



## Media Release

# DDT Highly Effective Against Resistant Mosquitoes

New study recommends using DDT to control #1 killer of African children: malaria

Washington, D.C. – A study published today by the [Public Library of Science \(PloS\) One](#) found that three out of five DDT-resistant *Aedes aegypti* mosquitoes, carriers of human diseases like dengue and urban yellow fever, avoid huts sprayed with DDT. The chemical's unique spatial repellent action, combined with its moderate irritant and toxic properties, reduced the risk of disease transmission by nearly three-quarters.

The study authors looked at huts sprayed inside with three different residual insecticides – DDT, alphacypermethrin and dieldrin. Dieldrin's toxic effect killed 92% of mosquitoes that made contact. Alphacypermethrin worked by both killing and irritating mosquitoes making contact, prompting them to rapidly exit, providing a composite 61% transmission protection. DDT's spatial repellency kept almost as many mosquitoes from even entering the huts. By combining all three modes of action, DDT provided 73% protection.

"A toxic chemical like dieldrin kills almost all of the mosquitoes that land on it, but also increases the chance for rapid build up of resistance," said Dr. Donald Roberts, study author and Professor of Tropical Disease at the US Uniformed Services University of the Health Sciences. "Since toxicity is dieldrin's only chemical action, resistance completely eliminates its usefulness. Unlike dieldrin, DDT's spatial repellency acts like a chemical screen, keeping 59% of the mosquitoes out of the hut at the outset. By comparison, alphacypermethrin and dieldrin did not deter the study mosquitoes from entering huts."

According to the study results, DDT is the only World Health Organization (WHO)-recommended chemical that provides all three levels of protection if the disease-carrying mosquito is not resistant. Even where resistance to its toxic action exists, DDT still provides protection through its repellent and irritant actions. These findings have implications for controlling malaria, the biggest killer of African children. Most malaria infections are acquired when *Anopheles* mosquitoes enter homes at night and bite people. *Anopheles* mosquitoes are known to exhibit stronger behavioral responses to DDT and other chemicals than *Aedes aegypti*, so the transmission protection DDT provides against malaria is likely to be greater than 73%.

"The findings of this study support WHO's recommendation to use DDT for indoor residual spraying," says Dr. Roberts. "DDT's repellent action makes it a powerful public health tool. It also explains why DDT remains effective against malaria-carrying mosquitoes in India, where mosquitoes developed resistance to its limited toxic action."

The study authors propose a new classification scheme for public health insecticides that takes into account the multiple modes of action described by the study. They further urge researchers to look beyond toxicity in the search for alternative public health insecticides.

"By limiting our focus on insecticidal action to one-dimension, toxicity, we have missed opportunities to optimize insecticides against malaria," says Richard Tren, Director of Africa Fighting Malaria, a non-profit advocacy group. "Vector resistance is a major threat to malaria control, but a poorly funded and barely understood subject. The Gates Foundation is the only organization investing in new public health insecticides, and broadening its focus to include all modes of chemical action on disease vectors."