

**Physiological and Psychosocial Solutions For Improving Maternal and Fetal Health
Outcomes in Marginalized Demographics in the United States**

Honors Thesis

Presented in Partial Fulfillment of the Requirements for the University Honors Program

University Honors Program

Colorado State University

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Spring 2025

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I. Introduction and Definitions

A. Current U.S. Maternal and Fetal Health Statistics

Despite its advanced healthcare systems and extensive resources, the United States holds the highest maternal mortality and morbidity rates of high-income nations, ranking just 26th out of 195 total countries (Burris, et al.). According to the CDC, the year 2023 saw 18.6 maternal deaths per 100,000 live births—a number that has been steadily rising for three decades (Anderson and Roberts, 2023). These statistics become even more stark when examining marginalized demographics. Between 2014-2017, African American women in the US were three to four times more likely to die from pregnancy related causes than white women, while American Indian and Alaskan Native women were twice as likely. In addition, African American infants were twice as likely to die as white infants during this period due to a 52% higher preterm birth rate among African American pregnant women compared to their white counterparts (Centers for Disease Control and Prevention, 2024). Even in healthy pregnancies, African American, American Indian, and Alaskan Native infants were two times more likely to die within the first year of life (Warren, 2021).

B. Obstetric/Gynecological Terminology

To fully grasp the implications of these disparities, it is necessary to begin by defining key terms. An obstetrical outcome encompasses not only the health of a mother during pregnancy but also the health implications that reverberate throughout both her life and her child's life. A fetal death refers to a miscarriage after a gestational age of 22 weeks (Kale, et al., 2021). A neonatal death is defined as one occurring within the first 27 days of life. Spontaneous preterm birth can be defined as premature cervical remodeling and myometrial contractility, resulting in an underdeveloped fetus at the time of delivery (Burris, et al., 2019). A preterm infant is one born under 37 weeks gestation (Burris, et al., 2019).

C. Foundations of Reproductive Physiology

The physiology behind pregnancy must be understood on a fundamental level before examining the various causes for fetal demise. In pregnant individuals, there are no direct vascular or neural connections between maternal and fetal compartments; all exchange and communication occurs through the placenta. Biomarkers of the endocrine, immune, and metabolic systems- such as cortisol, interleukin 6, and insulin, respectively- can be used to measure the extent of maternal and fetal stress. These markers play crucial roles in the initiation, maintenance, and progression of normal gestation, fetal development, and birth. Chronic physiological stress maintained over extensive time periods can initiate changes known as “biological embedding”, which are physical alterations in biology that lead to long-term effects (Kharouba, et al., 2018). An example of these damaging physiologies is the breakdown of fetal telomeres, the protective caps on chromosomes that become worn down as stress factors compound. Telomeres can only be replenished by stem cells, and when they are depleted for

good, the risk of genetic mutations and disease soars (Grobman, et al., 2023). A comprehensive analysis of these physiological stressors can be defined as the allostatic load measure: a standardized method used in analyzing maternal and fetal health outcomes.

D. Thesis Statement

Health examiners have estimated approximately two-thirds of maternal and fetal deaths in the United States could be prevented. Contributing factors include low health literacy, inadequate access to contraception, delayed or ineffective treatment due to missed warning signs, and a complex, fragmented healthcare system here in the United States. These issues are best understood through the lens of the four social determinants of health: economic stability, education access and quality, neighborhood and built environment (e.g. pollution, food access, crime/violence), and community context (e.g. discrimination, social support). In the United States, restricted access to birth control and reproductive healthcare has devastating consequences for both maternal and fetal outcomes. Furthermore, cultural values commonly associated with American identity—such as personal control, individualism, and action-orientation— should be leveraged to support better reproductive outcomes when thoughtfully integrated into care models. Continued research efforts in the sphere of reproductive healthcare have the potential to limit and prevent specific molecular pathways leading to harmful physiological conditions using targeted chemical interventions. *The maternal health crisis in the United States is not just a failure of individual behavior but a reflection of deeply rooted systemic inequities that rob women of agency and safety in their reproductive journeys. True change demands both personal accountability and bold structural reform, beginning with recognizing how micro-level interventions can change the trajectory of maternal health in a sustainable way.*

II. Relevant Background

A. Historical Context of Racism and Marginalization

The deep history of racialized thinking in the United States makes it difficult to dig ourselves out. Eugenic studies were the mainstream science prior to World War II and provided a foundation for unethical medical practices. During the clinical research era of the 1800s-1900s, African American women were subjected to rudimentary experimentation in obstetric and gynecological procedures. Many enslaved women underwent surgeries without anesthesia, leading to deaths from heart attack, stroke, hemorrhage, and resulting infections. These practices were justified by racist beliefs that African American women had higher pain thresholds and ‘thicker skin’ due to their survival of torturous beatings and ability to perform physically demanding field labor. Forced sterilizations of African American, Latina, and Indigenous women persisted into the turn of the 21st century— a reminder that racism continues to shape modern healthcare and society (Anderson and Roberts, 2023). While this blatantly immoral, large-scale, and non-consensual medical experimentation significantly declined after the 1970s

due to policy changes and public outrage, new forms of medical mistreatment persist. Racism and bias in medicine still impact treatment and research today, just in more subtle or systemic ways. The lasting legacy of slavery and segregation has maintained a subculture of white-supremacists that enable prejudice, coercive power, and marginalization to persist across patient-medical professional interactions and overarching social structures (Anderson and Roberts, 2023). The chronic stress triggered by this social state contributes to a lifelong physiological burden that compounds health inequities in maternal and fetal outcomes among afflicted demographics.

