

Tests reveal high chemical levels in kids' bodies

By Jordana Miller, CNN
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Story Highlights

- So-called "body burden" testing reveals industrial chemicals in humans
- Many of these chemicals harm rats, but studies on humans are preliminary
- One scientist warns modern-day humans are living an "unnatural experiment"

NEW YORK (CNN) -- Michelle Hammond and Jeremiah Holland were intrigued when a friend at the Oakland Tribune asked them and their two young children to take part in a cutting-edge study to measure the industrial chemicals in their bodies.

"In the beginning, I wasn't worried at all; I was fascinated," Hammond, 37, recalled. But that fascination soon changed to fear, as tests revealed that their children -- Rowan, then 18 months, and Mikaela, then 5 -- had chemical exposure levels up to seven times those of their parents.



Tests showed Rowan's blood had high levels of a chemical that can cause thyroid dysfunction in rats.

"[Rowan's] been on this planet for 18 months, and he's loaded with a chemical I've never heard of," Holland, 37, said. "He had two to three times the level of flame retardants in his body that's been known to cause thyroid dysfunction in lab rats."

The technology to test for these flame retardants -- known as polybrominated diphenyl ethers (PBDEs) -- and other industrial chemicals is less than 10 years old.

Environmentalists call it "body burden" testing, an allusion to the chemical "burden," or legacy of toxins, running through our bloodstream. Scientists refer to this testing as "biomonitoring."

Most Americans haven't heard of body burden testing, but it's a hot topic among environmentalists and public health experts who warn that the industrial chemicals we come into contact with every day are accumulating in our bodies and endangering our health in ways we have yet to understand.

"We are the humans in a dangerous and unnatural experiment in the United States, and I think it's unconscionable," said Dr. Leo Trasande, assistant director of the Center for Children's Health and the Environment at the Mount Sinai Medical Center in New York City.

Trasande says that industrial toxins could be leading to more childhood disease and disorders.

"We are in an epidemic of environmentally mediated disease among American children today," he said. "Rates of asthma, childhood cancers, birth defects and developmental disorders have exponentially increased, and it can't be explained by changes in the human genome. So what has changed? All the chemicals we're being exposed to." Elizabeth Whelan, president of the American Council on Science and Health, a public health advocacy group, disagrees.

"My concern about this trend about measuring chemicals in the blood is it's leading people to believe that the mere ability to detect chemicals is the same as proving a hazard, that if you have this chemical, you are at risk of a disease, and that is false," she said. Whelan contends that trace levels of industrial chemicals in our bodies do not necessarily pose health risks.

In 2004, the Hollands became the first intact nuclear family in the United States to undergo body burden testing. Rowan, at just 1½ years old, became the youngest child in the U.S. to be tested for chemical exposure with this method.

Rowan's extraordinarily high levels of PBDEs frightened his parents and left them with a looming question: If PBDEs are causing neurological damage to lab rats, could they be doing the same thing to Rowan? The answer is that no one knows for sure. In the three years since he was tested, no developmental problems have been found in Rowan's neurological system.

Trasande said children up to six years old are most at risk because their vital organs and immune system are still developing and because they depend more heavily on their environments than adults do.

"Pound for pound, they eat more food, they drink more water, they breathe in more air," he said. "And so [children] carry a higher body burden than we do."

Studies on the health effects of PBDEs are only just beginning, but many countries



Rowan, his sister Mikaela, and their parents were the first intact U.S. nuclear family to undergo body burden testing.

have heeded the warning signs they see in animal studies. Sweden banned PBDEs in 1998. The European Union banned most PBDEs in 2004. In the United States, the sole manufacturer of two kinds of PBDEs voluntarily stopped making them in 2004. A third kind, Deca, is still used in the U.S. in electrical equipment, construction material, mattresses and textiles.



The amount of industrial chemicals in their kids' bodies surprised Michelle Hammond and Jeremiah Holland.

Another class of chemicals that showed up in high levels in the Holland children is known as phthalates. These are plasticizers, the softening agents found in many plastic bottles, kitchenware, toys, medical devices, personal care products and cosmetics. In lab animals, phthalates have been associated with reproductive defects, obesity and early puberty. But like PBDEs, little is known about what they do to humans and specifically children.

Russ Hauser, an associate professor of environmental and occupational epidemiology at the Harvard School of Public Health, has done some of the few human studies on low-level phthalate exposure. His preliminary research shows that phthalates may contribute to infertility in men. A study led by Shanna Swan of the University of Rochester in New York shows that prenatal exposure to phthalates in males may be associated with impaired testicular function and with a defect that shortens the space between the genitals and anus.

The Environmental Protection Agency does not require chemical manufacturers to conduct human toxicity studies before approving their chemicals for use in the market. A manufacturer simply has to submit paperwork on a chemical, all the data that exists on that chemical to date, and wait 90 days for approval.

Jennifer Wood, an EPA spokeswoman, insists the agency has the tools to ensure safe oversight.

"If during the new-chemical review process, EPA determines that it may have concerns regarding risk or exposure, the EPA has the authority to require additional testing," she said. EPA records show that of the 1,500 new chemicals submitted each year, the agency asks for additional testing roughly 10 percent of the time. The EPA has set up a voluntary testing program with the major chemical manufacturers to retroactively test some of the 3,000 most widely used chemicals.

Trasande believes that is too little, too late. "The problem with these tests is that they are really baseline tests that don't measure for the kind of subtle health problems that

we're seeing," Dr. Trasande said.

In the three years since her family went through body burden testing, Michelle Hammond has become an activist on the issue. She's testified twice in the California legislature to support a statewide body burden testing program, a bill that passed last year. Michelle also speaks to various public health groups about her experience, taking Mikaela, now 8, and Rowan, now 5, with her. So far, her children show no health problems associated with the industrial chemicals in their bodies.

"I'm angry at my government for failing to regulate chemicals that are in mass production and in consumer products." Hammond says. "I don't think it should have to be up to me to worry about what's in my couch."