Toxic-Free Children's Act (SB 151):

Protecting Alaska's children from exposure to toxic chemicals

Alaska Community Action on Toxics | Tris Flame Retardant Fact Sheet | February 2014

Chemicals of Concern: Toxic Tris Flame Retardants

Senate Bill (SB) 151, introduced in the Alaska State Legislature on January 31, 2014 by Senator Donny Olson M.D., would ban the sale of children's products that contain toxic flame retardant chemicals known as "tris." This legislation is needed because our current regulatory system does not protect children from exposure to these harmful chemicals. Manufacturers are not required to disclose the use of toxic flame retardant chemicals in children's products.[1] In addition, recent scientific studies have found tris chemicals in baby and children's products including nursing pillows, nap mats, bassinet mattresses, baby carriers, portable cribs, car seats, sleep positioners, changing table pads, rockers, play tents and tunnels; as well as in home and office furniture foam in couches and chairs.[2,3]

What are toxic flame retardants?

Flame retardants are chemicals added to household products such as foam or plastics to reduce the product's flammability and to meet arcane flammability standards.[4] These toxic chemicals are used in products without providing proven fire safety benefits.[5] Polybrominated diphenyl ethers (PBDEs) have been commonly used as flame retardants in furniture and electronics. In 2002, countries began to phase out certain PBDEs including penta- and octa-BDE because of their toxic properties.[6] These substances were banned under the global, legally binding provisions of the Stockholm Convention on Persistent Organic Pollutants ("POPs" treaty in 2009 because they are persistent, bioaccumulative, and concentrate in remote areas such as the Arctic.[7] PBDEs are being replaced by other flame retardant chemicals which have similar properties and pose unnecessary risks to health and the environment.

The tris flame retardant TDCPP was phased out in children's sleepwear in the 1970's.

Why is tris showing up in children's products?

With the phase out of the flame retardant chemical penta-BDE for use in furniture foam and children's products, chemical manufacturers replaced it with alternative flame retardants including a group of chemicals known as chlorinated tris. One tris flame retardant - TDCPP (tris(1,3-dichloro-2-propyl) phosphate) was detected the most frequently in a recent study of 101 products intended for use by infants and young children.[8,9] The use of TDCPP on children's sleepwear was phased out in the 1970s because the flame retardant was found to be mutagenic. This mutagenic flame retardant TDCPP is now widely found in children's products.[10] Other tris chemicals such as TCPP (tris(1-chloro-2-propyl)phosphate) and TCEP (tris(2-chloroethyl)phosphate) are also commonly used replacement chemicals in polyurethane foam for furniture and children's products. [11]

How are we exposed?

Tris flame retardants are chemical additives that leach from furniture and children's products over time contaminating the indoor environment, and accumulating in household dust.[12] Household dust is a primary route of exposure for people. Babies, infants, and young children have a greater risk of exposure and are more vulnerable at these critical stages of development because they are often in close contact with the floors and products in the home. They can ingest contaminated dust from their hands, toys, and food.[13] Dusting with a damp microfiber cloth or wet mopping can reduce the amount of airborne household dust.

What are the health risks of exposure to tris?

The US Consumer Product Safety Commission determined that chlorinated tris (TDCPP) is a probable human carcinogen[14] and it was listed in 2011 on California's Proposition 65 list of chemicals known to cause cancer.[15] Documented health effects of TDCPP include reproductive harm (i.e. reduced semen quality in men) and hormone disruption (altered hormone levels related to fertility and thyroid function in men),[16,17] and DNA mutations in laboratory studies.[18] Laboratory studies demonstrate that TDCPP is also a potent neurotoxicant.[19,20] Studies in fish indicate that early life exposure to TDCPP results in abnormal development.[21] TCEP is also included on California's list of known cancer-causing chemicals.[22] The European Union listed TCEP as a Substance of Very High Concern in 2010 due its reproductive toxicity and potential to impair fertility.[23] TCPP has been used as a replacement flame retardant for chlorinated tris since the 1960s and is chemically similar to the other tris chemicals. There is very little research on TCPP and no research has shown its safety in children's products. Laboratory studies indicate that TCPP is a possible carcinogen, disrupts red blood cells, and irritates the skin.[24] TCPP is found widely in indoor dust and in the environment. TCPP is linked with genetic damage in studies of human cells.[25] In laboratory studies, TCPP altered the length of the menstrual cycle.[26]

Are there safe alternatives?

Yes. Responsible manufacturers are using design methods that eliminate the need for toxic flame retardant chemicals such as naturally fire-retardant materials and barrier technologies. Companies that make baby and children's products with materials such as polyester-filled and cotton-covered pads and mattresses and polypropylene foam without chemical flame retardants include: BabyLuxe Organic, Baby Björn, Boppy; and products with polypropylene foam such as Orbit Baby.[27]

What can we do?

Support efforts in Alaska to provide toxic-free fire safety by speaking out for passage of Toxic-Free Children's Act (SB 151)! Use a damp mop or rag when dusting to keep household dust from becoming airborne and use a HEPPA filtered vacuum to reduce your exposure.