Racism can be defined as both the systemic and structural ways in which societies foster racial discrimination through housing, education, employment, healthcare, and criminal justice. These systems create social hierarchies in which “people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life” (US Department of Health and Human Services, 2022). Therefore, “race” is a social and not biological concept (Kent, 2024). Health disparities observed across racial groups are not caused by race itself, but rather by the lived experience of racism and its consequences— both structurally and interpersonally.

B. Post-*Roe v. Wade* America

Nearly one in four women in the United States will have an abortion during their lifetime (Anderson and Roberts, 2023). However, the 2022 federal overturning of *Roe v. Wade* eliminated the constitutional right to medical abortion and shifted decision-making power to individual states. As of 2025, 15 states have total or near total abortion bans, while 41 out of 50 have placed varying restrictions on abortion timing, methodology, and access to related reproductive care (Bell, et al., 2025). These legal changes have also extended to broader fertility regulation, including restrictions on tubal ligation, vasectomy, and emergency contraception.

Restricting reproductive services has not only direct health impacts on women, but also deepens economic and educational inequalities. Individuals with greater financial resources are more likely to obtain private health insurance or travel to access abortion services, while those from marginalized backgrounds lack the resources to terminate an unwanted pregnancy, therefore further widening the health and opportunity gap.

Currently, the standard federally approved method for medical abortion involves the oral and vaginal administration of mifepristone and misoprostol medications¹. 91% of these abortions occur at 13 weeks gestation or under (Sangtani, et al., 2023). Without access to such care, marginalized individuals face compounding barriers to safe reproductive outcomes, highlighting the urgent need for equitable policy reform.

¹ The combined cost of mifepristone and misoprostol medication for an abortion procedure ranges from \$500-\$800 for women without insurance.

III. Identification of the Physiological and Psychosocial Problems Leading to Poor Health Outcomes

The Life Course Theory provides a holistic framework for understanding how a woman's entire life experience influences her current health and well being. It takes into account that prior experiences influence decision making during pregnancy and make the body and mind inseparable (Anderson and Roberts, 2023). A woman's perception of her own agency is influenced by a plethora of factors including self-efficacy, intellectual ability, determination of self control, personal accountability, and life context. However, external factors have a codominant influence on maternal and fetal health outcomes. Maternal mortality rates for African American mothers have been measured as 3.5 times higher than white mothers (Anderson and Roberts, 2023). Additionally, American Indian/Alaskan Native Mothers in the US have also been found to have twice higher maternal mortality rates compared to the general population (Anderson and Roberts, 2023). Disparities in health outcomes between these marginalized demographics and the general population can be explained by the dynamic interplay of biological and cognitive factors.

Physiological stress— a main player in negative health outcomes— is a condition where homeostasis is threatened by either intrinsic or extrinsic stressors. The body naturally compensates through various physiological and behavioral responses to restore balance (Eberle, et al., 2021). These changes primarily occur within the hypothalamic-pituitary system² and autonomic nervous system³, ultimately extending to the entirety of the body. Glucocorticoids, the chemical products of the stress response, play a key role in the positive feedback loop that keeps the nervous system in an persistently heightened state of arousal. The Life Course Approach, as used in this review, studies a mother's allostatic load in relation to her health outcomes. Research has confirmed that prenatal overexposure to elevated glucocorticoid levels can have immediate and lasting effects on both maternal and fetal physical health (Eberle, et al., 2021).

² Refers to the brain-monitored hormonal pathways that release important chemical messengers to cells throughout the body, regulating processes such as growth, development, metabolism, sexual function, reproduction, energy availability, and mood.

³ The portion of the nervous system responsible for unconscious bodily functions such as respiration, heart rate, and digestion.

A. Compounding Stress of Racism

Maternal psychological stress related to racism directly affects the fetus through the glucocorticoid-placental cascade. One immediate consequence of a high glucocorticoid level is reduced blood flow, which deprives the fetus of oxygen and nutrients while simultaneously increasing the transfer of stress-related hormones to the fetus. If this cascade is sustained over weeks to months to years, it can permanently impair placental function, leading to low birth weight, high blood pressure, and glucose intolerance later in life. (Eberle, et al., 2021). Decreased resource availability from the placenta can also hinder the development of various organs. For instance, the underproduction of surfactant within the lungs may result in fetal respiratory distress syndrome.⁴ For pregnant mothers, chronic stress can manifest in low morale, fatigue, exhaustion, sleep issues, decreased cognitive function, and increased susceptibility to infections. Additionally, highly stressed individuals are prone to make poor dietary choices and resort to unhealthy coping mechanisms involving harmful substances.

B. Poor Mental Health

Due to the social stressors mentioned previously, marginalized women are disproportionately affected by poor mental health. When socioeconomic factors are controlled for, African American women in the US are twice as likely to experience postpartum depression than white women (Anderson and Roberts, 2023). Hispanic mothers face greater risks, with some studies reporting a threefold increase in the risk of postpartum mental disorders (Lucero, et al., 2012). A study on mothers of Mexican descent found a striking 50% postpartum depression rate (Lucero, et al., 2012). Additionally, suicide rates are higher among African American women, women living below the poverty line, and younger women when compared to the general maternal population, particularly in the year before and after childbirth. (Anderson and Roberts, 2023). Strong partner/familial and community support during the pregnancy and postpartum period is crucial to a mother's self-determined efficacy and ability to thrive; a lack thereof can be devastating during such a critical period for long-term outcomes. Resource centers such as the North Shore Collective in Milwaukee, Wisconsin offer workshops that support every stage of pregnancy and parenthood (e.g. postpartum yoga, parenthood support circle, breastfeeding support, newborn sleep, workshops, and partner support conversations) (North Shore Wellness Collective, 2025). Currently, marginalized demographics continue to have unequal access to these types of interventions.

