



CHILD HEALTH

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By Robert E. Greenberg, M.D.

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CHILD HEALTH

PREFACE

THE CONSEQUENCES OF INEQUITY ON CHILDREN

By Child Health Contributing Editor
Robert Greenberg, M.D.

Impact of the larger world

In this chapter, we will provide you with some basic statistics on child health in Mississippi as she compares to the nation. While these measures reflect major problems of child health and sources of disparity therein, they are only a partial skeleton of a much more complicated story. In this preface, we endeavor to introduce some of the larger concepts and contexts that color current studies of child health and health disparities. These concepts will hopefully provide you with a richer context in which to assess the statistics presented in our chapter.

Major issues in child health over the years

Children, living in both developed and developing nations, are experiencing, on average, better health and developmental status as the years go by. Infant mortality rates, specific disease rates, control of infectious disease, and school readiness have all improved among today's children compared to those of the past (Palfrey & Richmond, 2005). However, this rosy assessment represents the average for the



population of children as a whole. Over recent years, a very different picture has been found beyond the statistics of the whole. Hidden behind the averages are sharp differences between groups of children - these differences occurring according to socioeconomic status, geography, race, culture, ethnicity, and gender (Graham, 2009; House & Williams, 2003; Wilkinson, 1999).

Immense differences in health outcomes are seen between specific groups. For example, the rate of children born prematurely is almost double in the black population compared to the white. Similar differences also exist in terms of the number of children and youth who are obese. In some situations, effects of race and racism appear to correlate most closely with health data, whereas in others, socioeconomic factors present as more proximal factors. Place also plays a significant role. If only total population data are examined, these striking disparities between different groups of children are hidden. As more and more findings of discrepancies between different groups of children emerge, there is urgent need for public approaches to remediate these disparities.

Distinguishing between health inequality/disparity and health inequity

When attempting to understand and respond to health differences between groups, it is necessary to be clear about the implied meaning of descriptive terms. Health equality or disparity is usually viewed as the result of a chain of events and involves differences in a) environment, b) access to, utilization of, and quality of care, c) health status, or d) a particular health outcome that requires examination.

Health inequity refers to unfair or unjust differences in health determinants or outcomes, within or between defined populations. Health inequity usually references differences in health status of specific populations and mortality rates that are systematic, patterned, unfair, unjust, and actionable, as opposed to random or being caused by those who become ill. The use of the descriptors “unfair” or “unjust” also assumes that eliminating the inequity requires changing the systems of privilege/conditions producing inequity rather than just treating their consequences through programs or social services. The term “health inequity” carries with it a social responsibility to do one’s best in order to correct the factor(s) that have led to the variance. It logically brings the citizenry, health professionals, and other helping groups into the fray as participants in the process of correcting social errors.

The critical importance of social determinants of health

Social determinants of health refer to the social and economic conditions that influence or determine the health of individuals, communities, and nations. Social determinants reflect measures which designate socioeconomic position, including both material and social resources as well as rank or status in a social hierarchy (Krieger, 2001).

The assumption is often made that improvements in health status primarily reflect better access to effective health care, to the application of technology to the service of patient care, to the improvement

in preventive care via immunizations, as an example. Indeed, the above are requisite components of effective health care and prevention. During the past several decades, however, a powerful understanding of the importance of social determinants of health has emerged. The many observations that have been reported, primarily in the British and Scandinavian literature, can, collectively, claim a legitimate role as one of the truly great scientific breakthroughs of our times. While the overarching importance of poverty in determining health status of both children and adults has long been recognized, several critical components of this interlinkage have now emerged.

The lower one is in terms of socioeconomic position, the higher the infant mortality rate, the lower the length of survival, and the higher the mortality rates of adults as well as children. This relationship persists over time and cause of death or disease. However, it is not poverty alone that is the primary determining factor. In many studies, it has been demonstrated that countries (and states in the U.S.) exhibit health data that reflect not absolute income but income inequality instead. Investigations of standard measures of population health, such as life expectancy or infant mortality rates, have revealed the surprising finding that, among developed nations, the standard measures of health correlate best with income inequality (Kawachi, Kennedy, & Wilkinson, 1999). The United States, while having one of the highest average standards of living, has comparatively greater differences between the wealthiest and poorest segments of the population and thus ranks low among developed nations in terms of life expectancy, outcome of pregnancy, and infant mortality. The mechanism(s) by which income inequality exerts deleterious effects on health status remain obscured, although numerous theories abound. In general, theories cluster around three factors: 1] Access to life opportunities, such as education; 2] relationship between income inequality and social cohesion; and 3] psychosocial explanations. The question “What is the significance of greater equality of income?” emerges as a result of these findings. Accumulating evidence supports the contention that income inequality is associated with a range of health effects including lower life expectancy, higher rates of infant and child mortality, shorter height, poor self reported health, low birth weight, depression, mental illness, and obesity (Pickett & Wilkinson, 2009). Health becomes a sensitive and powerful marker for the consequences of societal organization. Direct action to create a more equitable society may continue to be difficult; however, the evidence to support the importance of income distribution across society appears to be overwhelming.

The importance of poverty in the lives of children is highly visible when looking at poverty statistics in our country. The prevalence of poverty is shocking; approximately 40% of children (ages 0-18) live in low-income families. Approximately 60% of American Indian, Hispanic, and African-American children live in poverty, whereas 25% of white children and 30% of Asian children are similarly compromised. A higher percentage of children in the South live in low-income families than any other part of the nation. The Federal Poverty Line (FPL) is still considered to be \$21,200 for a family of four (2008); most research indicates that approximately twice that amount is needed to support a family (Douglas-Hall & Chau, 2008). While education is one marker of socioeconomic status, it is important to note that

49% of children in low income families live with parents who have some college experience. Poverty in and of itself imposes barriers of multiple forms. The constellation of socioeconomic ills accompanying poverty, and the discrepancy between those in poverty and the wealthiest members of society (income inequality) create even more obstacles.

Lasting effects of early experiences on children

The impact of early factors on the later lives of children and the adults they become is increasingly apparent. Attention on the long-lived consequences of early events gained prominence through the studies of D. J. P. Barker who began to demonstrate that intrauterine growth retardation was associated with increased rates of cardiovascular disease in adulthood (2007). Similar observations correlate cardiovascular disease in adults to exposure to poverty or environmental stress (defined in a number of ways) during gestation. Findings on the impact of early events on later life have expanded markedly, providing increasing evidence for the impact of social determinants on developmental trajectories.

Similar understandings have emerged regarding the primary tasks of childhood: social development, ability to be an effective member of groups, and school readiness. In each of these areas, social determinants are demonstrated, along with genetic mechanisms, to exert direct effects (Duncan & Brooks-Gunn, 1997). Countless studies address the importance of environment in modulating early childhood development. For example, breadth of exposure to abuse or household dysfunction during childhood strongly correlate to multiple risk factors for several of the leading causes of death in adults (Felitti et al., 1998). When environment is dissected, home and community factors combine with socioeconomic, geographic, and cultural factors as driving forces that indelibly shape children during early life.