Learn more at www.akaction.org.

[1] Betts, KS. 2013. Exposure to TDCPP appears widespread. Environmental Health Perspectives 121(5):A150.
[2] Stapleton, HM et al. 2011. Identification of flame retardants in polyurethane foam collected from baby products. Environmental Science and Technology 45:5323-5331.
[3] Stapleton, HM et al. 2009. Detection of organophosphate flame retardants in furniture foam and U.S. house dust. Environmental Science and Technology 43(19):7490-7495.
[4] Chemical flame retardant additives in U.S. furniture foam became the norm in response to the 1975 California flammability standard Technical Bulletin (TB117). And although TB117 was a California standard, manufacturers often chose to sell TB117-compliant products across the U.S. and Canada to avoid maintaining a double inventory and for defense against liability claims. In 2013, TB 117 was amended to protect public health and fire safety without the need for toxic chemicals. Green Science Policy Institute, 2013, accessed at: http://greensciencepolicy.org/topics/furniture/.
[5] DiGangi, J et al. 2010. San Antonio Statement on Brominated and Chlorinated Flame Retardants. Environmental Health Perspectives 118(12):A516-A518.
[6] Stapleton, HM et al. 2009. Detection of organophosphate flame retardants in furniture foam and U.S. house dust. Environmental Science and Technology 43(19):7490-7495.
[7] Stockholm Convention on Persistent Organic Pollutants as amended in 2009—Text and Annexes. 2010. United Nations Environment Programme Secretariat of the Stockholm Convention on Persistent Organic Pollutants. Available: www.pops.int
[8] Stapleton, HM et al. 2011. Identification of flame retardants in polyurethane foam collected from baby products. Environmental Science and Technology 45:5323-5331.
[9] Betts, KS. 2013. Exposure to TDCPP appears widespread. Environmental Health Perspectives 121(5):A150.
[10] Gold, MD et al. 1978. Another flame retardant, tris-(1,3-dichloro-2-propyl)-phosphate, and its expected metabolites are mutagens. Science 200(4343):785-787.
[11] State of California Office of Environmental Health Hazard Assessment Proposition 65 List: Accessed at: http://oehha.ca.gov/prop65/prop65_list/Newlist.html.
[12] Stapleton, HM et al. 2009. Detection of organophosphate flame retardants in furniture foam and U.S. house dust. Environmental Science and Technology 43(19):7490-7495.
[13] Stapleton, HM et al. 2011. Identification of flame retardants in polyurethane foam collected from baby products. Environmental Science and Technology 45:5323-5331.
[14] Babich, MA et al. 2006. *CPSC Staff Preliminary Risk Assessment of Flame Retardant (FR) Chemicals in Upholstered Furniture Foam.* Bethesda, MD: U.S. Consumer Product Safety Commission.
15 State of California Office of Environmental Health Hazard Assessment Proposition 65 List: Accessed at: http://oehha.ca.gov/prop65/prop65_list/Newlist.html.
[16] Meeker, JD and HM Stapleton. 2010. House dust concentrations of organophosphate flame retardants in relation to hormone levels and semen quality parameters. Environmental Health Perspectives 118(3):318-323.
[17] Stapleton, HM et al. 2011. Identification of flame retardants in polyurethane foam collected from baby products. Environmental Science and Technology 45:5323-5331.
[18] Gold, MD et al. 1978. Another flame retardant, tris-(1,3-dichloro-2-propyl)-phosphate and its expected metabolites are mutagens. Science 200(4343):785-787.
[19] Betts, KS. 2013. Exposure to TDCPP appears to be widespread. Environmental Health Perspectives 121(5):A150.
[20] Stapleton, HM et al. 2011. Identification of flame retardants in polyurethane foam collected from baby products. Environmental Science and Technology 45:5323-5331.
[21] McGee, SP et al. 2012. Early zebrafish embryogenesis is susceptible to developmental TDCPP exposure. Environmental Health Perspectives 120(11):1585-1591.
[22] State of California Office of Environmental Health Hazard Assessment Proposition 65 List: Accessed at: http://oehha.ca.gov/prop65/prop65_list/Newlist.html.
[23] European Chemicals Agency. 2009. Support document for identification of tris(2-chloroethyl)phosphate as substance of very high concern because of its CMR properties. http://echa.europa.eu/doc/candidate_list/svhv_supdoc_tris_phosphate_publication.pdf.
[24] Safe Kids Campaign Report of the Green Science Policy Institute 2011. Accessed at: http://www.greensciencepolicy.org/wp-content/uploads/2013/12/Safe-Kids-Campaign-Report.pdf.
[25] European Union Risk Assessment Report. 2008. Tris(2-chloro-1-methylethyl)phosphate (TCPP). http://echa.europa.eu/documents/10162/13630/trd_rar_ireland_tccp_en.pdf.
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[27] Safe Kids Campaign Report of the Green Science Policy Institute 2011. Accessed at: http://www.greensciencepolicy.org/wp-content/uploads/2013/12/Safe-Kids-Campaign-Report.pdf