⁴ Surfactant is a vital chemical produced by the lungs which serves to lower surface tension and prevent alveolar collapse at the end of expiration while also providing immune protections.

C. Living in Poverty

Furthermore, poverty rates across demographics of pregnant women have significant correlations to maternal and fetal health outcomes. In 2019, the U.S. poverty rates for African American and Hispanic individuals were 18.8% and 15.7%, respectively, compared to the national average of 10.5% (Feeding America, 2021). To further illustrate this economic gap, in 2020, the median income for African American households was \$20,000 less per year than that of white households (Feeding America, 2021). This can be the difference between buying organic produce and not, affording personal hygiene items, or visiting a primary care doctor for regular health checkups. Low income individuals are more likely to live in poor living situations and make health sacrifices to survive, ultimately succumbing to lower life expectancies.

D. Lack of Access to Reproductive Healthcare

Since marginalized demographics are more likely to live in poverty, these women also face challenges in accessing adequate healthcare and receiving medical support during pregnancy. Immigrants, for example, might lack the official documentation required to access public services, further deepening their vulnerabilities and inhibiting their ability to integrate into a new community. Similarly, rural mothers face significant barriers to receiving timely and adequate medical care. Despite rural areas accounting for 85% of U.S. land mass, over 34.8% of rural residents suffer from chronic health conditions that remain untreated due to the distance from healthcare facilities (Boersma, et al., 2018). Furthermore, only half of rural US counties have a qualified healthcare provider to attend births. In general, the more hours one must travel to get medical care, the less care is obtained and the worse the medical outcomes (Anderson and Roberts, 2023). To make matters complicated, the Catholic church still operates 15% of the hospitals in the country and is often the sole provider of care for rural women living in poverty (Anderson and Roberts, 2023). This leaves these demographics without birth control and emergency abortion options, as traditional Catholic providers do not offer the same services that might be found at an urban reproductive center like Planned Parenthood. In addition, access to healthcare insurance has a significant impact on pregnant women's ability to obtain the care they need. African American and Indigenous mothers, in particular, are more likely to be uninsured than their white counterparts, contributing to higher rates of unaddressed health needs and poorer maternal and fetal outcomes (Hill, et al., 2022).

E. Lack of Access to Nutritious Foods

Limited access to nutritious food due to financial concerns has compounding effects on maternal and fetal health. One in six Americans experience food insecurity⁵, while one in nine are chronically undernourished (Kent, 2024). When a woman is pregnant, diet quality is more important than quantity, however, cutting corners with either can be catastrophic to the fetus. A hungry body compensates for a lack of energy by slowing down physical and mental processes, leading to a decline in maternal and fetal health. “Food deserts” are geographical areas without a grocery store in reasonable distance; convenience stores tend to be the main shopping option with produce and unprocessed foods in short supply and often at much higher prices than market value. Therefore, a mother living in this neighborhood is more incentivized to take her family to dinner at McDonalds (or any fast-food equivalent) where she can get the most ‘bang for her buck’ in terms of calories and satisfying a hungry stomach. Toxic chemicals such as phthalates, often found in calorie-dense fast food, have been linked to preterm birth and are consumed at higher rates by these low-income populations (Burriss, et al., 2019).

F. The Obesity Epidemic

With the growth of U.S. agriculture over the past 50 years and the commodification of food products, obesity has become an epidemic in the United States. Nearly one in three American adults is overweight, while over two in five qualify as obese⁶, and one in eleven as severely obese. Rates of obesity are notably higher in African American, Hispanic, and Native American communities where socioeconomic disparities contribute to poor diet options mentioned above (Cànaves-Gómez, et al., 2024). Obesity is strongly associated with dangerous health conditions such as obstructive sleep apnea (OSA)⁷, which can be especially detrimental during a pregnancy. One study found that 8.5% of women with healthy weight experienced OSA, whereas 62% of obese women did (Cànaves-Gómez, et al., 2024). Pregnancy can exacerbate OSA, as weight gain and hormonal changes worsen the symptoms, particularly on women who were already obese before pregnancy. OSA leads to fluctuating oxygen levels, increased heart rate, elevated blood pressure, and systemic inflammation during deep sleep. This hostile environment is detrimental for the developing fetus, which requires constant tissue perfusion. Animal models have shown that sustained and intermittent hypoxia can affect the expression of certain genes involved in metabolism and growth, altering fetal development. OSA has been specifically linked to gestational diabetes, preeclampsia, preterm birth, low birth weight, insulin resistance, neurocognitive deficits, and long-term cardiovascular disease (Cànaves-Gómez, et al., 2024). A study of 30 pregnant women in their 3rd trimester found

⁵ Levels of food insecurity range from: uncertainty in ability to obtain food, decreased food quality and variety, reduced quantity of food consumed, and the physical experience of hunger (Kent, 2024).

⁶ Obesity is determined by a BMI of 30 or greater (BMI of a healthy adult ranges from 18.5-24.9).

⁷ OSA is the most commonly diagnosed sleep-related breathing disorder. It involves recurrent episodes of complete or partial apnea/airflow obstruction during REM sleep (Cànaves-Gómez, 2024).

increased mRNA expression related to cellular apoptosis, insulin signaling, and Type 1 Diabetes in women with chronic OSA (Cànaves-Gómez, et al., 2024).

