



# The Right Start

The Need To Eliminate Toxic Chemicals From Baby Products

MASSPIRG Education Fund

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## The Need to Eliminate Toxic Chemicals from Baby Products

October 2005

**MASSPIRG Education Fund**

# Acknowledgements

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The authors would like to thank those who provided technical and editorial support, guidance or review, including Dr. Kim Hooper of the California Environmental Protection Agency; Dr. Fred vom Saal of the University of Missouri-Columbia; Dr. Earl Gray of the U.S. Environmental Protection Agency; Dr. Pete Myers of Environmental Health Fund; Travis Madsen of the Frontier Group; Anna Aurilio of U. S. Public Interest Research Group; Teri Olle; and Andy Igrejas and Tom Natan of National Environmental Trust. The authors also would like to thank Dr. Theo Colborn for her thoughtful introduction to the report and Alison Cassady of MASSPIRG Education Fund for her leadership in researching and editing this report.

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# Executive Summary

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A child's first few years are an exciting time for parents who hope, if for nothing else, that their child starts his or her life happy and healthy.

Unfortunately, not all products marketed for children and babies are completely safe for their use. Many contain toxic chemicals that may have detrimental health impacts for children exposed during critical stages of development.

## Two Chemicals Linked to Health Problems

The media reports it, scientists have proven it, and American families are experiencing it: chronic diseases are on the rise in this country. Cancers, birth defects, childhood asthma, learning and behavior disorders, even obesity and early puberty are growing more prevalent in our society.

Scientists do not know why more children are developing these chronic problems. We do know, however, that this rise in chronic disease has occurred alongside a rise in the prevalence, use, and pervasiveness of toxic chemicals in the air we breathe, the water we drink, and the consumer products we use. Many of these chemicals are associated with chronic disease, and many others have never been tested for human health impacts. Moreover, there is often no "safe dose" of these chemicals for children. A growing body of evidence shows health effects at low doses, and chronic, multi-source exposure means that even a small amount of exposure from a variety of sources may add up to a major concern.

Even products designed for babies and young children may contain chemicals that pose a health concern. Unfortunately, because manufacturers are not required to label baby products as

containing toxic chemicals, parents have inadequate information to make wise purchasing decisions. To begin to close this gap, we purchased some popular baby products and analyzed them for two chemicals of concern:

- **Toxic flame retardants (or PBDEs)** are a set of chemicals used to slow the spread of fire in a wide set of consumer products. Levels of these chemicals found in the breast milk of American women and some fetuses are approaching levels shown to impair learning and cause behavior problems in lab mice.
- **Phthalates** are a family of chemicals used in many plastic children's products to improve flexibility and in personal care products to bind fragrance. Adults and children are exposed to phthalates through everyday contact with these products as well as through contact with indoor air and dust. These chemicals have been linked to premature birth, reproductive defects, and early onset puberty.

## Findings: Many Baby Products Contain Toxic Chemicals

We selected a sample of a variety of baby products from several manufacturers and tested them for toxic flame retardants or phthalates. We found:

- **Toxic Flame Retardants.** We tested seven infant sleep aids and other products for toxic flame retardants; three of those products tested positive for PBDEs in the foam material. The tests found multiple PBDEs in the foam material of the First Years' Air Flow Sleep Positioner, the

Leachco Sleep 'n Secure 3-in-1 Infant Sleep Positioner, and the PeeWees Disposable Crib Mattress Pads.

- **Phthalates.** We tested 18 bath books, teethingers, bath toys, and other products for phthalates; 15 of these products tested positive for phthalates.

These tests show that some baby products may in fact contain toxic chemicals. Unfortunately, since manufacturers do not have to label their products as containing phthalates or toxic flame retardants, parents have no way of knowing whether or not a product poses a hidden hazard.

### **Recommendations for Parents**

Parents have the right to know about chemicals in the products they purchase for their children. In the absence of good government regulations, but armed with the knowledge that some chemicals are a cause for concern, parents can take a few simple actions to limit their child's exposure to these and other toxic chemicals.

At the store, parents should select toys, baby dishware, and sleep aids made of materials that are less likely to contain toxic chemicals. At home, parents should avoid washing plastic dishware with harsh dishwashing soap and hot water, which may allow chemicals to leach out of the plastic. For a useful tip sheet, parents should visit [www.safefromtoxics.org](http://www.safefromtoxics.org).

### **Recommendations for Policy Makers**

Parents cannot deal with these issues alone. The U.S. government must ensure the safety of all products on the market for children.

- **Phase Out Dangerous Chemicals.**

Despite some remaining data gaps about the hazards of some chemicals, the U.S.

Environmental Protection Agency (EPA) must act based on the overwhelming weight of evidence showing that some chemicals might harm human health. The United States should phase out the use of hazardous chemicals – especially in children's products. Until the federal government acts, state governments should fill the regulatory gap and support policies to phase out these chemicals as well.

- **Reform U.S. Chemicals Policy.**

Currently, manufacturers can put chemicals on the market without proving they are safe. Manufacturers should be required to provide all hazard and health-impact information to EPA so the agency can begin to assess the thousands of chemicals currently on the market for which it has little or inadequate data. Next, manufacturers of chemicals should be required to conduct an alternatives analysis, in order to determine if they really are using the least hazardous chemical for each application. Finally, EPA must have the authority to ban or restrict the use of a chemical if it can harm human health.

- **Consumer Product Safety Commission Should Protect Consumers.**

The Consumer Product Safety Commission (CPSC) has an obligation to protect consumers from dangerous products. The CPSC should first label these products with the names of the chemicals they contain in order to allow parents to choose less toxic products. Second, the CPSC should take a precautionary approach and require manufacturers to remove chemicals that may pose a particular threat to fetuses, infants, and children, particularly when the chemical is not necessary for the product to function according to design.

# Introduction

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New parents wish for nothing but a healthy and safe start in the world for their new child, and they are ready to go to great lengths to ensure that happens. They shop for bedding, clothing, toys, shampoo, lotions, powder, bath accessories, feeding tools, pacifiers, and myriad other products to welcome their new baby. Parents spend hours and large amounts of money to ensure their child has the best of these products.

The sad reality is that many of these products may not be safe for our children. Toxic chemicals, many known to have adverse health effects and many others that have not been tested, are found in a variety of different products. Toxic flame retardants, such as polybrominated biphenyl ethers, and phthalates are two examples of compounds with known health consequences that are commonly found in products intended for use in the first few years of a child's life. Highly respected scientists have developed a vast body of scientific literature identifying a wide range of adverse health effects linked with exposure to these chemicals.

Parents have the right to know about the chemicals used in products intended for their children. But even the most educated parent with a scientific or medical background is going to have a hard time shielding his or her child from every harmful or potentially harmful chemical in products and in our environment. In a predicament such as this, the only answer is for our government to move forward to protect our children's health. Given the mounting scientific

evidence demonstrating the harmful effects of many chemicals on the market, elected officials and regulators should exercise precaution by requiring the removal of any unnecessary and potentially hazardous chemicals from children's products. Regulating toxic chemicals and requiring manufacturers to use safer chemicals wherever possible is a good first step.

