Racism and Inequity in Birth Outcomes for Black and Native American Families: A Review of the Literature

A product of the Achieving Birth Equity through Systems Transformation (ABEST) project
Michigan Public Health Institute

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Black and Native American women and infants experience the largest inequities in maternal and infant mortality, both nationally and in Michigan.

The death of an infant or a mother serves as a measure of how well a society ensures the health of its people, particularly its women and children. Disparities in infant and maternal mortality are indicators of inequities that go much deeper than health status, pointing to social, institutional, and structural inequities. Michigan Public Health Institute's Achieving Birth Equity through Systems Transformation (ABEST) project, funded by the Michigan Health Endowment Fund, seeks to disrupt racial inequities in maternal and infant mortality through systems change that addresses root causes, particularly **racism**.

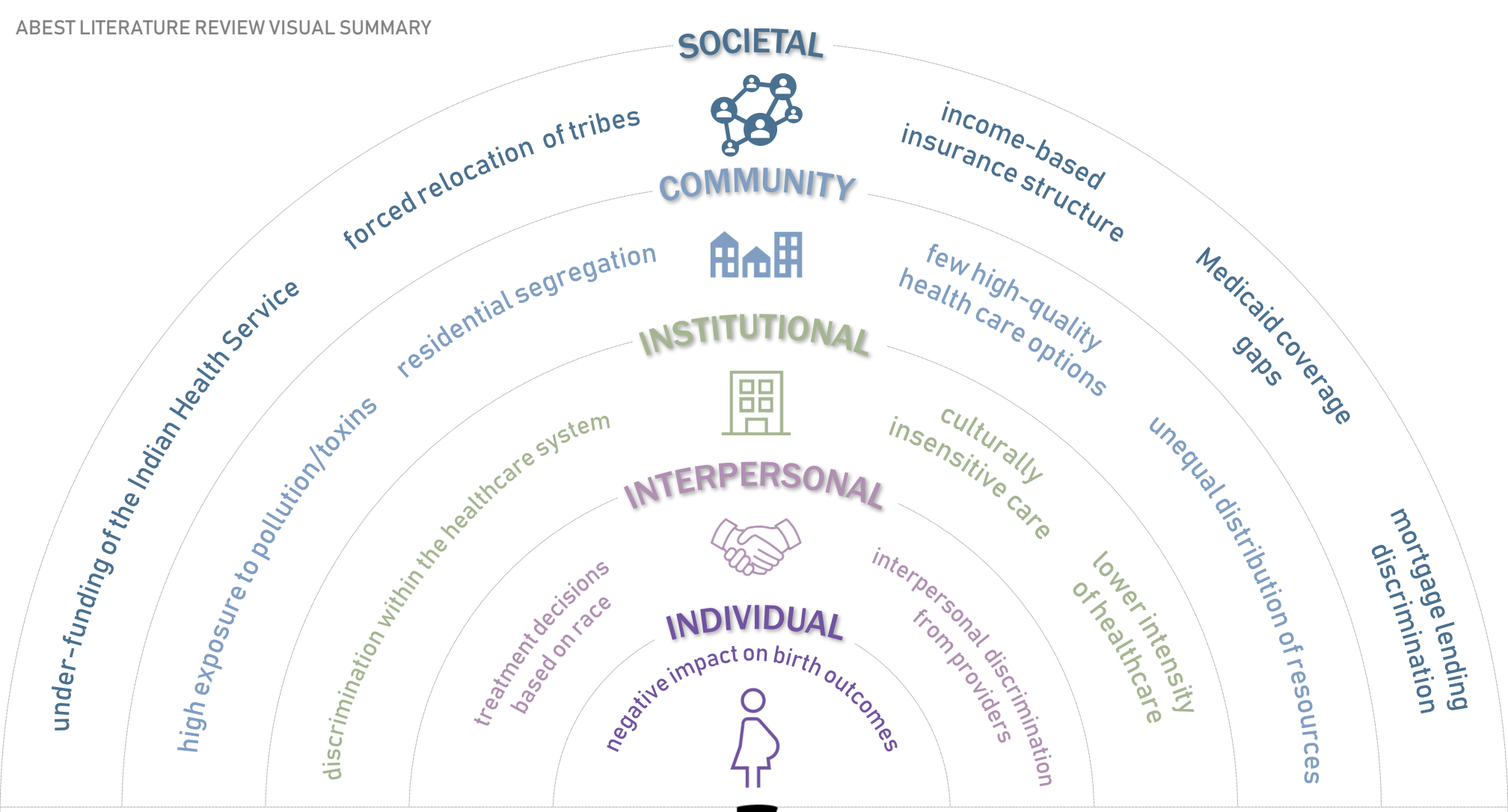
As part of ABEST, the project team conducted a literature review on **racial inequities in birth outcomes for Black and Native American populations**. Often, maternal and infant mortality are siloed in research and prevention, even though maternal and infant health are highly interrelated. This literature review pulled together the literature on **maternal mortality, maternal morbidity, infant mortality, and leading causes of infant mortality** (e.g., low birth weight, prematurity) to help **draw connections** between these outcomes, and to **inspire action** that addresses maternal and infant health together.

The literature review identified two themes concerning racism as a root cause of birth inequity: **Racism and Access to Quality Health Care** and **Racism, Adverse Childhood Experiences, and Psychosocial Stress**. To support greater understanding of root causes and where they are located within systems, these two themes were organized into the social-ecological model.

The **SOCIAL-ECOLOGICAL MODEL** is a five-level model that takes into consideration **complex interactions** across the societal, community, institutional, interpersonal, and individual levels (Bronffenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988). When applied to a specific topic or issue, the social-ecological model can help to **illuminate the elements** at each of these different levels that are impacting the issue, and to identify how **elements within different levels are interconnected**, as well as how this interconnectedness **compounds negative outcomes**. This greater understanding of complexity and interconnectedness can help guide actions that effectively address the multiple levels of contributors to inequity. The social-ecological model also helps to see how a single factor, such as racism, can play out differently at the various levels of the model.

LEVELS OF THE MODEL

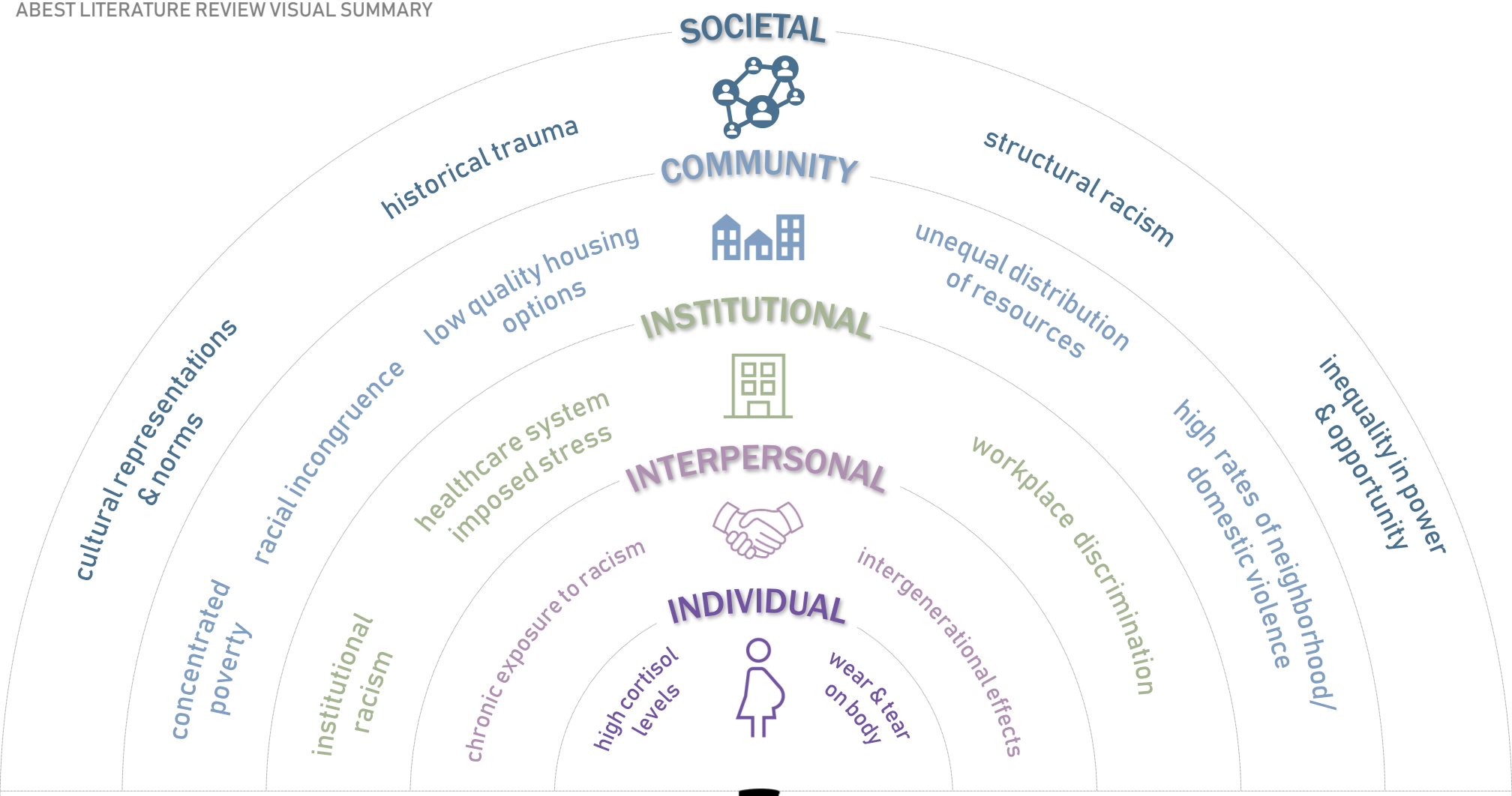
SOCIETAL: social conditions, public policies, social norms
COMMUNITY: physical environment, pollution, public safety
INSTITUTIONAL: healthcare systems, schools, police, employers, community organizations
INTERPERSONAL: relationships with family, neighbors, peers, health care providers
INDIVIDUAL: health status, education, income; individual beliefs, attitudes, behaviors



THEME 1:
Access to Quality Healthcare

RACISM

Public policies have shaped the racial geography and economic deprivation of Black and Native American communities, impacting access to quality health care. This is made worse by racial discrimination in healthcare systems and from individual providers. The end result is that Black and Native American women experience more medical conditions, leading to poorer maternal health, which in turn leads to higher rates of low birth weight, premature births, infant mortality, and maternal mortality.



THEME 2:
Adverse Childhood Experiences (ACES) & Psychosocial Stress

RACISM

ACEs and stress have overlapping negative long-term effects on physical and emotional health through their impact on the body's ability to manage the effects of stress and to fight disease. For Black and Native American women, the chances of experiencing ACEs and psychosocial stress are greater than for White women due to inequities at the societal, community, institutional, interpersonal, and individual levels.

Interventions at the societal, community, and institutional levels are key to overcoming structural inequities in Black and Native American maternal and infant outcomes. The literature review identified examples of promising interventions and recommendations that focus on these levels. In order to address the complex ways that racism functions as a root cause of birth inequity, interventions and strategies should focus on multiple levels.

