



# Wolbachia-Infected Mosquitoes for Dengue Control

[Source: TH](#)

## Why in News?

**Dengue fever, chikungunya, and Zika virus** represent major public health challenges in India, leading to considerable economic losses and healthcare burdens.

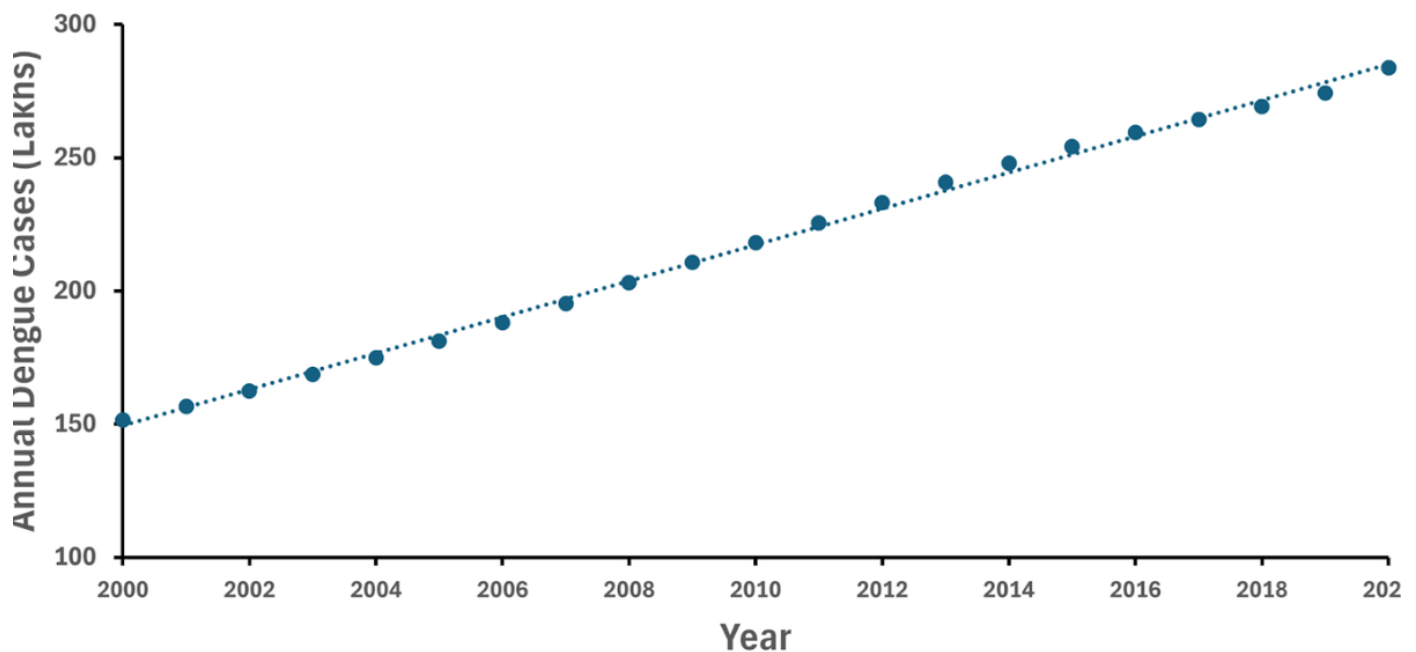
- The **limited success of traditional control methods** underscores the need for innovative strategies, such as the use of **Wolbachia-infected mosquitoes**, which offer a promising alternative.

## Note:

- As of April 2024, **India recorded 19,447 dengue cases and 16 deaths**. Kerala had the highest number of cases, followed by Tamil Nadu.
  - In India, the **economic impact of dengue** is estimated at **Rs 28,300 crore** annually, alongside 5.68 lakh years of young life lost.
- Globally, the [World Health Organization \(WHO\)](#) has reported over **7.6 million cases** of dengue as of April 2024.