The long-term consequences of events occurring at early periods of life, including the prenatal period is an area of growing inquiry. The overall significance of this relationship remains to be clarified; however, enough is currently known to validate assumptions that interactions between the developing child and biological, environmental, and psychological factors can play a significant role in the health and well-being of a child from early years through adulthood.

The role of technology in determining health status

The advent of new technology is presented as a striking and positive characteristic of health care in our country. Indeed, during the last thirty years, amazing technological advances have been made in the service of patient care. Such advances have often simplified diagnostic approaches, energized treatment, created new ways of thinking about the delivery of pharmaceuticals to patients, and made surgical approaches less invasive and safer. Yet, the question of whether or not technologic advances have a solely positive effect on the health status of our people remains only intermittently studied.

Paul Wise has asked intriguing questions about whether new technologies reduce or actually increase

inequities between different groups of people (2005). The discrepancy in neonatal mortality rates experienced by black as compared to white newborns is significantly reduced if all sick newborns have access to high technology care. If such access is not available, along socioeconomic lines, the inequities experienced by black newborns are actually accentuated.

Meanwhile, congenital malformations occur at increased rates in babies from lower socioeconomic groups as well as in babies who are the products of reproductive technology. The discrepancy between black and white babies in terms of congenital anomalies has actually been reduced by the advent of reproductive technology, because such advances are much less available to black women. Thus, disparity is decreased in an undesirable way, as the rates of anomalies for women linked with usage of reproductive technologies increase, bringing that group closer to the higher rates experienced by black women.

It is important to consider the role of technology when thinking about child health and health disparities. Utilization of various technologies differs according to social factors and constitutes an important component in the social determinants of health.

The significance of health problems affecting Mississippi children

Two primary child health problems, low birth weight and obesity, are focuses in the subsequent chapter. These problems 1] have great impact on the health in childhood; 2] exist amidst a plethora of ideas regarding their causation, with evidence for social as well as biological mechanisms at play in their genesis; 3] have significant impact on the health of the adults the affected children become; and 4] exist among black children to a much greater extent than among white children.

The impact of premature birth and/or intrauterine growth retardation cannot be overstated. Approximately 40 percent of all childhood deaths occur in the first month of life, and 68 percent of all neonatal deaths occur in infants born weighing less than 1,500 grams (very low birth weight) (Wise, 2004). Neonatal mortality differs markedly between black and white newborns. The survival of low and very-low birth weight infants is similar between black and white babies. The huge difference in neonatal mortality is thus explained by the increased prevalence of low birth weight babies in black women. Although multiple mechanisms have been proposed, the reasons for such discrepant rates remain obscure. Clearly, poverty, while playing some role, is not the primary cause, since Hispanic and Native American women from equal or more severe socioeconomic conditions do not produce low birth weight infants at rates greater than whites. Much attention is accredited to the effects of racism, although the pathophysiologic mechanisms whereby such societal events affect gestation are unknown. Increasing knowledge is accruing regarding the regulation of placental blood flow and its role in regulating placental function and fetal growth. Further studies on properties of placental structure and function may lead to greater understanding of variations in fetal growth. Factors that regulate the length of gestation also require further study.

The explosion of obesity in children and youth in recent years and recognition of the long-term consequences of obesity in both youth and adults also represent a health problem of immense magnitude. Obesity is associated with serious complications over time, including hypertension, heart disease, and kidney failure. As with low birth weight, the African-American population exhibits a greater prevalence of obesity in children, youth and adults. Obesity appears to occur more frequently in children and youth from low socioeconomic families without a clear racial bias beyond the disproportionate representation of black populations in lower socioeconomic positions. Since obesity occurs from an imbalance in the energy intake vs. energy expenditure ratio, it might be surmised that elucidating underlying mechanisms producing obesity should be straight forward. Factors such as reduced availability of low fat, low caloric foods in communities where people in poverty live, reduced expenditure of calories via exercise related to inadequate park or playground resources or concern about community violence, increased time spent watching television, poorly designed school lunch programs, and excessive intake of soft drinks represent some prevailing concepts. To date, it has been extremely difficult translating any putative causative factor into effective programs of either prevention or treatment. Principles and practices of public health, linked with public policy, will be required to modify prevailing trends.

These two immense health problems obviously require further understanding in terms of the pathophysiologic processes that underlie their occurrence. It is, however, equally apparent that such mechanisms must occur in the context of socioeconomic, psychological and/or environmental factors of equivalent importance.

The importance of other markers of health status of children that are often inadequately emphasized

Robert Haggerty, over 20 years ago, led child health professionals to understand the importance of what were termed “new morbidities,” emphasizing emotional and cognitive development, school readiness, and performance (2006). The impact of his teaching has focused on several arenas: a) the importance of looking at developmental events as interactions between a child and his/her environment, and not just expressions of an individual child’s intrinsic biologic/genetic signals, and b) a beginning search for the broader community-based factors that comprise social determinants of health. During the past several decades, the search has intensified for an understanding of just how environmental, socioeconomic, and psychological factors can exert adverse effects on the health of children and youth.

In that context, it is important to try to put into focus those factors that represent the main obstacles to normal growth and development. Death and disease-related morbidity remain a primary subject of attention by child health professionals. In addition, the manner by which children acquire the skills necessary to learn, the specific capabilities required for interacting successfully and meaningfully with others, the requirements for recognizing one’s interdependence with others, and the opportunities to develop a calm as well as optimistic sense of self all pose as necessary steps in successful development. They too are a reflection of both biologic and social determinants. Recognizing the duality of biological and social determinants to health emphasizes the potential impacts of inequality.

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About the Contributing Editor

Robert Greenberg received his pre-medical education at Stanford University, and his medical education at the University of California, San Francisco. After receiving clinical training in Detroit at the Children's Hospital of Michigan, he became a post-doctoral fellow in pediatric endocrinology at the Upstate Medical Center, Syracuse, New York. He then completed a year-long fellowship at the Fysiologiska Institute, Karolinska Institute, Stockholm, under the tutelage of Nobel Laureate Ulf von Euler, M.D.