Parents should do three things after they read this report. First, they should write their governors and state legislators and their senators and representatives in Congress to urge them to help protect children's health. Second, they should follow the recommendations in this report as guidance for their product-purchasing decisions in order to decrease their children's exposure to toxic chemicals. Finally, parents should encourage their friends and family to follow the recommendations, and thereby send a market-wide message to manufacturers that they must start using safer alternatives in their products.

Only by encouraging our elected officials to change the laws and exerting pressure on the manufacturers of toxic children's products to use safer alternatives will we be able to rest easy, knowing that we're putting our children on the right path to lead long and healthy lives.

**Theo Colborn, Ph.D.**

President, The Endocrine Disruption Exchange, Inc. (TEDX)

# Overview: Chemicals of Concern

While thousands of chemicals of concern are currently on the market, this report focuses on two of particular concern to children: toxic flame retardants and phthalates (Table 1). Children are exposed to these chemicals from a wide variety of sources, making it difficult to truly represent the

exposure scenario for each child. A growing body of evidence, however, has raised concerns about health effects from exposure at low doses and the health consequences of exposure to a variety of chemicals with similar properties and mechanisms of action.

**Table 1. Potential Health Effects of Exposure to Toxic Flame Retardants and Phthalates**

Chemical	Health Concerns	Routes of Exposure
<b>Toxic Flame Retardants (PBDEs)</b>	<ul style="list-style-type: none"> <li>• Impaired learning and memory</li> <li>• Delayed onset of puberty</li> <li>• Male and female reproductive defects</li> <li>• Cancer</li> <li>• Impaired immune system</li> </ul>	<ul style="list-style-type: none"> <li>• Common household products</li> <li>• Indoor and outdoor air</li> <li>• Water</li> <li>• Household dust</li> </ul>
<b>Phthalates</b>	<ul style="list-style-type: none"> <li>• Male reproductive defects</li> <li>• Premature birth</li> <li>• Cancer</li> <li>• Early onset puberty</li> </ul>	<ul style="list-style-type: none"> <li>• Plastic consumer products</li> <li>• Personal care products</li> <li>• Indoor air</li> <li>• Household dust</li> </ul>

## Toxic Flame Retardants

Polybrominated diphenyl ethers (PBDEs) are a class of brominated flame retardants. Widely used in foams, fabrics, and plastics to delay the spread of fire (Table 2), these chemicals can now be found practically everywhere scientists look.

There are three main types of commercially used PBDEs: Penta, Octa, and Deca. Starting in January 2005, manufacturers of Penta and Octa products agreed to cease manufacturing under a voluntary agreement with the U.S.

Environmental Protection Agency (EPA). U.S. EPA issued a rule to phase out importation of these chemicals; however, companies will be allowed to import products containing these chemicals.<sup>1</sup> The European Union banned Penta and Octa in August 2004, and many states, including California, Maine, Hawaii, Michigan, Washington, Oregon, Illinois, Maryland, and New York, have taken action against these two products.



**Table 2. Common Uses of Toxic Flame Retardants (PBDEs)**

Type of PBDE	Added to:	Found in (partial listing):
<b>Deca</b>	High-impact plastics and textiles	Casings for electronic equipment, small electrical parts, fabric backings and coatings, rubber cables, and paints.
<b>Octa</b>	Plastics	Casings for electronic equipment and small electronic parts in office equipment.
<b>Penta</b>	Polyurethane foam and other materials	Primarily used in polyurethane foam in furniture and mattresses. Also used in small quantity in carpet padding, packaging, fabric backings and coatings, imitation wood, paints, sound-insulating panels, and plastic electrical parts.

Although flame resistant products certainly save lives and help avoid injury from fire, PBDEs may lead to other severe health consequences.

**Toxic Flame Retardants Linked to Learning and Memory Effects**

When infant mice are exposed to PBDEs during a key window of their growth, they develop irreversible deficits in memory and learning. These effects worsen as the animals grow older.<sup>2</sup>

Scientists suggest that these neuro-developmental effects could be a result of disruption of the thyroid hormone system. The thyroid hormone system is instrumental in normal brain development. Exposure to certain chemicals at an early age can disrupt thyroid levels, leading to serious problems.<sup>3</sup> In fetuses and infants, abnormal thyroid hormone levels as early as week eight in the womb through the second year of life can disrupt normal brain development and impair the intelligence and behavior of children.<sup>4</sup>

PBDE exposure produces lowered thyroid hormone levels and physical changes in the thyroid gland in lab experiments.<sup>5</sup> Depressed thyroid hormone levels have been shown to occur

in mice when exposed to Penta at a single low dose.<sup>6</sup> These effects on thyroid hormone levels appear to be additive with the effects of related environmental contaminants known as polychlorinated biphenyls (PCBs) and dioxins.<sup>7</sup> This means that various chemicals could be working together in the body to produce greater effects.

PBDEs also may affect nerve impulse transmission and disrupt communication systems inside cells, which could prevent the cell from functioning properly.<sup>8</sup>

**Toxic Flame Retardants May Cause Reproductive System Damage**

Studies presented for the first time in 2003 point to yet another potential health consequence of PBDE exposure: irreparable damage to developing reproductive systems. These studies show that PBDE exposure can delay onset of puberty in both males and females and impair development of reproductive organs in laboratory animals.<sup>9</sup>

One study found that pregnant rats exposed to a single dose of Penta produced offspring with

structural changes in their ovaries.<sup>10</sup> Another study showed that adult male rats exposed to a single low dose of Penta while in the womb had significantly decreased sperm counts.<sup>11</sup>

### **Possible Links Exist Between Toxic Flame Retardants and Cancer**

Deca is the only PBDE product that has been directly tested for carcinogenicity, in studies conducted more than 15 years ago. The U.S. National Toxicology Program found that high levels of Deca exposure created tumors in the liver, thyroid, and pancreas in laboratory animals.<sup>12</sup>

Penta and Octa have not been tested for carcinogenicity, but based on their similarities to PCBs, there is reason to suspect they could cause cancer. Scientists debate whether the structures are similar enough to draw this conclusion. One study suggests a positive association between the risk of Non-Hodgkin's lymphoma and tissue levels of Tetra BDE, another type of PBDE, in humans.<sup>13</sup>

### **Exposure May Cause Immune System Impairment**

Conflicting studies present an unclear picture of the potential effects of PBDEs on immune systems. Suppression of the immune system can lead to increased susceptibility to infectious disease for years after exposure. Limited studies to date suggest that the Penta BDE product may impair the immune response in exposed rodents.<sup>14</sup> Contamination of commercial Penta with brominated dioxins and furans could explain this result,<sup>15</sup> as dioxins and furans have been linked to immune system impairment. Similar effects have been seen with PCBs. Other scientists, however, have not found immune system effects from Penta exposure.<sup>16</sup>

### **PBDEs Are Rapidly Accumulating in Our Bodies**

In the last few years, scientists have discovered that PBDEs are rapidly building up in our bodies. Recent studies in the United States have found the highest human contamination levels yet recorded. Contamination levels in the breast tissue of California women and in the breast milk of women throughout America are up to 75 times higher than those found in European countries.<sup>17</sup>

American women's breast milk and breast tissue contain some of the highest levels of PBDEs in the world. Levels found in some mothers and fetuses are rapidly approaching the levels shown to impair learning and behavior in laboratory experiments.<sup>18,19,20,21</sup>

In addition, Canadian studies have found PBDE levels in humans doubling every 2.5 years.<sup>22</sup> Therefore, some segments of the U.S. population may already carry body burdens of PBDEs that in laboratory testing cause developmental damage.

