

Testing for Toxics:

Children's Products and Chlorinated Tris

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I. Introduction

Conventional wisdom would tell us that public health and safety policy should be driven with a focus on protecting infants and children from dangerous products. Unfortunately, current toxics regulation in the U.S. follows an innocent until proven guilty structure for toxic chemicals.ⁱ As a result, thousands of new chemicals are marketed every year whose health effects are in question.

The Toxics Substances Control Act (TSCA), passed in 1976, is the primary chemical safety law in the U.S. Unfortunately, the law failed to require any safety testing of chemicals on the market when the law was passed, grandfathering in 62,000 chemicals. In the 30 years since the law was passed, the U.S. Environmental Protection Agency has only tested 200 of the more than 80,000 chemicals currently on the market for their health and safety effects. As a result, many untested toxic chemicals are found in common household products.

One such family of chemicals escaping supervision under TSCA is flame retardants. Many furniture and baby product manufacturers integrate flame retardants into their products because of a California flammability standard, TB 117. This standard requires the uncovered foam in all upholstered furniture sold in California to be able to withstand a small flame, and the cheapest way for manufacturers to meet this standard is to permeate the foam with flame retardant chemicals.

Unfortunately, many of these products are linked to serious health problems, including cancer, mutagenicity, hormone disruption, neurological damage, and infertility. Over time, chemical particles escape from the foam and mix with household dust, contaminating household surfaces like toys and food. Children have a natural tendency to touch and mouth objects as a way of exploring the world around them and as a result ingest the highest quantities of these toxic chemicals.

Despite the inevitability that children will come into contact with these harmful chemicals, manufacturers are not required to disclose to the consumer the type or even the presence of these flame retardants in their products.

To make matters worse, experts agree that these chemicals are ineffective at reducing the risk from fire. Though the chemicals prevent bare foam from igniting when exposed to a small flame, in an actual fire situation the cloth covering the foam would ignite first, causing a flame so large that it would render the flame retardants useless.ⁱⁱ

Still, the market for these chemicals is growing. In 1983, 526 million pounds of fire retardants were sold in the United States. By 2014, according to the Freedonia Group, a consulting firm, global demand is expected to reach 4.9 billion pounds.ⁱⁱⁱ

The exposure of infants and children to toxic chemicals leaching from the products they use every day is a failure of our nation's chemical safety policy. We need a new, comprehensive federal policy to protect

our health from toxic chemicals. In the meantime, we should support pioneering state efforts to adopt common sense solutions, like exempting juvenile products from out dated regulation requiring the use of ineffective flame retardants.

In an effort to better understand the prevalence of toxic chemicals that pose a risk to children's health, Illinois PIRG Education Fund purchased ten common baby products and tested these products for chlorinated Tris, or TDCPP, a chemical that has been linked to cancer, mutagenicity, hormone disruption, neurological damage, and infertility.^{iv} We also checked to see which of the products that were found to contain chlorinated Tris had a consumer label indicating the presence of toxic flame retardant chemicals to at least give consumers notice that some form of flame retardant is in the product. We found chlorinated Tris in a majority of the children's products tested (7 of 10). Of the products found to contain chlorinated Tris, only 5 had labels indicating its presence. The products were purchased in Illinois in May of 2012.^v Unfortunately, these results are similar to the findings of other organizations, like the Washington Toxics Coalition, who found that 80% of products they tested had chlorinated Tris in them.

