Working Together to Improve Birth Outcomes in North Carolina

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Objectives

- Describe the problem of infant mortality and its impact.
- Discuss an emerging approach to thinking about the prevention of infant death and illness.
- Share ideas about what we might do together to address this issue.
Every day, two babies die in North Carolina

- A society's infant mortality rate is considered an important indicator of its health, because infant mortality is associated with socioeconomic status, access to health care, and the health status of women of childbearing age. (Congressional Budget Office, 1992)
41st in the world – really?!

- Twenty years ago, the US was doing better than countries such as Cuba, Poland and Estonia in keeping newborn babies alive. As other nations improved this key indicator of women's and infants' health, the U.S. lagged, dropping to 41st worldwide.

- The highest newborn death rate in the world is in Afghanistan, where one of every 19 babies dies. In the US, one of every 233 newborns dies. In Japan (1:909), France (1:455), Lithuania (1:385) or Cuba (1:345).
North Carolina ranks in the bottom 10 in the US for infant mortality.
Deaths due to perinatal related conditions and birth defects are a major cause of death for children ages 1 to 9 years.
Improvements in infant mortality have stalled.

Infant Mortality Rate
U.S. 1990-2007
• Racial and ethnic disparities persist.

Infant Mortality Rates by Race/Ethnicity

- Hispanic: 5.5
- White: 5.7
- Black: 13.4
- Native American: 8.8
- Asian: 4.6
- Total: 6.8
Infant Mortality Rate
North Carolina, 1988-2010

Af. Am.
White
Data Review

- In 1988, NC’s overall IM rate was 12.5 per 1000 live births; the 2nd highest in the country.

- The downward trend in the NC infant mortality rates has slowed since the mid-1990s, then fluctuated between 8.1 and 8.8 between 2000 and 2008. NC’s IM rate was at an all time low in 2010 (7.0 per 1000 live births); 44% reduction since 1988.

- The largest decrease in 2010 was among non-Hispanic African American (19.6% reduction); NH White IMR declined 3.6%.

- Racial disparities in IMR remain, with African American NH continuing to have an IMR more than two times (2.3) higher than White NH.
The percentage of infants delivered very low birthweight (less than 1500 grams) remained about the same in 2010 (1.7% compared to 1.8% in 2009).

However, NH African American women experience markedly higher rates of low and very low birthweight births (14.1%) than did NH White (7.8%) and Hispanics (6.3%).

In 2010, more than one in ten (12.6%) of all resident births were premature (less than 37 weeks gestation). Almost 1:7 African American babies are born early.
Leading Causes of Infant Mortality

- Low Birth Weight
- Prematurity
- Birth Defects
- Perinatal Conditions Related to Maternal Health
- Sudden Infant Death Syndrome (SIDS) & sleep related injuries
Costs

- Newborn Intensive Care – top expense in Medicaid budgets around the country
- Post-discharge medical care
- Expenses for family – lost work hours (job), equipment, medical bills, stress, etc.
- Longer term issues around delayed development, learning disabilities, cerebral palsy, vision, RSV, additional surgeries, etc.
- Emerging evidence about adult chronic conditions
- Impacts education and the economy
Synthesis of Biomedical Models

- **Early programming**
  - Exposures in early life could influence future reproductive potential

- **Cumulative pathways**
  - Chronic accommodations to stress results in wear and tear contributing to declining health over time.
Barker Hypothesis
Birth Weight and Insulin Resistance Syndrome

Odds ratio adjusted for BMI

Prenatal Programming of Childhood Overweight & Obesity

Jennifer S. Huang · Tiffany A. Lee · Michael C. Lu

Abstract. Objective: To review the scientific evidence for prenatal programming of childhood overweight and obesity, and discuss its implications for MCH research, practice, and policy.

Methods: A systematic review of observational studies examining the relationship between prenatal exposures and childhood overweight and obesity was conducted using MCOE guidelines. The review included literature posted on PubMed and WDC-NHSD and published between January 1975 and December 2005. Prenatal exposures to maternal diabetes, malnutrition, and cigarette smoking were examined, and primary study outcomes was childhood overweight or obesity as measured by body mass index (BMI) for children ages 5 to 21.

