

HEALTH DISPARITIES AND WOMEN'S REPRODUCTIVE HEALTH

The National Institute of Child Health and Human Development (NICHD) is the institute within the National Institutes of Health that has played a great role in the conduct and support of research in women's reproductive health. In this position, the NICHD is advancing the health and well-being of women and girls in many areas, including research on uterine fibroids, birth outcomes, and community interventions that can improve health. This paper provides a general overview of the NICHD-sponsored women's reproductive health research portfolio, with emphasis on the challenges associated with eliminating racial/ethnic disparities in leiomyomata uteri and infant mortality. In addition, opportunities for community partnerships in reducing health disparities are described. (*Ethn Dis.* 2007; 17[suppl 2]:S2-4-S2-7)

Key Words: Health Disparities, Women's Reproductive Health, Leiomyoma, Birth Outcomes, Infant Mortality, Sudden Infant Death Syndrome (SIDS), Leiomyomata Uteri

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INTRODUCTION

Disparity in access to health care and health outcomes has been well documented in the literature. Sex, race and economics all play a critical role in the nature and quality of health care received in this country. Sex, for example, contributes to myocardial infarction mortality independent of other factors.¹ Minorities and the economically disadvantaged diagnosed with malignancies have lower survival rates.² In 2001, the Institute of Medicine published a report that further documented the nature and scope of this problem. Disparities were consistently found irrespective of diagnosis and clinical services. Even when clinical factors, such as stage of disease presentation, co-morbidities, age, and severity of disease were considered, disparities persisted. Disparities were also found regardless of type of clinical settings, with documentation of health-care inequities in public and private hospitals, teaching and non-teaching hospitals.³

Disparities in access to care as well as outcomes are a significant problem in the US healthcare system. The outcomes for women, minorities, and the poor are all negatively affected by these inequities, and poor, minority women face the greatest challenges in their attempts to obtain medical care. The objective of this discussion will be to examine health disparities in the area of women's reproductive health. This discussion will focus on reproductive morbidity among African American women, research on women's health and birth outcomes, uterine fibroids and other factors in infertility, and community interventions to improve health.

The role of the National Institutes of Health (NIH) is to acquire new knowledge to help prevent, detect, diagnose, and treat disease and disabil-

ity, from the rarest genetic disorder to the common cold. The institute within the NIH that is most actively involved in women's reproductive health studies is the National Institute of Child Health and Health Development (NICHD). The NICHD mission is to support healthy desired babies, optimize rehabilitation, and achieve minimal disability in an effort to help children reach their full potential. The NICHD supports research in a multitude of areas of women's health, including disorders of the menstrual cycle, dysfunctional uterine bleeding, leiomyomata uteri, endometriosis, polycystic ovary syndrome, premature ovarian failure, female sexual function and dysfunction, pelvic floor disorders, vulvodynia, chronic pelvic pain, adolescent gynecology, and racial and ethnic disparities. In this article, we focus on the NICHD-sponsored research in reproductive morbidity, birth outcomes, and leiomyoma.

NICHD-SPONSORED RESEARCH

Leiomyoma, benign tumors arising from the myometrium, are the most common gynecologic tumor, affecting $\approx 77\%$ of reproductive-age women. In 1998, this disease resulted in $> \$4$ billion in healthcare costs.⁴ As a result of the impact of leiomyoma on women's reproductive health, in 2002 the United States Senate urged NICHD to increase efforts to better understand "the physiological endocrine mechanisms that allow uterine fibroids to grow and become symptomatic." Thus, a primary focus of the NICHD has been to aggressively conduct and support research that leads to new treatment, new preventives, and new interventions in the care and treatment of women with uterine fibroids.

