TOXIC-FREE FUTURE
SCIENCE • ADVOCACY • RESULTS

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DON'T SLEEP ON IT:
GETTING TOXIC FLAME RETARDANTS OUT OF NAP MATS

Parents seek out childcares that provide a safe, healthy environment for their children to grow and learn. Commonly used materials in childcares, however, can include toxic chemicals linked to cancer, obesity, and trouble learning.

Nap mats, for example, can be found at nearly every childcare center. Typically, they are one- or two-inch thick foam mattresses with a wipeable cover, often made of vinyl. Most centers store them in the same room children play in when they are not in use. Unfortunately, these mats appear to serve as not just a comfortable place to rest but also as a source of toxic chemicals.

FLAME RETARDANTS IN NAP MATS

Until 2013, nearly all mats nationwide were made with flame-retardant-containing foam. These flame retardants are mixed in with the foam rather than chemically bound, and they escape over time and contaminate indoor air and dust.

Recent research suggests that nap mats can add to children's flame retardant exposure. Researchers have found that childcare centers that use nap mats have higher levels of cancer-causing flame retardants in their dust, and children who attend childcare have greater exposure to flame retardants. Now, new research has been completed in Seattle by Toxic-Free Future and Indiana University that provides evidence that switching to flame-retardant-free nap mats can reduce children's exposure.

GOING FLAME RETARDANT FREE IN SEATTLE

After 2013, most nap mat makers started to gradually produce mats free of flame retardants. Depending on the durability of the mats, providers may replace them frequently or may have the same mats for many years. Childcare providers therefore currently have a broad range of different mats and many have mats purchased before or around 2013 that contain flame retardants.

Toxic-Free Future partnered with seven Seattle-area childcare providers to study whether replacement of flame-retarded nap mats with flame-retardant-free mats affected indoor levels of flame retardants. We recruited seven centers serving low-income families; testing showed that mats in six of the centers contained flame retardants (results shown in Table 1).

TABLE 1: CONCENTRATIONS OF FLAME RETARDANTS IN NAP MATS (% BY WEIGHT) PRE-REPLACEMENT

		Chlorinated	Organophosphate			Brominated		Total Sum
Center #	Material	TDCIPP	TPhP	TMTP	TBPP	EHTBB	BEHTBP	FR
CC1	PUF							
CC2	PUF		0.99	0.19		2.7	1.5	5.5
CC3	PUF	6.8	0.57	0.066	0.19	0.00062		7.6
CC4	PUF		0.41	0.033	0.21	2.5	1.4	4.7
CC5	PUF		0.78	0.17		2.3	1.1	4.4
CC6/7	PUF		0.54	0.041	0.25	2.7	1.5	5.0

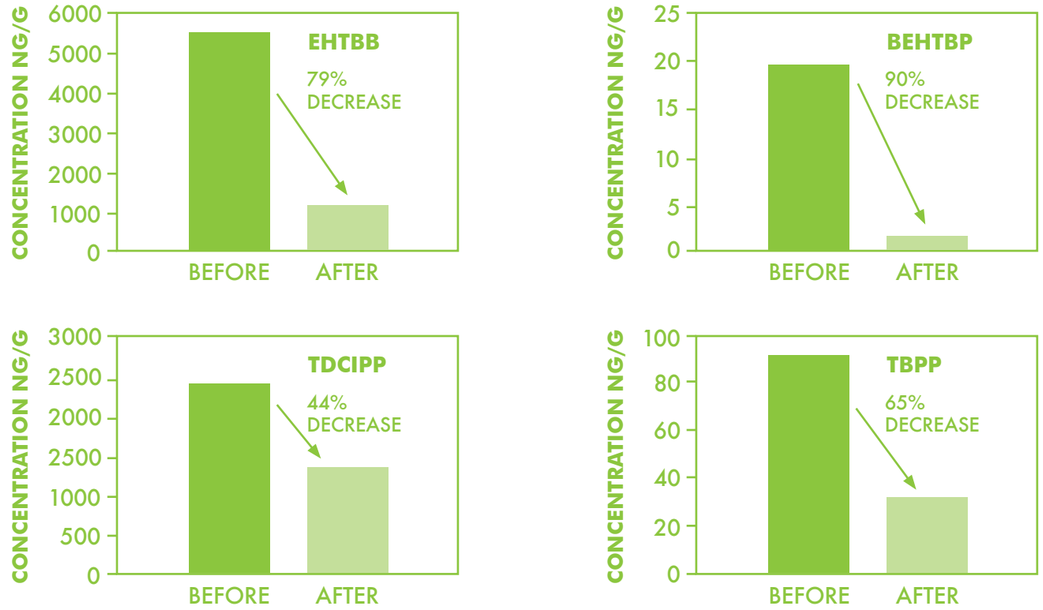
The flame retardants detected in nap mats included several components of the product Firemaster 550, such as the brominated flame retardants EHTBB and BEHTBP. The U.S. Environmental Protection Agency has given each of these chemicals a high-hazard designation due to their ability to build up in people, fish, and wildlife. There is also evidence linking the Firemaster 550 mixture to obesity and early puberty. Mats in one center contained chlorinated Tris, or TDCIPP, which has been designated as a carcinogen by the State of California. We wanted to know whether levels of flame retardants in indoor air and dust would change after nap mats were replaced. We collected air and dust samples from each center, using a specially outfitted vacuum cleaner as well as passive air samplers that collect an air sample over a 4-week period.

After the first round of sampling, we replaced their current mats with flame-retardant-free mats. We used mats that also were free of phthalates, which may be present in vinyl nap mat covers.

We waited three months after replacement, then collected air and dust samples again. Our partners at Indiana University analyzed the samples for a suite of flame retardants. We found nine flame retardants in 100% of dust samples, and seven in 100% of air samples. Compounds detected included the brominated, chlorinated, and phosphate flame retardants present in the nap mats, as well as other flame retardants such as PBDEs.

Levels in dust of four flame retardants found in the nap mats were lower in the samples taken after replacement of the mats. Figure one shows the median levels pre- and post-replacement, and the percent change, of those selected flame retardants.

FIGURE 1: CHANGES IN FLAME RETARDANT LEVELS IN DUST



CONCLUSION

Childcare providers want to create a safe space for children to learn and play, but common products in the childcare environment contain chemicals that can harm children's health. This pilot study showed a surprisingly strong effect of removing a single source of flame retardants—treated nap mats—on flame retardant levels in childcares. Levels of four of the primary flame retardants detected in nap mats decreased in dust after mats were switched out for flame-retardant free mats or cots.

Policymakers should ensure that only the safest materials, including flame retardants, plasticizers, and other compounds, are allowed for use around children. In the meantime, providers can protect the health of children through careful selection of products used in the childcare setting.

Specifically, since nap mats are such an important item in childcare centers, managers should ensure that they are free of flame retardants. In addition, childcare providers should purchase vinyl-free mats to minimize exposure to phthalates.