Conflicts of interest
Two authors (NG, AUY) are associated with WMP, who developed the Wolbachia method analysed in the study. While WMP was involved in the implementation of the study, they were not involved in data collection or analysis. All authors otherwise report no conflicts of interest.

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).

Image: Laura Aceituna, MSF

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

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Study Motivation

- Dengue cases are surging globally due to multifactorial reasons including climate change.
    - Outbreaks are becoming more frequent and larger.

- Since 2019, Honduras has declared 3 public health emergencies due to dengue.

- New innovative strategies are needed to prevent or lessen outbreaks.

Figure 1. Suspected dengue cases as of EW 41 in 2024 and 2023, and average of the last 5 years. Region of the Americas

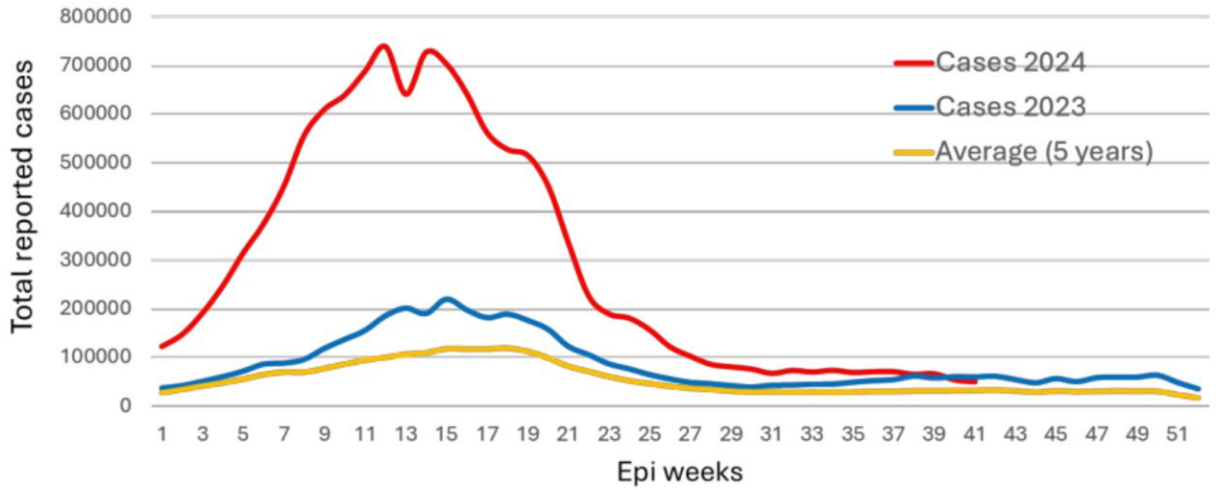

Image: PAHO

Wolbachia Method

- Bacteria that occurs naturally in 50% of insects
- Reduces dengue viral replication within *Aedes aegypti* mosquitos
- Can continue in subsequent generations of mosquitoes
- Has been successfully used in 16 countries

