**Minnesota Now (MPR) | Minnesota Now 'Forever chemicals' pose serious health risks. Here's what Minnesota can do to address them 01GWJ4AG8PJTH70HH6PXP8CRE2**

CATHY WURZER: We will talk a little bit more about what is happening at the capital, with lawmakers and activists gathered there this morning in support of tougher restrictions on a suite of chemicals known as PFAS or forever chemicals. I'm sure you've heard about these. This comes days after state agencies asked lawmakers for more than $45 million for cleanup and management of PFAS.

They've been widely used in everything from cosmetics to nonstick cookware to firefighting foam. Research has tied them to health problems, like low birth weights and some cancers. And they don't naturally break down in the environment. Instead, they circulate in soil and water and accumulate in the bodies of fish and other animals, including humans.

So what can the state do to address the risks? Matt Simcik is here to explain. He's a professor of environmental health sciences at the University of Minnesota. Professor, welcome.

**MATT SIMCIK:** Thank you for having me.

**CATHY WURZER:** Back in the 1940s, 3M, based in the Twin Cities, invented two of the most common of these chemicals. And I'm wondering, what problem was 3M trying to solve, or what hole were they trying to fill with these chemicals?

**MATT SIMCIK:** Well, I don't know that they were intending on solving a problem. I think it was a lot like a lot of scientific discoveries.

The way I understand it, they created these chemicals, these fluorinated alkyl substances. It got spilled on someone's shoe. And then coffee or something else also got spilled on the same shoe. And they noticed, wow, look at this stuff bead up and not stain my shoe. And they said, wow, these chemicals have really interesting properties. What else could we use them for?

**CATHY WURZER:** Hmm. Obviously, 3M made a lot of different products with these chemicals. I'm wondering, when did it become clear that these chemicals were a serious problem?

**MATT SIMCIK:** Well, the 3M Company themselves were monitoring it in their workers since the late '60s, I believe. But it wasn't really until a paper came out around 2000 by a researcher at Michigan State who looked at dead animals from around the world. These animals didn't die from PFAS exposure, but just took these dead animals that had sort of washed up on shore and analyzed them for these chemicals and found them in everything.

And so this was the first indication that these chemicals were not only being used and employed where they were intended, but they were getting out into the global environment and contaminating things. And shortly thereafter was when 3M decided to stop making the PFOS of the two that you mentioned.

**CATHY WURZER:** Yes. So these chemicals accumulate in fish and animals, and I've heard some researchers say also in humans. I mean, what do know about how PFAS affects the human body?

**MATT SIMCIK:** Well, one of the things that we're very sure about is that it does alter the amount of fat in our blood, the types of fat, and what we call the lipid content. We do know also that lipid content is extremely important in fetal development. And so while a lot of the research being done, like I mentioned, from the early on with 3M and the workers, didn't find a lot of adverse health effects.

My fear, and what we're starting to see in some of these associative studies, is that we're seeing effects in children. And again, going back to this lipid being very important in fetal development, if these chemicals alter that lipid content, our fear is that's where we're going to see some of the drastic or any adverse health outcomes, is in children or fetuses that were exposed to this, as long as even into their teens and 20s.

**CATHY WURZER:** So a lot of people know, Professor, about 3M paying the state some $850 million to clean up public drinking water, private wells, especially in the East Metro because of pollution, PFAS pollution. Back in December of last year, 3M announced it would stop making these chemicals by 2025.

I'm wondering-- clearly, they still are-- they're throughout the environment. How do you clean this up? How do you remove these chemicals, say, from drinking water?

**MATT SIMCIK:** Yeah. Really, really good question. So we have some technologies available for removing them from drinking water. Unfortunately, not all of them are amenable to every type of water system. If you have a small drinking water supply, if you have a private well, it can be very difficult to remove these compounds.

So even my lab has been looking at how can we better remove these chemicals from the drinking water and from the water in the environment already because these chemicals are already out there. Aside from just protecting drinking water, we want to protect ecosystem health as well.

**CATHY WURZER:** Mm-hmm. Once you start removing these chemicals, I mean, what the heck do you do with them?

**MATT SIMCIK:** Yeah. Another great question. So they're very, very difficult to destroy, hence the term "forever chemicals." It makes sense in the environment because fluorine is such a rare element. Microbiology and things like that don't see fluorinated organic compounds. So they don't know what to do with them.

In the laboratory, we can hit it with a whole bunch of energy and try and destroy it. Unfortunately, to date, everything that has been devised has basically taken a really highly concentrated waste stream and made it just a concentrated waste stream, so still not to the point where we can use these techniques to destroy everything in the environment to bring it down below these new EPA standards that we have.

**CATHY WURZER:** Mm-hmm. I mentioned, of course, that a lot of the attention has been focused on the pollution in the East Metro, with that big plume of PFAS. But we should say these chemicals are all over the state of Minnesota. Other areas of special concern that you know of?

**MATT SIMCIK:** Well, certainly, they're any place you had these chemicals being used. And as you mentioned in your intro, they were used in a whole lot of things. So we've seen them in aqueous film-forming foam. So any place you had a fire being put out, whether it be at an airport or a municipal fire department. Municipal fire departments use these materials as well because they were so good-- they are so good at putting out fires.

They were also used in chrome plating plants as a surface-active molecule to keep the chromium from evaporating and exposing the workers. And so that's another source. So any place you have these areas where they were used, as well as people who Scotchgarded their upholstery and their carpeting. You wash that. It ends up in our waste stream. It goes through our wastewater treatment plants or into our landfills.

That's another area where I think we can actually do some good, is the bottleneck in the flow of these chemicals are our wastewater treatment plants and our landfills. If we can learn how to destroy them there, maybe we can keep them from going out into the environment.

**CATHY WURZER:** Knowing what you know about PFAS, do you think a ban-- I'm asking you to go on a limb here-- do you think a ban on these chemicals is necessary?

**MATT SIMCIK:** Well, it's an interesting question. So what made them really good industrial chemicals and made our lives so much easier also tended to make them not so good for the environment. I think, in the end, this is the job of our synthetic organic chemists, is to come up with something better, right? Something that only lasts as long as we need it to do its job and then break down and not be an issue later on. I have great faith in the new students coming up and learning these things and that they'll figure this stuff out.

**CATHY WURZER:** But yet I wonder. There are risks of some alternative chemicals. That might be something to watch out for.

**MATT SIMCIK:** Absolutely. Absolutely. So not only having those chemicals break down or only last as long as we want. We want to make sure that what they break down to is not harmful, what they are is not harmful, and what goes into making them is not harmful, because at every step of that process, things can get out into the environment and cause problems.

**CATHY WURZER:** Mm-hmm. Before you go, by the way, we're still clearly learning a lot about these chemicals and the impact of these chemicals. What are the most important questions for you right now as a chemist?

**MATT SIMCIK:** So as a chemist, yeah. Really, how can we capture these and destroy them efficiently so that we can actually get rid of them? And then from the toxicology side, again, trying to figure out what it might be doing to developing fetuses is where I think it's really, really important that we spend our time and our effort.

**CATHY WURZER:** All right. Well, I really appreciate your time here, Professor. Thank you so much.

**MATT SIMCIK:** My pleasure.

**CATHY WURZER:** Matt Simcik is a professor of environmental health sciences at the University of Minnesota.