

Mosquito Spray Research

Concern regarding the health risks and environmental impact associated with the spraying of chemicals to control adult mosquitoes has been the subject of extensive research, resulting in numerous published studies. According to the American Mosquito Control Association, there are over 200 scientific, peer-reviewed, studies published in numerous international journals that have confirmed the low risk to human health, the environment, and populations of non-target organisms from the proper use of adult mosquito control products. Below is a small sample of some of these studies.

Human health impacts:

Centers for Disease Control and Prevention. 2005. Human Exposure to Mosquito Control Pesticides – Mississippi, North Carolina, and Virginia, 2002 and 2003. *Morbidity and Mortality Weekly Report*. 54(21): 529-532. – **Ground based truck applications of adult mosquito control products did not produce any detectable exposure in humans.**

Chung, WM, et al. 2013. The 2012 West Nile Encephalitis Epidemic in Dallas, Texas. *Journal of the American Medical Association*. 310(3): 297-307. – **An eight (8) day period of aerial spraying to stop a West Nile Virus epidemic in Dallas did not result in any detectable increase in respiratory ailments or skin rashes in emergency rooms.**

Duprey, Z., et al. 2008. Community Aerial Mosquito Control and Naled Exposure. *Journal of the American Mosquito Control Association*. 24(1): 42-46. – **Aerially applied adult mosquito control products did not produce any detectable exposure in humans.**

Geraghty, EM, et al. 2013. Correlation Between Aerial Insecticide Spraying to Interrupt West Nile Virus Transmission and Emergency Department Visits in Sacramento County, California. *Public Health Reports*. 128(3): 221-230. – **Aerially applied adult mosquito control products are not associated with any increase in respiratory, gastrointestinal, skin, eye, or neurological complaints in emergency departments.**

Karpati, A., et al. 2004. Pesticide Spraying for West Nile Virus Control and Emergency Department Asthma Visits in New York City, 2000. *Environmental Health Perspectives*. 112(111): 1183-1187. – **Ground based truck applications of adult mosquito control products did not result in increased emergency room visits for asthma.**

O'Sullivan, B., et al. 2005. The Effect of pesticide Spraying on the Rate and Severity of ED Asthma. *The American Journal of Emergency Medicine*. 23(4): 463-467. – **Ground based truck applications of adult mosquito control products did not increase the rate or severity of asthma presentations in emergency departments.**

Peterson, RK, et al. 2006. A Human-Health Risk Assessment for West Nile Virus and Insecticides Used in Mosquito Management. *Environmental Health Perspectives*. 114(3): 366-372. – **Human health risks from residential exposure to adult mosquito control products are low and do not exceed levels of concern. The risk from West Nile Virus exceeds the risk from exposures to adult mosquito control products.**

Preftakes, CJ, et al. 2011. Bystander Exposure to Ultra-Low Volume Insecticide Applications Used for Adult Mosquito Management. *International Journal of Environmental Research and Public Health*. 8: 2142-2152. – **Ground based truck applications of adult mosquito control products are below human exposure levels of regulatory concern.**

Schleier III, JJ, et al. 2009. A Two-dimensional Probabilistic Acute Human-Health Risk Assessment of Insecticide Exposure After Adult Mosquito Management. *Stochastic Environmental Research & Risk Assessment*. 23: 555-563. – **Risks to human health from adult mosquito control ULV spraying is negligible, using a sufficiently conservation measurement method.**

Environmental impacts:

Boyce, WM, et al. 2007. Nontarget Effects of the Mosquito Adulticide Pyrethrin Applied Aerially During a West Nile Virus Outbreak in an Urban California Environment. *Journal of the American Mosquito Control Association*. 23(3): 335-339. – **Aerial application of adult mosquito control products found no effects on dragonflies, spiders, butterflies, and honeybees.**

