



## Study of Mortality Rates of African American Infants and Infants in Rural Areas

Report to the Senate Finance Committee  
and the House Health and Government  
Operations Committee

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## **Executive Summary**

In 2018, the Maryland General Assembly passed a bill requiring the Maryland Health Care Commission (MHCC) to conduct a study on mortality rates for Black infants (in both rural and urban areas) and infants in rural areas (“the Study”). Chapter 83 of the 2018 Maryland State Laws requires MHCC to consult with the Office of Minority Health and Health Disparities, the Maternal and Child Health Bureau, the Vital Statistics Administration, and interested stakeholders to conduct the Study. The statute requires that MHCC--

- (1) examine factors, beyond the known factors of low birth weight, teen pregnancy, poor nutrition, and lack of prenatal care, affecting the mortality of Black infants and infants in rural areas in the United States and in the State;
- (2) research programs in other countries, states, and localities, including Baltimore City, that have aimed to reduce the infant mortality rate;
- (3) make recommendations on methods to reduce the mortality rate of Black infants and infants in rural areas;
- (4) make recommendations on ways to use pregnancy navigators or community health workers to assist pregnant women with the goal of reducing the infant mortality rate;
- (5) make legislative recommendations regarding the establishment of a permanent council for lowering rates of disparity with respect to infant mortality; and
- (6) make recommendations regarding methods to reduce the costs associated with low birth weight infants and with infant mortality.

Significant change has occurred in the health care environment in Maryland, including expansion of health insurance coverage under the Affordable Care Act and increased focus on patient safety and quality initiatives related to newborn health in hospitals, since the last major plan for address infant mortality in Maryland was published in 2011. The 2011 Plan for Reducing Infant Mortality in Maryland had a goal of reducing the infant mortality rate to 6.5/1,000 live births by 2012. As of 2017, the infant mortality rate in Maryland was 6.5/1,000, representing no progress from the 2012 goal. The Black infant mortality rate stalled at 11.3/1,000 in 2012 and in 2017 the Black infant mortality rate was 10.9/1,000. Significant disparity in outcomes between Black and White infants continue. The infant mortality rate for rural infants appears to be worsening over recent years, a trend that is not present for urban infants. The purpose of this report is to recommend action that can foster improvements in the overall infant mortality rate in the State, but more importantly, reduce disparities based on race and geography.

## **Study Process**

MHCC conducted the study through (1) collaboration with other State offices and agencies to plan the study, analyze State data, and coordinate policy goals; (2) an agreement with the Department of Family Science (FMSC), School of Public Health, University of Maryland in College Park that provided research, meeting support and project management for the study; and (3) a stakeholder Work Group.

FMSC conducted literature reviews on factors related to infant mortality and programs aimed at reducing infant mortality. FMSC conducted an inventory of programs in Maryland that focus on infant mortality and qualitative interviews with leaders of community-based programs.

The Work Group met eight times, and formed subgroups that met in the fall of 2018. More than 60 individuals participated in Work Group meetings over the course of the study, representing broad stakeholder involvement.

### **Overview of Recommendations**

The recommendations on methods to reduce the infant mortality rate of Black infants and infants in rural communities were developed from the Study findings (including literature reviews, data analysis, and interviews). Recommendations were further refined through discussion and feedback from State agencies and Work Group members. The recommendations are organized into three themes: 1) Care Coordination, 2) Expanding and Enhancing Access and Utilization of Services, and 3) the Need for a Sustained and Central Focus on Infant Mortality within the State.

#### **Theme: Care Coordination**

##### **Recommendation 1: Improve existing care coordination processes and tools.**

- a) *Use of assessment tools:* Providers should use effective assessment tools to determine client needs and link to the electronic health record. Providers should improve use of existing tools to connect clients with resources to address client needs.
- b) *Electronic data sharing to support connections between providers to meet client needs*
  - i) MHCC should continue work to support the connection of electronic health records with electronic methods of data exchange (such as the State-Designated Health Information Exchange).
  - ii) Hospitals, health systems, other providers, and insurers should use interoperable electronic health records, health information exchange, and other tools to enhance electronic communication and data sharing across care delivery systems providing pre/interconception, prenatal, and postpartum services.
  - iii) One improvement would be moving paper screening and referral documents to an electronic format that allows for efficient and accurate data sharing between providers.
  - iv) Any approach that includes electronic data sharing of individually identifiable health information will require appropriate data sharing agreements between organizations and privacy safeguards, including patient consent.
- c) Maryland Medicaid should identify challenges and opportunities to optimize use of Medicaid Administrative Care Coordination Units for care coordination among Medicaid participants.
- d) Providers and insurers (including public payers) should improve rates of screening for maternal depression and anxiety and the increase the provision of guidance on safe sleep, breastfeeding, and child safety in prenatal care and well-child visits.

##### **Recommendation 2: Care coordination should include programs to address social determinants of health outcomes, including the impact of racism and bias.**

- a) Programs serving families should use tools and approaches that are appropriate for their community to connect clients with social supports and resources.
- b) Housing programs should prioritize pregnant and postpartum women for temporary housing programs, subsidized housing, and coordinate support for pregnant mothers/families to avoid evictions.

- c) The General Assembly, State agencies, payers, and funders should work to provide sufficient funding to ensure infrastructure supports for care coordination addressing social determinants of health, including appropriate engagement of public and community agencies.
- d) The Health Services Cost Review Commission, Medicaid, and private payers should explore necessary changes in payment models to support care coordination to address social determinants of health, including considering flexibilities available under the Total Cost of Care Model.

**Recommendation 3: Implement rigorous implicit racial bias training in relevant health care providers' education and clinical practices.**

- a) Physicians, nurses and other health care professionals who treat pregnant individuals or infants should participate in evidence-based implicit or unconscious bias training. Professional organizations can support these goals by including this training as a component of on-going quality improvement efforts and continuing education curriculums.
- b) Organizations that provide services to pregnant and postpartum women should provide evidence-based implicit or unconscious bias training for program staff as part of ongoing quality improvement efforts.
- c) Health systems and health care institutions should develop a process for reviewing standards and implementation of Cultural, Linguistic and Appropriate Services (CLAS).
- d) The Maryland Department of Health, in collaboration with academic institutions in Maryland, should create a strategic vision to increase the diversity of the healthcare workforce and students in training for roles that support maternal and infant health.

**Recommendation 4: Strengthen coordination of care by assessment and referral to necessary mental health and substance use disorder treatment programs**

- a) *Substance use disorder and mental health* – The Behavioral Health Administration should strengthen and expand referral systems to substance use disorder and mental health programs and ensure follow-up to determine clients have been successful in accessing the services. Additionally, these programs should identify pregnant and postpartum women as special populations within their program and provide targeted services.
- b) *Grief counseling* – Local Health Departments should expand access and referrals to grief counseling programs and support groups for mothers experiencing fetal or infant loss.
- c) *Continuing education* - Professional accreditation organizations and health systems should ensure that Maryland health care providers (obstetricians, pediatricians, nurse practitioners, midwives, etc.) receive continuing education in recognizing and addressing mental health issues and substance use disorders in pregnant and postpartum women.
- d) *Training* - Home visiting programs should ensure that home visitors receive training on recognizing mental health, trauma, and substance use disorder problems and providing appropriate referrals to community resources.

**Recommendation 5: Improve continuity of care**

- a) Maryland Medicaid and the Maryland Health Benefit Exchange should continue their work to strengthen and streamline systems and supports (including use of insurance navigators) for women who need to transition from Medicaid to Marketplace coverage after birth. The Maryland Health Benefit Exchange should evaluate, and if necessary, revise the process for women to enroll in Exchange plans postpartum.
- b) Providers should co-locate and integrate preconception through postpartum care services when possible to link family planning and primary care to obstetricians and prenatal care providers.
  - i) Providers should discuss reproductive life planning goals with their patients to identify women who may want to become pregnant or who may want to avoid pregnancy, and refer women to appropriate services.
  - ii) Hospitals should increase their utilization of the Maryland Department of Health's Postpartum Infant and Maternal Referral (PIMR) tool, which is used at discharge after birth to identify high-risk infant or mothers (medical, psychosocial needs).
  - iii) Providers should also consider co-locating postpartum and pediatric care.
- c) Health care services and direct service programs should focus on the mother-infant dyad and the whole family unit.
  - i) Well-child visits provide an opportunity for screening for maternal depression and anxiety along with guidance on safe sleep, breastfeeding, and child safety. Appropriate referral and care coordination/follow-up should follow identification of maternal depression or anxiety to ensure the patient's connection with appropriate mental health treatment programs.
  - ii) Payers should ensure that mental health treatment services are reimbursed at appropriate rates and appropriate payment models should be used to maximize maternal depression screening during well-child visits.

**Recommendation 6: Increase adoption of breastfeeding prior to hospital discharge and support continuation through the first year of life.**

- a) The Maryland Department of Health, in conjunction with other programs such as the Maryland Patient Safety Center, should consider additional ways to support increased breastfeeding rates in hospitals, with specific attention to Black mothers, to help increase their adoption of breastfeeding.
- b) Maryland birthing hospitals should become, at minimum, a "Maryland Best Practices Hospital" by adhering to the ten criteria in the Maryland Hospital Breastfeeding Policy Recommendations. If resources permit, they should consider seeking certification as Baby Friendly Hospitals®. State agencies should identify hospitals on their web sites that receive Baby Friendly Hospitals® certification.
- c) Healthcare providers should integrate assessment of breastfeeding into pediatric and postpartum visits, including addressing barriers and providing additional supports.
- d) Community health workers and doulas should receive training in the importance of breastfeeding to prevent infant mortality, how to identify and address barriers to breastfeeding, and making successful referral to breastfeeding programs within WIC and other community programs.
- e) Research has shown that support of breastfeeding by respected members of the parent's family and social network is key to breastfeeding adoption. Family and friends,

along with community health workers, can support breastfeeding and advocate for cultural beliefs and norms around breastfeeding in Black communities.

**Recommendation 7: Health care providers, community health workers, and other organizations should enhance patient education on pregnancy spacing.**

Physicians, nurses, doulas, community health workers and other care providers, operating within their scope of practice, should provide information to pregnant persons and people who have given birth about the importance of pregnancy spacing and the availability of contraceptive methods that meet patients' diverse needs and support the individual's family planning decisions.

***Theme: Expanding and Enhancing Access and Utilization of Services***

**Recommendation 8: Expand and improve home visiting programs throughout the State to improve maternal and infant health and reduce infant mortality and disparities.**

- a) State agencies, payers, and funders should continue to develop approaches for improving funding for evidence-based home visiting programs.
- b) Private insurance companies should strengthen their procedures for identifying pregnant women with high-risk pregnancies or needs for support with social determinants of health and provide adequate resources to improve healthy birth outcomes.
- c) The Maryland Medicaid, MCOs, other payers, providers, and home visiting programs should seek to better coordinate care to improve outcomes for the families that they serve.
- d) Maryland should consider the best practices from other states for implementing evidence-based home visiting programs, including best practices related to recruiting and training the workforce.
- e) The Maryland Department of Health should consider developing a specialty certification for CHWs in maternal and child health, as part of the certification program for CHWs that is currently in development.
- f) Organizations that provide home-visiting programs should ensure that pregnant women and community health workers are engaged in planning for expansions of evidence-based group prenatal care programs.

**Recommendation 9: Increase adoption of evidence-based group prenatal care programs.**

- a) Expand existing group prenatal care programs throughout the State.
  - i) Providers considering adopting or expanding group prenatal care should focus on populations for which the program has demonstrated success.
  - ii) Funders should consider funding start-up costs for providers to encourage implementation of "Centering Pregnancy", the March of Dimes "Supportive Pregnancy Care", and other group prenatal care models, to encourage providers to adopt this model.
  - iii) Payers should consider innovative financing and reimbursement models for group prenatal care.

**Recommendation 10: Enhance the use of telehealth to provide care in rural communities.**

- a) The Maryland Department of Health (MDH) should examine the peer-reviewed literature on promising use of telehealth for prenatal and postpartum care and other critical care issues (such as mental health care) in rural areas.
- b) MHCC and MDH should consider providing grant funding for pilot projects for telehealth related to maternal and infant health.
- c) Although the priority should be on telehealth services in rural areas, telehealth should be examined as an option for urban areas that suffer challenges with transportation to health facilities.

**Recommendation 11: State and local health agencies should invest in an infant mortality prevention health literacy initiative across sectors to create an informed and activated community of residents, health and social service providers, and facilities.**

**Recommendation 12: Continue investment in safe sleep education and increase investment in safe sleep resources.**

- a) Birthing facilities and other providers should model safe sleep behavior when infants are in their care and provide education to parents on safe sleep.
- b) Programs serving pregnant individuals and infants should provide safe sleep education and promote breastfeeding (a protective factor against SIDS).
- c) Programs, hospitals and health departments should consider providing safe sleep resources (such as a crib), in addition to education, for at-risk families who may not have a crib or other safe sleep setting.
- d) Promote public awareness through safe sleep marketing campaigns.

***Theme: Need for a Sustained and Centralized Focus on Infant Mortality***

A number of entities in the State government have responsibility for taking action to reduce disparities in birth outcomes while improving infant health. The legislative mandate for this report explicitly stated that the MHCC make a legislative recommendation regarding the establishment of a permanent council on infant mortality. A new entity could potentially fill gaps by coordinating State resources and focus attention on outcomes and disparities.

**Recommendation 13: Establish a permanent council focused on disparities in infant mortality and maternal mortality.**

The literature reviews, program inventory, and data analysis for this study support the link between maternal and infant health. Many of the risk factors or program needs identified were related to maternal health (e.g., hypertension, behavioral risk factors) or healthcare seeking (e.g., early initiation of prenatal care). The largest Black - White disparity in infant mortality was infant deaths due to maternal complications of pregnancy. Leading causes of maternal death, such as eclampsia, can cause significant complications for fetal and newborn health, including greater risk of death. Addressing the health of the mother not only improves maternal, but infant health as well. Given the strong connections between maternal and infant health and the importance of the maternal-infant dyad for promoting infant development, we recommend establishing a permanent council focused on disparities in infant and maternal mortality. A permanent council would provide ongoing focus and accountability in efforts to save the lives of infants and mothers in Maryland. This is critically important given the persistent nature of

disparities in both infant and maternal mortality, and the workgroup's acknowledgement that previous shorter term efforts to address these disparities were not sufficient for long term change. Based on work group discussions, potential responsibilities for the permanent council could include, but not be limited to:

- Cross-sector collaboration, including membership from the Department of Housing and the Department of Human Services.
- A regular (bi-annual) reporting requirement that integrates information from multiple agencies, and monitors and assesses progress.
- Identify funding needs and advocate for allocating new and sustainable funding sources to target the reduction of infant and maternal mortality through the implementation of the report recommendations.
- Work with MDH to identify counties, and where feasible, sub-county areas, where infant mortality rates and trends are highest, to focus resources on those areas.
- Foster support for counties to develop their logic model for the reduction of disparities in infant mortality disparities, using state and local data and robust community engagement with stakeholders, elected officials, health care organizations and community based organizations
- Evaluate current programs, communication and outreach resources that focus on infant mortality to determine the cost effectiveness of programs to ensure the most impactful use of limited resources and funding.
- Determine need for further incentives to increase the number of nurse practitioners and certified nurse midwives practicing in rural areas and address other workforce issues.

Any legislation establishing a permanent council must account for the responsibilities of existing organizations within the Maryland Department of Health, and not duplicate functions of existing organizations. A permanent council should be organized under the Governor or in the Office of the Secretary of Health to ensure that infant and maternal mortality are high priorities in Maryland Government. Although the permanent council could assume programmatic or analytic functions, these activities should not be its first or second priorities. The permanent council's first role should be raising awareness of the problem and ensuring that existing resources are effectively mobilized. In some instances, the permanent council can raise awareness of successes or challenges, in other situations it can serve an advocacy function, and in other cases, it can prod organizations to do better or to work together more effectively. To be effective, the permanent council must be composed of high-level experts and leaders in Maryland communities where the challenges are significant.

A permanent council should have the flexibility to organize itself to address evolving challenges. The authority and visibility to engage communities by forming advisory committees and the ability to periodically draw in staff from within MDH will be key to the council credibility. The Work Group believes that the advisory committees should be configured to include women who have been pregnant in the recent past including some who have experienced poor birth outcomes. There are numerous experts on infant and maternal issues within MDH, allowing the council to draw on those experts knowledge will enable the permanent council to judge the progress of existing programs and advocate for new initiatives.

## **Overview**

In 2018, the Maryland General Assembly passed a bill requiring the Maryland Health Care Commission (MHCC) to conduct a study on mortality rates for Black infants (in both rural and urban areas) and infants in rural areas (“the Study”).<sup>1</sup> Chapter 83 of the 2018 Maryland State required MHCC, in consultation with the Office of Minority Health and Health Disparities, the Maternal and Child Health Bureau, the Vital Statistics Administration, and interested stakeholders, to conduct a study regarding the mortality rates of Black infants and infants in rural areas. The statute requires that MHCC--

- (1) examine factors, beyond the known factors of low birth weight, teen pregnancy, poor nutrition, and lack of prenatal care, affecting the mortality of Black infants and infants in rural areas in the United States and in the State;
- (2) research programs in other countries, states, and localities, including Baltimore City, that have aimed to reduce the infant mortality rate;
- (3) make recommendations on methods to reduce the mortality rate of Black infants and infants in rural areas;
- (4) make recommendations on ways to use pregnancy navigators or community health workers to assist pregnant women with the goal of reducing the infant mortality rate;
- (5) make legislative recommendations regarding the establishment of a permanent council for lowering rates of disparity with respect to infant mortality; and
- (6) make recommendations regarding methods to reduce the costs associated with low birth weight infants and with infant mortality.

This report focuses on two populations: (1) Black infants (both in urban and rural areas) and (2) infants in rural areas. This report also includes findings and recommendations resulting from this study.

The work in this study builds off of a 2011 epidemiological study and plan focused on infant mortality in Maryland<sup>2</sup>, which proposed programmatic interventions across a parent’s life span, including improving primary care and family planning services integration before pregnancy, improving access to Medicaid and prenatal care during pregnancy, and increasing community services referrals after pregnancy and working with hospitals on perinatal standards. It also follows on the successes of earlier efforts to reduce infant mortality in Maryland, notably those spearheaded by the Governor’s Commission on Infant Mortality Prevention in the 1990s.

Since 2011, significant change has occurred in the health care environment in Maryland, including expansion of health insurance coverage under the Affordable Care Act and increased

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<sup>1</sup> Maryland Health Care Commission—Mortality Rates of African American Infants and Infants in Rural Areas – Study. 2018 Md. Laws, Chap. 83. Available from:

[http://mgaleg.maryland.gov/2018RS/chapters\\_noln/Ch\\_83\\_sb0266E.pdf](http://mgaleg.maryland.gov/2018RS/chapters_noln/Ch_83_sb0266E.pdf)

<sup>2</sup> Maryland Department of Health. Plan for Reducing Infant Mortality in Maryland. Baltimore, MD: 2011 Dec. 1-35. Available from:

[https://health.maryland.gov/babiesbornhealthy/pdf/Plan\\_Reducing\\_Infant\\_Mortality\\_MD\\_Dec2011.pdf](https://health.maryland.gov/babiesbornhealthy/pdf/Plan_Reducing_Infant_Mortality_MD_Dec2011.pdf)

Maryland Department of Health. Maryland Infant Mortality Epidemiology Work Group: Findings from Data Analysis and Overall Recommendations. Baltimore, MD: 2011 Aug 24. 1-31. Available from:

[https://health.maryland.gov/babiesbornhealthy/pdf/IM\\_Epi\\_Work\\_Group\\_%20Report\\_Final\\_Aug\\_24\\_2011.pdf](https://health.maryland.gov/babiesbornhealthy/pdf/IM_Epi_Work_Group_%20Report_Final_Aug_24_2011.pdf)

focus on patient safety and quality initiatives related to newborn health in hospitals. The 2011 Plan for Reducing Infant Mortality in Maryland had a goal of reducing the infant mortality rate to 6.5/1,000 live births by 2012, through a reduction of 4.2% in the Black infant mortality rate, from 11.8/1,000 live births in 2010 to 11.3/1,000 in 2012.

As of 2017, the infant mortality rate in Maryland was 6.5/1,000, representing no progress from the 2012 goal. The Black infant mortality rate was 10.9/1,000.<sup>3</sup> As concerning, the infant mortality rate for rural infants appears to be worsening over recent years, a trend that is not present for urban infants. The purpose of this report is to recommend action that can foster improvements in the overall infant mortality rate in the State, but more importantly reduce disparities based on race and geography.

### **Study Process**

MHCC conducted the study through (1) collaboration with other State offices and agencies to plan the study and analyze State data; (2) an agreement with the Department of Family Science (FMSC), School of Public Health, University of Maryland College Park that provided research, meeting support and project management for the study; and (3) a stakeholder Work Group.

Throughout the study, MHCC worked with the Office of Minority Health and Health Disparities, the Maternal and Child Health Bureau, the Vital Statistics Administration, the Health Resources Cost Review Commission; and other Agencies within the Maryland Department of Health. State staff planned the study approach, analyzed State data to better understand “factors … affecting the mortality of Black infants and infants in rural areas in the … State” and “costs associated with low birth weight infants”,<sup>4</sup> and provided feedback on the report.

The Department of Family Science (FMSC), School of Public Health, University of Maryland College Park provided research, report drafting support, meeting support, and project management for the Study. The research conducted by the team included literature reviews on factors related to infant mortality (Appendix C) and programs aimed at reducing infant mortality (Appendix D). A limited literature review was also conducted on the cost implications of infant mortality and poor birth outcomes (Appendix B). The FMSC team also created an inventory of programs in Maryland that focus on infant mortality (Appendix E). A limitation of this program inventory is that it does not include programs operated by insurers, including Medicaid Managed Care Organizations. Discussion of the role of Medicaid Managed Care Organizations is included in this report. Finally, the FMSC team conducted qualitative interviews with leaders of community-based programs in rural and Black communities in Maryland and other states. These interviews focused on the use of community health workers and similar staff in infant mortality prevention efforts (Appendix F). The FMSC team conducted this research and analysis

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<sup>3</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017.

Baltimore, MD: 2018 Sep. 1-4. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf).

This rate is for all Black infants. The rate for Black Non-Hispanic infants was 11.2 in 2017

<sup>4</sup> Maryland Health Care Commission—Mortality Rates of African American Infants and Infants in Rural Areas – Study. 2018 Md. Laws, Chap. 83. Available from:

[http://mgaleg.maryland.gov/2018RS/chapters\\_noln/Ch\\_83\\_sb0266E.pdf](http://mgaleg.maryland.gov/2018RS/chapters_noln/Ch_83_sb0266E.pdf)

under the direction of MHCC, with advice and input from other State staff on the Study's Work Group and subgroups.

