Evaluation of community-level vector control activities and *A. aegypti* egg density indices in Guatemala

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INTRODUCTION

The Zika Community Response (ZICORE) project in Guatemala aims to improve surveillance of the *Aedes aegypti* vector by using entomological data as the basis for low-cost community-level vector control, as well as social and behavior change interventions. Weekly ovitrap reading averages were used to target communities for vector control activities.

METHODS

- In 2018, household-level *Aedes aegypti* breeding site monitoring was conducted in 41 communities
- Four sentinel households were selected for every group of 9 blocks (G9Ms) in each community
- Ovitraps were installed in the selected households and egg counts were recorded weekly using Collector for ArcGIS
- In these communities, 8,142 traps were positive out of 14,314 readings
- A weekly average was calculated at the community level to identify G9Ms with very high entomological risk (90th percentile) to be targeted for community-level clean-up campaigns.
- Using weekly ovitrap monitoring results, the ZICORE project has implemented community-level efforts to prevent *Aedes aegypti* breeding without the use of chemicals, such as:
  o Eliminate breeding sites within communities in G9Ms in the 90th percentile or above for egg counts, e.g. disposal of non-useful containers, scrubbing of sinks and useful containers as part of the "VELITA" methodology, which is a Spanish acronym for the steps to be taken to prevent artificial breeding sites: 1-flip, 2-eliminate, 3-clean and 4-cover different types of containers.
  o Remove solid waste identified as potential *Aedes* breeding sites, e.g. tires and non-useful containers of varying sizes. Enlisted strong municipal government support, such as provision of trash removal vehicles to dispose of waste.

Distribution of ovitraps across groups of 9 blocks

RESULTS

The table below shows average egg counts per community by epidemiological week in 2018. Cells highlighted in green denote averages in the 90th percentile or higher for the week. Averages were calculated based on the number of ovitraps assessed per community.

Monthly Egg Count Averages by Community with Community-Level Clean-up Campaigns

DISCUSSION

Weekly entomological surveillance using ovitraps allowed a quantitative assessment of *Ae. aegypti* risk, and data obtained were used to target community source reduction efforts in 18 communities. Although natural mosquito populations fluctuate seasonally, interventions carried out to date were followed by a decline in egg counts.

With data available on a routine basis, municipal and local health authorities can now be more responsive to local needs. The effect that geographically-targeted clean-up campaigns may have on subsequent egg counts could be better observed if clean-up campaigns were organized systematically each week in every group of nine blocks (G9M) in the 90th percentile for *Aedes aegypti* egg laying the previous week. "Situation rooms" need to be held weekly to interpret G9M vector data and plan targeted actions.

REFERENCES

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The Zika Community Response (ZICORE) project in Guatemala aims to improve surveillance of the *Aedes* vector by using entomological data as the basis for low-cost community-level vector monitoring as well as social and behavior change interventions. In 2017, household-level *Aedes aegypti* breeding site monitoring was conducted in 44 communities. Ovitraps were installed in selected households and egg counts were recorded weekly. In these communities, 4,457 traps were positive out of 8,004 readings. A moving average was used to adjust for seasonality to enhance vector monitoring and identify communities of high entomological risk to be targeted for community-level clean-up campaigns. Utilizing weekly ovitrap monitoring results, the ZICORE project has implemented community-level campaigns to prevent *Aedes aegypti* breeding, such as:

- Breeding sites eliminated in targeted communities in the 90th percentile or above for ovitrap egg counts. Activities included disposal of non-useful containers and scrubbing of sinks and useful containers as part of the ZICORE-VELITA (*Voltear, Eliminar, Limpiar y Tapar*) protocol, which describes in Spanish the steps to be taken with household items that have the potential to become mosquito breeding sites (in English: flip, eliminate, clean and cover).

- Elimination of solid waste identified as potential *Aedes* breeding sites, including tires and non-useful containers of varying sizes. Included strong municipal government support, such as sponsored trash removal vehicles to dispose of waste.

Communities below the 90th percentile for ovitrap egg counts did not receive intensified community-level interventions and will be analyzed as controls. This analysis is useful for assessing any correlation between community-led clean-up campaigns and *Aedes aegypti* egg counts in intervention versus control communities.