Exposure to organic solvents before first childbirth may increase hormone-related breast cancer risk

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Among women with a family history of breast cancer, those who worked with organic solvents prior to their first full-term birth had an increased risk for hormone receptor-positive breast cancer, according to data published in *Cancer Research*, a journal of the American Association for Cancer Research.

"The time between puberty and before first birth is an important period of development when the breast may be more vulnerable to chemical exposures," said Christine C. Ekenga, Ph.D., a postdoctoral fellow in the epidemiology branch of the National Institute of Environmental Health Sciences (NIEHS) at the National Institutes of Health (NIH). "We observed that women who started working with solvents before their first full-term birth had a greater risk for breast cancer.

"We identified several occupations where solvent exposure was associated with an elevated risk for breast cancer," added Ekenga. "These include clinical laboratory technicians, maids and house cleaners, and production [factory] workers. All women should be familiar with the chemicals and hazards that are present in their workplace, and use personal protective equipment and minimize exposures when appropriate."

Women who worked with organic solvents prior to their first full-term birth had about a 40 percent increased risk for developing hormone

receptor-positive, invasive breast cancer, and all women who worked in clinical laboratories had a twofold increased risk for this type of breast cancer.

"Our study is an important first step toward understanding how the timing of chemical exposures may impact breast cancer risk," said Ekenga. "We hope that our findings will generate additional interest in the possible role of solvents and other chemicals in the etiology of breast cancer."

To study the relationship between occupational exposure to solvents and breast cancer, Ekenga and colleagues used data from the Sister Study led by Dale P. Sandler, Ph.D., at the NIEHS, a prospective cohort study of 50,884 initially breast cancer-free sisters of women who had been diagnosed with breast cancer.

Participants were enrolled between 2003 and 2009, and they answered questionnaires about their occupational history and other potential breast cancer risk factors. Questions included duration of solvent exposure at the job, weekly frequency of exposure, and age at first job involving organic solvents. Participants were followed up annually for health updates. Evaluable data were available for 47,661 women.

Of the study participants, 1,798 were diagnosed with breast cancer during follow-up, of whom 1,255 had invasive cancer. Of the invasive tumors, 77 percent were hormone-receptor positive.

After adjusting for confounders including race/ethnicity, parity, exposure to tobacco smoke, and working night shifts, overall, there was no increased risk for invasive breast cancer from lifetime exposure to solvents, but the researchers found exposure to solvents prior to first full-term birth to be a critical period for breast cancer risk. A nonsignificant elevated risk was observed for women who worked as maids and

housekeeping cleaners, and those who had factory-related occupations.

"Additional research is needed to characterize the types of solvents used by women in different occupational settings and the levels at which women are exposed to solvents in the workplace," said Ekenga.

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