Fighting at Birth: Eradicating the Black-White Infant Mortality Gap

Report
March 2018

Imari Z. Smith, Keisha L. Bentley-Edwards, Salimah El-Amin and William Darity, Jr.
Duke University's Samuel DuBois Cook Center on Social Equity and
Insight Center for Community Economic Development

INTRODUCTION

The infant mortality rate is a key national indicator of population health. Despite technological advances in medicine and other health-related resources available to the average American, the infant mortality rate (IMR) in the United States is exceptionally high relative to other developed countries. For black infants, the numbers are devastatingly high. In 2013, the white IMR in the United States was five per 1000 live births —resembling economically advanced nations like New Zealand. In contrast, the black IMR was 11.2 per 1000 live births — a rate closer to that of lower income nations like Thailand, Romania, and Grenada.[1]

In fact, black women experience the highest infant mortality rates among any racial or ethnic group in the United States. The black IMR has been roughly twice that of the white IMR for over 35 years.[2] In order to decrease the national infant mortality rate, factors that maintain these disparities must be addressed directly.

There is a common perception that racial disparities in IMR are driven primarily by risky behaviors. However, the best available evidence does not support this assertion and indicates that systemic barriers to positive birth outcomes merit further investigation. This research brief will provide an overview of the social determinants that contribute to racial disparities in IMR. It will also provide policy and research recommendations to improve outcomes for black babies and their mothers.

PRETERM BIRTHS GO HAND IN HAND WITH INFANT MORTALITY

One of the leading factors associated with infant mortality in the United States is preterm birth, births that occur before 37 weeks of gestation. Risk factors commonly associated with preterm birth include age, education, alcohol and drug use, and stress.[3] Since an infant's birth weight depends on the length of gestation, preterm birth is the primary cause of low birth weight (born less than 2500 grams, or 5.5 pounds).[4] In 2013, the Centers for Disease Control (CDC) reported that about one-third (36 percent) of infant deaths were due to preterm-related causes, and infants considered "late preterm" were also at higher risk of infant death than those born full term. Black women continuously experience preterm birth at higher rates than white women. In 2016, the rate of preterm births among black women was estimated at fourteen percent while the rate of preterm births

among white women was considerably lower at nine percent.[5] Seventy-three percent of black infant deaths were due to complications associated with preterm birth.[6]

Even black infants that survive at 20 weeks gestation are at a greater risk of both fetal death and neonatal death than white infants who survive at the same number of weeks of gestation. In addition, the average time spent in the Neonatal Intensive Care Unit (NICU) is greater for black infants. In the Premature Birth National Need Gap Study, researchers found that the average black infant in the NICU stayed 4.05 weeks whereas the average white infant stayed 2.88 weeks.[7] Although the rate of survival is much greater among infants born between 34 and 37 weeks than those born earlier, all surviving preterm infants are at a higher risk of long-term cognitive, motor, sensory, behavioral deficits, poor growth, and long-term lung and gastrointestinal disease than those born at full term.[5, 8, 9, 10, 11]

However, preterm birth is not the root cause of the racial infant mortality gap. To identify and understand root causes, it is necessary to isolate the fundamental reasons why black women in the United States are more likely to have preterm babies.

"PROTECTIVE FACTORS" ARE NOT AS PROTECTIVE FOR BLACK WOMEN'S BIRTH OUTCOMES

Social and economic factors also are associated with the likelihood of infant mortality and morbidity. These factors directly affect the access to health, quality of prenatal care available, and conditions of fetal development for mothers and their children. Factors that generally are considered to be protective for pregnant women do not provide the same benefits for black women. Conventional risk factors tend to have a more pronounced negative effect on black infant outcomes.

SOCIOECONOMIC STATUS: Women from lower socioeconomic backgrounds (census-tract median household income) are more likely to give birth preterm than those from higher socioeconomic backgrounds.[12] Twenty-four percent of black women live in households at or below the poverty line.[13] Impoverished black women's health is affected adversely by diminished access to quality health care, food, housing as well as other poverty-related stressors that impact pregnancy outcomes and infant health. Nevertheless, among mothers with low socioeconomic status, white mothers had proportionately fewer low birthweight outcomes than black mothers (7.7 percent and 11.3 percent, respectively).[14]

Furthermore, improvements in socioeconomic status yield a stronger benefit for white low birth weight outcomes (7.7 percent for low-SES whites versus 4.3 percent for higher-SES whites, a close to 50 percent reduction) while black outcomes slightly improved (10.9 percent for low-SES blacks to 11.3 percent for higher-SES blacks, a close to 4 percent increase).[14] It should be noted that socioeconomic status in this article is based solely on income, and does not consider wealth or net worth (the difference between the value of assets owned and debts owed).

AGE: Generally speaking, the initial risks of preterm birth and infant mortality are high during the teen years and fall as women age into their mid twenties, rising again as women approach their mid-thirties.[12] When comparing the risk of infant mortality for women under 20 to women 20-24, white women's risk is halved while the risk for black women decreases slightly (from 11.7 to 10.9 infant deaths per every 1000 live births).