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Because leiomyoma disproportionately affect African American women, and low-income women have the greatest difficulty obtaining medical care, evidence is growing of disparity in the prevalence and outcomes of women with leiomyomata uteri. The lifetime incidence for fibroids is 80% for African American women, compared with 60% for Caucasian women.^{5,6} African American women are more likely to be symptomatic, more likely to undergo surgery, and more likely to have treatment complications.⁷ The size of the leiomyoma and the probability of undergoing hysterectomy are greater among African American women (Fig 1).⁸ Surgery, hysterectomy, is currently the only cure for fibroids. Myomectomy, removal of the fibroids with preservation of the uterus, is associated with an up to 50% recurrence rate.⁹ A greater understanding of the genetic basis and molecular mechanisms is imperative.

The insights obtained through basic science investigations have led to clinical protocols that are examining potential nonsurgical therapies. The NICHD group led by Segars was the first to publish global gene profiling experiments of leiomyomata uteri and matched myometrium. They evaluated up to 33,000 genes in five matched uterine-leiomyoma pairs and have since analyzed 15 pairs of leiomyoma and matched myometrium. These extensive studies consistently showed that expression of extracellular matrix genes (ECM) and genes encoding collagens were differentially regulated in fibroids.¹⁰⁻¹² Two investigations in the NICHD intramural branch, headed by Dr. Alan DeCherney, will study potential medical therapies. CDB 2914, a selective progesterone antagonist, and an antifibrotic agent that affects collagen synthesis, pirfenidone, are being evaluated as future nonsurgical treatments.