Strategies & Recommendations

SOCIETAL

- Expand health insurance coverage and increase health care funding to Tribes
- Provide families with additional income or economic supports (e.g., minimum wage increase, parental leave)
- Address historical racial and ethnic inequities such as residential segregation
- Conduct Health Impact Assessments and use Health in All Policies approaches

COMMUNITY

- Invest in communities of color and address concentrated poverty
- Reduce inequities in educational quality
- Create safe and healthy neighborhoods
- Foster community mobilization, civic engagement, and individual and community political capacity
- Increase collaboration among funders and organizations to holistically address family needs through comprehensive services

INSTITUTIONAL

- Coordinate healthcare systems to focus on providing comprehensive and holistic patient-centered services, including prevention and health promotion
- Increase health workforce diversity
- Integrate and coordinate social service systems to increase access to services
- Implement mandatory institutional trainings on topics such as diversity, implicit bias, cultural competency, and root causes of racial and ethnic inequities
- Increase access to high quality early childhood initiatives, education programs, and post-secondary education

Contents

Introduction

The death of an infant or a mother is an event that serves as a measure of how well a society ensures the health of its people, particularly its women and children. Therefore, disparities in infant and maternal mortality are indicators of inequities that go much deeper than health status, pointing to social, institutional, and structural inequities. The largest disparities are experienced by Black and Native American[1] women and infants. Nationally, Black and Native American infant and maternal mortality rates are 2-3 times higher than White rates (Centers for Disease Control & Prevention [CDC], 2016; Peterson et al., 2019). In Michigan, the maternal mortality rate for Black[2] women is two times higher than for White women (Michigan Department of Health & Human Services [MDHHS], 2020), and Black and Native American infant mortality rates are three times higher than White rates (MDHHS, n.d.). Unraveling the complex factors that contribute to these disparities and inequities is critical for addressing them.

Michigan Public Health Institute's Achieving Birth Equity through Systems Transformation (ABEST) project, funded by the Michigan Health Endowment Fund (2019), seeks to disrupt racial inequities in maternal and infant mortality, particularly for Black and Native American women and infants. The ABEST project focuses on root causes of birth inequities for Michigan's Black and Native American communities. Root causes are the underlying and deepest causes of an issue. For complex social problems such as health inequities, the deepest causes are the societal conditions that create advantages and disadvantages for certain groups (e.g., race, class, and gender groups) by providing different access to opportunities and resources. While the ABEST project focuses on identifying and addressing root causes generally, the project has an explicit focus on racism as a root cause of birth inequity. Racism refers to individual, cultural, institutional, and systemic ways in which different opportunities and resources are created for groups based on race.

In recent years, there has been growing attention to racism as a root cause of racial disparities in infant and maternal mortality and increased calls for birth equity. News outlets such as NPR and ProPublica have reported on racial inequities in maternal mortality, calling out racism in the form of social inequities, unconscious bias, and discrimination as a driver of disparities in maternal mortality rates.[3] Organizations such as the National Birth Equity Collaborative and Black Mammas Matter Alliance are addressing policy, research, and care for Black women. Researchers have expanded the literature on the role of racism in negative birth outcomes for women and babies of color (Collins, David, Handler, Wall, & Andes, 2004; Earhshaw et al., 2013; Grady & Darden, 2012; Lu & Halfon, 2003; Mutambudzi, Meyer, Reisine, & Warren, 2016; Rankin, David, & Collins, 2011; Wallace, Green, Richardson, Theall, & Crear-Perry, 2017). Much of this research focuses on Black women and babies, and there has been less attention given to inequities for Native Americans. However, the research that does exist on Native birth outcomes has also identified the role of racism in disparate outcomes (Dennis, 2019; Raglan, Lannon, Jones, & Schulkin, 2016; Truschel & Novoa, 2018; Urban Indian Health Institute, 2011),

[1] This document uses the terms Black and African American interchangeably. Native American, American Indian/Alaska Native (AIAN), and Indigenous are also used interchangeably.
[2] The Michigan Department of Health and Human Services does not report the maternal mortality rate for Native American women.
[3] For more information go to: https://www.propublica.org/series/lost-mothers; https://www.npr.org/series/543928389/lost-mothers

and the pathways to inequitable birth outcomes for marginalized populations are likely to share common factors and structural elements.

As part of the ABEST project, the project team conducted a literature review on racial inequities in birth outcomes for Black and Native American populations. Often, maternal and infant mortality are siloed in research and prevention, despite the fact that maternal and infant health are highly interrelated. This literature review pulled together the literature on maternal mortality, maternal morbidity, infant mortality, and leading causes of infant mortality (e.g., low birth weight, prematurity) to help draw connections between these outcomes, and to inspire action that addresses maternal and infant health together.

Because the ABEST project is focused on root causes and systems change for birth equity, the results of the literature review were organized into a framework that could support greater understanding of root causes and where they are located within systems: the social-ecological model (Bronffenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988). The social-ecological model is a five-level model that takes into consideration complex interactions across the societal, community, institutional, interpersonal, and individual levels. When applied to a specific topic or issue, the social-ecological model can help to illuminate the elements at each of these different levels that are impacting the issue, and to identify how elements within different levels are interconnected, as well as how this interconnectedness compounds negative outcomes. This greater understanding of complexity and interconnectedness can help guide actions that effectively address the multiple levels of contributors to disparities. The social-ecological model also helps to see how a single factor, such as racism, can play out differently at the various levels of the model.

Our review of the literature identified two main themes regarding racism as a root cause of birth inequities. The first is *Racism and Access to Quality Health Care*. This theme traces the history of policies impacting racial geography and health insurance to their impact on differential access to quality health care and the resulting inequities in health status and birth outcomes. The second theme is *Racism, Adverse Childhood Experiences, and Psychosocial Stress*. This theme examines the impact of Adverse Childhood Experiences (ACEs) and psychosocial stress on maternal and infant health, and how factors at each level of the social-ecological model contribute to ACEs and stress.

These two themes do not represent the only ways in which racism impacts birth outcomes, but rather represent the two areas in which we have the most research. It is our hope that the literature review will inspire readers to look for additional connections between the different levels of the social-ecological model and to discover more pathways by which racism serves as a root cause of birth inequities. We also hope the literature review can help readers identify areas to target if they are looking to push their maternal child health work more upstream to address root causes.

This literature review summary begins with background information on disparities in maternal and infant birth outcomes for Black and Native American women and infants. Then, it provides an overview of the social-ecological model. This is followed by descriptions of the two major themes identified in the literature. Finally, the literature review presents examples of interventions and recommendations to address birth inequity at the societal, community, and institutional levels.

Background

Racial Inequities in Birth Outcomes

African American and Native American women and infants experience the largest disparities in birth outcomes. The following sections summarize the research on disparities in maternal mortality, maternal morbidity, infant mortality, low birth weight, and premature births.

Maternal Mortality and Morbidity

Maternal mortality is measured as the number of pregnancy-associated or pregnancy-related deaths for every 100,000 live births. A pregnancy-associated death is the death of a woman while pregnant or within one year of the end of pregnancy from any cause, divided into pregnancy-related and not-pregnancy-related. The Centers for Disease Control and Prevention (CDC) defines pregnancy related death as "the death of a woman while pregnant or within one year of being pregnant from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (CDC, 2019).

A 2013 Michigan Department of Community Health report utilizing surveillance and Centers for Disease Control data shows that Michigan maternal mortality rates from 1999-2010 were higher than other states (22.2 per 100,000 births in Michigan compared to 15.6 per 100,000 births nationally) and that rates for Black women were very high, being the 3rd highest in the country (50.8 per 100,000 births for Black women in Michigan compared to 35.8 per 100,000 for Black women nationally). This report also ranked Michigan 15th highest in the country for racial disparity in maternal mortality rates. The Michigan Maternal Mortality Surveillance report for 2012-2016 (MDHHS, 2020) reported that maternal mortality rates were 2.4 times higher for Black women in Michigan (20.4 per 100,000 for Black women compared to 8.6 per 100,000 for White women), illustrating that disparities persist.

The Michigan Maternal Mortality Surveillance program does not report on Native American maternal mortality rates, but we know from national data that large disparities also exist for Native women. A recent CDC report (Peterson et al., 2019) showed that disparities in maternal mortality rates for Black and Native American women is a national issue, with Black women having a rate of 42.8 per 100,000 and American Indian/Alaska Native women having a rate of 32.5 per 100,000, compared to the mortality rate of 13.0 per 100,000 for White women.

While maternal mortality is a rare event, maternal morbidity is much more common. Maternal morbidity is any physical or mental illness or disability directly related to pregnancy and/or childbirth (Koblinsky, Chowdhury, Moran, & Ronsmans, 2012). Maternal morbidities are not necessarily life-threatening but can have a significant impact on quality of life. A number of studies have identified racial disparities in maternal morbidity. Creange et al. (2004) found that American Indian/Alaska Native women had 1.7 to 1.3 times higher rates of severe maternal morbidity when compared to White women after controlling for potential confounders. Aziz, et al. (2019) found Black women to be at a significantly higher risk (80% higher) for postpartum readmissions and at a 27% higher risk for severe maternal morbidity during readmissions. Other studies have consistently found that rates of severe maternal morbidity for Black women are 2-3 times the rates for White women (Creanga, Bateman, Kuklina, & Callaghan, 2014; Howell, Egorova, Balbierz, Zeitlin, & Hebert, 2016; Howland et al., 2019).

Infant Mortality

Recent Vital Statistics data for Michigan shows disparities in Black and White infant mortality rates for 2017 (MDHHS), with a rate of 14.6 per 1,000 live births for Black infants and 4.8 per 1,000 live births for White infants. Michigan Vital Statistics data between 2015 and 2017 (MDHHS) shows disparities in infant mortality rates between White infants (4.9 per 1,000) and Black (14.3 per 1,000) and American Indian infants (14.2 per 1,000). These disparities exist at the national level, as well. A National Vital Statistics Report using 2017 data (Ely & Driscoll, 2019) reports the infant mortality rate (per 1,000 live births) for White infants is 4.67, while the rate for American Indian/Alaska Native infants is 9.21, and for Black infants is 10.97.

A 2010 Health Resources and Services Administration Report (Singh & van Dyck) utilizing National Vital Statistics data shows that disparities in infant mortality between White and Black infants has been a long lasting and increasing trend. In 1935, the Black infant mortality rate was 58% higher than the White rate. By 2007, the Black infant mortality rate was 135% higher than the White rate. The report found that 2006 infant mortality data showed the highest rates of infant mortality for Black infants (13.4 per 1,000 live births) with American Indian/Alaska Native infants following with a rate of 8.3 per 1,000 live births. Research from Mathews, McDorman, & Thomas (2015) shows that this trend has continued. They found that the disparity in national infant mortality rates for Black and White infants more than doubled between 2005 and 2013.

Research has also documented disparities in other birth outcomes, such as premature birth and low birth weight for Black and American Indian/Alaska Native infants. A 2018 March of Dimes report using 2014-2016 National Center for Health Statistics aggregated data found the percentage of preterm births (less than 37 weeks gestation) in Michigan to be 9% for White infants, 11.4% for American Indian/Alaska Native infants and 13.9% for Black infants, with the preterm birth rate for black women being 54% higher than the rate among all other women. A 2018 National Vital Statistics Report (CDC) using 2017 data shows that this is also a national issue. The national preterm (less than 37 weeks gestation) birth rate was 13.93% for Black infants, 11.86% for American Indian/Alaska Native infants, and 9.05% for White infants.

National Center for Health Statistics (CDC) data from 2015 shows that the percentage of infants born low birth weight (less than 2,500 grams) varies by race in Michigan (14.2% for Black infants, 8.3% for American Indian/Alaska Native infants, and 7.0% for White infants). This is also true nationally. The 2015 National Center for Health Statistics (CDC) data show that the national percentage of infants born low birth weight varies by race (13.0% for Black, 7.5% for American Indian/Alaska Native, and 6.9% for White infants).