### **How Toxic Flame Retardants Get into Our Bodies**

Flame retardants are used in common products, such as couches and computers, which are found in the home or office and are often disposed of in landfills or incinerators. Flame retardants can escape from the products into the home and work environment or enter the food chain after disposal, ultimately ending up inside our bodies. Scientists need to conduct more research into exact routes of human exposure.

### **Toxic Flame Retardants Escape During Product Manufacturing**

Toxic flame retardants also are released during manufacturing. For example, a 1999 study found heavy contamination of the River Tees in the U.K., downstream from a Great Lakes Chemical Company factory that produced the flame retardants.<sup>23</sup>

The millions of pounds of PBDEs that end up in landfills also may be another avenue for human exposure. Plastic products containing commercial Octa and Deca BDE in landfills may release these chemicals through decomposition, especially when exposed to sunlight, which tends to break down plastics more quickly. A Norwegian study recently confirmed that PBDEs escape from discarded products and seep out of landfills into the environment.<sup>24</sup>

High levels of PBDEs have been found in water coming out of wastewater treatment plants. Studies by Dr. Robert Hale and Mark LaGuardia found PBDEs in 87% of the fish tested from a stream near one Virginia plant.<sup>25</sup>

### **Toxic Flame Retardants Contaminate Indoor and Outdoor Air**

Many types of PBDEs are found at low levels in both outdoor and indoor air. The air above Chicago contains PBDEs, including Deca, at levels 5-10 times higher than rural locations in the Great Lakes area.<sup>26</sup> Workers can be exposed to Deca and other PBDEs via inhalation of contaminated air in workplaces. PBDEs have been found in household air in rooms with electronics and in workplace air in electronics disassembly plants.<sup>27</sup>

### **Human Exposure Occurs through Inhalation or Ingestion of Household Dust**

Inhalation, ingestion, or skin contact with household dust may be a significant route of human exposure to some PBDEs in the home and workplace.<sup>28,29</sup>

U.S. EPA and the National Institutes of Standards and Technology (NIST) surveyed a sample of 17 homes in the Washington, DC, and Charleston, SC, areas and found high concentrations of PBDEs in household dust.<sup>30</sup> The researchers in this study found PBDEs in every single sample, with Deca found in the highest concentrations. They also showed that the PBDE concentrations found in the U.S. samples were nearly 10 times higher than levels found in the European Union.

In 2003, Greenpeace published a study that looked at a variety of chemicals in household dust in the U.K. and in other European countries. Researchers found Deca at levels significantly higher than those detected in a similar 2001 Greenpeace study of Parliament buildings. In household samples from Finland and Denmark, where Deca is being phased out, Greenpeace found Deca at levels between 10 and 100 times lower than those found in the U.K.<sup>31</sup>

A 2003 study of indoor air and household dust samples from 120 homes in Cape Cod found many different types of chemicals, including PBDEs, used in products such as plastics, detergents, furniture, carpets, electronic equipment, pesticides, and cosmetics.<sup>32</sup> A 2005 study of the dust in 70 homes in 10 different states found toxic flame retardants in every single sample.<sup>33</sup>

Deca also has been found in high levels in the film that builds up on the inside and outside surfaces of household windows, in both rural and urban homes. Levels were significantly higher in the urban locations and on the inside surfaces of the windows.<sup>34</sup>

## **U.S. Regulation of Toxic Flame Retardants: State Action and Voluntary Phase-Outs**

In 2003, Environment California successfully led the effort to ban two types of flame retardants in California, Penta and Octa. Since that time, several other states have followed suit, including California, Maine, Washington, New York, Illinois, Michigan, Maryland, Oregon, and Hawaii. Many of these states are considering a ban on a third type of toxic flame retardant, known as Deca.

Also in 2003, after the California ban, the U.S. EPA reached a voluntary agreement with the major toxic flame retardant manufacturers to cease production of Penta and Octa by the end of 2004. EPA then took the next step and finalized a rule prohibiting U.S. companies from manufacturing or importing the chemical without notifying EPA in advance. One loophole in this rule, however, will allow companies to import products manufactured in other countries that contain these chemicals. As a result, products on U.S. store shelves may still contain the chemical well into the future.

## Phthalates

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Phthalates are a family of chemicals, including diethyl phthalate (DEP), diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP), butyl benzyl phthalate (BBP), diisodecyl phthalate (DIDP), diisononyl phthalate (DINP), di-n-octyl phthalate (DNOP), and many other distinct types. The polyvinyl chloride (PVC) plastic industry uses large amounts of phthalates as additives to improve the flexibility of its products, including home siding, flooring, furniture, food packaging, toys, clothing, car interiors, and medical equipment, including IV bags. In addition, other manufacturers use phthalates in personal care products such as soap, shampoo, deodorant, hand lotion, nail polish, cosmetics, and perfume, as well as industrial products like solvents, lubricants, glue, paint, sealants, insecticides, detergent, and ink.<sup>35</sup> Five years ago, the Worldwatch Institute estimated global phthalate production at roughly 5.5 million tons per year.<sup>36</sup>

Scientists began studying the toxicity of several phthalates as early as the 1950s and discovered significant evidence of environmental and human contamination in the early 1970s, including the leaching of phthalates into human blood from PVC bags used in hospitals.<sup>37</sup> As noted by the Worldwatch Institute, NASA scientists warned against using PVC in the space program in 1971 because of poor physical properties and the presence of phthalates.<sup>38</sup> They noted that “substitute polymers . . . are available and in many cases they have far superior physical properties at a small sacrifice in immediate cost.”<sup>39</sup> Nonetheless, phthalates remain in wide use today.

### **Phthalate Exposure Linked to Reproductive Defects**

A recently published study by Dr. Shanna Swan and her colleagues reveals that normal exposure to phthalates can harm the genital development of unborn baby boys. In a study of fetuses exposed

to phthalates in the womb, the researchers found a strong relationship between phthalates and changes in the size and anatomy of the genitalia of male babies and toddlers. The findings were based on tests of 85 mothers and their sons, averaging nearly 13 months of age, born in three U.S. cities, including Los Angeles, Minneapolis, and Columbia, Missouri. Mothers with the highest levels of phthalates in their urine late in their pregnancies had babies with a shorter anogenital distance (the span between the anus and penis that forms into the scrotum in males), smaller penises, and more instances of incompletely descended testicles.

