative effects of racism impacting social and economic forces, are profoundly

affecting African American women's development across the life span, ultimately impacting maternal health outcomes.

A Call to Action:

There is an urgent need to improve quality in obstetrics overall, but specifically the care delivered to women of color. Actionable steps are required to improve maternal healthcare and address the unacceptable racial and ethnic disparities in the U.S. Improving quality of care across the continuum as well as implementing interventions specifically addressing racial and ethnic disparities in maternal health and healthcare are crucial to cultivating change. Through improvement in quality and access to care, education, new models of care and reinforcement of existing models, the gap in maternal health disparities can be addressed (Howell, 2018).

Improving Care Through Quality Initiatives

A significant proportion of severe maternal mortality events are considered preventable with 46% of deaths of black women considered preventable compared to 33% of deaths among white women (Berg et al. 2005; Lawton et al. 2014). Research indicates that hospital quality is a significant lever to improve these preventable outcomes.

Several studies in other areas of medicine have demonstrated that minorities receive care in different and lower quality hospitals than whites (Howell & Zeitlin, 2017). Furthermore, studies have also demonstrated rates of appropriate care are lower in hospitals with a high proportion of black patients (Jha et al. 2007). These studies demonstrated considerable differences in outcomes and preventability by hospital, but by race/ethnicity as well (Creanga et al. 2014). Implementation of quality initiatives geared at standardizing delivery care could improve care at all hospitals and especially lowest performing hospitals serving a disproportionate number of women of color.

The Council on Patient Safety in Women's Health Care and the Alliance for Innovation in Maternal Health (AIM Program), an interdisciplinary group including American Congress (college) of Obstetricians and Gynecologists the Society for Maternal Fetal Medicine, American College of Nurse-Midwives, and the Association of Women's Health, Obstetrics, and others, recently published the "Reduction of Peripartum Racial/Ethnic Disparities Patient Safety Bundle" aimed at reducing disparities in maternal morbidity and mortality. This bundle provides a roadmap and highlights key initiatives that institutions can implement to reduce disparities. There is considerable overlap between the levers to address between versus within-hospital disparities in maternal morbidity and mortality.

Implementation and standardization of protocol checklists, simulation training, coordinated care and resource management, team training and promotion of safety culture have all been recommended in the literature for quality improvement (Pettker & Grobman, 2015). Studies have noted the importance of standardization of care with the implementation of evidenced-based safety bundles (e.g. hemorrhage, venous thrombolic disease, hypertension) as an important step to improving care to all women at all hospitals, illustrating improved outcomes (Arora et al. 2016). In review of maternal deaths with delayed recognition of warning signs particularly in black women, triggers, such as maternal early warning criteria, can facilitate timely recognition of and response to acute maternal illness (Arora et al. 2016; Mhyre et al. 2014). While other areas such as protocol checklist and team training require further research, a comprehensive approach to quality improvement with particular attention to lowest performers is likely to have the most benefit.

Education and communication

Educating clinicians and staff about racial and ethnic disparities in maternal outcomes, the importance of cultural humility, and implicit bias are important steps to address disparities in care. A survey conducted by the Society for Maternal Fetal Medicine survey revealed a discrepancy between providers' willingness and/or awareness to acknowledge disparities in their practices and their own implicit bias. 84% of respondents agreed that disparities impact their practice but only 29% believed their own biases impacted how they treated patients (Jain & Moroz, 2017). Studies have shown reduction in implicit bias with physician education, and increased awareness of their biases with structured training programs, creating potential for addressing biases and improving outcomes (Wheeler & Bryant, 2017). Evidence suggests that implicit bias training based on social psychology that includes specific curricular elements—perspective taking, building partnerships, and emotional regulation (ie, mindfulness-based stress reduction)—tends to be most effective in reducing minority health disparities (FitzGerald et al. 2019). By incorporating these elements into approved training programs, healthcare workers can actively combat their own partiality, ensuring equitable care for their patients throughout.

Beyond access and addressing biases, many providers lack cultural training to serve black women appropriately. This furthermore creates disparities between the quality-of-care that black women receive, and their satisfaction compared to women of other races/ethnicities, even from the same provider. While reviews of cultural competence interventions have indicated that there is some evidence that interventions to improve cultural competency do improve patient health outcomes, objective evidence of intervention effectiveness in increased health outcomes remains unclear (Truong, Paradies & Priest, 2014). Nonetheless, increased patient satisfaction and perceived health outcome is an important step to eliminating disparities.

