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Maternal Age and Infant Mortality for White, Black, and Mexican Mothers in the United States

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Abstract: This paper assesses the pattern of infant mortality by maternal age for white, black, and Mexican mothers using the 2013 Period Linked Birth/Infant Death Public Use File from the Centers for Disease Control. The results are consistent with the "weathering" hypothesis, which suggests that white women benefit from delayed childbearing while for black women early childbearing is adaptive because of deteriorating health status through the childbearing years. For white women, the risk (adjusted for covariates) of infant death is U-shaped—lowest in the early thirties—while for black women the risk increases linearly with age. Mexican-origin women show a J-shape, with highest risk at the oldest ages. The results underscore the need for understanding the relationship between maternal age and infant mortality in the context of unequal health experiences across race/ethnic groups in the US.

Keywords: infant mortality; health disparities; weathering; maternal health; race/ethnic inequality

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An extensive literature addresses the relationship between maternal age and infant mortality for children by race and ethnicity in the United States (Frisbie et al. 2010). For the population overall, there is a U-shaped pattern of maternal age effects on infant mortality, with the highest risks experienced by the youngest and oldest birth mothers (Mathews, MacDorman and Thoma 2015) This pattern is long-standing (Friede et al. 1987; Friede et al. 1988). However, analysis through the year 2002 shows that the U-shaped pattern is much less pronounced for black women than it is for white women (Powers 2013). This is consistent with evidence on low birth-weight, which shows that for white mothers, the lowest rate of low birth-weight is in the late twenties, but for black women the lowest risk is under age 20 and it rises monotonically with age (Love, Rankin and Collins 2010).

The "weathering" hypothesis established by Arline Geronimus suggests that white women benefit from delaying childbearing while for black women early childbearing is adaptive because of deteriorating health status through the childbearing years (Geronimus 1996; Goisis and Sigle-Rushton 2014). This is supported by evidence of relative health deterioration for black versus white women on, for example, measures of allostatic load (Geronimu 2006). Subsequent research suggests that the weathering pattern may be seen among women of Mexican origin as well, as they have higher infant mortality rates than whites at advanced maternal ages in older data (Powers 2012).

The recent analysis by Powers (2013) uses the data through 2002, showing the black-white gap in infant mortality narrowing from the 1980s through 2002, but at a stagnating pace (that analysis does not model infant mortality using health-related covariates; see below). In the last decade, the black-white gap has narrowed further

(Mathews, MacDorman and Thoma 2015). Teen birth rates have been falling since the mid-1990s, and fell especially sharply in the half-decade to 2013, as did births to women in their early 20s, part of a general trend of rising age at first birth (Martin et al. 2015). This trend has been hailed by advocates of delayed parenting (e.g., Sawhill 2014) and those who recommend delaying births as a poverty-reduction strategy (AEI/Brookings 2015), but the impact of delay on health disparities remains unknown.

The purpose of this analysis is to assess the basic pattern of infant mortality by maternal age for white, black, and Mexican-origin (hereafter, Mexican) mothers. This is the first analysis to do so using the 2013 Period Linked Birth/Infant Death Public Use File from the Centers for Disease Control's (CDC) National Center for Health Statistics. The results show the continuing relevance of the weathering hypothesis, and underscore the need for understandings of the relationship between maternal age and infant mortality that recognize the unique health contexts experienced by different race/ethnic groups in the US.

Data and Methods

The 2013 Period Linked Birth/Infant Death Public Use File combines information from birth and death certificates (Mathews, MacDorman and Thoma 2015), linking at least 98% of all infant death certificates to birth certificates in every state in the US. In addition to maternal age, the key predictors for this analysis are race and ethnicity. I include births to mothers who are non-Hispanic white, non-Hispanic black, and Mexican origin. Rather than include all Hispanic mothers, which masks important heterogeneity in health outcomes across Hispanic subgroups (Henry-Sanchez and Geronimus 2013), I use the largest subgroup alone.

Some key predictors of infant mortality are included in the dataset, including birth parity, smoking during pregnancy, and education level, all of which are associated with an elevated risk of infant mortality (Hummer et al. 1999), along with plurality (Misra and Ananth 2001). The dataset does not include such proximate determinants of birth complications as high body mass index or obesity for birth mothers (Aune et al. 2014; Johansson 2014), maternal alcohol use (O'Leary 2013), the nativity of birth mothers (Collins, Rankin and Hedstrom 2012), or their geographic location.