I. Why Chlorinated Tris?

Since 1975, the California Bureau of Home Furnishings and Thermal Insulation Agency has mandated that the foam inside upholstered furniture be able to withstand exposure to a small flame, like a candle or cigarette lighter, for 12 seconds without igniting. This flammability standard, called Technical Bulletin 117 (TB 117) has become the driving force for non-essential applications of chemical flame retardants throughout the United States. Though it doesn't mandate the use of flame retardant chemicals, in practice they are the cheapest way to meet the standard. Since California's market for furniture is so large, it is impractical for manufacturers who sell nationally to not comply with the standard. As a result, about 80 percent of the home furniture and most of the upholstered office furniture sold in the United States has flame retardants in it.^{vi}

One of these flame retardants is chlorinated Tris, also known as Tris (1, 3-dichloro-2-propyl) phosphate, or TDCPP. Studies link chlorinated Tris to neurological damage, hormone disruption, mutagenicity and cancer,^{vii} and it has the same chemical structure as banned chemicals like DDT, PCBs and Dioxin.^{viii} Chlorinated Tris tested positive for mutagenicity in the 1970s and as a result it was voluntarily removed from children's pajamas in 1977. Since the action was voluntary, companies can legally use it in other consumer products without informing government officials or the public.

As a result, when the widely used flame retardant PBDEs were phased out of use in furniture and baby products with foam filling after 2004 because they were deemed too dangerous to human health, manufacturers turned to chlorinated Tris as a legal alternative, though less was known about its health effects. It is now one of the most popular flame retardants used in foam products.^{ix}

II. Flame Retardants are Ineffective

While TB 117 is well intentioned, it was implemented before people were aware of the toxic nature of these chemicals and it has no practical effect. TB 117 mandates that foam be resistant to open flame, but in reality, the fabric covering foam products is what creates the real threat in the case of a household fire. By the time that fire reaches the foam it is far too potent for the flame retardants to have an effect. According to Dr. Vytenis Babrauskas, a noted fire safety engineer and co-author of the only textbook written on the topic of fire safety and upholstered furniture, once the fabric catches fire, it can easily overwhelm the fire-suppression properties of treated foam. In tests, TB 117 compliant chairs catch fire just as easily as ones that aren't compliant and burn just as hot.^x

Getting rid of TB117 wouldn't go far enough in preventing harm from flame retardants, however. Even if the standard is eliminated, there is nothing to prevent the continued use of chlorinated Tris by manufacturers who may believe, or want to claim, that the addition of these chemicals makes their products safer. They may be prone to believe this because of a decades-long effort by the tobacco and chemical industries to promote the use of flame retardants.

According to an investigation by the Chicago Tribune, chemical companies for years have misrepresented a 15 year old study to claim that flame retardants are necessary to slow fires in the home. The study showed that flame retardants gave people a 15-fold increase in time to escape fires, but the author of the study, Dr. Babrauskas, says that the group "grossly distorted" the findings of his research. The amount of flame retardants used in the study, he said, was far greater than those found in typical house furnishings. The small amounts found in house furnishings offer little to no protection.

The flame retardants used today are not only ineffective; they are dangerous to human health. That's why the International Association of Fire Fighters supported the phase out of one toxic flame retardant, pentaBDE, to protect both fire fighters and occupants from adverse health effects caused by exposure to the chemical, only to see it replaced with a different set of toxic chemicals. In testimony before the New York State Assembly, Dennis Sweeney, Health and Safety Training Coordinator for the New York State Professional Fire Fighters Association said that while he believes that protecting fire fighters and building occupants from fire is critical, "we can and must do it without exposing babies and children to chemicals that harm their health. " He went on to say that companies can and must make safe products without cancer-causing chemicals that release toxic gases when they burn."^{xi}

III. Health Effects of Chlorinated Tris

The World Health Organization, National Cancer Institute, National Research Council and Consumer Product Safety Commission have all agreed that chlorinated Tris is a health hazard.^{xii} Chlorinated Tris has been linked to mutagenicity and cancer, neurological damage, hormone disruption, and infertility.^{xiii} Chlorinated Tris is chemically bonded to the foam in furniture and can escape into the air over time. It can be inhaled, absorbed through the skin, or ingested when it attaches itself to dust particles that

infants and toddlers are exposed to. In addition, during a fire, it causes furniture to release more carbon monoxide and soot in fires than products that don't contain these chemicals.^{xiv}