New Model of Antenatal Care

Prenatal care is important for promoting healthy pregnancies and improving maternal health outcomes. New models are emerging with a focus on patient-centered care in obstetrics and enhanced models of prenatal care. A well-researched enhanced model of prenatal care is CenteringPregnancy, a group oriented prenatal care model that has been implemented at over 500 sites in the United States and abroad including The Netherlands, Mexico, Malawi, and more (Centering Healthcare Institute, 2023). The model integrates the three components of prenatal carerisk assessment, education, and support, into one unit (Rising, 1998). Placed into groups of 8 to 12 based on estimated dates of delivery, the women meet for ten 90-minute prenatal or postpartum visits at regular intervals. In these group settings, prenatal risk assessment is completed within an educational format using a didactic discussion format with time provided for the women to talk and share with one another if they wish. The incorporation of these three aspects into one whole places emphasis on their collective importance. Women are encouraged to take responsibility for themselves creating a shift in the client–provider power base (Rising, 1998). Evidence shows that the CenteringPregnancy model reduces costs, lowers the risk of preterm birth, and improves both visit attendance and patient satisfaction. As the program is counted as prenatal care it is covered by most medical insurance plans with no added costs. Moreover, preliminary findings suggest that the model closes the disparity gap in preterm birth between black and white women (Ickovics et al. 2007). The available evidence demonstrates potential for a new model of antenatal care across health systems to improve health and reduce racial disparities across various aspects of maternal health.

Reinforcing preconception through postpartum care counseling

Preconception care is an important window to target disparities in maternal morbidity and mortality. Given the elevated rates of obesity, hypertension, diabetes, and chronic illness among

racial and ethnic minoritized women and the strong link between these comorbidities and adverse maternal outcomes, a focus on preconception care, and more specifically how it is delivered, is crucial. Rates of unintended pregnancies are higher among black women, and these pregnancies are associated with elevated risk of adverse outcomes. Preconception counseling is important to optimizing health prior to pregnancy and management throughout and beyond the pregnancy (Howell, 2018). Not only is the preconception counseling crucial, but how the information is delivered and communicated to patients effects the way it is understood and acted upon. Black women may benefit from one-on-one conversations regarding vital information as opposed to pamphlets or other reading resources. due to disparities in health literacy levels as according to the 2006 report by the U.S. Department of Education, 58% of black American adults possess below basic or basic health literacy, compared to 28% of white adults (Kutner et al. 2006). There is also evidence that clinicians are more verbally dominant and less patientcentered with black patients, impeding delivery of information and patient receptiveness (Johnson et al. 2004). This draws back to the significance of cultural humility and the role the implicit bias plays in delivery of care.

Additionally, there is growing recognition of the significance of postpartum care in improving maternal health outcomes short- and long-term. Racial disparities in the attainment of postpartum care most likely have implications for disparities in maternal health and the long-term health of women (Mi et al. 2022).

Access to Affordable Comprehensive Care

Expanding beyond preconception, pregnancy, and postpartum periods, it is imperative to ensure access to quality medical care. By targeting care throughout the lifecycle, the profound health disparities can begin to be addressed in a comprehensive fashion. The multiple and

interlocking medical problems of an excess of diabetes, hypertension, obesity, kidney, lung, and cardiovascular disease yielding heart attacks and strokes and a premature loss of life expectancy in blacks require special attention and new programs that can begin to treat and ultimately prevent this environmentally induced medical disadvantage. Addressing and breaking the transgenerational cycle of medical illnesses needs to involve both adults and children in the current generation.

To address these issues, affordable access, and health care coverage throughout a woman's life is imperative to ensuring optimal maternal health outcomes should she choose to reproduce. Data has demonstrated that significant advances in access to health care for women has been made through implementation of the Patient Protection and Affordable Care Act's (ACA) agreements for expanded Medicaid eligibility to adults earning up to 138% of the federal poverty level (Searing et al. 2019). Research has shown that those states that expanded Medicaid eligibility had improved health outcomes of women of childbearing age by increasing access to preventative care, reducing adversities prior, during and following pregnancy, and reduced maternal mortality (Searing et al. 2019). Furthermore, in these states, a significant reduction in Black-white disparities of adverse birth outcomes was seen as well with a 50% reduction in infant mortality, seen mainly amongst infants of color (Brown et al. 2019).