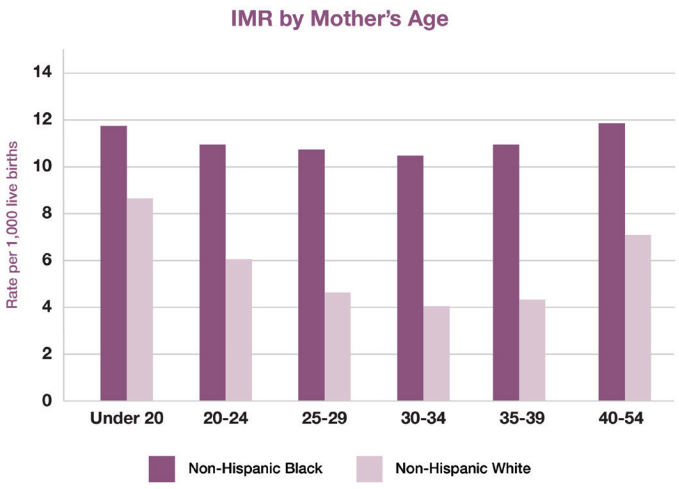

Figure 1. Source: CDC 2015. Infant Mortality Statistics from the 2013 Period Linked Birth/Infant Death Data Set. National Vital Statistics Reports.

In spite of the slight decrease, the black rate is approximately double the rate of their white counterparts. **Essentially, there is no safe age for black women to have children.** Black women consistently are at a higher risk of infant mortality at every age during their childbearing years. The slight drop in risk for black women at 25-34 years of age compared to the much larger drop for white women still results in a 2.3-2.6 ratio of black infants dying to every white infant death per 1000 live births.[15]

EDUCATIONAL ATTAINMENT: Similar to low income, low educational attainment also can have a negative effect on birth outcomes. However, for black women, higher educational attainment does not have as much of

a payoff in terms of improved infant survival rates as might be anticipated based upon the relationship between educational attainment and infant mortality outcomes for women collectively.

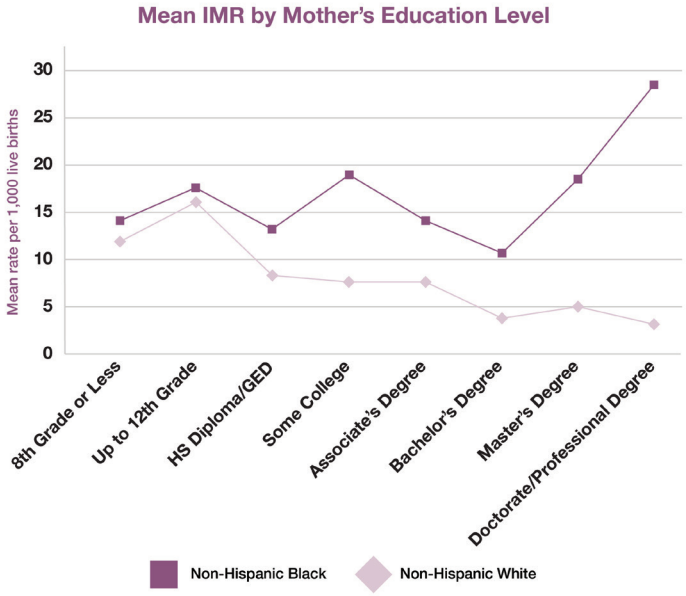

Figure 2. Adapted from source: CDC 2015. Infant Mortality Statistics from the 2013 Period Linked Birth/Infant Death Data Set. National Vital Statistics Reports. Note: This analysis controls for mother's age and marital status.

Black women with doctorates and professional degrees have a higher IMR than white women who never finished high school. Hamilton suggests this limited protection for high achieving blacks results from increased experiences of discrimination and stress as they attain higher levels of education.[16] Even after adjusting for age, parity, onset of prenatal care, and marital status, the likelihood of death for a black infant was 1.82 times that of a white infant.[17] **Not only does the black-white disparity for infant mortality exist at all educational levels, it is greatest for those with a master's degree or higher. Further, the IMR is highest for black women with a doctorate or professional degree.**

DISPARITIES PERSIST WHEN RISK FACTORS AND RISKY BEHAVIORS ARE CONSIDERED

There is a strong tendency to attribute racial disparities in infant mortality to the prevalence of obesity in black women and engagement in risky behaviors during pregnancy such as drinking alcohol, using illicit drugs, and smoking cigarettes. Indeed, these risky behaviors are associated with an increased incidence of infant mortality and morbidity. **However, it is crucial to recognize that the greater vulnerability of black infants cannot be explained by these factors.**[18]

OBESITY: Black women do have a higher average body mass index (BMI) than women of other racial/ethnic groups, both, before and during gestation[19] Obesity often is linked to poor pregnancy outcomes including congenital abnormalities and stillbirth.[20] However, even when obesity is taken into account, black women still experience a greater proportion of poor obstetric outcomes than white women. Infants born to obese black women were admitted to the NICU at higher rates with lower birth weight than those born to obese white women.[21]

ALCOHOL & DRUG USE: The disparity in fetal alcohol syndrome rates gives the impression that pregnant black women drink at higher rates. However, data from the National Survey on Drug Use and Health Statistics indicates the difference in alcohol consumption between black and white women during gestation (0.6 percent) is not statistically significant.[22]

