

**NATIONAL INSTITUTES OF HEALTH
NATIONAL INSTITUTE OF NURSING RESEARCH**

OPTIMIZING PREGNANCY OUTCOMES IN MINORITY POPULATIONS

**March 3-4, 2003
Four Points Sheraton
Bethesda, Maryland**

Executive Summary

The National Institute of Nursing Research (NINR), National Institutes of Health (NIH), convened the workgroup “Optimizing Pregnancy Outcomes in Minority Populations” on March 3-4, 2003 in Bethesda, Maryland.

BACKGROUND

Premature delivery and/or low birth weight, consequences of which can be profound, continue to be major public health concerns. It is well known that much of the health disparity of preterm and low birth weight is associated with racial and ethnic groups living under the burden of sub-optimal social, economic and health conditions. For example, low birth weight and very low birth weight percent of live births are 13.1 and 3.1 percent, respectively, for Blacks or African American, compared to 6.5 and 1.1 percent, respectively, for Whites (Healthy People 2010, 2000). Yet, to date, the interaction between these factors and biological mechanisms remains poorly understood. What is known, however, is that the problem of low birth weight in minority populations is highly complex, and no single approach to disentangling the multiple contributing factors is likely to succeed. Therefore, a collaborative multidisciplinary biobehavioral approach seems warranted.

This workgroup brought together researchers in the fields of nursing, epidemiology, psychology, and clinical and basic sciences in a collaborative, multi-disciplinary approach to address this issue and formulate future research strategies.

I. WELCOME

Dr. Patricia A. Grady, Director of the National Institute of Nursing Research (NINR), welcomed participants on behalf of the Institute and workgroup Co-Chairs, Yvonne Bryan, PhD, RN and Thelma Patrick, PhD, RN. Low birthweight (LBW) infants have been an area of interest for NINR since its inception 15 years ago although the interest has shifted from issues with the general population to minority populations. Dr. Bryan articulated the goals of the workgroup: identify key gaps and future directions for research; solicit input on novel study designs and strategies to increase collaborative multidisciplinary biobehavioral research that can elucidate the mechanisms underlying disparities in pregnancy outcomes and design interventions to reduce such disparities.

II. SUMMARY

The workgroup was organized around the following two themes:

- Challenges in conceptualizing factors influencing disparities in pregnancy outcomes
- Challenges in methodology, research design, and measurement

Papers were presented on key topics under each theme followed by a formal response and group discussion. After a review of the current state of knowledge on pregnancy outcomes in minority populations, speakers focused on the following topics:

- psychosocial and biological influences on pregnancy outcomes
- stress and neuroendocrine mechanisms in prematurity and low birth weight
- behavioral influences and maternal health during pregnancy
- environmental exposure and biological mechanisms affecting pregnancy outcomes.

Key points of discussion under research design and measurement included:

- defining risk and risk factors
- identification of physiological pathways and biochemical markers
- measurement of psychosocial constructs
- methodological considerations in designing multidisciplinary biobehavioral research on prematurity and low birth weight.

Disparities in pregnancy outcomes in minority populations (defined in the context of race and ethnicity) are driven primarily by the problems of preterm birth (PTB) and low birth weight. These problems occur across populations but their greater incidence among minority populations makes these groups particular targets of research interest although there are most probably commonalities among all groups. There was consensus that a multidisciplinary approach that facilitates the cross fertilization of ideas, perspectives and expertise, is a fruitful avenue to pursue in the quest to reduce disparities in pregnancy outcomes in minority populations. For example, research in one area, such as research on stress and stressors in the psychosocial context, can build upon research in another area, such as biological responses to stress, to more fully elucidate how stress influences poor pregnancy outcomes.

Following the presentations, respondents were tasked with summarizing the outcomes of the workgroup. There was consensus in several areas listed below.

General Areas:

- there are disparities in pregnancy outcomes among different races/ethnicities
- some groups are at greater risk than others and race may be a proxy for other factor(s)
- infections are involved in PTB, especially early PTB but this is still not clearly understood nor is there an effective intervention to prevent PTB

Factors Involved in PTB:

- race/ethnicity
- environment/genetics
- health care delivery systems
- stress and the responses to stress
- interactions (e.g., maternal-fetal, genes-environment, etc.)

