Assessing Effects of Exposures to DDE and PCBs on Premature Delivery via Ordinal Logistic Regression

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Abstract

Appendix A. Appendix

A.1. Box-Cox analysis for lipid adjustment.

Part of the issue with the exposures of interest in our study (DDE and PCB) is that the substances are lipophilic. This may require to adjust their measurement by the total serum lipid concentration in the blood, so to have an estimate for the excess exposure that comes from the environment. The work by LI LONGNECKER DUNSON suggests a possible correction based on a Box- Cox analysis. In particular, let s_i be the measure for the total lipids serum concentration, and x_i the exposure. The adjusted exposure can be computed by setting

$$x_i^* = x_i / g(s_i) \tag{1}$$

where g is a function to be estimated. A way to do this is by letting g being equal to the Box-Cox correction, that is

$$g(s_i, \lambda) = \begin{cases} \frac{s_i^\lambda - 1}{\lambda} & \lambda \neq 0 \\ \log(s_i) & \lambda = 0 \end{cases} \tag{2}$$