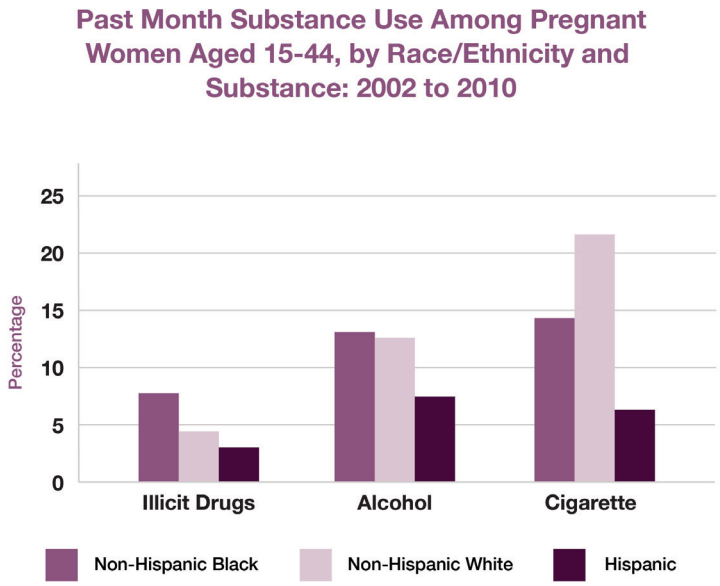

Figure 3. Source: SAMHSA 2012. The National Survey on Drug Use and Health Statistics Reports.

The National Survey on Drug Use and Health Statistics also reports that although the illicit drug use during pregnancy is low, overall, more pregnant black women used illicit drugs than pregnant white women.[23] Marijuana is the illicit drug used most often by mothers during pregnancy. Marijuana use during pregnancy increases the risk of stillbirths and infection-based morbidity, but has no significant impact on other infant mortality risk factors.[24] Regardless, black women's use of marijuana is lower than white women's use when pregnant (29.4 percent and 55.1 percent in the past month, respectively) and not pregnant (15.5 percent and 67.9 percent in the past month, respectively).[25] According to a 2014 report by the Centers for Disease Control (CDC), the percentages of black women who smoked cigarettes before and during pregnancy were 8.8 percent and 6.8 percent, respectively.[26] White women had percentages that were approximately double that of black women before and during pregnancy (15.5 percent and 12.2 percent, respectively).[27]

In addition, the CDC 2011 Pregnancy Nutrition Surveillance found that three times as many white women smoked cigarettes during the last trimester of pregnancies (22 percent) than black women (6.9 percent).[23] Considering black women smoke cigarettes less frequently than white women, drink alcohol at similar rates to white women, and illicit drugs are the least used substance type by all women, the assumption that IMR disparities are caused by black women's increased engagement in risky behaviors is not valid. **Even when risky behaviors are controlled, the black-white IMR disparity continues to exist.**

IT'S RACISM: THE NEGATIVE IMPACT OF DISCRIMINATION ON BIRTH OUTCOMES

Researchers are working to pinpoint factors that contribute to the differential preterm birth outcomes described earlier by looking beyond the idea that this health disparity is one that exists due to inherent racial differences in genes or behavior. According to Linda Goler Blount, president and CEO of the Black Women's Health Imperative, "It is very common for people to say 'race plays a factor,' and in fact it's not race so much as racism and the experience of being a black woman or a person of color in this society."[28] Perceived discrimination is generally linked to increased levels of inflammation and systolic and diastolic blood pressure,[29] depressive systems,[30] and allostatic load.[31]

For black women, exposure to discrimination and racialized stress throughout the lifespan can negatively impact birth outcomes. Wallace et. al identified structural racism, defined as a composite variable consisting of inequities regarding unemployment, education, and median household income, was associated with increased rates of infant mortality for blacks but not whites.[32] Siddiqi et. al found that higher degrees of income inequality were associated with lower IMR inequities.[33] Both of theses articles suggest that IMR inequities result from social conditions made possible by structural racism and discrimination.

Collins et. al posits that women's experiences throughout their lifetimes, rather than during gestation alone, influences the length of the gestation period.[34,35] The study found that the social class of the neighborhood environment in which a pregnant woman spent her youth similarly predicted her delivering, preterm, as does the social class of the neighborhood where she lives during pregnancy. Reports of encounters with racial discrimination are higher for blacks that live in predominantly white middle class neighborhoods.[36]

So, moving out of the "hood" does not make much of a difference for black pregnancies and infants. Though these stressors can be mitigated for black women who reside in racially congruent neighborhoods,[37]

research has suggested that racial and community level stress contribute to changes in inflammation and hormones that trigger adverse pregnancy outcomes.[38]

Like stressors experienced by blacks who live in predominantly white neighborhoods, being the only black person in a high status occupation also can lead to increased levels of discrimination and John Henryism among high-achieving black women.[16,40] Although black women of lower socioeconomic status may still experience higher levels of stress, John Henryism and racial isolation may explain the lack of protection that higher income and occupation levels have for infants born to high achieving black women.

PERINATAL AND POSTPARTUM CARE VARY BETWEEN BLACK AND WHITE WOMEN

PREFERENCE FOR CESAREAN DELIVERY: Cesarean deliveries play vital roles in preterm birth induction. Currently, this procedure is performed in the event that a pregnancy is deemed high-risk, a vaginal delivery is deemed infeasible, or a pregnant woman decides she does not want a vaginal delivery. According to a 2011 study by the National Collaborating Centre for Women and Children's Health, the rate of cesarean deliveries has risen faster than the rate of clinical risk factors that classify births as high-risk.[41,42] Since the rate of cesarean delivery for high- and low-risk pregnancies have risen at comparable rates from 1996 to 2003, this preference impacts more women than necessary.[40] Although the rate of cesarean sections decreased in 2013 for white women (32.0 percent), cesarean delivery rates have remained constant for black (35.8 percent) and Hispanic (32.2 percent) women.[43] Nevertheless, Hispanic women have a similar IMR to white women (5 percent).[1] The data on Hispanic women's birth outcomes is driven downwards by relatively low IMR for Mexican, Cuban, South American and Central American women, whereas women from Puerto Rico and the Dominican Republic have higher rates.[44]

