A modernized, integrated approach to killing Zika vectors

No treatment or vaccine is yet available for Zika virus so disease control is limited to the management of mosquitoes. Historically, this has relied on either insecticides or the destruction of larval breeding sites. However, in the Latin American context of burgeoning insecticide resistance and expanding mega-cities, these traditional methods have had limited impact. New weapons against *Aedes* mosquitoes are desperately needed to improve current efforts in Zika control.

A new study produced by ZikaPLAN researchers, in collaboration with ZikAlliance, highlights a fantastic opportunity for the effective and sustained control of Zika vectors. The study demonstrates profound public health impact through the strategic integration of two state-of-the-art technologies: the release of genetically sterilised mosquitoes (called 'RIDL' – Release of Insects carrying Dominant Lethal genes) followed by the release of *Aedes* mosquitoes made resistant to Zika virus through infection with (harmless) *Wolbachia* bacteria.

ZikaPLAN's Dr. Laith Yakob, who led the study, comments:

"*Field trials have demonstrated that RIDL is most effective for large mosquito populations. Conversely, models and trials have demonstrated that Wolbachia spreads more effectively in smaller mosquito populations. Our idea was simple: suppress Zika vectors using genetically sterilised 'RIDL' mosquitoes and then release Wolbachia-infected mosquitoes. The result is simultaneous elimination of Zika vectors and their replacement with mosquitoes that are incapable of spreading disease*"

These technologies have many advantages including the fact that both are environmentally friendly and that once replaced by a *Wolbachia*-infected mosquito population, local Zika transmission will be continually interrupted.

In recent weeks, Brazil has suffered multiple outbreaks of Yellow fever – another, more deadly, virus spread by *Aedes aegypti* mosquitoes. Dr. Yakob went on to say:

"A huge benefit of this combination approach to controlling *Aedes* is that it will be effective against all human viruses spread by this mosquito species – not just Zika, but dengue, chikungunya and Yellow fever too. And, this could not be more timely in the advent of the current Yellow fever surge in Latin America."

The paper:

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 734857

Yakob, L. ; Funk, S. ; Camacho, A. ; Brady, O. ; Edmunds, W.J. ; *Aedes aegypti* control through modernized, integrated vector management. PLoS Currents (2017) ; DOI: 10.1371/currents.outbreaks.45deb8e03a438c4d088afb4fafae8747;

Dr. Laith Yakob is Assistant Professor at the London School of Hygiene & Tropical Medicine. His background is in infectious disease epidemiology and he specializes in quantitative methods for disease control strategy. As current control efforts were insufficient to prevent Zika spreading throughout the Latin American continent, Dr Yakob and his group are developing models to inform optimal control strategy that take advantage of modern methods of *Aedes aegypti* management.

The EU-funded consortia, ZIKAction, ZIKAlliance and ZikaPLAN work closely to build a preparedness platform in Latin America and the Caribbean. They collaborate on harmonized protocols for cohort studies among pregnant women, infants and children, common communication strategies and the development of data sharing tools and methodology.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement No 734857