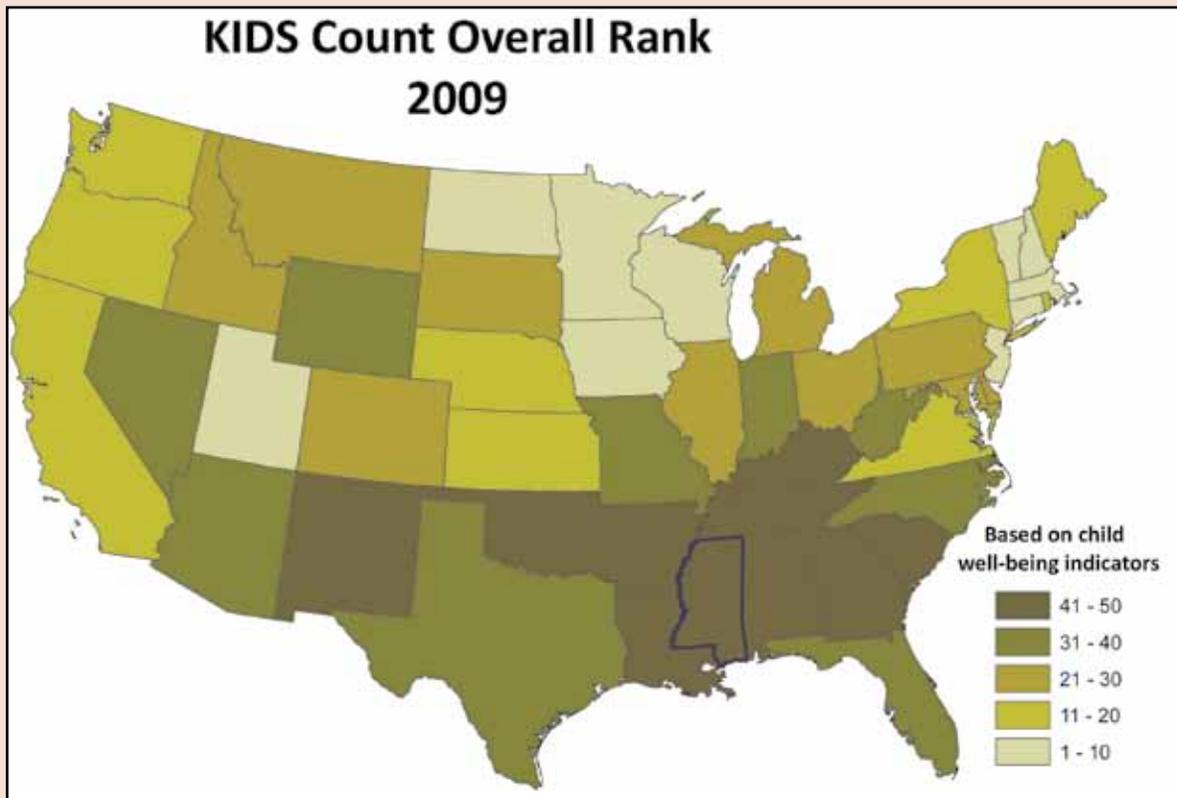
Dr. Greenberg joined the faculty of the Department of Pediatrics at Stanford University in 1960. Ten years later, he was appointed Professor and Chairman, Department of Pediatrics, Charles R. Drew Postgraduate Medical School and Martin Luther King, Jr. General Hospital, in the Watts district of Los Angeles. In 1977, he moved with his wife and children to New Mexico, as Professor and Chairman, Department of Pediatrics, University of New Mexico School of Medicine. After resigning his position as Chair in 1987, Dr. Greenberg has remained on the New Mexico faculty.

Dr. Greenberg served as Chair of the Board of Directors, Center for Research in Child Health, American Academy of Pediatrics. It was in this position that he established a relationship with the Social Science Research Center (SSRC) at Mississippi State University. He has collaborated with the SSRC on a number of projects. During his academic career, he has been an active biological researcher, and he served as a member of NIH Study Sections for twelve years. Dr. Greenberg has visited over 38 countries, giving talks in many of them. For the past five years, he and his wife, Dr. Maggie Greenberg, spend two months each year volunteering at various international sites. Bob is very active in the Society for Equity in Child Health and is involved in several writing projects related to the linkage between child rights and child health.



KIDS COUNT INDICATORS

According to the KIDS COUNT well-being measure, Mississippi ranked 50th in the nation in 2009 and has done so ever since 1998 (the first year of measurement) (KIDS COUNT, 2009).



The Anne E. Casey Foundation (AECF) combines 10 indicators to create an overall assessment of child well-being at the state level. These KIDS COUNT well-being indicators are:

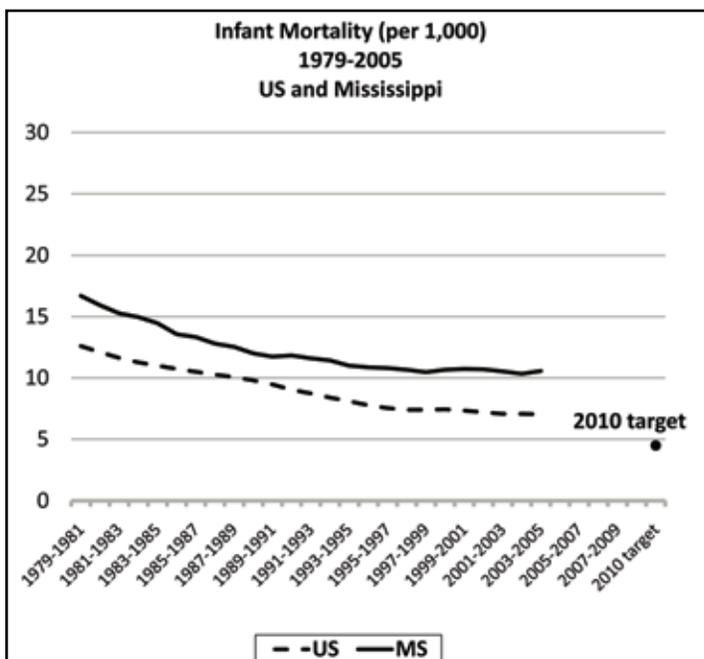
- | | |
|---------------------|--|
| 1) low birthweight | 6) teen high school dropouts |
| 2) infant mortality | 7) teens not in school or employed |
| 3) child mortality | 8) children in families where no parent has full-time employment |
| 4) teen mortality | 9) children in poverty |
| 5) teen births | 10) children in single-parent families |

Healthy People 2010 examines several different factors when considering child health. These factors include infant mortality rates, premature and low birth weight rates, immunization rates, obesity, and physical activity. While many other dynamics play a role in the health and lifestyles of children, these data present a snapshot of child health, particularly in areas with high potential for disparity.

INFANT HEALTH

INFANT MORTALITY

The health of children today will determine the health of America tomorrow; it is therefore imperative to recognize and address health disparities in the earliest years of development. Infant mortality rates, which are linked to “maternal health, quality and access to medical care, socioeconomic conditions, and public health practices” (MacDorman & Mathews, 2008, p.1), often serve as a leading indicator of population health.