The Consumer Product Safety Commission considers chlorinated Tris to be a probable human carcinogen and has said that adding it to furniture exposes children to a daily dose significantly higher than what the agency considers acceptable. Young children are most susceptible to the toxicity of flame retardant chemicals; they can ingest 10 times the amount adults do because they crawl around on the floor and put their hands and other objects into their mouths.^{xv} At the same time, because children are still developing, a smaller amount of chlorinated Tris can be much more harmful to them than adults. In 2006, researchers at the U.S. Consumer Product Safety Commission cautioned that adding chlorinated Tris to furniture would expose children to nearly twice the daily dose deemed acceptable by the federal agency. The cancer risk for children during the first two years of life would be seven times higher than what most physicians, scientists and regulators consider acceptable, according to the safety commission's report.^{xvi}

Health Effects of Chlorinated Tris

Carcinogen/Mutagenicity:

Laboratory studies have found that Tris causes kidney, liver, and testicular tumors, and a number of studies have found that Tris causes mutations, which are changes in DNA that can lead to cancer. Based on this evidence, the state of California designed Tris as a carcinogen under Proposition 65 in October of 2011.^{xvii}

Nervous System Effects:

Researchers have found that TDCPP can be toxic to the developing nervous system.^{xviii} A 2011 study tested the chemical's effects on the development of brain cells and compared its effects to those of chlorpyrifos, a pesticide known to be toxic to the nervous system. By some measures, TDCPP was even more toxic to the cells than chlorpyrifos, with effects on cell development, number, and DNA synthesis.^{xix}

Hormone Disruption:

A study published in 2010 found that men with greater exposure to TDCPP had lower levels of thyroid hormone and higher levels of prolactin, a hormone involved in a number of functions. The study evaluated exposure by determining the level of the flame retardant in house dust, and hormones were measured in blood serum.^{xx}

Infertility:

One study published in March this year found that in men, higher blood levels of TDCPP and TCPP corresponded with decreasing sperm quality.^{xxi}

Increasing Toxicity of Fire:

Foam containing this chemical was shown to release high amounts of carbon monoxide and smoke during ignition, according to a 2000 study.^{xxii} "It's hard to believe that the same chlorinated Tris flame retardant that our research helped remove from baby pajamas in 1977 is back in use in children's products." said Arlene Blum, PhD, a Visiting Scholar at the University of California, Berkeley Chemistry Department and Executive Director of the Green Science Policy Institute. "These children's products do not pose a fire hazard and the Tris increases the toxicity of a fire if they were to burn."^{xxiii}

IV. Our Testing

With growing awareness and concern around Tris, Illinois PIRG Education Fund decided to evaluate the prevalence of chlorinated Tris in commonly used children's products. We tested for chlorinated Tris in ten products marketed for infants and children found at popular chains in the Chicagoland area. These products were chosen at random and included common brand name items found at Target, Kmart and Babies R Us. We tested changing pads, diaper changing kits, booster seats and cradle and crib accessories purchased in May of 2012 (see Appendix 1). *We found toxic chemicals in seven out of the ten products tested.*

We sent these items to STAT Analysis Corporation in Chicago, a laboratory accredited by the Illinois Environmental Protection Agency in accordance with the National Environmental Laboratory Accreditation Program, for testing. All of the seven products that tested positive for the chemical contained more than a thousand parts per million, and some had as much as seventeen thousand parts per million chlorinated Tris. For example, a changing pad by Summer Infant was found to be 17,000 parts per million chlorinated Tris, equivalent to 1.7% chlorinated Tris by weight in the foam portion of the product.

TB 117, the California standard that is responsible for the use of flame retardants, also requires the products that are compliant with the standard to be labeled as such. This is the only warning consumers have that indicates the possibility of flame retardant chemicals; without it, there is no way to know that these toxic chemicals are in the products. Of the seven products that tested positive for chlorinated Tris, only 5 contained the required TB 117 Flammability Label indicating the presence of toxic chemicals. A Changing Pad by The First years found at Target and a Booster Seat by Cosco found at Kmart gave unsuspecting parents no warning that they would be exposing their infant to a known toxin. More of this information can be seen in Appendix 1.