The Perinatal Periods of Risk (PPOR) analytic framework is a tool that uses community data to identify which of four periods of risk for infant mortality (maternal health & prematurity, maternal care, newborn care, and infant health) has the most related infant deaths and largest disparities, providing a focus for prevention efforts in that community (Citymatch, 2012). A study using PPOR in Genesee County in 2003 (Pestronk & Franks) found maternal health & prematurity as the highest risk period. A number of other communities across the United States using PPOR have also found that maternal health and prematurity was the highest risk period with the most infant deaths (Brady, 2013; Xaverius & Salas, 2012; Citymatch, 2012). This identifies that the highest risk period for infant deaths across geographic areas is during the preconception period, and this highlights that prevention efforts need to start before a pregnancy begins.

These patterns of disparate outcomes are indicators of inequities that go much deeper than health status alone. In order to understand these inequities, we need to look to root causes, including structural inequality and racism. We need to understand how public policies, institutional practices, and cultural representations and other norms contribute to birth inequity. The social-ecological model provides an excellent framework for examining root causes.

Social-Ecological Model

The social-ecological model (Figure 1) is a five-level model that takes into consideration complex interactions across the societal, community, institutional, interpersonal, and individual levels (Bronffenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988). When applied to a specific topic or issue, the social-ecological model can help show how different elements at each of these levels are related to the issue, and how those elements interact. The social-ecological model also helps to see how a single factor, such as racism, can play out differently at the various levels of the model.

Figure 1. Social-Ecological Model

The outermost band of the social-ecological model is the *societal level*, which includes factors such as social conditions, public policies, and social norms. Examples of racism at the societal level include federal policies contributing to mortgage lending discrimination and forced relocation of Tribes, as discussed in Theme 1 below. Theme 2 focuses on historical trauma and the intergenerational effects of living in poverty, chronic exposure to racism/discrimination, and racialized stress.

Moving inward, the second band of the model is the *community level*, which focuses on community and environmental factors. These include factors such as the physical environment, pollution, and public safety. Theme 1 discusses racism at the community level by outlining the long-term impacts of racial residential segregation and the unequal distribution of resources and environmental risk factors in communities of color. Theme 2 addresses the outcomes of these community factors and how they relate to the frequency of neighborhood violence.

The third band of the model is the *institutional level*, which includes social institutions and organizations such as healthcare systems, schools, police, employers, and community organizations. Racism at the institutional level can be experienced through workplace discrimination and discrimination in healthcare systems and other organizations, as described in Theme 1. Theme 2 of this review connects this level with the community level by discussing the long-term effects of temporary economic hardships.

The fourth band of the model is the *interpersonal level*, which focuses on relationships. These include relationships with family, neighbors, peers, and health care providers. Racism at the interpersonal level can be experienced through health care provider discrimination and interpersonal discrimination experienced with other individuals, as described in Theme 1. In addition, the impact of experiencing a violent act due to the systemic effects of institutional oppression is the focus of Theme 2.

At the innermost level of the model is the *individual level*, which focuses on characteristics of individuals, such as health status, education, and income. It also includes individual beliefs, attitudes, and behaviors. The important thing to recognize about the individual level is that these characteristics of individuals are impacted by all of the other levels. Theme 1 provides information about the impact of racism at each level of the social-ecological model on health status for Black and Native American women and infants. Engagement in risky behaviors that have negative health outcomes is discussed in more detail in Theme 2.

Within the field of maternal child health, and in many other areas of health, programs and interventions often occur at the individual level, focusing on things like health behaviors or treating disease. The social-ecological model helps broaden the focus beyond the individual to see the importance of interpersonal interactions, institutional practices, community conditions, and laws and social norms. Taking the broader view, and examining how factors within each level interact, can help design actions that provide a more holistic and effective approach to improving health.

In addition to the different levels of the model, it is important to consider the role of time, including looking back at history, and thinking forward into the future. Time is relevant at each level of the model, and across levels. An excellent example of this is historical trauma. While historical trauma is certainly not something that is only relevant to Native Americans, there has been quite a bit written about the impact of historical trauma on Indigenous peoples. Historical trauma refers to a “cumulative emotional and psychological wounding over a lifespan and across generations emanating from massive group experiences” (Brave Heart, 2003). As Evans-Campbell (2002) explains, events associated with historical trauma have three key characteristics: 1) they are widespread among Native communities, 2) they generate high levels of collective distress and mourning in contemporary communities, and 3) they are perpetrated by outsiders with often destructive intent. For Native Americans, historical trauma has been connected to such historical events as settler-colonialism and the resulting decimation of Indigenous populations and their land; boarding schools that forcibly separated Native children from their family, culture, and language, and subjected them to abuse and neglect; and assimilation policies that relocated Native Americans to urban areas (Brave Heart & DeBruyn, 1998).

Historical trauma theory is useful for understanding transgenerational effects of past trauma, where trauma is transmitted to descendants through means such as impaired parenting,

distressing narratives, epigenetic processes, or spiritual means (Kirmayer, Gone, & Moses, 2014). While difficult to study empirically, there is some evidence to support the theory. In particular, studies have documented the impact of boarding schools on the well-being of future generations (Bombay, Matheson, & Anisman, 2014). In fact, the impacts of boarding schools can be seen across levels of the social-ecological model. Kirmayer et al. (2007) present a model of some of the hypothetical pathways through which boarding schools impact the individual, interpersonal (family), community, and societal (nation) levels. These pathways go in both directions through the different levels. As children were forcibly removed from their families and placed in boarding schools, this caused a denigration of identity and suppression of culture for individuals. Families experienced loss of children, grief, anger, and helplessness. Communities experienced the loss of a generation of children and negative stereotyping (e.g., that Native communities were not capable of raising their own children). The Indigenous Nation (societal level) suffered political disempowerment and loss of collective identity. These impacts at the societal level in turn led to community disorganization, conflict, and social problems. The community context impacted families, affecting family dysfunction (e.g., domestic violence, abuse). That interpersonal context within families impacted individuals' self-esteem, mental health, and parenting skills. This example illustrates how the element of time is an important consideration when considering root causes of racial inequities. Theme 1 talks at length about the history of public policies that have impacted the current racial geography of the United States and socioeconomic inequality. Theme 2 presents research on the intergenerational effects of living in poverty, chronic exposure to racism/discrimination, and racialized stress.

Methods

A structured process was followed to ensure a thorough literature review. The first step of the process was a comprehensive search of peer-reviewed journals via the PubMed, Sociological Abstracts, and PsychInfo databases, as well as searches on Michigan State University's Library site that searches articles, books, and journals from various databases. In addition, organizational and government reports were located and downloaded utilizing Google searches of relevant search terms. The project team also used the citation lists of articles, books, and reports to identify additional literature. Search terms for the literature review included: maternal mortality, maternal morbidity, infant mortality, low birth weight, premature birth, preterm birth, birth outcomes, negative birth outcomes, and adverse birth outcomes. These terms were searched in combination with: race, African American/Black, Native American/American Indian, racism, equity, and inequity. As the project team identified themes in the literature, the key terms were also searched in combination with: chronic illness, maternal age, education, C-sections, poverty, residential segregation, housing quality, environmental exposure, chemical exposure, access to health care, quality of health care, Medicaid, Adverse Childhood Experiences, life course, stress, interpersonal racism, structural racism, health care discrimination, and health care provider discrimination.

Journal articles, organizational reports, government reports, and book chapters were all included in the literature review. The literature review focused on recent articles and reports (within the last 10 years), but older articles that were relevant to the literature review were not excluded. The final number of articles included in this summary of the literature was 161. As the project team read the literature review materials, they kept notes on emerging themes. Once a list of core themes was developed, the project team used NVivo, a qualitative analysis software, to organize the literature and further develop themes. All reviewed articles were imported into

NVivo and then coded to the relevant themes. As the literature review expanded, additional themes were added or edited as appropriate, and additional articles were added and coded as appropriate.

Racism as a Root Cause of Birth Inequities

Our review of the literature identified two main themes regarding racism as a root cause of birth inequities. The first is *Racism and Access to Quality Care*. This theme traces the history of policies impacting racial geography and health insurance to their impact on differential access to quality health care and the resulting inequities in health status and birth outcomes. The second theme is *Racism, Adverse Childhood Experiences, and Psychosocial Stress*. This theme examines the impact of Adverse Childhood Experiences (ACEs) and psychosocial stress on maternal and infant health, and how factors at each level of the social-ecological model contribute to ACEs and stress.

Both themes demonstrate that racism at each level of the social-ecological model impacts the unequal distribution of health experienced by Black and Native American mothers that ultimately impacts both maternal and infant outcomes. These two themes do not represent the only ways in which racism impacts birth outcomes, but rather represent the two areas in which we have the most research.

Theme One: Racism and Access to Quality Health Care

Societal Level

This pathway begins at the societal level, where public policies have contributed to the racial geography of African American and Native American communities, and the economic deprivation of these communities. For African American communities, a key part of this history is the practice of redlining. For Native American communities, it is a history of displacement. Another key factor at the societal level is health policy, which creates additional inequities for African Americans and Native Americans.

Redlining

While the residential segregation of African Americans is not due solely to redlining, it did play a significant role. Redlining, a form of mortgage lending discrimination, refers to policies where banks and financial institutions base mortgage credit decisions on the location of a property, and locations considered to be high risk are marked in red. The term redlining was coined in the 1960s but is used to describe a practice that was widespread in the post-Depression era of the 1930s and 1940s where African American neighborhoods were given the riskiest rating and marked in red, making it difficult or even impossible to secure a home loan in those areas (Hillier, 2003). When reflecting on this nation's history of redlining, this practice is often described as the discriminatory practice of private banks and lenders, but the federal government played a significant role through the Home Owners Loan Corporation (HOLC) and Federal Housing Administration (FHA) (Rothstein, 2017). The HOLC helped homeowners avoid foreclosure and the FHA provided mortgage insurance. These programs provided mortgages that were fundamentally different from other types of mortgages, because they had longer terms for repayment, lower interest rates, and small down payments. Both programs considered Black neighborhoods, including middle class neighborhoods, too risky for investment (i.e., "redlined"). This led to the exclusion of African Americans from new developments and revitalized neighborhoods in order to maintain them as White neighborhoods that could qualify for these

programs. The results of these exclusionary policies can be seen in the geography of our country today, where suburbs are largely White, and African Americans are concentrated in city centers.

As Rothstein explains, African Americans' exclusion from these programs, which provided the opportunity to build equity in one's home, have had a lasting impact on the wealth of African American families. This inequality was compounded by wage suppression through means such as the historical exclusion of Black workers from unions (which of course followed 200 years of slavery and decades of sharecropping), as well as the higher cost of living that resulted from tight housing markets in Black neighborhoods and exclusion from affordable mortgage loans. Today, the median White household wealth is about $134,000, while the median wealth for Black households is about $11,000. Additionally, as Massey & Denton (1998) have shown, residential segregation exacerbates the impact of economic downturns, creating concentrated poverty. The result is racially segregated, deprived communities created in part by public policy.

Displacement of Indigenous Peoples

While the timeline and the mechanisms are very different, the overall story of racial geography and deprivation for African Americans has parallels to the history of Native Americans. Before European settlers came to America, millions of Indigenous peoples (estimates range from 1.5 million to 20 million) lived in complex, self-governed societies (National Congress of American Indians, 2019). The arrival of Europeans in the Americas began a centuries-long process of extermination, elimination, and exploitation through settler colonialism, resulting in the death of millions of Native Americans and an Indigenous land base that was only 2.3% of its original size by 1955 (Dunbar-Ortiz, 2014).