In the last three decades, the number of children born with hypospadias (a birth defect causing the opening of the urinary tract to develop on the underside of the penis) and cryptorchidism (a birth defect disrupting the descent of the testicles into the scrotum) has doubled.<sup>40</sup> Prior to Dr. Swan’s human study, animal studies had shown that phthalates could cause such reproductive defects in male rodents. The similarities between the male reproductive defects induced by phthalates in rodents and the features of male birth defects seen in humans are strong.<sup>41</sup>

In 2000, Dr. L. Earl Gray and his colleagues at EPA reported that three types of commonly used phthalates (DEHP, BBP, and DINP) disrupt sexual development in male rats.<sup>42</sup> When female rats were fed these phthalates during pregnancy, they gave birth to male pups that weighed less and showed symptoms of hypospadias, cleft phallus, reduced testes weight, and other reproductive malformations, including cryptorchidism. Apparently, DEHP reduces testosterone production in the developing testes, interfering with the signals that direct normal male reproductive development.<sup>43</sup> Pregnant rats fed DEHP after the second week of pregnancy produced male offspring with reduced

testosterone levels in the testes to the same level as in female rodents.

In 2004, Dr. Gray and others at the EPA followed up on this finding, showing that the phthalates DEHP, BBP, and DINP reduce the levels of insulin-like hormone #3. Reduced activity of this hormone is another known cause of undescended testicles in mice.<sup>44</sup>

Other research groups have implicated another common phthalate, dibutyl phthalate or DBP, as a direct cause of hypospadias and cryptorchidism in rodents. When female rats are fed DBP during the third week of pregnancy, 60% of their male offspring suffer cryptorchidism, hypospadias, infertility, and/or other testicular defects.<sup>45</sup>

### **Phthalates May Lower Sperm Count**

In 2003, Drs. Susan Duty and Russ Hauser of the Harvard School of Public Health published one of the first studies linking phthalate exposure with harm to human reproductive health.<sup>46</sup> They analyzed semen and urine samples from more than 150 men with no unusual exposure to phthalates in the Boston area. Men who had monobutyl or monobenzyl phthalate in their urine tended to have lower sperm counts, with the highest concentrations leading to the lowest sperm counts. These two chemicals are produced in the body from parent phthalates added to PVC plastics, food wrappings, nail polish, and a variety of other common items.

### **Phthalates Linked to Testicular Cancer**

The cause of testicular cancer is unknown. The only known risk factor is cryptorchidism,<sup>47</sup> which has been linked to phthalate exposure as described above. In addition, Dr. Carl-Göran Ohlson and Dr. Lennart Hardell of the Orebro Medical Centre in Sweden found that men exposed in the workplace to PVC plastics had a significantly increased risk for one type of testicular cancer.<sup>48</sup>

### **Phthalates Associated with Premature Delivery**

Rates of pre-term birth (defined as giving birth after 37 or fewer weeks of gestation) have been steadily rising at least over the last two decades.<sup>49</sup> A study published in November 2003 by a group of Italian scientists suggests a link between exposure to phthalates and pre-term birth. The scientists found phthalates and their breakdown products in the blood of newborn infants, with higher levels leading to a higher incidence of premature delivery.<sup>50</sup> They reported that babies exposed to common phthalates enter the world a week earlier on average than babies with less exposure. The scientists concluded that “human exposure to DEHP can begin *in utero*” and “phthalate exposure is significantly associated with a shorter pregnancy duration.”<sup>51</sup>

### **Phthalate Exposure May Lead to Early Onset Puberty**

One study of Puerto Rican girls suggests that phthalates may be playing a role in trends toward earlier sexual maturity.<sup>52</sup> Puerto Rican girls suffer from the highest rates of premature breast development ever recorded. Dr. Ivelisse Colon at the University of Puerto Rico and her colleagues searched for a link between chemical exposures and this phenomenon. They looked for foreign chemicals in blood samples from a set of very young girls with premature breast development, girls with an average age of 31 months. They found high levels of phthalates in these girls compared with normal children. In particular, levels of DEHP were seven times higher in girls with premature breast development than levels in normal girls.

### **Phthalates Are Rapidly Accumulating in Our Bodies**

Scientists are finding phthalates everywhere they look. This class of chemicals is one of the most widespread contaminants in the environment today. In fact, according to EPA scientist Robert

Menzer, phthalates are so common that it “has become very difficult to analyze any soil or water sample without detecting phthalate esters.”<sup>53</sup>

The human body has not escaped contamination. In 2000, Dr. Benjamin Blount at the Centers for Disease Control (CDC) found high levels of phthalates and their transformation products (known as metabolites) in every one of 289 adult Americans tested, including women of childbearing age.<sup>54</sup> CDC confirmed widespread exposure with a larger study in 2003, finding high levels of phthalates in practically every person they tested.<sup>55</sup> The metabolite of diethyl phthalate (DEP) was present in urine at levels over 2,000 parts per billion in five percent of test subjects.<sup>56</sup> The pattern of contamination reflected exposure to phthalates used mainly in personal care products.

A recent study found that infants exposed to DEHP from PVC plastics used in neonatal intensive care procedures had higher levels of the DEHP metabolite in their bodies. In fact, infants that had the highest levels of exposure had five times the level of the metabolite in their bodies than those in the lowest exposure group.<sup>57</sup>

### **How Phthalates Get into Our Bodies**

Phthalates leach into our bodies through our everyday contact with household and personal care products containing the chemical. Another source of exposure to phthalates is through the air we breathe in our own homes. In a study that sampled indoor air and dust in 120 homes, phthalates were among the most abundant compounds in the air.<sup>58</sup> The ability of phthalates to leach from plastics also is well documented.<sup>59</sup>

## **U.S. Government Fails to Take Action on Phthalates**

In 1998, the state Public Interest Research Groups (PIRGs) and several other environmental and consumer groups petitioned the Consumer Product Safety Commission (CPSC), asking the agency to ban polyvinyl chloride (PVC) plastic in all toys intended for children under the age of five because of the potential health hazards posed by diisononyl phthalates (DINP). While noting its position that “few if any children are at risk from the chemical,”<sup>60</sup> in December 1998 CPSC asked the toy and baby products industry to remove DINP from soft rattles and teething rings. About 90 percent of manufacturers indicated at that time that they had or would remove DINP from soft rattles and teething rings by early 1999. CPSC staff also asked the industry to find a substitute for phthalates in other products intended for children under three years old that are likely to be mouthed or chewed.<sup>61</sup>

CPSC also convened a Chronic Hazard Advisory Panel to examine the existing scientific data concerning the potential risks of phthalates to humans. In June 2001, the panel concluded that while the majority of children would not be adversely affected by diisononyl phthalate, “there may be a DINP risk for any young children who routinely mouth DINP-plasticized toys for seventy-five minutes per day or more.”<sup>62</sup> Critics of this study pointed out the circular logic in the panel’s conclusion, which came after manufacturers started phasing out DINP in teething rings and other mouthing toys. Because the voluntary ban made PVC toys softened with DINP less available, CPSC staff recommended against a ban on phthalates because children in the study did not spend enough time mouthing soft PVC toys.<sup>63</sup> In addition, the study did not consider the possible effects from multiple exposures to multiple types of phthalates.

