

Aerial mosquito spraying study finds no immediate public health risks

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Potential long-term effects of aerial spraying to combat mosquito-borne West Nile virus were not addressed in this UC Davis study.

(Medical Xpress)—In what researchers say is the first public health study of the aerial mosquito spraying method to prevent West Nile virus, a UC Davis study analyzed emergency department records from Sacramento area hospitals during and immediately after aerial sprayings in the summer of 2005. Physicians and scientists from the university and from the California Department of Public Health found no increase in specific diagnoses that are considered most likely to be associated with pesticide exposure, including respiratory, gastrointestinal, skin, eye and neurological conditions.

The study evaluated emergency room visits in Sacramento County hospitals on days that pesticides were sprayed as well as the three days

following spraying. The study appears in the May-June 2013 issue of *Public Health Reports*.

This week, mosquito control officials said the region's recent rainstorms and warming temperatures have increased stagnant water and favorable conditions for mosquitoes, which will likely magnify the incidence West Nile virus and the risks of [human transmission](#). The mosquito-borne disease first appeared in the state about 10 years ago. It already has been detected in dead birds and mosquitoes in at least 10 counties in recent weeks, including Sacramento and Yolo. However, the adult mosquito population has yet to increase to levels that require aerial spraying over heavily urbanized areas as was done in the Sacramento region in previous years.

"Unfortunately, West Nile virus is endemic in California and the United States, and the controversy of mosquito management will likely arise every summer," said Estella Geraghty, associate professor of clinical internal medicine at UC Davis and lead author of the study. "Findings from studies such as this one help public health and mosquito control agencies better understand the risks and benefits of their practices."

West Nile virus has become an increasingly serious problem throughout the United States and may become more of a threat as the climate warms. According to the Centers for Disease Control and Prevention, West Nile virus is the leading cause of viral encephalitis in the United States. The virus is transmitted to humans and animals through the bite of an infected mosquito. Mosquitoes become infected with the virus when they feed on infected birds.

In California around the time of the study—2004 and 2005—hundreds of people were sickened by West Nile virus and 48 died. Most people exposed to the disease do not have symptoms, but in about 1-in-150 people it can be fatal or result in permanent neurological effects.

The study evaluated emergency room visits in Sacramento County hospitals on days that pesticides were sprayed as well as the three days following spraying. Spraying was done in north Sacramento over three nights, and in south Sacramento over four nights in August 2005. Data were compared with emergency room visits on other days during the same period as well as from nearby areas that were not exposed to aerial spraying.

Emergency room visits were classified by specific diagnostic categories, including respiratory, gastrointestinal, skin, eye and neurologic diseases. Importantly, they found that exposure to aerial spraying was not associated with increased rates of emergency department visits for any of these conditions.

More than 250,000 emergency room visits were analyzed and stratified by 785 diagnostic codes. According to Geraghty, because there were so many data points, statisticians predicted that by chance alone, two conditions would appear to have occurred too frequently or too infrequently. In fact, a type of abdominal hernia was found to occur more often than the background rate during the time of spraying, and death and disease due to unusual causes was found to occur less frequently. The authors concluded that because these conditions have no known plausible biological connection with aerial spraying, the results related to these conditions are indeed likely to have occurred by chance.

Integrated mosquito management—a method to control mosquitoes through targeted interventions based on mosquito biology that includes surveillance of mosquito activity, reducing breeding sites such as neglected swimming pools, and the killing of larval and adult [mosquitoes](#)—are all used in California to control the spread of mosquito-borne diseases such as West Nile virus. When local methods prove inadequate, aerial spraying is used to rapidly reduce large, adult mosquito populations.

During the time of the study, ultra-low volume of pyrethrin insecticide was used for spraying; the chemical is derived from an African chrysanthemum and acts by blocking chemical signals at nerve junctions in insects. It is the same pesticide used to treat head lice in children and to kill fleas and ticks in pets.

Exposure to the pesticide has been reported to pose risks to human health, including skin and eye irritation, respiratory and gastrointestinal disturbances, lethargy, fatigue and dizziness. According to the UC Davis researchers, the exposure to pyrethrin during the urban aerial sprayings in 2005 was minimal due to the use of ultra low volume technology. Coverage required only about three-quarters of an ounce or less of the chemical per acre.

Geraghty cautioned that potential long-term effects of [aerial spraying](#) were not addressed in the study and would be extremely difficult to investigate on human populations. She said it would be worthwhile to reproduce the study for other pesticides and spraying techniques.

Provided by UC Davis

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