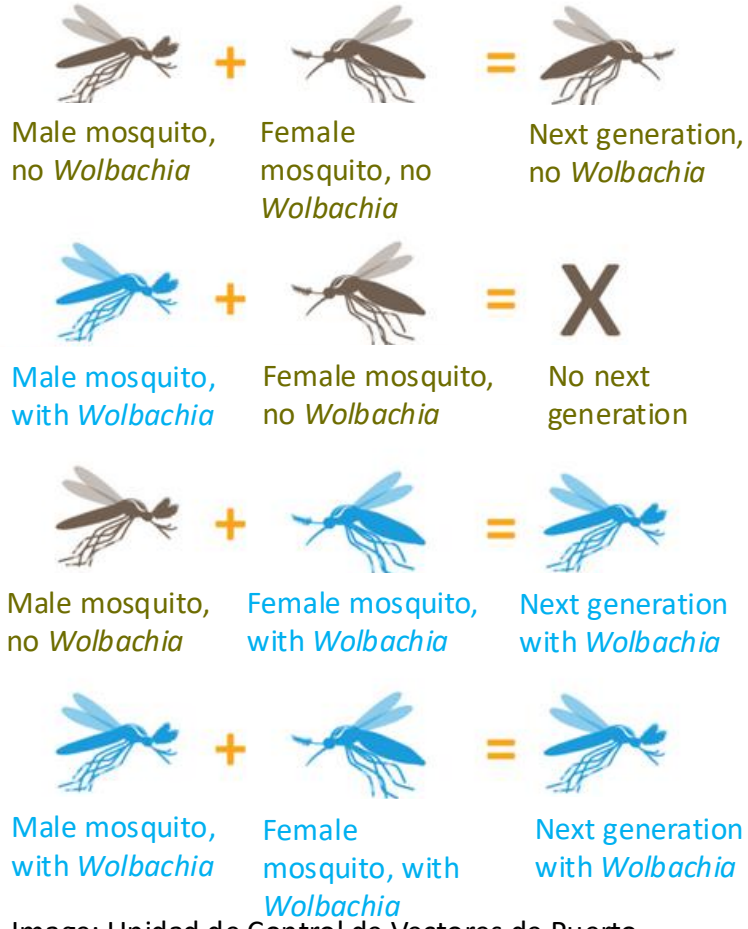

Image: Unidad de Control de Vectores de Puerto Rico, translated into English

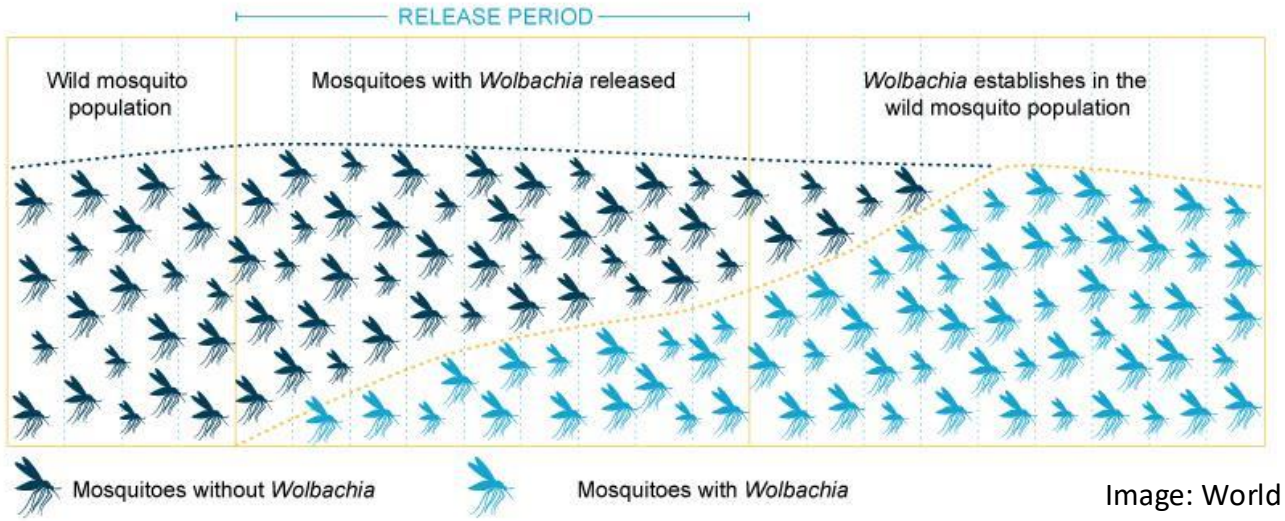

Image: World Mosquito Program

Study Context

- **Objective:** Assess the **feasibility**, **effectiveness**, and **acceptability** of Wolbachia for dengue prevention in Honduras
- **Location:** El Manchen, Tegucigalpa, Honduras
- **Period:** July 2023 – March 2024
  - Monitoring through June 2025
- **Partners:**
  - El Manchen community members
  - Ministry of Health (Secretaría de Salud)
  - Universidad Nacional Autónoma de Honduras
  - World Mosquito Program