Unfortunately, in February 2003, CPSC denied the state PIRGs’ petition to ban PVC plastic in toys for young children, noting the agency’s position that “there is no demonstrated health risk” posed by the phthalates used in PVC toys or other products intended for children under the age of five.<sup>64</sup>

Other countries have taken action, however, to protect children’s health. In September 2004, the European Union (EU) agreed to impose wide restrictions on the use of six phthalates in toys and childcare products.<sup>65</sup> The EU banned three phthalates classified as reproductive toxicants – diethylhexyl phthalate (DEHP), butyl benzyl phthalate (BBP), and dibutyl phthalate (DBP) – in all toys and childcare articles. The EU banned three other phthalates – DINP, diisodecyl phthalate (DIDP) and di-n-octyl phthalate (DNOP) – in toys and childcare articles intended for children under three years of age and that can be put in the mouth. Member states must now pass regulations in order to be in compliance with this instruction.<sup>66</sup>

### **European Union Action on Phthalates**

*Banned in all toys and childcare articles*

Diethylhexyl phthalate (DEHP)

Butyl benzyl phthalate (BBP)

Dibutyl phthalate (DBP)

*Banned in toys and childcare articles (that can be mouthed) for children under three*

Diisononyl phthalate (DINP)

Diisodecyl phthalate (DIDP)

Di-n-octyl phthalate (DNOP)



# Report Findings: Some Baby Products Contain Toxic Chemicals

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Do common baby products contain these chemicals of concern? To answer this question, we analyzed a sample of products—ranging from teething toys to baby mattresses—for phthalates and toxic flame retardants. Our laboratory tests found that some baby products contain phthalates or toxic flame retardants, showing that toxic chemicals are found in common consumer products intended for use by infants and children.

We tested sleep aids, such as sleep wedges and mattresses, for the presence of PBDEs in the foam material. We tested bath accessories, teething toys and other soft plastic baby products for phthalates. The products are just a sample of the products on the market and are not intended to represent a comprehensive list.

This section details which baby products tested positive in the lab for phthalates or toxic flame retardants. In Appendix A, we report how much

of each type of chemical the laboratory found in each product. The presence of these chemicals at any level in the products tested is cause for concern; there is no “safe” level. These chemicals are found in many everyday consumer products, and they build up in our bodies over time, particularly through our daily exposure to them.

These findings will clearly be alarming for parents and others who care about the health and safety of their children. Unfortunately, parents do not currently have the information they need to ensure the products they purchase do not contain toxic chemicals. In “Recommendations for Parents,” later in this report, we give parents some tips they need in order to begin to protect their children. Parents will be unable to fully protect their children, however, without adequate action by policymakers. We list these actions in “Recommendations for Policymakers.”

## Toxic Flame Retardants in Baby Products

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We tested seven common baby products for PBDEs. Three of the products tested positive for toxic flame retardants in the foam materials (Table 3).

We chose to test mattresses, mattress pads, changing pads, and sleep aids, including sleep wedges and positioners, because each of these products contain foam padding, in which PBDEs are commonly found. Moreover, infants and small children spend many hours of the day in direct contact with these products. As noted earlier, studies have shown PBDEs may escape

from household products, providing a common and direct route of exposure.

**Table 3. Summary of Testing for PBDEs**

	Number Tested	Number Containing PBDEs
Sleep Positioner/Wedge	3	2
Changing Pad	1	0
Mattress/Mattress Pad	3	1

Based on the laboratory tests, two different baby sleep positioners, used primarily to place and keep a child in a correct sleeping position, contained PBDEs. The Air Flow Sleep Positioner, by First Years, contained three different congeners of PBDEs, while the Leachco Sleep 'N Secure 3-in-1 Infant Sleep Positioner contained two different types of the chemical class. The laboratory did not find detectable levels of PBDE chemicals in the foam of the Dex Secure Sleeper Ultra 3-in-1 Sleep positioner.

**Air Flow Sleep Positioner by The First Years:  
Testing Found Three Different PBDEs**



The laboratory found three different types of PBDEs in one of the mattress pads tested for toxic flame retardants, the PeeWees Disposable Crib Mattress Pads. We did not find detectable levels of this chemical class in the Portacrib Mattress Pad by Simmons Juvenile and the Sealy Baby Soft Classic Mattress by Kolcraft.

**Disposable Crib Mattress Pad by PeeWees:  
Testing Found Three Different PBDEs**



The laboratory did not find detectable levels of PBDEs in the one changing pad tested, the Contoured Changing Pad by Simmons.

See Appendix A for more detailed information about the amount of chemicals found in each product.

In conclusion, we found that some of the products we tested for toxic flame retardants contained these chemicals, and some did not contain detectable levels. In order for parents to make informed decisions about the products they purchase, they need to know which products contain these chemicals and which do not. Moreover, given the potential health effects of these chemicals, they simply do not belong in products intended for infants or small children.

**Phthalates in Baby Products**

Most of the products we tested contained phthalates, either one or a few of the distinct types (Table 4).

We tested a variety of products for phthalates, including bath toys, soft plastic books, teethingers, and other products. We tested softer plastics that we suspected might contain phthalates, as phthalates are used to increase the flexibility of plastic products.

**Table 4. Summary of Phthalates Testing**

	Number Tested	Number Containing Phthalates
Soft Plastic Books/Bath Books	8	8
Bath Toys	3	2
Teethers	4	3
Toys for Infants	3	2

As detailed earlier, phthalates can leach out of soft plastic products, providing a common route of exposure. Some of these products are intended for mouthing, such as the teethers; however, infants are likely to mouth the other products as well. In addition, phthalates are found in indoor air and dust, indicating that the chemicals can escape from the products.

Notably, the laboratory testing did not find diisononyl phthalates (DINP) in any of the products we tested. As detailed in the box on page 15, in 1998 CPSC asked the toy and baby products industry to remove DINP from soft rattles, teethers, and other “mouthing” toys. The laboratory did find several other types of phthalates, however.

Two of the bath toys we tested contained phthalates. The Especially for Baby brand Bath Squirties contained one type of phthalate; the Splash Gear Fish Squirties contained two different types of phthalates. We did not find detectable levels of phthalates in the Especially for Baby brand Color Change Ducky.

We tested multiple bath books and other soft plastic books and found phthalates in all of the books we tested, including Random House’s *Elmo’s Tub-Time Rhyme*; Simon & Schuster’s *Where Is Slippery Soap?* (Blue’s Clues); DK Publishing’s *Duckling* bath book; Cook Communications’ *Splish Splash: Jesus*; Random House’s *One Fish, Two Fish, Red Fish, Blue Fish*; Penguin’s Beatrix Potter *Benjamin Bunny*; and Sassy’s *Hello Bee, Hello Me* bath book and *Who Loves Baby?* photo book.

Sassy’s *Who Loves Baby?* photo book, in which we found both DEHP and DBP, included a label on the packaging that read: “This product is phthalate-free.” When our researchers contacted the company, Sassy customer service representatives stated that the company had phased out phthalates from this product and modified the product’s design to differentiate between old books and “phthalate-free” books.<sup>67</sup> Books with red handles were manufactured

before the company changed its practices, and newer versions have handles of other colors, such as blue or purple. Sassy even has offered to replace those products with a red handle. We tested a book sent directly from the manufacturer, finding two types of phthalates. Sassy should clarify its “phthalate-free” label for this book.