The analysis uses logistic regression to produce multivariate risk odds ratios for each predictor, modeled separately for white, black, and Mexican origin mothers. I include all births to mothers with recorded values on the variables in the analysis (including Unknown, where recorded). The final sample sizes are: non-Hispanic white, 1,925,847; non-Hispanic black, 533,341; and Mexican origin, 501,390.

The key independent variable is maternal age, coded into six categories: 12-17, 18-24, 25-29, 30-34, 35-39, and 40+. Covariates in the multivariate analysis include plurality (single birth versus twin or higher plurality), birth order (first through fifth or more), maternal education (high school or less, some college, BA or more), timing of prenatal care (began in first trimester, second trimester, third trimester, or not at all), payment source (Medicaid, private insurance, self-pay, or other), and cigarette smoking during pregnancy (no smoking versus smoking).

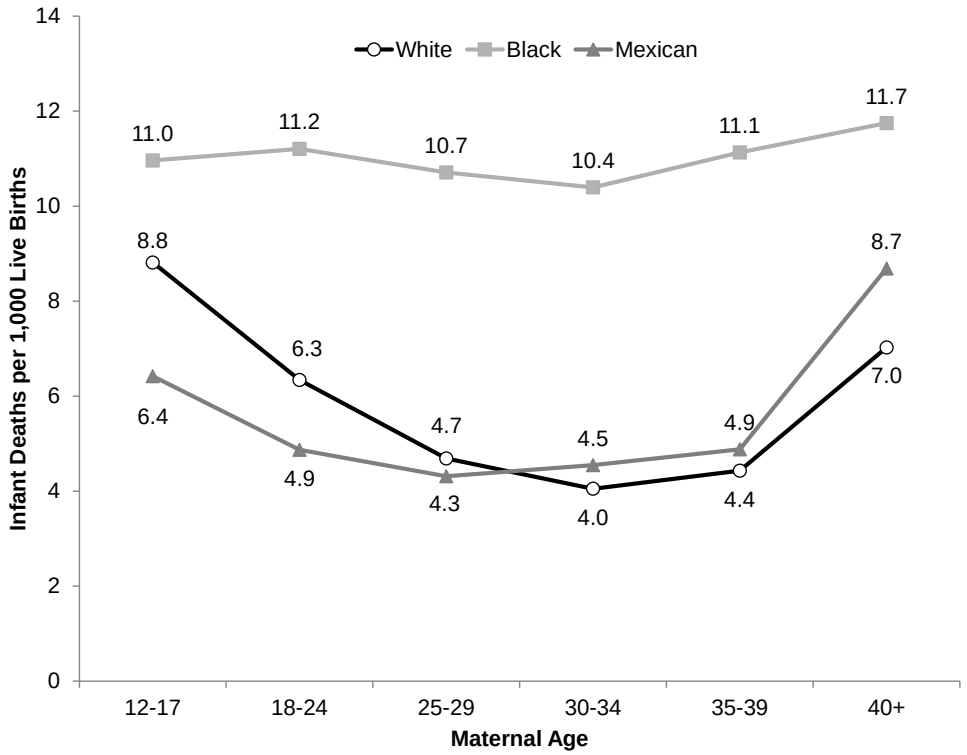

Figure 1: Infant Death Rates, by Maternal Age: White, Black, and Mexican Mothers, US, 2013. From the 2013 Period Linked Birth/Infant Death Public Use File, Centers for Disease Control.

Note: Infant death rates per 1,000 live births for non-Hispanic white (N = 1,925,847), non-Hispanic black (N = 533,341), and Mexican origin (N = 501,390) mothers.

The data are publicly available from the Centers for Disease Control at http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm. I used Stata 14 for the analysis; my code is available at http://philipncohen.com/working/SocSci2016.

Results

The unadjusted infant death rates for white, black, and Mexican mothers are presented in Figure. black women have the highest infant mortality rates, and show only a slight trend for maternal age. In contrast, white and Mexican women show pronounced U-shaped patterns, with the lowest infant mortality rates for mothers in the 30-34 age range and the highest infant mortality rates at the lowest (under 18) and highest (40+) ages.