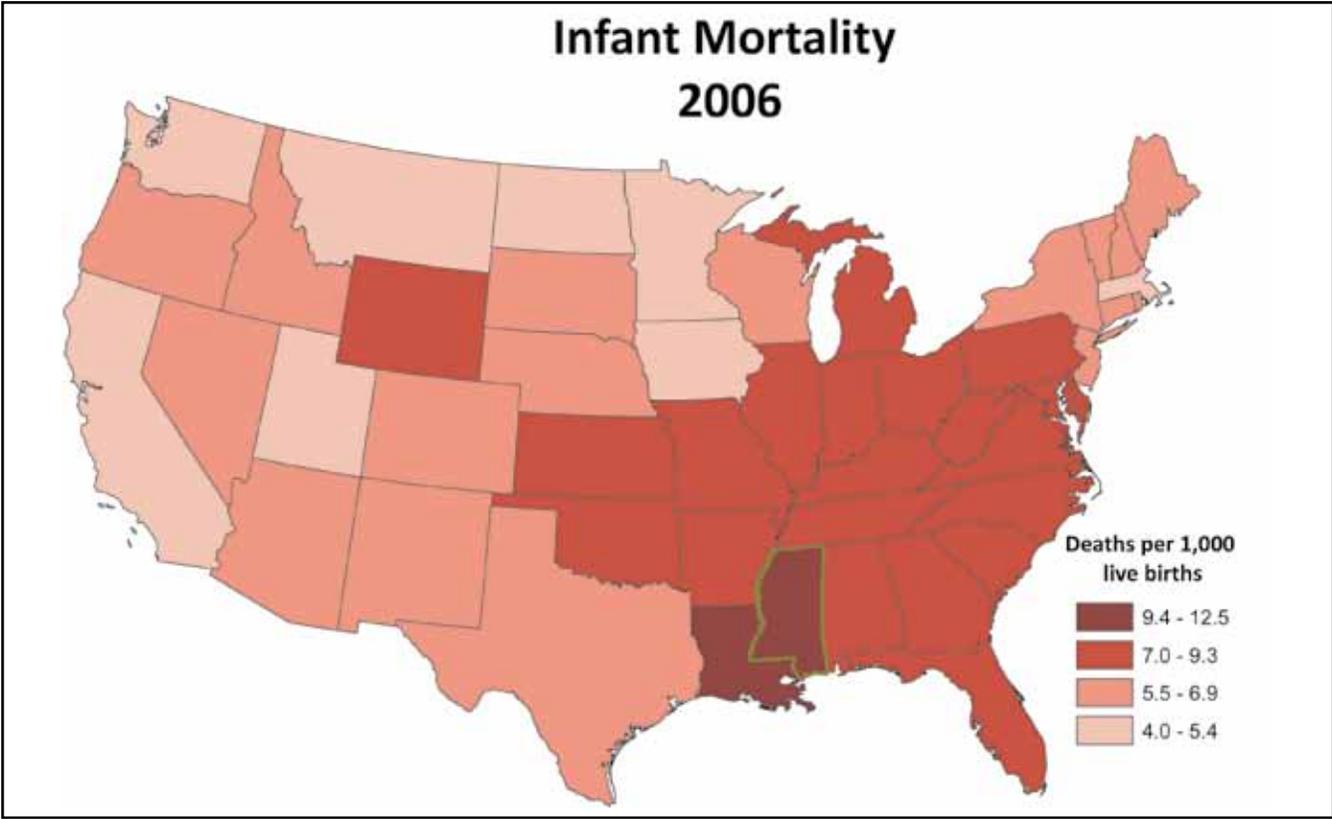
Source: CDC, Compressed Mortality Data, n.d.a; n.d.b

US infant mortality has barely decreased from the 1998 rate observed by Healthy People, while infant mortality in Mississippi increased slightly from 1998 to 2005.

Mississippi, the Nation, and Healthy People 2010

Using the 1998 US rate of 7.2 infant deaths per 1,000 (or 27,287 total) live births as a baseline, Healthy People calls for 4.5 (or 2.7 fewer) infant deaths per 1,000 live births by 2010. As of 2005, the US infant mortality rate had only declined by 0.2 per 1,000 (to 7.0 deaths per 1,000) (DHHS, Healthy People 2010, n.d.c). Given the almost non-existent decline in infant mortality rates over recent years, **the US is unlikely to achieve the remaining 2.5 per 1,000 fewer infant deaths necessary to meet the Healthy People target by 2010.**

Meanwhile, Mississippi has consistently experienced worse rates of infant mortality than the nation. Similar to US trends but at higher levels, Mississippi rates have remained fairly stable in recent years (the 1998 rate of 10.2 per 1,000 live births rising slightly to 11.1 per 1,000 in 2005). **Mississippi is thus even more unlikely to meet the Healthy People goal; in fact, the disparity between MS and US infant mortality is rising slightly.**



Source: CDC, Compressed Mortality Data, n.d.b

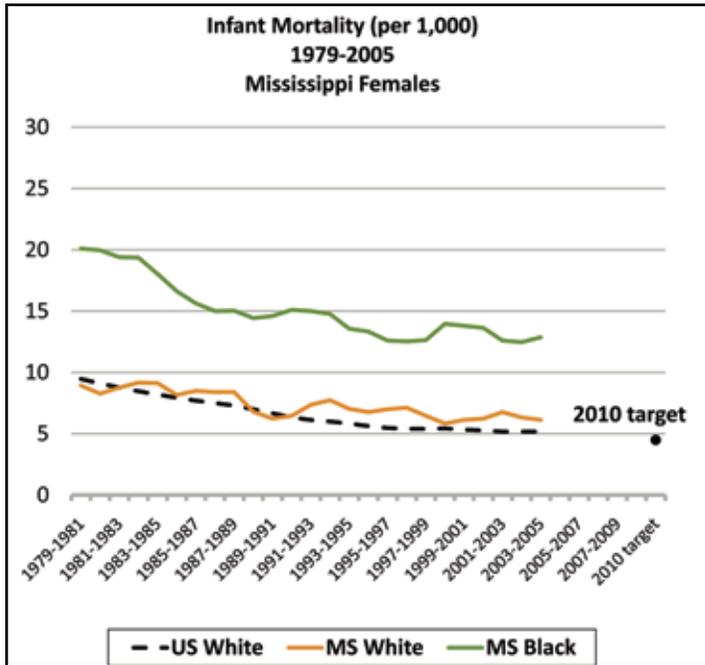
Mississippians: How Have We Compared?

From 1979 to 2005, white US females saw a fairly steady decline in infant mortality (from 9.8 to 5.2 infant deaths per 1,000 live births). Over this same period, **rates for black Mississippi female infants were more than twice as high** (falling from a rate of 20.5 per 1,000 in 1979 to a rate of 14.2 per 1,000 in 2005). 9 per 1,000 more black females died in 2005 because of higher mortality among black Mississippians compared to national white females. In contrast, rates for white Mississippi females tracked very closely with the rates of their national counterparts (dropping from 10 to 5.3 per 1,000 between 1979 and 2005).