The Study Work Group met 8 times between September 2018 and October 2019. The Work Group was chaired by Ben Steffen, Executive Director of MHCC. Dr. Lee Woods, the Medical Director for the Maternal and Child Health Bureau at MDH, and Dr. Noel Brathwaite, the Director of the Office of Minority Health and Health Disparities at MDH, served as Work Group co-chairs. The Work Group had three subgroups that developed and refined information on specific topics and provided draft recommendations to the larger Work Group for consideration. More than sixty individuals participated in the study through participation in a Work Group meeting or subgroup meeting. Additional information on the Work Group structure and a list of individuals who participated in the Work Group or a subgroup is available in Appendix I. Additional information on Work Group meetings is available at

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/workgroups\\_african\\_american\\_rural.aspx](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/workgroups_african_american_rural.aspx).

### **Description of Maryland Health Care Commission**

The Maryland Health Care Commission (MHCC) is an independent regulatory agency of the State of Maryland whose mission is to plan for health system needs, promote informed decision-making, increase accountability, and improve access in a rapidly changing healthcare environment by providing timely and accurate information on availability, cost, and quality of services to policy makers, purchasers, providers and the public.<sup>5</sup> The Commission's vision for Maryland is to ensure that informed consumers hold the health care system accountable and have access to affordable and appropriate health care services through programs that serve as models for the nation. MHCC has fifteen commissioners who are appointed by the Governor.

### **Background on Live Births and Infant Mortality in Maryland**

More than 71,000 infants were born in Maryland in 2017.<sup>6</sup> The focus of this study is Black infants and infants in rural communities.

Thirty-two percent of infants born in Maryland in 2017 are Black Non-Hispanic (Table 2). Approximately 26 percent of infants born in Maryland in 2017 were born to individuals residing in rural counties in the State (Table 1).<sup>7</sup>

Table 1: Live Births in Maryland by Geography, 2017

Source: Maryland Vital Statistics

	Number	Percent
Rural	18,340	26%
Non-Rural	53,249	74%
<b>TOTAL</b>	<b>71,589</b>	<b>100%</b>

<sup>5</sup> The Maryland Health Care Commission. MHCC (homepage). Baltimore, MD: 2019. Accessed 2019 Aug 25. Available from: <https://mhcc.maryland.gov/default.html>

<sup>6</sup> Vital Statistics Administration, Maryland Department of Health. Live Birth Data: 2017. Baltimore, MD: 2018. 1-34. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Live%20Births/Live\\_Birth\\_2017.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Live%20Births/Live_Birth_2017.pdf)

<sup>7</sup> Vital Statistics Administration, Maryland Department of Health. Additional 2017 Jurisdictional Data: Births. Baltimore, MD: 2018. 1-1. Available from:

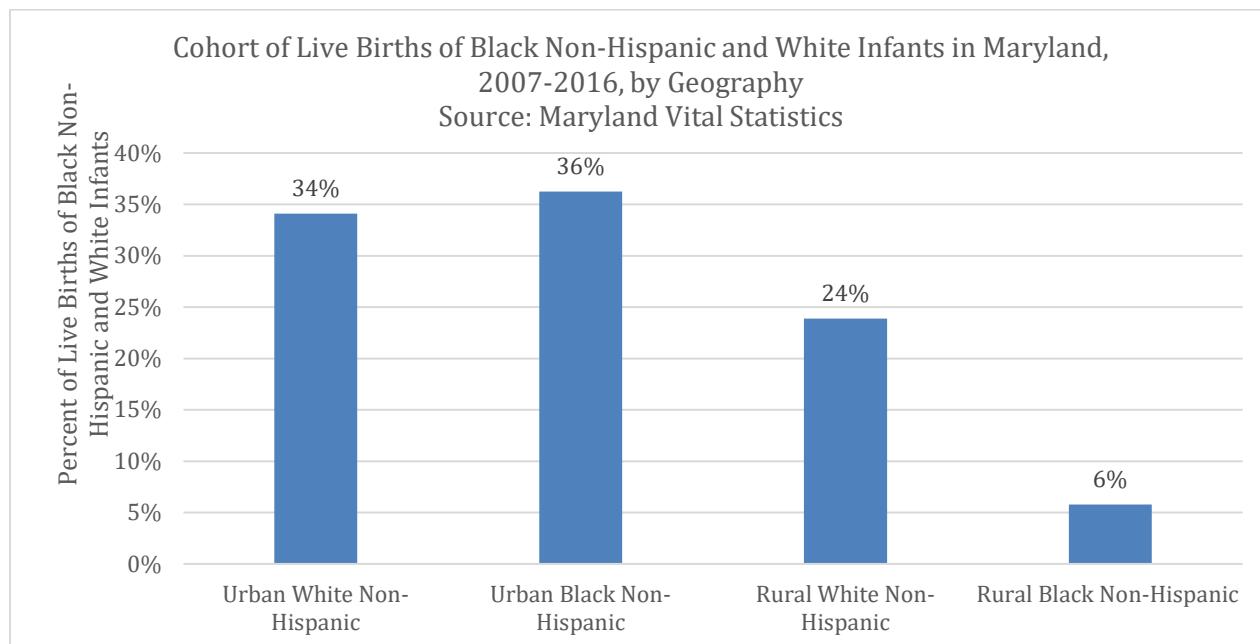
<https://health.maryland.gov/vsa/Pages/jurisdictional.aspx>. Table created by MHCC staff.

For some data analysis purposes in this study, a study cohort was created of live births of White Non-Hispanic and Black infants in Maryland from 2007-2016. Looking just at the study cohort, 58 percent of the cohort is White Non-Hispanic and 42 percent is Black Non-Hispanic. Seventy percent is urban. Six percent of the cohort is both Black Non-Hispanic and rural (or more than 16,000 infants over the 10 year period).

During the 25 year time period between 1990 and 2016, Maryland's Infant Mortality Rate decreased by thirty-five percent.<sup>8</sup> For purposes of this study, infant mortality is defined as a death within the first year of life. The infant mortality rate in Maryland has been above the national average throughout the past 25 years. In turn, the infant mortality rate in the United States is higher than the infant mortality rate in many other developed countries.<sup>9</sup>

Table 2: Live Births by Race and Ethnicity, Maryland, 2017		
	Number	Percent of total
White Non-Hispanic	30,392	42%
Black Non-Hispanic	23,043	32%
Hispanic	12,211	17%
Asian and Pacific Islander, Non-Hispanic	5,493	8%
Native American, Non-Hispanic	119	0%
Other	331	0%
Total	71,589	100%

Figure 1: Cohort of Live Births of Black Non-Hispanic and White Infants in Maryland, 2007-2016, by Geography



<sup>8</sup> See Figure 2: Infant Mortality Rates, Maryland & US, 1990 - 2016

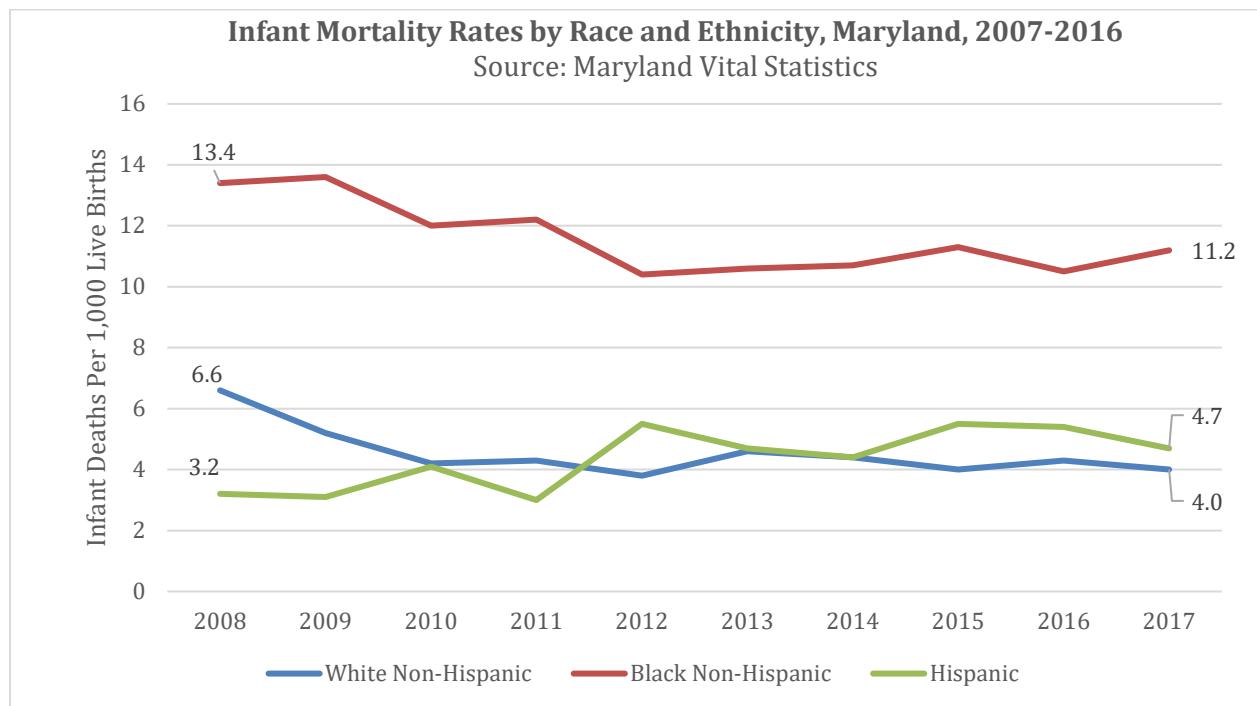
<sup>9</sup> "The U.S. infant mortality rate is 5.9 deaths per 1,000 live infant births, while the average rate of infant mortality among the OECD countries is 3.9 deaths per 1,000 live births."

United Health Foundation. America's Health Rankings 2018 Annual Report. Minneapolis, MN: 2019.

Accessed 2019 Sep 26. Available from: <https://www.americashealthrankings.org/learn/reports/2018-annual-report/findings-international-comparison>

According to the Kaiser Family Foundation, in 2016, Maryland's infant mortality rate ranked 35th in the nation.<sup>10</sup> Between 2014 and 2017, Maryland's infant mortality rate remained about one percentage point above the national average, translating to 1,908 potentially preventable deaths during this period.<sup>11</sup> In 2017, 462 infants died in Maryland in their first year of life, contributing to an infant mortality rate of 6.5 per 1,000 live births<sup>12</sup>. According to the Vital Statistics Administration, Maryland continues to fall short of the Healthy People 2020 benchmark rate of 6.0 infant deaths per 1,000 live births. Data on infant mortality in each county in Maryland is available in Appendix A2 and through the annual reports on infant mortality published by the Vital Statistics Administration, a component of the Maryland Department of Health.<sup>13</sup>

Figure 2: Infant Mortality Rates by Race and Ethnicity, Maryland, 2007 - 2016



<sup>10</sup> Kaiser Family Foundation. State Health Facts: Infant Mortality Rate, 2016. San Francisco, CA: 2019. Accessed 2019 Aug 8. Available from: <https://www.kff.org/other/state-indicator/infant-death-rate/?currentTimeframe=0&sortModel=%7B%22coll%22%22Infant%20Deaths%22,%22sort%22%22c%22%7D>

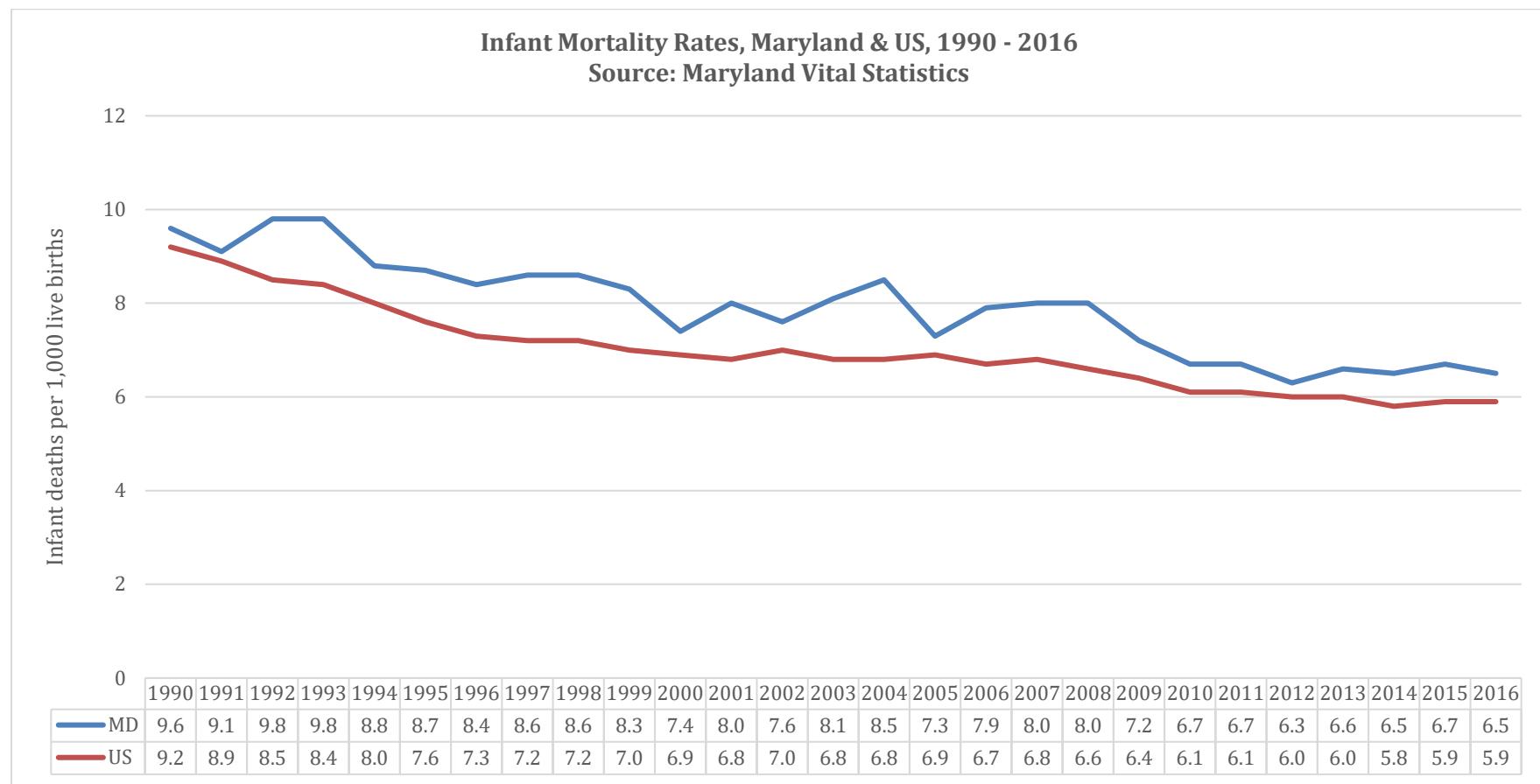
<sup>11</sup> The number of preventable deaths is calculated by the number of infant deaths that occurred between 2014-2017 minus the number of deaths that would be expected if the infant mortality rate were the same as the national average.

<sup>12</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep. 1-4. Available from: [https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

<sup>13</sup> Annual reports on infant mortality and live births in Maryland are published by the Vital Statistics Administration in the Maryland Department of Health and are available here: <https://health.maryland.gov/vsa/Pages/reports.aspx>

Study of Mortality Rates of African American Infants and Infants in Rural Areas

Figure 3: Infant Mortality Rates, Maryland & US, 1990 - 2016



Maryland's infant mortality rate is higher than the national average, in part, because the State has a higher proportion of Black residents than the average across the States, and the burden of infant mortality is borne disproportionately by people of color.<sup>14</sup> Among infants born in Maryland, non-Hispanic Black infants have the highest mortality rate compared to other racial and ethnic groups (Figure 3). In 2017, the mortality rate for White Non-Hispanic infants was 4.0 per 1000 births, while the mortality rate for Black Non-Hispanic infants was 11.2 per 1000 births. Black Non-Hispanic infants are 2.8 times more likely to die in their first year of life than White Non-Hispanic Infants. While disparities exist for Hispanic infants compared to White Non-Hispanic infants, the scale of the disparity is much smaller. In 2017, the mortality rate for Hispanic infants in Maryland was 4.7 per 1000 births.<sup>15</sup>

During 2016, Maryland's mortality rate for Black Infants ranked 9<sup>th</sup> in the United States, lower than the national average.<sup>16</sup> Nationally, the mortality rate for Black infants was 11.8 per 1,000 compared to 4.8 for White infants; in Maryland, the rate for Black infants was 10.5 per 1,000 compared to 4.3 per 1,000 White infants (see Appendix A2).<sup>17</sup> While mortality rates among both White and Black infants have declined over the past 25 years, the disparity between the two groups has persisted. The Maryland Maternal and Child Health Bureau estimates that to achieve racial parity, infant mortality among Blacks must be reduced by 59%.<sup>18</sup>

In 2017, the leading causes of infant death in Maryland include low birthweight (22%), congenital anomalies (19%), Sudden Infant Death Syndrome (SIDS) (12%), and maternal complications of pregnancy (8%).<sup>19</sup> Approximately nine percent of infants born in Maryland in 2017 had a low birthweight (less than 2500 grams or 5.5 pounds), and approximately eleven

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<sup>14</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep. 1-4. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

<sup>15</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep. 1-4. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

<sup>16</sup> Kaiser Family Foundation. State Health facts: Infant Mortality Rate by Race/Ethnicity, 2016. Updated 2019. Accessed 2019 Aug 8. Available from: <https://www.kff.org/other/state-indicator/infant-mortality-rate-by-race-ethnicity/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Non-Hispanic%20Black%22,%22sort%22:%22asc%22%7D>

<sup>17</sup> Nationally, Black Non-Hispanic infants are 2.3 times more likely to die in the first year of life than White Non-Hispanic infants.

Reid LD. Infant Mortality among Black & Rural Populations in Maryland. Analysis presented at the: Maryland Health Care Commission; 2018 Sep 17; Baltimore, MD. Available from:

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/IM%20\\_AA\\_Rrl\\_Wrkgrp\\_Prstn\\_20180917\\_FINAL\\_POSTED.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/IM%20_AA_Rrl_Wrkgrp_Prstn_20180917_FINAL_POSTED.pdf)

<sup>18</sup> Maternal and Child Health Bureau, Maryland Department of Health. Babies Born Healthy. Baltimore, MD: 2018 Sep. Accessed 2019 Aug 1. Available from:

<https://health.maryland.gov/babiesbornhealthy/Pages/home.aspx..>

<sup>19</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep. 1-4. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

percent of infants were born before 37 weeks of gestation, another concerning risk factor for infant mortality (Table 3).<sup>20</sup>

Figure 4: Leading Causes of Infant Death, Maryland 2017

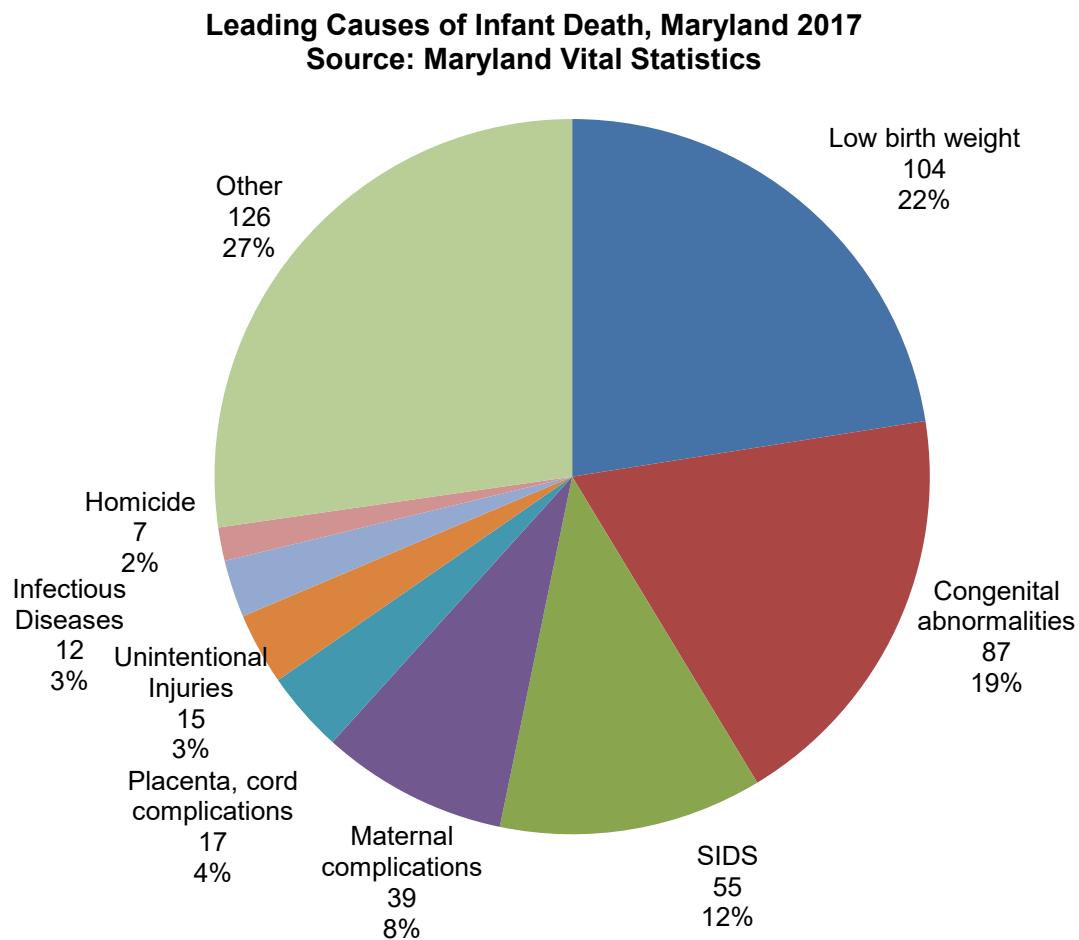


Table 3: Poor Birth Outcomes as a Percent of Live Births, Maryland, 2017

Source: Maryland Vital Statistics

Low Birthweight (<2500 grams)	8.9%
Very Low Birthweight (<1500 grams)	1.8%
Pre-term birth (born <37 weeks of gestation)	10.5%

<sup>20</sup> Callaghan WM, MacDorman MF, Rasmussen SA, Qin C, Lackritz EM. The contribution of preterm birth to infant mortality rates in the United States. Pediatrics. 2006 Oct;118(4):1566-73.  
DOI:10.1542/peds.2006-0860

Most infant deaths (68 percent) occurred in the neonatal period (the first month of life). Infant deaths in the neonatal period are more likely to be associated with factors related to the pregnancy and delivery compared with post neonatal infant mortality (between 1 month and 1 year).<sup>21</sup> Similar to Maryland, national data show that the rates of post neonatal mortality are lower than neonatal mortality, but the leading causes are more likely to be related to SIDS and injury-related deaths.<sup>22</sup> A recent Maryland State Child Fatality Review Report on SIDS indicated that the majority (84 percent) of these deaths occurred before 5 months of age and that unsafe sleep was indicated as a factor in the majority of cases (240 of 262 cases from 2012-2016).<sup>23</sup>

Vital statistics data from 2017 indicate that compared to White infants, Black infants were 4 times more likely to die from low birthweight, 2 times more likely to die from congenital abnormalities, 2.5 times more likely to die from SIDS, and 13 times more likely to die from maternal complications of pregnancy.<sup>4</sup> That Black infants are 13 times more likely to die from maternal complications is a reflection of persistent disparities in maternal mortality between Black and White women in Maryland. A 2018 report to Governor Hogan documented the dramatic disparities in maternal mortality rate over multiple overlapping five-year periods from 2007-2011 to 2012-2016, finding that in the most recent period, 2012-2016, the Black maternal mortality rate is 3.7 times higher than the White rate.<sup>24</sup>

The Vital Statistics Administration annually reports on births and infant mortality. Those reports are available here: <https://health.maryland.gov/vsa/Pages/reports.aspx>.