As Dunbar-Ortiz explains, the process by which the Native American land base was eroded was a combination of forced surrender and relocation driven by the US government's desire for land and Western expansion. Time and again, colonial powers and then the US government forced Native people to relinquish their land. In some cases, Tribes ceded their land to the US government in exchange for protection from settlers and provision of social services, reserving a portion of the land (i.e., reservation). In other cases, the US government seized tribal lands, such as for military use. For example, the government took 500,000 acres of Tribal land during World War II. In the 1830s, tens of thousands of Native Americans were forcibly removed from their land and relocated to Oklahoma during the Trail of Tears. Thousands died during the journey. Through the General Allotment Act of 1887, the US government divided Indigenous land into parcels for individual ownership. Ownership was opened to settlers, resulting in the loss of about 90 million acres, or close to two thirds of Indigenous land. The Termination Act of 1953 aimed to assimilate Native Americans by disbanding Tribes and selling their land, while the Indian Relocation Act in 1956 moved Native Americans off reservations and into urban areas. These acts of seizure, allotment, relocation, and termination attacked the culture, traditions, and economic security of Indigenous Nations. Many Tribes who were forcibly relocated were moved to areas with poor soil for agriculture and limited access to water and other resources, and were distant from their traditional lifeways.

Health Policy

Also, at the societal level, is a history of health policy unique to Native Americans that shapes the landscape of healthcare in Indian Country today. The Snyder Act of 1921 was a hallmark legislation enacted by the U.S. Congress aimed toward improving the general health of American Indians by authorizing the expenditure of federal funds for the "relief of distress and

conservation of health of Indians" (Pevar, 1992). However, until 1955, Indian health programs were administered by the Interior Department through the Bureau of Indian Affairs, which did a notoriously poor job of securing funds and providing health care. In 1955, the Indian health program was transferred to a special branch of the US Department of Health and Human Services Public Health Service known as the Indian Health Service (IHS). Appropriations dedicated to Indian health were doubled from $18M to $36M for IHS and the array of services that IHS provided expanded to include both medical care and public health services (E. Rhoades & D. Rhoades, 2014).

Passage of Public Law 93-638, the Indian Self-Determination and Educational Assistance Act of 1975, provided tribes the authority to directly administer health programs within their own communities by entering into contracts and compacts with IHS. The US responsibility to provide for health of members of American Indian tribes was reaffirmed again in the passage of the Indian Health Care Improvement Act in 1976.

Together, the laws of 1975 and 1976 fostered a movement toward greater community involvement and assumption of program management by tribes to provide for health and welfare of tribal members. Over the years, a growing number of Tribes have assumed management of their own health systems through contracts and compacts with IHS. Approximately 2 million American Indian and Alaska Native people, particularly those living on or near federal Indian reservations or nearby communities, are provided health services through the IHS funded system (Sequist, Cullen, & Acton, 2011). Historically, IHS has been grossly underfunded – the annual per person expenditure on health care is far lower than any other federal health program and the federal estimate of unmet need is around 50% (Sequist et al., 2011).

Federal policies have also limited health insurance coverage for Black adults, because of the income-based structure of insurance in the US and the fact that African Americans are disproportionately represented among low-income individuals. The Children's Health Insurance Program (CHIP) provides low-cost health insurance to children living in families that earn too much to qualify for Medicaid but not enough to buy private insurance, but the adults in these families are more likely to fall into coverage gaps. Due in part to this gap, Black adults spend a higher proportion of time without health insurance than White adults (Kirby & Kaneda, 2010). Passage of the Affordable Care Act in 2010 expanded Medicaid health insurance to help cover this gap for adults, but only to those states that chose to accept Medicaid expansion. A 2018 literature review (Anonisse, Garfield, Rudowitz, & Artiga) on the impacts of Medicaid expansion showed that multiple studies saw reductions in uninsured rates and Medicaid coverage gains for Medicaid expansion states when compared to non-expansion states across the major racial/ethnic categories.

Community Level

The public policies described in the previous section have shaped the quality of health care available at the community level. Residential segregation due in part to redlining policies directly impacts access to quality health care for African Americans, due to the geographical distribution of resources (Williams & Jackson, 2005). Residential segregation has been directly linked to negative birth outcomes for infants in the literature, including low birth weights, premature births and infant mortality (Chambers, Erausquin, & Tanner, 2018; Grady, 2010; Wallace et al., 2017). The geographic locations of these racially segregated areas often have higher concentrations of lower quality housing, including dilapidated residential structures, which is associated with

greater concentrations of premature and low birth weight infants (Grady, 2011; Kruger, Munsell, & French-Turner, 2011).

The fact that many racially segregated areas are characterized by a lack of resources, dilapidated living conditions, and are often located in highly industrialized areas leads to higher risks of exposure to environmental toxins, many of which have been shown to impact birth outcomes. A review of the literature shows that Black women are disproportionately impacted by chemical exposure affecting birth outcomes (Burris & Hacker, 2017). Individuals living in residentially segregated neighborhoods often find themselves surrounded by pathogenic residential conditions due to living in close proximity to abandoned buildings and facilities (Williams & Collins, 2001). They experience higher levels of exposure of air pollution due to living in close proximity to traffic and industrial pollution (Nachman & Parker, 2012), which has been found to increase infant mortality odds (Patel et al., 2018). Two studies showed that increased levels of lead exposure led to higher risks for preterm birth (Moody, Darden, & Pigozzi, 2016; Taylor, 2014). A Ferguson (2014) study found that exposure to environmental phthalate via contaminated food and water or products such as deodorant significantly increased the odds of preterm delivery.

Residentially segregated areas also have more limited health care options, which can lead to Black women seeking health care where it is available, regardless of the quality of care (Williams & Mohammed, 2009). With African Americans living more often in residentially segregated and deprived communities, they often have scarce access to hospital maternity wards, OB-GYNs, and other medical professionals, making it harder to access timely prenatal care and find a quality facility to give birth (Chalhoub & Rimar, 2018). Furthermore, physicians practicing in low-income, racially segregated areas are less likely to be board certified and less able to provide high-quality care and referrals to specialty care (Williams & Jackson, 2005).

A 2016 study (Howell et al.) found that racial differences in site of health care delivery is linked to inequities in Black severe maternal morbidity rates. The study found that 73.7% of Black infants were born in high-Black and medium-Black serving hospitals and that low numbers of White infants were born in these same hospitals. These Black-serving hospitals were found to have higher rates of severe maternal morbidity than White-serving hospitals, with Black women experiencing severe maternal morbidity more than twice as often as White women.

Healthcare policy also impacts access to care as the uninsured receive less medical care, receive care later, have poorer health and shorter life expectancy, and receive poorer care when they are in the hospital compared to the insured (Institute of Medicine, 2002). In the context of maternal health, patients without insurance comprise a larger portion of maternal deaths than insured patients (Campbell et al., 2013).

The current landscape of healthcare for Native American women has been shaped by the history of health policy described in the *societal* section above. The Indian Health Service (IHS) has three branches of service: direct health care services, tribally operated health care services (through contracts and compacts), and Urban Indian health care services and resource centers. Altogether, IHS serves members of 573 recognized Tribes in 37 states, for a total of 2.56 million American Indians and Alaska Natives, or about half the population of tribal members (IHS, 2019). As Sequist et al. (2011) explain, access to care within the IHS is limited by funding and geographic isolation. The IHS is chronically underfunded, with current funding levels at about half of the needed funding. These limited resources, combined with the fact that many clinics

are located in rural, isolated areas makes physician recruitment difficult. The physician vacancy rate within the IHS is around 20%. Furthermore, access to specialty care (including obstetric specialties), hospital admissions, diagnostic imaging, and mental health services are limited. Geographic isolation also creates difficulties for patients in accessing health care services, as they may have to travel long distances to receive care. At the same time, Native Americans living in rural areas that have an IHS facility may have better birth outcomes than those living in urban areas without one. A literature review by Raglan et al. (2016) found that some studies support that American Indian/Alaska Natives living in urban areas have higher rates of preterm births and those living in rural areas have lower levels of preterm births than other races, which could be due to access to care.

Institutional Level

Barriers to receiving care, or high-quality care, are further exacerbated by racism and discrimination within the institution of medicine. Within medical care, racial discrimination is not just an issue with a few providers, but a widespread systemic problem (Williams & Rucker, 2000). There is a long history of racism and discrimination in medicine (Hardeman, Medina, & Kozhimannil, 2016). The utilization of race in healthcare and health research socially classifies individuals on physical appearance and brings with it the indirect assignment of value and advantage or disadvantage. For African Americans, this includes historical segregation of care, beliefs that Black individuals are biologically different (e.g. black people's skin is thicker, black people have poor health because they are biologically inferior, black people's blood coagulates more quickly), and experimentation on Black communities (Cunningham, 2014). Additionally, both Black and Native women have been subject to forced sterilization (Lawrence, 2000; Roberts, 1999).

Racism and discrimination can impact health care practices and outcomes in many ways. Lack of care coordination, poor communication between providers, physical capacity to provide the necessary level of care, and available medical technology are all institutional healthcare factors that contribute to the quality of health care a woman receives, and in turn, can contribute to maternal mortality (Young & Chen, 2018). A 2003 book (Smedley, Stith & Nelson) discussed and provided in-depth literature support to show that racial differences in the quality and intensity of medical care exist for African Americans and other minorities, including fewer needed medical procedures and poorer quality care. At the same time, Black women are more likely to experience a cesarean delivery even after adjustment for risk factors (Huesch & Doctor, 2015; Min, Ehrenthal, & Strobino, 2015), and are more likely to feel pressured to accept epidurals (Morris & Schulman, 2014) and to be induced (Jou, Kozhimannil, Johnson, & Sakala, 2015).

Native American and Black women are also more likely to receive care that is not culturally sensitive. A 1999 DuBray and Sanders article identified the need for culturally specific health care for American Indians, emphasizing the importance of cultural beliefs such as family systems and natural and spiritual healing. A 2012 Hogan et al. study reported on medical systems' failures to acknowledge Black cultural factors, such as the importance of family members sharing their opinions and experiences in regard to medical decisions and treatments.

Experiences of discrimination and a lack of cultural sensitivity can lead to the exacerbation of health issues as they can cause Black and Native American women to disengage from the healthcare system. A National Public Radio, Robert Wood Johnson Foundation and Harvard T.H. Chan School of Public Health study found that 15% of Native American respondents

(2017a) and 22% of African American survey respondents (2017b) had avoided seeking health care services due to concerns about discrimination and poor treatment.

An important factor in the availability of culturally sensitive health care is the lack of diversity among medical providers. This lack of diversity is directly related to the exclusion of individuals of color from medical schools and associations. Baker et al. (2008) discussed how Black individuals were unable to join the healthcare workforce due to racist beliefs and practices being accepted within the medical profession. This led to Black individuals being actively or passively excluded from medical schools, residency programs, hospital staff, professional societies, and medical associations such as the American Medical Association (AMA). This historical legacy of racism by the AMA is acknowledged in a 2008 commentary (Davis) where a past president of the AMA apologized for the organization's history of discriminatory practices and its impact on the current landscape of the healthcare system.

The Association of American Medical Colleges (2018) has recognized that Native Americans have been impacted by exclusionary practices within higher education systems and that this has impacted access to medical schools for Native Americans. Exclusion of Native American content is also widespread throughout U.S. medical schools, with only 14 of 131 schools reporting Native American content in the 2016-2017 AAMC Curriculum Inventory. Furthermore, gaps in primary education, lack of resources, lack of knowledge of available program supports, and the lack of visibility of Native American professionals impacts medical school access for Native American students.

