Reviewer's report

Title: Racial disparities in infant mortality: What has birth weight got to do with it and how large is it?

Version: 1 Date: 10 April 2010

Reviewer: Brian Whitcomb

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Summary of manuscript
The authors consider the pediatric paradox and maternal race, and describe application of covariate density defined mixture of logistic regressions, a method they have developed and previously applied to assessment of the pediatric paradox and gestational age, maternal age, and maternal race (African American versus European American) in other published works. The authors fit these mixture models to data from a national birth dataset from the NCHS to assess direct and indirect effects of birth weight for ‘normal’ and ‘compromised’ births and observe indirect effects of birth weight, though only among ‘compromised’ births. The authors conclude that: while correct for ‘normal’ births, the hypothesis that birth weight is not a cause of infant mortality may not be true for compromised births; differential fetal loss may be responsible for the pediatric paradox, and; elimination of racial disparities requires consideration of race as well as birth weight.

Comments
The development of the method and use of the mixture models to fit the data provides another statistical approach to describe the birth weight paradox. Because the method has had limited use otherwise, additional explanation aimed at clarifying the method for general readership would be helpful. Given the authors’ previous published work applying the CDDmlr method to a large births dataset assessing racial disparities, additional discussion to clarify new developments and insights in the current manuscript would be of benefit.

Similarly, it would be helpful to better place the paper in context with other work aimed at resolving the paradox, including that cited by the authors. Other models have been proposed based on confounding and/or collider-stratification that fit existing data well and are consistent with birth weight having no direct effect on mortality. Additional discussion of the underlying biology and causal relations, as well as a comparison with the recently proposed alternative explanations for the paradox, would help clarify the implications of these findings for the readership.

Level of interest: An article of limited interest

Quality of written English: Acceptable
Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests