



## Health Effects of Bisphenol-A

### Summary of Key Issues

October 2011



#### Background:

Bisphenol-A, commonly known as BPA, is a chemical that has been used for more than 40 years in the manufacture of many hard plastic food containers such as baby bottles and drinking water bottles. Bisphenol-A-containing resins are also commonly used to line metal cans for foods and beverages, including canned liquid infant formula. The chemical is used because it allows manufacture of plastics that are strong, lightweight, and long-lasting. Bisphenol-A-containing resins help to increase the shelf life of canned products and prevent steel food and drink cans from rusting. Bisphenol-A is one of the top 50 production-volume chemicals in the United States.

#### Review of Existing Research:

At the request of the Chair's Office, the Health Department conducted a review of current research examining the health effects of Bisphenol-A. Based on this review, the Health Department identified the following concerns about Bisphenol-A and its impacts on human health:

- Bisphenol-A is a hormone-disrupting chemical with wide human exposure.
- There is a substantial body of scientific research raising concerns about the potential for Bisphenol-A to cause serious harmful health effects in infants, children and adults.
- Infants and young children are more vulnerable to the health effects of Bisphenol-A both in terms of developmental sensitivity and greater likelihood of exposure.
- Low income communities experience highest levels of exposure to Bisphenol-A.
- Federal environmental and health agencies are currently conducting extensive studies on exposure to Bisphenol-A and its health impacts.
- There is a nationwide legislative effort supported by health and healthcare organizations to ban Bisphenol-A.

#### **Bisphenol-A is a hormone-disrupting chemical with wide exposure that causes health effects.**

In the Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report), Centers for Disease Control and Prevention (CDC) scientists measured Bisphenol-A in the urine of 2,517 participants aged six years and older. They found Bisphenol-A in the urine of nearly all of the people tested, which indicates widespread exposure to Bisphenol-A in the U.S. population.<sup>i</sup>

Bisphenol-A mimics natural estrogen in the body; it can alter normal sex hormone function.<sup>ii</sup> Studies in laboratory animals have shown an increased risk of breast and prostate cancer, early puberty, low sperm count, other reproductive problems, obesity, and changes in brain development.<sup>iii, iv</sup> Studies in humans have shown an association between increasing Bisphenol-A levels and heart disease, diabetes, liver function abnormalities, and thyroid function abnormalities.<sup>v, vi</sup>

#### **Babies and infants are more vulnerable to the health effects of Bisphenol-A both in terms of developmental sensitivity and greater likelihood of exposure.**

Fetuses, infants and children are constantly growing, developing and maturing. As a result, disruption of their hormonal systems can set the stage for abnormal development and for occurrence

of disease later in life. Peer-reviewed scientific articles based on more than 15 years of laboratory and animal research cite specific concerns about Bisphenol-A potentially causing a range of health problems in fetuses, infants and children. These include abnormalities in brain growth and development (e.g., hyperactivity and other behavioral changes), and development of breast and prostate cancer later in life.<sup>vii, viii, ix</sup>

Not only do infants and children have greater inherent vulnerability to the effects of the chemical, they are also more likely to be exposed to Bisphenol-A and carry it in their bodies. Research shows that Bisphenol-A levels in children less than two years old are estimated to be 11 times the level in adults.<sup>x</sup> In addition, there is evidence that the health impacts of Bisphenol-A may occur at very low levels of exposure.

### **Low income communities experience highest levels of exposure to Bisphenol-A.**

Bottle-fed babies are at higher risk of exposure to Bisphenol A. African American and low income mothers breastfeed in lower rates, known as the “milk gap.”<sup>xi</sup> Mothers who do not breastfeed or who use limited breastfeeding rely on baby bottles and formula to feed their children. Research recently found that the most important pathway for infants to be exposed to Bisphenol-A was through polycarbonate plastic bottles. Research also uncovered a relationship between household income and Bisphenol-A exposure, showing that people with the highest Bisphenol-A exposure were from the lowest income groups.<sup>xii, xiii</sup> Bisphenol-A levels are highest in non-Hispanic Black Americans and in women.<sup>xiv</sup>

