

Updated Summary of Recent Research on Chemicals on the Chemical Avoidance List Recommended by the EO4 Advisory Council

October 2010

In May of 2010, the President's Cancer Panel reported that "the true burden of environmentally induced cancers has been grossly underestimated" and strongly urged action to reduce people's widespread exposure to carcinogens. The panel advised President Obama "to use the power of your office to remove the carcinogens and other toxins from our food, water, and air that needlessly increase health care costs, cripple our nation's productivity, and devastate American lives."

The panel wrote, "The prevailing regulatory approach in the United States is reactionary rather than precautionary. That is, instead of taking preventive action when uncertainty exists about the potential harm a chemical or other environmental contaminant may cause, a hazard must be incontrovertibly demonstrated before action to ameliorate it is initiated. Moreover, instead of requiring industry or other proponents of specific chemicals, devices, or activities to prove their safety, the public bears the burden of proving that a given environmental exposure is harmful."

We present this additional updated information in support of the Interagency Committee approving the EO4 recommendation on avoiding identified chemicals, known as the Chemical Avoidance List recommendation that was approved by the overwhelming majority of the Advisory Council.

Bisphenol-A

Bisphenol-A, or "BPA" is a common component of plastics, including those used to contain food. Discovered in the 1890s, BPA is a type of estrogen that has become ubiquitous in the environment because of its widespread use.

- In February, 2010, a study published in the Journal of the Federation of American Societies for Experimental Biology suggested that exposure to BPA during pregnancy leads to epigenetic changes that may cause permanent reproduction problems for female offspring.

"Exposure to BPA may be harmful during pregnancy; this exposure may permanently affect the fetus," said Hugh S. Taylor, Ph.D., co-author of the study from Yale University School of Medicine in New Haven, Connecticut. "We need to better identify the effects of environmental contaminants on not just crude measures such as birth defects, but also their effect in causing more subtle developmental errors."

- In March, the U. S. Environmental Protection Agency declared BPA to be a "chemical of concern."

- In the spring of 2010, the University of Missouri Division of Biological Sciences laboratory investigated the BPA content on cash register receipts. The scientists found that the total mass of BPA on a receipt is 250 to 1,000 times greater than the amount of BPA typically found in a can of food or a can of baby formula, or that which leaches from a BPA-based plastic baby bottle into its contents. In July, 2010, Swiss researchers report that BPA transfers readily from paper receipts to skin and can penetrate the skin to such a depth that it cannot be washed off. This raises the possibility that the chemical infiltrates the skin's lower layers to enter the bloodstream directly. BPA has also been shown to penetrate skin in laboratory studies.

- In August, the Centers For Disease Control's National Center for Environmental Health issued its "Fourth National Report of Human Exposure to Environmental Chemicals." The report included, for the first time, data on BPA. The authors wrote:

"Bisphenol A (BPA), a component of epoxy resins and polycarbonates, may have potential reproductive toxicity. General population exposure to BPA may occur through ingestion of foods in contact with BPA-containing materials. CDC scientists found bisphenol A in more than 90% of the urine samples representative of the U.S. population."

- Also that month, in one of the first human studies of its kind, researchers found that urinary concentrations of BPA may be related to decreased sperm quality and sperm concentration.

The study, published online in the journal *Reproductive Toxicology*, suggested that more research should focus on BPA and health effects in adults. The primary author was John Meeker, assistant professor of Environmental Health Sciences at the University of Michigan School of Public Health.

- Another study published in August in the journal *Biology of Reproduction* found that exposure of pregnant female mice to BPA may produce adverse reproductive consequences on gene expression in fetal ovaries as early as 12 hours after the mother has first been exposed to the chemical.

The mice in this study were given BPA at doses thought to be equivalent to levels currently being experienced by humans. The research, conducted in the laboratory of Dr. Patricia A. Hunt at Washington State University (WSU) in Pullman, showed that BPA exposure affects the

earliest stages of egg production in the ovaries of the developing mouse fetuses, thus suggesting that the next generation (the grandchildren of the females given BPA) may suffer genetic defects in such biological processes as mitosis and DNA replication.