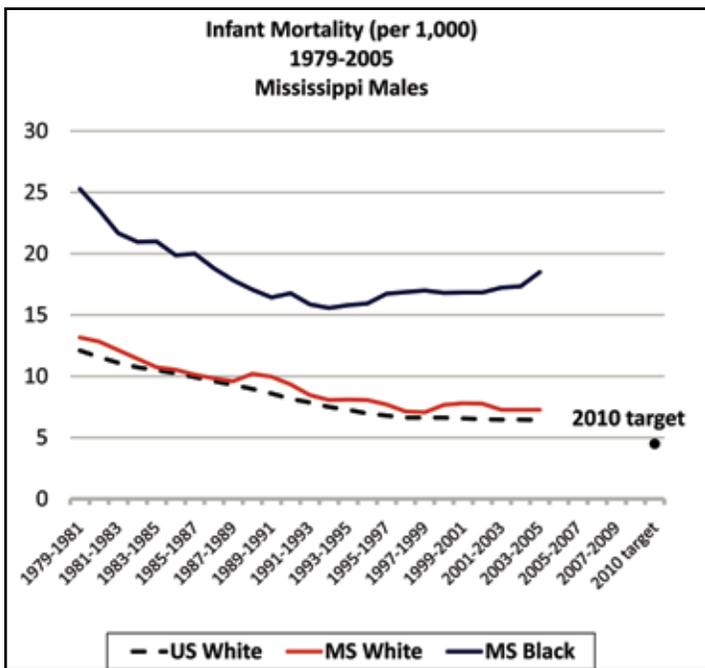
If we had achieved like the national rates in 2005, more than 1 in 2 deaths among black female infants in Mississippi would have been averted in 2005.

Infant Mortality (per 1,000)	1979	2005
US white male	12.7	6.4
MS white male	13.6	8
MS black male	26.8	19.8
US white female	9.8	5.2
MS white female	10	5.3
MS black female	20.5	14.2

NOTE: Measurements of equality employ national white data as the standard for comparison.



Source: CDC, Compressed Mortality Data, n.d.b



Source: CDC, Compressed Mortality Data, n.d.b

If we had achieved like the nation, **more than 1 in 3** infant deaths would have been averted in Mississippi in 2005.

Black Mississippi males also experience infant mortality rates more than double those of their white national counterparts. From 1979 to 2005, white US male infant mortality dropped (from 12.7 to 6.4 per 1,000 live births) as did black MS male infant mortality (from 26.8 to 19.8 per 1,000). However, recent rates for black MS males are actually on the rise, and the disparity between US white and MS black males has increased accordingly. Meanwhile, like their female counterparts, white male rates in Mississippi track closely with white US male rates (dropping from 13.6 to 8 per 1,000 between 1979 and 2005).

Because we were not equal...
19 more white male infants
129 more black female infants
83 more black males infants
...died in Mississippi in 2005.

If we had achieved like the national rates in 2005, 2 out of every 3 deaths among black male infants in Mississippi would have been averted.

NOTE: In tables, red data represent a worsening rate or percentage over the observed time period. Green data represent an improvement in rate or percentage.

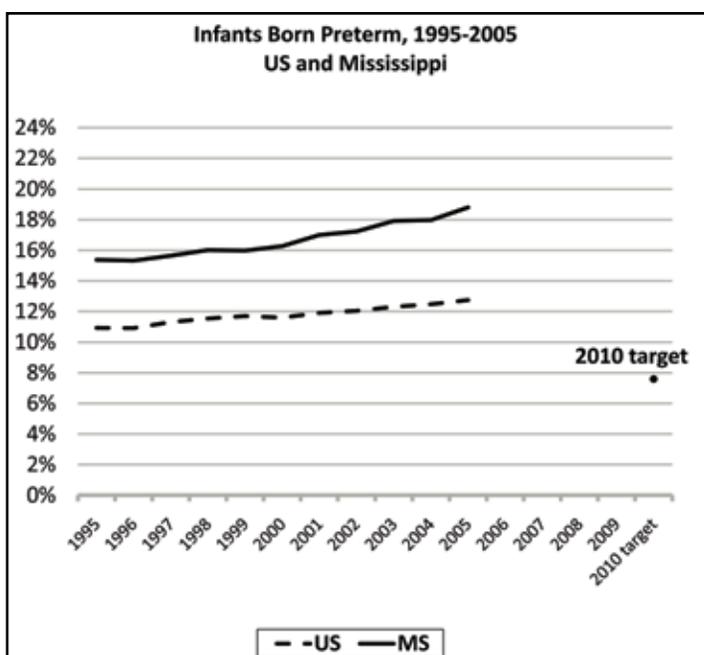
PRETERM BIRTHS

Preterm birth, or birth before 37 weeks of gestation, is the primary cause of death among newborns (Centers for Disease Control and Prevention (CDC), n.d.). Premature infants face higher risk for low birth weight, breathing problems due to underdeveloped lungs, underdeveloped organs or organ systems, life-threatening infections, respiratory distress syndrome, cerebral palsy, and learning and developmental disabilities (National Institutes of Health (NIH), 2009). While many preterm health complications are immediate and transient, some appear only later in life while others persist throughout life. The severity of preterm birth effects on health corresponds to how early a baby is born (CDC, 2008).

Mississippi, the Nation, and Healthy People 2010

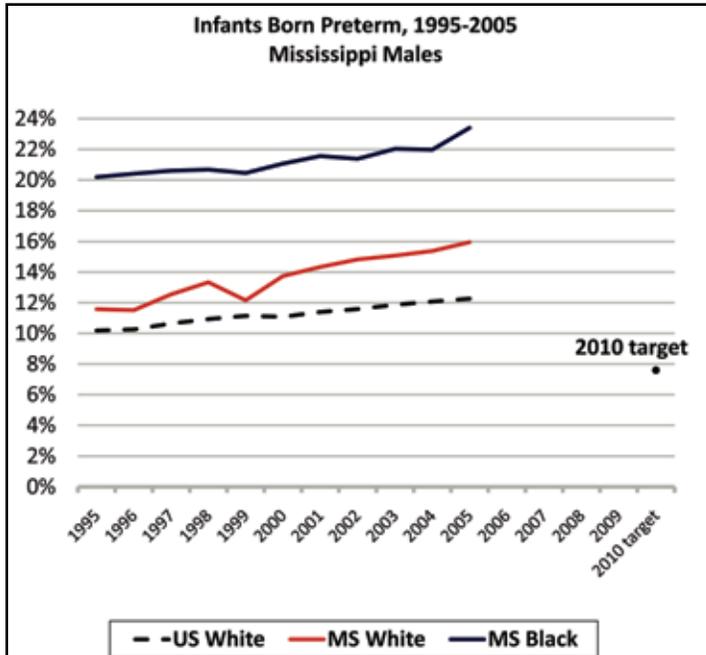
Using the 1998 US rate of 11.6% preterm births as a baseline, Healthy People calls for the reduction of preterm births (the rate of live births that occurred at less than 37 weeks of gestation) to 7.6%. Unfortunately, from 1998 to 2005, US rates for preterm births rose (to 12.7%). In Mississippi, from 1998 to 2005, preterm births even were higher (rising from 16.0% to 18.8%). **Both the US and MS are moving away from the Healthy People goal. Moreover, the disparity between MS and the US is on the rise.** In 2005 in Mississippi, 6.1% of preterm births and their accompanying risks could have been avoided if Mississippi achieved at national levels.

