

INEQUITIES IN MATERNAL AND CHILD HEALTH:

An Analysis of Policy, Practice, and
Social Determinants over the Life-course

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Glossary of Acronyms and Terms

Acronyms

ACA	Affordable Care Act
HRSA	Health Resources and Services Administration
IMR	Infant Mortality Rate
LBW	Low Birthweight
MCH	Maternal and Child Health
OECD	Organization for Economic and Co-operative Development
PCC	Preconception Care
PTB	Preterm Birth
SES	Socioeconomic Status
VLBW	Very Low Birthweight

Terms

Allostasis:	The ways in which the cardiovascular system responds to resting and active states of the body.
Infant Death:	Death of an infant younger than age 1.
Infant Mortality Rate:	The number of infant deaths per 1,000 live births.
Live Birth:	In Maryland, the complete expulsion of a human fetus from its mother's body regardless of length of gestation, and if, after the expulsion or extraction, the fetus breathes or shows any other signs of life including breathing, voluntary movement, whether or not the umbilical cord is cut or the placenta is removed.
Low Birthweight:	A live birth of an infant weighing less than 2500 grams (5.5 pounds)
Maternal Death:	Deaths due to pregnancy, childbirth and the puerperium occurring either during pregnancy or within 42 days of delivery or termination of pregnancy.
Maternal Mortality Rate:	Number of maternal deaths per 100,000 live births.
Neonatal Death:	Death of an infant under 28 days of age.
Neonatal Mortality Rate:	Number of neonatal deaths per 1,000 live births.
Post Neonatal Death:	Death of an infant between 28 days and 1 year.
Post-neonatal Mortality Rate:	Number of infant deaths between 28 days and 1 year per 1,000 live births.
Very Low Birthweight:	A live birth of an infant weighing less than 1,500 grams (3.3 pounds)

Introduction

Infant mortality rate (IMR) is the number of infant deaths per 1,000 live births among infants under age one.¹ This important indicator measures the health of a nation, as well as a range of complex factors including maternal health, access and quality of prenatal care, and socioeconomic risks.² The United States ranks 26th in infant mortality out of the 29 Organisation for Economic Co-operation and Development (OECD) countries,³ and Maryland ranks 21st out of 50 states.⁴ High infant mortality rates are cause for concern about the current and future health of the Nation and the State. Racial disparities in IMR are also troubling.⁵ Nationally, the IMR for non-Hispanic Blacks is 12.2 deaths per 1,000 live births – 2.5 times the rate for non-Hispanic Whites and Hispanics.⁶ In Maryland, the African-American infant mortality rate of 10.6 is more than two times greater than the rates for White non-Hispanics (4.6) and Hispanics (4.7).⁷ More work is needed to examine the social determinants experienced over the life-course that influence maternal health and adverse birth outcomes for African-Americans as well as all of America's women and children.

This paper examines the social determinants experienced over the life-course and their influence on adverse birth outcomes for Black women in Maryland. Examining the relationship between social determinants experienced over the life-course in relation to birth outcomes may help explain the health disparities and poor obstetric outcomes among African-Americans in the State. Studying the interactions between biological and physiological factors and social determinants may also help highlight the ways in which social inequality, racial discrimination, and other race biased exposures on a population level may contribute to poor health outcomes among Black women and children who continue to have worse maternal and child health outcomes compared to other racial and ethnic groups in Maryland. Finally, exploring the role of social determinants and racial inequalities may also shed light on unintended consequences of institutional level actions and policies that impact the health of African-American women and children over their life-course. Examining women's experiences of racism within the life-course model, including prior to and during pregnancy, is a step in designing and developing innovative maternal and child health (MCH) programs and strategies to address the disparities in obstetric outcomes for Black women.

To accomplish the aim of influencing future MCH policy, research, and practice, the first part of this paper gives background on Maryland and presents data on maternal and child health outcomes in Baltimore City, Montgomery County, Prince Georges County, and on the Eastern Shore. The second part of this paper gives vital statistics data on the health of mothers and infants in Maryland. The third part of this paper reviews select federal and state funded maternal and child health (MCH) programs in the counties that are under review in this paper. The final section of the paper provides a set of proposals to strengthen Maryland's policies and programs around maternal and child health.

Examining the relationship between social determinants experienced over the life-course in relation to birth outcomes may help explain the health disparities and poor obstetric outcomes among African-Americans in the State.

African-Americans have some of the worst health outcomes for mothers and children. These troubling, adverse health-outcomes warrant closer study of their causes to create innovative strategies and solutions for sustainable, positive change.



Maryland vital statistics data on infant mortality, preterm births (PTB), and low birthweight (LBW) were examined alongside the 2011 Maryland plan to improve infant mortality. Literature examining the social determinants of maternal and child health outcomes with specific attention to maternal educational attainment, socioeconomic status, pregnancy intendedness, use of prenatal care, and obstetric outcomes were also included.

Attention was given to adverse birth outcomes for three main reasons. First, infant mortality rate is a well-recognized measurement of social development and economic change over time.⁸ Second, IMR, PTB, and LBW are known to be very sensitive indicators that quickly respond to short and long term changes in healthcare, and social and economic conditions.⁹ And third, birth outcomes have lifelong implications for the health, social, and economic outcomes for individuals.¹⁰

All vital statistics presented throughout this paper are drawn from four areas in Maryland: Baltimore City, Montgomery County, Prince George's County, and the nine counties of the Eastern Shore. Counties on the Eastern Shore are: Caroline, Cecil,

Dorchester, Kent, Queen Anne's, Talbot, Somerset, Wicomico, and Worcester. Though data are presented on maternal and infant health outcomes for all groups of women, this paper primarily focuses on African-American women and children. As a group, African-Americans comprise more than 30 percent of Maryland's population, and have high exposure to social determinants associated with adverse maternal and infant health outcomes, such as poverty and environmental risk factors. Moreover, African-Americans have some of the worst health outcomes for mothers and children. These troubling adverse health outcomes warrant closer study of their causes to create innovative strategies and solutions for sustainable, positive change.

Background on Maryland

Maryland is home to some 5,928,814 residents including: 839,764¹¹ ¹² women of child bearing age, 15-44 and 367,210 children under age five.¹³ Less than 10 percent of all Marylanders live below poverty; however, 15 percent of all children under age five live below the poverty line. Though married couples and single parent households comprise the number of people living below

poverty, nearly 20 percent of families living below the poverty line are headed by a single woman.¹⁴

Maryland's population is diverse. In terms of racial distribution, 60.5 percent of the State's population is White, 30.1 percent is African-American, 6.1 percent is Asian, 0.6 percent is American Indian and Alaska Native, and

less than 0.1 percent is Native Hawaiian and Other Pacific Islander American Indian.¹⁵

Marylanders of Hispanic origin account for 9.0 percent of the population; which includes those who identify as White or Black.¹⁶

Combined, minorities make up the majority of children born in Maryland (54 percent in 2013).¹⁷

TABLES AND CHARTS

TABLE 1: Maryland Demographics, Select Regions, 2013

	Maryland Region	Baltimore City	Montgomery County	Prince George's County
Total Population				
Number	5,928,814	622,104	1,016,677	890,081
Percent	100	100	100	100
# of Children Under Age 5				
Number	367,210	41,692	66,123	59,439
Percent	6.2	6.7	6.5	6.7
# of Women of Reproductive Age				
Number	839,764	143,844	202,370	194,339
Percent	14.2	23.1	19.9	21.8
Black non-Hispanic				
Number	1,779,870	395,388	182,236	570,335
Percent	30.0	63.6	17.9	64.1
White non-Hispanic				
Number	3,216,548	178,979	489,689	131,772
Percent	54.3	28.8	48.2	14.8
Hispanic†				
Number	532,374	28,440	185,949	144,090
Percent	9.0	4.6	18.3	16.2
Other‡				
Number	432,632	21,205	168,402	54,729
Percent	7.3	3.4	16.6	6.1

†A person of Hispanic origin may be any race.

‡ Other includes American Indians and Asians/Pacific Islanders.

Source: U.S. Census Bureau

TABLE 2: Maryland Demographics, Eastern Shore, 2013

	Maryland Region	Eastern Shore	Caroline Co.	Cecil Co.	Dorchester Co.	Kent Co.	Queen Anne's Co.	Somerset Co.	Talbot Co.	Wicomico Co.	Worcester Co.
Total Population											
Number	5,928,814	452,447	32,693	101,913	32,660	19,944	48,517	26,273	37,931	100,896	51,620
Percent	100	100	100	100	100	100	100	100	100	100	100
# of Children Under Age 5											
Number	367,210	25,116	2,006	5,984	1,980	914	2,654	1,316	1,762	6,171	2,329
Percent	100	5.6	6.1	5.9	6.1	4.6	5.5	5.0	4.6	6.1	4.5
# of Women of Reproductive Age											
Number	839,764	82,617	6,063	19,062	5,632	3,433	8,012	5,047	5,676	21,887	7,805
Percent	14.2	18.3	5.9	18.7	17.2	17.2	16.5	19.2	15.0	21.7	15.1
Black non-Hispanic											
Number	1,779,870	76,583	4,831	6,907	9,207	3,055	3,419	11,352	5,043	25,387	7,382
Percent	30.0	16.9	14.8	6.8	28.2	15.3	7.0	43.2	13.3	25.2	14.3
White non-Hispanic											
Number	3,216,548	347,173	25,548	89,239	21,548	15,802	46,633	13,576	30,102	67,010	41,685
Percent	54.3	76.7	78.1	87.6	66.0	79.2	87.9	57.7	79.4	66.4	80.8
Hispanic†											
Number	532,374	19,906	1,955	4,017	1,374	848	1,645	995	2,204	5,163	1,705
Percent	9.0	4.4	6.0	3.9	4.2	4.3	3.4	3.8	5.8	5.1	3.3
Other‡											
Number	432,632	10,211	726	1,944	587	297	908	393	716	3,707	933
Percent	7.3	2.3	2.2	1.9	1.8	1.5	1.9	1.5	1.9	3.7	1.8

†A person of Hispanic origin may be any race.

‡ Other includes American Indians and Asians/Pacific Islanders.

Source: U.S. Census Bureau

Maryland's demographic diversity poses unique challenges to the State's healthcare and healthcare delivery systems. A range of health disparities in key indicators gives evidence of this strain. Data from the National Healthcare Disparities report from the Agency for Healthcare Research

and Quality shows 60 percent of disparities in quality of care measures are either not improving or degenerating over time.¹⁸ Areas of significant disparity include infant mortality, maternal mortality, cardiovascular disease, diabetes, and obesity.¹⁹ Maryland's persistently high infant mortality rates

and persistent racial disparities in infant mortality continue to pose major challenges for the State.