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<sup>21</sup> U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. Data Brief: Infant Mortality by Age at Death in the United States, 2016. Hyattsville, MD; 2018 Nov. 1-8. No. 236. Available from: <https://www.cdc.gov/nchs/data/databriefs/db326-h.pdf>

<sup>22</sup> U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. Data Brief: Infant Mortality by Age at Death in the United States, 2016. Hyattsville, MD; 2018 Nov. 1-8. No. 236. Available from: <https://www.cdc.gov/nchs/data/databriefs/db326-h.pdf> In recent years, deaths in Maryland due to SIDS remained nearly steady at approximately 50 deaths annually, but 2017 marked an increase with 55 SIDS related deaths.

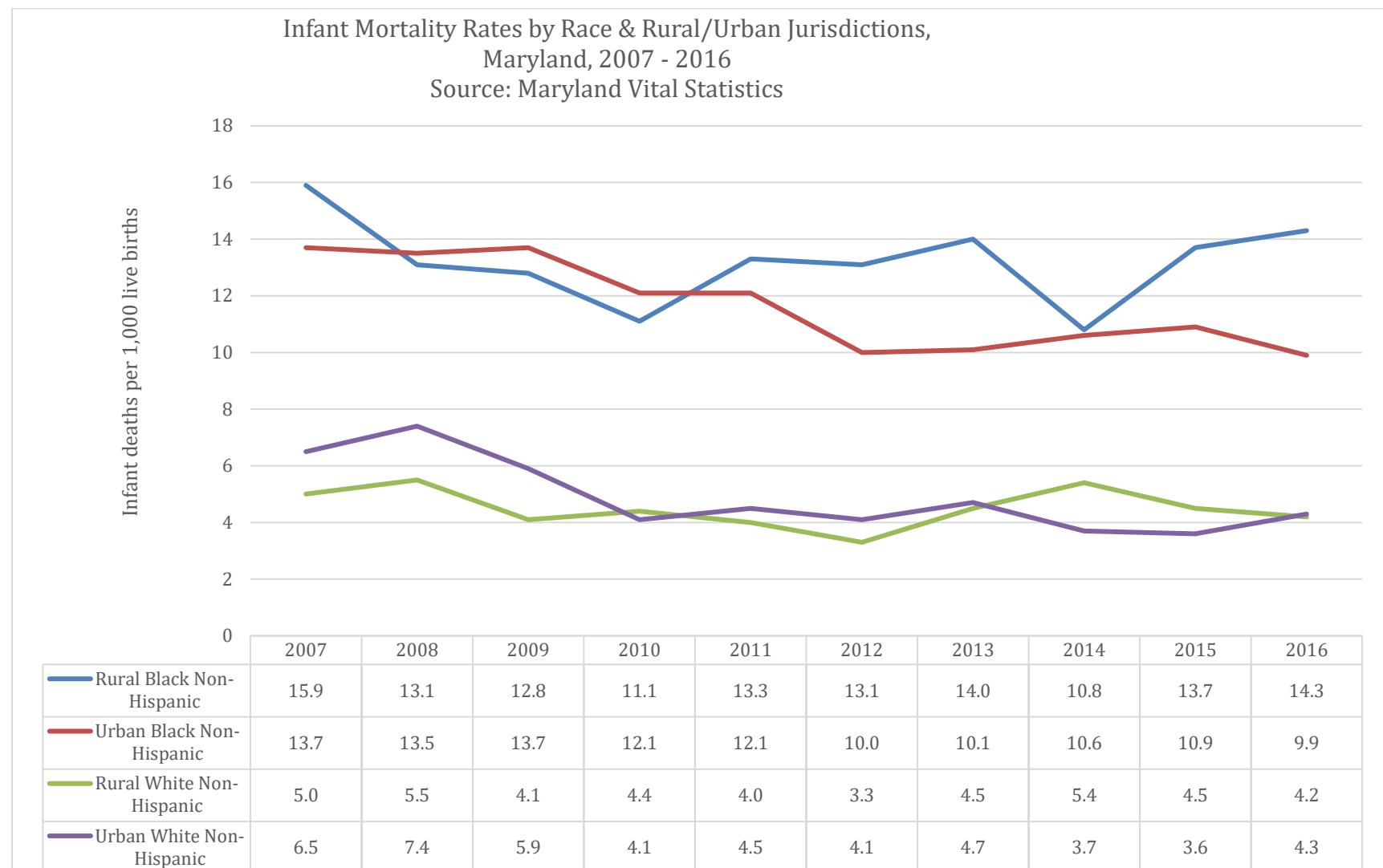
Maryland State Child Fatality Review Team. 2017 Annual Legislative Report. Baltimore, MD: 2018. 1-31. Available from: <https://health.maryland.gov/talbotcounty/Documents/2017%20Maryland%20State%20Child%20Fatality%20Review.pdf>.

<sup>23</sup> Maryland State Child Fatality Review Team. 2017 Annual Legislative Report. Baltimore, MD: 2018. 1-31. Available from: <https://health.maryland.gov/talbotcounty/Documents/2017%20Maryland%20State%20Child%20Fatality%20Review.pdf>.

<sup>24</sup> 2018 Maryland Code Health—General Title 13-- Miscellaneous Health Care Programs – Subtitle 12 – Maternal Mortality Review program Annual Report. Md Code, Health Gen. § 13-1207, 2018. Available from: <https://law.justia.com/codes/maryland/2018/health-general/title-13/subtitle-12/section-13-1207/>

Study of Mortality Rates of African American Infants and Infants in Rural Areas

Figure 5: Infant Mortality Rates by Race & Rural/Urban Jurisdictions, Maryland, 2007 - 2016



## ***Infant Mortality by Geography and Race***

For this study, data were analyzed for Black and White non-Hispanic infants in all jurisdictions of the State. In the 2012 - 2016 time period, the rural infant mortality rate was 5.8/1000, while the urban infant mortality rate was 6.5/1000.<sup>25</sup> Historically, rates of infant mortality have been higher in urban areas than in rural areas.<sup>26</sup> While infant mortality rates have declined across the State, these declines have not been uniform. Between 2007 - 2011 and 2012 - 2016 in rural areas of Maryland, the infant mortality rate among Black and White residents decreased by less than 1% and 5% respectively (see Figure 4).

In contrast, in urban areas during that same time period, the infant mortality rate among Black and White Non-Hispanic infants decreased by 21% and 29% respectively. In some rural areas, infant mortality rates have been increasing from the 2008-2012 time period to the 2013-2017 time period.<sup>27</sup> It is important to note the rural/urban comparison is confounded by race. While the statewide burden of infant mortality remains somewhat higher in urban than rural counties, in 2016, Black infants born in rural Maryland had a higher mortality rate (14.3 per 1000) than Black infants born in urban counties (9.9 per 1000) (Figure 4). Additional findings from this data analysis can be found in Appendix A.

## ***Factors Impacting Infant Mortality in Black and Rural Communities***

The statute authorizing this Study required an examination of “factors, beyond the known factors of low birth weight, teen pregnancy, poor nutrition, and lack of prenatal care, affecting the mortality of Black infants and infants in rural areas in the United States and in the State”.<sup>28</sup> These factors were identified through a literature review and an analysis of Maryland data.

## ***Overview of Literature Review on Factors Impacting Infant Mortality***

The FMSC team completed a review of peer-reviewed literature in the United States published between 2008 and 2018 (See Appendix C for the complete literature review and related conceptual framework). A substantial literature exists on factors impacting infant mortality for Black Infants. Fewer peer-reviewed studies exist that are specifically focused on infant mortality in rural populations (Appendix C contains a discussion of risk factors and protective factors for rural infants).

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<sup>25</sup> Vital Statistics Administration, Maryland Department of Health. Linked Birth/Death file for 2012-2016 births.

<sup>26</sup> Unless otherwise specified, this data is calculated using State of Maryland Department of Health definitions of “urban” and “rural”. Rural includes Allegany, Calvert, Caroline, Carroll, Cecil, Charles, Dorchester, Frederick, Garrett, Harford, Kent, Queen Anne’s, Somerset, Saint Mary’s, Talbot, Washington, Wicomico, and Worcester counties. Urban includes Baltimore County and City, Anne Arundel, Howard, Montgomery, and Prince George’s Counties.

<sup>27</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep. 1-4. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

<sup>28</sup> Maryland Health Care Commission—Mortality Rates of African American Infants and Infants in Rural Areas – Study. 2018 Md. Laws, Chap. 83. Available from:

[http://mgaleg.maryland.gov/2018RS/chapters\\_noln/Ch\\_83\\_sb0266E.pdf](http://mgaleg.maryland.gov/2018RS/chapters_noln/Ch_83_sb0266E.pdf)

The literature review confirmed the importance of preventing the five recognized causes of infant mortality: preterm birth, low birthweight, SIDS, obstetric complications, and accidents. In Maryland, these five factors make up 46 percent of the major causes for infant mortality, and thus deserve continued attention. Other major causes of infant mortality in the national literature are congenital anomalies (18.8%), newborn complications (3.7%), newborn sepsis (2.6%), and neonatal hemorrhage (2.4%).

The literature review identified additional factors related to individual health and behavior, demographic factors, and access to quality care. Appendix C includes discussion of the association between smoking and infant mortality, prior birth outcomes and infant mortality, maternal health (such as diabetes and hypertension), safe sleep behaviors (such as co-sleeping and sleep surface), access to prenatal care, post-partum depression, paternal involvement, interpersonal racism/bias, segregation/structural racism and income inequality

Infant mortality is a multifactorial phenomenon, with determinants that include the mother's health prior to and during pregnancy, those related to the clinical course of pregnancy, those associated with the birth and postpartum experience, and infant and maternal health during infancy. Therefore, reducing disparities in infant mortality will require attention to the diverse and inter-related set of risk factors and their causes. Individual-level, demographic, and access to care issues do not fully explain the persistent racial disparities in infant mortality. Black women experience an elevated risk of infant mortality regardless of their risk profile and regardless of whether they live in rural or urban areas. This highlights the importance of considering the lived experience of African Americans when considering preventive measures. In the U.S., even well-educated and high-income African Americans do not realize the same-level of protections against risk of mortality that is conferred to White women with similar levels of education and income. (Appendix C) A full accounting of racial disparities in infant mortality must also consider larger societal factors that disenfranchise Black populations regardless of their individual-level demographic factors, such as income and education.

### ***Analysis of Maryland Vital Statistics Data***

To complement the findings of the national literature review described above, the Work Group staff analyzed data from Maryland Vital Statistics. Most of the data used in this analysis is from a dataset that links data from birth certificates for births in 2012-2016 with data from death certificates for deaths in 2012-2017 (hereafter referred to as the Linked Birth-Infant Death Cohort, 2012-2016 Births).

For all factors studied, the mortality rate for non-Hispanic Black infants was higher than the mortality rate for non-Hispanic White infants. This is similar to the findings in the literature review that Black women experience an elevated risk for infant mortality regardless of their risk profile. Differences in risk between urban and rural jurisdictions were specific to each risk factor (e.g. Smokers in urban jurisdictions have a higher risk of infant mortality than smokers in rural jurisdictions, while late or no prenatal care has a worse impact in rural communities)<sup>29</sup>. Additional information about the data analysis can be found in Appendix A.

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<sup>29</sup> See Appendix A.

## ***Methodology***

The Linked Birth-Infant Death Cohort data was analyzed to look at associations between infant mortality and educational attainment, smoking, marital status, insurance source, prenatal care utilization, chronic hypertension, gestational hypertension, gestational diabetes, breastfeeding before hospital discharge, the length of the inter-pregnancy interval, and pre-pregnancy body mass index (BMI). These factors were identified by a process that considered factors mentioned in the statute authorizing this study, factors that were studied by the 2011 Maryland Infant Mortality Epidemiology Work Group, factors identified as important by members of the Work Group for this study, and factors identified in the national literature review described above. Not all factors that were identified as important by the Work Group or other sources are included in this analysis due to limitations in the data set (for example, data about experience of racial bias is not available in this data set) and limitations on study resources to conduct additional analysis. Because infant mortality is a relatively rare event, the data are not presented by individual year or jurisdiction, to avoid reporting small cell sizes and to improve statistical accuracy.

The correlation for each factor studied with infant mortality by race and geography is reported below. A strong correlation does not mean that infant mortality is caused by that factor. The data analysis conducted does not control for confounding factors, which may be significant. A number of factors that were not evaluated in the Maryland data cohort analysis could influence infant mortality overall and disparities based on race and geography. The analysis of Maryland data in the report do not include analysis of interaction between the factors studied or other potential confounding factors. However, to the extent this analysis aligns with the findings of the national literature review, it is useful.

Data in this study was analyzed at the State and County level. County level data was combined to generate rural and urban geographic categories. Sub-county level data (e.g. zip code or census tract) could be useful for targeting interventions, but sub-county analysis is not included in this document (see Appendix A for a further discussion of this topic).

## ***Findings from the Literature Review on “Factors” Related to Infant Mortality and Maryland Data***

This section combines findings from the national literature review on factors related to infant mortality with data analysis using Maryland data (methodology described above; additional data analysis in Appendix A).

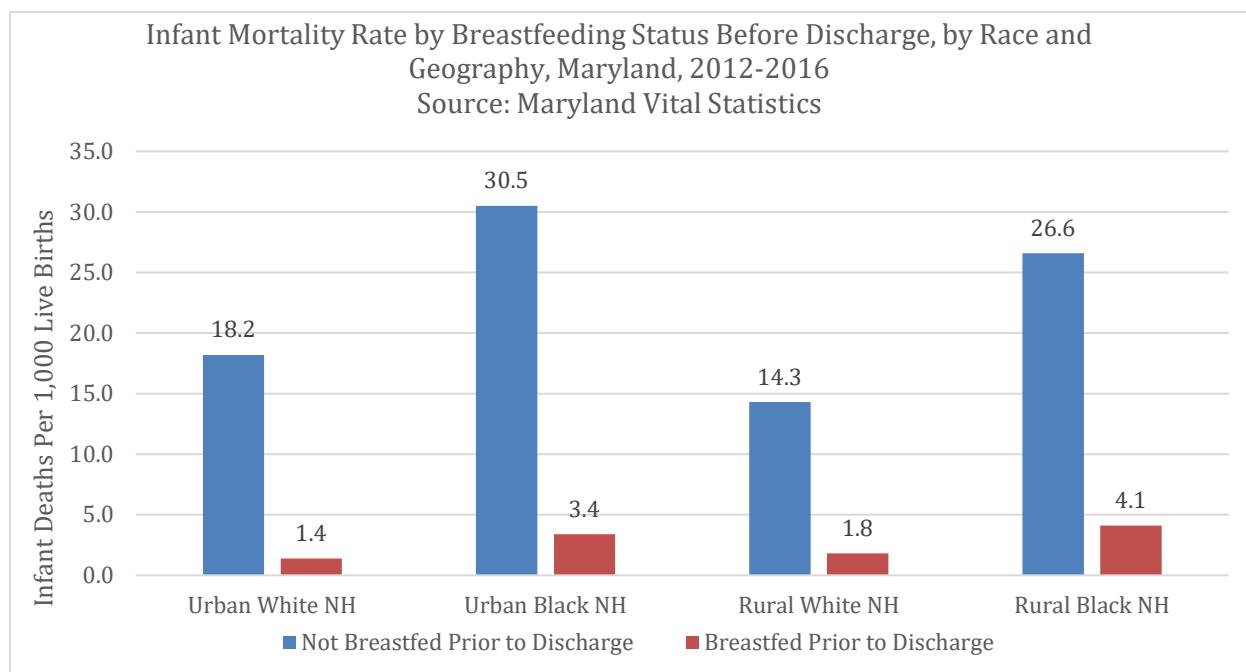
### ***Individual-Level and Demographic Factors***

Several factors that reflect individual behaviors and demographic characteristics were identified in the literature review. Individual behaviors are strongly influenced by culture, environmental context, social determinates of health, and other systematic factors.

## Breast Feeding: A Protective Factor

The national literature review identified the importance of breast feeding as a protective factor for infant mortality.<sup>30</sup> This finding was supported by the analysis of Maryland data. Black infants are the least likely to be breastfed, compared to infants of other races and ethnicities.<sup>31</sup> The national literature review found that a lower proportion of rural children are breastfeed in comparison to urban children, and that the lowest prevalence of breastfeeding is in Black families in rural areas (Appendix C). A number of different types of interventions have been developed to encourage breast feeding.<sup>32</sup>

*Figure 6: Infant Mortality Rate by Breastfeeding Status before Discharge, Race, and Geography, Maryland, 2012-2016*



According to Maryland data from for Black Non-Hispanic and White Non-Hispanic infants born in 2012-2016, failure to start breastfeeding before hospital discharge correlates strongly with infant mortality for Black Non-Hispanic infants. Black Non-Hispanic women living in urban areas who do not start to breastfeed before leaving the hospital after birth face an infant mortality rate of 30.5/1,000, compared to a rate of 3.4/1,000 for their peers who initiated breastfeeding prior to hospital discharge. The rates are lower for women in rural areas, but are much higher than the

<sup>30</sup> See Appendix C. Breastfeeding is overall protective. It does increase the risk of co-sleeping, which is in turn a risk for SIDs, so women who are breastfeeding should be counseled against co-sleeping (see Appendix C). U.S. Department of Health and Human Services, Health Resources and Services Administration. The Health and Well-Being of Children in Rural Areas: A Portrait of the Nation, 2007. Washington, D.C; 2011 Sep. 1-51. Available from: <https://mchb.hrsa.gov/nsch/07rural/moreinfo/pdf/nsch07rural.pdf>.

<sup>31</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration. The Health and Well-Being of Children in Rural Areas: A Portrait of the Nation, 2007. Washington, D.C; 2011 Sep. 1-51. Available from: <https://mchb.hrsa.gov/nsch/07rural/moreinfo/pdf/nsch07rural.pdf>.

<sup>32</sup> Moon RY, Hauck FR, Colson ER. Safe infant sleep interventions: What is the evidence for successful behavior change? *Curr Pediatr Rev.* 2016;12(1):67-75. DOI:10.2174/1573396311666151026110148

overall infant mortality rate for all racial and geographic groups in this study. The relative risks of not breastfeeding v. breastfeeding are higher than any other risk factor studied for all groups of women (see Table 4). This data is limited by only including data in the hospital at birth; as such it does not capture data on breast feeding that occurs outside of the hospital. Readers should keep in mind that this data could be impacted by a number of confounding factors, including socio-economic factors, the health of the infant at birth, maternal health status as examples. A more complex analysis of factors could clarify the findings. However, the strong support for breastfeeding in the national literature suggests that a focus on increasing breastfeeding initiation in Maryland could be useful.

Table 4: Relative Risk of Not Breastfeeding before Hospital Discharge at Birth v. Breastfeeding, Maryland, 2012-2016

Source: Maryland Vital Statistics

Urban White Non-Hispanic	Urban Black Non-Hispanic	Rural White Non-Hispanic	Rural Black Non-Hispanic
13.00	8.97	7.94	6.49

To support breastfeeding after birth, Maryland's Perinatal System Standards (Standard 6.7) require birthing hospitals to "have at least one full-time equivalent International Board Certified Lactation Consultant who shall have programmatic responsibility for lactation support services which shall include education and training of additional hospital staff members in order to ensure availability of lactation support seven days per week."<sup>33</sup>

#### Interpregnancy Interval

Short interpregnancy interval (the time between a previous live birth and the start of the next pregnancy) is also recognized as an important factor in infant mortality and other poor birth outcomes in U.S. literature.<sup>34</sup> A short pregnancy interval is associated with other risk factors, including income, smoking, and age.<sup>35</sup> The Maryland Vital Statistics data also showed a correlation between inter-pregnancy interval and infant mortality. Black Non-Hispanic infants in rural areas born less than 1 year after a sibling have a mortality rate of 30.2 per 1,000 infants, while infants with the same characteristics born more than 2 years after the most recent sibling

<sup>33</sup> Perinatal Clinical Advisory Committee. The Maryland Perinatal System Standards, Revised April 2019. Baltimore, MD: 2019. 1-31. Available from:

[https://phpa.health.maryland.gov/mch/Documents/perinatal\\_newsletters/Maryland%20Perinatal%20System%20Standards\\_Revised%20April%202019\\_FINAL.pdf](https://phpa.health.maryland.gov/mch/Documents/perinatal_newsletters/Maryland%20Perinatal%20System%20Standards_Revised%20April%202019_FINAL.pdf)

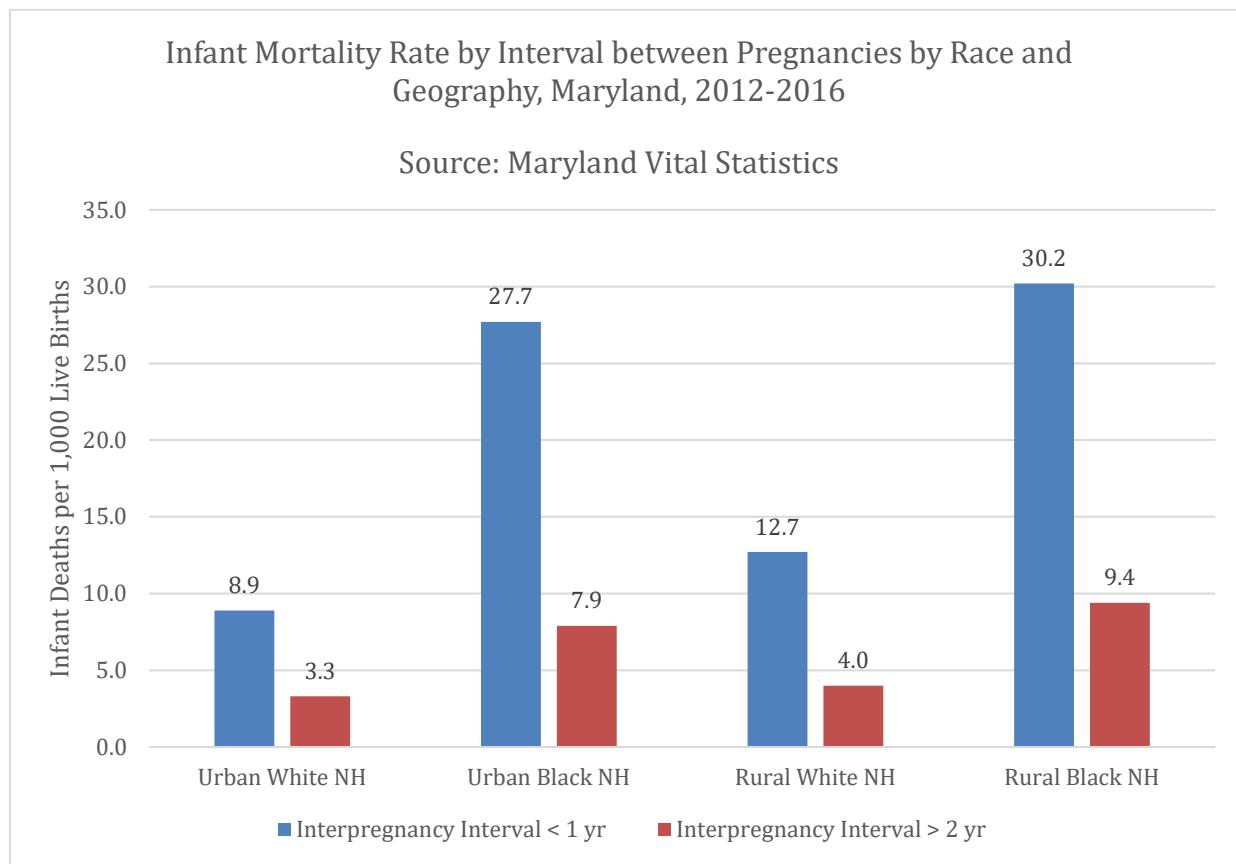
<sup>34</sup> Smith GC, Pell JP, Dobbie R. Interpregnancy interval and risk of preterm birth and neonatal death: retrospective cohort study. *BMJ*. 2003; 327(7410):313. [correction published: 2003 Oct 11; 327(7419):851]. DOI:10.1136/bmj.327.7410.313; One study found the optimal birth spacing was 18-23 months, with higher risks for both shorter and longer interpregnancy intervals.

