

Young people who are overexposed to antibacterial soaps containing triclosan may suffer more allergies, and exposure to higher levels of Bisphenol A among adults may negatively influence the immune system, a new University of Michigan School of Public Health study suggests.

Triclosan is a chemical compound widely used in products such as antibacterial soaps, toothpaste, pens, diaper bags and medical devices. Bisphenol A (BPA) is found in many plastics and, for example, as a protective lining in food cans. Both of these chemicals are in a class of environmental toxicants called endocrine-disrupting compounds (EDCs), which are believed to negatively impact human health by mimicking or affecting hormones.

Using data from the 2003-2006 National Health and Nutrition Examination Survey, U-M researchers compared urinary BPA and triclosan with cytomegalovirus (CMV) antibody levels and diagnosis of allergies or hay fever in a sample of U.S. adults and children over age 6. Allergy and hay fever diagnosis and CMV antibodies were used as two separate markers of immune alterations.

"We found that people over age 18 with higher levels of BPA exposure had higher CMV antibody levels, which suggests their cell-mediated immune system may not be functioning properly," says Erin Rees Clayton, research investigator at the U-M School of Public Health and first author on the paper.

Researchers also found that people age 18 and under with higher levels of triclosan were more likely to report diagnosis of allergies and hay fever.

There is growing concern among the scientific community and consumer groups that these EDCs are dangerous to humans at lower levels than previously thought.

"The triclosan findings in the younger age groups may support the 'hygiene hypothesis,' which maintains living in very clean and hygienic environments may impact our exposure to micro-organisms that are beneficial for development of the immune system," said Allison Aiello, associate professor at the U-M School of Public Health and principal investigator on the study.

As an antimicrobial agent found in many household products, triclosan may play a role in changing the micro-organisms to which we are exposed in such a way that our immune system development in childhood is affected.

"It is possible that a person can be too clean for their own good," says Aiello, who is also a visiting associate professor of epidemiology at Harvard.

Previous animal studies indicate that BPA and triclosan may affect the immune system, but this is the first known study to look at exposure to BPA and triclosan as it relates to human immune function, Aiello said.

One surprise finding is that with BPA exposure, age seems to matter, said Rees Clayton. In people 18 or older, higher amounts of BPA were associated with higher CMV levels, but in people younger than 18 the reverse was true.

"This suggests the timing of the exposure to BPA and perhaps the quantity and length of time we are exposed to BPA may be affecting the immune system response," Rees Clayton says.

This is just the first step, she said, but a very important one. Going forward, researchers would like to study the long-term effects of BPA and triclosan in people to see if they can establish a causal relationship.

One limitation of the study is that it measured disease and exposure simultaneously and thus shows only part of the picture, Aiello said.

"It is possible, for example, that individuals who have an allergy are more hygienic because of their condition, and that the relationship we observed is, therefore, not causal or is an example of reverse causation," Aiello says.

The paper, "The Impact of Bisphenol A and Triclosan on Immune Parameters in the U.S. Population," appears online in *Environmental Health Perspectives* Nov. 30.