Map of Tegucigalpa, HN

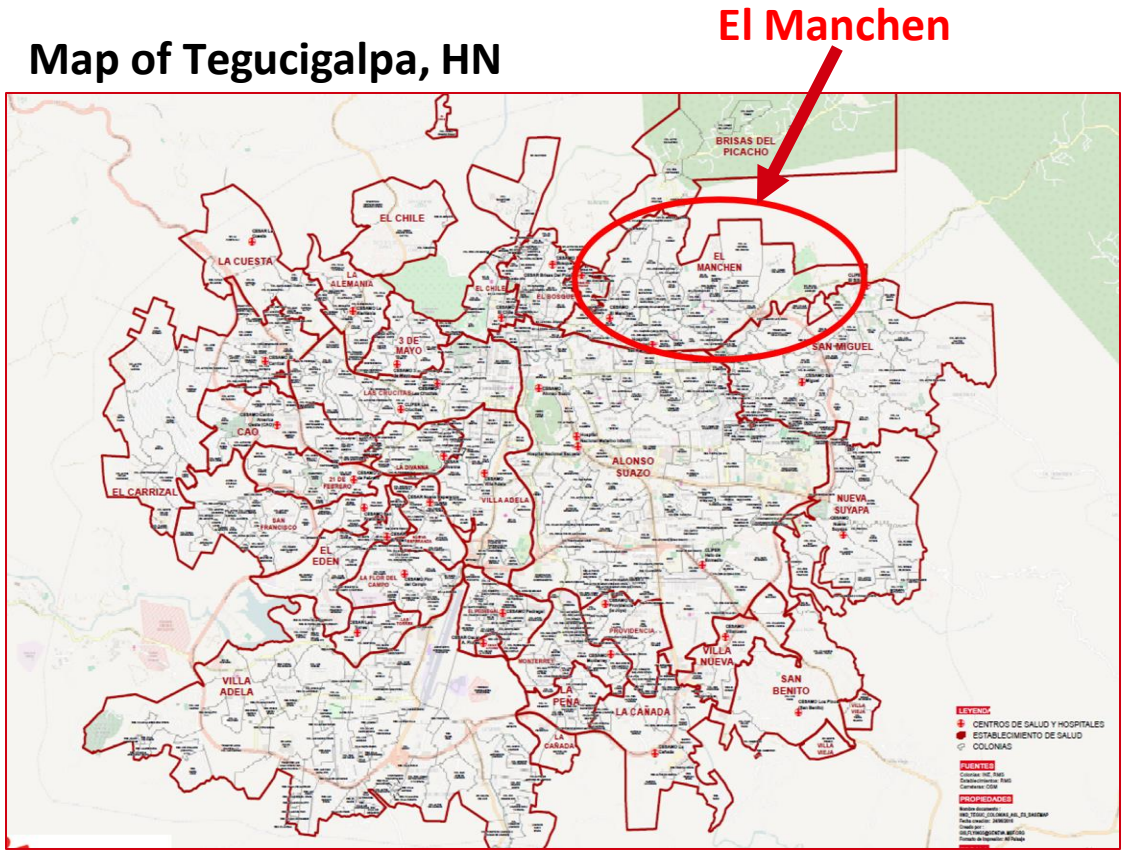

Image: MSF Arbovirus Project

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World Mosquito Program

SCIENTIFIC DAYS

Community Engagement During *Wolbachia* Implementation

- Releases of 8 million mosquitoes with *Wolbachia* by MSF staff*:* August 2023 – February 2024
- Multi-faceted **community engagement**
  - In-person meetings and interactions
  - Newspapers, radio, banners, flyers
  - Digital campaigns via social media
  - Recruitment of community volunteers
  - Rapid response to concerns in the community
- Community volunteers directly participated in the releases.

Images: Laura Aceituna, MSF

Study Methods: Mixed-Methods Data Collection

Entomological Monitoring

- Collecting mosquitoes and conducting PCR tests for *Wolbachia*
- Biweekly during release period and every 3 months thereafter

Pre- and Post-Intervention Surveys

- At randomly selected households, with questions on knowledge and acceptability
- 1 month before and 1 month after the release period

