



School Pesticide Monitor

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Scientists Determine 99.6% of Lice Resistant to Chemical Treatment

Virtually all lice in the U.S. have developed resistance to over-the-counter and prescription shampoos containing the toxic chemical permethrin, according to new research.

The U.S. Environmental Protection Agency's Office of Pesticide Programs considers permethrin, part of the synthetic pyrethroid class of chemicals, "likely to be carcinogenic." However, when used as a lice shampoo the chemical is regulated by the Food and Drug Administration (FDA) and allowed for use on infants over two months old. The

latest study on lice resistance, published in the *Journal of the Entomological Society of America*, shows that harsh chemical treatments not only are not necessary given effective least-toxic alternatives, but also are not able to provide the lice control that manufacturers claim.

"In the UK and Europe, they don't even use pyrethroids anymore. Virtually everyone but the United States and Canada has given up using these over-the-counter products," said Dr. John Clark, PhD, a professor of environmental toxicology and chemistry at the University

of Massachusetts Amherst and co-author of the new study.

In an interview with the Detroit Free Press, Eric Ayers, MD of the Children's Hospital of Michigan noted that lice that are not killed by the chemical treatment not only survive, but become stronger.

"The more a product is used within a community, the more lice in that community become resistant," said Shirley Gordon, PhD, director of the Head Lice Treatment and Preven-

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EPA Awards Over \$500,000 for Integrated Pest Management at Schools

In an effort to help reduce children's exposure to pesticides, the U.S. Environmental Protection Agency (EPA) announced three grants to universities in Texas, Michigan, and Arizona to implement integrated pest management (IPM) practices in schools on March 12.

Though these IPM programs are intended to reduce pesticide exposure, there is reason for concern that they may not provide the safety actually required for schools to keep children safe from toxic chemicals. Without strong set of guidelines, there can be weak IPM programs that unnecessarily rely on the use of pesticides, rather than

utilizing management practices that exclude pest entryways, adopt sanitation and cleaning practices to eliminate pest conducive conditions, and when necessary, as a last resort, use carefully defined least-toxic chemicals.

The three grants will be awarded to:

- **The Texas A&M Agrilife Extension** to develop a central, internet-based hub for materials and phone apps that will give school districts the information and tools they need to adopt an IPM program. While the project aims to reach 1 percent

of schools (552,350 students) within three years, it has the potential to reach all of the 15,000 school districts nation-wide and the 49 million children attending US public schools.

- **The University of Arizona** to develop and carry out a pilot training and certification program for school staff (custodians, kitchen staff, and school administrators) in eight states and four tribes, working with five other universities and stakeholders. Once finalized, the materials will be made available to schools na-

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Lice...continued from reverse

tion Project at Florida Atlantic University. "We don't like to use the term super lice, because it's sensational and frightening. It's not a superbug, but a louse that has become resistant." According to the latest study, 99.6% of lice tested between 2007-2009 would be considered "super."

A greater concern than "super" lice resistant to these chemicals is the use of these harsh products in the first place, especially on infants and children. A 2009 study, *Pesticide exposure resulting from treatment of lice infestations in school-aged children in Georgia*, found that children treated with common chemical lice shampoos containing permethrin and the organophosphate lindane showed levels of the chemical's metabolites up to seven days after the first treatment.

This is especially concerning given that environmentally relevant levels of pyrethroids are also common in many homes, where they are used as a household insecticide. Young children who play on the floor can come into chronic contact with these chemicals through skin or hand to mouth activities. A 2013 study, *Urinary metabolites of organophosphates and pyrethroid pesticides and behavioral problems in Canadian children*, found that high levels of pyrethroid metabolites correlated with a two-fold increase in parent-reported behavioral problems, including inattention and hyperactivity.

These chemicals can also damage children before they are born. A 2013 study, *In utero pesticide exposure and leukemia in Brazilian children less than 2 years of age*, found that a mother's exposure to per-

methrin at any time raised the cancer risk for infants. A 2006 study, *Household exposure to pesticides and risk of childhood acute leukemia*, also found an association between the use of lice shampoo and childhood leukemia.

A 2012 study, *Prenatal exposure to pesticide ingredient piperonyl butoxide and childhood cough in an urban cohort*, indicated that exposure to synthetic pyrethroids like permethrin in combination with piperonyl butoxide, a chemical often added to pesticide formulations and lice shampoos as a synergist



to enhance the toxicity of active ingredients, "...may be a factor in a very common problem for children – cough," according to co-author

IPM Grants

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tion-wide through partners.

- **The Michigan State University** to help 5 percent of Michigan and Indiana schools adopt IPM through hands-on education, training and coalition-building, including web-based trainings and a website. About 135,000 children may be protected.

IPM can have different definitions

Rachael Miller, MD.

There are a number of alternative lice treatment methods that do not include the use of toxic chemicals. According to researchers on alternative lice treatments, one method for eliminating head lice that will not lead to resistant strains of lice is the use of hot air, which desiccates the insects and eggs, killing them.

In fact, recent research shows that the extra chemicals in lice shampoo are completely unnecessary. Ordinary conditioners are just as effective at removing lice. "There were no significant differences in measured forces between the ordinary conditioner and the commercial nit removal product," authors of a study published in the *Journal of Medical Entomology* write. "The commercial nit removal products tested in the current study do not seem to have an additional effect."

For additional information on controlling head lice without toxic chemicals, see *Beyond Pesticides'* factsheet, *Getting Nit Picky About Head Lice*: bit.ly/nitpicky.

and methods of implementation, meaning virtually anything the practitioner wants it to mean. Beware of chemical dependent programs masquerading as IPM. Those who argue that IPM requires the ability to spray pesticides immediately after identifying a pest problem are not describing IPM. Conventional pest control tends to ignore the causes of pest infestations and instead relies on routine, scheduled pesticide applications. Pesticides are often temporary fixes, ineffective over the long term.