PROVIDER TYPE: Evidence suggests that preterm birth rates vary based on the primary provider type during gestation and birthing location. The main care providers during pregnancy are obstetricians and midwives, with obstetricians as the leading health provider.[45] While both types of providers serve a vital purpose in childbirth, studies have identified the obstetrics model of care as potentially unnecessary for women carrying low-risk pregnancies since the rate of cesarean delivery has increased for low-risk women.[40] In recent years, Affordable Care Act (ACA) provisions have made midwifery more widely accessible,[46,47] but black women continue to use midwives at lower rates (15 percent) than white women (54 percent).[48]

BIRTH LOCATION: Both midwives and obstetricians can work in birthing centers and hospitals; however, birthing centers tend to align more with the midwife model of care, while hospitals prioritize the obstetric model.[49] As a result, hospitals have higher cesarean rates than birthing centers. One study found that black women who received care from midwives at a birthing center were significantly less likely to have a cesarean section than black women who received typical hospital care. They were also significantly less likely to undergo medical intervention using other tools like forceps or vacuum extraction.[40]

SOMETIMES PRETERM BIRTH IS BETTER FOR MOM AND BABY: Although induced preterm birth outcomes are associated with morbidities common among naturally premature infants, it should be noted that preterm birth could be the best option for a relatively positive birth outcome in emergencies. Some women will choose to have their pregnancies induced preterm due to increasing complications regarding their own well being and/or that of the fetus, if the pregnancy is carried to term. Pregnancies can become high risk during gestation for many reasons such as size and position of the fetus, or issues related to preeclampsia. Essentially, due to advancements in technology, it may be better to birth the baby at 36 weeks as opposed to full term in spite of the known risks associated with preterm birth.[50] However, stark differences in rates of high-risk birth classification and preterm deliveries imply that there are more factors involved in the rise in preterm

birth prevalence.[40,41] It is possible that this rise is due to an increase in medically induced vaginal labor and cesarean deliveries between 34 and 36 weeks gestation.[40]

BREASTFEEDING PRACTICES: The Center for Disease Control and Prevention's 2013 Breastfeeding Report Card claimed 77 percent of new mothers breastfeed their children, with black women having the lowest rate. Even though black women breastfeed at the lowest rates by race, it should be noted that majority of black mothers (58.9 percent as of 2008) breastfeed their children.[51] For women with infants admitted to the NICU, the odds of breastfeeding their infants are even lower.[52] Two months or more of breastfeeding – even when supplemented with formula – is significantly related to a reduced occurrence of sudden infant death syndrome (SIDS), one of the leading causes of infant mortality.[53]

POLICY RECOMMENDATIONS

It is time for policy makers to develop strategies that effectively reduce infant mortality. When it comes to black infant mortality, **the price for inaction is too high.** In 2015, 23,458 Americans died before their first birthdays and 28.2 percent of these deaths were black infants.[6] With approximately 73 percent of black infant deaths occurring infants born preterm,[6] black women are losing their infants to these circumstances at a greater rate than any other racial/ethnic group in the nation. Considering that the black preterm birth rate and the black rate of cesarean sections for delivery exceed those of other groups, addressing these factors could decrease the gap between black and white infant mortality rates.

Policies and programs predicated on prioritizing healthy maternal and child outcomes for black women due to their greater susceptibility to racism and discrimination have the potential to reduce the gap. Given the disproportionate impact of services offered on a universal basis, these policies and programs must cater specifically to the needs of black women to decrease the disparity.

The following recommendations focus on strategies that can improve infant health and reduce preterm birth prevalence, since it is the greatest predictor of infant mortality.

PROVIDE ADEQUATE SUPPORT FOR PROGRAMS AND ADVOCACY GROUPS THAT CENTER BLACK WOMEN'S PERINATAL AND POSTPARTUM NEEDS: As previously mentioned, initiatives that promote higher educational attainment and income have weak influences on decreasing the black-white infant mortality gap. In order to have the desired effect, programs and policies that target black women before, during and after pregnancy must be adopted, supported and adequately funded. Organizations that engage in black women-specific interventions need the full backing of state legislators and key stakeholders to maximize their effectiveness on black birth outcomes.

IMPLEMENT POLICIES THAT REGULATE TREATMENT PROTOCOL TO MINIMIZE PROVIDER BIASES: Upon evaluations of attempts at reducing the black-white IMR disparity through universal screenings for substance abuse and provider referrals to treatment programs, researchers found that black women are less likely that white women to be given referrals for rehabilitation and more likely to be reported to Child Protective Services following delivery.[54] A key reason this protocol leads to differential outcomes is because referrals are at the discretion of the providers. Since the universal protocol stops at screenings, the protocol should be

expanded to include mandatory referral for pregnant women who test positive to treatment programs. Policy makers need to eliminate provider biases and increase black women's access to rehabilitation treatment during and after pregnancy.