G. Preeclampsia as a Comorbidity

Hypertension is another major manifestation of the interplay between chronic stress, poverty, and obesity. Pregnancy-induced hypertension is defined when the mother's blood pressure consistently exceeds 140/90 mmHg after 20 weeks gestation (Meander, et al., 2021). Preeclampsia is a more severe progression of the condition characterized by new-onset high blood pressure in the mother leading to organ damage and intrauterine growth restriction (McClements, et al., 2022). Preeclampsia occurs in 5-10% of pregnancies with varying severity, and has become the largest cause of perinatal mortality. The primary cause of the hypertensive cascade is angiotensin II, a vasoactive peptide that activates reactive oxygen species, damaging proteins, lipids, and nucleic acids, and resulting in cell death and inflammation. This dysfunction in maternal endothelial cells creates an environment that compromises placental perfusion, damaging fetal health (Nezu, et al., 2017). The mothers that develop hypertension have a fetal mortality rate of 3% (Santani, et al., 2023), and even those children who survive early infancy face a higher risk of cardiovascular disease later in life. These physiological malformations include—but aren't limited to—early-onset cardiac hypertrophy, aortic remodeling, endothelial cell dysfunction, and ischemia reperfusion injury (McClements, et al., 2022). Fetal death due to preeclampsia is also associated with higher rates of congenital syphilis and placental complications. Preventable comorbid conditions contributing to fetal death involve intrauterine hypoxia, umbilical cord compression leading to malnutrition while the fetus is developing, and neonatal aspiration syndrome (Kale, et al., 2021). Currently, there are no effective treatments to prolong pregnancy in cases of preeclampsia without posing additional risks to the fetus; early delivery remains the only option, though it presents its own set of challenges for both fetus and mother (Nezu, et al., 2017).

H. The Rise of Type II Diabetes

In relation to diet quality, pregestational diabetes is another significant contributor to poor maternal and fetal outcomes. Diabetes rates are notably higher for individuals who did not complete high school, those living below the federal poverty level, and those living with disabilities. Maternal mortality rates for pregnant women with Type 1 Diabetes are 3.8%, compared to 1.1% for women without the condition. This disparity is caused by an increased risk for myocardial infarction, diabetic gastroparesis, and renal disease (Sangtani, et al., 2023). Type II Diabetes typically develops later in life due to excess sustained glucose levels in the blood leading to a desensitization of cellular insulin receptors. For the fetus, poor glycemic control in diabetic mothers is linked to a higher risk of congenital malformations in the heart, kidneys, and central nervous system. At the time of birth, neonates born to diabetic mothers are

more likely to experience respiratory distress syndrome, low Apgar scores, and hypoglycemia. These complications increase the risk of stillbirth, with up to 25% of diabetic pregnancies resulting in spontaneous fetal or embryonic demise before 20 weeks. Additionally, rates of preterm birth among diabetic pregnant women are as high as 35-46% (Sangtani, et al., 2023). Delivering an underdeveloped fetus before 37 weeks gestation poses risks to even the general healthy patient population.

I. Alcohol and Substance Abuse

Fetal Alcohol Syndrome remains alarmingly common in the U.S. despite extensive public health campaigns. Studies indicate that nearly 6% of pregnant mothers use illicit drugs, with 18.3% of adolescent mothers aged 15-17 reporting substance abuse (Anderson and Roberts, 2023). Alcohol use can most immediately decrease food intake and gastrointestinal absorption by the mother, therefore interfering with fetal absorption of those nutrients as well (Wang, et al., 2021). Over time, exposure to ethanol during pregnancy has been shown to permanently impair fetal development. In a rat model, maternal exposure to alcohol resulted in a 5.8% reduction in fetal brain weight and 5.7% decrease in fetal liver weight, increasing the risk of intrauterine growth restriction (Wang, et al., 2021). The loss of neurons and structural changes in the brain during critical developmental periods can lead to cognitive and behavioral deficits in the child later in life. Impaired fetal liver development can also have lasting effects on the child's metabolic function as they mature. Cigarette smoking/nicotine usage among pregnant white women has been measured as twice that of pregnant African American women, the latter of which tend to abuse cannabis at higher rates. Regardless of the substance, mothers across the board suffer similar physiological consequences and lower birth success rates (Burris, et al., 2019).

J. External Environment and Pollution

While individual behaviors such as nutrition and substance use are critical to maternal and fetal outcomes, external environmental and systemic conditions are equally as influential. These stressors operate beyond an individual's control, compounding physiological strain and exacerbating existing health inequalities. Residents of low-income neighborhoods are more likely to experience stressors such as high traffic noise, elemental carbon pollution from vehicle emissions, and particulate matter toxins from nearby industrial facilities. Constant exposure to these pollutants activates the body's sympathetic nervous system, raises blood pressure, promotes oxidative stress, and allows inflammatory chemicals to permeate the vascular endothelium (Anderson and Roberts, 2023). A large-scale study conducted in China on 37,000 live birth cases found that short-term exposure to gases such as sulfur dioxide, nitrogen dioxide, and fine particulate matter increased the odds of preterm birth by 3.7-6.5 times compared to unexposed mothers (Burris, et al., 2019).

K. Abortion is no Longer a Basic Human Right. Women are Dying

The current politically-driven deterioration of reproductive healthcare adds yet another barrier for pregnant women. Currently, only 73.9% of American women have access to contraception, and marginalized groups are disproportionately burdened (Anderson and Roberts, 2023). Women of African American descent, adolescents, LGBTQ+ individuals, and individuals with disabilities experience lower quality care due to gaps in provider knowledge, discriminatory practices, and inadequate care options tailored to their specific needs and preferences (Anderson and Roberts, 2023). The overturning of *Roe v. Wade* has created a chilling climate where even emergency reproductive care is delayed or denied altogether. Interviews with affected mothers highlight this issue on a more personal level. In Wisconsin, a woman bled for more than ten days from an incomplete miscarriage because hospital staff, fearing legal repercussions, refused to remove the fetal tissue. In Texas, another woman whose water broke at 18 weeks was denied medical treatment for days despite clear signs of infection and no chance of fetal survival; but because the fetus still had a detectable heartbeat, the hospital's ethics board prohibited medical intervention until the mother's condition became critical (Sen. Warren, 2022).

