

Title: Individual and County-Level Factors Associated with Compromised Birth Outcomes: Florida, 1980-2000.

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## INTRODUCTION

Infant mortality has decreased dramatically over the course of the 20<sup>th</sup> century. In the United States, the infant mortality rate declined by 95-99% during this period (Hoekelman and Pless 1988) such that fewer than 10 infants per thousand died during their first year of life by 2000. The state of infant health in the United States remains an important topic of research because the improvements that have occurred over this period have not benefitted all groups equally. Recent findings have suggested that the persistent racial disparity in infant mortality is due in large part to shifts in cause-specific infant mortality, towards prematurity causes and maternal/obstetric conditions. This provides rationale for investigating birthweight and gestational age as birth outcomes, since several points remain unclear.

It is not well known how the dramatic improvements in therapeutic remedies such as surfactant therapy for Respiratory Distress Syndrome have influenced the relationships between maternal socio-demographic factors and birth outcomes, nor how these associations have changed during the period 1980-2000. Additionally, it is unclear how county level factors have influenced the overall risk of compromised birth outcomes and the extent to which these effects have changed over time.

We explore these relationships by conceptualizing birth outcomes in terms of neurological and physiological maturity. This approach differs substantially from cause-specific infant mortality investigations, which include a relatively small proportion of births (those that end in subsequent infant death). Examinations into maturity as a birth outcome are useful because they rely only on birth data, and therefore have fewer issues with statistical computing.

Using data on the 1980 and 2000 birth cohorts in Florida, we address the following questions:

1. What are the racial differences in birth outcomes in Florida in 1980? Do these racial differences persist in 2000?
2. What are the individual-level socio-demographic characteristics associated with racial differentials in birth outcomes in 1980? How do these relationships change in 2000?
3. What are the county level variables associated with racial differences in birth outcomes in 1980? How do these relationships change in 2000?
4. What are the net effects of individual characteristics and county level variables, and what are the changes in these relationships from 1980-2000?

## BACKGROUND

The growing importance of prematurity related conditions and obstetric and maternal conditions as vital for the survival of infants resonates with other demographic research on infant health outcomes, such as that by Frisbie et al (1996), who suggested that the pregnancy and birth process was too complex to be summed up in a measure of gestational age or birth weight. For example, there are issues and concerns surrounding a mother's recall of last menses, making estimates of gestational age based maternal reporting of that date unreliable. Frisbie et al suggest that birth weight is only a single component of an infant's "maturity" (1996). They assert that infants who are 2400 grams and 30 weeks gestation face substantially different odds of survival than infants who are 2400 grams and 32 weeks gestation. Frisbie and colleagues (1996) conclude that accounting for both birth weight and gestational age are equally important when considering the maturity of an infant and their chances of survival. Their result was the Fetal Growth Ratio, which considers an infant's birth weight against age and sex appropriate mean birth weights to determine their physical and neurological development at birth (or "maturity").

This approach attempts to differentiate between the various types of outcomes that can occur with a pregnancy. By considering fetal growth (birthweight) relative to age, Frisbie and colleagues brought attention to the complex relationship between birth weight, gestational age and maternal health. As such, they revealed that certain age and birthweight combinations have different risks of infant death. One such finding was the increased risk for “heavy preemies”, infants whose birth weights were at the heavier end of the birthweight continuum, but whose younger gestational age indicated less physiological and neurological development. While Frisbie et al documented substantial racial differences at all levels of fetal growth, these relationships have yet to be investigated over time, or with multi-level models or data.

## DATA/METHODS

We utilize data from the 1980 and 2000 Florida birth cohorts. There were just over 90,000 births in 1980 to women residing in Florida. This increased in 2000 to about 190,000 births. In both years, African-American births comprised about 25% of all births. We also categorized maturity/birth outcomes by weight and gestational age, as suggested by Frisbie et al (1997). Specifically, 4 outcomes were considered: (1) intrauterine growth restricted, which includes any birthweight, any gestational age and a FGR of  $<0.85$ ; (2) premature birth, where birth weight is less than 2500 grams, gestational age is less than 37 weeks and FGR is greater than 0.85; (3) heavy preemie births where infants weigh more than 2500 grams, gestational age less than 37 weeks and FGR greater than 0.85; (4) normal birth, any weight, gestational age greater than 37 weeks and FGR greater than 0.85.

We employ a series of multinomial logistic regression models to assess not only the individual risk of poor birth outcomes, but also racial differences in the distribution of poor infant health in 1980 and 2000. We expect to find different relationships among predictors and indicators of maturity, and also that relationships will vary in magnitude at the two points in time. Multinomial logistic regression will allow tests of these expectations. Multilevel models will be used to specify risk estimates that include the potential effects of maternal county of residence on racial differences in birth outcomes.

Finally, we employ Stata and GLLAMM models to assess the individual and county level influences on birth outcomes.