

This is the bi-weekly bulletin of the TURI Library at the University of Massachusetts Lowell. Greenlist Bulletin provides previews of recent publications and websites relevant to reducing the use of toxic chemicals by industries, businesses, communities, individuals and government. You are welcome to send a message to [mary@turi.org](mailto:mary@turi.org) if you would like more information on any of the articles listed here, or if this email is not displaying properly.

## Researchers find unsafe levels of industrial chemicals in drinking water of 6 million Americans

Source: [The Washington Post, August 9, 2016](#)

Author: Brady Dennis

Drinking water supplies serving more than six million Americans contain unsafe levels of a widely used class of industrial chemicals linked to potentially serious health problems, according to a new study from Harvard University researchers.

The chemicals -- known as polyfluoroalkyl and perfluoroalkyl substances, or PFASs -- have been used for decades in a range of industrial and commercial products, including non-stick coatings on pans, food wrappers, water-repellent clothing and firefighting foam. Long-term exposure has been linked to increased risks of kidney cancer, thyroid problems, high cholesterol and hormone disruption, among other issues.

"Virtually all Americans are exposed to these compounds," said Xindi Hu, the study's lead author. "They never break down. Once they are released into the environment, they are there."

As part of the study, which was published Tuesday in *Environmental Science & Technology Letters*, the researchers examined concentrations of six types of PFAS chemicals in drinking water supplies around the country. The data came from more than 36,000 samples collected by the Environmental Protection Agency between 2013 and 2015.

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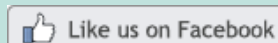
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See original study in *Environmental Science & Technology Letters*,  
["Detection of Poly- and Perfluoroalkyl Substances \(PFASs\) in U.S. Drinking Water Linked to Industrial Sites, Military Fire Training Areas, and Wastewater Treatment Plants"](#).

Also see July 2016 report from Greenpeace,  
["Hidden in plain sight: Poly-fluorinated chemicals \(PFCs\) in the air of outdoor stores"](#).

## **Biomimicry Is A Promising Approach for Driving Innovation, Study Finds**

[Source: GOJO, August 3, 2016](#)

Author: Michelle Williams

A case study, "Biomimicry: Streamlining the Front End of Innovation for Environmentally Sustainable Products," shows that biomimicry, a relatively new field that seeks to emulate nature to find solutions to human problems, can potentially expand intellectual property, increase energy savings and accelerate product innovation. This case study, conducted by GOJO researchers, was recently published in *Research-Technology Management (RTM)*.

"At GOJO, sustainability is a key driver of innovation and biomimicry is energizing how we create sustainable value for all stakeholders through new product development," said Tom Marting, co-author of the study and facilities and resources management director for GOJO Industries. "Nature is one massive field testing laboratory that has been operating for nearly four billion years. If it doesn't work in nature, it's not going to be around very long."

A cross-functional team of 15 GOJO employees dedicated 165 hours in workshop sessions on biomimicry, attempting to increase the energy efficiency and environmental sustainability of liquid soap and sanitizer dispenser pumps. Ultimately, four patent applications for novel dispensing systems resulted from the team's efforts with the inspiration for each system stemming from nature.

[Read more...](#)

See original article in the journal, *Research-Technology Management*, ["Biomimicry: Streamlining the Front End of Innovation for Environmentally Sustainable Products"](#).

## **U.S. EPA Initiates First Bid to Restrict or Ban a Chemical -- Trichloroethylene (TCE) -- Under "New" TSCA**

[Source: JDSupra Business Advisor, August 10, 2016](#)

Author: Joseph Green

The U.S. Environmental Protection Agency (EPA) has launched the first effort under the recently amended Toxic Substances Control Act (TSCA) to restrict or ban a chemical. The new proposed rule, which was sent for Office of Management and Budget review in late July but is not yet available to the public, seeks to address perceived risks to workers and consumers exposed to the once-prevalent degreaser, trichloroethylene (TCE). EPA has not attempted such a TSCA Section 6 regulation in 25 years, since its efforts to ban asbestos were derailed in 1991.