Beyond emergency cases, major hospitals in abortion-restricted states have ceased to offer essential reproductive medications like Plan-B, therefore denying treatment even to victims of rape and incest. Limitations on these abortion laws have extended to nonreproductive healthcare as well. For example, Methotrexate, a lifesaving drug for cancer and autoimmune conditions, has become inaccessible for many women due to its potential use in abortion. Reports indicate that some physicians have stopped prescribing it to critical patients who would benefit from the drug for fear of violating their state's laws. In one disturbing case, a pharmacist in Texas denied an eight-year old girl her Methotrexate prescription, citing state requirements that any female of childbearing potential must have a documented diagnosis compliant with state abortion laws (Sen. Warren, 2022).

The reality of the matter is that without access to safe abortions, many women will resort to self-managed terminations using black-market medications or unsanitary techniques. Over 7% of women in the U.S. report attempting self-managed abortions, with rates higher among African American and Hispanic populations (Sangtani, et al., 2023). Furthermore, the risk of death is 14 times higher when an unhealthy or unwanted pregnancy is continued to term versus being terminated early (Santani, et al., 2023). The so-called "triple jeopardy"-- the combination of being pregnant, diabetic, and living in a state with an abortion ban--has become single handedly the most dangerous scenario for maternal health. Long-term effects of being denied an abortion ripple throughout a woman's life, directly leading to food insecurity, financial struggles, and a cycle of poor health and poverty that reverberates through generations (Sangtani, et al., 2023).

L. Insufficient Maternal Leave

Adding to the burden on the mother is the alarming lack of maternity leave protections in the United States. The U.S. is one of only three countries in the world that does not guarantee paid maternity leave (Anderson and Roberts, 2023). Although the *1993 Family and Medical Leave Act (FMLA)* granted 12 weeks of unpaid leave to mothers, it applies only to certain employees and often requires them to deplete all vacation and sick days before qualifying. This lack of support places an especially high stress on women in low-wage jobs who cannot afford time off. These women are more likely to be engaged in physically demanding labor throughout pregnancy and return to work shortly after giving birth. In addition to their professional workload, they frequently shoulder the “second shift” of household chores and caregiving responsibilities, placing immense physical and psychological stress on both the mother, developing fetus, and older children in the household (Kent, 2024).

M. Discrimination in Treatment and Medical Malpractice

A significant percentage of American mothers—ranging from 10-27%—report negative experiences related to disrespectful treatment, inattention to their needs, victim-blaming, withholding of information, and judgemental commentary by healthcare workers during childbirth (Anderson and Roberts, 2023). Among these, African American and Hispanic mothers report experiencing discrimination at higher rates, with 18.1% of African American mothers and 13.3% of Hispanic mothers indicating that discrimination affected their birthing experiences (Anderson and Roberts, 2023). This disparity highlights the deeper systemic issues within maternal healthcare, particularly for marginalized communities, and indicates a need for better physician bias training and cultural integration within medical systems.

The challenges faced by African American mothers extend beyond discriminatory attitudes. They are also disproportionately affected by life-threatening complications during childbirth. African American women are 3-4 times more likely to experience preventable errors in care and “near-misses”. A study analyzing 2 million births between 1992 and 2015 found that African American newborns treated by white physicians faced 430 more fatalities per 100,000 live births than those treated by African American physicians (Anderson and Roberts, 2023). Additionally, African American women are less likely to be validated by healthcare providers, and are less frequently given pain relief compared to their white counterparts (Anderson and Roberts, 2023). Lasting mental health impacts include health-related anxiety and Post-Traumatic Stress Disorder (PTSD), as well as decreased incentive to seek healthcare when it is needed next time (Anderson and Roberts, 2023).

N. Interpersonal Violence

Another notable danger faced by marginalized demographics is the higher rates of interpersonal violence. African American mothers are more likely to experience intimate partner violence, rape, and adverse childhood events. Pregnant women in the U.S. die from homicide at twice the rate of those who die from other pregnancy-related causes. Homicide is often perpetrated by intimate partners, with females aged 10 to 24 being at the highest risk. A study found that pregnant African American women were almost three times more likely to die from homicide than when not pregnant (Anderson and Roberts, 2023).

O. Flaws in Modern Medicine

While medical advances have improved reproductive health, many aspects of maternal care remain far from perfect. Inconsistent management of obstetrical emergencies, fragmented, money-driven healthcare systems, inadequate health literacy, increasing comorbidities, and reporting inconsistencies all contribute (Anderson and Roberts, 2023). One major concern in hospital care is the presence of *Acinetobacter baumannii*, a bacteria linked to neonatal deaths. This bacterium is commonly found in neonatal intensive care units (NICUs) and lives on unsanitized surfaces. Bacterial infections can spread to the bloodstream quickly, especially in vulnerable patients like preterm babies, leading to sepsis and death if not managed in time.

P. Imperfect Modern Reproductive Technologies

In-Vitro Fertilization (IVF), first introduced in 1978, has also seen significant advancements, but users still sustain higher risks than mothers who get pregnant naturally. These include life-threatening complications such as bleeding, infection, and ovarian hyperstimulation syndrome (Anderson and Roberts, 2023). While IVF has offered hope to many women struggling with infertility, it is important to recognize the limitations in these developing reproductive technologies.

IV. Practical and Actionable Avenues for Improving Maternal and Fetal Health Outcomes

Addressing the devastating maternal and fetal health statistics in the United States involves comprehensive and dynamic policy changes, cultural attitude shifts, systemic improvements, and social behavioral changes. The proposed solutions include improving maternal health efficacy, increasing public education, dismantling structural racism in healthcare, streamlining healthcare access, promoting healthier lifestyles, and implementing inclusive legislation.