ENFORCE LAWS THAT PROTECT BLACK WOMEN AGAINST DISCRIMINATION: Both general stress and racialized stress are harmful to African Americans' wellbeing and physical health. For black women, adverse health effects of stress related to racism have been identified before, during, and after pregnancy.[55,56] Institutions that enforce anti-discrimination laws, like the U.S. Equal Employment Opportunity Commission (EEOC), need to be funded sufficiently so that they can become formidable obstacles to discriminatory actions and actors.

INCREASED SOCIAL SUPPORT FOR EXPECTANT BLACK WOMEN: It has been shown that social support for mothers, partners and families through phone calls, home visitation and comprehensive care improve outcomes for black women. The ACA offers a program titled The Maternal, Infant, and Early Child Home Visiting (MIECHV) Program in which new parents can opt-in to for additional support from health, social service, and child development professionals. This program entails participating in home visits for the purpose of improving maternal and child health, preventing child abuse and neglect, encouraging positive parenting, and promoting child development and school readiness. Given that black women are at greater risk of negative maternal and child outcomes than other racial groups, this program should prioritize recruitment for black women and children to combat the disproportionate effect of services offered on a universal basis on black birth outcomes.

COMPREHENSIVE PRENATAL EDUCATION PROGRAMS: The ACA contains provisions that expand coverage to midwife-lead births as well as freestanding birthing centers, but they are not frequented as often as obstetrician-lead births and hospitals. Programs should be provided at little to no cost in order to inform women across various socioeconomic backgrounds of their birthing options. Since the provision of these comprehensive prenatal services will have a disproportionate effect on black birth outcomes, caseworkers and providers should prioritize recruitment of black mothers for participation.

COST-SAVING INITIATIVES THAT ENABLE PROVIDERS TO PROMOTE VAGINAL BIRTH PRACTICES: Due to lesser emphasis on technological interventions, the overall cost of receiving prenatal, labor, and delivery care from midwives is associated with lower fees.[57] Aside from this, vaginal births require less hospitalization time than a cesarean procedure, which serves as another source for cost reduction.[58]

IMPROVE INFANT AND MATERNITY CARE OVERALL, BUT ESPECIALLY IN STATES WITH LARGE BLACK POPULATIONS. Some research suggests that birthing location impacts racial disparities since black women were found to be more likely to give birth in hospitals with higher infant mortality rates than white women.[59] If they delivered in the same hospitals under the same conditions as white women, black neonatal mortality rates would decrease by 6.7 deaths per 1000 births, which would decrease this disparity between black and white rates in New York City by 34.5 percent.[56]

Since black women have the highest rates of cesarean sections,[9,60] infant mortality, and preterm births, a step towards minimizing medical interventions that have to potential to greatly benefit this population. In the five states with the largest percentage of black people (Georgia, Louisiana, Maryland, Mississippi, and South Carolina), only Maryland birthing facilities average a "B-" on the CDC maternity practice in infant health scales. The other four states had average scores in the C or D range. Mississippi has the largest percentage of black residents, but only one hospital that has been deemed Baby-Friendly. If we were to replicate the standards of care found in states with over 20 percent Baby-Friendly facilities (e.g. Delaware) that average an A- on the CDC scale,[61] we could see improvements in infant mortality and preterm births.

POLICIES THAT PROMOTE COLLABORATION BETWEEN HOSPITALS AND BIRTHING CENTERS: Collaborative policies would ease the transfer from birthing center to hospital in the case of an emergency. This, in conjunction with the policies that allow patients to choose the provider type and birthing location, would make birthing centers and the midwife model of care more accessible to women who are at risk of requiring a transfer from birthing centers to hospitals during labor.

POLICIES THAT PROMOTE LACTATION AND LACTATION MAINTENANCE: Given that breast milk is the optimal form of nutrients for infants, policies that enable women to breastfeed and pump effectively would positively impact their wellbeing. Besides preference, women opt against breastfeeding due to their first attempts at breastfeeding not being successful — stressing the need for more lactation consultants. The Affordable Care Act has a provision for medical coverage of lactation consultants, but coverage is only granted for licensed consultants. Currently, there is no national licensure for lactation consultants and only two state licensure protocols, which means women in other states have to pay out-of-pocket for a service already covered by national policy.

RESEARCH RECOMMENDATIONS

Although we have discussed the weaker effectiveness of "protective factors" in reducing racial IMR disparities at the population level, it should be understood that these factors do play a role in better outcomes at the individual level. Black women who acquire protective factors like higher socioeconomic status and educational attainment do reduce their individual likelihood of preterm birth and infant mortality, but, regardless of the personal efforts made by individual black women, the difference in outcomes between black and white women persists.

Eradicating this disparity requires structural change that improves outcomes at the population level. There needs to be further exploration into the risk factors that affect black women's maternal and infant health outcomes, and the reasons why protective factors do not improve birth outcomes for black women in the same manner as white women. Research that emphasizes the impact of racism-induced stress on health outcomes and identifies insulating mechanisms can be used to decrease said impact. Most important, it is clear that many of the protective factors that reduce IMR in the general population have little or no significant influence on IMR for black women. More within-race research is necessary to isolate the factors that specifically improve outcomes for black women. Only by taking targeted approaches that attack inequitable social systems, will we confront the unique mechanisms that can eradicate the racial gap in infant mortality rates.