Lucey & Saguil (in press) illustrate how students of color do not have the same opportunities, resources or quality of education as White students in high schools and colleges, which impacts their ability to be competitive with White students on the Medical College Admission Test (MCAT). MCAT scores are a large deciding factor in medical school admissions. In a 2019 article, Williams and Cooper acknowledged that despite the implementation of affirmative action policies aimed at increasing diversity in the medical field, individuals of color have only received small gains in medical school enrollment. This highlights the reality that there are still barriers for individuals of color being able to enter the medical field. The article also acknowledges that a number of programs aimed at increasing diversity in the healthcare workforce are at risk of funding reductions or being eliminated.

Interpersonal Level

Within healthcare systems, racism also operates at the interpersonal level of the social-ecological model through Black and Native American women's experiences of discrimination, stereotyping, and implicit bias in interactions with their health care providers.[4] Experiencing discrimination in interactions with doctors is quite common for Black and Native American patients. Surveys conducted in 2017 by the National Public Radio, Robert Wood Johnson Foundation, and Harvard T.H. Chan School of Public Health found that 23% of Native Americans (2017a) and 32% of African Americans (2017b) reported being personally racially discriminated against when going to a doctor or health clinic. It is important to point out that implicit bias, rather than explicit bias, is responsible for most racial discrimination in medical

[4] Of course, interpersonal racism is experienced in many contexts other than health care, with important consequences for Black and Native American women's health. Theme 2 of the literature review provides a summary of literature on interpersonal racism in everyday life.

care, and that policies that only target explicit bias will not be effective in addressing racism in healthcare (Williams & Rucker, 2000).

Strained, culturally insensitive or discriminatory relationships with health care providers impact the medical care women receive. A 2019 (Altman et al.) study found that women of color with different levels of power and influence experienced differences in how information was packaged and shared with them by health care providers. The study found that women who were marginalized based on their race, education, and socioeconomic status received information from their health care providers in a manner that limited their ability to participate in their own health care decisions (e.g., withholding information, providing misleading information). Information sharing was also seen by participants as being impacted by provider bias, stereotyping, and judgement, as well as the patient's ability to build relationships with providers. A 2006 Call et al. article found that American Indians were more likely than Whites to report language, cultural and religious differences with their doctor, feel distrustful of doctors, and experience racial discrimination from their doctor as barriers to care. A 2009 literature review (Williams & Mohammed, 2009) found that discrimination can affect the quality and intensity of health care decisions regarding Black patients. These findings are confirmed other places in the literature. One study (Green et al., 2007) showed that physicians' implicit biases impacted their treatment decisions regarding thrombolysis treatment with Black patients. The study showed that as the degree of anti-black bias increased, the recommendation for thrombolysis treatment for Black patients decreased. Chalhoub and Rimar (2018) further found that health care providers are less attentive and do not listen as well to the needs of Black women. This can lead to health complications or even death when health concerns are being overlooked or not fully addressed.

Beyond these research findings on general experiences with discrimination, stereotyping, and implicit bias in interactions with health care providers, there is an important body of research on mistreatment during pregnancy and childbirth. The World Health Organization (WHO) recognizes that mistreatment in childbirth "not only violates the rights of women to respectful care, but can also threaten their rights to life, health, bodily integrity, and freedom from discrimination" (WHO, 2015). In a systematic review of qualitative, quantitative, and mixed-methods studies on the mistreatment of women during childbirth across all geographical and income-level settings, Bohren and colleagues (2015) constructed a seven-item typology of the mistreatment of women during childbirth that includes: physical abuse; sexual abuse; verbal abuse; stigma and discrimination; failure to meet professional standards of care; poor rapport between women and providers; and health system conditions and constraints.

Jewkes & Penn-Kekana (2015) drew parallels between the findings of the Bohren et al. systematic review and violence against women more broadly. As they explain, structural gender inequality, which places women in a subordinate position to men in society, creates the conditions for violence against women by disempowering and devaluing women. In a similar way, gender inequality shapes power differentials in maternity care and enables mistreatment of women during pregnancy and childbirth. Recognition of the impact of structural gender inequality on mistreatment during childbirth is seen in the concept of obstetric violence, which calls attention to the appropriation of women's bodies and reproductive processes, dehumanizing treatment, and a loss of autonomy (Sadler et al., 2016).

Mistreatment is not just an issue of gender inequality. It intersects with race to create further inequities for women of color. In a recent study of mistreatment during pregnancy and childbirth

in the United States, Vedam et al. (2019) found that one in six women (17.3%) experienced one or more types of mistreatment. The most common types were being shouted at or scolded by a health care provider (8.5%) and being ignored or not responding to requests for help (7.8%). Indigenous women were most likely to report mistreatment, with one in three women experiencing at least one form (32.8%). Nearly one quarter of Black women (22.5%) reported experiencing mistreatment. Black and Indigenous women were twice as likely as White women to report being ignored by providers, and Indigenous women were twice as likely as White women to report being shouted at or scolded. These racial inequities also extended to women's partners. Regardless of their own race, women with a Black partner were more likely to experience mistreatment.

Individual Level

This interconnected pathway ends at the individual level of the social-ecological model. All the barriers to quality health care described in the previous sections/levels impact the health status of Black and Native American women, which in turn leads to greater odds of negative birth outcomes for these women and their infants. Access to care is linked to disease prevention, early detection and diagnosis of disease, reducing the effects of chronic disease, and healthy birth outcomes (Institute of Medicine, 1993). It is for these reasons that Healthy People 2020 includes a goal to improve access to comprehensive, quality health care services.[5] A Health Policy Institute of Ohio (2017) report with policy recommendations identifies quality of pre-conceptional, prenatal and postnatal health care as one of the key issues impacting infant mortality.

Black and American Indian/Alaska Native women experience higher rates of health conditions leading to higher maternal morbidity and mortality rates. Obesity, hypertension and diabetes have been shown to be related to maternal mortality and morbidity (Howland et al., 2019; Khalil, Syngelaki, Maiz, Zinevich, & Nicolaides, 2013; Bateman et al., 2012), with obesity and diabetes being attributable to 31% and 17% (respectively) of maternal mortality in one study's model (Nelson, Moniz, & Davis, 2018). Studies documented that Black women and American Indian/Alaska Native women are more likely than white women to be obese (Small et al., 2012; Fisher et al., 2013). Other studies found that Black women are more likely to have hypertension (Bateman et al., 2012; Hertz, Unger, Cornell, & Saunders, 2005) and American Indian/Alaska Native women are 1.4 times more likely than White women to be diagnosed with gestational diabetes (Urban Indian Health Institute Seattle Indian Health Board, 2016).

Short gestation, low birthweight and maternal complications have consistently been among the leading causes of infant mortality (Mathews et al., 2015; Singh & van Dyck, 2010). Schempf, Branum, Lukacs, & Schoendorf (2007) found that almost 80% of the Black-White infant mortality gap in 1990 and 2000 can be explained by excess deaths among preterm Black infants and that the 4 times higher rate in extremely preterm birth for Black infants accounted for more than half of the infant mortality gap. The increased risk of death for infants born prematurely or low birth weight is linked to the mother's health as these infants are more likely to be born to mothers with health conditions such as hypertension and untreated diabetes mellitus (Premkumar, Henry, Moghadassi, Nakagawa, & Norton, 2016; Bramham et al., 2014; Clausson, Cnattingius, & Axelsson, 1998; Catov, Nohr, Olsen, & Ness, 2008; A. P. Sunjaya & A. F. Sunjaya, 2018; Ruager-Martin, Hyde, & Modi, 2010; Kung, Hoyert, Xu, & Murphy, 2007).

[5] https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services

While the risks of preterm birth and inadequate fetal growth increase for all hypertensive women, Black women have been found to have higher rates of hypertension than women of other races and Black women with hypertension had higher odds (3.91) of giving birth to a preterm infant compared to non-hypertensive Black women (Premkumar et al., 2016). A second study (Samadi et al., 1996) found a rate of chronic hypertension 2.5 times higher among delivering Black women compared to other women and these women were 2 times more likely than Black non-hypertensive women to have preterm deliveries and 3 times more at risk for antepartum hemorrhage. Unfortunately, due to the limited literature focusing on American Indian/Alaska Native women, we were not able to identify literature directly linking inequitable birth outcomes to inequities in health conditions experienced by American Indian/Alaska Native mothers. The literature did, however, identify that American Indian/Alaska Native women had higher rates of health conditions such as obesity (Fisher, Kim, Sharma, Rochat, & Morrow, 2013; Small et al., 2012) and gestational diabetes (Urban Indian Health Institute Seattle Indian Health Board, 2016).

Summary

The pathway described here illustrates one theme of how racism functions as a root cause of inequitable birth outcomes for Black and Native American women and infants, tracing the pathway through the levels of the social-ecological model. The pathway begins with public policies that have shaped the racial geography and economic deprivation of African American and Native American communities, as well as the history of health policy that shapes insurance coverage and health care access today. These histories map onto the community level, resulting in barriers to accessing health care for many Black and Native American women. Barriers to health care are exacerbated by racial discrimination in healthcare systems and from individual care providers. The end result is that Black and Native American women experience more medical conditions, leading to poorer maternal health, which in turn leads to higher rates of low birth weight, premature births, infant mortality, and maternal morbidity and mortality. The next section of the literature review provides information on the second major theme our review identified, which is the impact of racism, adverse childhood experiences, and psychosocial stress on birth outcomes.

Theme Two: Racism, Adverse Childhood Experiences, and Psychosocial Stress

The other common thread throughout the literature on racial inequities in birth outcomes is the impact of Adverse Childhood Experiences (ACEs) and psychosocial stress on maternal and infant health, and how factors at each level of the social--ecological model contribute to ACEs and stress. ACEs are traumatic events occurring before the age of 18 that cause health problems and induce psychosocial stress throughout the lifespan (see Figure 2).[6] Psychosocial stress is stress experienced when an individual is exposed to traumatic social interactions that go beyond their capacity to cope.[7] Chronic exposure to stressful situations causes an increase in allostatic load – an index of the 'wear and tear' on the body (McEwen & Stellar, 1993). The greater the allostatic load, the greater the body's inability to manage the physiological and psychological effects of stress (McEwen, 1998). Since ACEs activate the body's stress response system, as the number of ACEs increases so does the allostatic load causing greater

[6] Retrieved from http://www.cdc.gov/violenceprevention/acestudy/about.html

[7] Some key examples of stressful social situations are health problems, death of a loved one, abuse, and financial instability.

vulnerabilities to stress-related diseases (Wallace & Harville, 2013; refer to *Individual Level* on pp 14-15 for specific negative health outcomes for women).

Figure 2. Association Between ACEs and Negative Health and Behavioral Outcomes

Image source: https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/aboutace.html

Black children (Slopen et al., 2016) and Native American children (Kenney & Singh, 2016) experience ACEs at a greater rate than White children. Specifically, living in poverty and chronic exposure to racism (*societal level*) are reported more than any other ACE, followed by witnessing neighborhood violence/domestic violence (*community level*), experiencing temporary economic hardships (*institutional level*), being the victim of violence (*interpersonal*), abusing alcohol/drugs, and experiencing mental illness (*individual level*).[8,9] As adults, Black and Native American women report higher rates of exposure to stressful situations before and during pregnancy compared to White women (Lu & Chen, 2004).

Since ACEs and the frequency of exposure to stress have overlapping negative long-term effects on physical and emotional health, it is important to consider these experiences as dominant underlying factors for maternal and infant health outcomes. The linkage from childhood (ACEs and allostatic load/psychosocial stress) to adulthood (allostatic load/psychosocial stress) also allows us to fully understand the intersectionality of these risk factors. Therefore, the following sections include information about the impact of factors at each social-ecological level on infant and child health and how ACEs and/or psychosocial stress underlie these adverse health outcomes.