Manufacturers and other facilities that use TCE in their operations should consider

engaging in the regulatory process, in particular to provide EPA data that may show minimal potential for worker or consumer exposure to TCE (and, therefore, minimal risk) with respect to the degreasing and spot cleaning applications at issue in the rule. Companies also may want to explore the potential for using alternative degreasing chemicals or processes, in the event that EPA does move forward with restrictions or a possible ban. In June, EPA signaled that it intends to issue the proposed TCE rule by the end of 2016 and a final rule in late 2017.

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*TURI's Note: See our [fact sheet](#) and other resources on TCE. Visit the TURI Library to read a book co-authored by our Laboratory Director, Dr. Jason Marshall, and Laboratory Field Specialist, Heidi Wilcox, *In Search of the Silver Bullet: Assessment of Alternatives for Trichloroethylene in Cleaning Operations*.*

## The chemical reactions taking place in your swimming pool

[Source: Chemical & Engineering News, August 1, 2016](#)

Author: Cella Henry Arnaud

Audrey Eldridge brings an inhaler with her whenever she gets in the pool. An elite Masters swimmer from Colorado Springs, she swims between 3,000 and 4,000 meters per day. She notices respiratory effects that can strike depending on the conditions where she's swimming.

Eldridge hasn't been diagnosed with asthma, but many elite swimmers have been. In fact, studies have shown a statistically significant link between professional swimming and the respiratory ailment. Professional swimmers like the ones who will dive into the pool at the Summer Olympics this week in Rio de Janeiro can log upward of 10,000 meters per day during training. That's a lot of time spent exposed to the chemicals in and around swimming pools.

It takes a lot of chemicals to make pool water safe for swimming. Untreated water can accumulate harmful Escherichia coli and Salmonella bacteria and protozoans such as Cryptosporidium parvum and Giardia lamblia. So the disinfection chemicals are necessary for killing pathogens, but at the same time, they don't just float around inertly in the water: Many of them react with organic material in the water -- dirt, sweat, urine, and even skin moisturizers -- to form disinfection by-products (DBPs).

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## An Unlikely Pair: Gymnastics & Toxic Chemicals

[Source: Healthy Babies, Bright Futures, July 28, 2016](#)

Author: Dr. Courtney Carignan

Almost a decade ago I remember being shocked to learn that the foam equipment in my gym likely contained flame retardant chemicals. Like many competitive gymnasts, I started the sport at a young age and by the time I was 18 had spent over 6,000 hours in the gym. I never dreamed that chemicals like this were in my gym, or that the chemicals in the foam would be getting into my body and the body of everyone else in the gym.

As I learned, the science shows that some flame retardants can harm the developing brain and others are linked to cancer and reproductive problems. Flame retardants, I also learned, are used in many products including polyurethane foam (like in upholstered furniture) as well as the plastic casings of electronics. If flame retardants are used in foam, I recall wondering, does this also include the foam found in landing mats and the loose foam pit commonly used by gymnasts? As a former gymnast, I knew that as the

foam ages, it creates a gritty dust that gets all over the gym, especially in the loose foam pit. The dust clings to your skin and can get into the eyes and mouth. I was concerned about what this could mean for gymnasts, so I conducted a study as part of my doctoral thesis. Three years ago I graduated and published that work reporting elevated levels of flame retardants in blood samples from a team of collegiate gymnasts as well as in the air, dust and foam of training equipment.

Public concern about health impacts has led to the phasing out of some flame retardants. But other chemicals have taken their place in the foam used in gyms. This month I published a follow-up study in *Environment International* that showed that these replacement flame retardants are getting into the bodies of gymnasts. We found these chemicals at higher levels in urine samples collected after practice compared to before practice among the same 11 collegiate gymnasts. One of the replacement flame retardants, triphenyl phosphate, was found in foam of their gym's loose foam pit as well as in foam from 25 of 28 foam samples collected from foam pits in 11 U.S. gyms.