**Elmo’s Tub-Time Rhyme Bath Book:  
Testing Found Two Phthalates**



**One Fish, Two Fish, Red Fish, Blue Fish:  
Testing Found Two Phthalates**



**Sassy’s Hello Bee, Hello Me Bath Book and  
Who Loves Baby? Photo Book:  
Testing Found Two Phthalates**



We also tested a few teethers for phthalates and found the chemicals in some and not in others. We found phthalates in the Little Teethers Teething Ring, Baby Gund Jungle Collection Teether, and a small amount in Especially for Baby’s Water Filled Teethers. We did not find phthalates in Cool Baby’s Soft Freezer Teether.

**Baby Gund Jungle Collection Teether:  
Testing Found One Phthalate**



**AquaDuck Water Filled Playmat by Infantino:  
Testing Found Two Phthalates**



**Hasbro's Gloworm:  
Testing Found Three Phthalates**



**Teething Ring by Little Teethers:  
Testing Found One Phthalate**



We also tested a few toys marketed for infants. The Infantino AquaDuck Water Filled Playmat contained two different types of phthalates. The Hasbro Gloworm contained the largest amount of phthalates of any of the products we tested. We did not find phthalates in Fisher Price's Ocean Wonders Suction Spinner.

In conclusion, most bath accessories, teething, and other products for small children that we tested contained some types of phthalates, but some did not. As with products containing PBDEs, parents have the right to know which products contain phthalates so they can make more informed purchasing decisions for their children.

# Failures of U.S. Chemicals Policy

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Many people think, incorrectly, that the U.S. government would not allow chemicals to enter the market if they were not safe. In truth, the regulatory process has failed to work the way the public believes it should.

In 1976, Congress passed the primary law regulating toxic chemicals, the Toxic Substances Control Act (TSCA), which grandfathered all existing chemicals on the market into use without health-effects testing or analysis. Most of these chemicals emerged in the 1940s and 1950s when few laws governed chemical safety. Today, U.S. EPA reviews new chemicals that come onto the market but does not require full health effects testing for approval. With an estimated 2,000 chemicals introduced each year, EPA approves an average of seven new chemicals each day.<sup>68</sup>

## **Toxic Chemicals Missed By Regulation**

Stories of the mass production, marketing, and release of a dangerous chemical that damages the public's health and the environment are all too familiar. Phthalates and PBDEs are two examples of how the Consumer Product Safety Commission (CPSC), in conjunction with U.S. EPA and U.S. Food and Drug Administration (FDA), have failed to adequately protect the public from these harmful chemicals.

## **Current Law Leaves EPA with Little Power to Protect Public Health**

The U.S. government's regulation of chemicals is based on the premise that chemicals are presumed innocent until they are proven to harm human health.

Throughout its nearly 30-year history, TSCA has rarely been amended, but clearly fails to effectively regulate toxic chemicals. Since the law's inception, U.S. EPA has never used its

authority to ban a chemical and has only offered regulations on five different chemicals, including PCBs, which Congress ordered regulated. U.S. EPA's lax regulation can be attributed to the unreasonably high burden of proof the law places on the agency to show that a chemical poses an unreasonable risk to human health and the environment.

TSCA divides all the chemicals on the market into two categories: existing chemicals and new chemicals. Existing chemicals are chemicals already on the market before 1980. These make up approximately 99 percent by volume of the chemicals on the market today. Existing chemicals are considered safe until U.S. EPA can establish that they pose an unreasonable risk to people's health or the environment, that the benefits of action outweigh the risks of inaction, and that U.S. EPA is employing the least burdensome method when taking action.<sup>69</sup>

Companies that wish to introduce new chemicals to the U.S. market must notify U.S. EPA at least 90 days before producing or importing a new chemical. U.S. EPA has been able to ensure review of the new chemicals. The new chemicals program, however, could be improved by increasing the testing requirements of the chemicals.

U.S. EPA should have the authority and means to guarantee chemicals on the market are safe for human health and the environment. In its 1998 review of high production volume chemicals, U.S. EPA estimated the cost for a full round of basic screening tests, including tests for reproductive and developmental toxicity, at about \$205,000 per chemical.<sup>70</sup> The chemical industry, with profits of \$13.5 billion in 2004, should pay this price to protect both health and the environment.<sup>71</sup>

# Recommendations for Policy-Makers

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Parents cannot be expected to track the thousands of potentially harmful toxic chemicals they and their families come into contact with everyday. Instead, the U.S. government must act to adequately protect those most vulnerable in its population. Parents should call on decision-makers to take the following actions.

## **Label Products Containing Potentially Hazardous Chemicals**

Parents currently have little decision-making power when purchasing products for their family. With no government-ordered labels on products and no ability to readily gain information about the ingredients used in a product at the point of purchase, parents are left in the dark as to how they can best protect their children. The first step to protecting children is to give parents the tools they need to make safe choices. The U.S. Consumer Product Safety Commission (CPSC) should label children's products if they contain a chemical that is either known to be hazardous or has the potential to be hazardous.

## **Phase Out Hazardous Chemicals**

Despite some remaining data gaps about the hazards of each of these chemicals, the U.S. EPA and CPSC should take action based on current evidence. Given the scientific studies that show these chemicals are present in humans, disrupt chromosome sorting, interfere with hormone function, impair development and learning, and may cause cancer, the United States should phase out the use of these chemicals – especially in products used by our most vulnerable population, children.

In the absence of federal action, several states have passed legislation to protect public health. California, Maine, Washington, New York,

Maryland, Illinois, Oregon, Michigan and Hawaii have regulated toxic flame retardants, and many other states are considering such regulations. The California Legislature is considering a ban of phthalates and another endocrine-disrupting chemical, bisphenol-A, from children's products. Washington has taken steps to phase out persistent toxic chemicals, and Massachusetts is considering new rules that would change the way toxic chemicals are regulated in the state. States should continue to exercise their authority to pass laws that fill gaps and supplement federal law.

## **Reform Chemicals Policy**

Chemicals that are untested or known to be hazardous and chemicals that can harm the developing fetus should not be on the market or in widespread use and distribution. U.S. chemicals policy should ensure that manufacturers and industrial users provide regulatory agencies and the public with adequate information about their products so that agencies can act to protect public health from potentially dangerous substances before damage is done. The United States must prevent exposure to toxic chemicals when there is evidence of potential harm.

Currently, manufacturers can put chemicals on the market before detection methods have even been developed to test for the presence of the chemical in air, water, soil, and our bodies. The burden falls on federal and state governments to develop these analytical methods – an expensive and time-consuming process. The costs of developing analytical methods and methods to test for a chemical's safety should fall to the manufacturers who stand to profit from the product. California is currently considering legislation that would require chemical

manufacturers to provide the state with these detection methods.

The European Union is currently considering a policy, known as REACH (Registration, Evaluation, Authorization of Chemicals), which would require industry to supply large amounts of data to the EU so that regulators can assess and address chemical use. The chemical industry has pressured the EU to weaken this proposed policy over the past five years, but it remains a step forward in toxic chemical regulation.