### **Federal environmental and health agencies recognize the need for action and are currently conducting extensive studies on exposure to Bisphenol-A.**

The U.S. Food and Drug Administration (FDA) has expressed “some concern about the potential effects of Bisphenol-A on the brain, behavior and prostate gland of fetuses, infants and children.”<sup>xv</sup> The FDA has expressed support for industry’s actions to a) stop producing Bisphenol-A-containing baby bottles and infant feeding cups for the US market, b) help in the development of alternatives to Bisphenol-A for lining of infant formula cans, and c) support efforts to minimize or replace Bisphenol-A levels in other food can linings. The Centers for Disease Control has stated that “human health effects from Bisphenol-A at low environmental exposures are unknown. Bisphenol-A has been shown to affect the reproductive systems of laboratory animals. More research is needed to understand the human health effects of exposure to Bisphenol-A.”<sup>xvi</sup>

According to the Environmental Protection Agency (EPA), because Bisphenol-A is a reproductive, developmental, and systemic toxicant in animal studies and is weakly estrogenic, there are questions about its potential impact particularly on children’s health and the environment. The EPA is working closely with FDA, the Centers for Disease Control and Prevention and the National Institute of Environmental Health Sciences on research to better assess and evaluate the potential health consequences of Bisphenol-A exposures.<sup>xvii</sup>

### **There is a nationwide legislative effort supported by health and healthcare organizations to ban Bisphenol-A.**

Many jurisdictions and organizations nationwide and here in Oregon have raised concern about health impacts of Bisphenol-A. In 2010, 59 measures were proposed in 18 states nationwide, demonstrating the public’s interest in assuring that Bisphenol-A is banned in the manufacturing,

distribution and sale of certain products. Passed legislation includes: Connecticut HB 6572, Maryland House Bill 33, Minnesota Senate Bill 247, and New York Senate Bill 3296.<sup>xviii</sup>

Advocates supporting these measures include: American Medical Association, American Nursing Association, and the Breast Cancer Fund. For example, the American Medical Association adopted a policy in summer 2011 to formally recognize Bisphenol-A as an endocrine-disrupting agent and urge that Bisphenol-A-containing products with the potential for human exposure be clearly identified. While the policy also supports ongoing industry actions to stop producing Bisphenol-A-containing baby bottles and infant feeding cups, it supports a ban on the sale of such products.

Here at home, the Oregon Environmental Council identifies Bisphenol-A as among the twelve toxic chemicals of most concern to the health of Oregon's children. The criteria used by the Oregon Environmental Council to prioritize the toxic chemicals included an analysis of evidence of significant threats to human health and particular harm to children.<sup>xix</sup>

#### Recommendation:

The precautionary principle is a basic tenet of public health practice. The principle directs policy makers to make decisions contemplated to be protective of the public's health when there is evidence of potential harm even in the absence of complete scientific proof. The Health Department's review of current research examining the health effects of Bisphenol-A found evidence of potential harm. Given this, it is reasonable for the Multnomah County Board of Health to consider policy actions that remove the potential for ingestion of Bisphenol-A in certain products in order to support and protect the public's health. Under the precautionary principle, eliminating the sale of Bisphenol-A containing reusable beverage containers, including baby bottles and sippy cups, is a policy action that will reduce potential harm to Multnomah County residents, particularly infants and toddlers.

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#### **End Notes**

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<sup>ii</sup> H. Masuno, et al., "Bisphenol A in combination with insulin can accelerate the conversion of 3T3-L1 fibroblasts to adipocytes," Journal of Lipid Research 2002: 3:676-684; and K. Howdeshell, et al., "Plastic bisphenol A speeds growth and puberty," Nature 1999: 401:762-76

<sup>iii</sup> M. Sakaue, et al., "Bisphenol-A Affects Spermatogenesis in the Adult Rat Even at a Low Dose," Journal of Occupational Health 2001: 43:185-19

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