Results: Poorer maternal health status at the time of gestation and exposure to maternal diabetes and obesity was associated with increased odds of childhood obesity (OR 1.8, 95% CI 1.5–2.4). All eight included studies of prenatal exposure to maternal smoking showed significantly increased odds of childhood overweight and obesity, with most odds ratios changing around 1.5 to 2.0. The biological mechanisms mediating these relationships are unknown but may be partially related to programming of insulin, leptin, and ghrelin receptors in utero.

Conclusion: Our review supports prenatal programming of childhood overweight and obesity. MCH research, practice, and policy need to consider the prenatal period a window of opportunity for obesity prevention.

Keywords: Prenatal programming · Childhood obesity · Overweight · Developmental programming · Prenatal programming · Gestational diabetes · Maternal malnutrition · Cigarette smoking

Childhood overweight and obesity is a growing problem in the United States and worldwide. The prevalence of childhood overweight in the United States tripped between 1980 and 2000 [1]. Today approximately 1 in 6 (16%) U.S. children are overweight with significant racial/ethnic disparities. For example, nearly 1 in 4 (23%) non-Hispanic black girls ages 6 to 19 are overweight, a prevalence almost twice that of non-Hispanic white girls [1].

Overweight and obesity has significant lifelong consequences on the health and well-being of children [2, 3]. Childhood obesity is associated with early-onset Type II diabetes mellitus, hypertension, metabolic syndrome, and sleep apnea. It is also associated with cognitive or intellectual impairment and social exclusion and stigmatization as parts of a vicious cycle including school avoidance [3]. Childhood obesity tracks strongly into adulthood [4, 5]. Obesity beyond
Stressed vs. Stressed Out

- **Stressed**
  - Increased cardiac output
  - Increased available glucose
  - Enhanced immune functions
  - Growth of neurons in hippocampus & prefrontal cortex

- **Stressed Out**
  - Hypertension & cardiovascular diseases
  - Glucose intolerance & insulin resistance
  - Infection & inflammation
  - Atrophy & death of neurons in hippocampus & prefrontal cortex
Allostasis: Maintain Stability through Change

Allostastic Load:
Wear and Tear from Chronic Stress

Stress starts early

- Bus doesn’t come; late to school
- Mold found in house
- Not enough textbooks this year
- No fresh food nearby
- Poor air quality – gets asthma
- Discrimination
- YMCA summer program full – nothing to do
- Drug dealers live next door

Stress
Rethinking Preterm Birth

- Vulnerability to preterm delivery may be traced to not only exposure to stress & infection during pregnancy, but host response to stress & infection (e.g. stress reactivity & inflammatory dysregulation) patterned over the life course (early programming & cumulative allostatic load)
The Life Course Approach
Life Course Perspective

- Approach suggests a complex interplay of biological, behavioral, psychological and social protective factors contributes to health outcomes across the span of a person’s life.

- Factors impact racial, ethnic groups differently and may explain disparities despite equal access to care during pregnancy.

- Life course models BROADENS the focus of MCH to include both health & social equity.
Life Course Perspective

Life Course Perspective

- Rather than focusing on risks, behaviors & services during pregnancy, CUMULATIVE effects of health, life events are examined.

- Health & socioeconomic status of one generation directly affects the health status --- and REPRODUCTIVE HEALTH CAPITAL – of the next one.
The groundwork for health equity requires the contributions of many sectors.

