AN INTRODUCTION TO THE ISSUE OF LOW BIRTH WEIGHT

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I. An Overview of Low Birth Weight

The average infant weighs approximately seven pounds (about 3,200 grams) at birth.[1] In contrast, a baby has "low birth weight" if she weighs less than five pounds, eight ounces (2,500 grams), and the baby is categorized as "very low birth weight" if she weighs less than three pounds, five ounces (1,500 grams).[2] Low birth weight is associated with prematurity, and approximately two-thirds of low birth weight babies were born before 37 weeks of gestation.[3] The earlier a baby is born, the more underweight she is likely to be.[4] In addition, a baby may be born after a full term pregnancy, but as a result of fetal growth restriction have low birth weight.[5] Such babies are described as "small for gestational age" or "small for date."[6]

Low birth weight is a risk factor for a variety of adverse health outcomes, particularly among babies with very low birth weight. Such babies face many of the health problems associated with premature birth.[7] Generally, low birth weight babies are more likely than normal weight infants to experience complications during and directly following birth, including infection, difficulty in feeding, and neurologic problems.[8] Some specific conditions that are more likely to occur in low birth weight babies include respiratory distress syndrome, bleeding in the brain, patent ductus arteriosus (a heart condition), necrotizing enterocolitis (an intestinal condition), and retinopathy of prematurity (an eye condition).[9] Low birth weight babies often require intensive medical care after birth.[10] Furthermore, low birth weight newborns may have

[1] Weill Cornell Medical College, "Low Birth Weight," 2009. *Available at:* http://wo-pub2.med.cornell.edu/cgi-bin/WebObjects/PublicA.woa/4/wa/viewHContent?website=wmc+pediatrics&contentID=2382&wosid=ocIm5tesvYInJEiZtmQYQw.
[2] March of Dimes, "Quick Reference Fact Sheets: Low Birth Weight," 2009. *Available at*: http://www.marchofdimes.com/professionals/14332_1153.asp.
[3] *Id.*
[4] *Id.*
[5] *Id.*
[6] *Id.*
[7] Weill Cornell Medical College, *supra* note 1.
[8] *Id.*
[9] March of Dimes, *supra* note 2.
[10] *Id.*

an increased risk of some chronic diseases later in life, including high blood pressure, diabetes, and heart disease.[11]

Approximately thirty million children worldwide are born with low birth weight every year, representing 23.8% of all births.[12] In the United States, 8.3% of babies were born at low birth weight in 2006, and in Mississippi, that figure was 12.4%.[13] Mississippi has the highest rate of low birth weight infants, as a percentage of births, in the United States.[14] For 2006, 16.7% of non-Hispanic black babies in Mississippi were born with low birth weight, as opposed to 8.9% of non-Hispanic white babies and 7.1% of Hispanic babies.[15] Mississippi also had the highest rate in the nation for very low birth weight infants in 2006.[16] For Mississippi, the very low birth weight rate was 2.3%, while the rate for the United States overall was only 1.5%.[17]

A variety of risk factors increase the likelihood that a woman will give birth to an underweight baby. Poor nutrition, smoking, alcohol and drug use, and inadequate weight gain all increase the risk that a mother's infant will have low birth weight.[18] Certain medical conditions in mothers, such as high blood pressure, diabetes, infection, and placental problems, also increase the risk of low birth weight.[19] In addition, low birth weight disproportionately affects certain groups of babies, including African-Americans (two times more likely than white babies to have low birth weight), babies born to teenage mothers, and multiples (more than half of twins

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[11] *Id.*
[12] World Health Organization, "Feto-maternal Nutrition and Low Birth Weight," 2009. *Available at:* http://www.who.int/nutrition/topics/feto_maternal/en/index.html.
[13] Kaiser Family Foundation, Kaiser State Health Facts, "Births of Low Birthweight as % of Births," 2009. *Available at:* http://www.statehealthfacts.org/comparemaptable.jsp?ind=42&cat=2.
[14] *Id.*
[15] Kaiser Family Foundation, Kaiser State Health Facts, "Low Birthweight by Race/Ethnicity," 2009. *Available at:* http://www.statehealthfacts.org/comparemaptable.jsp?ind=43&cat=2.
[16] Annie E. Casey Foundation, Kids Count Data Center, "Data Across States: Very Low-birthweight Babies (Percent) – 2006," July 2009. *Available at*: http://datacenter.kidscount.org/data/acrossstates/Rankings.aspx?ind=17.
[17] *Id.*
[18] March of Dimes, *supra* note 2.
[19] *Id.*

are born with low birth weight).[20] Mothers with low socioeconomic status and low levels of education also face increased risk of low birth weight.[21]

Low birth weight infants require significantly more medical care than normal weight infants. In a study published in the journal of the American Academy of Pediatrics, Russell et al. calculated than the average cost of medical care for preterm and low birth weight infants between birth and one year of age was $15,100, as opposed to $600 for uncomplicated infants.[22] Preterm and low birth weight newborns spent an average of nearly 13 days in the hospital, while healthy newborns, on average, spent slightly less than two days in the hospital.[23] Infants with extreme prematurity and low birth weight (less than 28 weeks gestation or birth weight of less than 1,000 grams) spent an average of more than 42 days in the hospital at a cost of $65,600.[24] Although low birth weight and preterm infants made up only 8% of the births in the study, they accounted for 47% of health care costs.[25]

II. Current Programs in Mississippi Addressing Low Birth Weight

A. The Mississippi State Department of Health

In order to reduce low birth weight rates across the state, the Mississippi State Department of Health (MSDH) offers maternity services to low-income, pregnant women through county health departments.[26] These services include, but are not limited to, routine

[20] Weill Cornell Pediatrics, *supra* note 1.
[21] March of Dimes, *supra* note 2.
[22] Russell et al., "Cost of Hospitalization for Preterm and Low Birth Weight Infants in the United States," 120 Pediatrics, e1, e5 (2007). *Available* at: http://www.pediatrics.org/cgi/content/full/120/1/e1.
[23] *Id.*
[24] *Id.*
[25] *Id.* at e4.
[26] Mississippi State Department of Health, "Maternity Care," 2009. *Available at*: http://msdh.ms.gov/msdhsite/_static/41,1581,225,168.html.

medical check-ups, counseling and education, health care for the infant, family planning services, assistance applying for Medicaid, and post-partum follow-up care.[27]

In addition, MSDH provides a Perinatal High Risk Management Infant Service System, which focuses on reducing low birth weight rates by providing a "multi-disciplinary range of preventive health services for pregnant women including physical exams, nutrition, social services, health screening, education, counseling, interventions, and referral service as appropriate."[28] This program is available to "certain Medicaid-eligible pregnant/postpartum women and [their] infants."[29] The goal of the program is to reduce the low birth weight rate to five percent or less of total births, and the very low birth weight rate to one percent or less.[30] MSDH also works with the Centers for Disease Control and Prevention in administering the Pregnancy Risk Assessment Monitoring Survey, which is a research project aimed at discovering why some infants are born healthy and others are born with health problems.[31]

Finally, Juanita Graham, the Health Services Chief Nurse at MSDH, reports that the Department has created two projects in recent years that target women at risk for giving birth to low birth weight babies.[32] The Delta Infant Mortality Elimination (DIME) project (which covers 18 Mississippi Delta Counties) and the Metropolitan Infant Mortality Elimination (MIME) project (which covers the Jackson metropolitan area) are focused mainly on increasing access to medical homes, preventive healthcare services, and chronic disease management for women. The programs are expected to give both a rural and an urban perspective, respectively, on the