Several research studies have observed differences in pregnancy outcomes were attributable to a range of social determinants. These include maternal income, lifestyle, and access to social supports like kin networks that influence maternal health. Data from 2013 showed that in Maryland, 7,009 infants were born preterm and 6,080 infants had low birthweight weighing less than the standard, 2500 grams or 5.5 pounds. Poor birth outcomes impact a number of health issues including morbidity, mortality, and healthcare costs over the life-course.

Adverse outcomes such as low birthweight, for example, create an increased risk of diabetes, obesity, cardiovascular disease, and other health problems in adulthood. The number African-American children born preterm and low birthweight adds to the total population of infants starting life with increased risk for short and long term health and developmental complications. The greatest proportion of these births are African-American children. Disparities in health outcomes, particularly between non-Hispanic Black women and non-Hispanic White women and their children also calls for greater attention to the unique experiences and social conditions that contribute to adverse pregnancy and health outcomes for Black women and children.

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Review of Literature and Theoretical Framework

Unpacking and understanding the causes of adverse birth outcomes and health disparities is complex.^{20 21} Researchers have well established a relationship between maternal socioeconomic status and health outcomes for mothers and their children.^{22 23 24} These factors include maternal educational attainment,^{25 26} maternal age,^{27 28 29} and maternal marital status,^{30 31 32} but no single socioeconomic factor has been attributed to poor birth outcomes. Considering that non-Hispanic Black women tend to be more systematically exposed to factors such as poverty and food insecurity, factors which are known to negatively affect a pregnancy, it is likely that the interactions between a range of social and individual level factors including life style choice, diet, and genetics, contribute to adverse birth outcomes. Future research that examines individual behaviors and the influence of multiple social stressors and their cumulative effects over the life-course

holds potential for addressing the complex etiology influencing maternal and infant health. (Table 10)

Researchers have proposed two^{33 34} leading longitudinal models to help account for women's pre-pregnancy experiences and exposures that influence health and obstetric outcomes. The early programming model theorizes that early life exposure to a range of stressors, such as poverty, could negatively impact future reproductive health. The cumulative pathways model similarly holds that chronic accommodations to stress result in wear and tear, and decline in the body's allostatic systems, including the reproductive system.

The idea that chronic and adaptive stress may lead to increased vulnerability over the life-course is supported by a range of research evidence.³⁵ Geronimus's well-known work has examined multiple social

More research is needed to investigate and measure whether or not experiencing racism influences health outcomes and to what extent.



factors experienced over the course of a woman's life that contribute to poor pregnancy outcomes. Geronimus proposed the "weathering" hypothesis, postulating that poor birth outcomes for African-American women are due in part to the cumulative and interactive effects of experiencing racism over the life-course.^{36 37 38} Geronimus argued that the cumulative insults of racism and its related stressors accelerate the biological aging of Black women as evinced by their high rates of adverse obstetric outcomes, diabetes, hypertension, and heart disease.³⁹ Wanting to build on Geronimus' theory of weathering, researchers began to explore ways to measure the effects of weathering. Ultimate, the researchers found evidence in racial differences in pregnancy outcomes, mortality, and cardiovascular disease trends that supported Geronimus's idea.⁴⁰

Swinging the research and data collection pendula, McEwen and Seeman developed an algorithm to measure allostatis and allostatic load. They conceptualized allostasis as the ways in which the cardiovascular system adjusts during the body's resting and active states. McEwen and Seeman also conceptualized allostatic load to be the physiological burden imposed by stress. A high allostatic load is associated with old age,⁴³ increased mortality,⁴⁴ lower socioeconomic status,^{45 46} cognitive decline,⁴⁷ an unsupportive childhood,

^{48 49} and fragile adult relationships.^{50 51}

McEwen and Seeman's concepts of allostasis and allostatic load, and their algorithm to measure allostasis, are well suited to assessing weathering. Taken together, these concepts and tools may help capture the cumulative interactions of psychological and physiological stressors that cause progressive wear and tear over the life-course, impairing both short and long-term well-being and health.

More research is needed to investigate and measure whether or not experiencing racism influences health outcomes and to what extent. (Table 10) To date, the relationship between weathering and allostatic load remains inconclusive. Wallace et. al found no evidence connecting maternal preconception allostatic load, and adverse obstetric outcomes for Black and White women.⁵² In a separate study, Wallace and colleagues also found that although low SES Black women had higher preconception allostatic loads compared to White women, allostatic load was not associated with preterm births or low birthweight in their models.⁵³ Contrary to the findings in both studies, there is evidence suggesting that childhood exposure to adverse experiences such as poverty, and food insecurity, may accumulate over time to negatively affect biological functioning and health later in life.^{54 55}

Although more research is need to show how specific exposure to racism negatively impacts maternal health and obstetric outcomes, there is a voluminous and growing body of evidence linking discrimination and psychosocial stress to adverse maternal health and birth outcomes.^{56 57 58 59 60 61 62 63 64 65 66} Experiences of racism as a factor must be more fully studied to help us gain a deeper and more nuanced understanding of how racism fosters psychological and physiological stressors, and how those stressors help create

health disparities and adverse maternal and infant health outcomes over the life-course and across generations.

In 2003, Lu and Halfon promoted the idea of the life-course perspective as a major driver of future health research, practice, and policy with particular regard to maternal and child health.⁶⁷ In Lu and Halfon's model, birth outcomes are a culmination of a mother's exposures and experiences over the life-course leading up to her pregnancy. One benefit of their approach is its application to diverse health conditions and health disparities that cannot be easily explained solely by differences in genetics, knowledge, behavior or access to, and availability of medical care and services.

Lu and Halfon's life-course model served as a starting point to understand both the early exposures and the interplay of those factors influencing disparities in birth outcomes between Black and White women. Their life-course perspective has become the gold standard that is widely used to inform public health, public policy, and research to strengthen maternal and infant healthcare programs, practices, and services at the federal and state levels.

The Health Resources and Services Administration (HRSA), a federal agency of the Department of the Health and Human Services primarily responsible for improving access to care and services for people who are uninsured or medically vulnerable, utilizes the life-course model in its work administering programs and services. Many MCH programs and services focus on meeting the healthcare needs of women during the preconception period, during pregnancy and after pregnancy to ensure maternal health and optimal development of the child. While this approach reaches mothers and children at critical developmental stages in their life-course, there

are other sensitive periods both before the reproductive years and after early childhood. While HRSA sets a federal standard for applying life-course theory in programs the agency administers, States also apply the life-course model to their MCH programs and services for mothers and children.

In 2011, the Maryland Department of Health and Mental Hygiene used the life-course model as the basis of its plan to improve infant mortality in the State.⁶⁸ The specific aim of the plan was to reduce by 10 percent Maryland's overall infant mortality rate of 6.7 infant deaths per 1,000 live births by 2012 with specific attention on reducing the Black IMR, which at that time stood at 12.2 deaths per 1,000 live births. Three areas in the state were targeted for implementation of the plan: Baltimore City; Prince George's and Somerset County; Dorchester County was added later. These areas had high infant mortality rates and high racial disparities in infant mortality. In Baltimore City, the overall infant mortality rate was 10.3 deaths per 1,000 live births, but by race the infant mortality rates were 12.6 for Black non-Hispanics, and 5.3 for Hispanics, and 4.9 for White non-Hispanics. Racial disparities in infant mortality persisted in Prince Georges County, and on the Eastern Shore. In Prince George's County, the overall IMR was 7.8 deaths per 1,000 live births, but the IMR was 5.1 for White infants, and 9.9 for Black non-Hispanics, and 2.6 for Hispanics. On the Eastern Shore, IMR was only reported for Cecil and Wicomico Counties. In Cecil County the total IMR was 6.3 deaths per 1,000 live births, no IMR data was reported for Blacks, and Hispanics. In Wicomico County, the total IMR was 10.3 deaths per 1,000 live births, but for African-Americans that number was 22.3 deaths per 1,000 live births. Overall, the Eastern Shore reported

While this approach reaches mothers and children at critical developmental stages in their life-course, there are other sensitive periods both before the reproductive years and after early childhood.

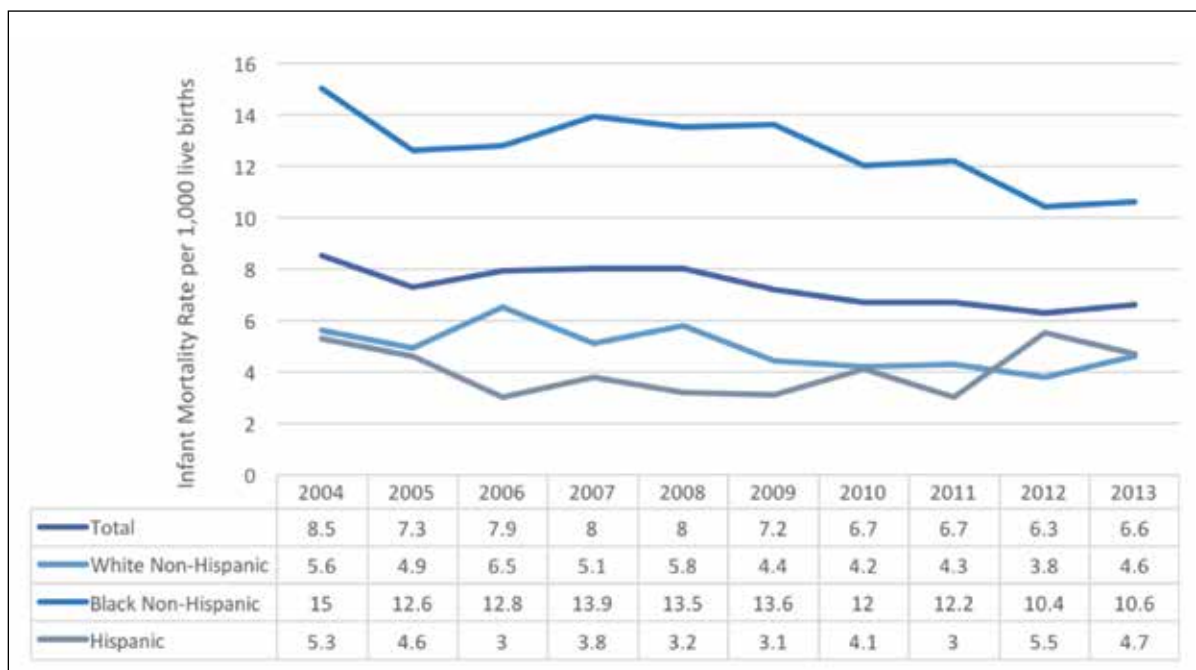
an IMR of 8.3 deaths per 1,000 live births, with an IMR of 6.2 deaths per 1,000 live births for White non-Hispanics, and an IMR of 17.3 deaths per Black non-Hispanics. No data was reported for the Hispanic IMR.