REFERENCES

1. OECD. "Infant Mortality Rates (Indicator)." 2017.

2. Hogue, J. R., Lilo T. Strauss, J. W. Buehler, and J. C. Smith. "National infant mortality surveillance (NIMS), 1980." *CDC Surveillance Summaries. MMWR* 38 (1989)

3. CDC. "Premature Birth." https://www.cdc.gov/features/prematurebirth/index.html.

4. March of Dimes. "Low Birthweight." https://www.marchofdimes.org/complications/low-birthweight.aspx.

5. CDC. "Preterm Birth." In *Reproductive Health*, 2017.

6. CDC, and National Center for Health Statistics. "User Guide to the 2015 Period Linked Birth/Infant Death Public Use File." Hyattsville, MD: National Center for Health Statistics, 2017.

7. Berns, Scott D, Maureen D Boyle, Barbara Popper, and Judith S Gooding. "Results of the Premature Birth National Need-Gap Study." Journal of Perinatology 27 (2007): S38-S44.

8. Klebanoff, Mark A, and Sarah A Keim. "Epidemiology: The Changing Face of Preterm Birth." Clinics in perinatology 38, no. 3 (2011): 339-50.

9. Osterman, M., K. Kochanek, M. MacDorman, D. Strobino, and B. Guyer. "Annual Summary of Vital Statistics: 2012–2013." Pediatrics (2015).

10. Moster, D, RT Lie, and T Markestad. "Long-Term Medical and Social Consequences of Preterm Birth." Obstetric Anesthesia Digest 29, no. 2 (2009): 68-69.

11. Raju, Tonse NK, Rosemary D Higgins, Ann R Stark, and Kenneth J Leveno. "Optimizing Care and Outcome for Late-Preterm (near-Term) Infants: A Summary of the Workshop Sponsored by the National Institute of Child Health and Human Development." Pediatrics 118, no. 3 (2006): 1207-14.

12. Coley, Sheryl L, Tracy R Nichols, Kelly L Rulison, Robert E Aronson, Shelly L Brown-Jeffy, and Sharon D Morrison. "Race, Socioeconomic Status, and Age: Exploring Intersections in Preterm Birth Disparities among Teen Mothers." International journal of population research 2015 (2015).

13. Proctor, Bernadette D, Jessica Semega, and Melissa Kollar. "Income and Poverty in the United States: 2015." US Census Bureau, Current Population Reports (2016).

14. Kothari, Catherine L, Rajib Paul, Ben Dormitorio, Fernando Ospina, Arthur James, Deb Lenz, Kathleen Baker, Amy Curtis, and James Wiley. "The Interplay of Race, Socioeconomic Status and Neighborhood Residence Upon Birth Outcomes in a High Black Infant Mortality Community." SSM-Population Health 2 (2016): 859-67.

15. Mathews, T.J., M. MacDorman, and M. Thoma. "Infant Mortality Statistics from the 2013 Period Linked Birth/Infant Death Data Set." National Vital Statistics Reports 64, no. 9 (2015).

16. Hamilton, Darrick. "Post-Racial Rhetoric, Racial Health Disparities, and Health Disparity Consequences of Stigma, Stress, and Racism." *Washington Center for Equitable Growth* (2017).

17. Schoendorf, Kenneth C, Carol JR Hogue, Joel C Kleinman, and Diane Rowley. "Mortality among Infants of Black as Compared with White College-Educated Parents." New England Journal of Medicine 326, no. 23 (1992): 1522-26.

18. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. "Substance Use During Pregnancy Varies by Race and Ethnicity." In National Survey on Drug Use and Health, 2012.

19. Misra, Vinod K, Calvin J Hobel, and Charles F Sing. "The Effects of Maternal Weight Gain Patterns on Term Birth Weight in African-American Women." The Journal of Maternal-Fetal & Neonatal Medicine 23, no. 8 (2010): 842-49.

[20.] Leddy, Meaghan A, Michael L Power, and Jay Schulkin. "The Impact of Maternal Obesity on Maternal and Fetal Health." Reviews in obstetrics and gynecology 1, no. 4 (2008): 170.

[21.] Gennette, Sarah, Angela Guzman, Mishka Peart, Steve Carlan, and Jeannie Mcwhorter. "Pregnancy Outcome in the Morbidly Obese: Black Versus White [37n]." Obstetrics & Gynecology 129 (2017): S152.

[22.] Morris, Daniel S, Leigh E Tenkku, Joanne Salas, Pamela K Xaverius, and Mark B Mengel. "Exploring Pregnancy-Related Changes in Alcohol Consumption between Black and White Women." Alcoholism: Clinical and Experimental Research 32, no. 3 (2008): 505-12.

[23.] Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. "Substance Use During Pregnancy Varies by Race and Ethnicity." In National Survey on Drug Use and Health, 2012.

[24.] Metz, Torri D, Amanda A Allshouse, Carol J Hogue, Robert L Goldenberg, Donald J Dudley, Michael W Varner, Deborah L Conway, George R Saade, and Robert M Silver. "Maternal Marijuana Use, Adverse Pregnancy Outcomes, and Neonatal Morbidity." American Journal of Obstetrics & Gynecology 217, no. 4 (2017): 478. e1-78. e8.

[25.] Ko, Jean Y, Sherry L Farr, Van T Tong, Andreea A Creanga, and William M Callaghan. "Prevalence and Patterns of Marijuana Use among Pregnant and Nonpregnant Women of Reproductive Age." American Journal of Obstetrics & Gynecology 213, no. 2 (2015): 201. e1-01. e10.

[26.] Curtin, S., and T.J. Mathews. "Smoking Prevalence and Cessation before and During Pregnancy: Data from the Birth Certificate, 2014." National Vital Statistics Reports 65, no. 1 (2016).