The multivariate results are detailed in the supplement, Tables 1-3, which also include the distributions of all covariates for each group. The main results are plotted in Figure 2, which presents predicted probabilities of infant mortality by maternal age, estimated at the mean of the covariates for each race/ethnic group. The results confirm the U-shaped pattern of maternal age and infant mortality for white mothers, whose lowest adjusted risk is in the ages 25-39, with higher risks at

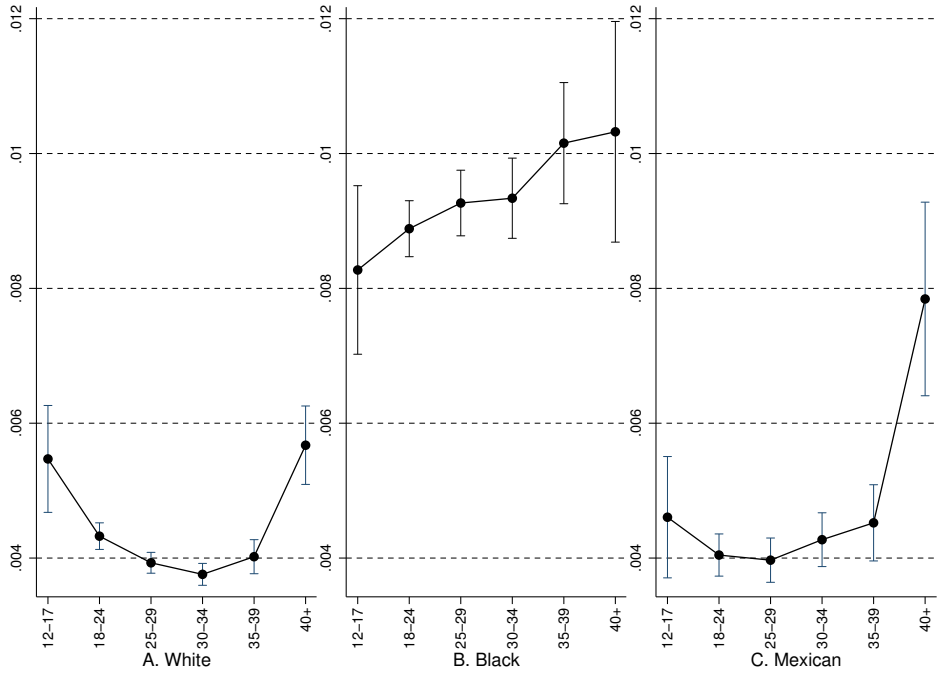

Figure 2: Adjusted Probability of Infant Death, by Maternal Age: White, Black, and Mexican Mothers, US, 2013. From the 2013 Period Linked Birth/Infant Death Public Use File, Centers for Disease Control.

Note: Predicted probabilities of infant death for white (A), black (B), and Mexican (C) mothers; models estimated separately (see Supplement Table 1). Predictions estimated at the mean of values for plurality, birth order, maternal education, prenatal care, payment source, and cigarette smoking during pregnancy for each race/ethnic group. Error bars are 95% confidence intervals.

younger and older ages. For black mothers there is a linear trend of increasing risk from younger to older ages (a separate model, not shown, with a linear term for age confirms this trend is significant at conventional levels); black mothers face a monotonically increasing adjusted risk of infant mortality as they age from younger than 18 to 40 and above. For Mexican mothers the trend takes a J-shape, as mothers age 40+ have increased risks of infant mortality.

Discussion

Unlike white women, black women show little maternal age trend in the unadjusted rate of infant mortality. However, with controls for plurality and birth order, education, medical care and payment source; and smoking, an upward linear trend in risk emerges. To the extent the adjustments capture socioeconomic and health behavior variables, this pattern presumably reflects deteriorating health conditions for black birth mothers as they age. For black women, then, delaying births per se is not associated with lower rates of infant mortality for black women. Instead, older age is associated with increasing risk of infant mortality. The risks for Mexican women at younger ages are greatly reduced when the covariates are introduced in the multivariate model. For both black and Mexican mothers, higher risks of

infant mortality at young ages are apparently accounted for by these controls. This is consistent with some prior research on adverse birth outcomes (Dennis, Mollborn and Young 2013; Lhila and Long 2012).

Delayed childbearing is culturally expected—and medically reasonable—for whites, but earlier childbearing may be adaptive for black women due to deteriorating health conditions through the childbearing years. As Geronimus notes, this makes black women who become young mothers the targets of social scorn in a cultural and media milieu dominated by whites (Geronimus 2003). This scrutiny is heightened by the push for "delayed, responsible childbearing," as a strategy for reducing poverty, in social policy circles (Rubin 2015). The results of this analysis are consistent with Geronimus's interpretation. The effects of maternal age on infant mortality for white women differ substantially from those of black and Mexican women. Imposing a dominant cultural standard across all groups is not consistent with the diversity—and inequality—of underlying health patterns in the population.

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