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## Introduction of *Wolbachia* in *Aedes aegypti* mosquitoes for prevention of dengue transmission in Tegucigalpa, Honduras: a mixed-methods implementation study

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### Introduction

Global surges in dengue necessitate improved prevention strategies. One potential strategy is the introduction of *Wolbachia*, a naturally occurring bacteria that reduces arbovirus transmission, into local *Aedes aegypti* mosquitoes. In partnership with World Mosquito Program, Médecins Sans Frontières (MSF) collaborated with community members to release mosquitoes with *Wolbachia* in Tegucigalpa, Honduras. A mixed-methods implementation study was conducted to assess the feasibility, acceptability, and effectiveness of this strategy.

### Methods

From August 2023 to February 2024, MSF staff and 51 community volunteers released over 8.3 million local-strain *Aedes aegypti* mosquitoes with *Wolbachia* in the El Manchen zone of Tegucigalpa, Honduras. Entomological monitoring was conducted biweekly during the release period and every 3 months thereafter, by collecting mosquitoes and conducting PCR tests for *Wolbachia* presence. Dengue case data from El Manchen and three comparable control zones without *Wolbachia* were collected weekly from the Ministry of Health to create epidemic curves and calculate incidence rate ratios (IRRs). Household surveys were performed one month before (July 2023; n=403) and one month after (March 2024; n=401) the intervention to assess community knowledge and acceptability of *Wolbachia*. Four focus group discussions (FGD) with community members, two FGD with MSF staff, and 50 individual interviews with community volunteers, leaders, and other key actors were conducted.

### Ethics

This study was approved by the Ethical Review Board of SF (ID: 2305) and the Comité de Ética de Investigación instituted by the Universidad Nacional Autónoma de Honduras (UNAH) (No. PI 03-2023).

### Results

*Wolbachia* prevalence increased from 0% at the start of the release period to 82.79% (n=202) in February 2024. Following the release period, *Wolbachia* prevalence initially declined to 57.55% (n=141) by June 2024, before steadily increasing to 96.96% (n=230) by February 2025. Meanwhile, the cumulative incidence rate (cases/10,000 people) for March 2024–February 2025 was 106.36 in El Manchen and 256.84 in the control zones (IRR 0.41, p<0.05). Median cumulative incidence rate for March–February 2018–2023 was 56.32 in El Manchen and 81.16 in the control zones (IRR 0.69). Awareness of *Wolbachia* increased from 33.7% (n=136) to 78.3% (n=314) after 8 months of community engagement. Post-intervention, the percentages of surveyed community members who found *Wolbachia* to be acceptable, neutral, or unacceptable were 64.1% (n=257), 28.4% (n=114), and 7.5% (n=30), respectively, compared to 85.1% (n=343), 10.7% (n=43), and 4.2% (n=17) pre-intervention. Most common complaints included an increase in mosquitoes, concerns about *Wolbachia*'s safety among humans, and doubts of its effectiveness against dengue.

### Conclusion

Preliminary results suggest that with strong community engagement, *Wolbachia* can be a feasible and effective strategy against dengue in Honduras. While awareness of *Wolbachia* improved, misinformation persisted. Post-intervention acceptability may have also been influenced by survey timing (during a significant dengue outbreak and before results on effectiveness were available).

### Conflicts of interest

NG, AV, AUY work for World Mosquito Program (WMP), who developed the *Wolbachia* method analysed in the study. While WMP were involved in the implementation of the study (supporting the releases of mosquitoes with *Wolbachia*), they were not involved in data collection or analysis. All authors otherwise declare no competing interests.