

Mosquito control program reduces dengue, costs in Sri Lanka

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A public health, police, and military partnership to reduce the mosquito population in Sri Lanka resulted in a more than 50-percent reduction in dengue, as well as cost savings, finds a study from an international team

of researchers led by NYU College of Global Public Health. The findings are published in *The Lancet Planetary Health*.

Dengue is a viral illness transmitted by [mosquitoes](#) and can cause fever, pain, rash, and other flu-like symptoms. Severe cases require hospitalization, placing an economic burden on areas where dengue is found. While a new dengue vaccine raised hope about reducing the impact of the disease, the vaccine's risks have limited its use, maintaining the focus on controlling mosquito populations to halt the spread of the disease.

Dengue is particularly prevalent in countries in south Asia and has become a major public [health](#) problem in Sri Lanka, which has seen a dramatic increase in the disease in recent years. In response, in 2014, Sri Lanka's Ministry of Health started a proactive mosquito control program in partnership with its military and police forces.

The program aimed to reduce mosquitos in high-risk communities by conducting door-to-door inspections on a large scale. Teams made up of a combination of public health authorities, police, and military personnel inspected at least 50 locations daily in order to identify and remove mosquito breeding sites, such as containers of stagnant water around homes. The program augmented the routine mosquito control interventions with larvicides and insecticides.

This study evaluated the impact of the mosquito control [intervention](#) from June 2014 to December 2016 in an urban region in western Sri Lanka highly affected by dengue. The researchers analyzed the rates of dengue in symptomatic patients in the presence and absence of the intervention, adjusting for climate variables, including rainfall and temperature, to measure the program's impact. The researchers also assessed the cost and cost-effectiveness of the program.

"Evaluating the effectiveness and cost-effectiveness of population-level interventions is essential for guiding [public health](#) planning and empowering policy makers to deploy the most effective and efficient interventions, particularly in resource-limited settings," said Yesim Tozan, assistant professor of global health at NYU College of Global Public Health and the study's senior author.

The mosquito control program had a significant effect on larval mosquito populations in the region as well as on dengue, with researchers measuring a 57-percent reduction in dengue incidence. They estimate that 2,192 cases of dengue were averted during the 31-month intervention.

The program cost \$271,615, the majority (89 percent) of which went to personnel, given the human resource-intensive nature of the intervention involving door-to-door inspections and removal of mosquito breeding places. To analyze its cost-effectiveness, the researchers calculated costs using three scenarios of the proportion of dengue cases treated in hospitals: moderate hospitalization (50 percent), low hospitalization (25 percent), and high hospitalization (75 percent).

The researchers found that the [cost savings](#) from treating fewer dengue cases in medical settings thanks to the intervention were \$291,990 in the moderate hospitalization scenario, offsetting the mosquito control program costs and yielding a savings of \$20,247. The program was estimated to avert 176 disability-adjusted life-years over the study period, or \$98 in savings per disability-adjusted life-year. The scenario with high hospitalization levels was also cost saving, while the scenario with low hospitalization was cost-effective based on certain calculations but not others.

"Our study suggests that communities affected by dengue can benefit from investments in mosquito control if interventions are implemented

rigorously and coordinated across sectors. By doing so, it is possible to reduce the disease and economic burden of dengue," said Prasad Liyanage of the Sri Lanka Ministry of Health and Umeå University in Sweden and the study's lead author.

"Even if a safe dengue vaccine becomes available in the future, mosquito control is likely to remain a key complementary strategy to curtail the continued spread and intensification of [dengue](#)," said Tozan.

More information: Prasad Liyanage et al, Evaluation of intensified dengue control measures with interrupted time series analysis in the Panadura Medical Officer of Health division in Sri Lanka: a case study and cost-effectiveness analysis, *The Lancet Planetary Health* (2019). [DOI: 10.1016/S2542-5196\(19\)30057-9](https://doi.org/10.1016/S2542-5196(19)30057-9)

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