Bao-Ping Zhu, M.D., Robert T. Rolfs, M.D., M.P.H., Barry E. Nangle, Ph.D., and John M. Horan, M.D., M.P.H., Effect of the Interval between Pregnancies on Perinatal Outcomes, *N Engl J Med*. Feb 25; 340(8):589-94. DOI:10.1056/NEJM199902253400801

<sup>35</sup> Smith GC, Pell JP, Dobbie R. Interpregnancy interval and risk of preterm birth and neonatal death: retrospective cohort study. *BMJ*. 2003; 327(7410):313. [correction published: 2003 Oct 11; 327(7419):851]. DOI:10.1136/bmj.327.7410.313

have a mortality rate of 9.4 per 1,000. A short time period between pregnancies (less than 1 year) was associated with an increased risk of infant mortality for all groups of women in the study cohort data set, compared to longer intervals between pregnancies.

Figure 7: Infant Mortality Rate by Interval between Pregnancies, Race, and Geography, Maryland, 2012-2016



### Maternal Health: Hypertension

The national literature review identified maternal hypertension (either chronic or pregnancy-related)<sup>36</sup> as clinical risk factors for IM among Blacks through the literature review. Recent national findings support the role of maternal hypertension, particularly chronic hypertension, in addressing disparities in preterm birth, a leading cause of infant mortality, after accounting for other pregnancy-related health conditions (e.g., diabetes) and sociodemographic characteristics.<sup>37</sup> Maryland data on maternal hypertension, support the findings of the literature review.

<sup>36</sup> A 2011 study of infant mortality in Mississippi found that Black women with hypertension were 2 and 3 times more likely to have a preterm birth or a low birth weight baby. Zhang L, Cox RG, Graham J, Johnson D. Association of maternal medical conditions and unfavorable birth outcomes: Findings from the 1996–2003 Mississippi linked birth and death data. *Matern Child Health J.* 2011; 15(7):910-920. DOI:10.1007/s10995-009-0516-8

<sup>37</sup> Thoma ME, Drew LB, Hirai AH, Kim TY, Fenelon A, Shenassa ED. Black-White Disparities in Preterm Birth: Geographic, Social, and Health Determinants. *Am J Prev Med.* 2019; e-print ahead of publication. DOI:10.1015/j.amepre.2019.07.007

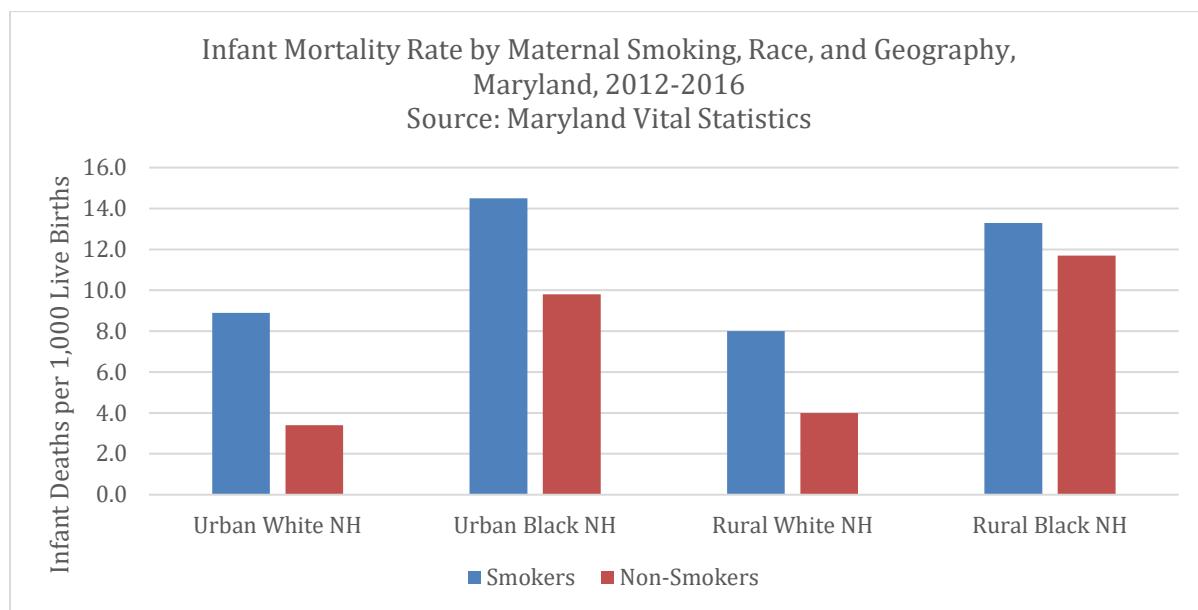
Table 5: Infant Mortality Rate for Chronic and Gestational Hypertension by Race and Geography, Maryland, 2012-2016

Source: Maryland Vital Statistics

	Urban White Non-Hispanic	Urban Black Non-Hispanic	Rural White Non-Hispanic	Rural Black Non-Hispanic
Chronic Hypertension	8.2	14.3	7.7	26.1
	3.7	9.8	4.5	11.2
Gestational Hypertension	4.7	10.0	5.3	10.5
	3.8	10.0	4.5	12.0

### Smoking

Figure 8: Infant Mortality Rate by Maternal Smoking, Race, and Geography, Maryland, 2012-2016



Maternal smoking is an important risk factor for mortality among all infants. In the national literature, smoking is associated with an increased risk of SIDS death, low birthweight, and preterm birth.<sup>38</sup> In a 2016 national survey of the noninstitutionalized U.S. civilian population, 16.6% (95% CI 15.9–17.4) of White adult women (i.e., aged  $\geq 18$  years) and 16.5% (95% CI 14.7–18.3) of Black women were current smokers.<sup>39</sup> Rural areas have a high prevalence of

<sup>38</sup> Wagijo MA, Sheikh A, Duijts L, Been JV. Reducing tobacco smoking and smoke exposure to prevent preterm birth and its complications. *Paediatric Resp Revs*. 2017; 22:3-10. DOI.10.1016/j.prrv.2015.09.002

<sup>39</sup> 2016 is the most recent data available. Jamal A, Phillips E, Gentzke AS, Homa DM, Babb SD, King BA, et al. Current Cigarette Smoking Among Adults –United States, 2016. *MMWR Morb Mortal Wkly Rep* 2018;67: 53-59. DOI:10.15585/mmwr.mm6702a1

smokers.<sup>40</sup> Rural children are more likely to live with a smoker than urban children, irrespective of race.<sup>41</sup> The reviewed literature emphasizes the importance of early availability of smoking cessation programs ([Maryland's Quit Line](#) provides smoking cessation support with heightened incentives for pregnant individuals).<sup>42</sup>

The analysis of Maryland data identifies some association between smoking during pregnancy and infant mortality (Figure 7). However, the difference in infant mortality outcomes between smokers and nonsmokers is smaller for Black families than for White families. In this cohort of Maryland data, significant differences exist in the prevalence of smoking by race and geography (*Table 6*).

Table 6: Percent of Infants with a Mother that Smokes, by Race and Geography, Maryland, 2012-2016	
Source: Maryland Vital Statistics	
Urban NH White	17%
Urban NH Black	8%
Rural NH White	25%
Rural NH Black	11%

#### Other individual factors, including safe sleep

The literature review also identified history of a previous stillbirth or death of child in infancy<sup>43</sup> and maternal depression, during either the prenatal or postpartum period, as additional clinical risk factors for infant mortality.<sup>44</sup> Maternal depression was also found to increase risk for bed sharing and reduce the likelihood of breastfeeding, both risk factors for SIDS.<sup>45</sup> Maternal depression is an established risk factor for or co-occurs with other health risk behaviors, including smoking and substance use disorder (SUD), which also increase the risk of infant mortality.<sup>46</sup> History of previous loss of a child and maternal depression were not included in the analysis of Maryland data (for a description of methodology, see Appendix A).

<sup>40</sup> Centers for Disease Control and Prevention. Tobacco Use by Geographic Region. Atlanta, GA: 2019 Aug 14. Access 2019 Oct 7. Available from:

<https://www.cdc.gov/tobacco/disparities/geographic/index.htm>

<sup>41</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration. The Health and Well-Being of Children in Rural Areas: A Portrait of the Nation, 2007. Washington, D.C; 2011 Sep. 1-51. Available from: <https://mchb.hrsa.gov/nsch/07rural/moreinfo/pdf/nsch07rural.pdf>

<sup>42</sup> Maryland Department of Health. QuitLine.Org: Pregnancy. Baltimore, MD: 2019. Accessed 2019 Oct 4. Available from: <https://mdquit.org/special-populations/pregnancy>

<sup>43</sup> Several studies of Black IM have found a strong association between having a previous live birth ending in death and risk of IM in a second pregnancy.

<sup>44</sup> Wallace M, Green C, Richardson L, Theall K, Crear-Perry J. "Look at the Whole Me": A Mixed-Methods Examination of Black Infant Mortality in the US through Women's Lived Experiences and Community Context. *Int J Environ Res Public Health.* 2017;14(7):e727 DOI:10.3390/ijerph140727

Broussard DL, Sappenfield WM, Goodman DA. The Black and White of infant back sleeping and infant bed sharing in Florida, 2004–2005. *Matern Child Health J.* 2012; 16(3):713-724. DOI:10.1007/s10995-011-0768-y

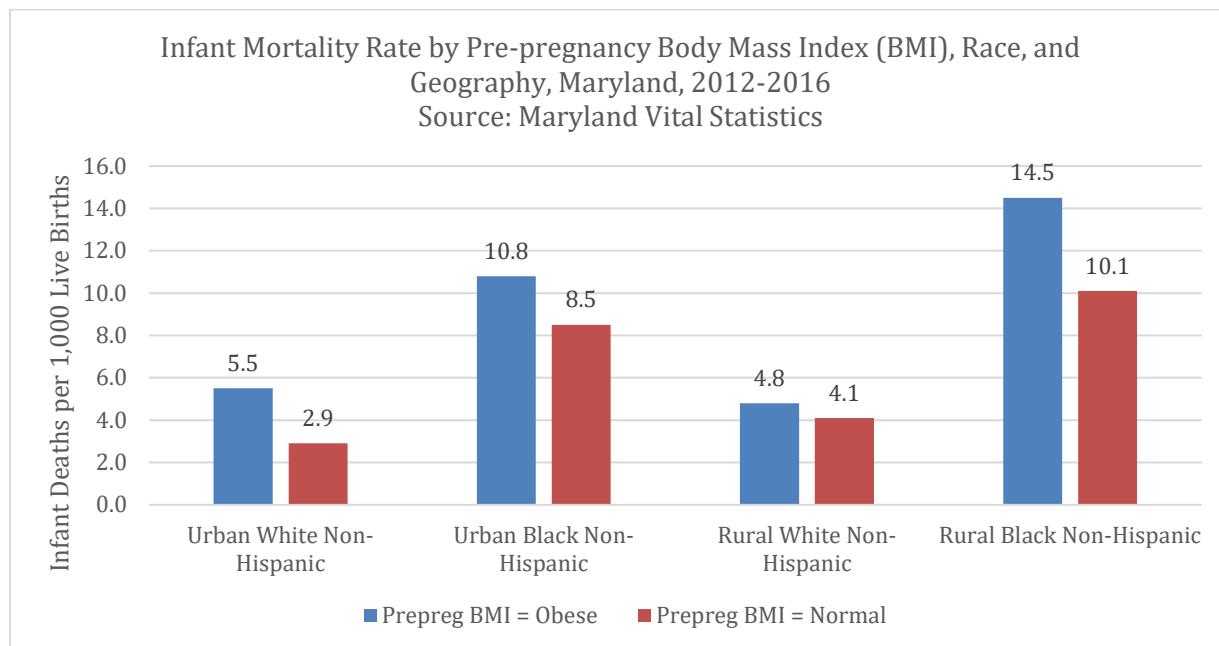
<sup>45</sup> Accortt EE, Cheadle AC, Schetter CD. Prenatal depression and adverse birth outcomes: An updated systematic review. *Matern Child Health J.* 2015; 19(6):1306-1337. DOI: 10.1007/s10995-014-1637-1

<sup>46</sup> Riaz M, Lewis S, Naughton F, Ussher M. Predictors of smoking cessation during pregnancy: A systematic review and meta-analysis. *Addiction.* 2018; 113(4):610-622. DOI: 10.1111/add.14135

The literature review also included findings related to sleep practices. Bed-sharing between parents and infants is associated with a two-fold increase in SIDS risk, and several recent studies have found racial differences in sleep practices, with more reports of bed-sharing among Black families.<sup>47</sup> The Maryland data cohort did not have data that allowed for analysis of sleep related factors, but other Maryland specific sources identify the importance of safe sleep in birth outcomes.<sup>48</sup>

Obesity is consistently linked with an elevated risk of infant mortality in the national literature. Maternal body mass index (BMI) is also associated with the risk for hypertension and diabetes during pregnancy.<sup>49</sup> According to Maryland data, while pre-pregnancy weight is associated with the risk of infant mortality, this association is weak compared to other risk factors.

Figure 9: Infant Mortality Rate by Pre-pregnancy BMI, Race, and Geography, Maryland, 2012-2016



Other caregivers play a role in sleep placement of infants and exposure to smoke. The non-birth parent's choices matter: the literature review suggest that infants without paternal involvement have an elevated risk of infant mortality.<sup>50</sup> Data on parental involvement for unmarried partners in Maryland was not available for analysis for this study, marital status is used as a proxy. In Maryland, infant mortality is twice as likely for unmarried White Non-Hispanic urban parents and

<sup>47</sup> Broussard DL, Sappenfield WM, Goodman DA. The Black and White of infant back sleeping and infant bed sharing in Florida, 2004–2005. *Matern Child Health J.* 2012; 16(3):713-724. DOI:10.1007/s10995-011-0768-y

Fu LY, Moon RY, Hauck FR. Bed sharing among Black infants and sudden infant death syndrome: Interactions with other known risk factors. *Acad Pediatr.* 2010; 10(6):376-382. DOI:10.1016/j.acap.2010.09.001.

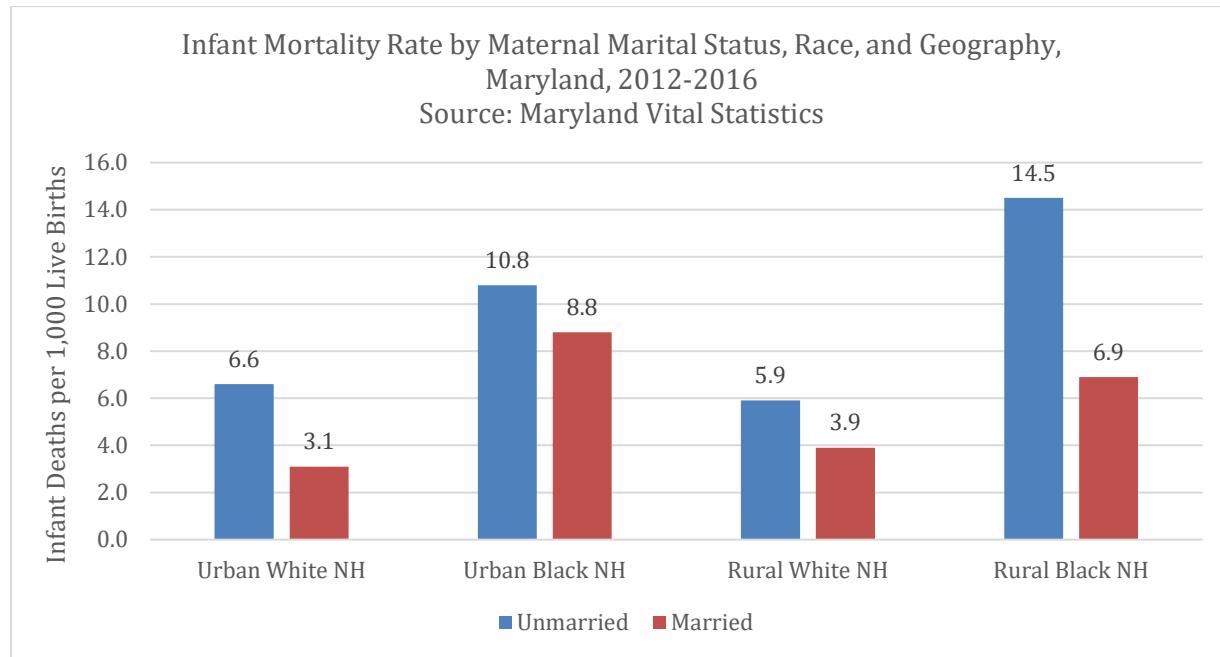
<sup>48</sup> Maryland State Child Fatality Review Team. 2018 Annual Legislative Report. Baltimore, MD: 2019 Feb 4. 1-36. Available from: [https://phpa.health.maryland.gov/documents/Health-General-Article-5-704\(b\)\(12\)-Maryland-State-Child-Fatality-Review-Team-2018-Annual-Legislative-Report.pdf](https://phpa.health.maryland.gov/documents/Health-General-Article-5-704(b)(12)-Maryland-State-Child-Fatality-Review-Team-2018-Annual-Legislative-Report.pdf)

<sup>49</sup> Appendix C.

<sup>50</sup> Appendix C

Black Non-Hispanic rural parents than their married counterparts. The relative risk for urban Black Non-Hispanic infants with married parents and rural White Non-Hispanic infants with married parents is modestly lower compared to infants with unmarried parents in the respective geographies (Figure 10). However, marital status is an incomplete measure of non-birth parent involvement or social and family supports, including programs that offer social support and peer networks including group prenatal care or home visiting. Numerous social, economic, and generational factors can modify the influence of marital status on the risk of infant mortality.

Figure 10: Infant Mortality Rate by Parental Marital Status, Race, and Geography, Maryland, 2012-2016



### **Access to Quality Health Care for Black Infants and Rural Infants**

The literature review focused on the importance of access to and utilization of quality prenatal care (especially for individuals with preexisting conditions), including racial disparities in access and utilization of care. Access and utilization of care includes access to health insurance coverage/financing, availability of providers (which may be impacted by geographic location), the quality of any available providers, and utilization of available providers (which may be influenced by social determinants of health such as transportation, income, health literacy, etc.).

#### **Health Insurance**

Health insurance coverage is crucial to access to care and utilization of care, as it allows patients to pay for health care services. Health insurance coverage before pregnancy (for preventive care and management of chronic conditions), during pregnancy (for prenatal care and birth), and after pregnancy are all important to outcomes for both mother and child. In Maryland, the uninsured rate is six percent.<sup>51</sup> However, according to the National Partnership

<sup>51</sup> Kaiser Family Foundation. State Health Facts: Health Insurance Coverage of the total Population, 2017. Published 2018. Accessed 2019 Oct 4. Available from: <https://www.kff.org/other/state-indicator/total->

for Women and Children, in 2017, 9.6% of Black women in Maryland did not have health insurance compared to 4.9% of White women.

Most adults with commercial health insurance receive insurance through their employers.<sup>52</sup> Seven percent of adults in Maryland receive coverage through the individual health insurance market. Subsidies for the purchase of qualified health plans (QHPs) are available through the Maryland Health Connection for individuals with incomes below 400 percent of the federal poverty level (FPL).<sup>53</sup> QHPs offered through the Maryland Health Connection cover preventive, maternity, and newborn care.<sup>54</sup> Changes to family status, such as the birth of a child, allow families to enroll in a QHP outside of the annual open season.<sup>55</sup> A bill passed in the 2019 legislative session provides a special enrollment period for pregnancy.<sup>56</sup>

As of 2017, 43 percent of births in Maryland were financed through Medicaid.<sup>57</sup> Pregnant individuals with incomes below 259 percent of the FPL qualify for Medicaid, including all Medicaid benefits (including prenatal and postpartum care) for the length of the pregnancy plus 60 days after birth. Medicaid and MHBE data show that over 81 percent of women who receive Medicaid under the pregnancy eligibility category retained Medicaid coverage after the postpartum period. Postpartum individuals whose Medicaid eligibility ends are usually eligible for qualified health plans in the individual market.<sup>58</sup> These individuals also continue to be eligible for the Medicaid family planning program if their income is below 264 percent of FPL.

Most pregnant women in the Medicaid program receive their health care services through a Medicaid Managed Care Organization (MCO), which is responsible for coordination of care (the role of MCOs is discussed in more detail later in this report). Data on associations between infant mortality and Medicaid enrollment status is available in appendix A.

Non-pregnant adults with incomes below 138 percent of the FPL qualify for Medicaid coverage in Maryland. The benefit package for adults covered by Medicaid includes routine preventive

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[population/?currentTimeframe=0&selectedRows=%7B%22states%22:%7B%22maryland%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D](https://www.kff.org/other/state-indicator/adults-19-64/?currentTimeframe=0&selectedRows=%7B%22states%22:%7B%22maryland%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D)

<sup>52</sup> 67 percent of age 19-64.

