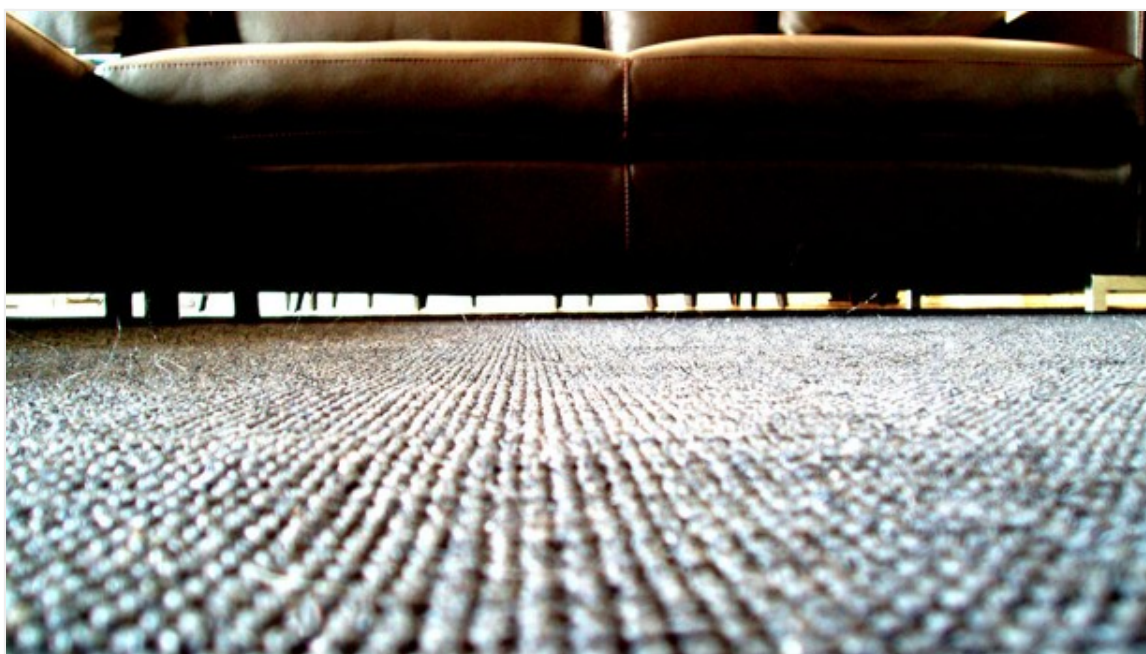


The Atlantic

How to Test a Couch for Toxins

Because industrial chemical use is minimally regulated, a lab at Duke University is offering free analyses of furniture for potentially hazardous compounds.



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TEXT SIZE



It began with a smell. Kerri Duntley had just bought a pair of large, cream-colored couches. Pregnant with her third child, she was excited to furnish her new house, a five-bedroom near Charlotte, North Carolina. But she was concerned about something wafting from the couches, which she described as "a strong chemical smell."

Duntley had reason to be concerned. Years before, while pregnant with her first child, she began reading about environmental pollutants—those

in our air, and those that creep out of consumer goods and into our bodies. Meanwhile, her family suffered from one health ailment after another. Her daughter was diagnosed with autoimmune and thyroid disorders, as was her husband. In 2010, Duntley herself was diagnosed with thyroid cancer.

As the scent continued to fill her living room, Duntley asked herself a troubling question: What was causing the couches to smell like industrial chemicals? The answers weren't easy to find. Duntley searched in web forums and even tried contacting the couches' manufacturer. "I called and called and called," she said. "They just would not give me the information." She grew frustrated and began looking for new couches. It was then that she discovered an [unusual service run by a Duke University lab](#).

The lab's offer was simple. First, the lab instructed, wield a pair of scissors. Grab something made with polyurethane foam—say, a mattress or the innards of a couch cushion. Cut a small chunk from the foam. Wrap the surgical work in tinfoil, ziplock seal it and mail the crime-scene-looking evidence off to Durham, North Carolina. Wait up to 45 days, the lab said, and it'll arrive: a report detailing toxic flame retardants embedded in the foam.

Duntley complied. When the results came back, she learned that her couch sample had tested positive for two flame retardants, including [one that has proven harmful in animal studies](#), a finding that she called heartbreaking. Her experience points to a vast gap in safety information about consumer goods. With the U.S. government's limited power to regulate chemicals, many consumers, like Duntley, are left to piece together their own crude health-risk assessments. That fabric softener? It may smell like the Elysian Fields, but what if its unlisted ingredients cause

cancer? And what about that reusable water bottle? It says BPA-free, but what, really, is it made of?

Some of the chemicals were carcinogens. Others were from a chemical class that has been linked to lower IQ scores, ADHD, and thyroid disorders.

[Government officials](#) , [academic researchers](#), [the chemical industry](#) and [environmentalists](#) agree: The U.S. system of chemical regulation is broken. But while the fight over reform [continues in Washington](#), consumers remain blind to many of the chemicals that enter their homes. Duke's service is looking in its small way to change that. The lab—which offers anyone a free chemical analysis of polyurethane foam—has informed hundreds of Americans about their furniture's toxicity.

At the same time, the foam samples have given Duke's team a large bank of crowdsourced research. By offering a free service to an anxious public, Duke's scientists are gaining a clearer view of chemical manufacturing. And they're learning just how much we don't know about the chemicals that enter our homes.

* * *

[Heather Stapleton](#) is no stranger to flame retardants, a class of chemicals that [limit fires in consumer products](#) but which have been linked to [cancer and neurological disorders](#). Stapleton, the environmental chemist who supervises Duke's lab, first studied flame retardants while working on her dissertation, which focused on the chemicals' presence in Lake Michigan's aquatic life. As a postdoc, she turned toward the terrestrial world. Stapleton was part of a scientific cohort that [found ingesting dust](#)—say,

getting our dusty hands on a burger—is by far [our largest source of exposure](#) to flame retardants; flame retardants aren't chemically bound to their products, and so they attach themselves to airborne dust.

Still, Stapleton hadn't yet focused directly on consumer products. That changed in 2008, alongside a major change in her life. “When I was pregnant with my first child, I started realizing that a lot of baby products in particular had a label on them indicating that they met a flammability standard for residential furniture, through the state of California,” she said.

The 1975 California standard, Technical Bulletin 117, was a regulation stemming from good intentions. By the early 1970s, [roughly 12,000 Americans died](#) each year from household fires, many of which were ignited by cigarettes. If the state government couldn't stop people from smoking, it could at least fireproof smokers' furniture. TB 117 required upholstered furniture to [withstand a small flame for 12 seconds](#) with limited damage. But that's a lofty feat for [polyurethane foam](#), a highly combustible material used in car seats, couch cushions, and mattresses, among other products. To meet the standard, manufacturers added chemical flame retardants to their products.

But what began in California soon became a [de facto national standard](#), since furniture companies didn't want to manufacture separate lines. Stapleton was interested to see how chemically saturated our furniture really is. So she and her colleagues asked families for samples of their baby products' foam. After reviewing 101 samples from across thirteen states, [Stapleton's 2011 study](#) reached a startling conclusion: Flame retardants accounted for about 5 percent of the products' weight, and the chemicals were found in 80 percent of the samples.

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Some of the chemicals were carcinogens. Others were from a chemical class known as polybrominated diphenyl ethers, or PBDEs, which have been linked to [lower IQ scores](#), [attention deficit hyperactivity disorder](#), and [thyroid disorders](#). The most common flame retardant among the samples was tris(1,3-dichloroisopropyl)phosphate, or TDCPP, which researchers [say is likely to harm the neurological development of infants](#). TDCPP, in fact, was used throughout the 1970s [in children's pajamas](#), until critical health research led manufacturers in 1977 to stop using it. Yet the chemical had reemerged in products like strollers and baby mattresses.

Stapleton's findings gained national media attention, and soon her inbox grew crowded. "We were receiving lots of requests from the general public about, 'What should I buy? I'm pregnant, I have this baby, I don't want to have these chemicals in my products,'" she said.

The lab offered to test some of these strangers' furniture for free. But the requests kept coming. That's when Stapleton and her colleagues decided to expand the scope of the testing and conceived of a free service for the public. They'd test anyone's polyurethane foam for a suite of seven common flame retardants as something of a public service, since it would be funded by a federal grant (itself funded by taxpayer dollars).

The service would also aid Stapleton's research, offering a valuable stream of crowdsourced data about the chemicals used in furniture.

“Saying to anyone, ‘Send me your sample and I’ll tell you what it is’—I don’t know of anyone else who does it,” said [Linda Birnbaum](#), the director of the National Institute of Environmental Health Sciences, which funds the lab. Birnbaum said she believes that consumers are hungry for this sort of information. Since February, Stapleton’s group has been sampling up to 50 pieces of foam each month. Hundreds of people have submitted samples, and at times, demand has been so overwhelming that the lab has shut down its website.

“If you’re dealing with something like a mattress or a camping tent or a TV, you’re not told what it’s made of,” Birnbaum said. “And I think that many consumers would like to be able have that information readily available, and then they can make their own decision [on] whether this is something that they want.”

By crowdsourcing her research, Stapleton has also uncovered a flame retardant that academic literature has yet to identify. The flame retardant is a chlorinated organophosphate, like TDCPP, and its health effects are unknown, she said. Stapleton said that this recent discovery-by-accident followed the same pattern as her research on Firemaster 550, a popular flame retardant that replaced two widespread PBDEs after they were withdrawn from the market.

