



# School Pesticide Monitor

A Bi-Monthly Bulletin on Pesticides and Alternatives  
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## Yale Study Links Prenatal Pesticides Exposure to Tremors in Children

According to a Yale University study, prenatal exposure to the widely used agricultural pesticide chlorpyrifos is linked to tremors – involuntary contraction or twitching of muscles – in childhood. Chlorpyrifos, a broad-spectrum chlorinated organophosphate insecticide also known as Dursban, may also affect the cardiovascular and respiratory systems and is acutely toxic to bees, birds, mammals, and aquatic life.

The study, titled *Prenatal exposure to the organophosphate pesticide chlorpyrifos and childhood tremor*

and published in the journal *Neurotoxicology*, measured the presence of chlorpyrifos in umbilical cord blood samples in 263 low-income, inner-city minority children.

In 2001, the U.S. Environmental Protection Agency (EPA) banned residential use of chlorpyrifos, which was prominent in urban areas at the time. However, the study participants – 263 minority mothers and their children, all from low income communities in New York City – were assembled in 1997, before the ban was imposed. In 1997, the initial

measure of each child's prenatal exposure to CPF was taken from umbilical cord blood. The children were then followed until approximately 11 years of age, after which they underwent a neurophysical assessment, which included a short drawing test.

Researchers found that compared to all other children, those who had relatively high levels of prenatal chlorpyrifos exposure were significantly more likely to exhibit mild or moderate tremor in one or both arms. The study is just one of many  
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## Harvard Meta-Analysis Ties Childhood Cancer to Pesticide Use

New research published in the September 2015 issue of *Pediatrics* finds that children's exposure to pesticides in and around the home results in an increased risk of developing certain childhood cancers.

Researchers made their findings through a meta-analysis, reviewing 16 epidemiological studies published since 1993 on the link between childhood cancer and pesticide exposure. Based on their findings, the authors of the study suggest "...public health policies should be developed to minimize childhood exposure to pesticides in the home," and that "[e]very effort should be made to limit children's exposure to pesticides."

While most meta-analytical reviews previously conducted on the link between pesticides and childhood cancer looked at parental exposure or agricultural exposure, the current study from scientists at the Harvard T.H. Chan School of Public Health focuses on residential exposure in and around a child's home.

Authors found that cancer risks were connected most closely to the type of pesticide used and the location where it was applied. For example, while residential herbicide use was associated with an increased risk of leukemia, the link between outdoor insecticide use and childhood cancers was not found to be statistically significant. However, exposure to insecticides inside the home was

significantly associated with an increased risk of childhood leukemia and lymphoma.

According to the National Cancer Institute, an estimated 15,780 children and adolescents aged 0 to 19 were diagnosed with some form of cancer in 2014. There is growing concern over the association between exposure to environmental chemicals such as pesticides and cancer risks both for children and the population at large.

Although agriculture and occupational exposure to pesticides has traditionally been tied to cancer and other pesticide-related illnesses, 16 of the 30 most commonly used  
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## Tremors

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suggesting that pesticide exposure is associated with adverse neurodevelopmental issues.

“This is perhaps one of the only examples in which we can show that in utero exposure to these pesticides leads to long-term health care consequences in the children,” said Yale senior author and School of Medicine neurology professor Elan Louis, MD, to Yale Daily News. “We’re talking about the possibility that fetuses exposed to pesticides through their mother, while they’re in utero, could have tremors eight or ten years later.”

This study points toward a need for the agricultural industry—the main setting in which chlorpyrifos is found today—to reconsider their use of pesticides.

Chlorpyrifos is highly neurotoxic. It is a cholinesterase inhibitor, which means that it can bind irreversibly to

acetylcholine esterase (AChE), an essential enzyme for normal nerve impulse transmission, inactivating the enzyme. Studies have documented that exposure to even low levels of organophosphates like chlorpyrifos during pregnancy can impair learning, change brain function, and alter thyroid levels of offspring into adulthood. The evidence of the neurotoxic dangers associated with chlorpyrifos’ exposure is extensive and consistent.

In 2000, EPA and DowAgrosciences reached an agreement to voluntarily stop all home and garden uses of Dursban, which was at the time the most widely used household pesticide in the U.S. However, it continues to be heavily used today in agriculture, on golf courses, and for public mosquito spraying, with an estimated 5 million pounds applied in the U.S. annually, releasing its toxins onto our food and into the lives of farmworkers, their children, and those in nearby communities.

In 2012, EPA imposed “no-spray”

buffer zones around public spaces, including recreational areas, schools, and homes to reduce bystander exposure risks. In spite of these restrictions, chlorpyrifos still poses risks to human and environmental health. In early 2015, a federal appeals court judge mandated that EPA respond to a petition filed nearly nine years ago that seeks to force the agency to restrict chlorpyrifos. EPA must meet an October 31 deadline and establish a timeline for finalizing the proposed rule if they decide on a ban.

Chlorpyrifos leads a list of numerous toxic chemicals that are central to chemical-intensive agricultural practices that threaten health and the environment effects. For more information on chlorpyrifos and other pesticides used in homes, schools, workplaces and communities, see *Beyond Pesticides’ Gateway on Pesticide Hazards and Safe Pest Management* (<http://bit.ly/Pesticide-Gateway>). For alternatives strategies on specific pest problems, check out our *ManageSafe Database* (<http://bit.ly/ManageSafe>).

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## Harvard

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pesticides available for use in and around homes have been linked to cancer.

Children are at particular risk from exposure to pesticides because they take in more of a pesticide than adults relative to their body weight and have developing organ systems that are less able to detoxify chemicals.

In 2012, the American Academy of Pediatrics released a landmark policy statement on *Pesticide Exposure in Children*. The report discussed how children come into contact with pesticides every day in air, food, dust and soil, and frequently are exposed

to pesticide residue on pets and after lawn, garden, or household pesticide applications. The report identified both acute and chronic effects of pesticides, noting that “Children encounter pesticide daily and have unique susceptibilities to their potential toxicity.”

The authors of both the current meta-analysis and the American Academy of Pediatrics report recommend that governments take steps to reduce and eliminate children’s exposure to pesticides.

With a growing market and availability of non-toxic and organic alternatives, replacing bug and weed killers in and around one’s home is becoming easier and easier. Safer practices

for common pests can be found on *Beyond Pesticides’ ManageSafe Database* (<http://bit.ly/ManageSafe>), and alternatives to herbicides can be found through the *Lawns and Landscapes* ([www.beyondpesticides.org/lawns](http://www.beyondpesticides.org/lawns)) webpage.

Beyond Pesticides encourages readers to follow the advice of scientists and researchers, and advocate for safer pest control practices in your community, both at home and in the school. Visit *Beyond Pesticides’ Tools for Change* (<http://bit.ly/Tools4change>) page for information on organizing on your community.

For additional assistance, call Beyond Pesticides at 202-543-5450 or email [info@beyondpesticides.org](mailto:info@beyondpesticides.org).