In 2005, almost **1 in 3 preterm births** in Mississippi would have been averted if we had achieved like the nation.

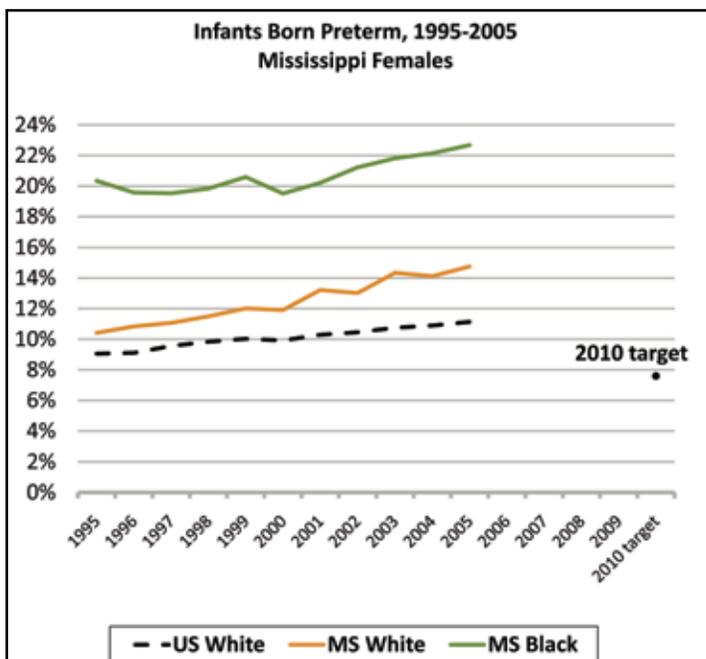


Source: CDC, Natality Database, n.d.c

Women at risk for preterm births include: those carrying multiple babies; previously experiencing preterm birth; having uterine or cervical problems; having chronic conditions such as high blood pressure or diabetes; experiencing certain infections; or smoking cigarettes, drinking alcohol, or using illicit drugs (CDC, n.d.).



Source: CDC, Natality Database, n.d.c



Source: CDC, Natality Database, n.d.c

Mississippians: How Have We Compared?

From 1998 to 2005, white US newborn males saw a steady increase in the number of preterm births (from 10.2% to 12.3%). White MS males saw higher rates of preterm births, and these rates also rose more rapidly (from 11.6% to 16.0%). Thus, disparities between preterm births among white MS males and white US males are rising. In fact, **disparity between white males in Mississippi and the nation almost tripled** over the observed period. **Black MS males saw the highest rates of preterm birth of all observed groups** (with preterm rates increasing from 20.2% in 1998 to 23.4% in 2005).

Female rates for preterm birth track closely to male patterns, but at slightly lower rates. From 1998 to 2005, white US newborn females saw a steady increase in the number of preterm births (from 9.1% to 11.1%). In Mississippi, **white female rates were higher overall** and rose much more quickly (from 10.4% to 14.8%). **Disparity between white females in Mississippi and the nation tripled** over the observed period. Meanwhile, **rates for black MS females were much higher overall** (rising from 20.3% to 22.7%).

“Approximately half of all excess deaths among African American children occur during infancy, primarily from extremely premature births” (Wise, 2004, p. 10).

“In 2005, the annual societal economic cost (medical, educational, and lost productivity) of preterm birth in the United States was at least \$26.2 billion.



The average first year medical costs were about 10 times greater for preterm than for full-term babies”

(CDC, n.d., Prematurity section, para. 3)

If black Mississippians (both male and female) had achieved at the white national rate in 2005, **half** of the preterm births in this population would have been averted.

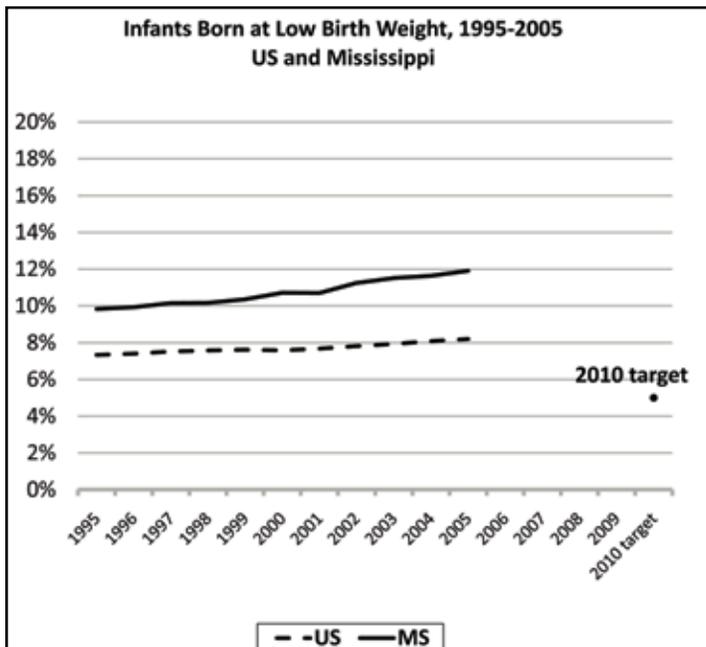
Meanwhile, the disparity between white Mississippians (both male and female) and national whites **tripled** over the observed period.

Infants Born Preterm	1995	2005
US white male	10.2%	12.3%
MS white male	11.6%	16.0%
MS black male	20.2%	23.4%
US white female	9.1%	11.1%
MS white female	10.4%	14.8%
MS black female	20.3%	22.7%

Because we were not equal...
406 more white females in Mississippi
437 more white males in Mississippi
1056 more black males in Mississippi
1060 more black females in Mississippi
...were born preterm in 2005.

LOW BIRTH WEIGHT

Infants born with low birth weight (less than 2,500 grams) are at a higher risk for infant mortality. Moreover, these infants are also at higher risk for health and developmental problems for the rest of their lives (Child Trends Data Bank, n.d.). Disadvantages include higher risk of respiratory illnesses, neurosensory impairments, subnormal height, lower IQ and academic achievement scores, and failure to complete high school and postsecondary studies (Walter, Ehlenbach, Hotchkin, Chien, & Koepsell, 2009; Hack et al., 2002).



