Herbstman et al. (2010) reported an association between polybrominated diphenyl ether (PBDE) levels in cord blood and neurodevelopmental effects in the children at specific ages. As a basis for their work, the authors cited several animal studies that reported causal relationships between prenatal exposure to PBDEs and developmental neurotoxicity. We are concerned that Herbstman et al.’s research suffers from investigator bias based on the reasons that follow.

First, the U.S. Environmental Protection Agency (EPA) cosponsored an expert panel that reviewed the experimental design employed in most of the studies cited by Herbstman et al. (2010) as a basis for their work. The U.S. EPA expert panel concluded that the experimental design failed to control for litter effects (Holson et al. 2008).

Next, the potential for specific brominated flame retardants to cause developmental neurotoxicity has been evaluated under Good Laboratory Practice (GLP) standards and according to validated test guidelines. In each case, the claims of developmental neurotoxicity from non-GLP, non-guideline studies were not reproducible (reviewed by Williams and DeSesso 2010). This is significant because in Europe, data generated from studies performed under GLP and according to validated test guidelines are considered the highest quality and most reliable (European Chemicals Agency 2008). Further, regulatory agencies in Europe and the United States seem to have shifted their stance on the non-GLP, non-guideline studies that have reported brominated flame retardant–induced developmental neurotoxicity. For example, when the European Union issued their Risk Assessment Report on hexabromocyclododecane (HBCD), a brominated flame retardant (European Chemicals Bureau 2008), they stated that…

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Herbstman et al. (2010) measured eight polybrominated diphenyl ethers (PBDEs) in cord blood and reported that children of mothers with higher cord blood concentrations of PBDEs 47, 99, and 100 scored lower on mental and physical development tests at 12, 24, 36, and 72 months of age. Here, we raise several issues that limit the conclusions that may be drawn from their study.

In the study by Herbstman et al. (2010), only 210 cord blood specimens from 329 mothers were available, and assessments were conducted for only 96–118 children at each age. Several congeners were measured in the study; overall, the percentage of individual congeners below the limit of detection (LOD) ranged from 18.6% to 96.1%. For congeners on which major assessments were conducted, the range of values < LOD was 18.6–50.2%. Herbstman et al. (2010) did not state how many samples were < LOD for each assessment, so it is possible that the percentage was even higher and may have led to a large impact on the results, particularly given the small sample size for each assessment.

Herbstman et al. (2010) measured PBDEs in cord blood and maternal blood only once, but individual levels most likely changed over the course of the pregnancy and over the period when developmental assessments were conducted. The median values were relatively low, and there was no reliable indication of interindividual variability, so even small changes in individual variability would have a large impact on the results.