Key Areas for Future Research:

- stress
- outcome assessment
- mechanisms/treatment/prevention
- environment/genetics
- methodology

There was some discussion on the utility of animal models to study PTB and LBW. Currently no model exists that emulates the human response to adverse pregnancy occurrences, but this would be a fruitful area of study.

III. CONCLUSION

There was consensus that bringing together multidisciplinary experts in biobehavioral sciences in this workgroup provided an excellent opportunity for dialogue and for fostering future collaborations within and across disciplines. Participants were able to view problems from others' perspectives and identified a number of promising areas for future research and important needs in research design, measurement, and methodology.

There was agreement that there are obvious disparities in pregnancy outcomes among different races, although race may not be an appropriate label. The best studies have been done among those in the African American population but the problems are not unique to that group. Factors influencing adverse pregnancy outcomes include: genetics/race, environment/interactions and health care delivery. Race does not denote a homogenous group of individuals. There are differences among those in the same race based upon length of time since migration to the U.S., biology differences that are genetically mediated such as hypo and hyper inflammatory responders, etc. Subsets of these groups may do well but when moved to another social environment they fail to thrive. Why do some individuals in a "beset population" not develop the same poor outcome?

Participants expressed a need to develop and test new statistical and analytical methods and to do qualitative research to aid in priming theories. The ability, for example, to assess lifestyle factors could be improved. It may be necessary to study a woman's health history prior to becoming pregnant in order to discern experiences that influence health disparities. The research should utilize cross-disciplinary collaborations in developing theories of health disparities. This is an ideal time to develop theories and models building on what has been done in other fields. Studies could combine approaches and look at multiple outcomes. Risk factors and biological pathways could be investigated in the same study. Research to date has focused on one or two predictors such as stress or infection in relation to the outcome. There is a need to understand the whole picture. Many

elements of the disparity in outcomes are not well understood. Therefore, new research is needed. Existing models need to be tested in randomized trials. It was suggested that randomizing at the level of the clinic would be useful to test systemic changes. When a specialized provider is matched with the population requiring the specific intervention and the dose is correct it leads to the desired outcome.

Research looking at commonalities in many racial/ethnic groups, including White women with no apparent disadvantage, may be fruitful. There may be common pathways to PTB/LBW that intersect at some point in pregnancy and the differences between groups may simply be one of dose. If the biologic commonalities can be elucidated and the common pathways can be understood it may be possible to test and develop targeted interventions. This is consistent with the Healthy People 2010 goal to continue to improve maternal and infant outcomes for all.

This workgroup is a step forward in the process of eliminating disparities in pregnancy outcomes. The strategies discussed and an integration of studies will be required to accomplish this. This is an Area of Opportunity for NINR in 2004.

IV. TABLE OF RECOMMENDATIONS FOR FUTURE RESEARCH

Participants provided a number of recommendations for future research. These are listed in the following table:

Suggested Research Topics
BIOLOGY/BASIC SCIENCE
1) Look at the underlying health problems among minorities e.g. anemia, hypertension, etc. and their relationship to birth outcome and intervention strategies. Related question: evaluate HPA and catecholamine response in terms of hypertension.
2) Research the role of cytokine polymorphisms in PTB and LBW.
3) Collaborative project with basic scientists and social scientists to understand what risk factors for poor pregnancy outcomes are mutable.
4) Measure markers especially in serial measurements and ascertain critical time periods in which to measure.
5) Target interventions to specific biochemical markers or problems.
6) Study markers in the fetus, mother, cord, placenta. Develop familial patterns or patterns of acquired risk to understand a more defined risk.
7) Research different mechanisms that trigger PTB, among them PROM. The antioxidant model may be useful. It suggests that local infections may be present and not generate huge responses elsewhere but may cause changes not cured by antibiotics because they set in motion a cascade of events.
8) Study the relationship of CRH to the pro-inflammatory response to bacterial challenge and its relationship to a poor outcome.
9) Study the causes of stillbirth by gestational age to see if there is a disparity or if spontaneous abortion is a thermometer of the degree to which ovarian exposures are toxic.
10) Look at risk factors and biological pathways in the same study with an interdisciplinary approach.
STRESS
1) Need evidence of the impact of stress on the neuroendocrine system, HPA axis, immune system, etc. and its subsequent relationship to poor pregnancy outcomes.
2) Does every stressor deliver some biological response?
3) Need ways to measure acute and chronic stress; measure stressors and stress response.
4) Look at interactions among stressors and combinations of stressors and study the differences between groups.
5) Need to further identify stressors related to weathering. Quantify weathering and its link to pregnancy outcome. Link births to a specific mother to establish weathering impact. Tie stressors and stress responses to preterm risk factors such as preeclampsia, CRH, cytokines, etc. and to PTB.
6) Study prenatal stress and the social-structural context within which stress is experienced by women.
7) Study the metabolic syndrome and allostatic load in response to internalized racism.
8) Look at normal risk factors and link them to biological markers for stress; also evaluate the markers in the placenta.
ENVIRONMENT
1) Research the issue of impact of intrauterine exposure vs. genetic exposure.

