Title: Racial Differences in Infant Mortality by Cause: Florida, 1980-2000

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INTRODUCTION:

The relationship between socioeconomic status and health has been established by many (House and Williams 2000, etc.) and has been suggested to apply to infants as well as adults (Newland 1981). Low maternal education has been shown to increase risk of infant death (Cramer 1987) as well as other poor pregnancy outcomes such as low birth weight and short gestation (Conley and Bennet 2001).

The relationship between socioeconomic status and health is complicated by race. This is illustrated in the racial disparity in infant mortality, where black infants have twice the risk of death as their white peers, a pattern that persisted throughout the twentieth century (Singh and Yu 1995, Hummer 1993, Collins and Tomasson 1998). The relationship between race and infant health is sustained even when socioeconomic status is taken into account; poorly educated black women have worse infant health outcomes than whites of the same level of education, leading investigators to look beyond SES in understanding racial disparities (Marmot 2003).

Despite overall declines in infant mortality in Florida, the racial disparity between whites and blacks has persisted, even with increased access to health care, improved educational distributions, and greater economic opportunities for both groups. We investigate the extent to which the stagnating relative racial differential in infant mortality

can be attributed to differential improvements in socioeconomic distributions, and then we seek to understand other, non-economic factors that may be important.

This question is investigated by medical cause of death for Florida born infants in 1980 and 2000 using two analytical strategies, indirect standardization by cause of death based on traditional tabulations, and micro-level multinomial logit regression analysis of linked birth-infant death files at the two points in time. The former approach provides a straightforward way to estimate the extent of cause-specific infant mortality differentials by race, after adjusting for maternal education and, thus, a simple way to estimate the proportion of the cause-specific racial differential that is associated with SES and SES change. The second approach enables the inclusion of a substantial set of controls for an extensive set of non-economic factors and the explicit modeling of changing SES-mortality relationships over time, including interactions by race and cause of death.

One important innovation in the present study is the examining these differentials specific to medical cause of death. Demographers have studied infant mortality by cause of death in the past (e.g., Sappenfield et al 1987, Rogers and Poston 1985, Eberstein and Parker 1984, Bouvier and van der Tak 1976, Shyrock and Siegel 1976), but these cause-of-death classifications are limited in terms of their usefulness in distinguishing the origin of lethal medical conditions. That is, the convention of distinguishing between endogenous and exogenous mortality requires an essentially arbitrary decision about what causes of death are due to internal conditions of the infant (traditionally considered to be "endogenous" causes) or to external conditions to which the infant was subject (traditionally considered "exogenous" causes). The diffusion of advanced medical technologies has created a situation where the line between endogenous and exogenous is

less theoretically useful. For example, a maternal infection, such as chorioamnionitis, might cause a mother to deliver an infant prematurely at 25 weeks gestation. The infant, whose internal organs are likely underdeveloped, develops necrotizing enterocolitis and dies. The infection (necrotizing enterocolitis), which would traditionally be considered an exogenous cause of death (Sowards 1997), was caused by complications arising from underdevelopment (prematurity) of the infant, which is generally considered an endogenous cause. Additionally, the conditions that led to the infection within the infant were rooted in the health characteristics of the mother.

In this research, cause of infant death is operationalized using a modification of the model proposed by Dollfus et al (1990), where cause of death is categorized into 8 different categories. Our modification to this model is the addition of a residual group of causes which have unknown etiology. Another strength of the Dollfus classification is that it was explicitly developed with an eye toward prevention.

Data for the project will be linked birth-infant death certificates for 1980 and 2000. These files were constructed by matching birth records in 1980 and 2000 with infant deaths in 1980-81 and 2000-2001, respectively. These data were chosen because they allow for the examination of the characteristics surrounding infant death and those regarding the infant's mother and her characteristics (such as education, race and age).

Progress to Date: Data for the project are in hand and the analysis is partly completed. The indirect standardizations have been finished (Bishop, 2006) and the linked birth-death files are up and running. Findings so far suggest a stronger relationship between SES and infant mortality for most but not all causes of death in 2000 than in 1980 (Table

1). We seek to explore this in greater depth using the micro linked birth- death files for these two periods.

Table 1: Percentage contribution of socioeconomic status to the Black-White differences in infant mortality by cause of death, 1980 and 2000.

	1980	Upper/lower C.I. (99%)	2000	Upper/lower C.I. (99%)
Prematurity related conditions	13.91***	0.002988607/-0.000395739	14.09***	0.005813101/-.004125737
Congenital anomalies	55.76***	0.001305753/-0.001305753	20.97***	0.00533245/-0.004672028
SIDS	11.05***	0.001280426/-0.00054389	34.36***	0.005070761/-0.004977014
Obstetric conditions	14.2***	0.000648889/-0.000464469	12.26***	0.005209950/-0.004829722
Birth asphyxia	11.28***	0.000692102/-0.000394556	49.52***	0.005043576/-0.005018364
Perinatal infections	10.58***	0.000582705/-0.000503793	12.87***	0.005242443/-0.004797227
Other infections	17.51***	0.000897221/-0.000410941	13.98***	0.005149268/-0.004902114
External causes	9.54***	0.000606461/-0.000365463	17.32***	0.005136740/-0.004912300
Undetermined causation	8.92***	0.001106255/-0.000409373	20.87***	0.005234781/-.004797255

*** indicates p-values <.0001

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