Source: CDC, Natality Database, n.d.c

Mississippi, the Nation, and Healthy People 2010

Using the 1998 rate of 7.6% low birth weight as a baseline, Healthy People calls for the reduction of live births with low birth weight to 5% by 2010. Unfortunately, from 1998 to 2005, the US rate of low birth weight increased (to 8.2%). Similarly, over the 1998 to 2005 period, Mississippi rates rose (from 10.2% to 11.9%). **Both the US and Mississippi are moving away from the Healthy People birth weight goal, with Mississippi experiencing higher rates and rising disparity compared to the nation.**

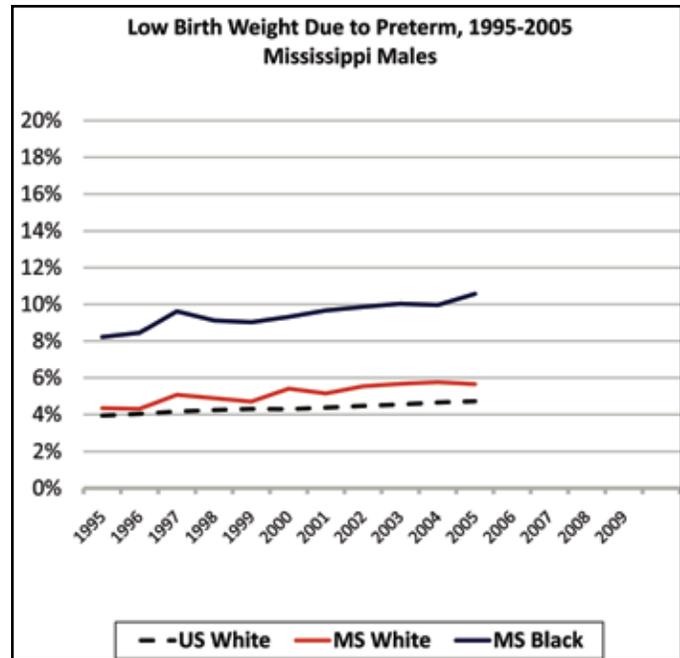
“Risk factors for low and very low birth weight include smoking, low maternal weight gain or low pre-pregnancy weight, maternal or fetal stress, infections, and violence” (Child Trends Data Bank, n.d., Violence section, para. 1).

“The relationship between lifestyle risk factors and low birth weight is complex and is affected by psychosocial, economic, and biological factors. Cigarette smoking is the largest known risk factor for low birth weight... Pregnancy and the prospect of pregnancy provide an important window of opportunity to improve women’s health and the health of children. The adoption before or during pregnancy of more healthful lifestyle behaviors, such as ceasing to smoke, eating an adequate diet and gaining enough weight during pregnancy, and ceasing heavy drug use, can positively affect the long-term health of women and the health of their infants. Detrimental lifestyles can be modified, but successful modification will require large-scale societal changes. In the United States, these societal changes should include a focus on preventive health, family-centered workplace policies, and changes in social norms” (Chomitz, Cheung, & Lieberman, 1995, Intro section, para. 2).

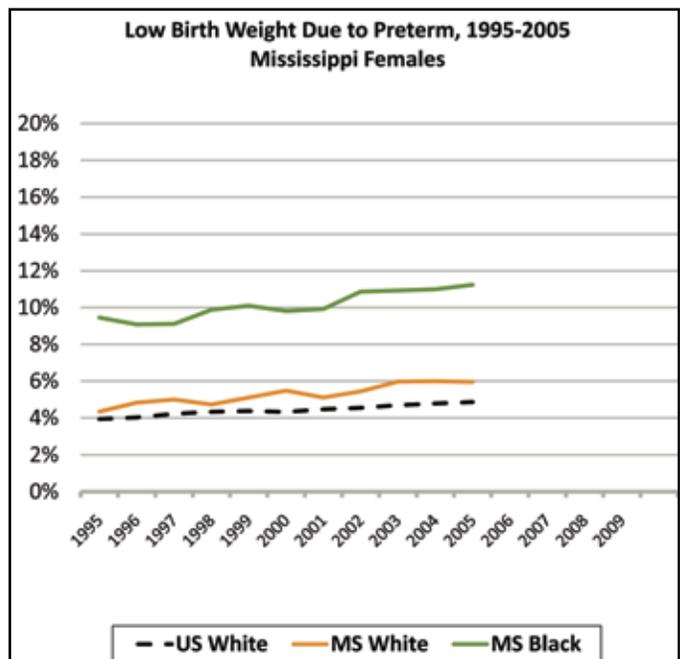
Mississippians: How Have We Compared?

Newborns can be born at low weight for two reasons: a) growth during the intrauterine period has been impaired, although the duration of pregnancy may remain normal (small for gestational age); or b) the rate of intrauterine growth may be normal, but the length of gestation may be impaired (preterm birth, the more common cause). As discussed in our preface, low birth weight due to preterm birth carries serious risks in early life. Small for gestational age does not necessarily lead to risks experienced as a result of preterm birth, but low birth weight for gestational age does carry risks for early life, including increased risk of mortality, and significantly, low birth weight for gestational age carries risk of long-term health effects, such as increased risk of cognitive disorder and differences in academic achievement and professional attainment (Kok, 1998; Strauss, 2000).

Black Mississippians are particularly disadvantaged in birth weight. From 1995 to 2005, **low birth weight due to preterm birth rose slightly among white US males (from 3.9% to 4.7%) and among white MS males (from 4.3% to 5.7%), the more rapid rise among white MS males creating an increased disparity.** As a result, 1% more white males in Mississippi experienced low birth weight due to preterm birth in 2005 compared to the nation. **Rates and patterns were very similar for white females,** with rates of low birth weight due



Source: CDC, Natality Database, n.d.c



Source: CDC, Natality Database, n.d.c

If Mississippians had achieved like the nation in 2005, **1 in 3 cases of low birth weight** would have been averted in Mississippi.

Infants With Low Birth Weight Due to Preterm Birth	1995	2005
US white male	3.9%	4.7%
MS white male	4.3%	5.7%
MS black male	8.2%	10.6%
US white female	3.9%	4.9%
MS white female	4.3%	6.0%
MS black female	9.5%	11.2%

Roughly **1 in 6 cases** of low birth weight due to preterm birth among **white Mississippi males** would have been averted in 2005, if we achieved like the nation.

Roughly **1 in 5 cases** among **white females** would have been averted.

