



# School Pesticide Monitor

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## Study Adds to Findings that Link Prenatal Pesticide Exposure to Lower IQs

A study released in late July finds lower IQ (intelligence quotient) in children born to mothers who during their pregnancy were living in close proximity to chemical-intensive agricultural lands where organophosphate pesticides were used. This study adds to the body of scientific literature that links prenatal exposure to organophosphate pesticides with lower IQ's in children.

Organophosphate pesticides, a relatively older generation of highly neurotoxic pesticides still widely used on farms in California, have been associated with a broad range of diseases in

both children and adults. This latest study supports health and environmental advocates' call to eliminate these toxic pesticides in agriculture and move toward safer, sustainable, and organic management practices.

The study, titled *Prenatal Residential Proximity to Agricultural Pesticide Use and IQ in 7-Year-Old Children*, looks at 283 women and children from the agricultural Salinas Valley who are enrolled in the long-term Center for the Health of Mothers and Children in Salinas (CHAMACOS) study. Specifically, researchers looked at pregnant wom-

en living within one kilometer of agricultural fields where organophosphate pesticides were used. They found that at age 7, the children of those women had declines of approximately two IQ points and three verbal reasoning points per 522 pounds of pesticides applied nearby. The researchers made sure to point out that it has been estimated that each one point decrease in IQ decreases worker productivity by approximately 2%, and reduces lifetime earnings of \$18,000 (in 2005 market standards).

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## Study Finds Nearly Half of Insecticide Poisonings Affect Young Children

Young children are disproportionately poisoned by toxic pesticides used indoors, according to a study published in the Australian and New Zealand Journal of Public Health. Data analyzed from the Queensland, Australia Poisons Information Centre (QPIC) finds that 49% of 743 insecticide-related calls in 2014 concerned young children. Given that children are more sensitive to pesticide exposure than adults because they take in more of a chemical relative to their body size and have developing organ systems, this data underscores the importance of educating the general public about alternatives to the use of toxic pesticides in and around the home.

A significant share of childhood pesticide poisonings occurred in very young children. "Children in the one-year age

group were at greatest risk – as they're at that stage where they spend a lot of the time on the floor and put things in their mouth," said Karin English, PhD candidate at the University of Queensland. As a result of children's propensity for hand to mouth motion, cockroach baits and ant liquid were found to be the most common source of insecticide exposure for kids under five, covering 39% of calls. However, Ms. English notes that enclosing cockroach baits in casings reduced poison exposure, and most liquid ant baits were placed in open containers on the floor, where children could access them. "While these products carry a relatively low risk of poisoning, parents need to ensure that all insecticides are out of reach and stored safely." Bug sprays, including those containing synthetic pyrethroids and the toxic synergist piperonyl butoxide, accounted

for another significant route of exposure in the home, comprising 26% of calls.

The lopsided impact of acute pesticide exposure and poisoning on toddlers and infants is underscored by the danger pesticides pose to developing bodies. A robust set of scientific studies has shown that children and pesticides don't mix. In 2012, the American Academy of Pediatrics (AAP) released a landmark policy statement affirming that, "Children encounter pesticides daily and have unique susceptibilities to their potential toxicity." Childhood pesticide exposure has been linked to a range of adverse health endpoints, including cancer, asthma, impaired sexual development, ADHD and other learning disabilities.

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## **Prenatal**

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Organophosphates are pesticides that were used in World War II as nerve agents. As potent neurotoxicants, organophosphates are extremely harmful to the nervous system, give that they are cholinesterase inhibitors and bind irreversibly to the active site of an enzyme essential for normal nerve impulse transmission. A 2015 study, which also used participants from CHAMACOS, found that a decrease in lung function in children was linked to exposure to organophosphates early in life. Another 2015 study found that prenatal exposure to chlorpyrifos, a potent organophosphate, is linked to tremors in children. Although organophosphate use is on the decline in the U.S., the U.S. Environmental Protection Agency (EPA) has allowed the continued registration of many of these products. As a result of a lawsuit filed by environmental groups, the agency proposed a rule that would remove chlorpyrifos' agricultural uses. How-

ever, EPA is not expected to finalize the rule until December 2016. In 2000, EPA announced the phase-out of residential uses of chlorpyrifos, with the exception of public health mosquito uses and golf courses.