A. Harness American Individualist Values for Positive Behavioral Change

American attitudes and individualist culture can be harnessed for good. Americans tend to highly value personal control and freedom of choice, especially regarding bodily autonomy and health decisions. By helping mothers identify what factors are within their own control and decreasing negative stigmas, mothers might feel more inspired to make prenatal health goals and birth plans with their physician (Anderson and Roberts, 2023). This can be achieved with positive messaging rather than shame-inducing fear tactics across media. Americans also tend to highly emphasize action-orientation, the inclination to act deliberately in a situation versus accepting the status quo and allowing events to happen without intervention. We can harness this trait by encouraging mothers to accept ownership of the cause and effect of their actions on the baby's health. This is most feasible by increasing general public health awareness and enforcing policy changes outlawing false advertising. For specific social groups with different cultural views, it is important to tailor reproductive health messages appropriately. For example, American Indian women tend to value collectivist culture that prioritizes community responsibility over individuality. By framing maternal health as a source of pride for the extended family and community, programs can better engage members and inspire healthier behaviors across a demographic that might not otherwise understand the severity of their maternal health situation. Therefore, it is necessary to have a nuanced level of social consciousness and understanding of the target group's collective history when formulating public messaging.

B. Health Education Efforts

To implement more effective public health education, federal and private campaign efforts should focus on educating the public about the impact of lifestyle choices on pregnancy. For example, mandating clearer warning labels for products harmful to maternal and fetal health—such as ultra-processed foods, alcohol, and tobacco—might incentivize mothers to think twice before buying. Studies have shown that exposure to repetitive messaging tends to resonate best with consumers, so education efforts must be cohesive amongst all corporations and media outlets. Furthermore, changing public school curriculums to include better sexual education and healthy lifestyle guidance would set the foundation for youth before they enter childbearing years. Young men should be equally as educated on how to support their future female partners as maternal health is the collective effort of the community.

C. Reduce Mental Health Stigma

Another avenue for improvement involves changing the stigma around seeking professional help for mental health issues. By promoting financially accessible mental health care and encouraging its use, mothers may find healthier ways to cope with stress and emotional difficulties rather than abusing substances harmful to the developing fetus. Therapy can help women work through the intense hormonal shifts of pregnancy, prolonged sleep-deprivation, frustrations with breastfeeding, and changes in a new mother's relationships, responsibilities, and core self-identity. Pregnancy and postpartum motherhood can trigger some mothers' genetic predispositions to mental illness which might require medication, cognitive-behavioral interventions, or a mixture of both. Finally, trained professionals can help women work through prior traumas related to infertility, miscarriages, stillbirths, and neonatal deaths. Primary care and OB-GYN physicians should be trained to recognize warning signs and symptoms in their patients in order to refer them to the proper resources early on.

D. Dietary Supplementation and Access to Healthy Foods

Aside from the positive effects of a healthy diet as outlined previously, dietary supplementation during pregnancy can act as a safeguard against malnutrition and fill in any nutritional gaps needed by the developing fetus. One promising supplement on the market is Vitamin D, an essential component necessary for maintaining musculoskeletal health, optimal immune system function, brain development, cell differentiation, and fetal lung development. During pregnancy, the fetus completely depends on the mother's Vitamin D reservoir. Pregnant and breastfeeding women tend to require a daily intake of 600 IU- a quantity far greater than what the body naturally produces (Meander, et al., 2021). Low levels may lead to fetal intrauterine development restriction as well as an increase in preterm birth and lasting physiological disease. As Vitamin D is relatively accessible compared to other pharmacological agents, an easy solution for these malnutrition problems is to increase prescriptions for Vitamin D and general awareness for its benefits among vulnerable populations. Vitamin D might also help with fertility as it stimulates synthesis of estrogens and progesterone, while simultaneously preparing the uterus and endometrium for implantation. A study involving over 500 fertile women found that those with serum Vitamin D levels over 50 ng/mL had an estimated 35% increase in conception within a menstrual cycle compared to those with levels under 20 ng/mL (Meander, et al., 2021). Furthermore, researchers found a decrease in the risk of miscarriage among mothers with adequate Vitamin D levels. Finally, a meta-analysis of 28,000 women found that the administration of Calcium and Vitamin D together significantly decreased the likelihood of preeclampsia when compared to placebo (Meander, et al., 2021).

E. Physical Activity During Pregnancy

Physical activity during pregnancy has additionally been shown to reduce the risk of pregnancy complications such as gestational diabetes, preeclampsia, and emergency cesarean sections. One study explored the impact of 30 minutes of physical activity versus a sedentary lifestyle on gestational age, gestational weight gain, birth weight, mode of delivery, blood loss during delivery, self-rated health during pregnancy, and risk of pregnancy-induced hypertension and preeclampsia. A higher level of physical activity was significantly linked with reduced risk for emergency cesarean section, lower gestational weight, and more favorable self-rated health during pregnancy (Meander, et al., 2021). Considering that almost 50% of women gain more weight than recommended during pregnancy, increasing physical activity levels among these mothers- while paired with a healthy diet- will have the most immediate and meaningful impact on health outcomes (Meander, et al., 2021). The first step in incentivizing people to change their lifestyle is to remove the barriers inhibiting positive action. These may include living in a neighborhood unsafe for walking, the high cost of gym memberships, and time constraints when working full-time and taking care of children or aging parents. Solutions for these problems require policy changes in economic welfare calling for more affordable childcare, living wages, public exercise facilities, and elder care support. It is important to provide these opportunities without adding guilt to mothers' plates, as health maintenance can be a major source of stress and shame. Rather, exercise interventions should be framed as an opportunity to integrate personalized, enjoyable physical activity into a more balanced day to day life.