[27.] Trends, Child. "Mothers Who Smoke While Pregnant." 2012.

[28.] Wescott, Lucy. "Washington's Poorest Infants Are Ten Times More Likely to Die Than Richest." Newsweek, 2015.

[29.] Goosby, Bridget J., Sarah Malone, Elizabeth A. Richardson, Jacob E. Cheadle, and Deadric T. Williams. "Perceived discrimination and markers of cardiovascular risk among low-income African American youth." *American Journal of Human Biology* 27, no. 4 (2015): 546-552.

[30.] Walsemann, Katrina M., Bethany A. Bell, and Bridget J. Goosby. "Effect of school racial composition on trajectories of depressive symptoms from adolescence through early adulthood." *Race and Social Problems* 3, no. 3 (2011): 131.

[31.] Duru, O. Kenrik, Nina T. Harawa, Dulcie Kermah, and Keith C. Norris. "Allostatic load burden and racial disparities in mortality." *Journal of the National Medical Association* 104, no. 1-2 (2012): 89-95.

[32.] Wallace, Maeve, Joia Crear-Perry, Lisa Richardson, Meshawn Tarver, and Katherine Theall. "Separate and unequal: Structural racism and infant mortality in the US." *Health & place* 45 (2017): 140-144.

[33.] Siddiqi, Arjumand, Marcella K. Jones, Donald J. Bruce, and Paul C. Erwin. "Do racial inequities in infant mortality correspond to variations in societal conditions? A study of state-level income inequality in the US, 1992–2007." *Social Science & Medicine* 164 (2016): 49-58.

[34.] J.W. Collins Jr., R.J. David, K.M. Rankin, et al. Transgenerational effect of neighborhood poverty on low birthweight among African Americans in Cook County, Illinois Am J Epidemiol, 169 (2009), pp. 712-717.

[35.] Mark A. Klebanoff, MD, MPH, , Sarah A. Keim, PhD, MA, MS, "Epidemiology: The Changing Face of Preterm Birth"

[36.] English, Devin, Sharon F. Lambert, Michele K. Evans, and Alan B. Zonderman. "Neighborhood racial composition, racial discrimination, and depressive symptoms in African Americans." *American journal of community psychology* 54, no. 3-4 (2014): 219-228.

[37.] Kothari, Catherine L, Rajib Paul, Ben Dormitorio, Fernando Ospina, Arthur James, Deb Lenz, Kathleen Baker, Amy Curtis, and James Wiley. "The Interplay of Race, Socioeconomic Status and Neighborhood Residence Upon Birth Outcomes in a High Black Infant Mortality Community." SSM-population health 2 (2016): 859-67.

[38.] Miller, Gregory E, Edith Chen, Alexandra K Fok, Hope Walker, Alvin Lim, Erin F Nicholls, Steve Cole, and Michael S Kobor. "Low Early-Life Social Class Leaves a Biological Residue Manifested by Decreased Glucocorticoid and Increased Proinflammatory Signaling." Proceedings of the National Academy of Sciences 106, no. 34 (2009): 14716-21.

[39.] James, Sherman A. "John Henryism and the health of African-Americans." *Culture, medicine and psychiatry* 18, no. 2 (1994): 163-182.

[40.] Jou, Judy, Katy B Kozhimannil, Pamela Jo Johnson, and Carol Sakala. "Patient-Perceived Pressure from Clinicians for Labor Induction and Cesarean Delivery: A Population-Based Survey of Us Women." Health services research 50, no. 4 (2015): 961-81.

[41.] Benatar, Sarah, A Bowen Garrett, Embry Howell, and Ashley Palmer. "Midwifery Care at a Freestanding Birth Center: A Safe and Effective Alternative to Conventional Maternity Care." Health services research 48, no. 5 (2013): 1750-68.

[42.] J. Martin, B. Hamilton, and M. Osterman. "Births in the United States, 2013." In NCHS Data Brief, 2014.

[43.] Mathews, T.J., and Anne Driscoll. "Trends in Infant Mortality in the United States, 2005-2014." *NCHS Data Brief* 279 (2017).

[44.] Goode, Keisha, and Barbara Katz Rothman. "African-American Midwifery, a History and a Lament." American Journal of Economics and Sociology 76, no. 1 (2017): 65-94.

[45.] McCartney, Caitlin. "The Patient Protection and Affordable Care Act and Choice in Childbirth: How the Aca's Nondiscrimination Provisions May Change the Legal Landscape of Childbirth." Am. UJ Gender Soc. Pol'y & L. 24 (2015): 337.

[46.] Proctor, Bernadette D, Jessica Semega, and Melissa Kollar. "Income and Poverty in the United States: 2015." US Census Bureau, Current Population Reports (2016).

[47.] Declercq, Eugene. "Midwife-Attended Births in the United States, 1990–2012: Results from Revised Birth Certificate Data." Journal of Midwifery & Women's Health 60, no. 1 (2015): 10-15.

[48.] Thornton, Patrick, Barbara L. McFarlin, Chang Park, Kristin Rankin, Mavis Schorn, Lorna Finnegan, and Susan Stapleton. "Cesarean outcomes in US birth centers and collaborating hospitals: a cohort comparison." *Journal of Midwifery & Women's Health* 62, no. 1 (2017): 40-48.

[49]. VanderWeele, Tyler J, John D Lantos, and Diane S Lauderdale. "Rising Preterm Birth Rates, 1989–2004: Changing Demographics or Changing Obstetric Practice?". Social science & medicine 74, no. 2 (2012): 196-201.