Maryland's plan to improve statewide IMR focused on providing programs, services, and interventions, and targeted women before and during pregnancy, and after delivery. During the preconception stage, programs and services focused on expanding the number of family planning sites, worked with Federally Qualified Health Centers (FQHCs) to integrate family planning services into their primary care services, and expanded Medicaid Eligibility to include all women living below 200 percent of the federal poverty level. At the pregnancy stage, Maryland began to expedite the Medicaid eligibility process for all pregnant women, developed the Quick State Prenatal Programs at the Local Health Departments; and collaborated with home visiting

programs and managed care organizations to expand access to case management during pregnancy. After delivery, a standardized postpartum discharge process was put in place as well as a greater exchange of information between community service providers and home visiting programs to increase referrals for community prevention services, and finally, a hospital compliance standard were put in place.

After the implementation of the plan, Maryland's IMR dropped to 6.3 deaths per 1,000 live births, the lowest it has ever recorded in the State. In 2012, 458 infants died compared to 493 the previous year. Among the infants who died there were 171 one White infants and 251 Black infants. The infant mortality rate for White infants has remained steady, while the infant mortality rate for Black infants fell substantially from 12.2 to 10.4 deaths per 1,000 live births between 2011 and 2012.

Figure 1: Maryland Infant Mortality Rate, 2004-2013



Source: Maryland Department of Vital Statistics

TABLE 3: Number and Rate of Infant, Deaths by Race and Ethnicity, in Maryland, 2007-2009 and 2010-2012

Number of Deaths			Mortality Rates	
	2007-2009	2010-2012	2007-2009	2010-2012
Infant Mortality				
All Races/Ethnicities	1,780	1,447	7.7	6.6
White non-Hispanic	540	411	5.1	4.1
Black non-Hispanic	1,052	834	13.7	11.6
Asian non-Hispanic	67	61	4.2	3.8
Hispanic	103	129	3.4	4.2

Source: Maryland Vital Statistics Administration

Maryland's success in improving maternal and infant health outcomes have generally focused on: building capacity; strengthening partnerships between care providers; community organizations; and individuals; and increased education for positive health behaviors to influence the health outcomes of women of reproductive age, pregnant women, mothers, and young children typically under age five., (Tables 5, 6, 7,8,9) While this approach has been successful, it can be further strengthened by additional programs and services spread out across a variety of points over the life-course. Maryland's approach, which gives specific attention to the reproductive years, only focuses on one point in the constellation of critical health and developmental periods spanning a woman and a child's life. Maryland could strengthen its approach to MCH programs and services and its application of the life-course model by widening its focus to include health and wellbeing at other critical developmental periods spanning the life-course, and by focusing on addressing the range of social determinants that influence health and wellbeing. This kind of approach would not only impact maternal and child health in the immediate pre-and post-reproductive

years, but also impact the intergenerational transmission of health and wellbeing.

Consider Maryland's Women Infants and Children (WIC), a federal program that funds states in providing vouchers to purchase supplemental nutrition and promotes health behaviors such as breastfeeding for pregnant women and new mothers with children up to age one. (Table 7) The epidemiological evidence supporting the WIC approach documents how the nutritional intake of a fetus fundamentally affects the developing physiology and metabolism.^{69 70} Some of that research shows that limited nutritional intake has grave health consequences such as diabetes,⁷¹ and cardiovascular disease risk,^{72 73} which only show up later in life and also passes across generations from parent to child.⁷⁴ WIC and similar programs increase food security for women and children vulnerable to food shortages and malnutrition particularly during a critical period. This approach has lifelong and cross generational effects that positively impact the long-term health of mothers and children even as they grow into adults. Yet MCH programs must also address the range of socioeconomic factors women experience over the life-course which

Maryland's approach, which gives specific attention to the reproductive years, only focuses on one point in the constellation of critical health and developmental periods spanning a woman and a child's life.

Research shows that children learn financial literacy and money management from their parents, engaging families in financial education could improve family health and financial stability across generations.

influences their health and the health of their children.

There are a range of socioeconomic factors, such as living in an economically distressed or segregated neighborhood with little opportunity for upward social and economic mobility, that have been shown to negatively impact health.⁷⁵ Maryland's programs and services could funnel more resources into meeting these socioeconomic needs just as they are meeting the nutritional needs of women and children. (Table 10) For instance, Maryland could integrate basic financial education services into all health programs, and develop and implement strategies that encourage families to build and maximize their financial resources for greater economic security and stability. Connecting these two distinct sectors, public health and asset building, is a promising paradigm shift that could improve the financial status and available resources with positive implications for health. Families that are able to preserve and increase their financial assets and resources will in turn be able to improve their access to healthcare, choose better housing situations, live in safer, healthier neighborhoods, and increase their food security. All of these factors are critical for good health and wellbeing. Moreover, since research shows that children learn financial literacy and money management from their parents, engaging families in financial education could improve family health and financial stability across generations. Some specific strategies that programs and services could employ includes working with women to address financial concerns, credit counseling and credit repair, education in asset development, opening a bank account, applying for public benefits,

and filing federal income tax and obtaining the Earned Income Tax Credit. (Table 10)

MCH programs and services in Maryland could also ensure qualifying women and children receive guaranteed housing in robust and economically thriving neighborhoods. Further, since maternal income and educational attainment are known risk factors for poor maternal and child health and are associated with poor health outcomes into adulthood, programs and services could also ensure a steady source of income for all families with children younger than age 18. Additional supports could include federally mandated maternity and paternity leave benefits, unemployment insurance benefits, and funding for education and jobs skills training to increase women's participation in the labor market on equal footing as men.

Maryland is already doing good work employing a range of programs, services, and resources to improve MCH outcomes and address disparities. What is needed to strengthen the State's approach is a broader focus on health and wellbeing across the life-course with special attention to the social determinants of health including, housing, wealth, and access to food and education. (Table 10) With greater attention to these factors the State's MCH programs and services, could provide greater long term health, social, and economic gains. Policy makers, clinicians, and service providers need not wait until a woman reaches reproductive age or until a child is born to influence health outcomes; they can begin positively influencing the social factors and strengthening the social nets along the way to improve health for better short and long term gains.

Methodology

A streamlined process was applied in selecting the regions, data, and programs discussed in this paper. Four Maryland regions were chosen to capture and to present data that reflect the demographic and socioeconomic diversity of the State. Baltimore City, for example, is Maryland's largest and most urban jurisdiction. In 2013, the City, along with Prince George's County, shared the State's average for the highest numbers of low birthweight infants, as well as the number of births to women with late or no prenatal care. The Eastern Shore was also included because it offers an important lens on poverty and health outcomes for a rural population.

In addition to comparing the common and salient features of the birth and health outcomes in these areas, another goal in selecting these vicinities was to gain a composite view of the health risks facing Maryland's mothers and children. Health outcomes and risks were examined by looking at them in the context of existing programs intended to mitigate poor maternal and child health outcomes. Six indicators directly and indirectly associated with maternal and child health were considered. These indicators are:

- ▶ Premature Birth
- ▶ Low-birthweight infants
- ▶ Infant Mortality
- ▶ Social determinants of prenatal, maternal, newborn, or child health risk.
 - Maternal educational attainment
 - Sociodemographics, including neighborhood SES and kin networks
 - Socioeconomic status

Three key criteria guided the selection of key health indicators: 1) The same data was

available state wide, and in all the counties considered; 2) All data was measured in the same way. 3) All data used was most recently available data covering the same indicators where possible⁷⁶.

The paper explores two proposals to inform policy, practice, and prevention strategies. The first proposal calls for the use of the life-course perspective to rethink, reform, and reorder the ways in which individual and population health based services are delivered to mothers and children in Maryland. The second proposal calls for the adoption and implementation of a comprehensive evaluation method to assess the effectiveness of all Maryland's MCH programs. Among these factors, special attention is given to housing, education, income, and culturally sensitive training for all MCH care, program, and service providers. All of the suggestions provided here are tethered to the Health Resources and Services Administration (HRSA) framework for maternal and child health services and programs. Linking the HRSA framework to future strategies for research, policy, and practice on a state and local level could strengthen the wider system of policies, programs, and services intended to establish a strong foundation for lifelong health of women and children. The HRSA framework has four tiers. Tier 1, the base of the pyramid, shows *Infrastructure-building Services*, which include needs assessment, evaluation, planning, policy development, and information systems. Tier 2 focuses on *Population-based Services* including newborn screening, immunizations, injury prevention, nutrition, and outreach/public education. Tier 3 shows *Enabling Services* that address key barriers to service delivery, such as transportation, translation, family support, health insurance, and case management. Lastly, Tier 4 addresses

Maryland should expand its use of the life-course perspective to include critical and developmental periods in a woman's and a child's life that go beyond the reproductive years and early childhood.

Direct Health Care which fills the gaps in basic health services as well as resources for children with special healthcare needs (CSHCN). Though the HRSA framework has four parts, the suggestions for policy changes that are presented in this paper - emphasize Tier 2,

Population-based Services (e.g., newborn screening, immunization, and nutrition), Tier 3, *Enabling Services* (e.g., transportation and language translation), and Tier 4, *Direct Healthcare Services*, which, together, comprise all direct delivery services for maternal and child health.

Infant Birth and Health Outcomes in Maryland

*Infant deaths
comprise the
largest number of
childhood deaths in
Maryland.*

Infant deaths comprise the largest number of childhood deaths in Maryland. In 2012, there were 695 children under the age of 18 who died, and 66 percent of them were infants. The high number of infant deaths continued in 2013. That year 474 children under age one died. Those deaths comprised 86 percent of all deaths of children younger than age five.

