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**Mixed Logistic Regressions with Covariate Density Defined Components:  
Applications to Birth Outcomes**

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**Abstract**

The statistical properties of covariate density defined, (CDD) mixtures of logistic regressions as a method of controlling for heterogeneity in infant mortality are explored. Unlike finite mixtures of logistic regressions, the CDD approach is usually identified and is probably generalizable to most regression like procedures. CDD mixtures use the marginal density of a covariate (birth weight in this case) to assign probabilistic (latent) group membership to separate

logistic probabilities. The procedure appears to be unbiased, and consistent. A procedure for estimating power is presented. The method identifies significant heterogeneity, which influences birth weight specific infant mortality, and is consistent across populations. This heterogeneity is the proximate cause of the “pediatric paradox”, i.e. the finding that low birth weight African American infants have lower infant mortality than European American infants. All of the “paradox” occurs in one subpopulation. Applications with additional covariates could identify the ultimate causes of this heterogeneity.

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