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Chemical Burns

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THIRTY years ago, as a researcher at the University of California, Berkeley, I published papers in *Science* magazine calling for the ban of brominated and chlorinated Tris, two flame retardants used in children's sleepwear. Both forms of Tris caused mutations in DNA, and leached from pajamas into children's bodies. In 1977, when brominated Tris was found to be a potent carcinogen, the Consumer Product Safety Commission banned Tris from children's sleepwear.



So I was astonished to learn recently that the same chlorinated Tris that I helped eliminate from children's pajamas is being used today in the foam inside furniture sold in California to meet standards there for fire retardancy, and that the state is considering similar standards for pillows, comforters and mattress pads. The federal safety commission, following California's lead, is working to set a national standard for fire-retardant furniture.

Unfortunately, the most effective and inexpensive way for manufacturers to meet such standards is to treat bedding and furniture with brominated and chlorinated hydrocarbons like Tris. Though the chemical industry insists that they are safe, when tested in animals most chemicals in this family have been found to cause health problems like cancer, sterility, thyroid disorders, endocrine disruption, developmental impairment or birth defects, even at very low doses.

Many of these chemicals are long-lived and accumulate, especially in people and other animals high on the food chain. For example, PCBs, chlorinated chemicals that were also used as flame retardants, were banned in 1977, but very high concentrations can still be found in many creatures, including dead killer whales washed ashore in British Columbia.

According to the polyurethane-foam industry, if the new federal standard for furniture were similar to the California standard, using current technology, then an estimated 17 million pounds of fire-retardant chemicals, mostly brominated and chlorinated hydrocarbons, would be used annually. (A more rigorous standard also being considered by the safety commission would require up to 70 million pounds of chemicals a year, the industry says. Some of that could eventually end up in people and the environment.)

To complicate matters, consumers wouldn't know whether the sofa they're curled up on had been treated with Tris or its cousins. The United States does not require labeling on furniture contents.

All this is not to say that furniture fires don't pose a danger. According to a recent report from the commission, 560 Americans died in house fires that started in upholstered furniture in 2003. But by contrast, cancer killed more than 500,000.

What makes the potential increased use of chlorinated and brominated fire retardants all the more troubling is that it comes at a time when the risk of furniture fires is receding.

Most fatal furniture fires are caused by cigarettes, which typically smolder for half an hour after being put down. The good news is that after decades of opposition from the cigarette industry, cigarettes that extinguish themselves within minutes are now mandatory in New York State and laws have been passed requiring them in five other states. They are likely to become universal in the United States in the near future, thereby greatly reducing the risk of furniture fires — and the need for chemical treatments.

So why are we still using these potentially dangerous chemicals?

In the United States, chemicals are innocent until proven guilty: we wait until someone has been harmed by exposure to chemicals before regulating them. This is not an effective strategy, since most cancers occur 20 to 40 years after exposure, and are usually caused by multiple agents. Consequently, it's very difficult to link human cancer to specific chemicals or consumer products.

And there's another problem: In the United States, the manufacturers of consumer products are not required to disclose the results of toxicity tests to regulators or the public before selling their products.

In marked contrast, the European Union is adopting a "better safe than sorry" philosophy through regulations known as the Registration, Evaluation and Authorization of Chemicals. Manufacturers must demonstrate that their products are safe for people and the environment to introduce them and keep them on the market.

This standard provides a strong incentive for finding new alternatives to potentially dangerous brominated and chlorinated chemicals. An innovative Swedish company, for example, is developing a nontoxic fire retardant, Molecular Heat Eater, derived from oranges and lemons, that prevents fires in plastics and fabrics.

Home fires are a defined danger in the present. Chemical fire retardants pose a more ambiguous risk that can last for decades. We need to consider the larger picture before passing regulations that would put chemical fire retardants inside our pillows and those of our children, who are even more vulnerable to carcinogens. These regulations would lead to the widespread use of fire retardants that could be ultimately much more hazardous to us and our environment than the fires they're intended to prevent.

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