Kaiser Family Foundation. State Health Facts: Health Insurance Coverage of Adults 19-64, 2017. Published 2018. Accessed 2019 Oct 4. Available from: <https://www.kff.org/other/state-indicator/adults-19-64/?currentTimeframe=0&selectedRows=%7B%22states%22:%7B%22maryland%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>

<sup>53</sup> Maryland Health Benefit Exchange Homepage. Lantham, MD: 2019. Accessed 2019 Oct 4. Available from: <https://www.marylandhbe.com/>

<sup>54</sup> Maryland Health Benefit Exchange Homepage. Lantham, MD: 2019. Accessed 2019 Oct 4. Available from: <https://www.marylandhbe.com/>

<sup>55</sup> <https://www.marylandhealthconnection.gov/get-answers/pregnant-women-and-new-moms/>

<sup>56</sup> Health Insurance—Health Benefits Plans—Special Enrollment Period for Pregnancy. 2019 Maryland State Laws, Chap. 355. Available from:

[http://mgaleg.maryland.gov/2019RS/chapters\\_noln/Ch\\_355\\_hb0127T.pdf](http://mgaleg.maryland.gov/2019RS/chapters_noln/Ch_355_hb0127T.pdf)

<sup>57</sup> Vital Statistics Administration, Maryland Department of Health. Live Birth Data: 2017. Baltimore, MD: 2018. Available from:

[https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Live%20Births/Live\\_Birth\\_2017.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Live%20Births/Live_Birth_2017.pdf)

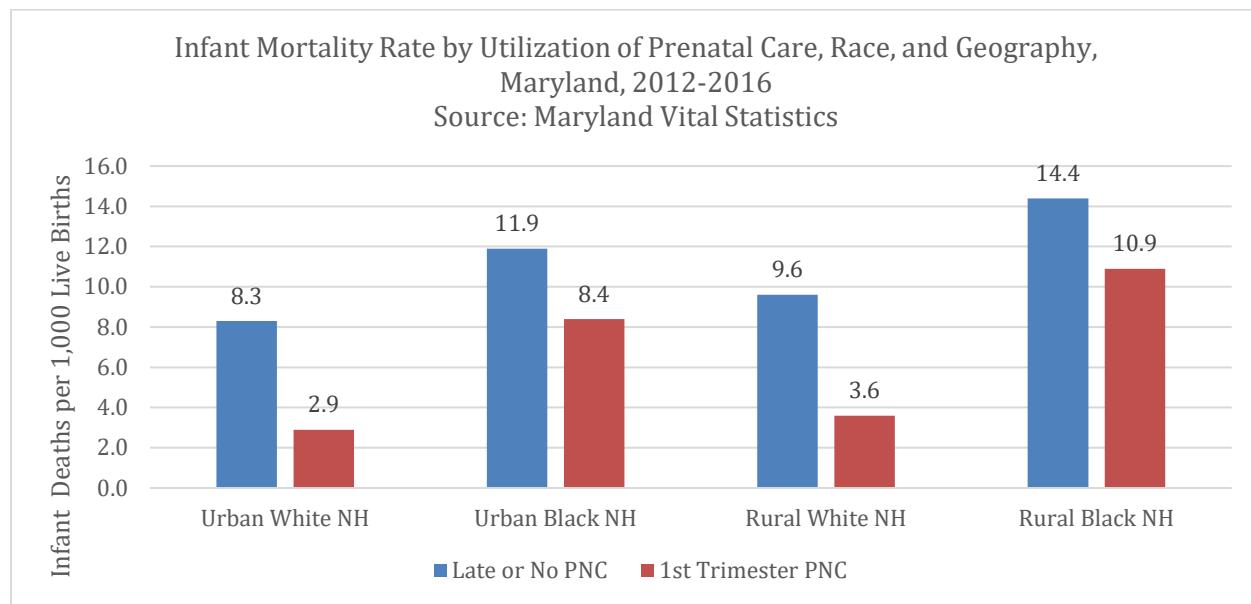
<sup>58</sup> Maryland Medicaid covers adults up to 138% FPL and pregnant women up to 250% FPL. To the extent a pregnant woman loses coverage post-partum, QHP coverage is available through the Maryland Health Benefit Exchange to individuals up to 400% FPL.

care and comprehensive family planning services (office visits, laboratory tests, contraceptive devices and supplies, and voluntary sterilization with no copayments), which is important both for women planning to become pregnant in the future and postpartum women. Individuals with incomes below 264% FPL qualify for Maryland Medicaid's Family Planning program, which includes access to contraceptive services.

### Access to Care and Utilization of Services

The national literature review identified the importance of prenatal care for promotion of health and prevention of poor health outcomes among Black women. A study in Mississippi found that when compared to White women, Black women were more likely to receive inadequate prenatal care, despite carrying a greater burden of chronic conditions.<sup>59</sup> In Maryland, the difference in infant mortality risk between early and late prenatal care utilizers is larger for White women than for Black women.

Figure 11: Infant Mortality Rate by Utilization of Prenatal Care, Race, and Geography, Maryland, 2012-2016



Primary care and preventive care is important before individuals become pregnant because preconception health has an impact on the health of the infant. The national literature documents that residents of rural areas are less likely to receive preventive care, which is important given that a mother's chronic disease pre-pregnancy can pose risks to the infant (see discussion of chronic hypertension above). In many rural areas, access to health care is a challenge because of geographic distances and limited transportation options. The Centers for Medicare and Medicaid Services released a report on "Improving Access to Maternal Health

<sup>59</sup> Cox RG, Zhang L, Zotti ME, Graham J. Prenatal care utilization in Mississippi: Racial disparities and implications for unfavorable birth outcomes. *Matern Child Health J.* 2011;15(7):931-942.  
DOI:10.1007/s10995-009-0542-6

Care in Rural Communities" in September 2019 which further details challenges to maternal health care access in rural areas, as well as potential interventions.<sup>60</sup>

Access to appropriate hospital care is also important. In Maryland, only one hospital with a NICU is in a rural county (Frederick) while all other hospitals with NICUs are in the center of the State, in urban jurisdictions.<sup>61</sup> The Maryland Perinatal System Standards specify that higher risk mothers and infants (very low birth weight infants (VLBW, <1500 gm birth weight or <32 weeks gestation) are expected to be delivered at a level III or IV facility with high-risk obstetrics (maternal fetal medicine) and a NICU. Because Maryland has had their standards in place since the 1990's, the State, with an existing system for infant transport, exceeds the Healthy People 2020 goal of 83.7% of VLBW infants born at level III or IV hospitals with 86%-92% of VLBW infants born at the appropriate level in the State. The existing statewide neonatal transport system is operated jointly by Johns Hopkins Hospital and the University of Maryland Medical System. Both university medical centers actively facilitate maternal transports, as do some of the level III hospitals. The level I and II hospitals generally have an established maternal transport relationship with a level III or IV hospital.

The quality of care offered at health facilities also influences outcomes. For example, a study of quality of care provided by New York City birthing hospitals found that 35 percent of the disparity in infant mortality between Black and White infants is attributable to differences in the quality of care provided by the hospitals where the infants were born (as measured by risk adjusted neonatal mortality rates).<sup>62</sup> No Maryland data on the topic of health facility quality and infant mortality was analyzed for this study. The Maryland Patient Safety Center works with birth hospitals in the State on quality improvement initiatives related to prenatal care.<sup>63</sup> Data on child birth quality for Maryland Hospitals are available through the Maryland Health Care Quality Reports, published by the Maryland Health Care Commission.<sup>64</sup>

### ***Social Determinants of Health***

The literature review identified several social determinants of mortality in Black infants, including the lived experience of racism, residence in segregated areas (regardless of individuals' family income) and income inequality. Of particular note is that Black women experience an elevated risk of infant mortality regardless of their individual-level risk profile. Even well-educated and high-income Black women do not experience the same degree of risk reduction that is conferred

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<sup>60</sup> Centers for Medicare & Medicaid Services. Improving Access to Maternal Health in Rural Communities: Issue Brief. Baltimore, MD: 2019. 1-62. Available from: <https://www.cms.gov/About-CMS/Agency-Information/OMH/equity-initiatives/rural-health/09032019-Maternal-Health-Care-in-Rural-Communities.pdf>

<sup>61</sup> Level III and level IV perinatal hospitals in Maryland have NICUs. See Appendix J.

<sup>62</sup> Howell EA, Hebert P, Chatterjee S, Kleinman LC, Chassin MR. Black/White differences in very low birth weight neonatal mortality rates among New York City hospitals. *Pediatrics*. 2008;121(3):e407-e415.

<sup>63</sup> Infant Mortality Workgroup. Workgroup Meeting Materials: Maryland Patient Safety Center: Past Programs and New Initiatives. Baltimore, MD: 2019 Jul 19. 1-5. Available from: [https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/PtntSftyCenterHndout07192019WGmeeting.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/PtntSftyCenterHndout07192019WGmeeting.pdf)

<sup>64</sup> Maryland Health Care Commission. Maryland Health Care Quality Reports. Baltimore, MD. Accessed 2019 Oct 4. Available from:

<https://www.marylandqmdc.org/MarylandHospitalCompare/index.html#/professional/quality-ratings/condition?topic=8&subtopic=18>

to White women with similar levels of education and income. There is growing evidence that these differential outcomes are associated with ongoing exposure to structural racism and racial bias in the health care system.<sup>65</sup>

The March of Dimes is developing an Implicit Racial Bias Training for clinical providers caring for women in the preconception, pregnancy or postpartum periods. The training will be delivered virtually and in-person and will be available in the fall, 2019. It will include an overview of implicit bias, historical overview of structural racism in the US, strategies to mitigate racial bias in maternity care and commitment to creating a culture of equity. This is just one resource available to providers: other options for training on implicit bias are available through professional organizations and in the market. Although training alone will not lead to immediate improvements in racial and ethnic disparities in birth and maternal health outcomes, it can provide healthcare professionals with important insights on how to recognize and remedy implicit racial bias. These actions can result in improved patient experience, better quality of care and cultural shift across committed organizations towards the broader goal of achieving equity for all moms and babies.

The few studies included within this review present some evidence that residence in segregated areas may be associated with a direct risk of infant mortality. Residence in segregated areas limits access to health promoting resources and is a source of chronic exposure to social stressors that can elevate the likelihood of poor health and in turn, the likelihood of infant mortality.<sup>66</sup> The reviewed evidence also supported the existence of a modest association between income inequality and risk of infant mortality. Evidence has consistently demonstrated the effectiveness of income transfer programs in reducing the harms associated with these poor social conditions. Two of the most relevant programs are retooling the Medicaid system to better

<sup>65</sup> Institute of Medicine (US) Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care; Smedley BD, Stith AY, Nelson AR, editors. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington (DC): National Academies Press (US); 2003. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK220358/> doi: 10.17226/12875; Bailey, Zinzi D ScD, et al, "Structural racism and health inequities in the USA: evidence and interventions", *The Lancet*, volume 389, issue 10077, p1453-1463, April 08, 2017, DOI:[https://doi.org/10.1016/S0140-6736\(17\)30569-X](https://doi.org/10.1016/S0140-6736(17)30569-X); Martha Hostetter and Sarah Klein, "In Focus: Reducing Racial Disparities in Health Care by Confronting Racism", Commonwealth Fund, September 27, 2018, <https://www.commonwealthfund.org/publications/newsletter-article/2018/sep/focus-reducing-racial-disparities-health-care-confronting>; Maria Trent, Danielle G. Dooley, Jacqueline Dougé, "The Impact of Racism on Child and Adolescent Health", *Pediatrics* Aug 2019, 144 (2) e20191765; DOI: 10.1542/peds.2019-1765; René Bowser, "Racial Profiling in Health Care: An Institutional Analysis of Medical Treatment Disparities", *Mich. J. Race and Law*, V7:1, <https://repository.law.umich.edu/cgi/viewcontent.cgi?article=1181&context=mjrl>; Council on Patient Safety in Women's Health Care, "Patient Safety Bundle: Reduction of Peripartum Racial/Ethnic Disparities", American College of Obstetricians and Gynecologists, October 2016. Carroll, Aaron E. "Doctors and Racial Bias: Still a Long Way to Go", *The New York Times*, February, 25, 2019, <https://www.nytimes.com/2019/02/25/upshot/doctors-and-racial-bias-still-a-long-way-to-go.html>. This issue also impact maternal mortality: Nina Martin, ProPublica, and Renee Montagne, NPR, "Nothing Protects Black Women From Dying in Pregnancy and Childbirth", ProPublica and NPR, Dec. 7, 2017, <https://www.propublica.org/article/nothing-protects-black-women-from-dying-in-pregnancy-and-childbirth>

<sup>66</sup> Landrine H, Corral I. Separate and unequal: Residential segregation and Black health disparities. *Ethn Dis*. 2009;19(2):179. Available from: [https://www.researchgate.net/publication/26302127\\_Separate\\_and\\_Unequal\\_Residential\\_Segregation\\_and\\_Black\\_Health\\_Disparities](https://www.researchgate.net/publication/26302127_Separate_and_Unequal_Residential_Segregation_and_Black_Health_Disparities)

focus on preventive measures and funding of community health workers to provide individual-level assistance with life-management skills that promote women's access to care.

### **Best Practices and Lessons Learned for Infant Mortality Reduction Programs**

In addition to the literature review on factors influencing infant mortality, described above, the FMSC team studied programmatic interventions. The team conducted a national literature review examining programmatic interventions related to infant mortality (see Appendix D); and inventory of direct service programs related to infant mortality in the State of Maryland (Appendix E), and interviewed community leaders related to the use of community health workers (Appendix F). The findings from these activities are reported in this section.

#### ***Literature Review on Programmatic Interventions***

The literature review of evidence-based interventions for Black infants and rural infants in the U.S. and globally identified the following programs as promising models:

- a) enhanced perinatal care models, including home visiting programs and group prenatal care models such as Centering Pregnancy (™);
- b) the Women, Infants and Children (WIC) program of the U.S. Department of Agriculture's food and nutrition service;
- c) behavioral interventions seeking to reduce known risk factors for poor birth outcomes;
- d) community-based interventions;
- e) telehealth interventions; and
- f) prenatal administration of progestogens to reduce repeat preterm birth (PTB).

A detailed discussion of the methodology, approach, and findings from this literature review are in Appendix D.

#### ***Home visiting programs***

Home visiting is an important tool to support pregnant individuals and young families. Perinatal home visiting programs discussed in the literature review include Healthy Start; Nurse Family Partnership; the Maternal Infant Health Outreach Worker Program; and Maternity Care Coordination.<sup>67</sup> Healthy Start is a federally-funded home visiting program employing nurses and community health workers (CHWs) and targeting high-risk pregnant women, which operates in 37 states.<sup>68</sup> The literature failed to find consistent evidence that the Healthy Start program lowered infant mortality or its antecedents.<sup>69</sup> The Nurse Family Partnership provides home

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<sup>67</sup> B'more for Healthy Babies. HOPE Project. Baltimore, MD. 2019. Accessed 2019 Aug 1. Available from: <http://www.healthybabiesbaltimore.com/our-initiatives/hope-project>

<sup>68</sup> Health Resources and Services Administration, Maternal and Child Health. Healthy Start. Rockville MD; 2019. Accessed 2019 Aug 1. Available from: <https://mchb.hrsa.gov/maternal-child-health-initiatives/healthy-start>

<sup>69</sup> However, a Healthy Start program that targeted non-pregnant, high-risk Black adolescent girls in Jacksonville, Florida significantly improved birth outcomes among those who became pregnant, suggesting that preconception programming can help address racial disparities in infant mortality. The

visits from a nurse for first-time mothers in underserved areas. This program has been shown to improve early childhood mortality in a Black urban population, as well as being positively correlated with breastfeeding, immunization, and higher birthweight in both Black and rural communities. A home visiting program called “The Maternal Infant Health Outreach Worker Program” that employs local community health workers in rural Appalachia improved breastfeeding, safe sleep, and lowered postpartum depression among participants in one limited evaluation.<sup>70</sup> An additional program, the Maternity Care Coordination (MCC) program in North Carolina, incorporated elements of home visiting by employing trained nurses, social workers and paraprofessionals to aid pregnant women receiving Medicaid in navigating the healthcare system, and showed efficacy in improving birth outcomes in both rural and Black populations.<sup>71</sup>

The Federal Health Resources and Services Administration and the Administration for Children and Families funds twenty evidence-based home visiting programs.<sup>72</sup> Six of these programs operate in Maryland, including the Nurse-Family Partnership (NFP), Healthy Families America, Parents as Teachers, Home Instruction for Parents of Preschool Youngsters (HIPPY), Family Connects, and Early Head Start.<sup>73</sup> Evidence-based home visiting programs operate in 22 of the 24 jurisdictions in Maryland. Of these evidence-based programs only the NFP and Healthy Families America focus on the perinatal period.

### **Group Prenatal Care**

Supportive Pregnancy Care, another identified intervention with demonstrated efficacy in the literature, involves bringing together groups of women of the same gestational age for multiple prenatal visits/meetings conducted by a certified nurse midwife (CNM) or physician. The original model of group prenatal care, Centering Pregnancy, has been evaluated in numerous studies

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Jacksonville program provided case management to address risk behaviors, care coordination for well woman care, and health education.

Medicaid and CHIP Payment and Access Commission. Medicaid Payment Initiatives to Improve Maternal and Birth Outcomes. Washington, D.C; 2019. Accessed 2019 Aug 1. Available from: <https://www.macpac.gov/wp-content/uploads/2019/04/Medicaid-Payment-Initiatives-to-Improve-Maternal-and-Birth-Outcomes.pdf>

<sup>70</sup> Elkins T, Aguinaga MDP, Clinton-Selin C, et al. The maternal infant health outreach worker program in low-income families. J Health Care Poor Underserved. 2013; 24(3):995–1001. DOI: 10.1353/hpu.2013.0143

<sup>71</sup> Hillemeier MM, Domino ME, Wells R, et al. Effects of maternity care coordination on pregnancy outcomes: Propensity-weighted analyses. Matern Child Health J. 2015;19(1):121-127. DOI:10.1007/s10995-014-1502-3

<sup>72</sup> Maryland Department of Health. Maternal, Infant and Early Childhood Home Visiting in Maryland. Baltimore, MD: 2017 Aug. Accessed 2019 Oct 4. Available from: [https://phpa.health.maryland.gov/mch/Pages/home\\_visiting.aspx](https://phpa.health.maryland.gov/mch/Pages/home_visiting.aspx)

U.S. Department of Health & Human Services, Administration for Children & Families. Home Visiting Evidence of Effectiveness. Washington, DC; 2019. Accessed 2019 Oct 4. Available from: <https://homvee.acf.hhs.gov/models.aspx>

<sup>73</sup> Maryland Department of Health. Maternal, Infant and Early Childhood Home Visiting in Maryland. Baltimore, MD: 2017 Aug. Accessed 2019 Oct 4. Available from: [https://phpa.health.maryland.gov/mch/Pages/home\\_visiting.aspx](https://phpa.health.maryland.gov/mch/Pages/home_visiting.aspx)

and has been adopted in over 585 clinical practice sites within the U.S.<sup>74</sup> In the published literature, Black women showed significantly reduced preterm birth (PTB) when participating in this program and rural program participants had lower than average rates of PTB for their local area.<sup>75</sup> However, Centering Pregnancy is only available to women with medically low-risk pregnancies. Health care practices that adopt this model must reorganize their care delivery model to support group prenatal care.

Group prenatal care programs for higher medical risk populations (such as women with gestational diabetes) have a limited evidence base.<sup>76</sup> The March of Dimes recently introduced the “Supportive Pregnancy Care” model, a new model of group prenatal care. This model is available to all pregnant women with the exception of those with serious high-risk conditions and certain mental health disorders. Testing was recently completed on the Supportive Pregnancy Care model and the results will be published later this year. Initial findings reveal that Supportive Pregnancy Care participants demonstrate a greater level of health literacy, experience fewer ER visits, have fewer preterm births, are more likely to breastfeed and attend their postpartum appointments.<sup>77</sup>

### ***Behavioral Interventions***

The literature review also demonstrates that behavioral interventions that use trained behavioral health professionals to encourage women to change behaviors that are risk factors for poor birth outcomes have shown efficacy. Behavioral interventions may focus on smoking, exposure to secondhand smoke (ETS), coping with perinatal depression, safe sleep practices/bed sharing, breastfeeding, and other behaviors. Effective programs use validated techniques such as motivational interviewing for smoking cessation, cognitive behavioral therapy for depression, and role playing to negotiate for reduced exposure to ETS. A review of an 18-year multi-pronged program to reduce Black infant mortality in Washington, D.C. found that behavioral interventions were more effective when they included family members in addition to pregnant women.

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<sup>74</sup> Centering Healthcare Institute. Centering Pregnancy. Boston MA; 2019. Accessed 2019 Aug 1. Available from: <https://www.centeringhealthcare.org/what-we-do/centering-pregnancy>

<sup>75</sup> Ickovics JR, Kershaw TS, Westdahl C, et al. Group prenatal care and perinatal outcomes: A randomized controlled trial. *Obstet Gynecol.* 2007;110(2 Pt 1):330. DOI: 10.1097/01.AOG.0000275284.24298.23

Picklesimer AH, Billings D, Hale N, Blackhurst D, Covington-Kolb S. The effect of Centering Pregnancy group prenatal care on preterm birth in a low-income population. *Am J Obstet Gynecol.* 2012;206(5):415-e1. DOI: 10.1016/j.ajog.2012.01.040

Crockett A, Covington-Kolb S, Zang L, Chen L. The South Carolina centering pregnancy expansion project: Improving racial disparities in preterm birth. *Am J Obstet Gynecol.* 2017;216(1). DOI: 10.1016/j.ajog.2016.11.462

<sup>76</sup> Schellinger MM, Abernathy MP, Amerman B, et al. Improved outcomes for Hispanic women with gestational diabetes using the Centering Pregnancy© Group Prenatal Care Model. *Matern Child Health J.* 2017;21(2):297-305. DOI: 10.1007/s10995-016-2114-x

<sup>77</sup> March of Dimes. About March of Dimes Supportive Pregnancy Care. Arlington, VA: 2019. Accessed 2019 Oct 4. Available from: <https://www.marchofdimes.org/supportive-pregnancy-care/about-march-of-dimes-supportive-pregnancy-care.aspx>

Behavioral interventions can be enhanced through the provision of resources. For example, an intervention that provided a free portable crib and sheets appeared more effective at supporting adoption of safe sleep behaviors than an intervention that only provided information/education on safe sleep.

### ***Other interventions***

Community-based interventions show some promise for both rural and Black populations. An example of a community-based intervention is a community baby shower. At a community baby shower, community educators inform pregnant women about safe sleep, breastfeeding benefits, and smoking cessation while providing “shower gifts” such as diapers, toys, and cribs. Another example is Comenzando Bien/Becoming a Mom, a six-session training program developed by the March of Dimes and implemented using trained community health workers who inform women of risk reduction behaviors and educate them on infant and postpartum care as well as services available in the community, while providing free cribs and diapers. Evaluations of these community programs showed that participants improved their knowledge of behavioral factors related to healthy pregnancy and infant safety. Researchers did not follow-up on participants after the event(s), so it was not clear whether the program changed birth outcomes. Other community-based approaches are discussed in Appendix D.