2) Research antecedent environmental exposures and later outcomes.
3) Look at toxins in the environment and their role in the PTB process.
4) Do ongoing assessments of women prior to pregnancy to see what environmental and individual stressors are present and measure them.
GENETICS
1) Study gene/environment interactions. Look for genetic components of hardiness in smaller groups to understand the differences within groups.
2) Mothers infected with HIV respond differently in different populations. Look at old genes and find mutants in chromosomes. With a particular chromosomal change there may be a great increase in PTB. Race may be an indicator of very old genes and susceptibility. If a genetic issue can be identified that may be causally related to PTB that may explain 80% of the cases. It could be exposure to a toxin or other behavioral issues.
RESEARCH TECHNIQUES/MEASURES
1) The following methods were mentioned as potentially useful tools in this area: PRIM (form of data mining; patient rule induction method); proteomics and several types of models including random intercept model, fixed and random effects model, hierarchical models.
2) Combine measures to capture what is going on with a social phenomenon such as violence.
3) Social scientists and statisticians need to collaborate to develop better models.
4) Instruments used should be culturally appropriate and measure what is of value to that population. Need to develop valid, reliable instruments to measure lifestyle and other exposures of interest. The measures need to be tested for validity.
PSYCHOLOGY
1) Study relationship between chronic psychosocial stress and pregnancy.
2) Clarify whether or not there are critical periods of exposure to psychosocial factors.
HEALTH BEHAVIORS
1) Study the role of micronutrients and how vitamins may help prevent membrane rupture.
2) Study fasting and its impact on CRH levels.
3) Study nutrition and its impact on pregnancy outcomes.
4) In attempting to measure income or SES, measure family wealth also.
5) Do epidemiological studies on race/ethnic group health behaviors and outcomes.
HEALTH CARE DELIVERY SYSTEMS
1) Study what is valued in health care messages. Study health care delivery systems that are effective.
EPIDEMIOLOGY
1) Need to find interventions to eliminate societal factors that are potential triggers of the identified pathways to adverse pregnancy outcomes.
2) Test for common experiences among majority and minority populations.

V. ATTACHMENTS

1. Agenda
2. Participant list

Workgroup on
Optimizing Pregnancy Outcomes in Minority Populations
National Institute of Nursing Research
National Institutes of Health
Four Points Sheraton Bethesda
March 3-4, 2003

Agenda

March 3, 2003

8:15 - 9:00 am Light Refreshments and Registration

9:00 - 9:15 am Welcome
Dr. Patricia Grady
Director, NINR

9:15 - 9:30 am Overview & Purpose of the Workshop
Drs. Yvonne Bryan & Thelma Patrick

Challenges in Research on Disparities in Pregnancy Outcomes
Coordinator: Dr. Thelma Patrick

9:30 - 10:00 am Overview of Current State of Research on Pregnancy Outcomes in
Minority Populations
Susan Gennaro, DSN, RN, FAAN
University Of Pennsylvania

10:00 - 10:25 am Response & Discussion
Claudia Holzman, DVM, MPH, PhD
Michigan State University

10:25 - 11:05 am Psychosocial and Biological Influences on Pregnancy Outcomes: An
Integrated Conceptual Framework
Jennifer Culhane, MPH, PhD
Thomas Jefferson University

11:05 - 11:30 am Response & Discussion
Patrick Catalano, MD
Case Western University