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Annual Estimated Dengue Cases in India (Year 2000-2020, Lakhs)



## How does Wolbachia Help in Controlling Mosquito Populations?

### ▪ About:

- Wolbachia is a common type of bacteria found in insects. Approximately 6 in 10 of all insects, including butterflies, bees, and beetles, around the world have Wolbachia.

- Wolbachia bacteria cannot make people or animals (for example, fish, birds, pets) sick.

- They are **not found in Aedes Aegypti mosquitoes**.

- **Aedes aegypti can spread viruses including dengue, Zika, and chikungunya.**
- Aedes mosquitoes with **Wolbachia can be used to reduce the number of target mosquito species.**

- Mosquitoes with Wolbachia are **not [genetically modified](#)**.

### ▪ **Process of Production:** Wolbachia bacteria are first **introduced into the eggs of male and female Aedes Aegypti mosquitoes.**

- The eggs are then used to **mass-produce new mosquitoes infected with Wolbachia.**
  - There are **2 Wolbachia strains, wMel and wAlbB**, that have been transfected into **Aedes Aegypti** mosquitoes for population replacement.
- After production, the mosquitoes are **sorted by sex, with only the males being retained for release**, while the females are kept for further breeding in the laboratory.




### ▪ **Use for Mosquito Control:** **Wolbachia-infected mosquitoes** are used to **lower the population of target species** like **Aedes Aegypti**, the yellow fever mosquito, that can spread **dengue fever, chikungunya, Zika fever, Mayaro** etc.

- Control professionals release male **Aedes Aegypti** mosquitoes carrying **Wolbachia** into areas with wild **Aedes Aegypti**.
- When these **males mate with wild females that lack Wolbachia**, the **eggs produced do not hatch**. As a result, the population of **Aedes Aegypti** mosquitoes decreased.

### ▪ **Status of Wolbachia Programs in India:** India currently lacks an active **Wolbachia mosquito release program.**

- The **[Indian Council of Medical Research](#) - Vector Control Research Center (ICMR-VCRC)** has initiated the development of **wMel Aedes strains** but has faced delays in public updates and government approvals.
- Recent findings indicate the natural presence of Wolbachia in Aedes mosquitoes in Northeast India, **though its immediate significance is unknown.**

# Most common mosquito-borne diseases

Mosquito	Type of Mosquito	Disease caused
	<b>Aedes</b>	<b>Chikungunya</b> <b>Dengue</b> <b>Lymphatic filariasis</b> <b>Rift Valley fever</b> <b>Yellow Fever</b> <b>Zika</b>
	<b>Anopheles</b>	<b>Lymphatic filariasis</b> <b>Malaria</b>
	<b>Culex</b>	<b>Japanese encephalitis</b> <b>Lymphatic filariasis</b> <b>West Nile fever</b>

## Global Examples for Wolbachia Implementation

- In **Singapore**, the release of infected male mosquitoes **resulted in a 90% reduction in the Aedes population** and a 77% decrease in dengue cases in release areas.
- **Australia** adopted a population replacement strategy, leading to a stable **wMel strain** genome in wild populations and significant reductions in dengue incidence.
- A landmark randomised controlled trial in **Indonesia** demonstrated that areas with released wMel (strain) mosquitoes experienced **a 77% reduction in dengue cases and an 86% decrease in hospitalizations.**

## UPSC Civil Services Examination, Previous Year Question

**Q. Consider the following statements: (2017)**

1. In tropical regions, Zika virus disease is transmitted by the same mosquito that transmits dengue.
2. Sexual transmission of Zika virus disease is possible.

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

**Ans: (c)**

**Q. 'Wolbachia method' is sometimes talked about with reference to which one of the following? (2023)**

- (a) Controlling the viral diseases spread by mosquitoes
- (b) Converting crop residues into packing material
- (c) Producing biodegradable plastics
- (d) Producing biochar from thermo-chemical conversion of biomass

**Ans: (a)**

PDF Reference URL: <https://www.drishtiias.com/printpdf/wolbachia-infected-mosquitoes-for-dengue-control>