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[27] *Id.*
[28] *Id.*
[29] Mississippi Division of Medicaid, "Maternal and Child Health Services: Perinatal High Risk Management/Infant Services System," 2009. *Available at*: http://www.medicaid.ms.gov/MaternalChildHealth.aspx#PHRMISS.
[30] *Id.*
[31] Mississippi State Department of Health, "Maternity Care," 2009. *Available at*: http://msdh.ms.gov/msdhsite/_static/41,1581,225,168.html.
[32] Juanita Graham, "MCH Success Stories: Prematurity & Preconception Health – Mississippi," November 2008. *Available at*: http://www.amchp.org/abouttitlev/pages/successstories.aspx.

issue of successfully implementing care for pregnant women across the state.[33] Both projects began implementation in the fall of 2008.[34] The Delta Health Alliance has given initial funding to the DIME project, and the program "anticipates 3 years of funding in the amount of $1 million annually."[35] As of December 2008, a grant application for the MIME project was still pending; the grant would give the program $750,000 of funding for each of 5 years.[36]

B. Other Programs

In February 2009, the University of Mississippi Medical Center developed the Interpregnancy Care Project–Mississippi, which is a community-based program that works to reduce low birth weight.[37] The Project is designed to help women who deliver very low birth weight babies at the Medical Center, and it plans to offer these individuals case management and funded primary health care services for 24 months. The services will be provided by a team of doctors, case managers, social workers, nurses, and other relevant professionals.[38] As of August 2009, the Medical Center was still in the process of recruiting participants for the Project.[39]

Another program that works to address the issue of low birth weight in Mississippi is Stork's Nest. This project originally began in 1976, but it has been operating in its current form since January 2003.[40] The project is administered by the Alpha Delta Zeta Chapter of Zeta Phi Beta Sorority in Jackson, and it uses a community-based model to serve low-income pregnant mothers.[41] Stork's Nest identified early and regular prenatal care as a significant factor in

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[33] *Id.*
[34] Office of Health Data and Research, Mississippi State Department of Health, "2008 Mississippi Infant Mortality Report," December 19, 2008, p. 10. *Available at*: http://www.msdh.state.ms.us/msdhsite/_static/resources/3109.pdf.
[35] *Id.*
[36] *Id.*
[37] ClinicalTrials.gov, U.S. National Institutes of Health, "Interpregnancy Care Project-Mississippi," Oct. 9, 2009. *Available at*: http://clinicaltrials.gov/ct2/show/NCT00852319.
[38] *Id.*
[39] *Id.*
[40] Zeta Phi Beta Sorority, Alpha Delta Zeta Chapter, "Stork's Nest: Home," 2009. *Available at:* http://www.adz-1938.org/storks/.
[41] Zeta Phi Beta Sorority, Alpha Delta Zeta Chapter, "Stork's Nest: Introduction," 2009. *Available at:* http://www.adz-1938.org/storks/storks.htm#intro.

preventing low birth weight; therefore the program works to promote participation in prenatal care and other healthy behaviors. Stork's Nest provides educational programs and referrals to community services; it also rewards mothers who fulfill prenatal care tasks with "points" that they can redeem for baby clothing, nursery items, and other infant supplies.[42]

Finally, the Delta Health Partners operates a Healthy Start project in ten counties in the Mississippi Delta.[43] The project receives funding from the Health Resources Administration of the U.S. Department of Health and Human Services, and it aims to address problems of teen pregnancy, low birth weight, and infant mortality in minority populations.[44] Mississippi Healthy Start uses a case management team model to offer referral services to high risk women and their babies.[45] The program also provides health education programs to nine schools in the Delta.[46] In 2006, the Healthy Start program reduced the rate of very low birth weight babies born to women receiving its case management services to zero; however, the low birth weight rate was seven percent.[47] Thus, improvement can still be made in this area.