[Read more...](#)

See original article in *Environment International*, "[Urinary biomarkers of flame retardant exposure among collegiate U.S. gymnasts](#)".

Find additional information on the website for [The Gymnast Flame Retardant Collaborative](#).

*TURI's Note:* Dr. Carignan received a grant from TURI in 2016. See more information about her project, "[Reducing Reliance on Flame Retardants in Foam Pits](#)".

## **Increased Susceptibility to Chemical Toxicity with Pre-existing Diseases: Case Studies with Particulate Matter, Cadmium, Mercury, Trichloroethylene and Dioxin**

[Source: U.S. Environmental Protection Agency, August 3, 2016](#)

[Authors: Sonawane, B., Yu-Sheng Lin, R. Dietert, and G. Ginsberg](#)

Numerous host and environmental factors may modulate vulnerability and risk. An area of increasing interest to risk assessors is the potential for chemicals to interact with pre-existing diseases and aging that may yield cumulative damage, altered chemical response, and increased disease susceptibility. We evaluated the relationships between chemicals and pre-existing disease and identify the type of information needed to evaluate the relationships of interest. Key among these is the existence of a clinically relevant and easy to measure biomarker of disease risk which is also modulated by a particular chemical of interest. This biomarker may be a physiological, biochemical, or genetic indicator that corresponds to a phase of the disease process and may be an indicator of where an individual is on the continuum of disease or health status. The relationship between chemical exposure and a biomarker may then be used to predict how preexisting conditions may modify health risks of chemical exposures. Several case studies are explored to describe the toxic chemical, the clinical biomarker, the impacted disease and the evidence that the chemical enhances disease risk: fine particulate matter/decreased heart rate variability/increased cardiopulmonary events; cadmium/decreased glomerular filtration rate/increased chronic kidney disease; methyl mercury/decreased paraoxonase-1/increased cardiovascular risk; trichloroethylene/increased anti-nuclear antibody/autoimmunity; dioxin/increased CYP1A1/hypertension. These case studies point out that consideration of how aging and the presence of pre-existing disease may modulate responses to chemical exposures is essential to the identification of important vulnerabilities and the development of new approaches to evaluate risk from exposure to environmental toxicants.

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## Quartz Common Product Profiles Now Available in Pharos

[Source: Healthy Building Network, August 1, 2016](#)

Author: Melissa Coffin

Since 2009, the Pharos Project's Building Products Library (BPL) has been a resource for those seeking disclosure of the chemicals and materials used to formulate and manufacture building products. More than 1,600 individual building products appear in the BPL, representing 15 different product categories (adhesives, flooring, etc.). Compiling this data was no easy feat. It required a lot of time reaching out to manufacturers and formulators and urging them to disclose the contents of their products. More often than not, companies would opt to hold back some portion of information as proprietary or confidential. At that point, HBN would do its own research to fill in the gap of this missing data.

Patent review, industry publications, trade data, academic articles, and government publications were all referenced to account for substances in the product that the manufacturer was unwilling to disclose directly.

In 2015, HBN brought this rigorous literature review approach to product research to a larger audience. We partnered with Flux, Google, and thinkstep on the Quartz Project, an open-source effort to introduce transparent data about the health and environmental hazards of building materials earlier in the construction process. For its part in that effort, HBN identified the typical composition of 102 products used in construction -- ready-mix concrete, steel beams, hardwood flooring, etc. These 102 products were described in Common Product Profiles, and are freely available in the Quartz database for browsing or download in both Excel or machine-readable formats. Hundreds of individual products were researched in this effort. HBN has continued to create additional Common Product Profiles since the Quartz Project research was completed.

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## 1-Bromopropane Listed Effective August 5, 2016, as Known to the State of California to Cause Cancer

[Source: California Office of Environmental Health Hazard Assessment, August 5, 2016](#)

Effective August 5, 2016, the Office of Environmental Health Hazard Assessment (OEHHA) is adding 1-bromopropane (CAS No. 106-94-5) to the list of chemicals known to the state to cause cancer for purposes of Proposition 65.