Technology-enabled interventions have also showed evidence of efficacy in rural and Black populations. Two interventions that provided emails, text messages, and videos to new mothers about safe sleep and prenatal wellness showed some improvement in birth outcomes but warrant more rigorous evaluation.

Care management is also important. A telephone-based nurse case management program for pregnant Medicaid recipients in the South Carolina low country - an area with largely rural and Black populations - was associated with small but significant reductions in rates of very preterm births (VPTB) (<28 weeks) and days in neonatal intensive care units in the region.<sup>78</sup>

The literature review also includes a clinical intervention for women with previous PTB: the administration of progestogens (injections of 17- [alpha]-hydroxyprogesterone caproate (17P) or vaginal progesterone suppositories). Published literature shows strong evidence that both methods of administration, when delivered early in pregnancy, reduce repeat PTB. This literature also highlighted systemic challenges with this intervention, including required insurance pre-authorization requirements, late entry into prenatal care, cost, and lack of education among healthcare providers. Some states have successfully addressed these challenges and models exist for effective coordination of care integrating progestogens for women at elevated risk of PTB. While the literature review found this intervention to be successful, it is important to note that a post-approval confirmatory clinical trial has raised some

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<sup>78</sup> Newman RB, Sullivan SA, Menard MK, et al. South Carolina Partners for Preterm Birth Prevention: A regional perinatal initiative for the reduction of premature birth in a Medicaid population. *Am J Obstet Gynecol.* 2008;199(4):393.e1-393.e8. DOI:10.1016/j.ajog.2008.07.047

questions about the effectiveness of this drug.<sup>79</sup> As a result, the U.S. Food and Drug Administration is reviewing the drug in a meeting in late October, 2019.<sup>80</sup>

Overall, our reviews demonstrate that many modes of outreach to pregnant women at risk of poor birth outcomes can be effective.

### ***An Inventory of Maryland Programs Focused on Infant Mortality***

The FMSC team created an inventory of local and State programs focused on infant mortality, its causes (e.g., low birthweight, sudden infant death syndrome), or its risk factors (e.g., teen pregnancy, pregnancy spacing). The inventory provides information about the entities working to address infant health in Maryland, their mission and role, the types of services provided, and best practices and challenges for sustaining effective programs (see Appendix E). The programs were categorized into direct service programs and surveillance and oversight programs. Each program category is reported on separately below.

Programs were only included in the inventory if they identified pregnant women, mothers/fathers, or infants as a special population within their program. Medicaid and Medicaid Managed Care organization programs were not included in this inventory, but information on Maryland Medicaid requirements and initiatives related to Maryland's Medicaid Managed Care Organizations (MCO) and their efforts to address the preconception, prenatal, and postpartum health of low-income women are discussed below.

#### ***Service programs: Types of services offered***

The inventory identified 72 state, local, or non-profit programs that provided direct services to Maryland residents. Overall, programs addressed a range of clinical and social services from reproductive health to housing. As noted above, HealthChoice/MCO programs were not included in this inventory, which is a limitation of this project.

Evidence from the inventory of infant mortality programs in Maryland suggests that existing services are available to address a range of risk factors for infant mortality and could be enhanced to further integrate these services. The most common services identified were service linkage (i.e., referral or care coordination), health education, home visiting, and safe sleep education and resources (mostly in the form of information rather than safe sleep resources). Although safe sleep education was commonly provided, survey respondents noted this as a service that needed further investment, particularly in light of recent increases in SIDS deaths in Maryland in 2017. Behavioral health and social services were less frequently mentioned as services provided by programs in the State. Of these types of services, smoking cessation was the most commonly offered service. Mental health, SUD, and housing services were less

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<sup>79</sup> U.S. National Library of Medicine. ClinicalTrials.gov: Confirmatory Study of 17P Versus Vehicle for the Prevention of Preterm Birth in Women With a Previous Singleton Spontaneous Preterm Delivery (PROLONG). 2019 Apr 25. Accessed 2019 Oct 7. Available from:

<https://clinicaltrials.gov/ct2/show/NCT01004029?titles=prolong&spons=amag&rank=1>

<sup>80</sup> Food and Drug Administration. Advisory Committee Meeting: October 29, 2019: Meeting of the Bone, Reproductive and Urologic Drugs Advisory Committee Meeting Announcement. Silver Spring, MD: 2019 Sep 25. Accessed 2019 Oct 9. Available from: <https://www.fda.gov/advisory-committees/advisory-committee-calendar/october-29-2019-meeting-bone-reproductive-and-urologic-drugs-advisory-committee-meeting-announcement>. The application number is sNDA 021945/S-023#.

frequently mentioned as a service that was provided by the programs in the inventory; however, program staff cited these behavioral health services as essential needs of their clients.

Medicaid enrollees have access to physical and behavioral (encompassing mental health and SUD) health services. The MCOs and the behavioral health ASO are required to coordinate care across services. The behavioral health ASO also administers behavioral health services for the uninsured (and services not covered by Medicaid).

#### Enhanced prenatal care: Home Visiting Programs & Group Prenatal Care

Federal, State, and local funds support home visiting models in the State. These programs have been shown to reduce barriers to receiving traditional prenatal care and improve birth and infant health outcomes (Appendix D). Many home visiting programs offer enhanced interconception care and deliver safe sleep interventions, breastfeeding support, and other infant care services that address risk factors for infant mortality in the State.<sup>81</sup>

Group prenatal care is another model of enhanced prenatal care and its effectiveness is discussed above. The program inventory identified that a few programs in Maryland were providing group prenatal care services in addition to traditional prenatal care.

Other programs have used home visiting or group settings as a way to deliver specific types of care (e.g., counseling), such as to women who have experienced a fetal or infant loss.<sup>36</sup>

#### Outreach Strategies

The program inventory identified several interesting outreach strategies including community baby showers; information sessions or community input sessions in schools, communities, churches, and barbershop/hair salons; partnering with other local organizations; utilizing community health workers in at-risk communities; and including a male involvement coordinator for teen programs. These strategies enhance initial client connection to the programs and continued use of services.

#### Supplemental Practices

The inventory also identified key supplemental practices that support clients' or providers' needs and goals. For providers, offering online training with continuing education credits or specific designations for hospitals (e.g., Baby Friendly Hospital) helps enhance provider participation. For clients, the use of a reproductive life plan as part of preconception care could facilitate appropriate follow-up care depending on client needs, as outlined in the joint CDC-OPA recommendations for Quality Family Planning.<sup>82</sup> Phone hotlines (e.g., smoking cessation) provide another approach to supplement services offered through existing programs. Phone and other technology-enabled services may be especially useful for clients living in rural areas where distance to programs or transportation access are barriers to program participation. Other

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<sup>81</sup> Johnson K, Posner SF, Biermann J, et al. A report of the CDC/ATSDR Preconception Care Work Group and the select panel on preconception care. MMWR Morb Mortal Wkly Rep. 2006; 55(RR06); 1-23. Available from: <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5506a1.htm>

<sup>82</sup> U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Providing Quality Family Planning Services Recommendations of CDC and the U.S. Office of Population Affairs. MMWR Morb Mortal Wkly Rep. 2014; 63(4). Available from: <https://www.cdc.gov/mmwr/pdf/rr/rr6304.pdf>

supplemental practices include support of family needs (e.g., babysitting, transportation, GED support, meal planning), social support through peer networks, resources (e.g., cribs, doulas, educational toys and books), enabling services (e.g., language services, disability support), and engaging in policy and advocacy related to their mission.

### ***Service programs: Client demographics and geographic location***

The majority of programs in the Maryland survey mentioned that they serve low-income or underinsured populations. About half of all identified programs served clients in rural communities. The highest number of programs were located in the more populated counties (Anne Arundel, Baltimore, Baltimore City, Howard, Montgomery, and Prince George's). The number of programs per county ranged from a minimum of 8 programs (Somerset, Cecil counties) to 24 programs (Baltimore City).

### ***Surveillance and oversight programs***

The program inventory identified 12 programs that provided surveillance of maternal and child health data or made recommendations for the provision of maternal and child health services in the State (rather than providing direct service). The Maryland Department of Health administers many of these programs. Examples include the Pregnancy Risk Assessment Monitoring System (PRAMS); vital records data (including data from birth and death certificates); and the Birth Defects Reporting and Information System through the Office of Genetics and People with Special Health Care Needs. These surveillance systems enable the State and local jurisdictions to monitor progress on key maternal and child health outcomes and risk factors.

The State also has three review systems which make recommendations for improvements in the provision of care and services related to maternal and infant health. These systems are the Fetal and Infant Mortality Review (FIMR), Maternal Mortality Review Committee (MMRC), and Child Fatality Review (CFR) programs. A thorough review of each death is conducted by a committee of experts in the State, who review information from vital records, family interviews, and medical records. These review systems provide a better understanding of factors related to each death, which inform strategies to improve care and prevent future deaths.

Lastly, a number of programs were identified that provide evidence-based recommendations, hospital standards and certifications, regulation of those standards, and reporting of activities within the State. For example, the non-profit Maryland Patient Safety Center has developed recommendations for neonatal abstinence syndrome and runs the perinatal quality care collaborative with hospitals in the State. Currently, the Patient Safety Center is working on a two-year initiative to model safe sleep practices within hospitals. The Maryland Department of Health's Perinatal System Standards sets standards for birthing hospitals in conjunction with the Institute for Emergency Medical Services System (MIEMSS). Additionally, MDH provides training, continuing education, and technical support to providers and hospitals implementing the Maryland Hospital Breastfeeding Policy Recommendations. This is just a sample of the activities and programs conducted in the State to support maternal and child health policy and services.

### ***Best practices and challenges for sustaining effective programs***

The best practices for sustaining effective programs and reducing costs that emerged in the survey of programs were the use of incentives, outreach, and partnerships. Incentives were effective for engaging and retaining participation in the programs, especially for vulnerable populations facing issues such as substance use disorder or income restrictions. Programs reported that partnerships allowed the programs leverage existing cross-sector community resources to address the unmet needs of clients which the programs could not address directly. Many programs emphasized their focus on both social and health factors to better serve their clients.

Most programs reported concerns regarding financial sustainability, with challenges described for both grant funding and reimbursement. Competition for funding, changing priorities, and flat funding despite increasing costs were common concerns. Programs reported the need for funding to provide and enhance services, including services focused on the needs of specific vulnerable populations (i.e. undocumented, low income, substance use).

Programs also identified challenges connecting high-risk individuals and families, including mothers and infants, to appropriate social service and health programs. Work Group members noted that some communities had limited options for referral to these types of programs or had long waiting lists for these services even when referral was an option. Other challenges include participant recruitment and retention, program enrollment and eligibility, and transportation.

### ***Summary of Maryland's Managed Care Organizations (MCOs)***

While not captured in the program inventory directly, Medicaid Managed Care Organizations are key providers of maternal and child health services for low-income women and children. As of 2017, 43 percent of births in Maryland were financed through Medicaid. In Maryland, most Medicaid enrollees participate in HealthChoice, Maryland's Medicaid managed care program. According to a 2018 evaluation, in 2016, HealthChoice served over 1.1 million Maryland residents, over 84 percent of the enrollees of Maryland Medicaid and the Maryland Child Health Program.<sup>83</sup> Nine managed care organizations (MCOs) participate in the HealthChoice program, and each HealthChoice enrollee is enrolled in 1 of the 9 MCOs.

The MCOs provide a range of clinical and care coordination services relevant to maternal and infant care. All HealthChoice MCOs are required to provide medically necessary pregnancy-related services including comprehensive prenatal, perinatal, and postpartum care.<sup>84</sup> The coverage must, at a minimum, follow American College of Obstetricians and Gynecologists (ACOG) guidelines for pregnant and postpartum women. MCOs facilitate the completion of a

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<sup>83</sup> Maryland Department of Health. 2018 HealthChoice Evaluation (CY 2012-2016). Baltimore, MD: 2018 Jul 3. 1-126. Accessed 2019 Aug 1. Available from: [https://mmcp.health.maryland.gov/healthchoice/Documents/HealthChoice%20Evaluations/2018%20HealthChoice%20Evaluation%20\(CY%202012-CY%202016\).pdf](https://mmcp.health.maryland.gov/healthchoice/Documents/HealthChoice%20Evaluations/2018%20HealthChoice%20Evaluation%20(CY%202012-CY%202016).pdf)

<sup>84</sup> Maryland Department of Health. 2019 HealthChoice Managed Care Organization Agreement. Baltimore, MD: 2018 Sep. 1-344. Accessed 2019 Aug 1. Available From: <https://mmcp.health.maryland.gov/healthchoice/Documents/MCO%20Agreement%202019%20for%20CY%202019%20MCO%20file.pdf>

prenatal risk assessment at the first prenatal visit, provide enriched maternity services including counseling and education, and provide home visitation services.

Pregnant and postpartum women are considered a special needs population within Maryland regulations; therefore, MCOs are required to ensure access to appropriate referrals, and provide outreach to bring women in to care. HealthChoice MCOs have varied approaches to outreach for pregnant and postpartum women, including the use of incentives for timely prenatal and postpartum visits. The Maryland Department of Health also operates a dedicated helpline for pregnant women (the HealthChoice Helpline for Pregnant Women). Women who contact the help line are referred to Medicaid-funded Administrative Care Coordination Units (ACCUs) within each local health department, and the ACCUs assist all eligible and enrolled pregnant women to navigate the health care benefits through their MCO.

Federal regulations require that state Medicaid programs have a plan to ensure that Medicaid participants have transportation to and from Medicaid covered services, commonly referred to as “non-emergency medical transportation” (NEMT). The State of Maryland provides transportation to and from covered services via ambulance, sedan, publicly available transportation services, and fixed wing air ambulance modes. Covered medical services include, but are not limited to, scheduled trips to primary care physicians, prenatal visits, well child visits, dental services and trips to the pharmacy for prescriptions no matter what region of Maryland. A full Medicaid benefit participant shall be screened to determine eligibility for NEMT. If personal vehicles, public fixed routes, para transit services or other community services are available, a participant may not be eligible for NEMT services.

In addition to the services provided by HealthChoice MCOs, a Home Visiting Services (HVS) Pilot program is currently underway through Maryland Medicaid’s section 1115 HealthChoice Waiver, which allows participating lead local governmental entities to fund fifty percent of total HVS Pilot costs with local dollars, and access matching Federal funds to expand existing evidence-based home visiting programs (Nurse-Family Partnership and Healthy Families America) for at-risk pregnant women and children up to age 2. To date, MDH has approved two lead entities, Harford County Health Department and Garrett County Health Department, for federal matching funds in support of a HVS Pilot. The application and review process for the HVS Pilot is now closed.

HealthChoice MCOs outperformed national averages for quality measures related to prenatal care. For example, the HEDIS measure for timeliness of prenatal care assesses the percentage of deliveries for which the mother had a prenatal care visit in the first trimester (or within 42 days of HealthChoice enrollment). In 2016, 87.6% of HealthChoice deliveries met this criteria, compared with 81.7% nationally among Medicaid HMOs.<sup>85</sup> Because Maryland MCOs outperform national averages, HealthChoice uses Maryland-specific benchmarks for the Health

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<sup>85</sup> Maryland Department of Health. 2018 HealthChoice Evaluation (CY 2012-2016). Baltimore, MD: 2018 Jul 3. 1-126. Accessed 2019 Aug 1. Available from:

[https://mmcp.health.maryland.gov/healthchoice/Documents/HealthChoice%20Evaluations/2018%20HealthChoice%20Evaluation%20\(CY%202012-CY%202016\).pdf](https://mmcp.health.maryland.gov/healthchoice/Documents/HealthChoice%20Evaluations/2018%20HealthChoice%20Evaluation%20(CY%202012-CY%202016).pdf)

National Committee for Quality Assurance. Prenatal and Postpartum Care (PPC). Washington, D.C; 2019. Accessed 2019 Aug 1. Available from: <https://www.ncqa.org/hedis/measures/prenatal-and-postpartum-care-ppc/>

Choice value-based payment program. This ensures that MCOs continue to be incentivized to improve. In 2017, each MCO was evaluated on the percentage of deliveries that had a postpartum visit on or between 21 and 56 days after delivery. Of the 8 MCOs with performance assessed, two received incentive payments ( $\geq 78\%$  of deliveries with timely postpartum visit), 2 were neutral (74-77% of deliveries with timely postpartum visits), and 4 had financial disincentives due to  $\leq 73\%$  of deliveries having timely postpartum visits.<sup>86</sup>

Given the scope of services and high rate of coverage of low-income women and infants, HealthChoice MCOs are key stakeholders in addressing infant mortality in the State.

### ***Community Health Workers- Overview and Interview Findings***

The statute that authorized this study requires that the study include “recommendations on ways to use pregnancy navigators or community health workers to assist pregnant women with the goal of reducing the infant mortality rate.” The FMSC team interviewed ten experts on the use of Community Health Workers (CHW) to improve infant and maternal health in Black or rural populations (see Appendix F). The interviews aimed to clarify how CHWs involved in perinatal care facilitate infant and maternal health and how they could be better utilized to address infant mortality in Maryland. A detailed explanation of the procedures followed (including the interview protocol) and findings are included in an appendix to this report (see Appendices F and F2).

In Maryland law, a community health worker is “a frontline public health worker who:

- (1) Is a trusted member of, or has an unusually close understanding of the community being served;
- (2) Serves as a liaison to, link to, or intermediary between health and social services and the community to:
  - (i) Facilitate access to services; and
  - (ii) Improve the quality and cultural competence of service delivery; and
- (3) Builds individual and community capacity by increasing health knowledge and self-sufficiency through a range of activities, including:
  - (i) Outreach;
  - (ii) Community education;
  - (iii) The provision of information to support individuals in the community;
  - (iv) Social support; and
  - (v) Advocacy.”<sup>87</sup>

Maryland is in the process of developing a certification and training program for CHWs in Maryland, which will include accredited training programs.<sup>88</sup> The Maryland Department of

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<sup>86</sup>Maryland Department of Health. Medicaid Managed Care Organization, CY 2018 Annual Technical Report. Baltimore, MD: 2019 Apr. 1-217. Available from:

<https://mmcp.health.maryland.gov/healthchoice/Documents/2018%20Annual%20Technical%20Report.pdf>

<sup>87</sup> Md. Code Ann., Health Gen. §13-3701.

<sup>88</sup>Maryland Department of Health. Community Health Workers in Maryland. Baltimore, MD: 2018. Accessed 2019 Oct 4. Available from:<https://health.maryland.gov/mhhd/Pages/Community-Health-Worker.aspx> <https://health.maryland.gov/mhhd/Pages/Community-Health-Worker.aspx>

Health estimates that there are nearly 1,500 CHWs in Maryland (working on all health care topics).

CHWs working in maternal and infant health often have parenting experience, cultural and community connections to the women in the program, and specific short-term training by the organizations, associations, hospitals, or practices that employ the CHW. In addition to CHWs who fall under the above definition and will be eligible for certification, other paraprofessionals with community expertise may also be involved in perinatal health work. These include some home visitor program staff members, doulas (laypersons involved in perinatal care who undergo their own training and certification processes), as well as “outreach workers” and “resource parents” not certified as CHWs. CHWs and related paraprofessionals provide different services than nurses or social workers.

### ***Limitations***

The research project using interviews on the use of CHWs for maternal and infant health was exploratory in design and limited in scope. The project did not generate an exhaustive inventory of programs in Maryland that use CHWs for maternal or infant health or delineate specific funding structures for CHWs. The interviews also treated doulas as a type of pregnancy navigator or CHW – but some Work Group members think a narrower definition of CHWs is more appropriate and further examination of the role of doulas would be useful.

### ***Findings from interviews***

This section contains the key findings from the interviews related to CHWs and related paraprofessionals working in maternal and infant health. Overall, Interviewees emphasized the unique ability of the CHW or doula to meet the mother “where she is [and] where her family is,” and to work with the mother to meet her goals, rather than setting expectations about behavior and adherence to treatment without considering her social and family circumstances or her cultural needs. CHWs often go out into the community to recruit pregnant women for the programs in which they serve, sometimes through innovative events such as community baby showers, but also through word of mouth or referral from health care providers. CHWs can be employed by medical practices or other health programs. CHWs sometimes visit pregnant women at home or at other convenient sites in the community. CHWs maintain contact with clients through email, text message and phone, and may work with clinical teams to hold support groups for pregnant women.

CHWs can play a unique and flexible role in serving women at risk of poor birth outcomes and can provide a wide array of supports to pregnant women and young families. The CHW, by virtue of connections to the community and culture, parenting experience, relational skills, and training, can gain the trust of a pregnant woman and her family. CHWs work within the context of a care team with other types of health professionals such as nurses or social workers. CHWs can play an important role in understanding client goals and helping the client communicate those goals to their health care providers (such as through a birth plan). CHWs

can help mediate clinician-patient interactions to ensure that they are respectful and culturally sensitive. Within a team of providers, CHWs can identify unmet needs that impact a client's health and ability to access medical care (such as transportation, food, or housing); assist in care coordination; and assist in monitoring pregnant individuals between prenatal visits. Some CHWs are trained in assisting clinical care teams with identifying and responding to mental health concerns (for example, through mental health first aid), substance use disorder, and other risk factors. In one program, CHWs administered a perceived stress scale and an everyday discrimination scale to better understand and address client stress, an important predictor of birth outcomes. Postpartum, perinatal CHWs can promote breastfeeding, infant nutrition, and safe sleep education. Doulas and other related paraprofessionals may also do many of the above things, following their training.

Interviewees indicated that institutional/organizational knowledge about how to effectively use perinatal CHWs has often stayed within existing programs and organizations, which often lack resources to focus on disseminating best practices. Wider diffusion of this knowledge of best practices and innovative practices/models could help expand and improve these models.

The interviewees identified organizational or programmatic level barriers to more effectively engage CHWs in improving birth outcomes, including program capacity, funding sustainability, data sharing, training, transportation services for clients, and low CHW wages.

### **Economic Costs of Preterm Birth, Low Birth Weight, and Infant Mortality**

In addition to the human costs of infant mortality, there are significant financial costs associated with preterm birth, low birth weight infants and with infant mortality. Appendix B provides an overview of some of the costs associated with infant mortality. This study does not include a broad economic or actuarial analysis of costs related to infant mortality, but rather a limited literature review to provide context. Existing data demonstrate that hospitalization costs associated with conditions such as preterm birth and low birth weight, key risk factors for infant mortality, are consistently higher than other hospital-based births. Lifetime economic and health costs of poor birth outcomes, beyond initial hospitalization at birth, demonstrate the consequences of these conditions (See Appendix B). Prevention of LBW and PTB can directly save families and society in both the immediate period after birth and into childhood. If specific funding or payment reform approaches are considered in the future, a more thorough actuarial or economic analysis would be appropriate.

### **Areas for Future Study**

The scope of this study was limited by the statutory focus on Black infants and rural communities, by State resources, and by time. Over the course of the study, potential areas for future research were identified.