Firemaster 550’s manufacturer, Great Lakes Solutions, maintains that its newer flame retardants are less of a problem for human health. Marshall Moore, Great Lakes’ director of innovation and sustainability, said that the large majority of health research focuses on flame retardants that were withdrawn from the market about a decade ago. The research, he said, “is really not representative of the flame retardants that are on the market today.”

But emerging research has raised concerns about Firemaster 550, too. One study from Boston University and Duke researchers found that the [chemical mixture may cause obesity in humans](#). Stapleton found the [same effect in rats](#).

How is a quasi-DIY service one of the few free options for consumers who want to know what's in their furniture? And why is it that researchers like Stapleton stumble upon new chemicals, only to find evidence of their harm years after the chemicals have entered millions of homes? But the real problem is beyond flame retardants. As Stapleton put it, "We need more critical evaluation of chemicals before they go onto market."

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That sort of evaluation is currently the province of the [Toxic Substances Control Act](#) (TSCA), the 1976 federal law that governs commercial chemicals. (Not including pesticides and pharmaceuticals.) TSCA's many critics say the law cripples the government's power to regulate chemicals. If a manufacturer wants to bring a new chemical to market, for example, it has few requirements to prove that the chemical is safe. Instead, the responsibility belongs to the U.S. Environmental Protection Agency, according to [Jim Jones](#), EPA's assistant administrator for the Office of Chemical Safety and Pollution Prevention. "The burden is pretty much on us to figure out if there's an issue, which is not true for drugs in the United States, it's not true for pesticides in the United States," he said.

Under TSCA, manufacturers can also request that the EPA [keep secret a broad array of information](#) about their chemicals, in order to protect

themselves from their competition. That, coupled with the EPA's weak ability to demand data, has left consumers with a limited view of the chemicals that enter the market.

California recently [updated TB 117](#), in order to require fewer flame retardants in furniture. But gauging the response to California's new mandate remains an imprecise science, since no one is tracking every manufacturer's use of flame retardants, Stapleton said.

With elections looming and Congress divided, TSCA is unlikely to receive an overhaul this year, despite pleas from both public health advocates and the chemicals industry. Even after November's elections, TSCA reform may remain elusive. "We're at a period when we're not passing any major laws in this country," said Sarah Vogel, who directs the health program at the Environmental Defense Fund. "Reforming a major piece of environmental legislation hasn't happened in a long time."

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Three years ago, when I removed my new memory foam mattress from its box, I noticed an acrid smell like what Duntley described. It was something like paint thinner mixed with stale wine, and it lasted for months. I've wondered about that smell ever since. So I took a sample of the mattress to Stapleton's lab. Several days later, I received my report by email and learned that my mattress didn't have any flame retardants—or at least not the ones that Duke was looking for.

I asked Stapleton what she thought the smell may have been, and she explained that flame retardants are odorless. "What you're smelling are VOCs," she said, referring to [volatile organic compounds](#), some of which are harmful gases, emitted from thousands of products, including paint strippers and photocopiers. What kind of VOC, though, she couldn't say. I

knew, like Duntley, that I'd have to spend countless hours to find the answer, if ever I could.

"The burden is pretty much on us to figure out if there's an issue, which is not true for drugs or pesticides in the United States."

How are any of us supposed to make smart purchases when we're starved for information, yet fed news about the omnipresence of dangerous chemicals? I posed the question to [Brian Zikmund-Fisher](#), a professor at the University of Michigan who studies the way consumers make decisions about their health. He reminded me that we live in a world full of risks. But when we look at one risk in isolation, we tend to overinflate its value. "Since we can't avoid living in a world that has lots of risk, part of the important question about how to survive is, 'Am I worrying about the stuff that's most useful for me to worry about?'"

Some people may opt to buy organic, pesticide-free cookies instead of an apple grown with pesticides, he explained. But that's a poor choice. "The fruit's probably going to win that one." But deciding between apples and cookies is easy, at least it is for me. What about one lotion with triethanolamine and another with polysorbate 60? He agreed that sort of analysis shouldn't be left to consumers.

"Trying to ask a consumer to be the judge of which one is better is well beyond the level of what anyone can do," he said. Instead, consumers need government agencies or other testing agencies to help them make these sorts of decisions.

The EPA, in fact, [already has a program like this](#). It isn't as well known as it could be, but the agency is looking to change that, in part by redesigning the program's label to be more consumer-friendly, according to Jim Jones, of the EPA. Which is a good start. I'm willing to look at the sugar count on the side of my cereal box. But when it comes to laundry detergent, I'd happily surrender my judgment to an EPA logo. And if Zikmund-Fisher is right, once I stop fretting about the chemicals in my washing machine, I'll have plenty of room for new anxieties.

ABOUT THE AUTHOR

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