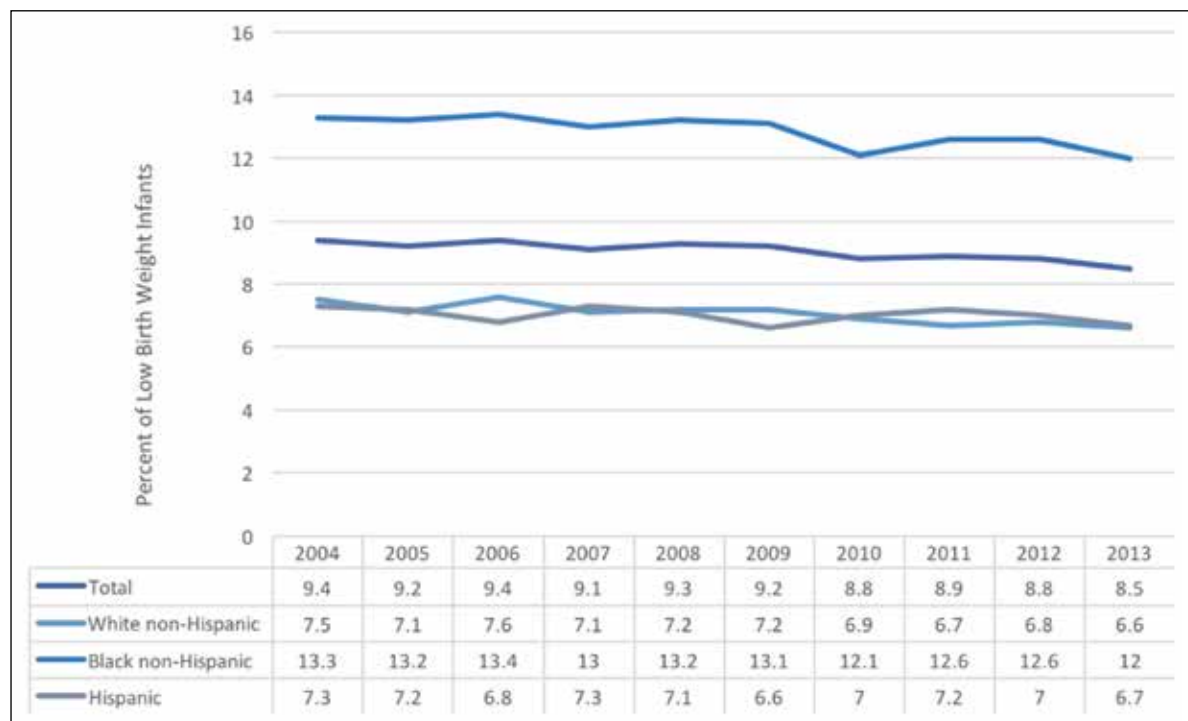
Considering that children under age one comprise the largest group of child deaths in Maryland, efforts to lower overall deaths of children must place a special emphasis on causation during the first year. Understanding the underlying causes of these deaths is critical to developing effective prevention strategies. The leading causes of death are disorders related to short gestation and unspecified low birthweight, which accounted for ⁷⁷ 21.5 percent of all infant deaths in 2012. (Figure 5) Low birthweight, prematurity, and other disorders associated with short gestation were also among the leading causes of infant death during the first month. Between the neonatal and the post neonatal period, disorders related to short gestation and unspecified low birthweight accounted for just 1.3 percent of infant deaths. Sudden Infant Death Syndrome (29.5%) and congenital abnormalities (20.8 %) were the other leading causes of death after the first month. In 2013, Maryland's IMR was 6.3 infant

deaths per 1,000 live births, a 5 percent decline from the 2012 IMR of 6.6 deaths per 1,000 live births.⁷⁸ (Figure 1) The 2013 IMR marked an improvement from an average rate of 7.3 infant deaths per 1,000 live births from 2004-2008, and an average of 6.7 infant deaths per 1,000 live births from 2009-2013.⁷⁹ Yet even with these declines, in 2013, an estimated 474 infants died before their first birthdays. Short gestation related disorders and unspecified low birthweight were among the leading causes of death. These unspecified causes include very preterm births, preterm births, very low birthweight babies, and low birthweight babies. Amid all of these causes the majority of infant deaths happen during the infant's first 28 days.

Looking at IMR, non-Hispanic Blacks consistently have the highest rate. For instance, although the infant mortality rate fell for all racial groups – and was the lowest rate ever recorded in the State – the Black infant mortality remained 2.5 times greater

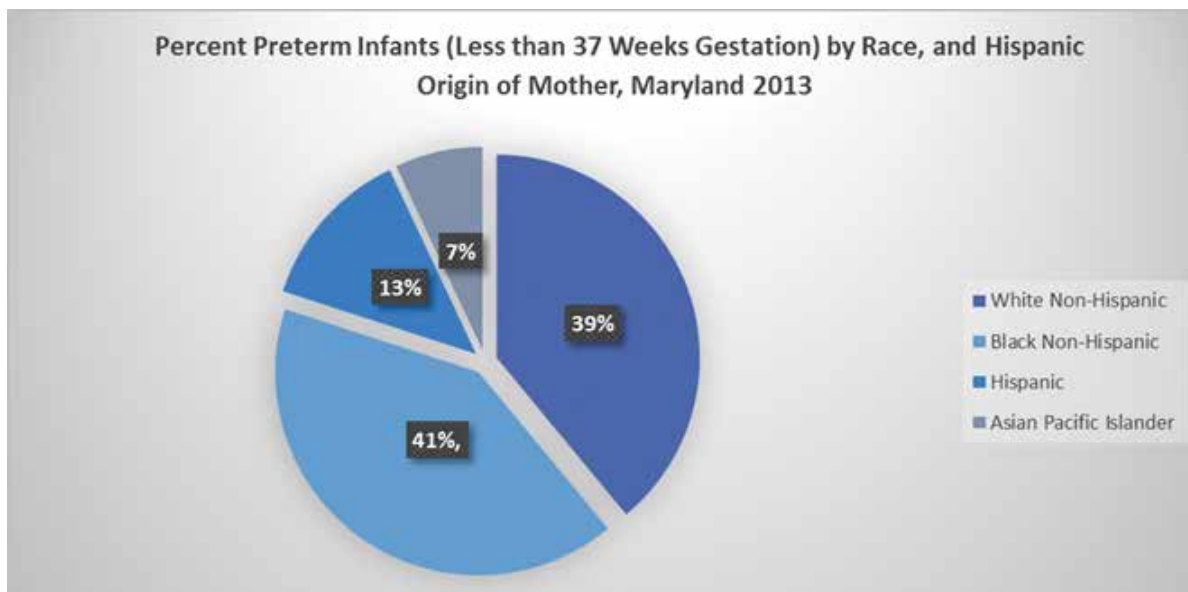


Figure 2: Percent Low Birthweight Infants, Maryland, 2004-2013



Source: Maryland Vital Statistics Administration

Figure 3: Percent Preterm Births, Maryland 2013



Source: Maryland Vital Statistics Administration

than all other races and ethnic groups. Black infant deaths accounted for 54.4 percent of all infant deaths.⁸⁰

According to data from the Maryland Child Death Report, 2014, Black non-Hispanic infants died at 2.7 times the rate White

Not only do Black infants die at a higher rate than their White counterparts, Black mothers die at a higher rate than their White counterparts as well.

non-Hispanic infants.⁸¹ The trend of higher rates of infant deaths persisted for Black non-Hispanic infants from 2007-2009 and from 2010-2012.⁸² A full picture of racial disparities in birth outcomes in Maryland shows that a Black infant is 1.5 times more likely to be born prematurely, almost 2 times as likely to be born at a low birthweight, 3 times as likely to be very low birthweight, and 2.5 to 3 times more likely to die in the first year of life compared to a White infant.⁸³

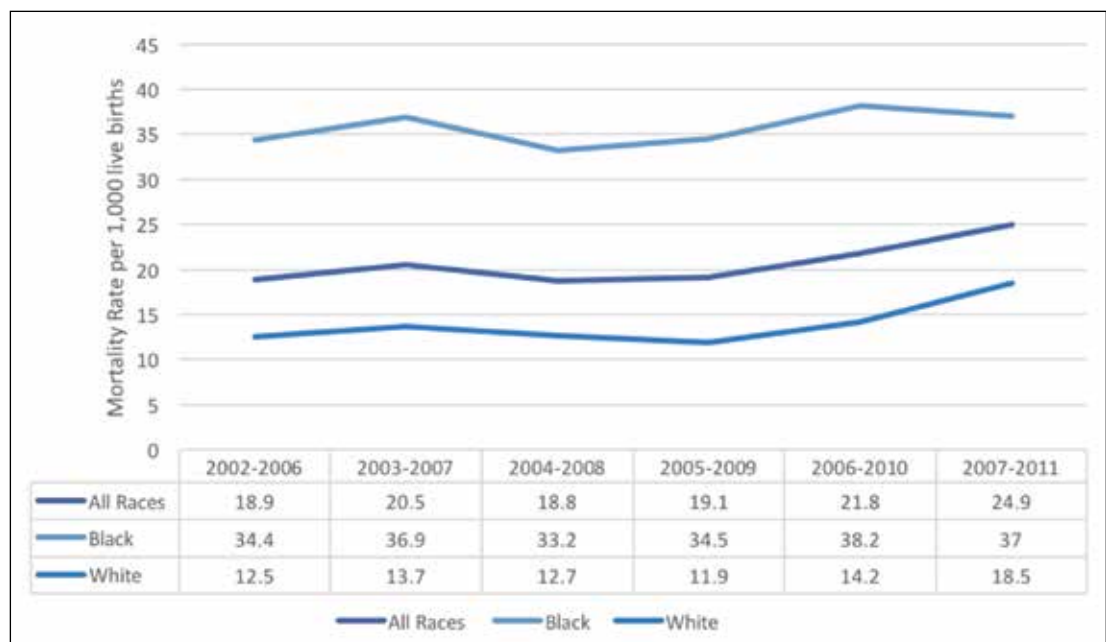
Maternal Health in Maryland

Not only do Black infants die at a higher rate than their White counterparts, Black mothers die at a higher rate than their White counterparts as well. Maryland data for 2011 shows Black mothers died at a rate that was between 2.5-3 times greater than white mothers.⁸⁴ The rise in the maternal mortality rate in Maryland is not an anomaly.

Research findings published in the Lancet by the Institute for Health Evaluation and Metrics, a global research institute at the University of Washington, showed a sharp incline in U.S. maternal deaths from 12.1 deaths per 100,000 live births to 18.5 deaths per 100,000 live births between 1990-2013 when the study was published.⁸⁵ Though there has been a global decline in maternal infant mortality, the U.S. remains the only developed nation on the list of 8 countries bucking that trend.⁸⁶ While there has been an overall increase in maternal deaths in the U.S., racial disparities persist. As is the case with infant mortality rates, the Black maternal mortality rate is higher than the maternal mortality rates for White women.