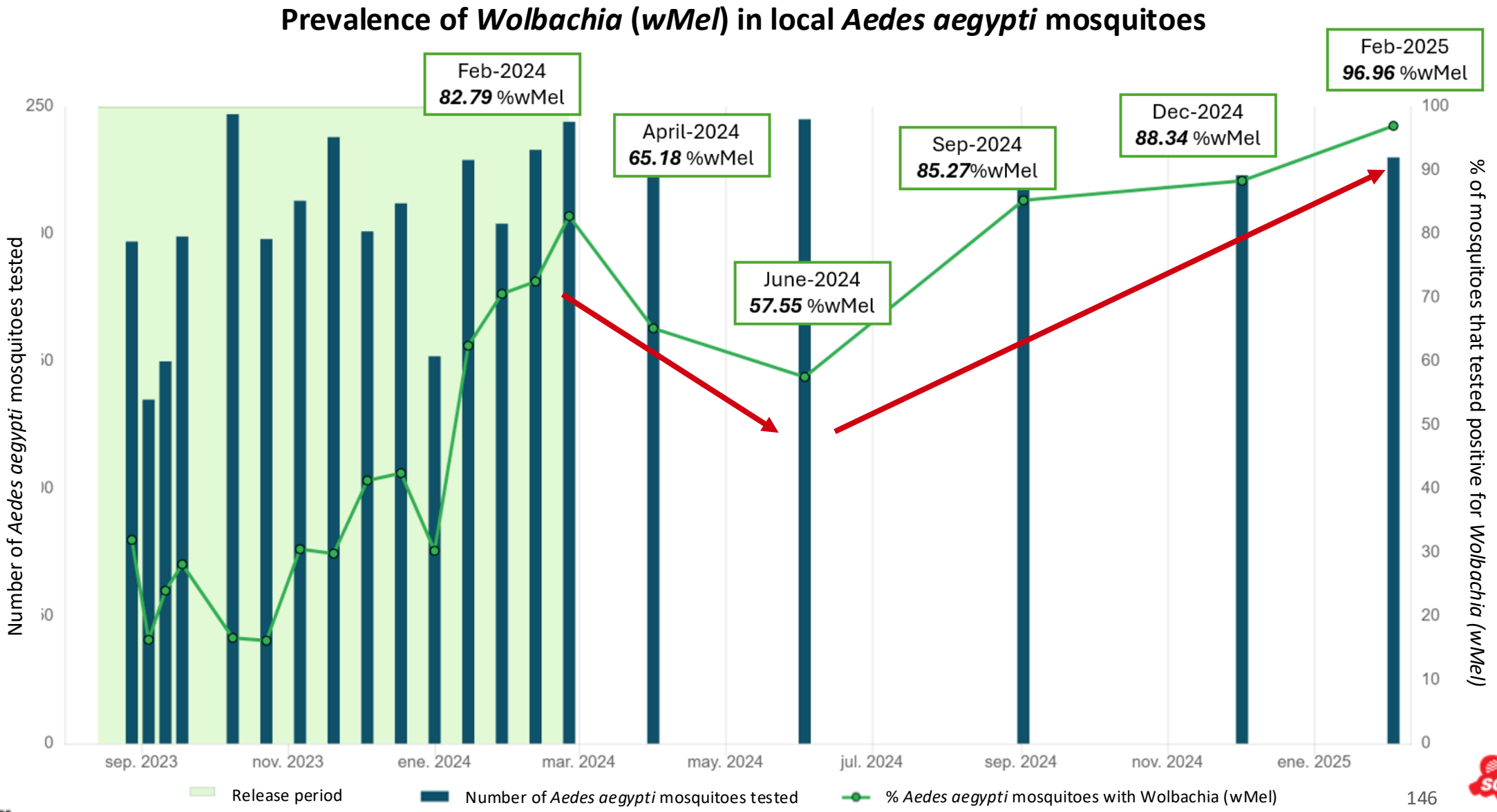
Epidemiological Monitoring

- Collecting weekly data from Ministry of Health from 2018-2025
- El Manchen and 3 comparable control zones

Interviews and Focus Group Discussions (FGDs)

