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Agricultural Pesticide Exposure Linked to Childhood Cancers, Study Says

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STORY AT-A-GLANCE

- Nebraska study reveals a 10% increase in pesticide exposure is linked to 36% rise in childhood brain cancers, 23% increase in leukemia, and 30% overall increase in pediatric cancers
- Research analyzing 2,512 cancer cases over 22 years identified herbicides dicamba, glyphosate, and paraquat as significant contributors to childhood cancer development in agricultural regions
- Children face heightened vulnerability to pesticide exposure through air, water, and soil due to developing organs and frequent hand-to-mouth contact during play
- The research demonstrates the importance of examining combined effects of multiple pesticides rather than individual chemicals, to represent real-world agricultural exposure more accurately
- Future research recommendations include human biomonitoring studies measuring pesticide levels in children's blood, plasma, and urine to better understand health impacts

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High exposure to multiple pesticides may cause childhood and adolescent cancers, especially brain and central nervous system (CNS) tumors, according to a new study by researchers at the University of Nebraska Medical Center.

A predominantly agricultural state, Nebraska has among the highest rates of childhood cancer in the U.S. After adjusting for other factors, the researchers found that a 10% increase in pesticide mixtures was associated with a significant rise in certain pediatric cancers:

- Brain and other CNS childhood cancers increased by 36%
- Leukemia rates in children and adolescents increased by 23%
- Overall pediatric cancer rates increased by 30%

Previous studies have focused on individual chemicals such as **atrazine** or **nitrates** and their impact on a limited number of cancer types. This is the first study to estimate the combined effects of multiple pesticides — a method that more accurately reflects real-world agricultural exposure — on all 11 types of pediatric cancers over 22 years, the researchers say.

"Our results demonstrate the importance of evaluating chemical mixtures while studying pediatric cancer risk," they conclude in research published this week [Feb. 12, 2025] in GeoHealth.[1]

The findings raise concerns about the long-term health impacts of pesticides on children, particularly in agricultural regions, and add to growing evidence that pesticide exposure contributes to childhood cancer, including retinal cancer[2] (retinoblastoma).

Early-life pesticide exposure has also been linked to lower cognitive function, **adverse birth outcomes**, and behavioral issues.

Children Are Especially Vulnerable to Pesticide Health Risks

Although cancer in children and adolescents is rare, it is the leading cause of death by disease after infancy among children in the United States, according to the National Cancer Institute.[3]

Pesticides spread through air, water, and soil, and studies suggest that they may increase cancer risk by disrupting hormones, damaging DNA, and causing inflammation. The American Academy of Pediatrics (AAP) says that children are uniquely vulnerable to pesticide exposure,[4] which occurs daily, due to their developing organs. Young children are also at higher risk than adults because they crawl or play in areas that might contain pesticides and often put their hands in their mouths.

In this study, the researchers used data on 2,512 cancer cases among children aged 0-19 from the Nebraska Cancer Registry between 1992 and 2014 and examined 32 different pesticides. Those that appear to play the most significant role in childhood cancer development were shown to be the herbicides **dicamba**, **glyphosate**, and paraquat[5] they found. Three other pesticides — quizalofop, triasulfuron, and tefluthrin — also had strong associations.

The researchers also tried a different statistical approach for some rarer cancers to see if any patterns emerged. This method showed that higher pesticide exposure may be associated with increased rates of lymphoma and bone cancer, among others, but more research is needed.

Limitations of the study included its demographics (more than 90% of the study population was White), and pediatric cancer subtypes with too few cases, the researchers say. Cancer data was available until only 2015, so they could not analyze more recent trends. Additionally, the study lacked individual exposure data, and county-level pesticide data may involve exposure misclassification, the researchers note.

They say future research should include human biomonitoring studies (measuring pesticide levels in blood, plasma, and urine, especially in children) to understand better how these chemicals affect health.

“We anticipate these findings will enhance efforts by public health departments, government agencies, and other relevant pediatric cancer stakeholders to design and implement cancer control programs and interventions in agriculturally dominant states, including Nebraska.”

About the Author

U.S. Right to Know is a nonprofit public health research group dedicated to investigating corporate misconduct and government failures that impact public health, the environment, and the food system. Through public records requests and whistleblower disclosures, USRTK uncovers and shares critical information with journalists, academics, and the public.

Recognized for its impact, USRTK has received multiple journalism awards, including the James Madison Freedom of Information Award from the Society of Professional Journalists.

Sources and References

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- [4] American Academy of Pediatrics, Pesticide Exposure
- [5] The Guardian, "Why does the US allow a controversial weedkiller banned across the world?"