The listing of 1-bromopropane is based on formal identification by the National Toxicology Program (NTP), an authoritative body, that the chemical causes cancer. The criteria used by OEHHA for the listing of chemicals under the "authoritative bodies" mechanism can be found in Title 27, Cal. Code of Regs., section 25306.

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*TURI's Note:* 1-bromopropane was added to the TURA list (effective 2010) and was designated as a Higher Hazard substance (effective 2016).

## What chemicals are in your tattoo?

[Source: Chemical & Engineering News, August 9, 2016](#)

Author: Sarah Everts

Humans have been tattooing themselves for millennia, motivated by reasons as diverse as the designs decorating their skin. Crusaders tattooed crosses on their bodies to

ensure they'd go to heaven, while for centuries, sailors inked their bodies to boast about where they'd travelled. The 61 tattoos on Ötzi, a 5,300-year-old mummy discovered in the Alps, were all located near his joints, leaving researchers to speculate that the tattoos may have been part of an ancient arthritis treatment.

These days, however, most of the 120 million tattooed people worldwide have inked themselves for fashion. This trend is on the upswing among young adults, especially women, who now possess more inked body art than men in Italy, Denmark and the U.S., according to Darren McGarry, who led a panel discussion about tattoo science and policy at the European Science Open Forum (ESOF) conference in Manchester, England, in late July.

But if tattoos are now commonplace, knowing the ingredients and provenance of the colorful cocktail injected beneath the skin is not. It's not widely known by the general public that the pigments found in tattoo inks can be repurposed from the textile, plastics or car paint industry, said McGarry, who works at Joint Research Centre (JRC), an organization that provides independent scientific advice to the European Commission.

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## **An Informatics Approach to Reading the Label: Identifying Common Chemical Mixtures in Personal Care Products**

*Source: [Environmental Health Perspectives](#), August 2016*

*Author: Carol Potera*

For many years chemical risk assessments focused on exposures to single agents, but researchers are now paying more attention to chemical mixtures. Of particular interest are mixtures that people encounter in daily life, including combinations of ingredients in shampoo, deodorant, toothpaste, and other personal care products. In this issue of *EHP*, researchers describe a new informatics approach to identify chemical mixtures commonly found in personal care products.

Some ingredients used in personal care products are associated with adverse effects in people or animals. For instance, there is evidence that some fragrance compounds and antimicrobials can exacerbate asthma. Other ingredients have shown endocrine-disrupting activity in animal studies -- for instance, inhibition of testosterone production, suppression of thyroid hormone, and estrogen mimicry -- although effects in humans are unclear. Over time, a typical morning hygiene routine can result in cumulative exposures to multiple ingredients that can potentially have adverse effects singly or in combination.

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*Also see from the August 2016 issue of [EHP](#), "[An Informatics Approach to Evaluating Combined Chemical Exposures from Consumer Products: A Case Study of Asthma-Associated Chemicals and Potential Endocrine Disruptors](#)".*

## **Samsung workers sickened by chemicals in factories speak up**

*Source: [San Francisco Chronicle](#), August 9, 2016*

*Author: Youkyung Lee*

SEOUL, South Korea (AP) -- Samsung Electronics, the leader in the global computer chip and smartphone industries, is South Korea's biggest company, with about 100,000 workers. An Associated Press investigation found South Korean authorities let Samsung withhold from sick workers and their families crucial information about the chemicals they are exposed to at its computer chip and display factories.



A worker-safety group has documented more than 200 cases of serious illnesses including leukemia, lupus, lymphoma and multiple sclerosis among former Samsung semiconductor and LCD workers. Seventy-six have died, most in their 20s and 30s.

It is extremely difficult for workers to get compensation for occupational diseases from the South Korean government, and without details on their exposure to toxins in their workplaces it is almost impossible.

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