F. Dismantle Racist Social Structures

Structural racism remains a significant barrier to equitable maternal and fetal health outcomes that must be dismantled from its core. The Anti-Racism in Public Health Act was created in 2021 to further research on public health and effects of structural racism and barriers to health. One approach for measuring the behavioral manifestations of structural racism is to gather patient testimonies on their individual experiences with quality of care, looking for differences by race. This "narrative based" medicine is used to better understand the context of these cases (Grobman, et al., 2022). As anthropological research is accumulated, it needs to be integrated into medical school programs to address stereotypes and invalid claims. While some of this is going on currently, curriculums should place more of an emphasis on culture and ethics. Another data-based, quantitative approach measures reduced access to financial resources, access to healthcare insurance, and rural access to healthcare. Implemented strategies must be socially methodical and have integrated the diverse perspectives of the population it seeks to help.

G. Increase Access to Healthcare

The availability and accessibility of reproductive healthcare, including birth control and family planning services, must be expanded. As of 2024, approximately 1.3 million Coloradan residents were enrolled in the “Health First Colorado” Medicaid program which covers over 40% of the state’s child births and concentrates care in counties identified as maternal care deserts (Colorado Department of Health Care Policy and Financing, 2024). An expansion of this program and an emphasis on early prenatal checkups would decrease comorbidities in mothers, therefore improving pregnancy outcomes in demographics that lack primary medical care and professional health guidance. Increased access to contraception not only empowers women to plan pregnancies but also reduces the likelihood of unintended pregnancies which are often associated with poor maternal health outcomes. Additionally, ensuring that healthcare providers have the resources and training to offer unbiased reproductive healthcare is crucial. Policy changes begin by electing government leaders who advocate for women’s rights. Advocates should focus on increasing voter turnout and political awareness especially among the younger demographic.

H. Improve Sanitation Efforts

Improving sanitation standards in hospitals, particularly in NICUs, could drastically reduce the spread of bacterial infections, which are a significant comorbidity for infants. Regular audits of infection control procedures, better training for staff, and increased funding for cleanliness in hospitals has the potential to save lives (Goldenberg, et al., 2023).

I. Changes in Maternal Leave Policies

One one of the most effective and overlooked ways to improve post-birth health outcomes for both mother and infant is to increase maternal leave policies on the federal level. Extending paid time away from work allows for more time to recover from childbirth, reduces stress, improves mental health, and allows mothers to bond with their babies without the added pressure of returning to work too soon. The Colorado Family and Medical Leave Insurance (FAMLI) program established in 2024 offers paid, job-protected leave to Colorado workers for various life events, including bonding with a new child, caring for a serious health condition, and addressing safety needs related to domestic violence or sexual assault. Notably, mothers experiencing pregnancy or childbirth complications are eligible for an additional four weeks of leave, totaling up to 16 weeks per year. In its first year, the FAMLI program distributed \$689 million to over 128,000 approved claims, demonstrating its wide impact across the state and higher maternal and fetal success rates when compared to the rest of the country (Colorado Family and Medical Leave Insurance Program, 2024). Studies have shown that mothers who take over 13 weeks of paid leave experience 76% lower odds of psychological distress than mothers who took no leave (Aitken, et al., 1982). Furthermore, an American psychiatric study found that having less than 8 weeks of paid leave was associated with a 9% increase in the mean depression score among this population (Aitken, et al., 1982). Countries like Germany and France offer over

160 weeks of transition period back into work post-delivery, demonstrating the direct health benefits of such policies. In order to implement these policies, extensive campaigning efforts must convince lawmakers at the federal level to allocate money towards women- a monumental but not impossible task amidst the current political climate.

J. Get Men Involved

Getting men involved in the fight for maternal and fetal health on both a personal and policy-making level has proven instrumental in other countries. An interventional study in Myanmar posed intervention groups that sought to improve male partners' attitudes towards maternal health and support. One mother explained that prior to the study, her husband had limited awareness of his role in pregnancy and childbirth beyond providing financial support. Educational efforts can help to improve partner efficacy and confidence in their ability to make a positive impact on the mother and fetus. One pregnant woman in the study explained the relief she felt when her husband took accountability for his physical and mental support role: “I experienced swelling in my legs and high blood pressure when pregnant, he accompanied me to visits, reminded me about danger signs, prepared for emergencies, and even helped with household chores that he had never done before” (Oo, et al., 2024). Social scientists should seek to implement these programs in the United States on a central level and ongoing basis. The significance of extended family support and strong community should not be forgotten either.

K. Develop Reproductive Technology

Allocating more funding for new reproductive technologies like IVF can help make these services more accessible and safe. As infertility rates rise, access to IVF offers hope to many families, but continued research would greatly improve the viability of alternatives.

V. Recommendations for Future Research

Research into the field of reproductive health should be pursued with urgency and purpose, while continuing down promising avenues currently being implemented on clinical levels.

A. Cofactors Aiding in Placental Nutrient Transfer (*Colorado State University*)

A majority of still births and roughly half of preterm neonatal deaths were linked to placental malperfusion (Goldenberg, et al., 2023). At Colorado State University, Dr. Russ Anthony and Dr. Quint Winger are using a pregnant sheep model to research different methods for improving maternal-fetal nutrient exchange to improve fetal viability. Investigations have included protein purification and sequencing, examination of gene organization, specific gene transcriptional regulation, microarray and RNAseq assessment of gene expression, mRNA and protein expression, protein-protein interactions, maternal and fetal hormone concentrations, and in vivo assessment of altered placental function (Anthony and Winger, 2025). Due to similarities between humans and sheep with standardized catheterization practices, it is possible to measure steady-state uptake, transfer, and utilization of oxygen and nutrients under both stressed and unstressed conditions. Most recently, the researchers have examined RNA interference within sheep placentas to determine the physiology of those altered pregnancies. Given the importance of placental nutrient transfer during gestation, this information has the potential to improve human maternal and fetal health outcomes via targeted gene interference.