In order to protect its most vulnerable citizens, the U.S. must adopt a similar but stronger

chemicals policy. Here in the U.S., manufacturers should be required to provide all hazard and health-impact information to U.S. EPA so the agency can begin to assess the thousands of chemicals currently on the market for which the U.S. EPA has little or inadequate data. Next, manufacturers of chemicals should be required to conduct an alternatives analysis, in order to determine if they really are using the least hazardous chemical for each application. Finally, U.S. EPA must have the authority to ban or restrict the use of a chemical if it can harm human health.

# Recommendations for Parents

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A few small, easy changes in how you store and heat foods, which toys your child plays with, and which foam furnishings and linens you use can help reduce your child's exposure to toxic chemicals.

## At the Store

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### Choose safer toys and teethers.

- **Look for “PVC-free” on the labels of soft plastic toys and teethers.** Some manufacturers have removed PVC from their children's products, especially products intended to be put into children's mouths. Unfortunately, no law requires or regulates these labels, and few products are labeled as such. When parents have a question about the chemicals in a product, they should call the manufacturer.
- **Choose wooden toys.** There are countless manufacturers of high quality wooden toys in the market. Everything from baby rattles to kitchen play-sets are now made out of wood. Some commonly available brands include Plan, Haba, Jake's Room, Turner Toys, and Holztiger.

### Choose safer food packaging and serving containers.

- **Avoid PVC plastic in food containers.** Check the bottom/underside of the product. If you find the number “3” in the recycling triangle, it is made from PVC plastic and should be avoided. Choose plastics labeled #1, #2, #4, or #5 in the recycling triangle, but do not heat beverages or food in plastic containers of any kind.
- **Avoid foods wrapped in plastic.** Almost all commercial grade plastic cling wrap contains PVC plasticized with phthalates or adipates (another hormone-disrupting PVC plasticizer that leaches out of the cling wrap), and other plastic food packaging may be made of PVC, as well. Avoid buying foods wrapped in plastic, especially cheeses and meats. Buy deli-sliced cheeses and meats and have them wrapped in paper. If you can't avoid buying plastic-wrapped foods, cut off a thin layer of the cheese or meat when you get home and store the remainder in glass or less-toxic plastic.
- **Choose safer containers for sippy cups and water bottles.** Look for plastics labeled #1, #2, #4, or #5 in the recycling triangle. As an alternative to hard plastic water bottles (such as the polycarbonate Nalgene bottles), try a lightweight stainless steel bottle instead.
- **Choose metal feeding utensils and enamel or ceramic plates.** While many manufacturers have removed phthalates from products intended to be put into young children's mouths, without a law prohibiting their use, there is no guarantee that these products, such as soft plastic-coated feeding spoons, are made without phthalates. Look for PVC-free labels or buy stainless steel, enamel, ceramic, or glass. (Note that enamel cannot be put in the microwave, and you should not use old pottery that could have lead-based glazes).



## Choose safer sleeping accessories and furniture.

- **Choose natural materials for mattresses and linens.** Buy products with natural fibers (cotton and wool), which are naturally fire resistant. For example, Lifekind sells organic mattresses, linens, and receiving blankets without PBDEs.
- **Purchase furniture without PBDEs.** Several retailers sell PBDE-free furniture. For example, European Sleep Works sells mattresses, bedding, and furniture without PBDEs. Ikea is another retailer of PBDE-free foam furnishings.

## At Home

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- **Use glass to heat food or liquid in the microwave. You should not heat food in plastic containers or on plastic dishware, or heat liquids in plastic baby bottles.** Heating food and liquids in plastic containers can cause chemicals and additives in the plastics to leach out more readily—right into baby’s food and milk. While some plastic containers are marketed as “microwave safe” it is safest to avoid them for heating.
- **If you do use plastic bottles, containers, or dishware,** to reduce exposure, take care to avoid harsh detergents or hot water when washing them. Do not put plastic bottles, containers, or dishware in the dishwasher. Also, throw out any plastic bottles, containers, and dishware that start to look scratched or hazy. Do not let milk sit for long periods of time in plastic.
- **Avoid letting your child put plastic toys in his/her mouth.** Toys designed for older children are more likely to contain phthalates. It is assumed that young children will not mouth these toys—such as action figures and Barbie dolls. To be safe, keep all plastic toys out of children’s mouths. Call the manufacturer if you want to know if a product contains phthalates.
- **Avoid degraded or crumbling foam that might contain PBDEs.** Replace or cover couches, stuffed chairs, and automobile seats that have exposed foam. Reupholster padded furniture in homes where children or pregnant women live.
- **Be careful when removing and replacing the foam padding beneath your carpet.** Remove old carpet padding from your home and clean up well when finished.

# Methodology

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We selected a sample of baby products available at popular retail outlets and online vendors. These baby products are not intended to be comprehensive nor representative statistically of all products on the market; rather, they are examples of common products a parent might purchase.

We hired professional and accredited labs using approved testing methods to conduct all product testing.

Paradigm Environmental Services in Rochester, New York performed the PBDE testing. The lab followed standard procedures, essentially EPA Method 8270 (GC/MS), modified to include multi-point calibration for the indicated compounds. To determine the PBDE levels in the foam material of each product, the laboratory

began by cutting a foam sample into smaller pieces about  $\frac{3}{4}$  of an inch in diameter. The laboratory used methylene chloride to extract PBDEs from the sample and gas chromatography/mass spectrometry to analyze the sample. The reporting/quantitation limits varied based on the product tested, as detailed in Appendix A. A detailed methodology is available upon request.

Stat Analysis Corporation in Chicago, Illinois performed the phthalate testing. Stat Analysis followed standard procedures, using EPA Method 8060 for phthalate extraction and EPA Method 3580A for waste dilution. The reporting/quantitation limits varied based on the product tested, as detailed in Appendix A. A detailed methodology is available upon request.

# Appendix A. Results of Laboratory Testing for Toxic Flame Retardants and Phthalates

## Product Testing Results: Toxic Flame Retardants

Product Name	Type	Product Number	Brand	Reporting/ Quantitation Limit (ppb)	Type of PBDE							
					BDE-28 (tri)	BDE-47 (tetra)	BDE-99 (penta)	BDE-100 (penta)	BDE-153 (hexa)	BDE-154 (hexa)	BDE-183 (octa)	
Air Flow Sleep Positioner	Sleep Aid	Item #: 4064	The First Years	< 8,570	ND	47,900	10,800	61,900	ND	ND	ND	ND
Sleep 'N Secure 3-in-1 Infant Sleep Positioner	Sleep Aid	UPC: 45516135082	Leachco	< 8,330	ND	13,000	ND	10,800	ND	ND	ND	ND
Dex Secure Sleeper Ultra 3-in-1 Sleep Positioner	Sleep Aid	ASIN: B0001652X0	Dex	< 828	ND	ND	ND	ND	ND	ND	ND	ND
Contoured Changing Pad	Changing Pad	Item #: 90409	Simmons	< 1,770	ND	ND	ND	ND	ND	ND	ND	ND
PeeWees Disposable Crib Mattress Pad	Mattress Pad	UPC: 7895540006 SKN: 927948;	PeeWees	< 90.0	ND	ND	717	ND	93	143	ND	ND
Portacrib Mattress Pad	Mattress Pad	ASIN: B00067VWRW	Simmons Juvenile	< 82.8	ND	ND	ND	ND	ND	ND	ND	ND
Sealy Baby Soft Classic Mattress	Mattress	SKN: 074060; ASIN: B00067TA1C	Kolcraft	< 863	ND	ND	ND	ND	ND	ND	ND	ND

### Results in parts per billion (ppb).

ND = Non Detect. Indicates that the laboratory could not detect the chemical at levels above the reporting/quantitation limit noted.

