

## Illinois Children’s Environmental Health Research Center

Health and the Risks of Routine Consumer Chemicals in Plastics, Cleaning Products, Fragrances, and Personal Care Products

**Throughout the day, we all take in chemicals as a matter of routine. We eat, breathe in, and absorb through our skin chemicals that are common in food, drinks, the air, household cleaners, and products we use for personal care (e.g., soap, shaving cream, deodorant).**

Research over the past two decades finds that common ingredients in everyday products may impair the development of our brains and organs, and alter how our hormones function. Some sources of these chemicals in our daily environments are consumer products like:

- Food packaging
- Drink packaging
- Cleaning products
- Personal care products (shampoo, nail polish, makeup)
- Manufactured fragrances and scents
- Plastics

Chemicals in these items can interfere with our hormones, such as testosterone, estrogen, or androgen. By interfering with our hormones, they may change the development of the brain and the reproductive system to an extent that intelligence, behavior, fertility, and obesity are affected. This may be especially so when children or pregnant women are exposed to them.

### ACTIONS

The University of Illinois was distinguished in 2013 as one of 14 Children’s Environmental Health Research Centers (CEHCs) across the country. The US Environmental Protection Agency and the National Institute of Environmental Health Sciences jointly awarded \$8 million for the Illinois CEHC to research the effects of chemicals in consumer products on the long-term health of children. Some of the funds go toward communicating the science to policymakers and the public. Central questions for communicating the research results are:

- As families, child care providers, and schools learn about the possible harms caused by everyday chemicals in consumer products, what can they do about it?
- What reasonable actions can families take to reduce risks from items they use routinely?
- How should national and state policies, approvals, and regulations that deal with chemicals and children’s health change to protect the health of children?



# The Illinois CEHC: Research Focus

| EVERYDAY EXPOSURES<br>(EXAMPLES)  | EXPOSURE CHEMICALS  | PERIODS OF EXPOSURE  | HEALTH EFFECTS   |
|---|---|--|--|
| <ul style="list-style-type: none"> <li>• Food and beverage packaging—tin cans, aluminum cans, plastic</li> <li>• Baby bottle and sippy cups</li> <li>• Household cleaning products</li> <li>• Personal care products</li> <li>• Fragrances</li> <li>• Cash register receipts</li> </ul> | Endocrine disruptors: <ul style="list-style-type: none"> <li>• Bisphenol A (BPA)</li> <li>• BPA replaces</li> <li>• Phthalates</li> <li>• DINCH</li> <li>• Triclosan</li> <li>• Parabens</li> </ul> and whether obesity or a diet high in unhealthy fats may increase the health effects of these chemicals | <ul style="list-style-type: none"> <li>• In utero (during pregnancy)</li> <li>• Adolescence</li> </ul> These are periods when brain and reproductive system development is rapid | Observed effects <ul style="list-style-type: none"> <li>• Brain development</li> <li>• Intelligence</li> <li>• Behavior</li> <li>• Development of ovaries and testes</li> <li>• Reproductive function</li> <li>• Fertility and infertility</li> </ul> Underlying mechanisms <ul style="list-style-type: none"> <li>• Oxidative stress</li> <li>• Inflammation</li> </ul> |

To increase our understanding of the health risks from consumer chemicals, the Illinois CEHC is leading the following research:

## 1. A NEW BIRTH COHORT STUDY IN ILLINOIS

A large prospective birth cohort study (a group of people that is studied over time), following Illinois children from the time of their mother's pregnancy through childhood. The Illinois CEHC is recruiting 600 pregnant women in east central Illinois, in partnership with Carle Physician Group, Carle Foundation Hospital, Christie Clinic, and Presence Covenant Hospital. The study records the exposure of the women to chemicals over the course of their pregnancies. After their baby is born, the study will track that child's development to learn whether higher levels of chemicals during pregnancy are associated with poorer physical or mental development in the children.

## 2. A SECOND BIRTH COHORT, NOW AGES 13–17

The Illinois CEHC is learning from a second large prospective birth cohort in Massachusetts whose children are now in adolescence. By measuring exposures in more than 500 teens to chemicals during adolescence, the study will learn if higher levels of chemicals in the body are related to poorer neurologic development or behavior in teens. This is one of the first large studies to measure the health effects of consumer chemical exposures during adolescence.

## 3. LAB ANIMAL RESEARCH, TO ADD TO THE WEIGHT OF EVIDENCE

As large and ambitious as birth cohort studies are, one limitation is that the evidence they produce is correlational. Health outcomes in the children can be correlated with particular exposures, but the study design is unable to say whether a particular health effect is caused by a certain exposure. To complement the research with humans, the Illinois CEHC also conducts research with laboratory animals. Adding to the weight of evidence, experimental studies with animals can demonstrate that health effects may really be caused by a particular exposure. Therefore, Illinois CEHC lab research is evaluating reproductive development and function, and neurodevelopment and function in animals, in response to the animals' exposure to the same chemicals measured in the human cohort studies. Inflammation and oxidative stress, two of the body's reactions to chemicals, are also a focus. This lab research will help to explain the reasons for the negative health effects of the chemical exposures.

## 4. INTERACTION OF OBESITY, OR A HIGH FAT DIET, AND CHEMICAL EXPOSURES

The human and animal studies will both assess whether obesity, or a diet high in processed, unhealthy fats, may increase the health risks of chemical exposures. The focus of these questions addresses maternal obesity in the case of prenatal exposures, and child obesity in the case of adolescent exposures, in relation to health risks for the child.

## 5. A "RESEARCH TRANSLATION" PROGRAM

The aim of the Illinois CEHC's Community Outreach and Translation Core is to communicate with the public about reasonable actions a family, a child care provider, or a school can take to reduce children's exposures to the consumer chemicals that may harm their health over the long term. This research translation program also defines policy opportunities to rid a child's environment of chemicals that may have grave lifelong effects on health and development.

To learn more about the Illinois Children's Environmental Health Research Center and its Community Outreach and Translation Core, please visit:

- <http://ikids.beckman.illinois.edu>
- [http://epa.gov/ncer/childrenscenters/centers/illinois\\_urbana.html](http://epa.gov/ncer/childrenscenters/centers/illinois_urbana.html)
- <http://www.familyresiliency.illinois.edu/research/COTC-I-Kids.html>