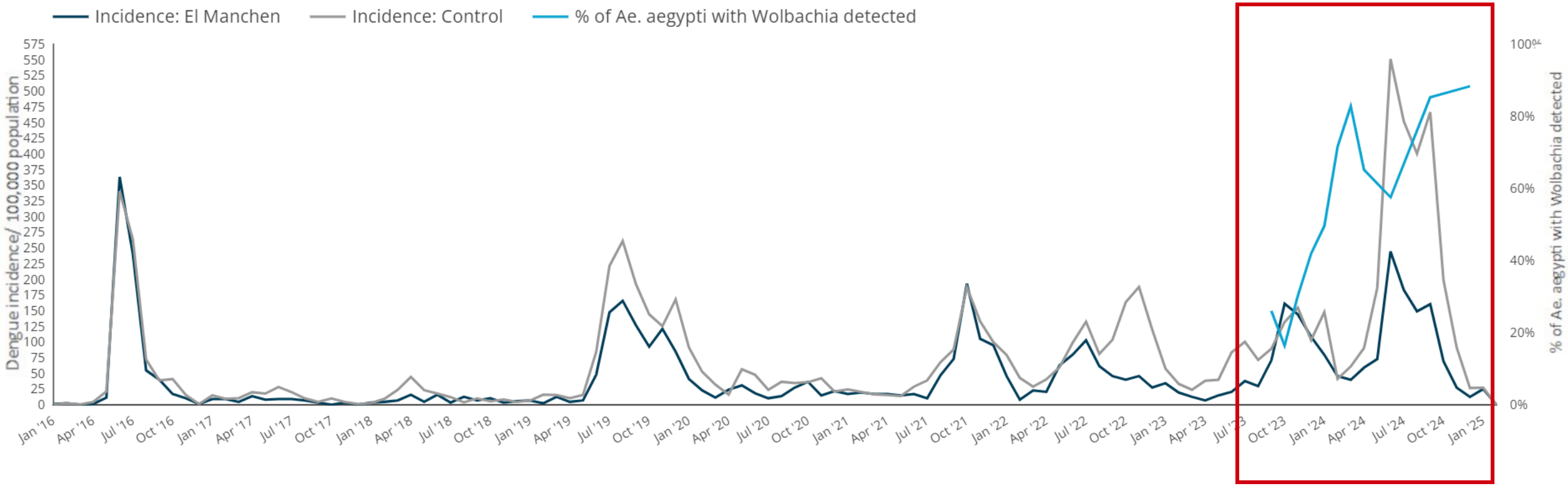
- With community volunteers, leaders, MSF staff, and other actors
- After the release period

Preliminary Results: Establishment of *Wolbachia* in local *Aedes aegypti* population



