



Statement for Julie Herbstman

June 11, 2014

I, Julie Herbstman, am writing this statement in support of the Petition to the CPSC to regulate four categories of household products containing non-polymeric additive organohalogen flame retardants.

1. I am an environmental epidemiologist, currently holding the position of Assistant Professor in the Department of Environmental Health Sciences at the Columbia University Mailman School of Public Health. I completed a master's of science (ScM) and a doctoral degree (PhD) in environmental epidemiology from the Johns Hopkins Bloomberg School of Public Health. I completed a postdoctoral fellowship in environmental health at the Columbia Mailman School of Public Health before joining the faculty. At Columbia, I am affiliated with the Columbia Center for Children's Environmental Health, the Columbia Center for Environmental Health in Northern Manhattan, and the Cancer Epidemiology Program at the Herbert Irving Comprehensive Cancer Center at the Columbia University Medical Center.

2. Since 2002, I have been studying the impact of prenatal exposure to polybrominated diphenyl ethers (PBDE) on children's thyroid hormone levels and neurodevelopment, first at Hopkins and now at Columbia. In my research, I have collected umbilical cord blood and have worked with the Centers for Disease Control and Prevention (CDC) to measure PBDE components (congeners) associated with the penta-brominated diphenyl ether (penta-BDE) mixture. I have found that all the neonates in my research studies in Baltimore and in New York had detectable levels of at least one penta-BDE congener in their cord blood [1,2]. We found evidence suggesting that prenatal exposure to penta-BDE congeners may impact perinatal thyroid hormone levels [3]. We also found that children who were exposed prenatally to higher concentrations of penta-BDE congeners (relative to children in the study with lower exposure) scored significantly lower on cognitive tests, including such tests as full-scale, verbal, and performance intelligence quotient (IQ) at ages 4 and 7 [1].

3. Based on this evidence along with evidence provided by other researchers in the field, I conclude that generally, infants in the US are born with detectable concentrations of penta-BDE in their circulating blood. This occurs because the mothers are exposed to penta-BDE either before or during pregnancy, and these chemicals are then transferred to the neonates while *in utero*. Additional research has shown that children's exposure to penta-BDE continues through the ingestion of penta-BDE-containing breast milk [4] and household dust [5]. Research shows that it is likely that penta-BDE in dust is the result of penta-BDE added to consumer products like furniture, toys, and electronics, which subsequently migrates into the household environment. I can conclude from this that other organohalogen flame retardants found in additive form in household consumer products also have the potential to migrate, leading to human exposure, especially in children.

4. Based on my research and the research of other investigators in the field, there is ample evidence indicating that prenatal exposure to penta-BDEs is associated with lower scores on indices of both cognition (e.g., IQ) and behavior throughout childhood. Since PBDEs have been phased out of use in new consumer products, new

compounds have been used instead. Some of these compounds are also organohalogen flame retardants, meaning they are in the same chemical family as PBDEs and other flame retardants that have been banned or phased out (e.g., brominated tris).

5. I have carefully reviewed the statement from Dr. Terry Collins about the toxicity mechanisms of organohalogen flame retardants, and the hazard screen performed by Dr. David Eastmond's group on 85 non-polymeric organohalogen flame retardants. Based on the information in these statements and my research and experience as an environmental epidemiologist, my professional opinion is that there is reason to be concerned that the entire class of organohalogen flame retardants may cause injury or illness to humans, particularly to fetuses and young children. Therefore, I support regulations designed to prevent human exposure to these chemicals from consumer products.

Sincerely,

Julie Herbstman, Ph.D.

References

1. Herbstman JB, Sjodin A, Kurzon M, Lederman SA, Jones RS, et al. (2010) Prenatal exposure to PBDEs and neurodevelopment. *Environ Health Perspect* 118: 712-719.
2. Herbstman JB, Sjodin A, Apelberg BJ, Witter FR, Patterson DG, et al. (2007) Determinants of prenatal exposure to polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) in an urban population. *Environ Health Perspect* 115: 1794-1800.
3. Herbstman JB, Sjodin A, Apelberg BJ, Witter FR, Halden RU, et al. (2008) Birth delivery mode modifies the associations between prenatal polychlorinated biphenyl (PCB) and polybrominated diphenyl ether (PBDE) and neonatal thyroid hormone levels. *Environ Health Perspect* 116: 1376-1382.
4. Zhang JG, Sun XW, Ai H. (2012) Levels and congener profiles of polybrominated diphenyl ethers (PBDEs) in primipara breast milk from Shenzhen and exposure risk for breast-fed infants. *J Environ Monit* 14(3): 893-900.
5. Stapleton HM, Eagle S, Sjödin A, Webster TF. (2012) Serum PBDEs in a North Carolina toddler cohort: associations with handwipes, house dust, and socioeconomic variables. *Environ Health Perspect* 120(7): 1049-1054.