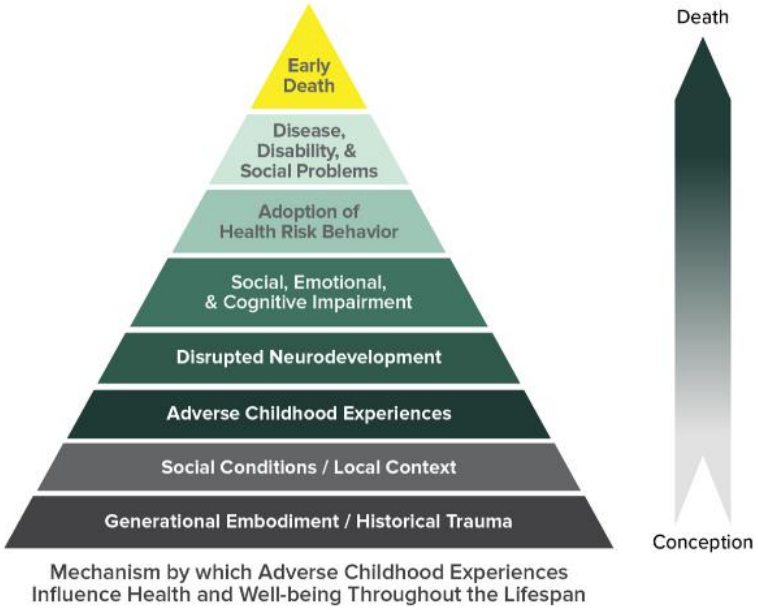
[8] For more information: Indian Health Service: The Federal Health Program for American Indians and Alaska Natives https://www.ihs.gov/dccs/mch/aces/

[9] For more information: Child Trends: https://www.childtrends.org/publications/prevalence-adverse-childhood-experiences-nationally-state-race-ethnicity

Societal Level

To adequately assess the relationship between societal inequities, ACEs, and psychosocial stress, we must link it to generational embodiment/historical traumas (refer to pp. 6-7) and the structure of our current society. Psychosocial stress is prominent at the societal level due to the disadvantages imposed by structural racism on people of color. Structural Racism is the normalization of historical, cultural, institutional and interpersonal policies and practices that tend to lend advantages to White people resulting in adverse health outcomes for people of color (Lawrence & Keleher, 2004). Structural racism can be gauged by inequalities in power, access, opportunities, treatment during social interactions (e.g., substandard patient experiences), and policies (for more details refer to pp. 5-7). Structural racism imposes a hierarchical structure on society that perpetuates a cycle of poverty and manifests as disparities in health outcomes, particularly in maternal and infant mortality (Bailey et al., 2017). As generational embodiment/historical traumas relate to this literature review, the root cause - racism - mediates racial disparities in maternal and infant health (Lawrence & Keleher, 2004; Wallace et al., 2013). Essentially, structural racism negatively impacts maternal and infant health at all levels of the social-ecological model.

Figure 3. Association Between ACEs and Negative Outcomes Throughout the Lifespan[10]



The hierarchical structure of the social-ecological model suggests that health outcomes are influenced by societal conditions. Racial and social inequities are the root causes of health disparities across the lifecourse, and these inequities become embodied and internalized across racial groups and within individuals (Gravelee, 2009). Structural policies such as segregating Black people and displacing Native Americans led to higher occurrences of ACEs compared to White people. Black people and Native Americans are also disproportionately impacted by the frequency of experiencing psychosocial stress through chronic exposure to racism. Both racial groups experience social inequities in various contexts and frequencies leading to a cumulative exposure effect over the lifecourse. Indirect (e.g., institutional racism) and direct (e.g.,

[10] Image source: https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/aboutace.html

interpersonal racism) exposures to social inequities result in racial groups embodying or internalizing the *belief* of being socially unequal (Krieger, 1999). These elevated risks for adverse health outcomes are important to keep in mind since societal policies and conditions have had long-term effects on children before birth and extending into child-bearing age for women (see Figure 3).

Two important outcomes of societal structure and structural racism that have lasting negative impacts on maternal and infant health are *poverty* and chronic exposure to *racism/discrimination.*[11] Poverty is an epidemic in the U.S. due to the intentional removal of opportunities such as new workforce developments and revitalized neighborhoods in predominantly Black communities (Grady, 2006) and in Native American communities (Dunbar-Ortiz, 2014). As such, Black women and Native American women are geographically situated in societal conditions in which stress due to poverty, discrimination and racism (*racialized stress*) is rarely avoidable. The cumulative effects of these societal conditions result in increases in allostatic load in Black women and Native American women, and an even greater increase in psychosocial stress during pregnancy (Lu & Chen, 2004; Williams, Neighbors, & Jackson, 2003). Recently it was found that increased levels of cortisol due to stress led to disruptions in neurodevelopment (see Figure 3), resulting in low infant birth weight delivery (Bowers et al., 2018). Although the ACEs reported were linked to the cumulative life-course effects of psychosocial stress, low birth weight was not directly associated with ACEs, but was highly correlated with experiencing chronic stress during pregnancy.

There is a relationship between chronic exposure to discrimination and infant and maternal mortality that can be linked to psychosocial stress (Williams et al. 2003; Krieger 1999). Recall that the higher the number of ACEs, the greater an individual's allostatic load causing greater vulnerability to stress-related- diseases. This vulnerability to disease in the mother directly impacts the health of a developing fetus. Cortisol, the hormone released during stressful situations impedes gestational growth resulting in a low birth weight delivery (Davis & Sandman, 2010) and on a smaller scale preterm birth (Gillespie, Christian, Alston, & Salsberry, 2017; Wadhwa, Entringer, Buss, & Lu, 2011). This impact on fetal development is disconcerting given that nearly 40% of Black women and Native American women report having experienced two or more ACEs before the age of 18 (Kenney & Singh, 2016; Slopen et al., 2016), and experienced racialized stress throughout pregnancy (Blackmore et al., 2016). Given that the long-term effects of traumatic experiences over the course of a mom's life not only affect her health but also the health of her infant (Blackmore et al., 2016), this confirms the cyclical and intergenerational effects of structural racism on health outcomes proposed by Lawrence & Keleher in 2004. More specifically, the biological and intergenerational effects of chronic exposure to racism and poverty span the life course of an individual.

To establish a time line, children born premature or to parents with chronic exposure to stress (e.g., race, class, or gender oppression) have a more difficult time with emotional regulation (Karolis, Froudist-Walsh, Kroll, Brittain, Tseng, et al., 2017), and have a greater likelihood of feeling like a second-class citizen throughout childhood and into adulthood (Krieger, 1999; Utsey, et al., 20008). These feelings of low self-worth negatively impact parenting behavior and parent modeling (Bowers & Yehuda, 2016). All of which are exacerbated by the psychosocial stress of living in poverty and chronic exposure to racism throughout the life course of an

[11] Recall that poverty and chronic exposure to racism are reported by Black people and Native American people more than any other ACEs.

individual (Kwata, Valdimarsdottir, Guevarra, & Bovbjerg, 2003; Nazroo, 2003) resulting in an intergenerational transmission of poverty. Intergenerational transmission of poverty is the long-term effects of poor nutrition, inadequate education and health care, few assets (see *redliing* in Theme 1, page 8-9) or a lack of opportunities (Bailey, Krieger, Agenor, Graves, Linos, & Bassett, 2017). These are defining characteristics that underlie negative maternal and infant health outcomes. In general, the interactions of social inequities with race, class, and gender are greater contributors to psychological distress than generalized stressful life events (Utsey, Giesbrecht, Hook, & Stanard, 2008).

Community Level

Since Black women and Native American women report experiencing poverty and chronic exposure to racism more than any other ACE, we should address how structural racism impacts maternal and infant health at the community level. Community-level factors, such as concentrated poverty, increase the frequency of psychosocial stress and the number of ACEs. At the community level, Black people and Native American people most frequently reported witnessing neighborhood violence/domestic violence as their top ACE. Living in areas of concentrated poverty is significantly correlated with witnessing neighborhood/domestic violence in both Black communities (Felker-Kantor, Wallace, & Theall, 2017) and Native American communities (Brockie, Dana-Sacco, Wallen, Wilcox, & Campbell, 2015). Witnessing violence increases the odds of low birth weight delivery (Blackmore et al, 2016). One of the structural mediators of the association between neighborhood violence and low birth weight delivery is residential segregation (Lawrence & Keleher, 2004) which has a substantial impact on infant and maternal health. Women living in racially segregated neighborhoods are more likely to be impacted by neighborhood disadvantages such as concentrated poverty, unequal housing conditions, dilapidated buildings, and environmental toxin exposures.

The isolation of Black individuals from White neighborhoods has been linked to higher incidences of intrauterine growth retardation (Grady & Darden, 2012). It is also important to note that while various studies have shown negative impacts due to living in residentially segregated neighborhoods, a 2017 Kothari et al. study found that there is some protection around infant birth weights for higher-SES Black women living in racially congruous neighborhoods. The study found that higher-SES Black women living in disproportionately Black neighborhoods had almost identical rates of low birth weight infants as higher-SES White women living in disproportionately White neighborhoods (4.0% and 4.1% respectively). At the same time, higher-SES Black women living in White neighborhoods had the highest rates of low birth weight (14.5%). The study's findings support that residential racial congruity may mitigate low birthweight risk possibly through more social supports for mothers and an increased sense of well-being. Racial incongruity, on the other hand, may increase low birthweight risk due to a greater sense of social isolation and the stress that accompanies isolation.

Increased quality of housing and access to safe green spaces for exercise and play have been shown to decrease the amount of stress experienced throughout the life-course of an individual. This includes increasing the availability of and access to healthy foods, safe environment, stable housing, and the availability of and access to quality health care. More importantly, there is neurological evidence that shows when the amount of stress is removed over the life-course of an individual, the allostatic load decreases and has positive impacts on the overall health of one's family (Shapiro, Fraser, Frasch, & Séguin, 2013), reducing the direct intergenerational impacts of racism. Therefore, there is opportunity for improving maternal and infant health outcomes through community change.

Institutional Level

As previously stated, segregation of Black people and displacement of Native American people severely limited and restricted access to adequate socioeconomic resources (e.g. lack of available jobs that lead to economic hardship and the removal of opportunities to acquire wealth and pass it on to their children – the intergenerational accumulation of assets) and to adequate health care which led to conditions such as neighborhood blight, and removed opportunities for community development and individual growth, which is an example of institutional racism (Bailey, Krieger, Agenor, Graves, Linos, & Bassett, 2017; Feagin & Bennefield, 2017). Institutional racism is a practice that emerges from structural racism and is put into practice by social and political institutions (e.g., work, health care providers, law enforcement and education). More specifically, it is discriminatory treatment that reinforces the current structure of society by promoting attitudes, practices, beliefs, and policies that give advantages to White people and disadvantages to people of color.

The impact of institutional racism on maternal and infant health is an area that is still quite understudied. Most research on institutions has focused on the healthcare system (see *Institutional Level* on pg. 12). However, there has been some research on workplace discrimination. For example, stress related to racial discrimination in the workplace was found to impact infant birth weight (Collins et al., 2004). The study found that Black women that had low birth weight infants and whom were working outside the home were more likely to report racial discrimination in the workplace than women who did not have a low birth weight infant.

One reason institutional racism is understudied is due to a lack of valid and reliable self-report measures (Krieger, Smith, Naishadham, Hartmen, & Barbeau, 2005). Participants are less likely to report or name a negative experience to be the result of institutional racism, because it is often invisible or difficult to see without knowing how others are treated (e.g., lower salary than coworkers, being denied a mortgage or rental home on the basis of race). Individuals are much more likely to identify an interpersonal interaction as racism.