### ***Use of Progestogens to prevent preterm birth***

Individuals who have had a baby preterm are at higher risk for a preterm birth for subsequent pregnancies. The literature review conducted for this study found that the administration of progestogens through injections or as vaginal suppositories, when begun by the 16-20th week of pregnancy, significantly reduces rates of repeat preterm birth in mothers with a previous

preterm birth. This literature review suggested that adoption of these practices could be improved and administrative barriers to patient use of these products should be minimized, particularly since lower cost generic formulations were approved in 2018.<sup>89</sup>

In late September 2019, shortly before this report was finalized, the U.S. Food and Drug Administration announced that a meeting of the Bone, Reproductive and Urologic Drugs Advisory Committee on October 29, 2019. The Advisory Committee will review a supplemental new drug application for MAKENA (manufactured by AMAG Pharmaceuticals).<sup>90</sup> MAKENA is the brand name formulation of the progestogen used to prevent pre-term birth. A post-approval confirmatory clinical trial, conducted mostly in a European population, has raised some questions about the effectiveness of this drug.<sup>91</sup>

Until the FDA issues a decision on the supplemental new drug application, taking the new study data into account, it is not clear that making recommendations related to the adoption and use of progestogens is appropriate.

### ***Expansion of Medicaid Coverage***

Disruptions in care resulting from transitions in insurance coverage and related provider networks can interfere with health outcomes. One of the most common transitions of coverage for women who receive Medicaid coverage during pregnancy occurs 60 days after childbirth, when eligibility for Medicaid through the pregnant woman eligibility category ends. Women may continue to qualify for Medicaid under other eligibility categories (for example, women with incomes under 138% of the Federal poverty level qualify under the adult Medicaid expansion eligibility category). Women who lose Medicaid coverage must inform the Maryland Health Connection of their change in coverage to allow for enrollment in a subsidized Marketplace insurance plan.<sup>92</sup>

The March of Dimes, ACOG and the AMA have strongly endorsed the extension of Medicaid coverage to 12 months postpartum.<sup>93</sup> Additionally, extending postpartum coverage beyond 60

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<sup>89</sup> Food and Drug Administration, "Product Details for ANDA 210723", Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations,

[https://www.accessdata.fda.gov/scripts/cder/ob/results\\_product.cfm?Appl\\_Type=A&Appl\\_No=210723](https://www.accessdata.fda.gov/scripts/cder/ob/results_product.cfm?Appl_Type=A&Appl_No=210723)

<sup>90</sup> Food and Drug Administration. Advisory Committee Meeting: October 29, 2019: Meeting of the Bone, Reproductive and Urologic Drugs Advisory Committee Meeting Announcement. Silver Spring, MD: 2019 Sep 25. Accessed 2019 Oct 9. Available from: <https://www.fda.gov/advisory-committees/advisory-committee-calendar/october-29-2019-meeting-bone-reproductive-and-urologic-drugs-advisory-committee-meeting-announcement>. The application number is sNDA 021945/S-023#.

<sup>91</sup> U.S. National Library of Medicine. ClinicalTrials.gov: Confirmatory Study of 17P Versus Vehicle for the Prevention of Preterm Birth in Women With a Previous Singleton Spontaneous Preterm Delivery (PROLONG). 2019 Apr 25. Accessed 2019 Oct 7. Available from:

<https://clinicaltrials.gov/ct2/show/NCT01004029?titles=prolong&spons=amag&rank=1>

<sup>92</sup> Stube A, Moore JE, Mittal P, Reddy L, Low LK, Brown H. Extending Medicaid Coverage for Postpartum Moms. Health Affairs Blog. 2019 May 6. Accessed 2019 Oct 4. Available from:

<https://www.healthaffairs.org/do/10.1377/hblog20190501.254675/full/>

<sup>93</sup> The American College of Obstetricians and Gynecologists (ACOG). ACOG Statement on AMA Support for 12 Months of Postpartum Coverage Under Medicaid. Washington, DC: 2019 Jun 12. Accessed 2019 Oct 4. Available from: <https://www.acog.org/About-ACOG/News-Room/Statements/2019/AMA-Support-for-12-Months-Postpartum-Medicaid-Coverage>

days is under consideration in 3 states (Texas, New Jersey, and Illinois) and is being considered in two bills at the federal level.<sup>94</sup> In Maryland, the state chapter of the American Academy of Pediatrics (MDAAP) endorses the recommendation of the Maryland Chapter of the American College of Obstetricians and Gynecologists (MDACOG) to expand Medicaid coverage postpartum from 60 days to 1 year for women at or below 250% of poverty. The Maryland Nurses Association also supports extension of Medicaid coverage. The Maryland Dental Action Coalition endorsed including dental coverage in such an extension of coverage.

Extending medical coverage under Medicaid to women who would not otherwise qualify for Medicaid for the first year post-partum requires several steps, including requesting approval from the Federal Centers for Medicare and Medicaid Services (CMS) to expand eligibility for Medicaid (medical and dental) for new mothers through 1 year postpartum. It is not clear that CMS would approve such a request. Funding for this population would need to come exclusively from State funds, with no Federal matching funds.

Another important consideration is the impact of moving women who would currently qualify for coverage under the Maryland Health Connection to Medicaid. Maryland has worked hard to stabilize the individual health insurance market and control premium growth. Reducing enrollment in qualified health plans in this market could negatively impact that model, but the impact is unknown without further study.

### ***Funding Sources and Limitations***

One area for potential future study is funding sources and limitations. In the inventory of programs operating in the State, funding sustainability was often raised as a concern by program leaders. State funding for infant mortality programs is available from multiple sources. The Maryland Maternal, Infant, and Early Childhood Home Visiting program through the Maryland Department of Health provides approximately five million in funding for home visiting annually, and is currently in the process of a needs assessment to inform future funding decisions. Medicaid (and the MCOs) provide crucial funding for direct patient care, care management, and other services as an insurer. Medicaid also funds special programs such as an ongoing home visiting pilot program. The Maryland Community Health Resources Commission provides grant funds for new programs related to women's and infant health. The number of funding streams makes it difficult to tabulate the total funding for addressing infant mortality. A future study could develop a better understanding of the available funding streams in the State and evaluate funding adequacy and use.

### ***Other potential topics for study***

A future study could address racial and ethnic groups that were not addressed in this report, including Hispanic infants. Many Work Group members believed that more detailed cost and cost effectiveness analysis would be useful for prioritizing existing and future interventions.

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The American Medical Association (AMA). Press Release: AMA adopts new policies at 2019 Annual Meeting. Chicago, IL: 2019 Jun 12. Accessed 2019 Oct 4. Available from: <https://www.ama-assn.org/press-center/press-releases/ama-adopts-new-policies-2019-annual-meeting>

<sup>94</sup> Ranji U, Gomez I, Salganicoff A. Henry J Kaiser Family Foundation: Expanding Postpartum Medicaid Coverage. Women's Health Policy. San Francisco, CA: 2019 May, 22. Accessed 2019 Aug 1. Available From: <https://www.kff.org/womens-health-policy/issue-brief/expanding-postpartum-medicaid-coverage/>

## Recommendations

The following recommendations on methods to reduce the infant mortality rate of Black infants and infants in rural communities were developed as a result of the Study findings detailed above and refined through discussion and feedback from multiple State agencies and members of the Work Group. The recommendations are organized into three themes: 1) Care Coordination, 2) Expanding and Enhancing Access and Utilization of Services, and 3) the Need for a Sustained and Central Focus on Infant Mortality within the State.

### ***Theme: Care Coordination***

A challenge identified through the Work Group discussions and research described above was care coordination; i.e. how to ensure that families are identified and connected to services that they need and qualify for, and that care is coordinated through the preconception period, pregnancy, birth, and postpartum period. Models to address infant mortality and reduce disparities rely on health care across the life course (i.e. preconception, prenatal, and postpartum care). Care coordination requires: 1) screening for needs (through a screening tool), 2) identification of resources and supports (through a directory of programs), 3) referrals to appropriate services and supports (which in turn must have the ability to accept new clients), and 4) follow-up to ensure the client is receiving and benefiting from the services.

A number of existing processes and programs exist to support care coordination. Home visiting programs provide opportunities for integrating across prenatal and postpartum care, which could also serve to enhance interconception care (i.e., preconception care for the next pregnancy). Primary care and family planning services are the main providers of preconception care but may not be fully integrated with obstetric and pediatric practices. Health insurance can play an important role in coordinating these services. Medicaid regulations mandate that Medicaid Managed Care Organizations provide care coordination for special needs populations, such as pregnant individuals and infants.

#### ***Recommendation 1: Improve existing care coordination processes and tools.***

Existing processes and tools for care coordination should be enhanced and adoption of those tools by providers, insurers, and others should be encouraged. A number of existing processes and programs exist to support care coordination. An example of an existing screening tool is Medicaid's Prenatal Risk Assessment (a screening tool to identify risks and needs for pregnant women). A number of public and private tools exist as resource directories, and some software vendors (including electronic health record vendors) have developed tools to support better screening, referral, and follow-up of patients. The following recommendations relate to improving existing care coordination processes and tools:

- a) *Use of assessment tools:* Providers should use effective assessment tools to determine client needs and link to the electronic health record, referral systems for social determinants of health needs, and other electronic means of ensuring adequate coordination. Such tools are available from multiple sources.<sup>95</sup> Providers should

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<sup>95</sup> Examples of tool kits include the National Association of Community Health Centers <http://www.nachc.org/research-and-data/prapare/toolkit/> and the Health Leads: Social Needs Screening Toolkit at <https://healthleadsusa.org/resources/the-health-leads-screening-toolkit/> Additionally, Kaiser Permanente is developing a similar toolkit that will be accessible to non-KP clients and providers:

improve use of existing tools, such as the Medicaid prenatal risk assessment and the Postpartum Infant and Maternal Referral (PIMR), to connect clients with resources to address client needs.

- b) *Electronic data sharing to support connections between providers to meet client needs*
  - i) MHCC should continue work to support the connection of electronic health records with electronic methods of data exchange (such as the State-Designated Health Information Exchange).
  - ii) Hospitals, health systems, other providers, and insurers should use interoperable electronic health records, health information exchange, and other tools to enhance electronic communication and data sharing across care delivery systems providing pre/interconception, prenatal, and postpartum services.
  - iii) One improvement would be moving paper screening and referral documents to an electronic format that allows for efficient and accurate data sharing on maternal and infant health between providers and insurers. Depending on the data storage policies, this could also improve availability of data for program evaluation.
  - iv) Any approach that includes electronic data sharing of individually identifiable health information will require appropriate data sharing agreements between organizations and privacy safeguards, including patient consent.
- c) Maryland Medicaid should identify challenges and opportunities to optimize use of Medicaid Administrative Care Coordination Units for care coordination among Medicaid participants. The purpose of the ACCU Program is to assist Medicaid/HealthChoice eligible beneficiaries in accessing and appropriately using their Medicaid benefits.
- d) Providers and insurers (including public payers) should improve rates of screening for maternal depression and anxiety and increase the provision of guidance on safe sleep, breastfeeding, and child safety in prenatal care and well-child visits.

**Recommendation 2: Care coordination should include programs to address social determinants of health outcomes, including the impact of racism and bias.**

Many factors affect the health and well-being of our children. A life course approach that addresses the needs of both families and communities is critical. Such an approach must address systemic inequities, bias, and health disparities. Programs should be coordinated to address social determinants of health and the root causes of these systemic inequities, and will require cross-sector collaboration. These resources include nutrition and food access, housing, transportation, and job training and workforce development programs that have long term impacts on infant mortality and infant well-being. The following recommendations relate to addressing social determinants of health that impact infant mortality:

- a) *Connect to social supports:* Programs serving families should use tools and approaches that are appropriate for their community to connect clients with social supports and resources. Many existing tools exist in the community and nationally to provide these connections.

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<https://healthitanalytics.com/news/kaiser-permanente-launches-full-network-social-determinants-program>; their kit and tools will be linked to the electronic medical record for their patients.

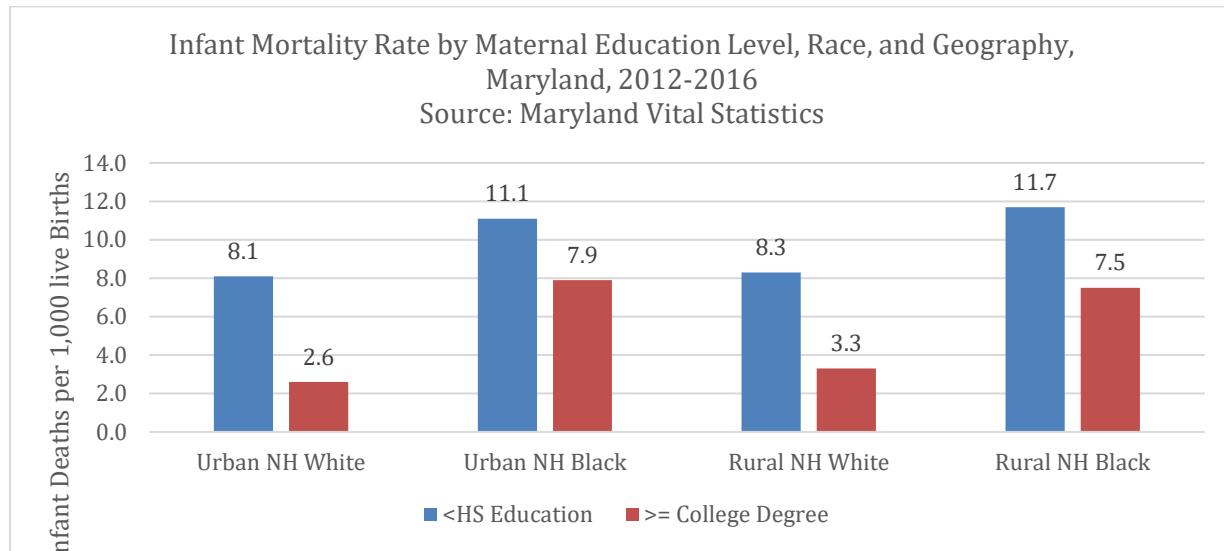
Note: MHCC does not endorse any single screening or referral tool. Named tools are included as examples only. Health care providers and communities should select the tools that work best for their organizations and communities

- b) *Housing*: Housing programs should prioritize pregnant and postpartum women for temporary housing programs, subsidized housing, and coordinate support for pregnant mothers/families to avoid evictions.
- c) *Funding*: The General Assembly, State agencies, payers, and funders should work to provide sufficient funding to ensure infrastructure supports for care coordination addressing social determinants of health, including appropriate engagement of public and community agencies.
- d) *Payment Models*: The Health Services Cost Review Commission, Medicaid, and private payers should explore necessary changes in payment models to support care coordination to address social determinants of health, including considering flexibilities available under the Total Cost of Care Model.

**Recommendation 3: Implement rigorous implicit racial bias training in relevant health care providers' education and clinical practices.**

The analysis of Maryland data in appendix A shows that Black women experience higher levels of risk for every risk factor examined. This finding is also supported by the national literature review: Black women experience an elevated risk of infant mortality regardless of their risk profile.<sup>96</sup> As an example, well-educated and high-income Black families do not experience the same degree of reduction in infant mortality rate as White families with similar levels of education and income. This means that there is an underlying factor that is increasing infant mortality for Black women that is not addressed by the factors analyzed in Appendix A. Researchers increasingly attribute a portion of this latent risk for Black families to the impact of structural racism, implicit racial bias, and maternal stress and risk related to the impact of perceived racism and bias (for example, distrust of the health care system).<sup>97</sup>

Figure 12: Infant Mortality Rate by Maternal Education Level, Race, and Geography, Maryland, 2012-2016



<sup>96</sup> Kramer MF, Hogue CR. Place matters: variation in the Black/White very preterm birth rate across U.S. metropolitan areas, 2002-2004. Public Health Rep Wash DC 1974. 2008; 123(5):576-585. DOI: 10.1177/003335490812300507

<sup>97</sup> See Risk Factors Literature Review Appendix C

Multiple health professional organizations from the American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, the American Medical Association, and the American Psychological Association, among others, have called for their members to take action to identify and reduce implicit and explicit racial bias in their practices. In July 2019, the American Academy of Pediatrics released an official policy statement recognizing that discrimination is linked to maternal stress and infant mortality and calling for multiple individual and structural level approaches to address racism in pediatric practices. These approaches include implicit racial bias training for health care providers and office staff, identifying and providing appropriate referrals for needs associated with social determinants of health, and increasing awareness and understanding of the communities from which their patients come. Unlike many short, cognitive focused, “cultural competence” training, implicit racial bias training focuses on self-reflection and awareness about one’s own biases, understanding how to recognize and address bias, and importantly, is a life-long learning process aimed at increasing cultural humility, self-awareness, and effective relationship and communication skills. In 2017, Sukhera and Watling’s article in Academic Medicine provided a framework for the integration of implicit bias training into health professions education.<sup>98</sup> When planning efforts to reduce infant mortality rates, an approach that addresses systemic inequities, implicit racial bias in the health care setting, and health disparities is critical.

- a) Physicians, nurses and other health care professionals who treat pregnant individuals or infants should be encouraged to participate in evidence-based implicit or unconscious racial bias training. This interactive training could include simulations, case studies, and other teaching methods. Ideally, health systems, hospitals, practices, and clinics should provide this training for all patient-facing staff. Professional organizations can support these goals by including this training as on-going quality improvement efforts and continuing education curriculums.
- b) Organizations that provide services to pregnant and postpartum women should provide evidence-based implicit or unconscious racial bias training for program staff as part of ongoing quality improvement efforts.
- c) Health systems and health care institutions should develop a process for reviewing standards and implementation of Cultural, Linguistic and Appropriate Services (CLAS).
- d) The Maryland Department of Health, in collaboration with academic institutions in Maryland, should create a strategic vision to increase the diversity of the healthcare workforce and students in training for roles that support maternal and infant health.

**Recommendation 4: Strengthen coordination of care by assessment and referral to necessary mental health and substance use disorder treatment programs**

Mental health and substance use disorder (SUD) treatment is a critical need identified in the literature, program inventory, interviews, and the Work Group discussions. Maternal depression, past exposure to trauma, and intimate partner violence all place mothers and infants at risk. The Maryland Department of Health has identified drug overdose as the leading

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<sup>98</sup> Sukhera J, Watling C A framework for integrating implicit bias recognition into health professions education. Acad Med. 2018;93(1):35-40. DOI: 10.1097/ACM.0000000000001819

cause of death of pregnant women and new mothers in Maryland.<sup>99</sup> Loss of a mother has a direct impact on infant wellbeing. The Behavioral Health Administration is currently engaged in a gap analysis and concurrent implementation of a quality improvement framework with the goal of increasing service capacity, increasing quality and operational efficiency, and improving health outcomes. In addition to strengthening referral networks, it is critical to ensure that there are adequate treatment resources available and prepared to serve pregnant and parenting women.

- a) *Substance use disorder and mental health* – The Behavioral Health Administration should strengthen and expand referral systems to substance use disorder and mental health programs and ensure follow-up to determine clients have been successful in accessing the services. Additionally, these programs should identify pregnant and postpartum women as special populations within their program and provide targeted services.
- b) *Grief counseling* – Local Health Departments should expand access and referrals to grief counseling programs and support groups for mothers experiencing fetal or infant loss.
- c) *Continuing education*- Professional accreditation organizations and health systems should ensure that Maryland health care providers (obstetricians, pediatricians, nurse practitioners, midwives, etc.) receive continuing education in recognizing and addressing mental health issues and substance use disorders in pregnant and postpartum women.
- d) *Training*- Home visiting programs should ensure that home visitors receive training on recognizing mental health, trauma and substance use disorder problems and providing appropriate referrals to community resources.

#### **Recommendation 5: Improve continuity of care**

Pre/interconception, prenatal, and postpartum care are essential for ensuring infant and maternal health. Women and infants benefit from the mother's lifelong access to patient-centered, culturally-sensitive primary care, management of chronic conditions, family planning services, and health education. Continuity of care is most concerning for women who are uninsured before, during, or pregnancy. The following recommendations are designed to support continuity of care throughout the life course for the purpose of improving birth outcomes and infant and maternal health.

Disruptions in care resulting from transitions in insurance coverage and related provider networks can interfere with health outcomes. One of the most common transitions of coverage for women who receive Medicaid coverage during pregnancy occurs 60 days after childbirth, when eligibility for Medicaid through the pregnant woman eligibility category ends.

- a) Maryland Medicaid and the Maryland Health Benefit Exchange should continue their work to strengthen and streamline systems and supports (including use of insurance navigators) for women who need to transition from Medicaid to Marketplace coverage after birth. The Maryland Health Benefit Exchange should evaluate, and if necessary, revise the process for women to enroll in Exchange plans postpartum.

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<sup>99</sup> Maryland Department of Health. Maryland Maternal Mortality Review 2018 Annual Report, Health—General Article § 13-1207. Baltimore, MD: 2018 Dec 12. 1-21. Available from: <http://healthymaryland.org/wp-content/uploads/2019/01/Health-General-Article-%C2%A713-1207-2018-Annual-Report-Maryland-Maternal-Mortality-Review.pdf>

- b) Providers should co-locate and integrate preconception through postpartum care services when possible to link family planning and primary care to obstetricians and prenatal care providers.
  - i) Providers should discuss reproductive life planning goals with their patients to identify women who may want to become pregnant or who may want to avoid pregnancy. Providers should refer women who wish to have children to preconception services and support women who do not wish to become pregnant through access to appropriate contraception. Providers should be educated about initiatives such as One Key Question® that encourages all primary care health teams to routinely ask women of reproductive-age, “Would you like to become pregnant in the next year?” Women are then offered follow-up preventive reproductive health services depending on their needs. One Key Question® is designed to proactively address the root causes of poor birth outcomes and disparities in maternal and infant health.
  - ii) Hospitals should increase their utilization of the Maryland Department of Health’s tool, the Postpartum Infant and Maternal Referral (PIMR), which is used at discharge after birth to identify high-risk infant or mothers with medical or psychosocial needs. Use of PIMR can improve the identification of high-risk infants and mothers, who may not have been identified prenatally, for referral to local health departments for community-based services.
  - iii) Providers should also consider co-locating postpartum and pediatric care.
- c) Health care services and direct service programs should focus on the mother-infant dyad and the whole family unit.
  - i) Well-child visits with pediatricians provide an opportunity for screening for maternal depression and anxiety along with guidance on safe sleep, breastfeeding, and child safety. The American Academy of Pediatrics (AAP) recommends screening of maternal depression and anxiety during well-child visits.<sup>100</sup> An interconception care toolkit, IMPLICIT, is available for pediatricians and family medicine practices to minimize preterm and low birth weight births through maternal assessments conducted in the context of well-child visits. The March of Dimes and the Family Medicine Education Consortium developed the toolkit that is based on the premise that mothers will take their children to the doctors even when they do not seek care for themselves. The maternal risk assessments focus on four behavioral risks affecting future birth outcomes: smoking, depression, family planning, and folic acid usage. Integration and appropriate referral should also be coordinated and facilitated, and follow-up conducted to ensure successful entrance into appropriate mental health treatment programs.
  - ii) Payers should ensure that these services are reimbursed at appropriate rates and appropriate payment models should be used to maximize maternal

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<sup>100</sup> Earls MF, Yogman MW, Mattson G, Rafferty J. Policy Statement: Incorporating recognition and management of perinatal depression into pediatric practice. Pediatrics 2019;143(1): 9:e20183259. DOI:10.1542/peds.2018-3259

depression screening during well-child visits, given the magnitude and impact of maternal mental health on infant health.<sup>53</sup>

**Recommendation 6: Increase adoption of breastfeeding prior to hospital discharge and support continuation through the first year of life.**

The literature review showed that breastfeeding was strongly associated with infant mortality disparities, and breastfeeding rates are lower in Black families and rural families. As noted above, the Maryland Perinatal System Standards already require birthing hospitals to have a lactation consultant on staff. Five hospitals in Maryland have also achieved “Baby-Friendly” hospital certification, a certification from a third-party organization which is the U.S. national authority for the World Health Organization and United Nation Children’s Fund international Baby-Friendly Hospital Initiative.<sup>101</sup>

- a) The Maryland Department of Health, in conjunction with other programs such as the Maryland Patient Safety Center, should consider additional ways to support increased breastfeeding rates in hospitals, with specific attention to Black mothers to help increase their adoption of breastfeeding.
- b) Maryland birthing hospitals should become, at minimum, a “Maryland Best Practices Hospital” by adhering to the ten criteria in the Maryland Hospital Breastfeeding Policy Recommendations. If resources permit, they should consider seeking certification as Baby Friendly Hospitals®. State agencies should identify hospitals on their web sites that receive Baby Friendly Hospitals® certification.
- c) Healthcare providers should integrate assessment of breastfeeding into pediatric and postpartum visits, including addressing barriers and providing additional supports.
- d) Community health workers and doulas should receive training in the importance of breastfeeding to prevent infant mortality, how to identify and address barriers to breastfeeding, and making successful referral to breastfeeding programs within WIC and other community programs.
- e) Research has shown that support of breastfeeding by respected members of the parent’s family and social network is key to breastfeeding adoption. Family and friends, along with community health workers, can support breastfeeding and advocate for cultural beliefs and norms around breastfeeding in Black communities.