Conclusion

There are significantly increasing racial and ethnic disparities in maternal health outcomes in the United States with an imperative need to implement change. Despite continued advancements in medical care, rates of maternal mortality and morbidity in the U.S has been increasing since the late 20th century, far exceeding comparable wealthy nations (Gunja et al. 2022). As rates have peaked, and amidst the COVID-19 pandemic, racial disparities have further

widened. Furthermore, the overturning of *Roe v. Wade*, is thought to even further this disparity as barriers to abortion disproportionately effects women of color. There is substantial evidence demonstrating the role that institutionalized racism and bias play in propagating these disparities as well as increased barriers to accessing care disproportionately effecting women of color. The complexity of the numerous factors contributing to racial inequalities requires a multifaceted approach to decrease the disparity in maternal health. Comprehensive action targeting the delivery and access of care throughout the lifecycle is crucial to reducing the racial and ethnic disparities in severe maternal mortality rates.

References:

- Arora, K. S., Shields, L. E., Grobman, W. A., D'Alton, M. E., Lappen, J. R., & Mercer, B. M. (2016). Triggers, bundles, protocols, and checklists--what every maternal care provider needs to know. *American journal of obstetrics and gynecology*, 214(4), 444–451. https://doi.org/10.1016/j.ajog.2015.10.011
- Baciu, A., Negussie Y., Geller A., et al. (2017). The root causes of health inequity. In *Communities in Action: Pathways to Health Equity*. Pp 99-104.
- Boakye, E., Kwapong, Y. A., Obisesan, O., Ogunwole, S. M., Hays, A. G., Nasir, K., Blumenthal, R. S., Douglas, P. S., Blaha, M. J., Hong, X., Creanga, A. A., Wang, X., & Sharma, G. (2021). Nativity-related disparities in preeclampsia and cardiovascular disease risk among a racially diverse cohort of US women. *JAMA Network Open*, 4(12). https://doi.org/10.1001/jamanetworkopen.2021.39564
- Bailey Z., Krieger N., Agénor M., Graves J., Linos N., Bassett M.T. 2017. Structural racism and health inequities in the USA: Evidence and interventions. The Lancet; 389(10077): 1453-1463
- Berg, C. J., Harper, M. A., Atkinson, S. M., Bell, E. A., Brown, H. L., Hage, M. L., Mitra, A. G., Moise, K. J., Jr, & Callaghan, W. M. (2005). Preventability of pregnancy-related deaths: results of a state-wide review. *Obstetrics and gynecology*, 106(6), 1228–1234. https://doi.org/10.1097/01.AOG.0000187894.71913.e8

- Building U.S. Capacity to Review and Prevent Maternal Deaths. (2018). Report from nine maternal mortality review committees. Retrieved from http://reviewtoaction.org/2018 Report from MMRCs
- Brown, C. C., Moore, J. E., Felix, H. C., Stewart, M. K., Bird, T. M., Lowery, C. L., & Tilford, J. M. (2019). Association of State Medicaid Expansion Status With Low Birth Weight and Preterm Birth. *JAMA*, *321*(16), 1598–1609. https://doi.org/10.1001/jama.2019.3678
- Centering Healthcare Institute Inc. (2023). *Centering at a glance*. Centering Healthcare Institute.

 Retrieved January 29, 2023, from https://centeringhealthcare.org/what-we-do
- Centers for Disease Control and Prevention. (2022, April 13). *Preventing pregnancy-related deaths*. Centers for Disease Control and Prevention. Retrieved October 11, 2022, from https://www.cdc.gov/reproductivehealth/maternal-mortality/preventing-pregnancy-related-deaths.html
- Centers for Disease Control and Prevention. (2022, April 6). Working together to reduce Black

 Maternal Mortality. Centers for Disease Control and Prevention. Retrieved October 11,

 2022, from https://www.cdc.gov/healthequity/features/maternal-mortality/index.html
- Creanga, A. A., Bateman, B. T., Mhyre, J. M., Kuklina, E., Shilkrut, A., & Callaghan, W. M. (2014). Performance of racial and ethnic minority-serving hospitals on delivery-related indicators. *American journal of obstetrics and gynecology*, 211(6), . https://doi.org/10.1016/j.ajog.2014.06.006