Researchers note several factors influencing the causes and rise in maternal mortality. Among these factors are hypertension, cardiovascular disease, kidney disease, and a greater number of women giving birth at a later age. National data shows African-American women and low-income women

Figure 4: Maternal Mortality by Race and Ethnicity, Maryland, 2011



Source: Maryland Vital Statistics Administration

inordinately account for the number of women facing these health complications. Another contributing factor has been the numbers of women who begin pregnancy with no health insurance. A report published by the Commonwealth Fund found that 20 percent of American women were uninsured, more likely to go without needed care, and likely to struggle to pay their medical bills.⁸⁷ Though a separate survey conducted by the Commonwealth Fund found declines in the numbers of Americans who had trouble paying their medical bills between 2010-2014, that same study showed that African-Americans and Hispanics/Latinos, were still less likely to have coverage as compared to Whites.⁸⁸ Where the uninsured rates for Whites fell from 15 to 10 percent from 2010-2014; among African-Americans the rate of uninsured fell from 24-18 percent, and among Hispanics dropped from 39 to 34 percent during the same period.⁸⁹

Taken together these data signal an underlying issue of access to healthcare as a primary element that could improve maternal and child health particularly for those at risk for adverse health and obstetric outcomes. (Table 10) The Affordable Care Act (ACA) will no doubt ensure U.S. women have access to affordable, comprehensive healthcare services that they need, but the ACA is not a quick fix. A 2013 analysis of changes in healthcare after the enactment of the ACA projected that for several years after the law is applied, nearly 30 million people will still be uninsured, and the majority of them will be women of reproductive age 15-44.⁹⁰ Furthermore, barriers to care such as cost-sharing for preventative services will no doubt play a role in women's access to reproductive healthcare.

Empowering women with greater resources and access to prenatal and preconception care (PCC) is essential for women's health, reproductive planning, and improved pregnancy outcomes. Research shows that preconception care is vital for women of childbearing age and women who are at risk for preterm and low birthweight infants. As critical as this care is known to be, most U.S. and Maryland women do not receive preconception care. Data from the 2012 Maryland Pregnancy Risk Assessment Report found 33.1 percent of women received preconception care prior to a live birth in the preceding 12 months.⁹¹ The low numbers of Maryland women receiving preconception care is concerning. Issues such as the fragmentation of healthcare services and cost sharing for preventative services such as contraceptives no doubt contribute to the gaps in services women receive. However, given Maryland's focus on reducing the State's IMR, increased promotion of PCC is imperative. Consistent and high quality PCC has been shown to improve women's health by providing early screenings and health assessments that catch key health issues including diabetes and hypertension. Moreover, PCC is critical for reproductive health awareness and planning in allowing women greater control over when they become pregnant and greater insights into their health which impacts pregnancy outcomes. Women receiving PCC are more likely to be in optimal health when they become pregnant because they have already been made aware of their own specific diet and exercise needs and other healthcare regimens that promote their health and wellbeing.

Other benefits of preconception care include its impact on pregnancy planning and the reduction in the numbers of unintended

The Affordable Care Act (ACA) will no doubt ensure U.S. women have access to affordable, comprehensive healthcare services that they need, but the ACA is not a quick fix. A 2013 analysis of changes in healthcare after the enactment of the ACA projected that for several years after the law is applied, nearly 30 million people will still be uninsured, and the majority of them will be women of reproductive age 15-44.

*Offering women
care and services
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health, as well as
state and federal
budgets.*



pregnancies. Currently, about 50 percent of all U.S. pregnancies are unintended⁹² — meaning the woman did not wish to become pregnant at that time or did not wish to become pregnant at all.⁹³ In Maryland, nearly half (42 percent) of all pregnancies were unintended in 2012.⁹⁴ Figures from Maryland show Black non-Hispanic women accounted for 58 percent of all unintended pregnancies, Hispanic women accounted for 40 percent of all unintended pregnancies, and White non-Hispanic women accounted for 33 percent of unintended pregnancies. Nationally, Black women had the highest rates of unintended pregnancy among any racial or ethnic groups.⁹⁵ National figures of unintended pregnancy among Black women ages 15-44 show a rate of 92 unintended pregnancies per 1,000 live births compared to 38 unintended pregnancies per 1,000 live births for non-Hispanic White women.⁹⁶ Though available Maryland data does not show the demographic breakdown of pregnancy intendedness by socioeconomic status, the data which was collected from mothers ages 20 and above, reveals that 50 percent of the women surveyed had less than a high school education, while 35 percent of women had some schooling beyond high school.⁹⁷ Using education as a proxy for socioeconomic status, the data suggests that poor women account for the majority of unintended pregnancies in the State. National figures are similarly suggestive highlighting that the rate of unintended

pregnancy among women whose incomes are at or below the federal poverty level is five times greater than the rate among women at the highest end of the income spectrum.⁹⁸

Unintended pregnancies carry a range of social, health, and economic consequences. For example, births resulting from unintended pregnancies are associated with adverse maternal health and infant outcomes including delayed prenatal care,⁹⁹ premature birth,¹⁰⁰ and adverse physical and mental health effects for children.¹⁰¹ In addition to social and health costs, unintended pregnancies also carry high financial burden. In 2010, there were 1.5 million unplanned pregnancies in the U.S. and 68 percent of those pregnancies were paid for by public insurance programs, primarily Medicaid. Comparatively, only 51 percent of all births and 38 percent of all planned births were funded by public insurance programs.¹⁰² Offering women care and services to reduce the rates of unintended pregnancy positively impacts public health, as well as state and federal budgets.

Comprehensive, culturally competent, high quality, and frequent preconception and prenatal care must be of primary interest within the spectrum of healthcare services offered to women, particularly women at risk for adverse health and obstetric outcomes. Most recent available Maryland data for 2012 shows 80.1 percent of women received prenatal care during the first trimester, 18.3 percent received care during the second trimester, and 0.4 percent received care during the third trimester, and 1.2 percent received no care at all.¹⁰³ These figures, positively suggestive that the bulk of Maryland women receive prenatal care, particularly during the critical first trimester. However, the data give no indication of the frequency and quality of the care women

receive. Moreover, though 1.2 percent of women that did not receive prenatal care accounts for just 873 all births in Maryland in 2012, the numbers of women who do not receive prenatal care warrants closer attention when considering the potential adverse outcomes for the mothers and those children, and when considering the potential long-term healthcare and other costs.

Increased frequency and quality of prenatal care has been shown to improve birth outcomes and could help clinicians better manage the health of women who may already have health complications or be at risk for health complications due to pregnancy. (Table 10) Quality assurance measures could include pregnancy risk screening that feature not only maternal risk for domestic and intimate partner violence, but a range of inconspicuous risk factors such as socio-demographics, neighborhood socioeconomic status (SES), and maternal education. This kind of assessment could include maternal risk, and the level of risk. Clinicians could use the assessment outcomes to adjust and fine tune specific care services based on maternal need.

Examining less conspicuous social determinants of health such as sociodemographics, neighborhood SES, and maternal education, alongside the adverse birth outcomes such as IMR, PTB, and LBW helps to conceptualize the dynamic interplay between contextual and individual level social determinants that lead to adverse maternal and infant health outcomes and health disparities. Sociodemographic factors such as neighborhood SES may partially account for maternal health and pregnancy outcomes by influencing women's access to and use of resources and services.¹⁰⁴ In a 2001 study of neighborhood SES and its impact on birthweight, Pearl and colleagues found that while neighborhood SES did not affect birthweight for White women and U.S. born Hispanic women, neighborhood SES was directly related to birthweight for Black and Asian women.¹⁰⁵ Elo and colleagues made similar findings in a 2001 study in Philadelphia, Pennsylvania.¹⁰⁶ Pearl's and Elo's work sheds valuable light on neighborhood SES as an important factor contributing to maternal health and obstetric outcomes.

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Neighborhood-Level Socioeconomic Factors and Maternal and Child Health

Neighborhood-level socioeconomic deprivation may partially account for adverse pregnancy outcomes of African-American women.¹⁰⁷ For example, Baltimore City neighborhoods that are mostly Black have the highest rates of poverty. High concentrations of poverty affect neighborhoods such as, Sandtown-Winchester, which are east and west of Downtown Baltimore.¹⁰⁸ These neighborhoods are deeply divided by race and place. Racial isolation and high rates

of poverty in Baltimore City reflect a long history of explicit and implicit policies that have yielded stark differences in economic, education, and health outcomes between Black and White city residents. In Baltimore City, 4.8 percent of Whites are unemployed while that number is 11.3 percent of Blacks.¹⁰⁹ These disparities climb higher on a number of other key economic measures. For example, where 49 percent of White residents hold a bachelor's degree, that number is just 13.7 percent for Blacks.¹¹⁰

The socioeconomic divide by race suggests there are two Baltimores: a mostly White Baltimore that is economically thriving, and Black Baltimore that is entrenched in poverty and poor health.

Where 13.7 percent of White children live in poverty, that number more than triples to 41.6 percent of Black children.¹¹¹

As abysmal as these numbers may seem, the City's level of concentrated poverty and income inequality are similar to many other major U.S. cities such as Detroit, Chicago, and New Orleans. In fact, American Community Survey data from 2013 show Baltimore City's rate of Black poverty ranks 75th compared with 100 American cities with the largest Black populations.¹¹² Furthermore, reviewing additional data from the American Community Survey on the Black employment rate in 100 U.S. cities with the largest Black population, Baltimore ranks 57th in the nation. Considering these figures, Baltimore indeed has the higher overall rate of poverty among the 100 surveyed American cities, but Baltimore's level of income inequality mirrors the racial gap in income across major U.S. cities. These data highlight two important points: first, in terms of poverty and income inequality, Baltimore is an average American city; and second, the socioeconomic divide by race suggests there are two Baltimores: a mostly White Baltimore that is economically thriving, and Black Baltimore that is entrenched in poverty and poor health. This uncomfortable truth must be addressed if

we are to close the City's gaps in health equity. Baltimore residents need greater opportunities for quality employment that pay a living wage, greater opportunities for small businesses to grow, opportunities for social mobility, increased opportunities for education, greater access to services and programs that promote civic engagement and interaction among residents who span the income spectrum. All of these social factors are crucial for better health. Without innovative solutions to address the uneven distribution of health and wealth, the disparities gap will continue to widen and deepen with negative lifelong and intergenerational consequences.