Interpersonal Level

In 2002, at the request of Congress, the Institute of Medicine assessed the degree to which differences in quality of health care are related to discriminatory clinical practices. The Institute of Medicine found that the unequal quality of health care patients received was not due to access to care, having insurance, or having the ability to pay, but instead to racist healthcare policies (Nelson, 2003). This is due to the reluctance in healthcare systems to identify and assess racism and everyday discrimination as a root cause of stress-related health inequities (Glurgescu, McFarlin, Lomax, Craddock, & Albrecht, 2011; Prather, Fuller, Marshall, & Jeffries, 2016).

Stress from everyday discrimination has been shown to lead to increased depressive symptoms, pregnancy distress, and pregnancy symptoms, which are associated with low birth weight. In one study, Black mothers who delivered preterm, low-birth-weight infants were more likely to report experiencing interpersonal racial discrimination in public settings within the past year than Black mothers who delivered term non-low-birth-weight infants (Rankin et al., 2011). Two other studies (Carty, Kruger, Turner, Campbell, DeLoney, & Lewis, 2011; Collins et al., 2004) also found that stress related to interpersonal racism increased the odds of women having low birth weight infants (Carty et al., 2011; Collins et al., 2004). Additionally, a 2017 Mutambudzi et al. literature review found that lifetime, vicarious childhood and adult

discrimination, and discrimination during pregnancy were associated with low birth weight and preterm delivery.

Maternal stress due to everyday discrimination uniquely contributes to adverse maternal and infant outcomes in Black women and Native American women (Hartmann, Wendt, Burrage, Pomerville, & Gone, 2019; Lu & Chen, 2004; Palacios & Portillo, 2009; Rosenthal & Lobel, 2011). These unique sources of trauma and stress have lifelong consequences in Black and Native American women and can manifest in the form of chronic disease and engaging in risky behaviors.

Individual Level

At the individual level, much of the attention given to maternal and infant mortality in research, medicine, and public health has focused on the effects of chronic disease (e.g., obesity) and engaging in risky behaviors (e.g., smoking). However, in order to understand the whole picture, we must look at social inequities (Bay Area Regional Health Inequities Initiative, 2015)[12]. In the last ten years, more research has been conducted to target specific risk factors related to chronic comorbidity with respect to individual differences (e.g. Creanga et al., 2014). This includes maternal race, ethnicity, age, and socioeconomic status – the whole individual as they are situated within the social-ecological model.

To take a deeper dive into disparities in maternal risk and addressing the whole individual, ACEs data should be gathered from mothers. A recent study found that accumulation of cortisol is a known mediator of how a person responds to stressful situations (Bowers et al., 2018). Maternal cortisol and experiences of stress during pregnancy affect the development of the fetus which in turn increases the likelihood of low birth weight (Davis & Sandman 2010). The accumulation of cortisol is greatest among mothers who experience chronic exposure to adverse experiences before the age of 18 (ACEs). The effects of ACEs on prenatal health were observed for Black and White moms suggesting that chronic exposure to stress leads to high levels of cortisol accumulation, which in turn causes low birthweight delivery. There are notable limitations with this study - small sample size across racial groups. Regardless this same conclusion came from a study with a larger sample size - Blackmore et al. (2016) with regard to timing of exposure. This study looked at the effects of traumatic experiences over the course of a mom's life. Adverse childhood experiences before the age of 18 increased a mom's likelihood of being depressed and/or anxious during pregnancy which in turn led to a higher rate of having a low birthweight delivery.

Early traumatic experiences can also lead to a phenotypic (i.e., physical, observable) increase in chronological age/weathering, where chronological age and biomedical age do not match (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006; Hogue et al., 2005; Palacios & Portillo, 2009). This causes women to be more vulnerable to stress-induced neuroendocrine (cortisol)/ inflammatory pathways which manifests as young people having health conditions that typically emerge much later in life and can cause preterm births (Hogue & Bremner, 2005; Paul et al., 2008) and low birth weight (Geronimus, 1996). There is also a significant association between ACEs and changes in neurological pathways – the pathways that regulate how our bodies fight disease and respond to stress (McEwen, 2000; Shapiro et al., 2013). To effectively

[12] For more information: http://barhii.org/framework/

understand how this impacts racial inequities in birth outcomes, other underlying factors need to be considered, such as the impact of maternal age.

Maternal age impacts maternal mortality, maternal morbidity, and infant mortality regardless of race. Older women are at a higher risk due to an increase in maternal health factors (Fisher et al, 2013; Khalil et al., 2013) and increased likelihood of having a Cesarean-section (Clark et al., 2008; Clark, Christmas, Frye, Meyers, & Perlin, 2014; Timofeev et al, 2013). These studies argue that maternal age should be combined with other maternal factors when considering adverse birth outcomes since it is a key underlying determinant in morbidity and mortality. More recent studies have shown that age is not solely accountable for increases in maternal mortality and morbidity, but other factors such as social determinants of health are greater contributors to this increased risk (Nelson et al., 2018). Nelson found that changes in chronic diseases before, during, and after pregnancy were the greater contributors to increased maternal mortality risk, and the most salient risk factors were related to the timing of social determinants of health. Another outcome of prolonged exposure to psychosocial stress is substance abuse, such as smoking, drinking and using drugs. Engaging in these behaviors during pregnancy has been well documented and shown to increase the likelihood of infant mortality (Gorman, Orme, Nguyen, Kent, & Caughey, 2014).

The degree to which prolonged exposure to stress enhances the likelihood of adverse birth outcomes for both mother and child is variable (Goldenberg et al., 1996; Lu & Chen, 2004) and highly dependent upon the frequency of the psychosocial stressors (Blackmore et al., 2016; Palacios & Portillo, 2009). Regardless of variability, racism is a major source of chronic stress for Black and Native American women and contributes to adverse birth outcomes, which essentially points to social and health disadvantages occurring throughout the life-course of an individual (Cronholm et al., 2015).

Summary

ACEs and psychosocial stress serve as mediators of the effect of racism on birth outcomes and have overlapping negative long-term effects on physical and emotional health through their impact on the body's ability to manage the effects of stress and to fight disease. Black and Native American women bear a greater burden of ACEs and psychosocial stress than their White counterparts due to factors at each level of the social ecological model. For example, policies and practices that create isolated, deprived communities result in Black and Native American women being more likely than White women to be geographically situated in conditions where stress due to poverty, discrimination and racism is rarely avoidable. Black and Native American women are more likely than White women to experience discrimination in healthcare systems and in the workplace, and to experience a lifetime of interpersonal discrimination. All these experiences of ACEs and psychosocial stress lead to higher levels of cortisol and a greater allostatic load (an index of the 'wear and tear' on the body) that impact the health of the woman and child, both before and after birth.

Strategies & Recommendations

This review of the literature has illustrated the role of racism as a root cause of inequities in birth outcomes, and the importance of understanding factors across the levels of the social-ecological model that impact maternal and infant mortality for Black and Native American women. Once these factors are identified, we can focus our work on addressing factors at the broader levels of the social-ecological model to better address root causes. In other words, we

can enact structural change. This area of the literature is still in development, but we were able to identify a handful of examples of institutional, community, and societal level strategies for addressing infant and/or maternal health. These can be divided into empirical research and recommendations.

Empirical Research on Societal, Community, and Institutional Strategies

Societal Level

Several articles evaluated the impact of policies and programs at the societal level on maternal and/or infant health outcomes. An evaluation of the impact of state minimum wage laws on low birth weight and infant mortality (Komro, Livingston, Markowitz & Wagenaar, 2016) found that increased state minimum wages are associated with a reduction in low birth weight births and infant deaths. An evaluation of Medicaid expansion (Brown et al., 2019) found larger reductions in low birth weight and preterm birth rates among Black infants in expansion states in relation to white infants in expansion states. There also were significant improvements in relative disparities for Black infants compared with White infants in states that expanded Medicaid versus states that did not. A second evaluation of Medicaid expansion (Bhatt & Beck-Sague, 2018) found that while infant mortality rates declined in both Medicaid expansion and non-Medicaid expansion states, the decline in Medicaid expansion states was more than 50% greater than in non-Medicaid expansion states. The declines and differences in mean state infant mortality rates by Medicaid expansion were greatest in African American infants, substantially reducing the infant mortality rate racial disparity.

Komro, Markowitz, Livingston, & Wagenaar (2018) evaluated the effects of the Earned Income Tax Credit (EITC) on birth outcomes (low birth weights) across race and ethnic subgroups. The study found that the EITC had beneficial effects across race and ethnic subgroups, but found larger effects for Black mothers with a high school education or less. It is to be noted that given their higher baseline rate, that the relative percent reduction is similar among Black and White mothers. The study found that states with the most generous state EITCs had nearly 12% reductions in low birth weights for Black and White mothers. An evaluation of rural Mexican conditional cash transfer programs, social programs that provide money to poor individuals that engage in healthy promoting behaviors (Barham, 2011), found a 17% reduction in the infant mortality rate for participants. Williams & Cooper (2019) discussed that research has identified that states with more generous policies supporting the well-being of vulnerable populations (i.e. Temporary Assistance to Needy Families, Medicaid), policies providing families with additional income, greater investment in areas benefiting children, such as education, and policies increasing access to health care (i.e. Affordable Care Act) lead to better health outcomes, including lower death rates and increased birth weights.

Community Level

Sparks, Faust, Christens & Hilgendorf (2015) looked at the impact of organizational collaborations in addressing Black infant mortality rates at the community level. The authors found that organizations played a key component in successfully addressing disparities in infant mortality. The study found that in the 1990s there was interorganizational collaboration among funders and organizations in Madison, Wisconsin that focused on obtaining better health outcomes. Funders and decision makers committed to providing financial support, organizations worked together to align and coordinate services, and organizations shifted their philosophies and orientations to address all needs of families (including needs outside of health care). This

shared vision and alignment led to a decrease in the Black infant mortality rate during this time period. Conversely, in the mid 2000s, the study found that the dissolution of the interorganizational collaborative corresponded to an increase in the Black infant mortality rate. This article demonstrates that individual organizational changes in philosophies and orientations to address all familial needs at the institutional level and organizational collaborations and service alignment at the community level lead to an environment where a broader array of aligned services are able to more fully address the needs of their families and decrease disparities in infant mortality.

Institutional Level

Dubus & Traylor (2015) looked at the health system of Cuba, because the infant mortality rate is lower than the United States (6 in 1,000 compared to 8 in 1,000) despite having fewer resources. The article looked at the Cuban healthcare model for elements of the model that are successful in achieving lower infant mortality rates. These elements of the Cuban healthcare system included universal and accessible health care, integration of healthcare systems, holistic and comprehensive services focused on the health care and social services needed by patients (i.e. dentistry, nutrition, social work, mental health, and family care), continuity of care, and a focus on prevention and health promotion.

A 2015 Webinar presentation (Wisdom, Parker, Jones & Tan-McGrory) provided information on the impact of the Robert Wood Johnson (RWJ) University Hospital's diversity and inclusion strategy, which focused on expanding diversity and inclusion efforts throughout the health system. Impacts of this strategy included 22% of the RWJ Health System's Board being comprised of racial and ethnic minorities, 15% of organization goals being diversity focused, 34% increase in executive leadership diversity, implementation of annual mandatory diversity trainings for leaders and new employees, implementation of mandatory culturally competency training for all nursing staff, 50% decrease in readmissions of low-income patients through the Delivery System Reform Incentive Payment program, engagement of LEAN Six Sigma Project to improve collection of race, ethnicity, and language data, and serving nearly 50,000 individuals through targeted education and disease management programs for diverse populations.