Preliminary Results: Reduction in dengue incidence

Dengue Incidence in El Manchen



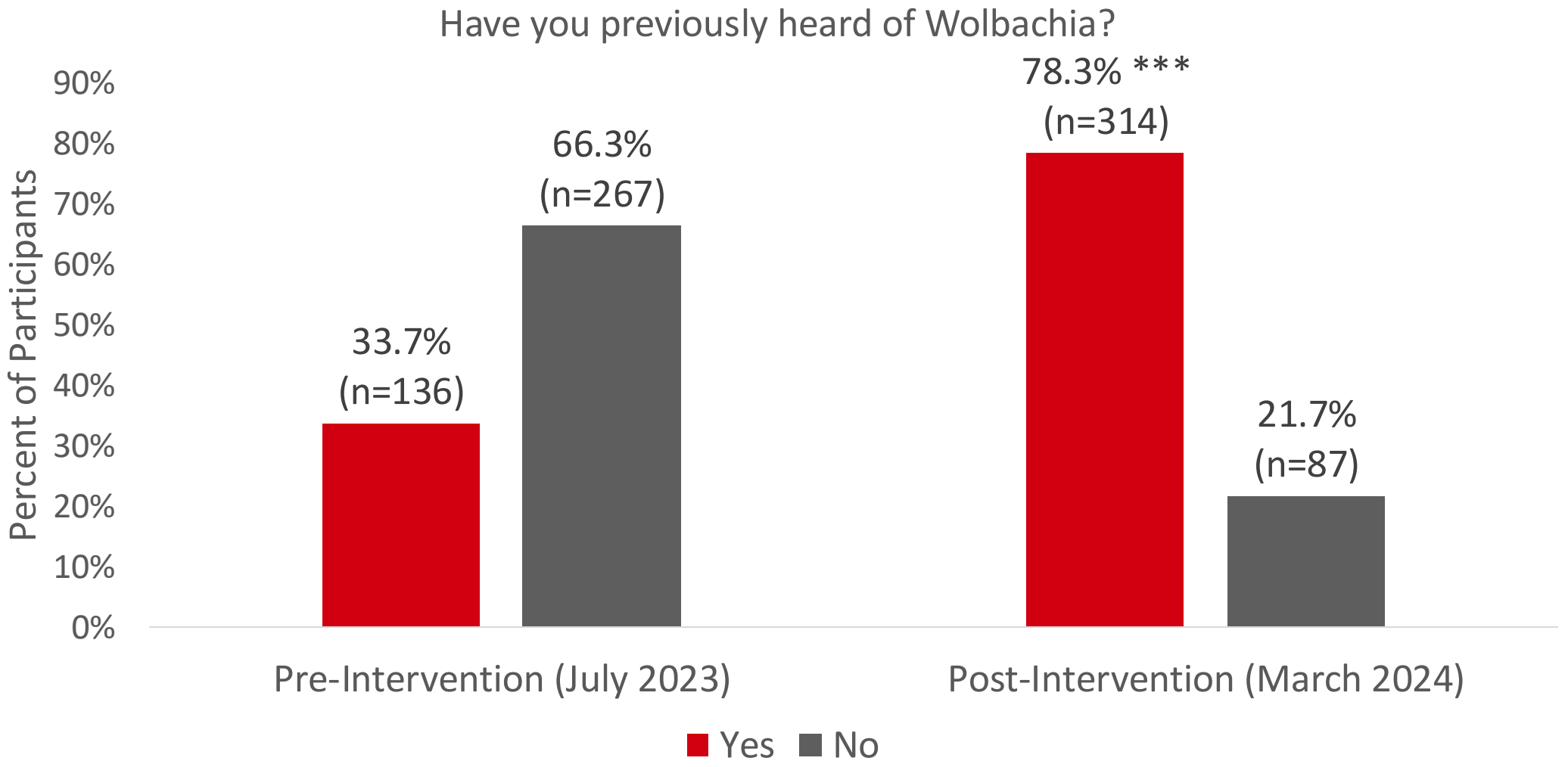
Preliminary Results: Reduction in dengue incidence

Time Period	Cumulative Incidence Rate (per 10,000)		Incidence Rate Ratio
	El Manchen	Control Zones	
March 2024 – Feb 2025	106.36	256.84	**0.41**
March 2023 – Feb 2024[a]	69.23	95.13	**0.73**
March-Feb 2018-2023 (Median)	56.32	81.16	**0.69**

[a] Note: This time period overlaps with release period.