TB 117 Update:

On June 18th, 2012 Governor Jerry Brown of California asked the Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation to reconsider the state's standards for flammability. He directed revision of regulations involving flame retardants, specifically pointing to concerns related to upholstered furniture. The state's bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation will update Technical Bulletin 117 "to reflect modern manufacturing methods that can lower the use of harmful chemicals."

In July, the Bureau released a draft update of the regulation, TB 117-2012, on which the state will hold workshops, solicit public comments and perform an administrative review.^{xxiv} The draft regulation replaces the small flame test with a "smolder standard" which would require furniture to either be covered with materials that are smolder resistant or to have a barrier between the foam and fabric that is smolder resistant.^{xxv}

V. Conclusions and Recommendations

Parents expect the products they buy for their babies to be safe, and current regulation of flame retardants has failed to make this a reality. Chlorinated Tris is far too dangerous to be found in high amounts in the majority of baby products tested at random, especially when parents are given no warning as to presence of this chemical.

Fortunately, policymakers can protect public health by adopting common-sense chemical policies and reforming outdated standards. This includes banning the use of Tris in children's products and residential upholstered furniture. In 2012, bills to ban Tris were introduced in NY, WA, CT, and MD, and many more states are considering bans in 2013. States can also take other steps to get these chemicals out of consumer products, like in Washington, where the Department of Ecology is in the process of declaring Tris a chemical of high concern to children. Policymakers must also include revisiting standards like TB117 and creating an alternative set of standards for children's products to ensure their safety. While the action on TB117 is good news for manufacturers and consumers, the only way to eliminate the chemicals from our homes is to prohibit the use of Tris in products.

Current laws should be updated to mandate that all existing and new chemicals are evaluated for their safety for pregnant women, children, and other vulnerable populations.

Most importantly, policymakers should implement laws that would:

- Require industry to develop and provide information on the health and environmental safety of their chemicals in order to enter or remain on the market.
- improve the safety of chemicals used in consumer products
- reform EPA's science practices to ensure the best available science is being used to determine chemical safety, and
- Support innovation in the marketplace and provide incentives for the development of safer chemical alternatives.

Instead of letting chemical companies decide when to report that their products are hazardous to human health, the EPA should only allow the use of chemicals after they have gone through testing and are proven to be safe. Illinois PIRG is calling on policymakers to reform the outdated toxics laws and ban chlorinated Tris to ensure that children's health is protected.

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- ^{xiii} "Flame Retardants: Tris (Chlorophyl) Phosphate and Tris (2- Chloroethel) Phosphate." (1998). World Health Organization. Web. <http://www.who.int/ipcs/publications/ehc/who_ehc_209.pdf>.
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Appendix 1

Product Type	Brand	Retailer	Material	TB 117 Label?	Chlorinated Tris?	Amount?
Changing Pad	Munchkin	Target	63% polyurethane foam; 37% cardboard stiffener	Yes	Yes	8900 ppm
Changing Pad	Summer	Kmart	93% polyurethane foam; 7% polyester fiber (filler)	Yes	Yes	17,000 ppm
Diaper Changing Kit	The First Years	Target	100% polyurethane foam	No	Yes	9300 ppm
Diaper Changing Kit	Brica	Target	Polyurethane foam (filling)	No	No	n/a
Booster Seat (Car)	Cosco	Kmart	100% polyurethane foam	No	Yes	10,000 ppm
Booster Seat	Safety 1 st	Kmart	100% polyurethane foam	No	No	n/a
Crib Wedge	Dexbaby	Babies R Us	100% polyurethane foam	Yes	Yes	1200 ppm
Cradle Pad	Babies R Us	Babies R Us	100% polyurethane foam	Yes	Yes	4100
Diaper Changing Kit	Koala Baby	Babies R Us	Polyurethane foam (filling)	Yes	No	n/a
Oval Bassinet Pad	Babies R Us	Babies R Us	100% polyurethane foam	Yes	Yes	7200 ppm