Neighborhood-level SES in the form of segregation by race and income have been shown to create associations with higher risks of infant mortality and preterm births.^{113 114 115}

Considering the relationships that have been shown to exist between neighborhood-level SES and rates of adverse birth and health outcomes for Black women and children, examining these neighborhood-level disparities is but one approach to addressing poor birth outcomes for this population. Neighborhood SES has also been shown to influence social cohesion, sometimes referred to as social support, and kin networks.¹¹⁶

Social Cohesion, Kinship Networks, Maternal Economic Status, and Maternal and Child Health

Social cohesion related to neighborhood conditions warrants closer attention in our analysis of health disparities and efforts to improve health and birth outcomes.¹²⁵ Social cohesion has been known to encourage the diffusion of knowledge about health behaviors, and collective action about policies that

promote health.¹²⁶ Multilevel cross sectional analysis of neighborhoods with perceived low levels of social cohesion predicted lower level infant birthweight for Black infants, not Whites.¹²⁷ One explanation for this finding may be the role that kin networks play in Black families and in poor communities. Sev-

eral studies of Black families show that the presence of a grandmother is associated with healthier pregnancies.^{128 129} Studies of births to Black women who were poor in childhood found that the presence of a coresidential grandmother reduced the risk of low birthweight infants by 56 percent.^{130 131} This finding was not true of White infants.¹³²

The role and value of kin networks for mothers and infants in more affluent communities is especially intriguing. Though studies show that kin networks provide important resources such as money and childcare in economically deprived communities, there is some ambiguity about whether those support networks remain intact for Black families climbing up the socioeconomic ladder.¹³³ Colen and colleagues found that among Blacks, while 47 percent of births to poor mothers had a coresidential grandmother, just 18 percent of births to upwardly mobile Black mothers had a coresidential grandmother.¹³⁴ If upward mobility indeed decreases the likelihood that a mother remains connected to her kin network, and kin networks are known to promote positive health behaviors and health outcomes, then more work is needed to promote kin networks in MCH programs and services.

Maryland MCH programs are geared toward serving women of low SES and little social cohesion. At first this approach seems promising as children under 5 make up 15.3 percent of the population living below poverty and female headed households make up 19.3 percent of those living below poverty. While Maryland's MCH programs and services should continue to address women and children living below the poverty line, not all Black women are poor. In Prince George's and Montgomery Counties, Black families earn a median household income ranging from \$64,000-\$74,999.¹³⁵ These earnings are on par with household median income

for the State. Demographically, the percentage of Blacks in Prince George's County is greater than in Montgomery County, and both counties are among Maryland's most affluent. Moreover, more than 42 percent of Prince George's County's Black residents earn more than \$100,000 each year.¹³⁶ Despite these high earnings, Prince George's County has some of the State's worst birth outcomes for Black mothers and their infants. (Figure 1 and 2)

Wealth and social mobility are not protective factors against poor health outcomes for African-Americans.¹³⁷ Using educational attainment as a proxy for socioeconomic status, research shows that infants born to college educated Black women are at higher risk for LBW, PTB, and IMR than college educated White women.¹³⁸ Several explanations have been offered for the persistent disparities in maternal health and infant outcomes among middle class and affluent Black women. One argument suggests that fewer financial resources are available to Black women because of differential returns on education, racial discrimination experienced over the life-course, and a paucity of opportunities for them to accumulate wealth.¹³⁹ Differences in the returns on education and opportunities for upward social mobility for Black and White women may help explain persistently high rates of poor pregnancy and health outcomes among Black mothers as compared to their White counterparts. MCH programs and services in Maryland must continue to consider the financial resources available to low income women, but must also consider the availability of financial resources for Black women of middle class status. Moreover, there is a need for a more comprehensive way to measure how well individuals and families are able to provide for their basic needs. Such a measure could change eligibility requirements for wider delivery of a range of MCH related

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Many researchers, policy makers, and government officials have argued that the standard methods of measuring poverty and delineating the “poor” and “non-poor” are out dated.

programs and services to families that would benefit from greater supports regardless of their income.

Nationally, debates are rife about the best methods to gauge the depth of U.S. poverty.¹⁴⁰ Many researchers, policy makers, and government officials have argued that the standard methods of measuring poverty and delineating the “poor” and “non-poor” are out dated. The methods of assessing individual and family poverty grew out of Mollie Oshansky’s 1955 models of devising income levels below which families and individuals could be classified as poor.¹⁴¹ Though some adjustments have since been made, the U.S. Bureau of Budget, now the Office Management and Budget, formally adopted Oshansky’s poverty measurement model in 1969, and it is still used to determine who is and who isn’t poor in America.¹⁴² A simplified version of this model is used to determine financial eligibility of income based federal programs such as Women Infants and Children.¹⁴³

Programs and services that use family income and composition as a basis of receiving services are not adjusted for work related expenses. Looking specifically at single women headed households, one may reasonably expect that an increase in earned income would improve a family’s standard of living. However, while working no doubt increases a mother’s income and elevates a family’s position in the socioeconomic hierarchy, it also increases her childcare, transportation, and clothing expenses. And greater income would also reduce the likelihood of her receiving financial help from people in her kin and social networks. What this means is that the while the family’s income may have increased, the family’s standard of living may have decreased, and the family may need to, for example, “stretch food” or otherwise cut corners. But it is precisely

negative changes in social determinants, such as, food insecurity, that contribute to adverse maternal and child health outcomes. If Maryland’s MCH programs and services are to be strengthened to benefit all mothers and children for improved long term and intergenerational health outcomes, more attention must be given to the social and economic needs of women and children over their life-course and spanning the socioeconomic spectrum. (Table 10)

Employing a new, more comprehensive model to gauge individual and family poverty could perhaps be a powerful tool to determine how many individuals and families are indeed sufficiently resourced to live above the poverty threshold. (Table 10) While changing the metric for assessing poverty levels may not at first glance seem a direct way to affect health disparities or health outcomes, greater awareness of individual and family ability to provide for their own healthcare, food, clothing, and housing needs could provide greater resources where they are needed, which in turn may alleviate or change exposure to stressors that in turn create poor health. One alternative poverty assessment model could include values for certain kinds of non-cash benefits, for example medical benefits, that families and individuals receive through the Affordable Care Act. This approach could help reduce the number of children counted as living in poverty.¹⁴⁴ New poverty measurement models could also include costs of basic expenditures for food, clothing, shelter, utilities, and a small allowance for additional needs such as internet, and cell-phones which were not in use when Oshansky created her model back in 1955. Other measures could build on existing models used by the American Community Survey which takes into account geographic differences in housing costs, and three kinds of housing statuses – owners

without mortgages, owners with mortgages, and renters. Finally, a newer model could assess the availability of family resources that not only include cash-income, but also a variety of in-kind benefits, and accrued debt including student loans for college education. These kinds of modifications in how family resources are assessed could help shed light on the availability of economic resources to families which are not based on income alone. This kind of model could help directly address socioeconomic risk factors for upwardly mobile African-American mothers who, through education and income, may appear to be above the poverty threshold, but in reality are not well-resourced, and who, without a steady flow of income, could otherwise be living well below the poverty line. (Table 10)

Additional steps to ensure healthcare services are available to all, particularly low-income individuals and families are already under way. (Table 3) The Affordable Care Act (ACA) which was passed by Congress

and signed into law on March 23, 2010 is a prime example. The law ensures coverage for a range of healthcare services including preventative care services such as mammograms, screenings for cancer, and prenatal care. These provisions are significant particularly for lower and moderate income women. However, barriers to care remain. Cost sharing, for example, is known to negatively affect contraceptive use which could help women to better time and plan pregnancies or help women receive prenatal care earlier in their pregnancies. Data collected and published in the 2010 Kaiser Commission on Medicaid and the Uninsured found that cost sharing reduces the preventative care services, particularly among low-income Americans.¹⁴⁵ Culwell and Feinglass,¹⁴⁶ and Nearn¹⁴⁷ have shown that having health insurance increases use of contraceptive prescription while other studies have shown that women's use of long acting contraceptive methods decreased when insurers introduced cost-sharing.¹⁴⁸

The law ensures coverage for a range of healthcare services including preventative care services such as mammograms, screenings for cancer, and prenatal care.

TABLE 4: Provisions and Services under the Affordable Care Act

Services and Provisions Covered under the Affordable Care Act	
Type of Preventive Service	Frequency
Well-woman visits	Annual preventative care visits that are age and developmentally appropriate. These include preconception and prenatal care, and other preventive care services. Although several follow up visits may be necessary to obtain a full picture of a woman's health status, health needs, and risk factors.
Screening for gestational diabetes	Available for women who are between 24-28 weeks pregnant and at the risk for diabetes.
Human papillomavirus-testing	Testing for women beginning at age 30, and follow-ups every 3 years.
Counseling for sexually transmitted diseases.	Annual
Counseling and screening for human immune deficiency virus.	Annual
Contraceptive methods and counseling	As prescribed.
Breastfeeding support, supplies and counseling with a trained provider during pregnancy and postpartum. Includes costs for renting breastfeeding equipment.	In conjunction with each birth.

Source: U.S. Department of Health and Human Services

Though paid maternity leave is available with limitations to some working American women, there is no federally mandated standard for maternity leave and pay.

While the provisions of the Affordable Care Act provide needed improvements in the availability of healthcare and health services, more can be done to ensure a high quality of care, and that women across the income spectrum are afforded services that limit adverse health and pregnancy outcomes. For example, widening the range of care providers to include highly trained doula's and midwifery services could help reduce costs of care for hospitals and clinicians, while enhancing the care and supports women receive during and after pregnancy. (Table 11) Further, provisions under the ACA could ensure women receive maternity health coverage during and after their pregnancies. Though paid maternity leave is available with lim-

itations to some working American women, there is no federally mandated standard for maternity leave and pay. Typically, women working in low-wage jobs, particularly in the restaurant and retail industries often experience the brunt of inadequate provisions for maternity leave and care. Few to no maternity provisions for women often compels women to work up through the latter stages of pregnancy and return to work quickly after labor and delivery. Inadequate time to rest post-partum affects not only maternal health, but also limits time for attunement, the bonding period mother and child, and skills development, such as breastfeeding, which are important for infant health and later childhood development. (Table 10)

Hispanic and other Foreign-born Mothers

Profound differences exist between maternal health and obstetric outcomes for Hispanic and foreign-born mothers, and African-Americans. These disparities are also wide ranging among immigrant women from different countries of origin and ethnicities. The causes of these differences is not fully known, however, the comparatively better health outcomes of foreign-born women give cause for further investigation.

Though health data on Hispanic and foreign-born women and infants are not the major focus of this paper, their health and birth outcomes pose something of a paradox that remains to be fully studied and explained. Collecting data and observing the Hispanic population, in particular, is challenging because Hispanics make up most (76 percent) of the undocumented immigrants in the United States.¹⁴⁹ Where data is available, much of it does not account for the variety of socioeconomic

backgrounds, nativity, or national origin within the Hispanic population.

Research documenting differences in health behaviors and outcomes for White, and Hispanic women has uncovered widely favorable outcomes including better mortality rates, better obstetric outcomes, and healthier diets among Hispanic groups. Taking a look back to data presented on infant mortality rates in Maryland, though the overall IMR was 6.6 deaths per 1,000 live births in 2013, the IMR for Hispanics was 4.7 deaths per 1,000 live births, compared to 4.5 for White non-Hispanics and 10.6 for Black non-Hispanics. Low IMR and other positive health outcomes among Hispanic women have been dubbed the Hispanic "epidemiological paradox."¹⁵⁰ A main point of this paradox has been the advantage in birth outcomes experienced by Hispanic women. These outcomes rival birth outcomes of White women, and are better

than expected given the socioeconomic status of Hispanic women once they arrive in the U.S.