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<thead>
<tr>
<th>ECONOMICS</th>
<th>EDUCATION</th>
<th>PHYSICAL ENVIRONMENT</th>
<th>COMMUNITY</th>
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<tbody>
<tr>
<td>Neighborhood poverty = lower early school readiness and poorer long-term academic attainment.</td>
<td>Knowledge of the alphabet at the end of kindergarten = higher SAT scores.</td>
<td>Experience in the wilderness = higher grades</td>
<td>More social support = better health</td>
</tr>
<tr>
<td>Family savings of as little as $3,000 = higher odds of high school graduation.</td>
<td>Mothers’ college education = a child twice as likely to recognize letters in kindergarten (vs. Mother’s HS graduation)</td>
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<td>Neighborhood education = higher life expectancy</td>
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<td>A 1% increase in wealth = a 5% boost to a young man’s chance of escaping a low-wage job.</td>
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<td>Being born healthy weight = healthy physical, social, and intellectual development.</td>
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<tr>
<td>Low birth weight = heightened risks for problems in school as early as kindergarten.</td>
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High school grads: 90%
Unemployment: 4%
Poverty: 7%
Home ownership: 64%
Non-White: 49%
Life Expectancy by Tract

High school grads: 81%
Unemployment: 6%
Poverty: 10%
Home ownership: 52%
Non-White: 59%

High school grads: 65%
Unemployment: 12%
Poverty: 25%
Home ownership: 38%
Non-White: 89%
Oakland: Mortality and High School Graduation

[Image of a map showing mortality and high school graduation rates with color-coded areas indicating different rates.]

What Can We Do?
Improve Health Services

- Provide interconception care to women with prior adverse pregnancy outcomes
- Increase access to preconception care for all women, especially African American women
- Improve the quality of prenatal care
- Expand healthcare access over the lifetime

Strengthening Families and Communities

- Strengthen father involvement
- Enhance service coordination and systems integration
- Create reproductive social capital particularly in low income and African American communities
- Invest in community building and urban renewal

Lu MC, Kotelchuck M, Hogan V, Jones L, Jones C, Halfon N et al
Address Social and Racial Inequities

- Close the education gap
- Reduce poverty
- Support working mothers and families
- Undo racism

Lu MC, Kotelchuck M, Hogan V, Jones L, Jones C, Halfon N. et al.
Next Steps

YOU CAN AND DO IMPACT THE HEALTH OF GENERATIONS OF NORTH CAROLINIANS
Ideas

- Promote / Incentivize Employers to support
  - Lactation Rooms and Breaks
  - Tobacco Free Campus
  - Good maternity/paternity leave benefits
  - Preventive benefits offered through health care
  - Fatherhood Initiatives
  - Finance consulting services
  - Stress relief workshops / healthy food on site
  - Reaching out to support healthy communities
The Women’s Initiative

- Partner with women to foster entrepreneurship and support new business.
- Grameen Bank and Microlending are changing health status for women in other countries.
- Since 1988, Women's Initiative has been assisting high-potential low-income women who dream of business ownership. Through an intensive 20 session program — in English or Spanish — women are enabled to start, or expand their business.
- http://www.womensinitiative.org/index.htm
Ideas

- Macroeconomic policies
  - Community Reinvestment Act
  - Housing development
  - New Markets Tax Credit
  - Community Change Initiatives
- Employment for young adults that gives them goals for the future
- Microfinance
- Business incubator & job training
- Financial literacy & asset development for families
- High-function safety net programs
What do you think??
Birth Equity Council

- 25+ member leadership team representing a variety of sectors including Commerce. 60+ member Council
- Purpose: develop an actionable strategic plan to address disparities in birth outcomes...then fund and implement
- Council in process of deciding on focus and framework for this work. Strong interest in addressing underlying social determinants of health
- Will launch over 15 stakeholder forums across NC as part of this process
- Timeline for completion and funding – Fall 2013
Play the Game!

- Life Course Game developed by CityMatCH and Contra Costa Health Services
- Interactive way to understand key concepts of Life Course framework.
- Life Course Toolbox www.citymatch.org
The Every Woman Southeast Initiative is a group of leaders and agencies from eight states working together to build a multi-state, multi-layered partnership to improve the health of women and infants in the south.
All this will not be finished in the first 100 days. Nor will it be finished in the first 1,000 days, nor in the life of this Administration, nor even perhaps in our lifetime on this planet. But let us begin.
Questions?

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