B. Cellular Physiology of Preeclampsia

Another study examined the impact of reduced uterine perfusion pressure on a rat model of preeclampsia on the maternal cardiovascular system, placental, and fetal heart metabolism. Researchers applied silver clips around the rats' aortas and uterine arteries on gestational day 14 resulting in 40% uterine blood flow reduction. The pregnancies were terminated on gestational day 19 and researchers took a metabolomic profile of the placenta using high resolution H-NMR spectroscopy. Due to the induced placental and cardiac hypoxia, the fetuses were found to have undergone a series of physical adaptations including altered carbohydrate, lipid, and amino acid metabolism of the placenta and maternal hearts (McClements, et al., 2022). Resulting data showed that the preeclampsia model had pathophysiological effects consistent with intrauterine growth restriction, increased heart rate and hemodynamic load, and cardiac hypertrophic enlargement. All of the physiologies are associated with higher rates of fetal demise and may become compounding factors in poor maternal and fetal health outcomes.

Furthermore, a 2017 study aimed to reduce preeclampsia by genetically and pharmacologically manipulating the Keap1-Nrf2⁸ system to decrease oxidative stress. Systematic deletion of Nrf2 was shown to increase oxidative DNA damage and enhance placental angiogenesis, as evidenced by higher density capillaries and increased endothelial cell proliferation. Conversely, genetic and pharmacological addition of Nrf2 resulted in increased maternal mortality and fetal growth restriction. These researchers were able to conclude that Nrf2 overactivation is directly involved in the biochemical pathways leading to preeclampsia and its related health outcomes (Nezu, et al., 2017). Proposals for subsequent studies should focus on understanding more about Nrf2 and how to block its effects from producing an irreversible proliferation cascade. Since preeclampsia is the leading cofactor in maternal and fetal mortalities, improvements on this front have the greatest potential to save lives and improve quality of life.

C. Methods for Preventing Hypertension

Another study found that women who received aspirin were less likely to have hypertensive disorders during pregnancy, and these mothers were also able to carry their fetuses closer to full term (Goldenberg, et al., 2023). This over the counter drug acts by relaxing blood vessels, therefore lowering blood pressure and improving blood flow to the fetus, kidneys, and brain, lowering the risk of complications during gestation. Due to its low cost and accessibility, regular consumption of low-dosage aspirin is a promising way to manage hypertension during pregnancy⁹.

D. Genetic Morphologies and Epistatic Incompatibility

Finally, medical anthropological researchers found that hypomethylation of the matrix metalloproteinase-1 promoter¹⁰ in fetal tissue was associated with premature rupture of membranes in African American women. An assessment of DNA methylation's contribution to epistatic interactions could help explain certain genotype incompatibilities and malformations possibly linked to certain ancestries (Timothy, et al., 2014).

⁸ Nrf2 (Nuclear factor erythroid 2-related factor 2) is a transcription factor that plays a crucial role in the body's defense against oxidative stress and other forms of cellular damage. Keap1 acts as a sensor protein to regulate the activity of Nrf2. When activated, Nrf2 binds to antioxidants that help the cell cope with stress (Nezu, 2017).

⁹ All pregnant individuals should consult with a physician before taking any drug that may interact with fetal development.

¹⁰ MMP-1 is a region of DNA that regulates collagen degradation and physiologies leading to arthritis, asthma, and fetal demise.

E. General Improvements in Research

Overall improvements in research should include standardization of biological data collection to facilitate definitive and comprehensive meta analyses on topics such as telomere research, for example. Studies should also include specific developmental periods in studies of biological pathways and consider paternal genotypes in genetic profiling. Furthering efficacy of screening tools for early detection of vulnerability and previous adverse exposures can help researchers better identify which populations might benefit from behavioral or social interventions. Finally, researchers should target specific contributing factors (e.g. economic stability, environment, education, food security, violence, social support, healthcare access) in their determination of viable solutions rather than creating overarching, broad public health plans (Grobman, et al., 2023). The implementation of Participatory Action Research (PAR) will create an inclusive environment with the knowledge and experiences of the afflicted demographics of pregnant women. Effective PAR engages the population of interest in the planning stages of intervention to ensure that researcher goals align with what is happening in reality (Kent, 2024). While the first step in improving maternal and fetal outcomes is identifying the physiological causes of preterm and stillbirth, progress is impossible without the aforementioned policy and social welfare changes.

VI. Conclusion

The fight for maternal and fetal flourishing is undoubtedly a complex and ongoing endeavor, but it is one we cannot afford to neglect. People are unique and imperfect, and not everyone is able or willing to follow guidance, especially when systemic barriers like poverty, racial discrimination, and limited access to healthcare stand in the way. External influences out of individual control continue to influence health outcomes and limit mothers' opportunity to thrive. While individual choice goes a long way, poor health statistics in the United States are a result of institutionalized shortcomings. While it seems impossible to quantify or even fully assess the cost of solving such an immense issue, large-scale change starts with incremental, intentional actions. By acknowledging problems at the micro level— whether in a single clinic, patient interaction, or policy change— we can begin to create ripples and change the narrative for women and their reproductive health stories.

A society's worth is best measured by how we treat our most vulnerable— not just in words, but in the structures we build to support them. If we can commit to valuing mothers and infants not as statistics, but as valued lives worth protecting, then it is possible to imagine a future where good health is not a privilege, but a birthright. After all, the well-being of future generations begins with how we care for those who nurture them.

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