[50.] CDC. "Progress in Increasing Breastfeeding and Reducing Racial/Ethnic Differences — United States, 2000–2008 Births." In *Morbidity and Mortality Weekly Report*, 2013.

[51.] Berns, Scott D, Maureen D Boyle, Barbara Popper, and Judith S Gooding. "Results of the Premature Birth National Need-Gap Study." Journal of Perinatology 27 (2007): S38-S44.

[52.] Thompson, John MD, Kawai Tanabe, Rachel Y. Moon, Edwin A. Mitchell, Cliona McGarvey, David Tappin, Peter S. Blair, and Fern R. Hauck. "Duration of breastfeeding and risk of SIDS: an individual participant data meta-analysis." *Pediatrics* 140, no. 5 (2017): e20171324.

[53.] Roberts, Sarah CM, and Amani Nuru-Jeter. "Universal screening for alcohol and drug use and racial disparities in child protective services reporting." The journal of behavioral health services & research 39, no. 1 (2012): 3-16.

[54.] Geronimus, Arline T., Margaret Hicken, Danya Keene, and John Bound. ""Weathering" and age patterns of allostatic load scores among blacks and whites in the United States." American journal of public health 96, no. 5 (2006): 826-833.

[55.] Reid, Allecia E., Lisa Rosenthal, Valerie A. Earnshaw, Tené T. Lewis, Jessica B. Lewis, Emily C. Stasko, Jonathan N. Tobin, and Jeannette R. Ickovics. "Discrimination and excessive weight gain during pregnancy among Black and Latina young women." Social Science & Medicine 156 (2016): 134-141.

[56.] Huynh, Mary. "Provider Type and Preterm Birth in New York City Births, 2009–2010." Journal of health care for the poor and underserved 25, no. 4 (2014): 1520-29.

[57.] Griffin, Jacqueline, Shuangjun Xia, Siyang Peng, and Pinar Keskinocak. "Improving Patient Flow in an Obstetric Unit." Health care management science 15, no. 1 (2012): 1-14.

[58.] Howell, Elizabeth A, Paul Hebert, Samprit Chatterjee, Lawrence C Kleinman, and Mark R Chassin. "Black/White Differences in Very Low Birth Weight Neonatal Mortality Rates among New York City Hospitals." Pediatrics 121, no. 3 (2008): e407-e15.

[59.] Martin JA, Hamilton BE, Osterman MJK, Curtin SC, Matthews TJ. Births: final data for 2013. Natl Vital Stat Rep. 2015;64(1): 1–65. Available at: www.cdc.gov/nchs/ data/nvsr/nvsr64/nvsr64_01.pdf. Accessed November 10, 2014

[60.] CDC. "2015 Mpinc State Reports: Maternity Practices." 2017.

AUTHORS

Imari Smith is a Graduate Research Assistant, Health Equity Working Group. A recent graduate from Duke University with a Bachelors of Arts in women's studies and a minor in chemistry, Imari Smith serves as a Graduate Research Assistant for the Cook Center. She was the first in the history of the Women's Studies department to graduate with Highest Distinction for her honors thesis titled Black Femininity through the White Speculum. Imari attends the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill where she is pursuing a Master's of Public Health in Health Behavior so that she may continue her studies of the intersections of gender, race, and health inequities.

Keisha L Bentley-Edwards is an Associate Director of Research, Director of Health Equity Working Group, and Assistant Professor of General Internal Medicine. Dr. Bentley-Edwards is a developmental psychologist who uses a cultural lens to understand the human experience and health outcomes. Her research focuses on how race and racism stress influence social, physical and emotional health as well as academic outcomes throughout the lifespan, with an emphasis on adolescence. Dr. Bentley-Edwards' work has particularly focused upon the development of culturally relevant measurement to address the constructs of racial/ethnic socialization, racial cohesion and dissonance and same- race violence. She is a former Robert Wood Johnson Foundation, New Connections Scholar that was based on the bullying experiences of African American children. Overall, she uses research to guide parents and practitioners to support the healthy functioning of Black children and families.

Salimah El-Amin Witherspoon is a Senior Research Associate. Dr. Salimah El-Amin is a Senior Research Associate at the Cook Center. In this role she serves as the Program Director for the Global Inequalities Research Initiative (GIRI) and the Diversity in Tenure and Economics (DITE) program. Dr. El-Amin is a behavioral scientist, her research interests include sexual health, STD/HIV prevention, health disparities, Black infant mortality and health literacy.

William "Sandy" Darity is the Founding Director of the Samuel DuBois Cook Center on Social Equity. William A. ("Sandy") Darity Jr. is the Samuel DuBois Cook Professor of Public Policy, African and African American Studies, and Economics at Duke University. Darity's research focuses on inequality by race, class and ethnicity, stratification economics, schooling and the racial achievement gap. He was a fellow at the Center for Advanced Study in the Behavioral Sciences (2011-2012) at Stanford, a fellow at the National Humanities Center (1989-90) and a visiting scholar at the Federal Reserve's Board of Governors (1984). He received the Samuel Z. Westerfield Award in 2012 from the National Economic Association, the organization's highest honor, and has published or edited 12 books and published more than 210 articles in professional journals.

THE SAMUEL DUBOIS COOK CENTER ON SOCIAL EQUITY AT DUKE UNIVERSITY

INSIGHT