Some studies have argued that strong kin networks serve as a protective factor against adverse health outcomes for Hispanic women and infants.^{151 152 153 154} There is also the selective migration argument positing that healthier women are better resourced to leave their countries; and they therefore have better health and birth outcomes because of those superior resources. But selective migration alone does not account for the complexities of factors influencing migrant health, nor does it explain changes over time in health and birth outcomes for Hispanic women who have longer durations in the U.S.

Two particularly compelling studies investigated the relationship between maternal ethnicity and nativity, and obstetric outcomes. Pearl and colleagues found that foreign-born Hispanic women living in neighborhoods with high unemployment and poverty delivered infants of higher birth weights, and had a lower risk of delivering a low birthweight infant.¹⁵⁵ Hendi, Mehta, and Elo also found that children born to foreign-born mothers were healthier than children born to U.S. born

mothers, and maternal length of stay in the U.S. negatively impacted child health outcomes.¹⁵⁶ These findings suggest that socioeconomic status, maternal education, preconception and prenatal care, quality of care, and maternal nativity, either in conjunction or alone, do not completely explain positive or adverse birth outcomes.

Additional research has shown that foreign-born Blacks have lower allostatic loads and better obstetric health outcomes than U.S. born Blacks. Other research on foreign-born women who give multiple births in the U.S. has shown their birth outcomes become increasingly adverse over time. These various findings suggest that there is something unique about the American experience for Blacks, Hispanics, and people of low socioeconomic status that creates poor health outcomes. More research is needed to examine the relationship between weathering, maternal preconception allostatic load and birth outcomes for Black women and women of low socioeconomic status. (Table 10) Studying the relationship between these factors could shift our understanding of how social experiences of racism or racial discrimination could negatively impact health.

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Maryland's Maternal and Child Health (MCH) Programs and Services

All of Maryland's maternal and child health services and programs are administered through the Maternal and Child Health Bureau.¹⁵⁷ Within the Bureau there are four offices: the Office of Family Planning and Home Visiting, (OFPHV); the Office of Surveillance and Quality Initiatives (OSQI);

Women, Infants, and Children (WIC), and the Office of Genetics and People with Special Healthcare Needs. A close look at Maryland's MCH programs shows that policy makers, public health officials, healthcare service providers, and other health advocates have made a concerted effort to improve

reproductive healthcare and family services, and reduce the State's infant mortality rate and racial disparities. (Tables 5, 6, 7, 8, 9)

Maryland's strategy to create these improvements and changes has included a comprehensive systems approach that reaches across jurisdictions to build strong partnerships, and to provide culturally competent education and care to vulnerable and hard to reach families. Interventions and programs have especially targeted

Baltimore City, Prince George's County, Dorchester, Somerset, and Wicomico counties on the Eastern Shore. These regions have had some of the poorest infant health outcomes in the State. A review of the types of programming available in the regions under review in this paper shows they typically cover a range of direct services including food and nutrition, teen pregnancy prevention, preconception, pregnancy, and postpartum care. Below is an overview of federally-funded programs and services.

Federal and State Funded MCH Programs and Services in Maryland

TABLE 5: Maryland Title V Programs and Services

Program Name	Program Description	Program Services	Budget, Amount Receiving	Demographics Served	Locations
Title V¹⁵⁰	Provide funding to state MCH programs and to improve the health and livelihood of women, children, and families.	<ul style="list-style-type: none"> Promote preconception health Promote newborn screenings Partner with local health departments to promote child and adolescent health Fund essential programs for children with special healthcare needs. 	<ul style="list-style-type: none"> \$11,334,311 (Federal) \$9,176,099 (State) <p>States must match every \$4 federal, with at least \$3 from state/local government.</p> <ul style="list-style-type: none"> Total: \$20,510,410 	<ul style="list-style-type: none"> 72,751 Infants 69,876 Pregnant Women 	Statewide 21 Programs receive partial or full funding through Title V.

TABLE 6: Maryland Family Planning and Reproductive Health Program

Program Name	Program Description	Program Services	Budget, Amount Receiving	Demographics Served	Locations
Maryland Family Planning and Reproductive Health Program¹⁵¹	<ul style="list-style-type: none"> The aims of the program are to reduce unintended pregnancy and to improve birth outcomes by providing comprehensive quality family planning and reproductive services care 	<ul style="list-style-type: none"> Preconception health Health education Screening and treatment for STIs and colposcopy Teen pregnancy prevention services Contraceptive services Referrals for primary health Mental health and social services. 	\$1,850,277 ¹⁵²	<ul style="list-style-type: none"> 64,940 women. 6,152 men (figures for 2013)¹⁵³ 	60 sites across the state ¹⁵⁴

TABLE 7: Maryland Women, Infants, and Children Program (WIC)

Program Name	Program Description	Program Services	Budget, Amount Receiving	Demographics Served	Locations
Maryland Women, Infants, and Children (WIC) ¹⁵⁵	WIC's mission is to assist eligible women, infants, and children to achieve improved nutrition and health status through nutrition education, selected supplemental foods, and health referrals in a caring and supportive environment.	WIC provides vouchers for farm fresh produce from participating farmer's markets, breakfast cereal, infant cereals, foods, and meats, cheese, milk, legumes, peanut butter, canned fish, whole wheat bread and other grains. ¹⁵⁶	In fiscal year 2013, Maryland WIC received \$81,692,042 in food grants, and \$29,566,290 in nutrition services and administration grant. Total: \$111,258,332 ¹⁵⁷	<ul style="list-style-type: none"> • Black 68,223 • (non-Hispanic) • White 67,001 (Includes Hispanic and non-Hispanic) • Hispanic 43,961 • Non-Hispanic 111,662¹⁵⁸ 	Multiple locations in each county across the state.

TABLE 8: Maternal Infant and Early Childhood Home Visiting Program in Maryland

Program Name	Program Description	Program Services	Budget, Amount Receiving	Demographics Served	Locations
Maternal, Infant and Early Childhood Home Visiting in Maryland (MIECHV)	A voluntary program providing individual and culturally competent programs for expectant parents, young children and their families. There are 5 of these programs in Maryland: the Nurse Family Partnership (NFP); Healthy Families America (HFA); Parents as Teachers (PAT); Home Instruction for Parents of Preschool Youngsters (HIPPY); and Early Head Start (EHS).	<ul style="list-style-type: none"> • Education • Parental Coaching • Early Learning resources for children • Pregnancy and delivery guidance and home visits for first time mothers until child/ren turn age two. 	\$7 million from multiple sources <ul style="list-style-type: none"> • \$1.3 million – Maternal Infant and Early Childhood Home Visiting in Maryland (MIECHV) • \$1.1 million Children's Cabinet Interagency Fund's Early Intervention and Prevention • \$4.6 million Maryland Dept. of Education 	No demographic data was available for Maryland.	75 Total locations across the State, 18 Total Programs with MIECHV Program Funding. Throughout the State, each county has at least one of five programs.

TABLE 9: Personal Responsibility Education Program and Abstinence Education and Coordination Program

Program Name	Program Description	Program Services	Budget, Amount Receiving	Demographics Served	Locations
Personal Responsibility Education Program (PREP) and Abstinence Education and Coordination Program (AECPP) ¹⁵⁹	<ul style="list-style-type: none"> • Abstinence and contraception education 	<ul style="list-style-type: none"> • Condoms • Pregnancy • Age of Consent • Unplanned pregnancies • STIs/STDs 	<ul style="list-style-type: none"> • \$500,895 cap set for Abstinence education Grants awarded to state agencies through the Family and Youth Services Bureau (FYSB) and included in the Title V of the Social Security Act with the Administration for Children, Youth and Families. • Smaller grants are given to county health departments if they demonstrate a need for PREP.¹⁶⁰ 	<ul style="list-style-type: none"> • Data not available 	Baltimore City, Allegany County, Anne Arundel County, Cecil County, Dorchester County, Washington, County, Garrett, County, Wicomico County, and Worcester County were sub-awardees. ¹⁶¹

Programs Discussion

After decades of experiencing adverse maternal and child health outcomes, Maryland's targeted approach to improving birth outcomes and designing programs has seen many positive changes. Close review of Maryland's programs and services reveals they are intended to meet women along the life-course. This approach includes a range of targeted strategies that cover reproductive healthcare at three points: before pregnancy, during pregnancy, and after delivery. This strategy is comprehensive and far reaching in addressing the biological and physiological needs of pregnant women, new mothers, and women who anticipate becoming pregnant. There are many other benefits of the good work Maryland is doing to improve maternal and infant health outcomes in the State. For example, Maryland's programs focusing on improving pregnancy outcomes follows the Centers for Disease Control and Prevention (CDC) recommended guidelines for providing comprehensive women's healthcare. Yet as much as Maryland's MCH programs and services are yielding positive changes in health outcomes for Maryland's mothers and their children, these efforts do not yet fully address the long standing disparities in birth outcomes. For example, though Maryland's infant mortality fell in 2012, much for the decline was attributed to the fall in the infant mortality rate of White infants. And all though the Maryland Medicaid data show increased utilization of prenatal services by all groups, racial disparities in birth outcomes persist. The State's MCH programs as they currently exist must do more to consider and address the range of social factors that influence maternal health across the life span and across generations. Factors such as living in neighborhoods of social deprivation, experiencing poverty across the life-course, or even experiencing racism, not only affect maternal health but the health of a woman and her future pregnancies. A wider lens is needed to examine the range of critical periods over the life-course, and greater innovation in the design and delivery of MCH services is needed to address the range of social factors that also influence maternal and child health.

Conclusion

This paper examines the social determinants associated with adverse birth outcomes for Black women in Maryland, and makes a case for improving research, policy and practice to ameliorate disparities in maternal health and birth outcomes for women and children in the State. Specifically, the paper argues that more attention must be given to the range of social determinants influencing both maternal and infant health. Studying social determinants alongside birth outcomes may help explain the disparities in birth outcomes in diverse populations, and may enable comparisons in population health attainment across varied settings. Maryland's approach to funnel greater resources to build capacity for increased access to reproductive healthcare programs and services is supported by a range of research evidence showing that this approach could improve health outcomes and reduce disparities for women and children vulnerable to poor health outcomes. However, programs and services need not only focus on the immediate reproductive years – before, during, and after pregnancy – or on directly addressing the biological and physiological factors to influence health. Though this approach has and will continue to bring about additional gains, new models and innovations in designing and delivering maternal and child healthcare services are needed to make further progress. Tackling the social factors such as maternal education, maternal income, maternal exposures to racism and poverty could help provide a framework to address a broader range of factors contributing to maternal and child health. Making this shift in our thinking will require more comprehensive evaluations of programs and services, and better tracking of health outcomes. More research is needed to investigate the relationship between the cumulative insults of racism experienced over the life-course, and the psychological and physiological stressors that help create health disparities for Black women and their children. It is imperative that researchers and policy makers consider the social factors influencing health and how those factors may be mediated for improved health outcomes. Increased research, more robust policies, and stronger practices are key for ensuring the future health of all of America's women and children.