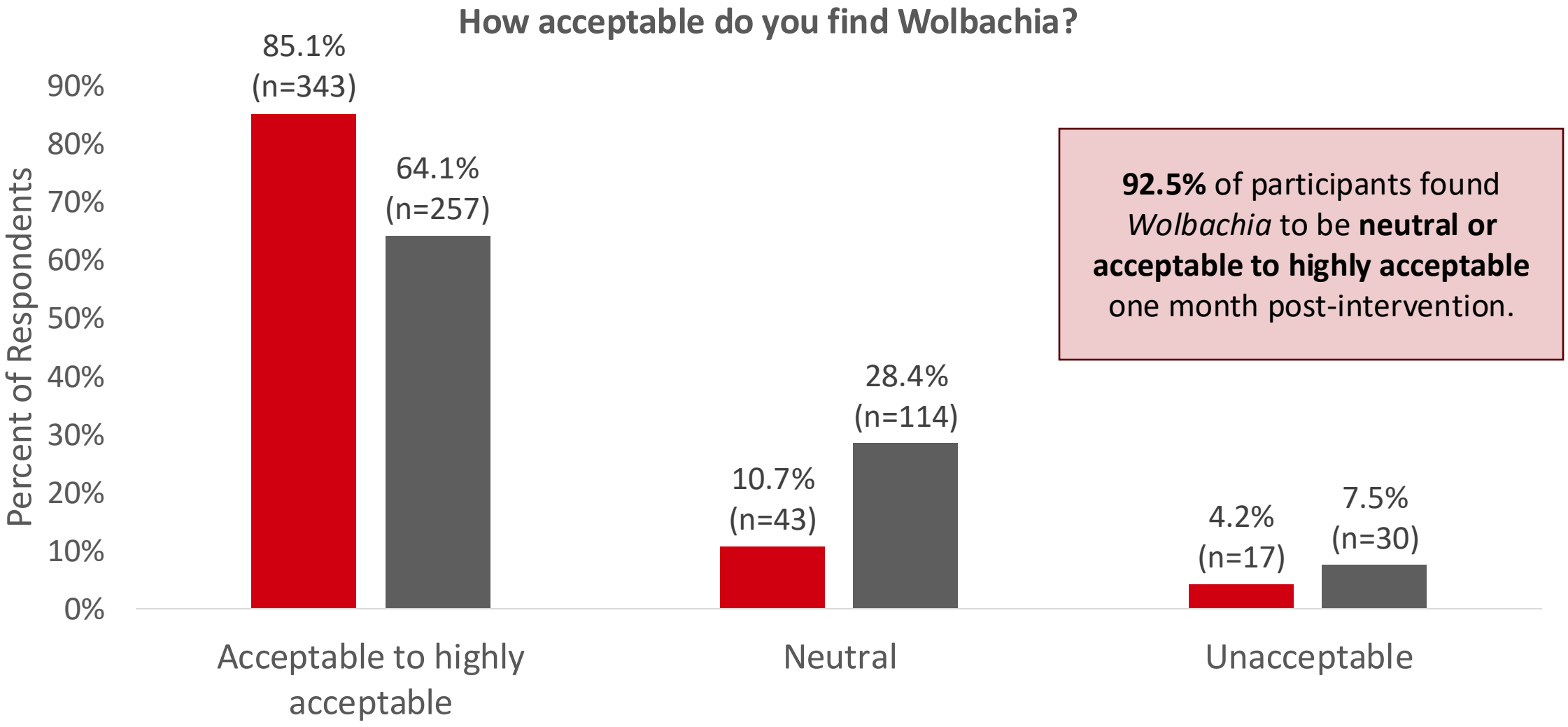
* Time series analyses are still pending.

Preliminary Results: Awareness



*** p<0.001

Preliminary Results: Acceptability



92.5% of participants found *Wolbachia* to be **neutral or acceptable to highly acceptable** one month post-intervention.

Preliminary Results: Acceptability

Reason for Unacceptance	n(%)
Increase in mosquitoes	19 (63.3%)
Fear of getting ill from *Wolbachia*	5 (16.7%)
Doubt that *Wolbachia* would reduce transmission	5 (16.7%)
Concerns about *Wolbachia*'s safety in humans	4 (13.3%)
Potential negative impact on ecosystem	3 (10%)
Other	6 (20%)

Preliminary Results: Acceptability

"The cases (of dengue) are increasing, because they are throwing more dengue at us."

"I have that cup (of mosquitoes with *Wolbachia*), and I have not get any dengue and they bit me. They left me with (a reaction) but I did not get any dengue, thank God."

"No one else had been interested in us doing that (prevention) together, and when I saw that you were bringing a project like this, I was the first that said: 'I want a cup at my house, one for my sister, for my mom,' because it's something positive for the neighborhood."

"There are new diseases because of the mosquitoes (with Wolbachia)."

"I believe that it works, because my neighbors get sick with dengue every year and this year they have not gotten sick. That mosquito, it bothers, they bite and bite hard, but those people have not gotten sick with dengue, so I believe that it does work."

Limitations

- Pre/post-surveys were conducted with the same households but not necessarily the same people
- Largest dengue outbreak potentially limits generalizability of dengue incidence results
- Only short-term dengue incidence data; longer-term time series analysis pending
- Costing report ongoing

Image: Laura Aceituna, MSF

Image: Laura Aceituna, MSF

Conclusions

- *Wolbachia* has become **well-established** in the Aedes aegypti mosquito population in El Manchen.
- El Manchen has reported **lower dengue incidence** than the control zones.
- **Community acceptance** of *Wolbachia* remained **high** despite **challenges** including skepticism about such a novel method, persisting misinformation, and study timing.
- We are in discussions with Ministry of Health about **expanding the pilot** to other areas of the city.

Preliminary results suggest that with strong community engagement, *Wolbachia* can be a feasible and effective strategy against dengue in Honduras.

Image: Laura Aceituna, MSF

Acknowledgements