**Recommendation 7: Health care providers, community health workers, and other organizations should enhance patient education on pregnancy spacing.**

The Maryland data showed that short interpregnancy intervals are associated with increased risk of infant mortality and other adverse outcomes. Physicians, nurses, doulas, community health workers and other care providers should provide information to pregnant persons and people who have given birth about the importance of pregnancy spacing and the availability of contraceptive methods that meet patients’ diverse needs and support the individual’s family planning decisions.

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<sup>101</sup> Baby-Friendly USA. The Baby-Friendly Hospital Initiative. Colonie, NY: 2019. Accessed 2019 Oct 4. Available from: <https://www.babyfriendlyusa.org/about/>

### **Theme: Expanding and Enhancing Access and Utilization of Services**

The research conducted in this Study, as well as the Work Group discussions, provided strong evidence for the feasibility and efficacy of home visiting programs and group prenatal care programs in reducing infant mortality, increasing breastfeeding support, and optimizing health among both Black and rural infants and mothers.

Some evidence has shown that telehealth can be a useful adjunct in improving access to care for rural high-risk pregnant women. The MHCC has funded 16 grants to assess the effectiveness of telehealth to address various health care challenges from increasing patient engagement for pediatric patients with asthma, supporting value-based care delivery in primary care settings through expanded access to health services for different patient populations, and improving patient experience and overall health of patients with chronic conditions living in underserved rural and minority communities.<sup>102</sup>

#### **Recommendation 8: Expand home visiting programs throughout the State to improve maternal and infant health and reduce infant mortality and disparities.**

Evidence-based home visiting programs use trained, culturally competent staff including community health workers (CHWs) and other paraprofessionals (such as Doulas or “resource parents” from the community); nurses; social workers, or a combination of both types of staff. Program staff visit the client’s home regularly during pregnancy and postpartum.<sup>103</sup> A number of evidence-based home visiting programs are in use in Maryland. Some of these programs are operated under the Maternal, Infant, and Early Childhood Home Visiting Program, which is funded through Federal funds and administered by the Maryland Department of Health. Four of the 5 MIECHV programs focus on the prenatal and infant period. These programs operate in all 24 jurisdictions in Maryland. In addition, Medicaid is currently operating a home visiting pilot program in Maryland.

Interviews with home visiting program leaders indicated that many existing programs lack reliable funding sources and that reaching clients can be challenging, either due to resource constraints or client availability. Funding for home visiting programs in Maryland currently comes from a variety of Federal, State, and Local sources.

The following items support the goal of expanding the use of evidence-based home visiting programs for maternal and infant health in Maryland and stabilizing existing programs.

- a) State agencies, payers, and funders should continue to develop approaches for improving funding for evidence-based home visiting programs. This may include reimbursement of services provided by nurses and certified community health workers through evidence-based home visiting programs.<sup>104</sup>

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<sup>102</sup>Maryland Health Care Commission. Telehealth Grants Summary. Baltimore, MD: 2019 May 1. 1-2. Accessed 2019 Oct 4. Available from:

[https://mhcc.maryland.gov/mhcc/pages/hit\(hit\\_telegmedicine/documents/TLHT\\_Grants\\_Table.pdf](https://mhcc.maryland.gov/mhcc/pages/hit(hit_telegmedicine/documents/TLHT_Grants_Table.pdf)

<sup>103</sup> See Appendix F.

<sup>104</sup> The Maryland Department of Health will begin certifying CHWs starting September 2019. Training programs will begin to be accredited in January 2020.

- b) Private insurance companies should strengthen their procedures for identifying pregnant women with high-risk pregnancies or needs for support with social determinants of health and provide adequate resources to improve healthy birth outcomes.
- c) The Maryland Medicaid, MCOs, other payers, providers, and home visiting programs should seek to better coordinate care to improve outcomes for the families that they serve.
- d) Maryland should consider the best practices from other States for implementing evidence-based home visiting programs, including best practices related to recruiting and training the workforce.
- e) The Maryland Department of Health should consider developing a specialty certification for CHWs in maternal and child health, as part of the certification program for CHWs that is currently in development. The Department should identify training programs that support the competencies for that specialty area. This training could include training for existing evidence-based home visitor programs.
- f) Organizations that provide home-visiting programs should ensure that pregnant women and community health workers are engaged in planning for expansions of evidence-based group prenatal care programs.

**Recommendation 9: Increase adoption of evidence-based group prenatal care programs.**

Group prenatal care (including, but not limited to the “Centering Pregnancy” model) appears to be effective in improving birth outcomes among Black and rural women with high risk related to social determinants of health but with pregnancies that are of low medical risk (see appendix D). In group prenatal care, women with pregnancies of the same gestational age meet regularly for visits with a clinician. The group participates in self-assessment, support, and prenatal education. Group prenatal care has a high initial startup cost but saves money in the long term (see appendix D). Group prenatal care models are already in use in Maryland. The following recommendations support increased adoption of group prenatal care programs:

- a) Expand existing group prenatal care programs throughout the State.
  - i) Providers considering adopting or expanding group prenatal care should focus on populations for which the program has demonstrated success.
  - ii) Funders and payers should consider funding start-up costs for providers to encourage implementation of “Centering Pregnancy”, the March of Dimes “Supportive Pregnancy Care”, and other group prenatal care models, to encourage providers to adopt this model.
  - iii) Payers should consider innovative financing and reimbursement models for group prenatal care, including pilot studies conducted in other states, to facilitate wider adoption of this model in Maryland.

**Recommendation 10: Enhance the use of telehealth to provide care in rural communities.**

In 2017, the State of Maryland conducted a study on Rural Health Care.<sup>105</sup> That study found that there are only 9 obstetrics and gynecology providers in the five county mid-shore area (and area with an estimated population of 171,166). Three of the five counties (Caroline, Dorchester, and Queen Anne's) had no obstetrics and gynecology providers at that time. The number of psychiatrists and behavioral health specialists was also limited (10 psychiatrists, with none in Caroline and Kent counties).

Telehealth has long been perceived as a tool to increase access to care for rural residents. The Health Resources and Services Administration defines telehealth as the use of electronic communication and information technologies to provide or support long-distance clinical health care, patient and professional health-related education, public health and health administration. In rural areas, where long distances and provider shortages are barriers to care, telehealth services increase patient access to services such as emergency department care, home health, specialty care, medication adherence and intensive care monitoring. There is some literature on the use of telehealth for prenatal care.

In Maryland, the Maryland Health Care Commission has compiled information on challenges and considerations for telehealth implementation although the reviewed programs are not related to maternal or infant health.<sup>106</sup> The Maryland Board of Physicians recently adopted new telehealth regulations. Maryland Medicaid also funds telehealth.<sup>107</sup>

- a) The Maryland Department of Health (MDH) should examine the peer-reviewed literature on promising use of telehealth for prenatal and postpartum care and other critical care issues (such as mental health care) in rural areas.
- b) MHCC and MDH should consider providing grant funding for innovative pilot projects for telehealth related to maternal and infant health that do not qualify for funding from other sources (e.g. Medicaid).
- c) Although the priority should be on telehealth services in rural areas, telehealth should be examined as an option for urban areas that suffer challenges with transportation to health facilities.

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<sup>105</sup> Maryland Health Care Commission. Transforming Maryland's rural healthcare system: A regional approach to rural healthcare delivery Report of the Workgroup on Rural Health Delivery to the Maryland Health Care Commission As Required by Senate Bill 707. Baltimore MD, 2017 Oct 23. Accessed 2019 Oct 4. Available from:

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/rural\\_health/Final%20Report/LGSRPT\\_FinalReport\\_rpt\\_23102017.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/rural_health/Final%20Report/LGSRPT_FinalReport_rpt_23102017.pdf)

<sup>106</sup> Maryland Health Care Commission. Health Information Technology: Telehealth. Baltimore, MD: 2019 Aug 29. Accessed 2019 Oct 4. Available from:

[https://mhcc.maryland.gov/mhcc/pages/hit/hit\\_telemedicine/hit\\_telemedicine.aspx](https://mhcc.maryland.gov/mhcc/pages/hit/hit_telemedicine/hit_telemedicine.aspx)

<sup>107</sup> Maryland Department of Health. Maryland Medicaid Telehealth Program. Baltimore, MD: 2018 May. Accessed 2019 Oct 4. Available from: <https://mmcp.health.maryland.gov/Pages/telehealth.aspx>

**Recommendation 11: State and local health agencies should invest in an infant mortality prevention health literacy initiative across sectors to create an informed and activated community of residents, health and social service providers and facilities.**

In this study, health literacy emerged as a concern from the Work Group and individual interviews. This concern was also identified in the 2017 Rural Health Study, which recommended the development of community-based health literacy across sectors to support a more informed and health literate Mid-Shore population.<sup>108</sup> Health literacy initiatives would empower self-care to support a healthy pregnancy and healthy lifestyle behaviors; support adoption of safe sleep practices; train providers; create an easy to navigate road map to access coordinated care; and provide guidance on how to use health insurance. A commitment to incorporate health literacy principles in health care organizations and other sectors such as education, social services, mental health and substance use and the faith community, could enhance the ability of Black and rural families to effectively use appropriate services and prevent risk factors for infant mortality. There are numerous, high quality resources available for use by providers including: a) AHRQ Health Literacy Universal Precautions Toolkit, 2<sup>nd</sup> Edition; b) CDC Resources; c) Ten Attributes of Health Literate Health Care Organizations and d) The Horowitz Center for Health Literacy at the University of Maryland School of Public Health.<sup>109</sup>

**Recommendation 12: Continue investment in safe sleep education and increase investment in safe sleep resources.**

Safe sleep programs reduce infant mortality. Sudden unexpected infant death (SUID) is the third leading cause of IM in Maryland.<sup>110</sup> Nationally, the rate of sudden unexpected infant death (SUID) is higher among Black infants than among White infants.<sup>111</sup> Evidence from existing national and local programs suggests that safe sleep education can dramatically reduce the number of unsafe sleep practices. The program inventory identified a need for more programming related to safe sleep education and resources, including programming targeted at

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<sup>108</sup> Maryland Health Care Commission. Health Matters: Navigating an Enhanced Rural Health Model for Maryland Lessons Learned from the Mid-Shore Counties. Baltimore, MD: 2017. 1-8. Available from: [https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/rural\\_health/September%2025th%202017%20Meeting/lqrpt\\_%20ExecutiveSummary\\_rpt\\_20170928.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/rural_health/September%2025th%202017%20Meeting/lqrpt_%20ExecutiveSummary_rpt_20170928.pdf)

<sup>109</sup> U.S. Department of Health & Human Services. Agency for Healthcare Research and Quality: AHRQ Health Literacy Universal Precautions Toolkit, 2<sup>nd</sup> Edition. Washington, DC: 2010 Apr. Accessed 2019 Oct 4. Available from: <https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/literacy-toolkit/index.html>

Centers for Disease Control and Prevention. Health Literacy. Atlanta, GA: 2019 Oct 1. Accessed 2019 Oct 4. Available from: <https://www.cdc.gov/healthliteracy/index.html>

Brach C, Keller D, Hernandez LM, et al. Ten Attributes of Health Literate Health Care Organizations. Institute of Medicine of the National Academies; Washington DC: 2012 Jun. 1-27. Available from: [https://nam.edu/wp-content/uploads/2015/06/BPH\\_Ten\\_HLit\\_Attributes.pdf](https://nam.edu/wp-content/uploads/2015/06/BPH_Ten_HLit_Attributes.pdf)

University of Maryland, School of Public Health. Horowitz Center for Health Literacy (homepage). College Park, MD: 2019. Accessed 2019 Oct 4. Available from: <https://sph.umd.edu/center/hchl>

<sup>110</sup> Vital Statistics Administration, Maryland Department of Health. Infant Mortality in Maryland, 2017. Baltimore, MD: 2018 Sep 19. 1-4. Available from: [https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant\\_Mortality\\_Report\\_2017\\_20180919.pdf](https://health.maryland.gov/vsa/Documents/Reports%20and%20Data/Infant%20Mortality/Infant_Mortality_Report_2017_20180919.pdf)

<sup>111</sup> Hobson K. Racial and ethnic disparities persist in sudden infant deaths. NPR Shots Health News. 2017 May 27. Accessed 2019 Oct 4. Available from: <https://www.npr.org/sections/health-shots/2017/05/15/528173372/racial-and-ethnic-disparities-persist-in-sudden-infant-deaths>

high-risk families (families with smokers, infants in the NICU, teen parents, and parents with unstable housing). Most birthing hospitals in Maryland are currently participating in a collaborative with the Maryland Patient Safety Center to improve modeling of safe sleep behavior in the hospital setting. In addition to safe sleep education, providing resources like cribs, Pack n' Plays, or other safe sleep environments to reinforce safe sleeping practices can enhance program success. 'Bedtime Basics for Babies' is an example of a program model that provides safe sleep resources. In Maryland, B'more Healthy Babies provides cribs to some families. The following recommendations are intended to improve safe sleep programming throughout the State.

- a) Birthing facilities and other providers should model safe sleep behavior when infants are in their care and provide education to parents on safe sleep.
- b) Programs serving pregnant individuals and infants should provide safe sleep education and promote breastfeeding (a protective factor against SIDS).
- c) Programs, hospitals and health departments should consider providing safe sleep resources (such as cribs), in addition to education, for families who may not have a crib and have other risk factors for SIDS.
- d) Promote public awareness through safe sleep marketing campaigns.

***Theme: Need for a Sustained and Centralized Focus on Infant Mortality***

The legislative mandate for this report explicitly stated that the MHCC make legislative recommendations regarding the establishment of a permanent council on infant mortality. While there has been improvement in infant mortality in Maryland over the past 20 years, Black and rural infants continue to be at higher risk for infant death. These persistent disparities require a sustained focus on adequate and effective efforts to eliminate them and improve the health of mothers and their infants. Additionally, disparities for infant mortality likely exist for other population groups (ex. ethnicity etc.) or by income within Black and rural infants that were not examined in this study.

A number of entities in the State government have responsibility for taking action to narrow this gap. In the January work group meeting, work group members expressed an interest in having a function within the State government that could focus public and stakeholder attention on disparities in infant mortality and provide a plan, structure, and accountability for continuing change. Work group members noted that it is important that this entity or function not pull resources from existing infant and maternal mortality work within the State. With limited resources, it is important not to duplicate work and effort. Rather, the entity or function should help coordinate existing resources and fill gaps. If a new entity or function is recommended, it must receive adequate funding for staff and other necessary resources, to avoid stressing already stretched resources focused on necessary program delivery and public health surveillance.

***Recommendation 13: Establish a new permanent council focused on disparities in infant mortality and maternal mortality***

The literature reviews, program inventory, and data analysis for this study support the link between maternal and infant health. Many of the risk factors or program needs identified were related to maternal health (e.g., hypertension, behavioral risk factors) or healthcare seeking

(e.g., early initiation of prenatal care). The largest Black - White disparity in infant mortality was infant deaths due to maternal complications of pregnancy. Leading causes of maternal death, such as eclampsia, can cause significant complications for fetal and newborn health, including greater risk of death.<sup>112</sup> Addressing the health of the mother not only improves maternal, but infant health as well.<sup>113</sup> Given the strong connections between maternal and infant health and the importance of the maternal-infant dyad for promoting infant development, we recommend establishing a permanent council focused on disparities in infant and maternal mortality. A permanent council would provide ongoing focus and accountability in efforts to save the lives of infants and mothers in Maryland. This is critically important given the persistent nature of disparities in both infant and maternal mortality, and the workgroup's acknowledgement that previous shorter term efforts to address these disparities were not sufficient for long term change. Based on work group discussions, potential responsibilities for the permanent council could include, but not be limited to:

- Cross-sector collaboration, including membership from the Department of Housing and the Department of Human Services.
- A regular (bi-annual) reporting requirement that integrates information from multiple agencies, and monitors and assesses progress.
- Identify funding needs and advocate for allocating new and sustainable funding sources to target the reduction of infant and maternal mortality through the implementation of the report recommendations.
- Work with MDH to identify counties, and where feasible, sub-county areas, where infant mortality rates and trends are highest, to focus resources on those areas.
- Foster support for counties to develop their logic model for the reduction of disparities in infant mortality disparities, using state and local data and robust community engagement with stakeholders, elected officials, health care organizations and community based organizations
- Evaluate current programs, communication and outreach resources that focus on infant mortality to determine the cost effectiveness of programs to ensure the most impactful use of limited resources and funding.
- Determine need for further incentives to increase the number of nurse practitioners and certified nurse midwives practicing in rural areas and address other workforce issues.

Any legislation establishing a permanent council must account for the responsibilities of existing organizations within the Maryland Department of Health, and not duplicate functions of existing organizations. A permanent council should be organized under the Governor or in the Office of the Secretary of Health to ensure that infant and maternal mortality are high priorities in Maryland Government. Although the permanent council could assume programmatic or analytic functions, these activities should not be its first or second priorities. The permanent council's first role should be raising awareness of the problem and ensuring that existing resources are effectively mobilized. In some instances, the permanent council can raise awareness of successes or challenges, in other situations it can serve an advocacy function, and in other cases it can prod organizations to do better or to work together more effectively. To be effective, the permanent council must be composed of high-level experts and leaders in Maryland communities where the challenges are significant.

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<sup>112</sup> Backes CH, Markham K, Moorehead P, Cordero L, Nankervis CA, Giannone PJ. Maternal preeclampsia and neonatal outcomes. *J Pregnancy*. 2011;2011:21365. DOI: 10.1155/2011/214365

<sup>113</sup> Misra DP, Guyer B, Allston A. Integrated perinatal health framework. A multiple determinants model with a life span approach. *Am J Prev Med*. 2003;25(1):65-75. DOI: 10.1016/S0749-3797(03)00090-4

A permanent council should have the flexibility to organize itself to address evolving challenges. The authority and visibility to engage communities by forming advisory committees and the ability to periodically draw in staff from within MDH will be key to the council credibility. The Work Group believes that the advisory committees should be configured to include women who have been pregnant in the recent past including some who have experienced poor birth outcomes. There are numerous experts on infant and maternal issues within MDH, allowing the council to draw on those experts knowledge will enable the permanent council to judge the progress of existing programs and advocate for new initiatives.

## Appendix A: Data on Factors Associated with Infant Mortality in African American Infants and Infants in Rural Communities in Maryland

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppA\\_MHCCREVIEW\\_10172019.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppA_MHCCREVIEW_10172019.pdf)

### ***Appendix A2: Infant Mortality among African American & Rural Populations in Maryland: Epidemiology***

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppA2\\_MCH%20Presentation.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppA2_MCH%20Presentation.pdf)

### ***Appendix A3: Opportunities for Reducing Infant Mortality Rates: Perinatal Period of Risk (PPOR) Findings for Maryland Counties***

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/PPOR\\_IM\\_Maryland\\_FINAL\\_2018.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/PPOR_IM_Maryland_FINAL_2018.pdf)

## Appendix B: Economic Costs Associated with Preterm Birth, Low Birth Weight Infants and Infant Mortality

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppB\\_CostAnalysisFINAL.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppB_CostAnalysisFINAL.pdf)

## Appendix C: Narrative Synthesis of Risk Factors for Infant Mortality Among African American and Rural Populations in the U.S.

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppC\\_RiskFactLitFINAL.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppC_RiskFactLitFINAL.pdf)

## Appendix D: What Works to Save Babies' Lives? Reviews of Interventions to Reduce Mortality among African American and Rural Community Infants

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppD\\_EffctvPrgrmsFINAL.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppD_EffctvPrgrmsFINAL.pdf)

## Appendix E: Inventory of Programs in Maryland

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppE\\_InventoryFINAL.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppE_InventoryFINAL.pdf)

**Appendix E2: Survey Instrument**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppE2SurveyInst.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppE2SurveyInst.pdf)

**Appendix E3: Website Extraction Table**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppE3WebsExtrctTbl.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppE3WebsExtrctTbl.pdf)

**Appendix F: Community Health Worker Programs Qualitative Study: Summary and Detailed findings.**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppF\\_InterviewSummFINAL.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppF_InterviewSummFINAL.pdf)

**Appendix F2: Interview Protocol**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppxF2IntrvwPrtcl.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppxF2IntrvwPrtcl.pdf)

**Appendix G: Issue paper: Potential Placement of Permanent Council on Disparities in Infant Mortality**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppGPermCnclDsscss.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppGPermCnclDsscss.pdf)

**Appendix H: Glossary of Terms and Abbreviations**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppHGloss913.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppHGloss913.pdf)

**Appendix I: Workgroup Structure and Participants**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppI\\_Wrkgrp.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppI_Wrkgrp.pdf)

**Appendix J: List of Birthing Hospitals in Maryland**

[https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african\\_american\\_study/AppJ MDBrtHosp.pdf](https://mhcc.maryland.gov/mhcc/pages/home/workgroups/documents/african_american_study/AppJ MDBrtHosp.pdf)