This new study also found similar cognitive declines for three other classes of pesticides: neonicotinoids, pyrethroids, and manganese fungicides. Unfortunately, because the pesticides were almost always used in combination, it is impossible to determine whether the cognitive deficits were caused by organophosphate use alone, or by the interactive effect with other classes of pesticides. This adds to the growing body of research on the interactive effects of pesticides on human health and the environment. A 2002 study by Warren Porter, PhD., professor of zoology and environmental toxicology at the University of Wisconsin, Madison, examined the effect of fetal exposures to a mixture of 2,4-D, mecoprop, and dicamba exposure —frequently used

together in lawn products like Weed B Gone Max and Trillion— on the mother's ability to successfully bring young to birth and weaning. Researchers looked at pesticide concentrations diluted to levels that are considered "safe" by EPA and found that it is capable of inducing abortions and resorptions of fetuses at very low parts per billion. The greatest effect was at the lowest dose.

Beyond Pesticides has long been critical of EPA's risk assessment process, which fails to look at chemical mixtures and synergistic effects (or inert ingredients) in common pesticide products, as well as certain health endpoints (such as endocrine disruption), disproportionate effects to vulnerable population groups, and regular non-compliance with product label directions. These deficiencies contribute to its severe limitations in defining real world poisoning, as captured by epidemiologic studies in Beyond Pesticides' Pesticide-Induced Diseases Database, <http://bit.ly/2e4sebX>.

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## **Poisonings**

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Despite this constant threat, while certain U.S. states like California, Oregon, and Maryland have pesticide illness reporting systems, there has been no change at the federal level since Director of the Government Accountability Office highlighted the absence of a comprehensive national database on pesticide incidents and poisonings in 2001. Available data does indicate that pesticide poisonings continues to impact human health and the U.S. economy. A 2012 study published in the *Journal of Agromedicine* determined through reports from the American Association of Poison Control Centers that an average of 130,136 calls to poison control centers occurred between 2006 and 2010. Scientists estimated the annual national cost associated with pesticide exposures at roughly \$200 million.

The vast majority of pesticide poisoning incidents can be prevented by eliminating the need to use a pesticide in the first

place. Adhering to organic and integrated pest management techniques in and around the home can work to address pest problems before they become an infestation and health problem themselves. For household pests, place a focus on sealing pests out and denying them access to food and water. This can be done through structural and cultural practices. Seal pests out by caulking and sealing cracks and crevices, and installing simple door sweeps. Deny pests access to food and water by making sure pipes and faucets are not leaking, storing food in tightly sealed containers, and purchasing a trash can with a tight fitting lid. Additional cultural controls such as attentive vacuuming, not leaving food or crumbs out at night, immediately cleaning up messes, and refraining from allowing dishes to soak overnight are certain to limit pest access to food and water. In the unlikely event pests do become a problem, least toxic pesticides like baits or gels can be employed but should never be stored or placed in areas where children or pets can access them.

In the event that you or a child are poisoned by a pesticide, it is important to seek help immediately by calling 911 and the poison control hotline at 1 (800) 222-1222. Pesticide poisonings incidents should also be reported to your state pesticide regulatory agency, which you can find through this link. You can also send a pesticide incident report to Beyond Pesticides, which allows us to keep track of poisoning events and watchdog state and federal agencies. Though the U.S. Environmental Protection Agency does not have a comprehensive pesticide incident reporting database, it does keep track of poisonings based on individual chemicals, and use that information when evaluating a pesticide for re-registration.

For more information on what to do in a pesticide emergency, see Beyond Pesticides' webpage. And for important information on protecting newborns, infants, and toddlers from toxic chemical exposure, see the Healthy Health Care webpage, [beyondpesticides.org/hospitals](http://beyondpesticides.org/hospitals).