Multi-Level

Kruger, French-Turner & Brownlee (2013) looked at an intervention addressing birth outcomes disparities at multiple levels of the social-ecological model. The Racial and Ethnic Approaches to Community Health (REACH) coalition intervention in Flint, MI focused on fostering community mobilization, reducing racism, and enhancing the maternal–infant healthcare system. The authors evaluated the impact of REACH's Community Windshield Tours, which were tours of the Flint, Michigan community for healthcare system staff that examined the environmental conditions and experiences of children, mothers and families at risk for poor birth outcomes. The purpose of the tours was to raise awareness of social and environmental barriers to health care among healthcare system staff in Flint, many of whom were not familiar with the community or the barriers their patients faced on a daily basis. The evaluation of these tours found that at the community level, a partnership was established between the Community Health Network and REACH, leading to patient service referrals and check-ins on patients missing prenatal appointments. The tours have also led to additional physician trainings on cultural understanding and physicians participating in REACH programs. At the institutional level, the tours increased familiarity with the Flint community and health care provider participants reported changes in knowledge, beliefs, and behaviors.

Recommendations for Societal, Community, and Institutional Strategies

In addition to empirical research on specific strategies, the literature review also identified several articles that provided recommendations on addressing maternal and infant health outcomes at the higher levels of the social-ecological model. As Cooper et al. (2015) explain, because health disparities are complex and multifactorial, interventions need to be multi-level and involve stakeholders at multiple levels. The following provide some recommendations for action at each level (societal, community, and institutional).

 *Societal Level*

At the societal level, recommendations focused on eliminating discriminatory policies, ensuring that health policy incorporates and addresses historical racial and ethnic inequalities, and increasing access through healthcare policies. The Health Policy Institute of Ohio (2019) provided a list of recommendations to the Ohio Legislative Service Commission focused on reducing infant mortality and achieving equity. One recommendation at the societal level was to acknowledge and address racism and discrimination through eliminating discriminatory policies and practices, such as discriminatory housing practices and policies leading to residential segregation (i.e. redlining). Williams & Mohammed (2009) recommended that health policy needs to encompass the legacies of racial and ethnic inequalities and levels of intolerance as the stress related to discrimination negatively impacts health outcomes. Lu, Kotelchuck, Hogan, Johnson, & Reyes (2010) outline the need for policies to focus on addressing social and economic inequities, including poverty, the education gap, childcare, and parental leave.

Lu et al. (2010) also discussed improving health care access for women through expanding Medicaid to cover preconception care and mandating or subsidizing job-based health insurance coverage of preconception care. The authors submit that a national insurance program is the surest way to increase access to preconception care. Sequist et al. (2011) call for increased funding to the IHS to achieve parity in resources available for Native American health care delivery. Kozhimannil, Hardeman, Attanasio, Blauer-Peterson & O'Brien (2013) recommended that Medicaid programs consider offering coverage for birth doulas. The authors conducted a study looking at childbirth-related outcomes for Medicaid recipients who received childbirth support and prenatal education from trained doulas. The study found a lower c-section rate of 22.3% for births supported by a doula compared to a 31.5% c-section rate for Medicaid births nationally. After controlling for clinical and sociodemographic factors, the odds were 40.9% lower for a c-section in a doula-supported birth. It was also found that preterm birth rates were 6.1% for births supported by a doula and 7.3% for Medicaid births nationally.

Cooper et al. (2015) identified that assessments of social policy interventions on health and health equity outcomes are needed. This article discussed the need for new approaches, such as Health Impact Assessments, which is a data-driven approach that identifies potential health consequences of new policies or decisions. This process allows for research and stakeholder engagement to help create practical strategies to enhance health benefits and minimize adverse effects of a policy or decision. The article also recommends using a social determinants framework for disparities interventions and a "health in all policies" approach to policy interventions targeting socioeconomic disadvantage and expanding efforts to dismantle historical and contemporary drivers of stigmatization and discrimination.

Community Level

At the community level, recommendations focused on improving the infrastructure of residentially segregated communities, enhancing service coordination, and fostering collaborative relationships. Organizational and transdisciplinary collaborations were recommended to consider the impact of societal level policies on population health and invest in residentially segregated and deprived areas to improve the economic circumstances of marginalized families (Williams & Jackson, 2005), to prioritize community engagement and equity in intervention ownership between community and researchers to maximize outcomes and sustainability (Cooper et al., 2015), and leverage innovative public-private partnerships across sectors (Health Policy Institute of Ohio, 2019).

Lu et al. (2010), Williams & Cooper (2019), and the Healthy Policy Institute of Ohio (2019) recommend investing in community building and urban renewal through economic, infrastructure and political development. Suggested strategies include investing in employment opportunities for people of color, increasing the availability of affordable and decent housing, creating safer neighborhoods, access to parks and recreation, access to clean air and water, quality health care, building community networks, increasing awareness of racial inequities, mobilizing civic participation, and building individual and community political capacity. Furthermore, Lu et al. (2010) call for strategies to close the education gap through equitable education funding, as well as programs for early childhood development, after-school and summer programs, and school-community clinics. The Health Policy Institute of Ohio (2019) recommends educational programs to reduce barriers to high school graduation and postsecondary education.

Other recommendations at the community level include improving access to care to decrease maternal mortality (Young & Chen, 2018) and creating reproductive social capital (i.e. connectedness between a pregnant woman and her community) through programs such as One Hundred Intentional Acts of Kindness toward a Pregnant Woman, where pregnant women identified actions that friends, family and strangers could take to help make their pregnancies better and these suggestions were posted throughout their community (barber shops, churches, etc.). Lu et al. (2010) propose that strategies enhancing the coordination of multiple social services and the integration of systems focused on serving pregnant women would allow for women to access comprehensive and connected services. This would help decrease stress and duplication and increase access and efficiency for women with limited time and resources.

Institutional Level

At the institutional level, recommendations included improving medical system practices and procedures and increasing health workforce diversity. Several articles argued for better enforcement and incentivizing of evidence-based guidelines and adherence to national standards of care (Williams & Jackson, 2005; Young & Chen, 2018; Howell & Zeitlin, 2017). Others recommended ensuring and improving quality maternal care through health screenings, management of risks for women with preeclampsia or gestational diabetes, and addressing antenatal and delivery care factors impacting maternal morbidity rates at hospitals with higher Black infant delivery rates (Young & Chen, 2018; Lu et al, 2018; Michigan Department of Health and Human Services, 2018; Howell, 2016).

Other articles recommended that medical systems improve communication and provider coordination procedures (Cooper et al., 2015; Young & Chen, 2018) and require staff credentialing (Howell & Zeitlin, 2017). Training recommendations to improve the knowledge of

all health workforce employees included cultural competency (Lu et al., 2010; Howell & Zeitlin, 2017), implicit bias, root causes of peripartum racial and ethnic disparities, and team trainings on the provision of coordinated care (Howell & Zeitlin, 2017). Recommendations also included increasing health workforce diversity and addressing barriers for individuals of color to access medical training (Williams & Jackson, 2005; Lu et al., 2010; Chalhoub & Rimar, 2018; Williams & Cooper, 2019).

Chalhoub & Rimar (2018) suggest the use of health systems records that self-identify race, ethnicity, and primary language, and Howell & Zeitlin (2017) suggest hospitals implement a disparities dashboard which stratifies quality metrics by race and ethnicity. Williams & Cooper (2019) recommend addressing the social determinants impacting patients by incorporating patient screenings in healthcare systems and coordinating with social workers and other professionals providing social services. Also, patients, families, and staff should be provided a clear way to report inequitable care or disrespect (Howell & Zeitlin, 2017), and hospitals and clinics should build a safety culture focused on non-judgmental approaches to adverse outcomes and event reviews (Howell & Zeitlin, 2017). Additionally, healthcare organizations should utilize best practices for shared decision-making with patients regarding health care decisions (Chalhoub & Rimar, 2018).

Several of these recommendations are echoed in Fetal Infant Mortality Review reports across Michigan. The counties with current FIMR teams include: Berrien, Calhoun, Genesee, Ingham, Jackson, Kalamazoo, Kent, Macomb, Muskegon, Oakland, and Saginaw counties, City of Detroit, and Inter-Tribal Council of Michigan. The purpose of these teams is to conduct an evidence-based process of identification and analysis of factors that contribute to fetal and infant death through chart review and interview of individual cases. Every year they develop reports sharing strengths and recommendations for improvement to maternal infant service systems and community-based resources. The ABEST team reviewed the most recent FIMR reports, and identified common themes in suggestions that were focused on social determinants of health or root causes. Among the suggestions were expanding Title X services to meet family planning needs, improving Medicaid non-emergency medical transportation, and implementing shared decision-making processes in healthcare institutions.

In addition to the strategies and recommendations focused on medical systems, other recommendations focused on the education and social services systems. Education system recommendations included increasing access to high quality early childhood initiatives (Williams & Cooper, 2019; Lu et al., 2010) and decreasing educational disparities through programs increasing literacy and graduation rates and increasing access to post-secondary education (Lu et al., 2010; Health Policy Institute of Ohio, 2017). Social services system recommendations included increasing access to and reducing duplication of family support services (e.g. childcare, financial supports, etc.) through the integration and coordination of services (Lu at al., 2010).

Conclusion

Black and Native American women and infants experience the largest disparities in maternal and infant mortality, both nationally and in Michigan. In Michigan, the maternal mortality rate for Black women is two times higher than for White women (MDHHS, 2018), and Black and Native American infant mortality rates are three times higher than White rates (MDHHS, 2018). A growing body of literature points to racism (systemic, institutional, and interpersonal) as a root

cause of these inequities (Collins et al., 2004; Earhshaw et al., 2013; Grady & Darden, 2012; Lu & Halfon, 2003; Mutambudzi et al., 2016; Rankin et al., 2011; Wallace et al., 2017).

This literature review brought together the research on maternal mortality, maternal morbidity, infant mortality, and leading causes of infant mortality (e.g., low birth weight, prematurity), organizing the literature into a framework that can support greater understanding of root causes and the role of structural oppression in birth inequity: the social-ecological model (Bronffenbrenner, 1979; McLeroy, Bibeau, Steckler, & Glanz, 1988). Furthermore, the literature review identified two themes regarding the impact of racism on negative birth outcomes for women and infants: *Racism and Access to Quality Health Care* and *Racism, Adverse Childhood Experiences, and Psychosocial Stress.*

The theme of *Racism and Access to Quality Health Care* describes how public policies have shaped the racial geography and economic deprivation of African American and Native American communities, which has resulted in barriers to accessing health care (e.g., lack of quality healthcare facilities in the community). The barriers to access in the community are made worse by experiences of racial discrimination in healthcare systems and from individual care providers. The end result is that Black and Native American women experience more medical conditions, leading to poorer maternal health, which in turn leads to higher rates of maternal mortality and morbidity, low birth weight, premature births, and infant mortality.

Within the theme of *Racism, Adverse Childhood Experiences(ACEs), and Psychosocial Stress,* research has illustrated how ACEs and stress have overlapping negative long-term effects on physical and emotional health through their impact on the body's ability to manage the effects of stress and to fight disease. For Black and Native American women, the chances of experiencing ACEs and psychosocial stress are greater than for White women due to inequities at the societal, community, institutional, interpersonal, and individual levels. This indicates the importance of understanding ACEs and stress as mediators of the effect of racism on birth outcomes, and as dominant underlying factors for maternal and infant mortality.

The goal of this literature review has been to help readers understand the role of racism as a root cause of racial inequities in maternal and infant mortality. We hope it will create inspiration to look for connections between the different levels of the social-ecological model to discover more ways in which racism impacts birth outcomes. Armed with this information, we can all push our maternal child health work upstream to address root causes and eliminate racial inequities in maternal and infant health.

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