Work-related solvent exposure may increase breast cancer risk

By Annah Wyss

Women exposed to solvents before the birth of their first child may have an increased risk for breast cancer, according to a study *(http://www.ncbi.nlm.nih.gov/pubmed/24879566)* published in the June issue of the journal Cancer Research. The study, led by NIEHS scientists, followed 47,661 initially breast cancer-free women who had a family history of breast cancer. The women were participants in a Sister Study *(http://sisterstudy.niehs.nih.gov/English/index1.htm)* cohort evaluating the relationship between lifetime occupational solvent exposure and the incidence of breast cancer.

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

Solvents, a group of chemicals characterized by their ability to dissolve other compounds, are commonly used in adhesives, paints, and cleaning products, as well as in the manufacturing of many goods. According to the authors, in animal studies, several solvents have shown strong associations with mammary tumors. Studies among humans have also identified associations between solvents and breast cancer, but few have investigated how the timing of exposure may affect breast cancer risk.

Explaining how she gathered the data for her analysis, Ekenga said, "When the women entered the Sister Study, we collected important data from them about their lifestyle, reproductive history, work history, and exposures at different time periods." (Photo courtesy of Steve McCaw)

Timing of solvent exposure

The researchers found that, overall, women in the Sister Study who were exposed occupationally to solvents were not at elevated risk for breast cancer compared to women who were not occupationally exposed to solvents. However, when the researchers examined the timing of solvent exposure, they found that women exposed before the birth of their first child had an increased risk of breast cancer, particularly estrogen receptor-positive breast cancers.

Further, breast cancer risk appeared to increase with duration of solvent use before a first childbirth. The authors suggested that these findings underscore a key window of susceptibility during a woman's lifetime. "The time between puberty and first birth is an important period of development when the breast may be more vulnerable to chemical exposures," explained Ekenga.

Breast cancer risk by occupation

The researchers also investigated the relationship between breast cancer risk and exposure to solvents in specific occupations. Of the 44 occupations considered, women who worked with solvents in three occupations - clinical laboratory technicians, maids and housekeepers, and factory workers - appeared to have an increased risk of estrogen receptor-positive breast cancer. However, the authors cautioned that occupation-specific results were limited by small numbers of breast cancer cases for some occupations, and lack of information on specific types of solvents used in each occupation.

"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.

In addition to outlining next steps for researchers, the authors also noted a message for general audiences. "All women should be familiar with the hazards that are present in their workplace and use personal protective equipment when appropriate," said Ekenga.

Dale Sandler, Ph.D., chief of the NIEHS Epidemiology Branch, was senior author on the paper. She said her research team began this work because there had been very few breast cancer studies that focused on chemicals in the workplace. (Photo courtesy of Steve McCaw)

Citation: Ekenga CC, Parks CG, D'Aloisio AA, DeRoo LA, Sandler DP. *(http://www.ncbi.nlm.nih.gov/pubmed/24879566)* 2014. Breast cancer risk after occupational solvent exposure: the influence of timing and setting. Cancer Res 74(11):3076-3083.

(Annah Wyss, Ph.D., is an Intramural Research Training Award fellow in the NIEHS Genetics, Environment, and Respiratory Disease Group.)

The Environmental Factor is produced monthly by the National Institute of Environmental Health Sciences (NIEHS) *(http://www.niehs.nih.gov/)*, Office of Communications and Public Liaison.