- 11:30 - 11:45 am BREAK
- 11:45 - 12:15 pm Stress and Neuroendocrine Mechanisms in Prematurity and LBW
Janet Rich-Edwards, MD
Harvard Medical School
- 12:15 - 12:40 pm Response & Discussion
Roberta Ruiz, PhD, RN
University of Texas, San Antonio
- 12:40 - 1:40 pm LUNCH
- 1:40 - 2:10 pm Behavioral Influences and Maternal Health During Pregnancy
Carol Hogue, MPH, PhD
Emory University
- 2:10 - 2:35 pm Response & Discussion
Seonae Yeo, PhD, RN
University of Michigan
- 2:35 - 3:05 pm Environmental Exposure and Biological Mechanisms Affecting Pregnancy
Outcomes
Ellen Silbergeld, PhD
Johns Hopkins Bloomberg School of Public Health
- 3:05 - 3:30 pm Response & Discussion
Richard K. Miller, PhD
University of Rochester

Challenges in Research Design and Measurement

Coordinator: Dr. Dorothy Brooten

- 3:30 - 4:00 pm Defining Risk and Risk Factors
Roberta Ness, MD, MPH
University of Pittsburgh
- 4:00 - 4:25 pm Response & Discussion
Anna Maria Siega-Riz, PhD, RD
University of North Carolina at
Chapel Hill
- 4:25 - 4:40 pm BREAK

4:40 - 5:10 pm Identification of Physiological Pathways and Biochemical Markers
Robert Goldenberg, MD
University of Alabama at Birmingham

5:10 - 5:35 pm Response & Discussion
James Roberts, MD
Magee Women's Institute

March 4, 2003

Challenges in Research Design and Measurement Cont'd.

Coordinator: Dr. Dorothy Brooten

8:15 - 9:00 am	Light Refreshments
9:00 - 9:30 am	Measurement of Psychosocial Constructs Patricia O'Campo, PhD Johns Hopkins Bloomberg School of Public Health
9:30 - 9:45 am	Discussion
9:45 - 10:15 am	Designing Multidisciplinary Biobehavioral Research on Prematurity and LBW: Methodological Considerations Brian Finch, PhD The RAND Graduate School
10:15 - 10:30 am	Discussion
10:45 - 11:00 am	BREAK
11:00 - 12:00 pm	Future Directions for Research (30- minute Panel Discussion) Discussion - All
12:00 - 12:30 pm	Wrap-up & Adjourn

Workgroup

Optimizing Pregnancy Outcomes in Minority Populations

National Institute of Nursing research

National Institutes of Health

March 3-4, 2003

Objectives:

The overall objectives of this workshop are to: (1) examine the state of the science on disparities in pregnancy outcomes in minority populations with respect to achievements and challenges; and (2) foster multidisciplinary collaborative research that identifies and expands our understanding of psychosocial and environmental factors that affect or interact with biological mechanisms to influence pregnancy outcomes.

Goals:

Specific goals include: 1) identify key gaps and future directions for research; and 2) solicit input on novel study designs and strategies to increase collaborative multidisciplinary biobehavioral research that can elucidate mechanisms underlying disparities in pregnancy outcomes as well as interventions to reduce such disparities.

Background:

Premature delivery and/or low birth weight, consequences of which can be profound, continue to be major public health concerns. It is well known that much of the health disparity of preterm and low birth weight is associated with racial and ethnic groups living under the burden of sub-optimal social, economic and health conditions (for example, low birth weight and very low birth weight percent of live births are 13.1 and 3.1 percent, respectively, for Blacks or African American, compared to 6.5 and 1.1 percent, respectively, for Whites)(Healthy People 2010, 2000). Yet, to date, the interaction between these factors and biological mechanisms remains poorly understood. What is known, however, is that the problem of low birth weight in minority populations is highly complex, and no single approach to disentangling the multiple contributing factors is likely to succeed. Therefore, a collaborative multidisciplinary biobehavioral approach seems warranted. As such, the workshop is a first step in bringing together scientists from different fields - nursing, psychology, epidemiology, clinical and basic sciences - to discuss and potentially build upon recent advances.

Format: Solicited paper presentations on agenda topics; Responses and Discussion



**OPTIMIZING PREGNANCY OUTCOMES IN MINORITY POPULATIONS:
COLLABORATIVE, MULTI-DISCIPLINARY BIOBEHAVIORAL RESEARCH
MARCH 3-4, 2003**

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