III. Mississippi Policy History Concerning Low Birth Weight and Further Policy Recommendations

Unfortunately, Mississippi has not done much to address low birth weight through policy initiatives. In terms of legislation, House Bill No. 71 from the Second Extraordinary Legislative Session in 2009 attempted to amend Miss. Code Ann. § 43-13-107, the statute which governs the

[42] *Id.*
[43] Felicia T. Whittington, Tougaloo College, "George and Ruth Owens Health and Wellness Center," 2006. *Available at*: http://www.tougaloo.edu/content/Administration/Health/index.htm.
[44] *Id.*
[45] John Bierma and Felicia Whittington, Tougaloo College, "Delta Health Partners: Mississippi Healthy Start," 2006. *Available at:* http://www.tougaloo.edu/content/administration/Health/dhp.htm.
[46] *Id.*
[47] *Id.*

creation and establishment of the State Division of Medicaid.[48] Among other provisions, this bill would allow the Division of Medicaid to develop a "population health management program for women and children health services through the age of one (1) year."[49] This program would have been aimed at providing prenatal care to combat the issues of low birth weight and preterm babies.[50] Similar bills have been proposed in both the House and the Senate of the Mississippi Legislature since at least 2000, but no version has passed yet.

A. General Recommendations

Because little has been done legislatively, policy changes regarding low birth weight babies could prove to be very effective. Analyzing policies and programs from other states provides an important foundation for making such recommendations. Generally, for women who are not high-risk, basic procedures like beginning prenatal care early in a woman's pregnancy and helping mothers to avoid unhealthy behaviors like smoking and drinking have proven to be successful strategies in addressing low birth weight rates. However, a study evaluating the effectiveness of Colorado's Prenatal Plus Program has indicated that "standard prenatal interventions have not generally shown success at increasing birthweights among infants born to high-risk women."[51] Rather, these high-risk patients require enhanced multidisciplinary services which are targeted at resolving individual risk factors associated with low birth weight rates, such as inadequate weight gain during pregnancy, smoking, and psychosocial problems.[52]

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[48] An Act Relating to the Administration of the Mississippi Medicaid Law, HB 71, 2d Extraordinary Sess. (2009). *Available at*: http://index.ls.state.ms.us/isysnative/UzpcRG9jdW1lbnRzXDIwMDkyRVxub3RkZWFkXGhiXDAwMDEtMDA5OVxoYjAwNzFzZy5wZGY=/hb0071sg.pdf#xml=http://10.240.72.35/isysquery/irl119c/1/hilite.

[49] *Id*. at ¶42, ln. 899-901.

[50] *Id*. at ¶42, ln. 901-03.

[51] Sue Austin Ricketts et al. "Reducing Low Birthweight by Resolving Risks: Results from Colorado's Prenatal Plus Program," American Journal of Public Health, Nov. 2005, v. 95(11): 1955. *Available at*: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1449467.

[52] *Id.*

The Minnesota Healthy Women, Healthy Babies Program has identified five key approaches that are effective in reducing low birth weight. These include implementing the Women, Infants, Children (WIC) program in the community; developing a home visitation program; establishing teen pregnancy prevention initiatives; ensuring that women are engaging in family planning; and providing primary, preventive health care for women of childbearing age.[53] Furthermore, the Program lists a number of factors which increase the risk of having a low birth weight infant. While certain risk factors were noted earlier, these are particularly important to reiterate in the policy context because policies which address specific factors will help in the reduction of low birth weight rates overall. These risk factors, taken directly from the Healthy Women, Healthy Babies Program website, are listed below:[54]

- Use of alcohol, tobacco, drugs
- Vaginal infections, sexually transmitted infections
- Unintended pregnancy
- Maternal age under 19 and over 35
- Stress, lack of support
- Race, ethnicity
- Low pre-pregnancy weight, poor weight gain during pregnancy
- Periodontal disease
- Previous LBW or pre-term birth
- Short intervals between pregnancies
- Domestic violence
- Poverty, residential segregation, geographic isolation
- Environmental exposures: at work, at home, or in the community
- Heavy physical work during pregnancy

Thus, the Healthy Women, Healthy Babies Program presents a broad overview of concerns to be considered when addressing the issue of low birth weight. This general structure is particularly useful to keep in mind when determining how to implement specific, targeted programs. The following section focuses on individual project approaches taken to reduce low birth weight rates in other states.