- In September, researchers posited that exposure to BPA is actually much greater than previously thought, and its authors urged the federal government to act quickly to regulate the chemical that is in baby bottles, food-storage containers and many household products. The peer-reviewed study, published Sept. 20 in the online NIH journal *Environmental Health Perspectives*, also says BPA exposure is likely coming from many sources--including some still unknown.

Worldwide regulatory action on BPA:

- Denmark has banned BPA in materials that come into contact with food and beverages
- France has banned baby bottles containing BPA
- Canada will add BPA to its toxic substances list under the Canadian Environmental Protection Act by the end of this year.

The following states and municipalities have banned the sale of baby bottles containing BPA:

Maryland
Connecticut
Minnesota
Washington
Vermont
Wisconsin
New York (effective December 2010)

Perfluorooctanoic acid (PFOA)

PFOA is a persistent organic chemical used in industrial and consumer goods including nonstick cookware and stain- and water-resistant coatings for carpets and fabrics.

- In January, 2010, a study by the University of Exeter and the Peninsula Medical School for the first time links thyroid disease with human exposure to perfluorooctanoic acid (PFOA). Published in the journal *Environmental Health Perspectives*, the study revealed that people with higher concentrations of PFOA in their blood have higher rates of thyroid disease. The researchers analyzed samples from the US Centers for Disease Control and Prevention's nationally representative National Health and Nutrition Examination Survey (NHANES).

- In August, the CDC's National Center for Environmental Health also addressed PFOA in its "Fourth National Report of Human Exposure to Environmental Chemicals." The authors wrote:

"Another example of widespread human exposure included several of the perfluorinated chemicals. One of these chemicals, perfluorooctanoic acid (PFOA), was a byproduct of the synthesis of other perfluorinated chemicals and was a synthesis aid in the manufacture of a commonly used polymer, polytetrafluoroethylene, which is used to create heat-resistant non-stick coatings in cookware. Most participants had measurable levels of this environmental contaminant.

- In September, a new study from researchers at the West Virginia University School of Medicine suggested that chemicals used to create non-stick coatings on cookware could be causing an increase in the cholesterol levels of children.

For the study, researchers tested the levels of PFOA and perfluorooctanesulfonate (PFOS) in 12,000 Ohio and West Virginia children. These chemicals are the same as those for non-stick coatings. The results showed that the kids with highest PFOA and PFOS levels also had the highest cholesterol levels.

Polybrominated diphenyl ethers (PBDE)

Polybrominated diphenyl ethers are fire retardants used in certain manufactured products.

- In June, a new study suggested that flame-retardant chemicals (PBDEs) might be making it more difficult for women to get pregnant. Researchers studied PBDE blood levels in 223 pregnant women and asked how long it took them to conceive. The team found that those with high levels were up to 50 percent less likely to get pregnant in a given month than women with lower levels. According to the study, nearly all Americans (97 percent) have PBDEs at detectable levels in their blood.

- The CDC's *Fourth National Report on Human Exposure to Environmental Chemicals*, issued in August, looked for levels of PBDE in the population for the first time. They confirmed earlier reports, writing:

[PBDEs] accumulate in the environment and in human fat tissue. One type of polybrominated diphenyl ether, BDE-47, was found in the serum of nearly all of the [study] participants.

- In September, a study led by researchers at the University of California, Berkeley found that pregnant women with higher blood levels of PBDE had

altered thyroid hormone levels, a result that could have implications for fetal health.

"This is the first study with a sufficient sample size to evaluate the association between PBDE flame retardants and thyroid function in pregnant women," said the study's lead author, Jonathan Chevrier, a UC Berkeley researcher in epidemiology and in environmental health sciences. "Normal maternal thyroid hormone levels are essential for normal fetal growth and brain development, so our findings could have significant public health implications. These results suggest that a closer examination between PBDEs and these outcomes is needed."

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