Leiomyoma affect fertility and obstetric outcomes primarily by decreasing

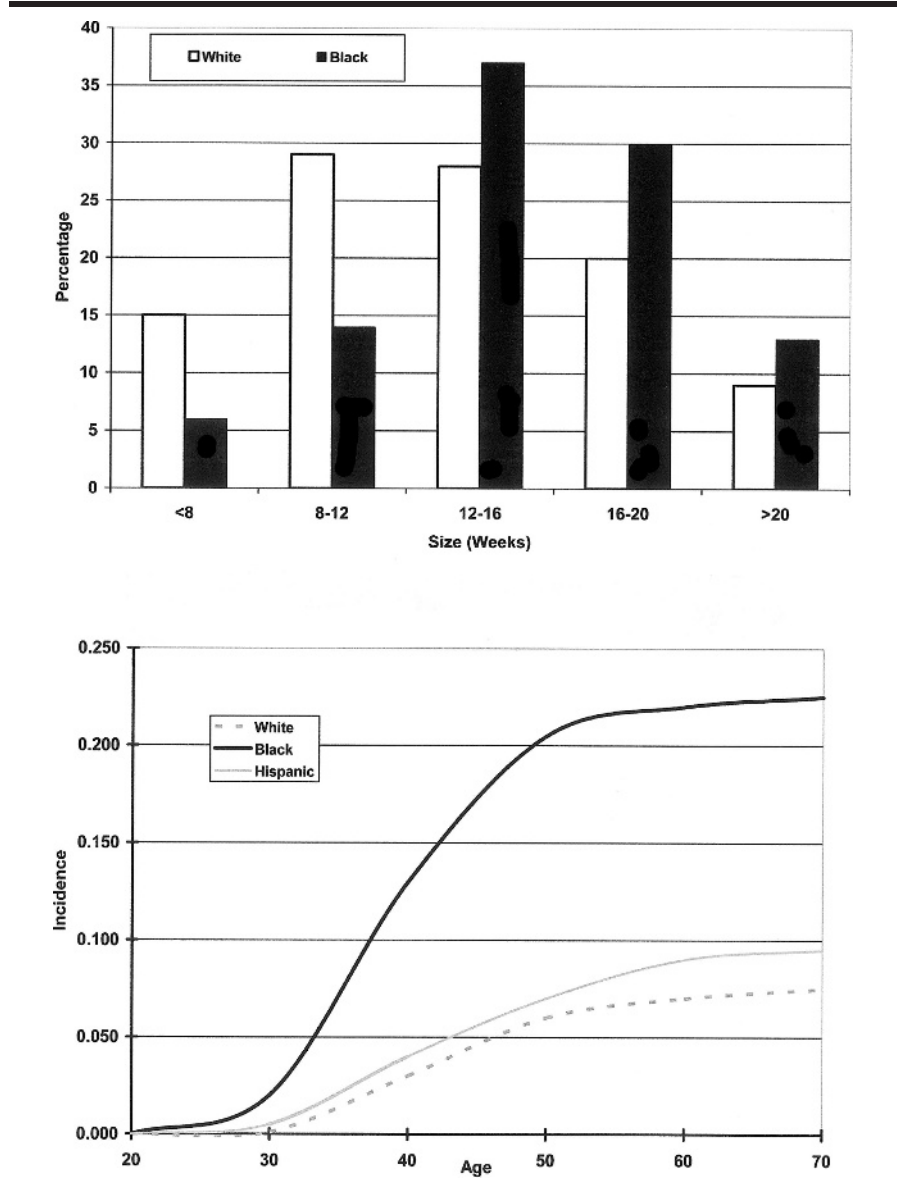


Fig 1. Leiomyoma size at myomectomy (top); cumulative incidence of hysterectomy (bottom). Reprinted with permission from: E. Myers, White House Lecture, June 2002

the likelihood of successful implantation and by increasing the risk of preterm labor, malpresentation, and operative delivery. Because of the higher incidence of fibroids in African American women, leiomyoma may also help to explain the disparity in in vitro fertilization (IVF) outcomes. In an NICHD supported study by Feinberg et al, African American women undergoing IVF had a significantly higher incidence of leiomyoma when compared to Caucasian

women (30.7% vs 10.6%, $P<.0001$). African American women also had a higher rate of spontaneous abortion, an obstetric complication associated with leiomyoma. Even when the analysis was controlled for the presence of fibroids, African American women had lower live birth rates and higher spontaneous abortion rates (Table 1). Another finding of this study was that access to care among African American women was facilitated by decreasing

Table 1. Leiomyomata and selected assistive reproductive technology outcomes by race

Variable	Outcome	African American N (%)	Caucasian N (%)	RR (95% CI)
Leiomyomata Present	Live birth rate	17/78 (21.8)	31/105 (29.5)	0.78 (0.51–1.2)
	Spontaneous abortion	7/24 (29.2)	9/39 (22.5)	1.21 (0.62–2.37)
Leiomyomata Absent	Live birth rate	58/175 (33.1)	318/869 (43.2)	0.91 (0.72–1.14)
	Spontaneous abortion	18/76 (23.7)	57/375 (15.2)	1.56 (0.98–2.48)

Adapted from: Feinberg EC, Larsen FW, Catherino WH, Zhang J, Armstrong AY. Comparison of assisted reproductive technology utilization and outcomes between Caucasian and African American patients in an equal-access-to-care setting. *Fertil Steril.* 2006;85(4):888–894. Epub 2006 Mar 9.

medical costs and other barriers to care.¹³

In examining obstetric outcomes, further evidence of racial disparities exists. Infant mortality is higher among minority women (Fig 2).¹⁴ Minorities also have a greater likelihood of preterm birth, low birthweight (<2500 g), and very low birthweight (<1500 g). The percentages of women who receive late or no prenatal care are also higher among minorities. The NICHD-sponsored Maternal Fetal Medicine Units Network is addressing these disparities. This network consists of 14 clinical sites, representing >120,000 deliveries per year. One of the aims of this cooperative research group was to

examine the use of progesterone injections to reduce the risk of preterm delivery. Women with a history of preterm delivery were studied, and African American women were found to have a higher rate of preterm delivery, but they were also found to have a reduction in both preterm and very preterm delivery after treatment with progesterone.^{15,16} This study led the American College of Obstetricians and Gynecologists to recommend the use of progesterone to prevent preterm delivery in women with a history of preterm birth.¹⁷

Examination of the causes of infant mortality indicated that African Americans and Native Americans have

a higher incidence of sudden infant death syndrome (SIDS). An NICHD household survey documented a relationship between sleep positions and deaths due to SIDS.¹⁸ The risk of SIDS is reduced when infants are placed on their backs when sleeping. This revelation led to the NICHD-sponsored Back to Sleep campaign. This program is an example of a successful public-private partnership to reduce the risk of SIDS. Partnerships, such as the African American Outreach program, were then established to educate minority parents and other caregivers about the connection between sleep position and SIDS.