Future Directions

TABLE 10: Future Directions for MCH Research, Programs, and Policy

Social Determinants Research	Policy	Outcomes
Access to Preconception Care <ul style="list-style-type: none"> Long and short term benefits of preconception care. The relationship between maternal and infant health outcomes and preconception and prenatal care. 	<ul style="list-style-type: none"> Increase and standardize the frequency and quality of prenatal care to women at risk for adverse birth outcomes 	<ul style="list-style-type: none"> Improve birth outcomes and help physicians better manage the health of women.
Experiences of Racism/Racial Discrimination <ul style="list-style-type: none"> More research is needed to show how exposure to racism impacts physiological health. More research about how people experience race/ racism in the healthcare and services that they receive. 	<ul style="list-style-type: none"> Establish a procedure for cultural competency and care around race and racism for all clinicians, programs and services. 	<ul style="list-style-type: none"> Stronger, more culturally sensitive programs and services to address issues of race and racism in care and health.
Poverty <ul style="list-style-type: none"> Develop a comprehensive metric for measuring risk factors and health consequences of childhood, neighborhood SES Develop metric for measuring individual and family poverty 	<ul style="list-style-type: none"> Require clinicians to use pregnancy risk assessments to fine tune service and care to mothers at risk regardless of income background. Incorporate kin networks in list of resources MCH programs and services count for Substitute surrogates where kin networks are not available. Include more role for fathers in MCH programs and services. 	<ul style="list-style-type: none"> More holistic approach to understanding the risk factors influencing maternal health. Improved opportunities to intervene and address risk factors to improve maternal and child health. Stronger networks of support for mothers and women and children at risk for adverse birth and health outcomes.
Financial Insecurity/Instability and Health	<ul style="list-style-type: none"> Financial literacy education and skills training in all MCH programs and services 	<ul style="list-style-type: none"> Greater financial stability for mothers and families Resource and asset development
<ul style="list-style-type: none"> Study other models such as the Supplemental Poverty Measure to better assess poverty levels and access to resources. 	<ul style="list-style-type: none"> Develop new ways to assess family resources and eligibility requirements for greater delivery of programs and services 	<ul style="list-style-type: none"> Creates a wider social net to catch families, women, and children across the income and resource spectrum.
	<ul style="list-style-type: none"> Develop a state and federal requirement for paid maternity leave. Ensure women working in low-wage jobs are protected under the law and guaranteed maternity leave and other benefits without risks of losing their jobs. 	<ul style="list-style-type: none"> Improved health outcomes for children. Stronger families. Job security and more opportunities to bring women into the workplace. Increased opportunity for gender equity in parenting, both parents can take needed leave to care for their families.
	<ul style="list-style-type: none"> Provide basic income for all families with children younger than age 18. Provide a guaranteed supplemental income for working mothers and mothers enrolled in or other training in school, without a requirement to work to receive supplemental income. 	<ul style="list-style-type: none"> Fewer families in poverty. Increased standard of living for children and families.
	<ul style="list-style-type: none"> Incorporate and offer doulas and midwife services for pregnant women. Provide mental healthcare services for pregnant women and new mothers Include transportation costs support in MCH service and program delivery. 	<ul style="list-style-type: none"> Increase access to MCH care programs and services.

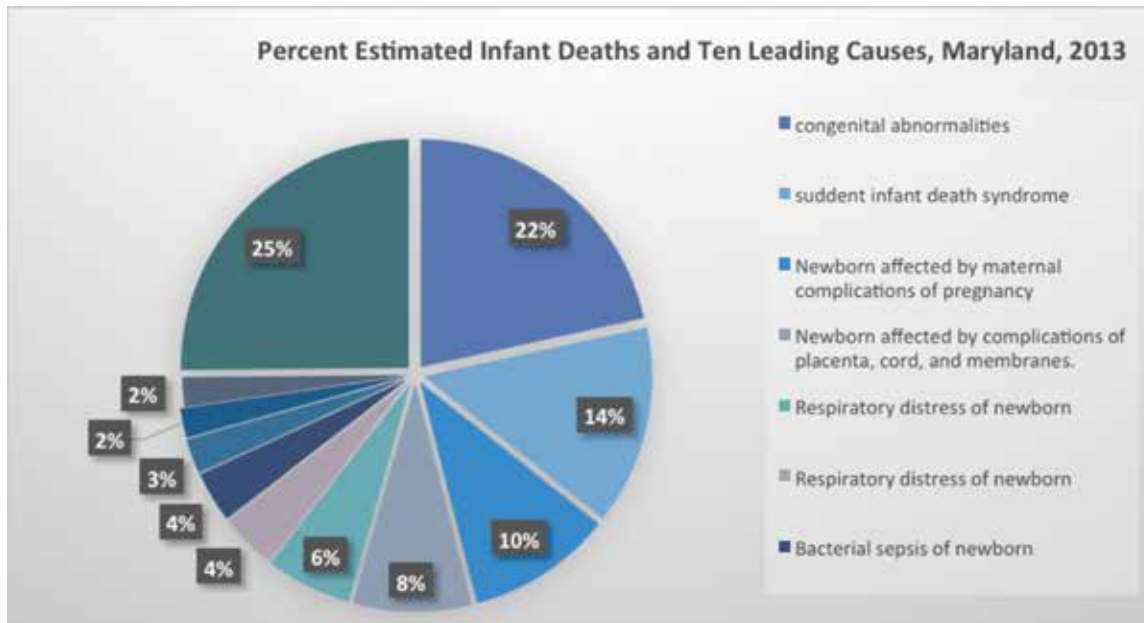
TABLE 11: Future Directions for MCH Programs and Services within the HRSA MCH Framework

TIER 1 – Direct Healthcare Services *(gap filling) Ex: Health services for children with special healthcare needs (CSHCN)	TIER 2 – Enabling Services transportation, translations, purchase of health insurance, case management coordination with Medicaid, WIC etc.	TIER 3 – Population Based Services Ex. Newborn screening, immunizations, SIDS counseling, outreach and public education	TIER 4 – Infrastructure Building Services Ex. Needs Assessment, policy development, quality assurance, applied research training
Mental Health counseling and care for parents and caregivers of CSHCN	Provide education and health promotion counseling to all women and men of childbearing age to reduce risks and improve pregnancy outcomes.	Provide continuity of maternity care starting before pregnancy and continuing over the life-course.	Allow women, children, and families to retain a primary healthcare provider, pediatrician, of their choice regardless of changes in their health, income, jobs, and housing status. This would grant providers and families to better ability to chart, track, and maintain goals for long-term health.
	Expand care providers to include trained and certified doulas. Continue to provide midwifery support.	Offer as a component of pregnancy care, two pre-pregnancy checkups for couples and individuals planning pregnancy.	Implement and use a supplemental poverty measure to assess need based aid for programs and services. Devise alternative measure for assessing family income levels.
	Include mental healthcare providers, social workers and public health nurses at resource centers to screen treat, and consult to coordinate care and develop pro-active approaches to promote health for women and children ages 0-1 year.	Offer as component of maternity care, a minimum of 6 months of post-pregnancy checkups Currently, women are speed tracked to receive care during pregnancy, and up to 6 weeks postpartum. Provide interconception healthcare to women who have had a previous pregnancy that ended in an adverse outcome, for example, low birthweight, fetal loss, preterm birth or birth defects.	Provide cultural competency training for service and care providers all levels of interaction with patients. Provide language skills and training for providers working with populations in high need communities.
	Provide resources for transportation costs to and from care sites for women. Provide safe sleeping arrangements including bassinets, cribs etc. for mothers and families who do not wish to co-sleep. Provide resources and supports for clothing and diapers for infants.	Promote awareness and importance of preconception health and health behaviors and preconception care services by using public and community outreach tools appropriate to various ages, literacy, (including health literacy) cultural and linguistic contexts, and health	Develop measure and track and evaluate changes in family income and location – community and housing in relation to health.

Appendix

Tables and Figures of Child and Infant Health Data, Maryland

Figure 5: Estimated Percent of Infant Deaths and Ten Leading Causes, Maryland, 2013



Source: Maryland Vital Statistics Administration

TABLE 12: Infant Deaths: Number, Percent, and Rate, Maryland, 2003-2013

Infant Deaths: Number, Percent of Deaths Under Age 5 and Infant Mortality Rate, Maryland 2003-2013			
Year	Number of Infant Deaths	% of Infant Deaths < Age 5	Infant Mortality Rate
2003	610	89%	8.1
2004	632	87%	8.5
2005	545	89%	7.3
2006	615	88%	7.9
2007	622	87%	8
2008	617	88%	8
2009	541	89%	7.2
2010	496	90%	6.7
2011	493	89%	6.7
2012	458	86%	6.3
2013	474	87%	*Not available at the time preparing this paper.

Source: Maryland Vital Statistics Administration

TABLE 13: Number and Rate of Infant Deaths by Race and Ethnicity, in Maryland, 2007-2012

	Number of Deaths		Mortality Rates	
	2007-2009	2010-2012	2007-2009	2010-2012
Infant Mortality				
All Races/Ethnicities	1,780	1,447	7.7	6.6
White non-Hispanic	540	411	5.1	4.1
Black non-Hispanic	1,052	834	13.7	11.6
Asian non-Hispanic	67	61	4.2	3.8
Hispanic -	103	129	3.4	4.2
Neonatal Mortality				
All Races/Ethnicities	1,289	1,061	5.6	4.8
White non-Hispanic	380	302	3.6	3.0
Black non-Hispanic	762	611	9.9	8.5
Asian non-Hispanic	54	48	3.4	3.0
Hispanic	81	91	2.6	3.0
Post neonatal Mortality				
All Races	491	386	2.1	1.8
White Non-Hispanic	160	109	1.5	1.1
Black non-Hispanic	290	223	3.8	3.1
Asian non-Hispanic	13	13	0.8	0.8
Hispanic	22	38	0.7	0.7

Source: Maryland Vital Statistics Administration

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