The Penta commercial mixture is composed of BDE-47, -99, -153, and -154. The Octa commercial mixture is composed of BDE-153 and -154. The Deca commercial mixture is composed of BDE -209 and some -183.

## Product Testing Results: Phthalates

Product Name	Type	Product Number	Brand	Reporting/ Quantitation Limit (ppb)	Type of Phthalate*							
					DEHP	BBP	DINP	DBP	DNOP	DEP	DMP	
Elmo's Tub-Time Rhyme Bath Book	Bath Book	ISBN: 0375826920	Random House	< 7,800	65,000	84,000	ND	ND	ND	ND	ND	ND
Where Is Slippery Soap? Blue's Clues Book	Bath Book	ISBN: 0689829485	Simon & Schuster	< 7,700	760,000	ND	ND	ND	ND	ND	ND	ND
A Beatrix Potter Bath Book: Benjamin Bunny	Bath Book	ISBN: 0723200181	Penguin	< 8,300	20,000	ND	ND	ND	ND	ND	ND	ND
Duckling Bath Book	Bath Book	ISBN: 0789498855	DK Publishing	< 7,800	37,000	ND	ND	ND	190,000	ND	60,000	ND
One Fish, Two Fish, Red Fish, Blue Fish	Bath Book	ISBN: 0375811648	Random House	< 7,700	370,000	ND	ND	ND	ND	210,000	ND	ND
Spish Splash: Jesus	Bath Book	ISBN: 0781434203	Cook Communications	< 6,600	840,000	ND	ND	ND	16,000	4,600,000	ND	ND
Who Loves Baby? Photo Book	Soft Plastic Book	Item #: 844	Sassy	< 7,600	660,000	ND	ND	ND	39,000	ND	ND	ND
Hello Bec, Hello Me Book	Bath Book	Item #: 871	Sassy	< 8,500	450,000	ND	ND	ND	45,000	ND	ND	ND
Bath Squirties	Bath Toy	Item #: 40157	Especially for Baby	< 7,800	26,000	ND	ND	ND	ND	ND	ND	ND
Fish Squirties	Bath Toy	UPC: 075656011823	Splash Gear	< 6,800	39,000	ND	ND	ND	ND	6,100,000	ND	ND
Color Change Ducky	Bath Toy	Item #: 26158	Especially for Baby	< 8,600	ND	ND	ND	ND	ND	ND	ND	ND
Soft Freezer Teether	Teether	Item #: 333	Cool Baby	< 7,800	ND	ND	ND	ND	ND	ND	ND	ND
Baby Gund Jungle Collection Teether	Teether	Item #: 58090	Gund	< 8,400	ND	ND	ND	ND	760,000	ND	ND	ND
2 Water Filled Teethers	Teether	Item #: 40142	Especially for Baby	< 6,000	ND	ND	ND	ND	10,000	ND	ND	ND

Product Name	Type	Product Number	Brand	Reporting/ Quantitation Limit (ppb)	Type of Phthalate*								
					DEHP	BBP	DINP	DBP	DNOP	DEP	DMP		
Teething Ring	Teether	(sold with oral pain relief gel or tablets) UPC: 5618412090	Little Teethers	< 8,700									
Ocean Wonders Suction Spinner	Toys for Infants	unknown	Fisher Price	< 6,600	ND	ND	ND	ND	ND	ND	ND	ND	ND
AquaDuck Water Filled Playmat	Toys for Infants	Item #: 150-2063	Infantino	< 9,400	420,000	ND	ND	ND	ND	ND	490,000	ND	ND
Gloworm	Toys for Infants	Item #: 124126	Hasbro	< 7,800	82,000	ND	ND	ND	9,500	17,000,000	ND	ND	ND

**Results in parts per billion (ppb).**

\* Key to chemical abbreviations: Di (2-ethylhexyl) phthalate (DEHP); Butyl benzyl phthalate (BBP); Di-isononyl phthalate (DINP); Di-n-butyl phthalate (DBP); Di-n-octyl phthalate (DNOP); Diethyl phthalate (DEP); and Dimethyl phthalate (DMP).

ND = Non Detect. Indicates that the laboratory could not detect the chemical at levels above the reporting/quantitation limit noted.

# End Notes

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- <sup>1</sup> U.S. Environmental Protection Agency (EPA), "Polybrominated diphenylethers (PBDEs) Significant New Use Rule (SNUR) Questions and Answers," accessed September 28, 2005 at <http://www.epa.gov/oppt/pbde/qanda.htm>.
- <sup>2</sup> P Eriksson et al, "Brominated Flame Retardants: A Novel Class of Developmental Neurotoxicants in Our Environment?," *Environmental Health Perspectives*, 109(903-8), 2001; P Eriksson et al, "A brominated flame retardant, 2,2',4,4',5-pentabromodiphenyl ether: uptake, retention, and induction of neurobehavioral alterations in mice during a critical phase of neonatal brain development," *Toxicological Science*, 67 (98-103), 2002; H Viberg et al, "Neonatal exposure to the brominated flame retardant 2,2',4,4',5-pentabromodiphenyl ether causes altered susceptibility in the cholinergic transmitter system in the adult mouse," *Toxicological Science*, 67(104-7), 2002; H. Viberg, A. Fredriksson, and E. Jakobsson, "Developmental neurotoxic effects of 2,2,4,4,5-pentabromodiphenyl ether in the neonatal mouse," *Toxicologist*, 54(1360), 2000; H. Viberg, A. Fredriksson, E. Jakobsson, U. Ohrn, and P. Eriksson, "Brominated flame retardant: Uptake, retention, and developmental neurotoxic effects of decabromodiphenyl ether in the neonatal mouse," *Toxicologist* 61(1034), 2001; I. Branchi et al, "Effects of perinatal exposure to a polybrominated diphenyl ether (PBDE 99) on mouse neurobehavioural development," *Neurotoxicology*, 23(375-84), 2002; J.L. Jacobson., S.W. Jacobson, H.B. Humphrey, "Effects of in Utero Exposure to Polychlorinated-Biphenyls and Related Contaminants on Cognitive-Functioning in Young Children," *Journal of Pediatrics*, 116(38-45), 1990.
- <sup>3</sup> Zhou et al, "Effects of short term in vivo exposure to polybrominated diphenyl ethers on thyroid hormones and hepatic enzyme activities in weanling rats," *Toxicological Science* 61(76-82), 2001; J.R. Fowles et al, "Immunologic and Endocrine Effects of the Flame-Retardant Pentabromodiphenyl Ether (DE-71) in C57BL/6J Mice," *Toxicology*, 86(49-61), 1994.
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