

# Risk assessment

[Literature](#), [Russian Literature](#)



Malathion Risk Assessment Malathion Risk Assessment This report assesses the risk to Genericville regarding the application of Malathion as a preventative and precautionary measure to control the mosquito population; and , therefore, control the spread of West Nile Virus (WNV). This report will address the following conditions: 1. Hazard identification 2. Dose-response 3. Exposure 4. Risk characterization From these data, the report will recommend a course of action regarding the relative risks of using Malathion and no application. Hazard Identification Malathion, according to the Environmental Protection Administration (EPA), does not necessarily pose health risks to humans, mammals or birds; however, the byproducts of Malathion degradation and common impurities from manufacturing do. This report, as does EPA, will treat all of these chemicals as surrogates of Malathion and investigate the health risks associated with all likely byproducts. The three most common reactions to Malathion application are no reaction or discomfort, mild allergic reactions and conditions drawn from cholinesterase inhibition. This enzyme affects the circulatory system. Those symptoms can be categorized as mild: pin-point pupils, headache, nausea, general flu like symptoms; moderate: chest tightness, sweating, confusion and abdominal pain; or very severe: coma, respiratory arrest and seizures. Severe cases are commonly associated with suicide attempts. (ATSDR. CDC. GOV., 2011) Empirical data demonstrate low potential health risk. The laboratory study cited showed a very small reaction rate. The follow up study in the Florida fruit fly data sets had a 9 of 10, 000 people incidence rate. Genericville could expect 90 cases of Malathion exposure risk based on these data. The California study found no significant increases in hospital activity

after spraying. Dermatitis was reported at an increased rate. Also, gastrointestinal birth defects were reported in second trimester exposures. Malathion is not classified as a carcinogen. Dose-Response Minimum Risk Level (MRL) for Malathion extrapolated from available data is .02 mg/Kg/day for chronic oral pathway and .2 mg/m<sup>3</sup> for inhalation. Each of these levels has a safety factor of 100x. “ Using these proposed values for the risk assessments for public health mosquito uses, EPA (2000d) concluded that the risk estimates for adults and toddlers for combined dermal and inhalation exposure did not exceed EPA’s levels of concern for residential bystander inhalation and dermal exposure from truck fogger and aerial ULV mosquito-control applications. This assessment included incidental oral ingestion for hand-to-mouth activities. Given the low levels of malathion used to control mosquito-borne diseases, ATSDR finds this assessment reasonable.” (ATSDR. CDC. GOV., 2011) Exposure A Malathion spraying operation would require an evening to spray, and then a week for the product to break down in the air column. As good risk management technique, a public service message and education to remain indoors during the spraying should be announced and enforced, and schedule the spray in the evening so most people remain indoors to sleep for at least a few hours. These methods will reduce the direct exposure at the most highly concentrated time. The wetland area should be sprayed only, no introduction directly into the water column. Citizens should hose down outdoor equipment which has been exposed to the spray including: lawn chairs, pool covers, barbeque grills and kids toys. The spray will not be in the environment long enough for chronic exposure issues to occur. Spraying for mosquitoes is low dose enough that risk to

humans is low; however, more caution is best. Vulnerable citizens should take additional precautions and nobody should be sprayed directly. Risk Characterization Pregnant women, certainly those in the second trimester, should not be exposed to Malathion. People with chronic pulmonary disease or heart conditions similarly, should not be exposed. The general population should be indoors during the spraying to avoid direct contact. People who have been previously exposed to Malathion and had skin irritation or other allergic reactions should take precautions to avoid additional exposure.

Although the studies show relatively high doses are required to show symptoms, relatively low doses are needed for repeat doses.

Recommendations West Nile Virus claimed 177 fatalities and 4269 severe illnesses in 2006. (CDC, 2005) Malathion spray demonstrated very little effect on the health care systems where it was applied. The social and political opposition suggests using the spray money to educate people on avoidance techniques. Opponents suggest the Malathion application may damage the ecosystem, or kill the natural mosquito predators. The money available for spraying is not community money; it is a private citizen willing to protect the community due to his own tragic loss. Using that money for a different purpose would be unethical, or perhaps it would not be available at all. Malathion does not show a negative effect on birds, the mosquito's natural predator. Given the balance and preponderance of evidence, this report recommends the use of Malathion under the conditions that vulnerable populations are informed of the risks and avoidance techniques.

References Agency for Toxic Substances and Disease Registry. (2005)

Retrieved from <http://www.atsdr.cdc>.

gov/consultations/west\_nile\_virus/Malathion.html Axia College Material.

Appendix B. Center for Disease Control Prevention. (2007) 2006 West Nile Virus activity in the United States. West Nile Virus Statistics, Surveillance, and Control. Retrieved from: [http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount06\\_detailed.htm](http://www.cdc.gov/ncidod/dvbid/westnile/surv&controlCaseCount06_detailed.htm)

gov/ncidod/dvbid/westnile/surv&controlCaseCount06\_detailed.htm