Chaskopoulou, A. et al. 2014. Nontarget effects of aerial mosquito adulticiding with water-based unsynergized pyrethroids on honey bees and other beneficial insects in an agricultural ecosystem of north Greece. *Journal of Medical Entomology*. 51(3): 720-724. – **Aerially applied adult mosquito control products produced no increase in mortality of beneficial nontarget organisms. Beehives exposed to the applications performed as well as others that were not exposed, increasing in weight, adult bee population, and brood population.**

Davis, RS, et al. 2007. An Ecological Risk Assessment for Insecticides Used in Adult Mosquito Management. *Integrated Environmental Assessment and Management*. 3(3): 373-382. – **Ground based truck applications of adult mosquito control products pose little risk to small mammals, birds, aquatic vertebrates, and aquatic invertebrates.**

Davis, RS and Peterson, RK. 2008. Effects of Single and Multiple Applications of Mosquito Insecticides on Nontarget Arthropods. *Journal of the American Mosquito Control Association*. 24(2): 270-280. – **Ground based truck applications of adult mosquito control products in a National Wildlife Refuge near Great Falls, MT indicated few, if any, negative impact on nontarget aquatic and terrestrial organisms.**

Jensen, T. et al. 1999. Effects of Ultra-Low Volume Pyrethrin, Malathion, and Permethrin on Nontarget Invertebrates, Sentinel Mosquitoes, and Mosquitofish in Seasonally Impounded Wetlands. *Journal of the American Mosquito Control Association*. 15(3): 330-338. – **Ground based truck applications of adult mosquito control products are unlikely to have any substantial effect on aquatic insects or fish, tested in a wetland environment.**

Kwan, JA, et al. 2009. Mortality of Nontarget Arthropods from an Aerial Application of Pyrethrins. *Journal of the American Mosquito Control Association*. 25(2): 218-220. – **Aerially applied adult mosquito control products did not have an effect on large bodied beneficial insects.**

Schleier III, JJ and Peterson, RK. 2010. Toxicity and Risk of Permethrin and Naled to Non-target Insects After Adult Mosquito Management. *Ecotoxicology*. 19: 1140-1146. – **Ultra-Low Volume (ULV) applications of adult mosquito control products do not impact populations of medium or large bodied beneficial insects.**

Effectiveness and Disease Prevention:

Carney, RM, et al. 2008. Efficacy of Aerial Spraying of Mosquito Adulticide in Reducing Incidence of West Nile Virus, California, 2005. *Emerging Infectious Diseases*. 14(5): 747-754. – **Results from study provide direct evidence that adult mosquito control spray applications are effective in reducing human illness and potential death from West Nile Virus infection.**

Elnaiem, DE, et al. 2008. Impact of aerial spraying of pyrethrin insecticide on *Culex pipiens* and *Culex tarsalis* (Diptera: Culicidae) abundance and West Nile Virus infection rates in an urban/suburban area of Sacramento County, California. *Journal of Medical Entomology*. 45(4): 751-757. – **Aerial application of adult mosquito control products were effective at reducing abundance and infection rates for West Nile Virus in mosquito populations, lowering transmission intensity and decreasing risks of human infections.**

Farajollahi, A., et al. 2012. Effectiveness of Ultra-Low Volume Nighttime Applications of an Adulticide against Diurnal *Aedes albopictus*, a Critical Vector of Dengue and Chikungunya Viruses. *PLOS ONE*. 7(11): e49181. - **Nighttime ground based truck applications of adult mosquito control products utilized by TASD are effective at reducing populations of a difficult to control mosquito species.**

Macedo, PA, et al. 2010. Evaluation of efficacy and human health risk of aerial ultra-low volume applications of pyrethrins and piperonyl butoxide for adult mosquito management in response to West Nile virus activity in Sacramento County, California. *Journal of the American Mosquito Control Association*. 26(1): 57-66. – **Aerial application of adult mosquito control products were below human health concern levels and were effective at reducing abundance and infection rates for West Nile Virus in mosquito populations.**