

Zika: Is DDT An Answer?

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DDT is not the answer to controlling zika! The *Aedes aegypti* mosquito, which is the main vector responsible for Zika transmission in humans in the Americas, has been shown to be resistant to DDT since the 1960s. Although the use of DDT in public health has since been discontinued, the issue of DDT resistance continues to pose a problem. The ‘pyrethroids’, another group of insecticides introduced in the Americas for mosquito control, uses the same mechanism as DDT. This has resulted in the development of cross-resistance to pyrethroids in *Aedes aegypti* mosquitoes, thereby adding to the problem of insecticide resistance.

Francisco Becerra, MD, MPH '84, DrPH is the assistant director of the Pan American Health Organization/World Health Organization.

DDT isn't just a public health technology, it's a symbol. What it symbolizes depends on one's values—which is easier to see by looking to the past than the present. When we “banned” DDT in the '70s, the pesticide symbolized human hubris and technology out of control to its foes; to its defenders, it represented humankind's power to eliminate starvation and disease through science. Is DDT an answer to Zika today? For those with one set of values, yes; for those with another, no. No individual can answer this question, only a

society, as its values and prevailing worldview tip the balance in favor of DDT's known benefits—or its real and potential risks.

Elena Conis, PhD, is a historian of public health and medicine at Emory University, the 2015–2016 Cain Fellow at the Chemical Heritage Foundation, and the author of Vaccine Nation: America's Changing Relationship with Immunization.

No. With underlying insecticide resistance mechanisms antagonistic to DDT likely to already be present in targeted Zika vectors, justification of using DDT in place of insecticides such as pyrethroids that are safer for vertebrates and the environment is unjustifiable. If used, DDT should only be used as an indoor residual spray, which may have limited impact on Zika vectors due to metabolic, genetic and behavioral resistance. Source reduction, if carried out at large enough scale, would have a greater and longer impact on reducing vector populations. This, in addition to reducing personal risk (e.g. repellents, window screening, air conditioning, etc.) is a better alternative than DDT for Zika virus.

Douglas Norris, PhD, MS, is a professor and researcher in the Department of Molecular Microbiology and Immunology and Johns Hopkins Malaria Research Institute.

The short answer is no. It might be part of the answer, but we need to

be wary of partial answers. Over the decades since the first eradication campaigns related to malaria, insect vectors have developed resistance to DDT, which means we have to do more. The answer is to develop careful and multicomponent programs for control of insect-borne disease: Drain the swamps, eradicate standing water, screen dwellings, utilize pyrethrin-treated bed nets along with carefully targeted indoor residual spraying with DDT; most importantly, establish and maintain effective case identification and treatment.

Ellen Silbergeld, PhD, a professor in Environmental Health Sciences, is an authority on how exposure to toxic substances can affect human health. She helped prove that lead in gasoline is bad for us, and more recently connected mercury and malaria, for which the MacArthur Foundation awarded her a genius grant.

Did DDT work in South America when they were trying to eradicate malaria and yellow fever? Yes, it

did. Do I personally think it's the answer? No, I don't. First, I think the environmental costs are real for DDT. Secondly, those programs that utilize DDT went on for years, were incredibly expensive and required the cooperation of many countries. The reason it fell apart was because it was too expensive to continue, and you were relying on your neighbor to be a good neighbor. I think that we can do better, and hopefully at a lower environmental cost.

Anna Durbin, MD, an associate professor in International Health, recently led a dengue vaccine trial at the Center for Immunization Research showing it protected 100 percent of human volunteers from dengue challenge.