

Residents concerned about use of genetically modified mosquitoes to curb insect population

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A small survey of residents of a Florida Keys neighborhood where officials hope to release genetically modified mosquitos to potentially reduce the threat of mosquito-borne illnesses such as Zika finds a lack of support for the control method, according to new research from former and current students at the Johns Hopkins Bloomberg School of Public Health.

The findings, published last month in *PLOS Currents Outbreaks*, suggest that people's attitudes toward this new mosquito control method may be tied to pre-existing beliefs about risks of contracting diseases including dengue, chikungunya and Zika from the insects. The researchers say that people who do not feel that they are at risk from mosquito-borne diseases or who don't believe that mosquitoes are a nuisance express greater discomfort with the idea of introducing male *Aedes aegypti* mosquitoes which are bred to mate with wild females and produce offspring with a defective gene that kills them, thereby reducing the population of disease-carrying mosquitoes.

The novel mosquito control method has been tried in Brazil and Panama with some success, and the U.S. Food and Drug Administration is considering a trial in Key Haven, a community in the Florida Keys. *Aedes aegypti* carry all three diseases, though no local mosquito-borne cases of Zika virus have been reported in the United States. Zika has been linked to brain-related birth defects in babies born to pregnant

mothers who contract the virus.

The scientists, current students and recent graduates of the Bloomberg School, say the research could help public health and community leaders address head-on the objections of residents where such control measures are being contemplated, as the fight against mosquito-borne illnesses heats up. The survey was conducted in the second half of 2015, after locally transmitted dengue and chikungunya cases had been discovered in Florida, but before the Zika epidemic in South and Central America became big news. There is concern that Zika could spread north into the continental U.S. The band from southern Florida, including the Keys, to southern Texas, as well as Hawaii, are believed to be part of the region of the U.S. most at risk.

A British company, Oxitec, has been trying for years to get approval to test their [genetically modified mosquitoes](#) in the Keys. Some local residents have tried to kill the field trial, concerned about unanticipated consequences of introducing these lab-grown insects into the wild.

"With the start of mosquito season here and all of the media coverage of Zika, [public health](#) officials are going to be faced with important decisions about mosquitoes and how to best protect citizens," says Meghan McGinty, MPH, MBA, a recent PhD recipient from the Bloomberg School and one of the researchers. "People will have objections and it is critical for them to be heard. Our research provides a starting point to understand how the community feels and to begin a dialogue about how to address [mosquito-borne diseases](#)."

For the study, the researchers mailed a survey in July 2015 to all 456 households in the Key Haven community outside Key West; they received 89 responses. Residents were evenly split over whether they consider mosquitoes a nuisance, but two-thirds agreed there was a need to reduce the mosquito population. Women were more opposed to the

genetically modified mosquitoes than men.

The most popular mosquito control method was draining standing water to reduce breeding, followed by treating standing water with larvicides designed to kill new mosquitoes before they hatch and spraying insecticides. The least popular was using genetically modified mosquitoes to reduce the population.

Fifty-eight percent of respondents said they either "oppose" or "strongly oppose" the use of genetically modified mosquitoes to combat the risk of disease. The most common objection was a concern over disturbing the local ecosystem by eliminating mosquitoes from the food chain. Respondents were also concerned that using genetically modified mosquitoes could lead to an increase in the use of other genetically modified products.

Since the survey was conducted before the extent of the Zika epidemic was widely known, respondents were only asked about their concerns about dengue and chikungunya (the area was hit by a dengue outbreak several years ago). Sixty-three percent said they were "a little worried" or "very worried" about becoming sick from one of those mosquito-borne illnesses, and most said they or someone they knew would contract one of the diseases.

Researcher Crystal Boddie, MPH, a DrPH candidate in the Bloomberg School's Department of Health Policy and Management, who is also employed at the University of Pittsburgh Medical Center's Center for Health Security in Baltimore, says that those who were most concerned about the risk of contracting one of the mosquito-borne illnesses were more likely to support the release of the new mosquitoes.

The researchers recognize that their sample size is small and that with the rising threat of Zika, opinions may have changed about the use of

these genetically modified mosquitoes.

Still, Boddie says, "the survey provides a baseline of information about residents' attitudes and concerns and can help health officials better educate the public about the risks and benefits of these [genetically modified](#) mosquitoes. Then we need to have an honest conversation about where this control method does—or does not—fit in."

"Genetically Modified (GM) Mosquito Use to Reduce Mosquito-Transmitted Disease in the US: A Community Opinion Survey" was written by Amesh Adalja, Tara Kirk Sell, Meghan McGinty and Crystal Boddie.

Provided by Johns Hopkins University Bloomberg School of Public Health

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