

# More than 50 new environmental chemicals detected in people

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Researchers have detected more than 50 new environmental chemicals lurking in people's bodies, the vast majority of which are little known or unknown compounds.

These chemicals — which have never been observed in people before — were discovered in a study of pregnant women and their newborns.

The findings are concerning given that very little is known about these chemicals and their potential health effects, researchers from the new study say. What's more, pregnant women and their newborns are a particularly vulnerable population.

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"We are very concerned about these exposures that occur during pregnancy because it's such a vulnerable period of development," said study senior author Tracey Woodruff, director of the Program on Reproductive Health and the Environment (PRHE) and the Environmental Research and Translation for Health (EaRTH)

Center, both at University of California San Francisco. "It can influence the mom's health later. And it's a vulnerable period of development for the fetus, so it can have childhood and lifelong consequences."

Of these newly detected chemicals, two were perfluoroalkyl and polyfluoroalkyl substances, or PFAS. These chemicals, used in consumer products such as nonstick cookware and pizza boxes, stay in the human body for a long time and can accumulate, according to the Environmental Protection Agency (EPA). Ten of the newly detected substances were plasticizers, or chemicals used in the production of plastics. For example, one of the detected plasticizers, a group of chemicals called phthalates, are often found in fast-food packaging and have been associated with adverse health effects. Two of the newly detected chemicals are used in cosmetics; one in pesticides.

But most — 37 — of these newly detected chemicals are ones that researchers have little to no information on, the authors wrote in the study, published Tuesday (March 16) in the journal Environmental Science & Technology.

## **Mysterious chemicals**

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Despite pregnancy being a vulnerable period of development, there's been a lack of data on chemicals that mothers and fetuses are potentially exposed to, due in part to a lack of methods for detecting those chemicals, Woodruff told Live Science. Current methods for monitoring human exposure to chemicals typically involve screening for only a few hundred of some 8,000 chemicals produced or imported into the U.S. every year, the authors wrote in the study.

For this study, the researchers recruited 30 expectant women seeking prenatal and delivery care at the Zuckerberg San Francisco General Hospital and UCSF Mission Bay Medical Center. Blood samples were collected from the mother during labor and delivery and from the newborn's umbilical cord (cord blood) just after birth.

The researchers then analyzed the blood samples using a relatively new technique called high-resolution mass spectrometry that involves determining the different masses of compounds to identify them. In this way, they were able to take snapshots of nearly all the chemicals present in blood samples from mothers and their newborn infants, said study co-author Dimitri Abrahamsson, a postdoctoral fellow at PRHE. "That allowed us in the end to find evidence for some chemicals that appear to not have been previously reported in people," he added.

The researchers identified 109 chemicals present in both the maternal and cord blood samples, including 55 that had never been found in people before. Others detected in the samples, such as phthalates, have previously been found in humans before and have been linked to adverse health effects, such as reproductive problems. The researchers also detected the two most-studied PFAS, known as PFOA and PFOS, in the maternal and newborn samples. PFAS and PFOA have been shown to cause developmental, liver, kidney, and immunological problems in laboratory animals and have also been linked to numerous health problems in human epidemiological studies, according to the EPA.

The researchers found traces of such chemicals in both the mothers and the babies, Woodruff said. "So that's a very important feature of this, because it shows that these exposures are also occurring in the womb," Woodruff said.

The umbilical cord, which connects the placenta to the fetus, is the conduit through which oxygen, and other nutrients pass between the mother and the fetus. If a chemical is present in the cord blood, the fetus has been exposed to it, Woodruff said. More research is needed to determine whether these particular chemicals are also present in fetal tissues and at what levels; however, previous studies have found that chemicals detected in cord blood also show up in fetal tissue, Woodruff said.

Because so little is known about these newly detected chemicals, including where the mothers may have been exposed to them, it's not clear what the potential health effects of them may be, the researchers told Live Science. This should signal not a sense of uncertainty but "alarm," Abrahamsson said. "We're being exposed to chemicals that we have very little information about. And these chemicals could potentially have harmful health effects that we don't know and can't predict," he said.

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The researchers can determine whether these chemicals are present in the maternal and cord blood, but they can't tell at what levels, Woodruff said. For that reason, the researchers cannot say whether the chemicals detected are dangerous at the levels at which they are present in mothers and babies.

But that doesn't necessarily mean there's no reason to worry about adverse health effects from chemical exposures, Woodruff added. "We already know from other studies that pregnant women are exposed to chemicals, many of them at levels that have been associated with adverse health effects," such as exposure to phthalates being linked with problems with male reproductive development, she said. "These [newly detected] chemicals are in addition to chemicals we know are linked to adverse health outcomes."

In the future, Woodruff said, the researchers plan to study the toxicities of these newly detected chemicals in the human body and to learn how the chemicals affect various tissues with the long-term goal of using the information to prevent adverse health outcomes and disease. The researchers also need to confirm the identities of the newfound chemicals by comparing them, again using mass spectrometry, to "analytical standards," or pure samples of each chemical, the researchers said.

For consumers, the researchers have put together some tips on how to avoid exposure to substances that can be harmful to reproductive health, including cleaning with non-toxic products, using less plastics and avoiding canned foods.

*Originally published on Live Science.*