In low-income countries, removal of infants from low birth weight status is estimated to incur a \$510 economic benefit per infant due to reduced medical costs and mortality rates and increased learning and productivity

(Alderman & Behrman, 2006).

to preterm birth rising slightly for white US females (from 3.9% to 4.9%) and white MS females (from 4.3% to 6%), an increasing disparity between the two groups reaching 1.1% in 2005.

Meanwhile, **rates of low birth weight due to preterm birth among black males and females are more than double white rates.** Rates for black males rose slightly more rapidly (from 8.2% to 10.6%) than rates for black females (from 9.5% to 11.2%). However, over the entire observed period, black females saw higher rates and greater disparity from their white national counterparts. In 2005, 6.3% more black females in Mississippi suffered low birth weight due to preterm birth compared to their white national counterparts, while 5.9% more black males in Mississippi suffered the same.

Overall, roughly 1 in every 2 cases of low birth weight due to preterm birth among black Mississippians (male and female) would have been averted, if we achieved like the nation. In addition, a reversal of typical patterns shows that females, generally the healthier sex, experience slightly higher rates of low birth weight than males. Very similar patterns are observed for low birth weight for gestational age.

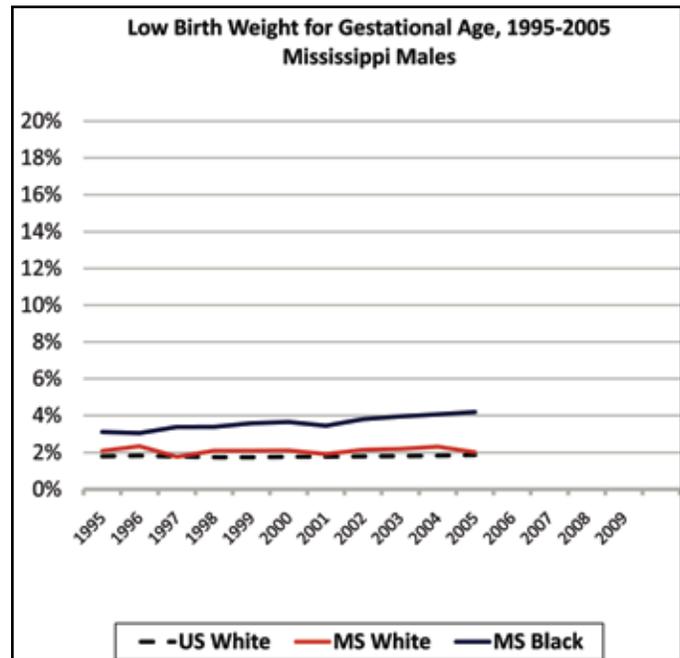
Rates for white males and females remained fairly stable, with white male rates at 1.8% in 1995 and 1.9% in 2005 and US white female rates at 2.6% and 2.8%. Almost no difference existed between white males in Mississippi and across the nation. However, in 2005, 0.6% more white females in Mississippi experienced low birth weight for gestational age.

As with low birth weight due to preterm, prevalence rates of low birth weight for gestational age among black males and females are double white US rates. Rates for black males rose (from 3.1% to 4.1%) to create a disparity of 2.2% compared to white US males, and rates for black females rose (from 5.2% to 6%) to create a disparity of 3.2%.

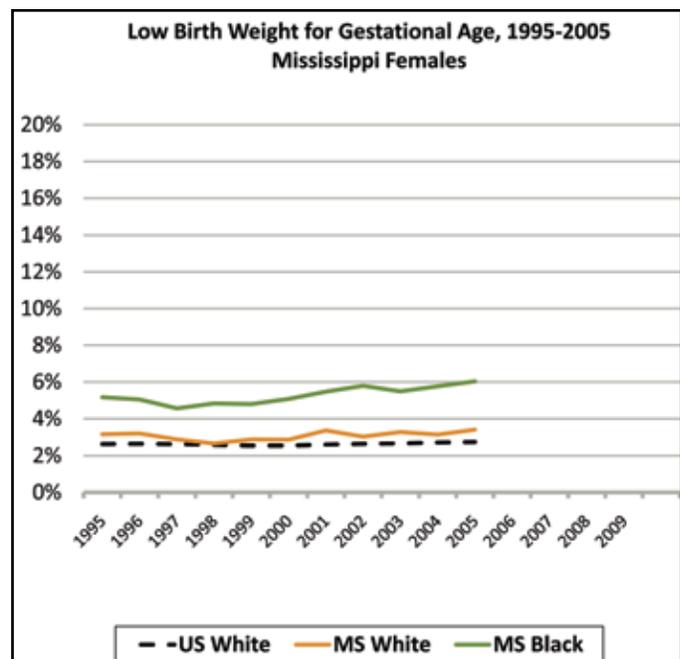
Black US infants of US-born mothers are at greater risk to be small for gestational age than black US infants whose mothers were foreign-born. These and similar findings undermine theories that lower birth weights among black infants (compared to white infants) reflect normal physiological differences

(Kramer, Ananth, Platt, & Joseph, 2006).

Infants With Low Birth Weight for Gestational Age	1995	2005
US white male	1.8%	1.9%
MS white male	2.1%	2.0%
MS black male	3.1%	4.2%
US white female	2.6%	2.7%
MS white female	3.2%	3.4%
MS black female	5.2%	6.0%



Source: CDC, Natality Database, n.d.c



Source: CDC, Natality Database, n.d.c

More than **1 in 6** cases of low birth weight for gestational age among **white female Mississippians** would have been averted in 2005, if we achieved like the nation.



Blair E. Batson Hospital for Children is Mississippi's only children's hospital. It also houses the state's only children's cancer clinic, cystic fibrosis program, and epilepsy center. In 2008, the hospital averaged 9,000 admissions, while more than 150,000 children from all of Mississippi's 82 counties were treated in its emergency room and clinics. The research and teaching hospital focuses on family-centered care and will treat all children regardless of their ability to pay for health services. (Image provided by Emily Nations, 2010.)

More than **1 in 2 cases** of low birth weight for gestational age among **black Mississippians (male and female)** would have been averted in 2005, if we achieved like the nation.

Because we were not equal...
111 more white males in Mississippi
122 more white females in Mississippi
554 more black males in Mississippi
586 more black females in Mississippi
...were low birth weight due to preterm birth in 2005.

Because we were not equal...
17 more white males in Mississippi
75 more white females in Mississippi
220 more black males in Mississippi
303 more black females in Mississippi
...were low birth weight for gestational age in 2005.

“The reduction of low birthweight rates poses a challenge for public health programs, as standard prenatal interventions have not generally shown success at increasing birthweights among infants born to high risk women. [A study of Colorado’s Prenatal Plus program shows] the effectiveness of enhanced services for pregnant women when these services are targeted toward the resolution of specific risk factors that are known to be associated with low birthweight, such as smoking, inadequate weight gain, and psychosocial problems”

(Ricketts, Murray, Schawlberg, 2005, p. 1955).