[53] Minnesota Department of Health, "Healthy Women, Healthy Babies: Reducing Low Birth Weight in Minnesota," 2009. *Available at*: http://www.health.state.mn.us/divs/fh/mch/mortality/reduce-lbw.html#print.
[54] *Id.*

B. Noteworthy Programs from Other States

The Baltimore Healthy Start Program follows the traditional Healthy Start model by offering medical support and care to low-income pregnant women and their children.[55] However, the Baltimore program has gone further with its mission by hosting neighborhood outreach programs aimed at recruiting participants, and offering mothers an array of services, such as "medical care, household supplies, parenting instruction, mental health services, job training and drug addiction services."[56] Furthermore, officials who administer the program also work with experts to study how environmental factors like crime and pollution affect women during their pregnancies. In 2005 and 2006, less than one percent of Baltimore Healthy Start participants gave birth to low birth weight babies.[57]

In New York City, the Spaces of Hope in Harlem Agency has improved the health of mothers and their infants by bringing perinatal care and Healthy Start programs to the area.[58] , The agency has also implemented a job readiness program for mothers and worked with other groups to increase affordable housing and to provide competitive support for local vendors in the area. In addition, the agency has studied the connection between low birth weight and diesel engine fumes emitted by buses. Finding a correlation between poor air quality and low birth weight rates, the agency has worked to reduce the number of bus stations in Harlem.[59] Finally, looking to the total health of mothers during their pregnancies, the agency has advocated for the construction of neighborhood supermarkets that offer healthy food choices to the community.[60]

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[55] Medical News Today, "Baltimore Healthy Start Program Nearly Eradicates Low Birthweight Among Infants Born to Women Enrolled in Program," Sept. 25, 2007. *Available at*: http://www.medicalnewstoday.com/articles/83339.php.
[56] *Id*.
[57] *Id.*
[58] Julius Dasmarinas, "MCH Success Stories: Prematurity & Preconception Health – Spaces of Hope in Harlem," November 2008. *Available at*: http://www.amchp.org/abouttitlev/pages/successstories.aspx.
[59] *Id*.
[60] *Id.*

Finally, the Nurse Family Partnership Program (NFP) is an early home visitation program that has improved infant mortality rates and other health incomes for a number of communities. The National Service Office of this program is based in Denver, Colorado, and it provides support to organizations which choose to implement the NFP. The program follows a model which focuses on first-time, low-income mothers. A nurse usually begins to work with a client in her home during the first trimester of pregnancy, and home visits continue until the child's second birthday. The National Service Office offers comprehensive training and resources to nurse home visitors. The goals of the NFP are three-fold: first, to improve the pregnancy outcomes of mothers (including low birth weight); second, to improve child health and development; and third, to improve the economic self-sufficiency of the family.[61] Importantly, two of the consistently reported effects of the NFP are improved prenatal health and increased intervals births – both of these elements have proven to be contributing factors to the reduction of low birth weight rates in various contexts.[62]

These programs offer innovative approaches to addressing the problem of low birth weight. Combined with the more general policy initiatives in this issue area, they present a comprehensive and multidisciplinary solution. In order for Mississippi to reduce its own low birth weight rate in a significant way, it must analyze these approaches and programs and adapt such successful models to fit the particular needs of the state.

[61] Nurse Family Partnership, "Fact Sheets: Overview," 2008. *Available at:* http://www.nursefamilypartnership.org/resources/files/PDF/Fact_Sheets/NFP_Overview.pdf.
[62] Nurse Family Partnership, "Research Evidence: Consistent Program Effects," 2009. *Available at*: http://www.nursefamilypartnership.org/content/index.cfm?fuseaction=showContent&contentID=4&navID=4.