- Creanga, A. A., Syverson, C., Seed, K., & Callaghan, W. M. (2017). Pregnancy-related mortality in the United States, 2011–2013. *Obstetrics & Gynecology*, *130*(2), 366–373. https://doi.org/10.1097/aog.00000000000000114
- Crowe, J., Lacy, C., & Columbus, Y. (2018). Barriers to food security and community stress in an Urban Food Desert. *Urban Science*, *2*(2), 46. https://doi.org/10.3390/urbansci2020046
- Declercq, E., & Zephyrin, L. (2020, December 16). *Maternal mortality in the United States: A Primer*. Commonwealth Fund. Retrieved October 10, 2022, from https://www.commonwealthfund.org/publications/issue-brief-report/2020/dec/maternal-mortality-united-states-primer
- Demby, G. (2013, June 17). For people of color, a housing market partially hidden from view.

 NPR. Retrieved October 14, 2022, from

 https://www.npr.org/sections/codeswitch/2013/06/17/192730233/for-people-of-color-a-housing-market-partially-hidden-from-view
- Feagin, J., & Bennefield, Z. (2014). Systemic racism and U.S. health care. *Social science & medicine (1982)*, 103, 7–14. https://doi.org/10.1016/j.socscimed.2013.09.006
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258. https://doi.org/10.1016/S0749-3797(98)00017-8

- FitzGerald, C., Martin, A., Berner, D., & Hurst, S. (2019). Interventions designed to reduce implicit prejudices and implicit stereotypes in real world contexts: a systematic review. *BMC psychology*, 7(1), 29. https://doi.org/10.1186/s40359-019-0299-7
- Gunja, M. Z., Gumas, E. D., & Williams II, R. D. (2022, December 1). *The U.S. maternal mortality crisis continues to worsen: An international comparison*. U.S. Maternal Mortality Crisis Continues to Worsen | Commonwealth Fund. Retrieved January 20, 2023, from https://www.commonwealthfund.org/blog/2022/us-maternal-mortality-crisis-continues-worsen-international-comparison
- Hall, W. J., Chapman, M. V., Lee, K. M., Merino, Y. M., Thomas, T. W., Payne, B. K., ... & Coyne-Beasley, T. (2015). Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. *American journal of public health*, 105(12), e60-e76.
- Hill, L., Artiga, S., & Haldar, S. (2022, January 26). *Key facts on health and health care by race and ethnicity*. KFF. Retrieved October 10, 2022, from https://www.kff.org/racial-equity-and-health-policy/report/key-facts-on-health-and-health-care-by-race-and-ethnicity/
- Hill, L., Artiga, S., & Ranji, U. (2022, November 1). Racial disparities in maternal and infant health: Current status and efforts to address them. KFF. Retrieved December 22, 2022, from https://www.kff.org/racial-equity-and-health-policy/issue-brief/racial-disparities-in-maternal-and-infant-health-current-status-and-efforts-to-address-them/
- Hoffman, K. M., Trawalter, S., Axt, J. R., & Oliver, M. N. (2016). Racial bias in pain assessment and treatment recommendations, and false beliefs about biological differences between

- blacks and whites. *Proceedings of the National Academy of Sciences of the United States of America*, 113(16), 4296–4301. https://doi.org/10.1073/pnas.1516047113
- Howell, Elizabeth A. "Reducing Disparities in Severe Maternal Morbidity and Mortality." *Clinical obstetrics and gynecology* vol. 61,2 (2018): 387-399. doi:10.1097/GRF.00000000000000349
- Howell, E. A., & Zeitlin, J. (2017). Improving hospital quality to reduce disparities in severe maternal morbidity and mortality. *Seminars in perinatology*, 41(5), 266–272. https://doi.org/10.1053/j.semperi.2017.04.002
- Hoyert, D. L., & Miniño, A. M. (2020). Maternal Mortality in the United States: Changes in Coding, Publication, and Data Release, 2018. *National vital statistics reports: from the Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System*, 69(2), 1–18.
- Ickovics, J. R., Kershaw, T. S., Westdahl, C., Magriples, U., Massey, Z., Reynolds, H., & Rising, S. S. (2007). Group prenatal care and perinatal outcomes: a randomized controlled trial. *Obstetrics and gynecology*, 110(2 Pt 1), 330–339.
 https://doi.org/10.1097/01.AOG.0000275284.24298.23
- Jain, J., & Moroz, L. (2017). Strategies to reduce disparities in maternal morbidity and mortality:

 Patient and provider education. *Seminars in perinatology*, 41(5), 323–328.

 https://doi.org/10.1053/j.semperi.2017.04.010

- Jha, A. K., Orav, E. J., Li, Z., & Epstein, A. M. (2007). Concentration and quality of hospitals that care for elderly black patients. *Archives of internal medicine*, *167*(11), 1177–1182. https://doi.org/10.1001/archinte.167.11.1177
- Johnson, R. L., Roter, D., Powe, N. R., & Cooper, L. A. (2004). Patient race/ethnicity and quality of patient-physician communication during medical visits. *American journal of public health*, *94*(12), 2084–2090. https://doi.org/10.2105/ajph.94.12.2084
- Kutner, M., Greenberg, E., Jin, Y., & Paulsen, C. (2006). US Department of Education. *Washington, DC: National Center for Education Statistics*, 483.
- Lawton, B., MacDonald, E. J., Brown, S. A., Wilson, L., Stanley, J., Tait, J. D., Dinsdale, R. A., Coles, C. L., & Geller, S. E. (2014). Preventability of severe acute maternal morbidity. *American journal of obstetrics and gynecology*, 210(6), 557.e1–557.e5576. https://doi.org/10.1016/j.ajog.2013.12.032
- Lu, M. C., & Halfon, N. (2003). Racial and ethnic disparities in birth outcomes: a life-course perspective. *Maternal and child health journal*, 7(1), 13–30. https://doi.org/10.1023/a:1022537516969
- MacDorman, M. F., Thoma, M., Declerq, E., & Howell, E. A. (2021). Racial and ethnic disparities in maternal mortality in the United States using Enhanced Vital Records, 2016–2017. *American Journal of Public Health*, 111(9), 1673–1681.
 https://doi.org/10.2105/ajph.2021.306375

- Mi, T., Hung, P., Li, X., McGregor, A., He, J., & Zhou, J. (2022). Racial and ethnic disparities in postpartum care in the greater Boston area during the COVID-19 pandemic. *JAMA Network Open*, 5(6). https://doi.org/10.1001/jamanetworkopen.2022.16355
- New York Law School Racial Justice Project., "Unshared Bounty: How Structural Racism Contributes to the Creation and Persistence of Food Deserts. (with American Civil Liberties Union)." (2012). Racial Justice Project. Book 3.

 http://digitalcommons.nyls.edu/racial_justice_project/3
- Novoa, C., & Taylor, J. (2018). (rep.). Exploring African Americans' High Maternal and Infant Death Rates (pp. 1–13). Center for American Progress.
- Petersen, E. E., Davis, N. L., Goodman, D., Cox, S., Syverson, C., Seed, K., Shapiro-Mendoza,
 C., Callaghan, W. M., & Barfield, W. (2019). Racial/ethnic disparities in pregnancy-related
 deaths United States, 2007–2016. Morbidity and Mortality Weekly Report, 68(35), 762–765. https://doi.org/10.15585/mmwr.mm6835a3
- Pettker, C. M., & Grobman, W. A. (2015). Obstetric Safety and Quality. *Obstetrics and gynecology*, 126(1), 196–206. https://doi.org/10.1097/AOG.000000000000018

- Popescu, I., Duffy, E., Mendelsohn, J., & Escarce, J. J. (2018). Racial residential segregation, socioeconomic disparities, and the white-black survival gap. *PLOS ONE*, *13*(2). https://doi.org/10.1371/journal.pone.0193222
- Powell, J. A. (2007). Structural racism: building upon the insights of John Calmore. *NCL Rev.*, 86, 791.
- Ranji, U. (2019, September 11). *Medicaid and health coverage for low-income women in*pregnancy and after childbirth. KFF. Retrieved October 14, 2022, from

 https://www.kff.org/womens-health-policy/issue-brief/medicaid-and-health-coverage-for-low-income-women-in-pregnancy-and-after-childbirth/
- Rising S. S. (1998). Centering pregnancy. An interdisciplinary model of empowerment. *Journal of nurse-midwifery*, 43(1), 46–54. https://doi.org/10.1016/s0091-2182(97)00117-1
- Roeder, A. (2020, June 10). *America is Failing its Black Mothers*. Harvard Public Health