NICHD has supported an active and wide-ranging research portfolio in

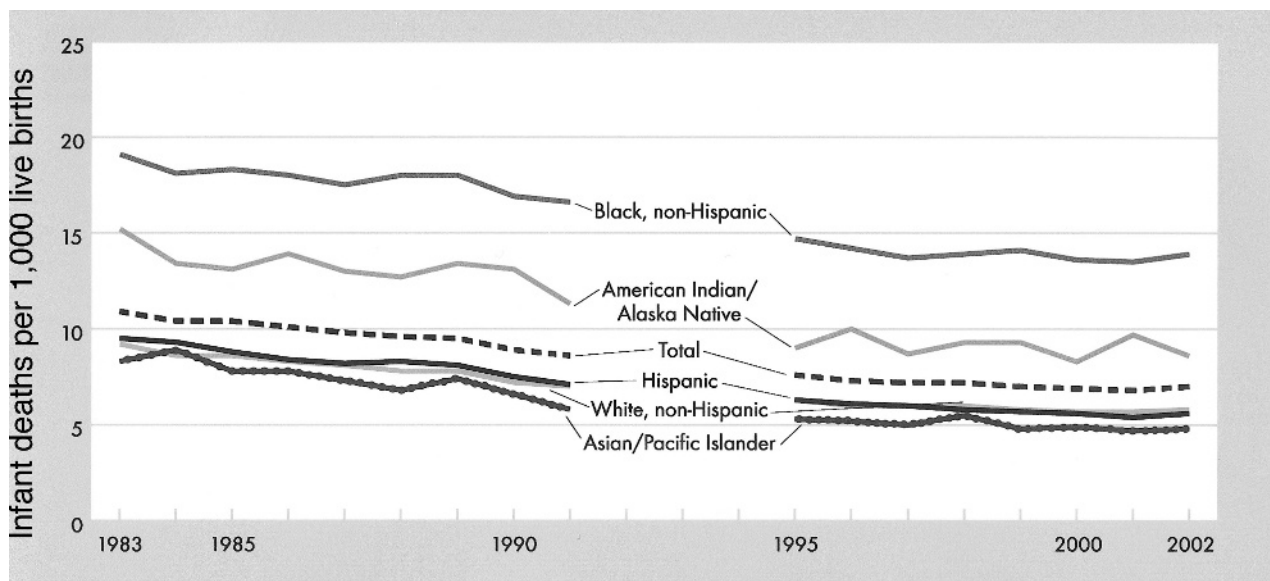


Fig 2. Death rates among infants by detailed race and Hispanic origin of mother, 1983–2002. Infant deaths per 1,000 live births. Note: Data are available for 1983–1991 and 1995–2002 only. Infant deaths are deaths before an infant’s first birthday. Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Linked Files of Live Births and Infant Deaths

women's health. Investigators interested in this area of research can find information about current programs at the NICHD homepage and <http://clinicaltrials.gov/ct/gui/action>. A number of strategies have been supported by NICHD to help eliminate health disparities. Efforts to build a knowledge base to understand the connection between socioeconomic status, race, prevention, and health are ongoing. In addition, strategies are being developed to increase access to care and improve outcomes. Lastly and perhaps most importantly, preventive methods, such as the Back to Sleep program, are being developed at the community level through partnerships with NICHD.

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AUTHOR CONTRIBUTIONS

Design concept of study: Maddox, Armstrong
Acquisition of data: Maddox, Armstrong
Data analysis and interpretation: Armstrong
Manuscript draft: Maddox, Armstrong
Administrative, technical, or material assistance: Maddox, Armstrong
Supervision: Maddox