

Pregnant women exposed to cancer-causing chemicals in dishware, hair coloring, plastics, and pesticides: study

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Pregnant women in the U.S. are being exposed to chemicals like melamine, cyanuric acid, and aromatic amines that can increase the risk

of cancer and harm child development, according to researchers at UC San Francisco and Johns Hopkins Bloomberg School of Public Health.

Melamine and cyanuric acid were found in nearly all study participants' samples, but the highest levels were found in women of color and those with greater exposure to tobacco. Four aromatic amines that are commonly used in products containing dyes and pigments were also found in nearly all pregnant participants.

People can be exposed to melamine and aromatic amines in a variety of ways: through the air they breathe, by eating contaminated food or ingesting household dust, as well as from drinking water or by using products that contain plastic, dyes, and pigments.

"These chemicals are of serious concern due to their links to cancer and developmental toxicity, yet they are not routinely monitored in the United States," said Tracey J. Woodruff, Ph.D., a professor of obstetrics, gynecology and [reproductive medicine](#) who directs the UCSF Program on Reproductive Health and the Environment, and is the co-senior author of the study published August 30, 2022, in *Chemosphere*.

Melamine and its major byproduct, cyanuric acid, are each high production chemicals that exceed 100 million pounds per year in this country alone. When exposure to these chemicals happens together, they can be more toxic than either one alone. Melamine is found in dishware, plastics, flooring, kitchen counters, and pesticides; cyanuric acid is used as a disinfectant, plastic stabilizer, and cleaning solvent in swimming pools; aromatic amines are found in hair dye, mascara, tattoo ink, paint, tobacco smoke, and diesel exhaust.

Melamine was recognized as a kidney toxicant after baby formula and pet food poisoning incidents in 2004, 2007, and 2008 that caused several deaths as well as [kidney stones](#) and urinary tract obstruction in some

people. Additional animal experiments suggest melamine reduces [brain function](#).

For their study, researchers measured 45 chemicals associated with cancer and other risks using new methods to capture chemicals or chemical traces in [urine samples](#) from a small but diverse group of 171 women who are part of the National Institutes of Health's Environmental influences on Child Health Outcomes (ECHO) Program. The study period covered 2008 to 2020.

The 171 women came from California, Georgia, Illinois, New Hampshire, New York, and Puerto Rico. About one-third (34%) were white, 40% were Latina, 20% were Black, 4% were Asians, and the remaining 3% were from other or multiple racial groups. Prior studies on [melamine](#) were conducted among [pregnant women](#) in Asian countries or limited to non-pregnant people in the U.S.

"It's disconcerting that we continue to find higher levels of many of these harmful chemicals in people of color," said study co-senior author Jessie Buckley, Ph.D., an associate professor at Johns Hopkins Bloomberg School of Public Health.

For example, levels of 3,4-dichloroaniline (a [chemical](#) used in the production of dyes and pesticides) were more than 100% higher among Black and Hispanic women compared to [white women](#).

"Our findings raise concerns for the health of pregnant women and fetuses, since some of these chemicals are known carcinogens and potential developmental toxicants," said Giehae Choi, postdoctoral fellow at Johns Hopkins Bloomberg School of Public Health and first author of the study. "Regulatory action is clearly needed to limit exposure."

More information: Giehae Choi et al, Exposure to melamine and its derivatives and aromatic amines among pregnant women in the United States: The ECHO Program, *Chemosphere* (2022). [DOI: 10.1016/j.chemosphere.2022.135599](https://doi.org/10.1016/j.chemosphere.2022.135599)

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