 Magazine. Retrieved October 10, 2022, from

 https://www.hsph.harvard.edu/magazine/magazine_article/america-is-failing-its-black-mothers/
- Roth, L. M., & Henley, M. M. (2012). Unequal motherhood: racial-ethnic and socioeconomic disparities in cesarean sections in the United States. *Social Problems*, *59*(2), 207-227. https://doi.org/10.1525/sp.2012.59.2.207

- Saluja, B., & Bryant, Z. (2021). How Implicit Bias Contributes to Racial Disparities in Maternal Morbidity and Mortality in the United States. *Journal of women's health (2002)*, *30*(2), 270–273. https://doi.org/10.1089/jwh.2020.8874
- Searing, A., Ross, D. C., Lawson, N., & Brooks, T. (2019, June 17). *Medicaid expansion fills* gaps in maternal health coverage leading to healthier mothers and babies. Center For Children and Families. Retrieved December 17, 2023, from http://ccf.georgetown.edu/2019/05/09/medicaid-expansion-fills-gaps-in-maternal-health-coverage-leading-to-healthier-mothers-and-babies
- Singh, G. K., & Yu, S. M. (2019). Infant Mortality in the United States, 1915-2017: Large Social Inequalities have Persisted for Over a Century. *International journal of MCH and AIDS*, 8(1), 19–31. https://doi.org/10.21106/ijma.271
- Tikkanen, R., Gunja, M. Z., FitzGerald, M., & Zephyrin, L. (2020, November 18). *Maternal mortality and maternity care in the United States compared to 10 other developed countries*. Maternal Mortality Maternity Care US Compared 10 Other Countries. Retrieved October 12, 2022, from https://www.commonwealthfund.org/publications/issue-briefs/2020/nov/maternal-mortality-maternity-care-us-compared-10-countries
- Trost, S., Beauregard, J., Chandra, G., Njie, F., Berry, J., Harvey, A., & Goodman, D. (2022, September 19). *Pregnancy-related deaths: Data from Maternal Mortality Review Committees in 36 US States, 2017–2019*. Centers for Disease Control and Prevention. Retrieved December 10, 2022, from https://www.cdc.gov/reproductivehealth/maternal-mortality/erase-mm/data-mmrc.html#print

- Truong, M., Paradies, Y., & Priest, N. (2014). Interventions to improve cultural competency in healthcare: a systematic review of reviews. *BMC health services research*, *14*, 99. https://doi.org/10.1186/1472-6963-14-99
- Turner, M. A., Levy, D. K., Wissoker, D. A., Aranda, C. L., Pitingolo, R., Santos, R., & Urban Institute (2013, June 11). *Housing discrimination against racial and ethnic minorities*2012. HUD User. Retrieved January 24, 2023, from

 https://www.huduser.gov/portal//Publications/pdf/HUD-514 HDS2012.pdf
- United States Government Accountability Office (2022, October), *Maternal Health: Outcomes*Worsened and Disparities Persisted During the Pandemic, GAO-23-105871
- U.S. Department of Health & Human Services. (2020, April). 2018 National Healthcare Quality and Disparities Report. Agency for Healthcare Research and Quality. Retrieved October 11, 2022, from https://www.ahrq.gov/research/findings/nhqrdr/nhqdr18/index.html
- Vedam, S., Stoll, K., Taiwo, T. K., Rubashkin, N., Cheyney, M., Strauss, N., McLemore, M., Cadena, M., Nethery, E., Rushton, E., Schummers, L., & Declercq, E. (2019). The giving voice to mothers study: Inequity and mistreatment during pregnancy and childbirth in the United States. *Reproductive Health*, 16(1). https://doi.org/10.1186/s12978-019-0729-2
- Wheeler, S. M., & Bryant, A. S. (2017). Racial and Ethnic Disparities in Health and Health Care. *Obstetrics and gynecology clinics of North America*, 44(1), 1–11. https://doi.org/10.1016/j.ogc.2016.10.001

Wodtke, G. T., Ramaj, S., & Schachner, J. (2022). Toxic neighborhoods: The effects of concentrated poverty and environmental lead contamination on early childhood development. *Demography*, *59*(4), 1275–1298. https://doi.org/10.1215/00703370-10047481