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Beyond case management: Why dengue prevention needs stronger vector-management systems

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Vector management stops the mosquito from breeding and biting, before anyone falls sick

In July this year, India approved its first dengue vaccine. The Union Health Ministry said it would support the work already under way. That work runs from mosquito control to the diagnosis and treatment of patients. Health experts call that last part "case management". It saves lives every season, and it begins once a person is already ill.

Vector management works much earlier. A vector is a living creature that carries a disease from one person to another. For dengue, that vector is a mosquito. Vector management stops the mosquito from breeding and biting, before anyone falls sick.

Dengue numbers rise and fall. India recorded 2,89,235 cases in 2023 and 1,21,824 in 2025. In the first six months of 2026, it recorded 23,952. The places where mosquitoes breed stay the same through quiet years and busy ones, so prevention has to continue in both.

The established way to organise this work is called Integrated Vector Management, or IVM. The World Health Organization (WHO) describes it as a way of making decisions on evidence. The aim is the best use of the people, money and tools available for mosquito control. India's national programme follows the same approach, and calls for a package of methods against dengue. In practice, IVM starts with the local mosquito and local data. It also depends on cooperation and coordination well beyond the health department.

Start with the mosquito

The main dengue mosquito, *Aedes aegypti*, lives in and around homes. It bites mostly in the early morning and before sunset. It also stays close to where it was born. A 2022 review of tracking studies found that it travels about 106 metres on average, roughly the length of a football field.

People travel much farther. A mosquito picks up the virus by biting an infected person, and can then infect others. So someone can catch dengue at work and bring the virus home to the mosquitoes around their own building. That makes the building the practical place to act, because it holds the water the local mosquito needs.

The female lays eggs on the wet inside wall of a water container, such as discarded plastic containers, tyres, flower vases, or a desert cooler. The eggs can survive drying out for up to eight months. In warm weather, an egg becomes a flying mosquito in seven to ten days. That is why WHO advises emptying and cleaning water containers every week, and keeping them covered.

Let local data decide

Surveillance means regular checks for mosquitoes and their larvae. By early October this year, Delhi's health workers had made more than 3.18 crore home visits and found breeding in over 1.89 lakh homes. Matched each week against new dengue cases, data like this shows which neighbourhoods need attention first.

WHO suggests going a step further. Health workers can count pupae (the last stage before a mosquito flies), to find the containers that produce the most mosquitoes. Treating those first can come close to the result of treating every container, with far less effort and time.

Surveillance also tracks whether insecticides still work. A 2023 review of 43 Indian studies found the dengue mosquito resisting DDT in many areas. It was also growing harder to kill with several insecticides in common use, thus it is advised to monitor resistance every year. Such results guide which insecticide to use and when to switch. Every product is then used exactly as its label directs.

IVM combines various methods, removing or covering water, called source reduction, comes first. Small fish that eat larvae can be used in larger bodies of water. Larvicides, including ones made from a natural bacterium, treat water that has to stay. Fogging kills adult mosquitoes, but its effect is short-lived. It is used mainly during outbreaks, alongside the steps that stop the next generation in the water.

Bring in everyone who manages the water

Mosquitoes breed on property that someone owns or manages, so IVM calls for work well beyond the health department. Indian law clearly places a responsibility on owners. In Mumbai, municipal law has required owners and occupiers to prevent mosquito breeding on their land since 1975.

The construction site shows how this works. In the last weeks of the monsoon, a trained inspector walks a building under construction, floor by floor. Curing water, used to keep new concrete wet, has pooled on the top floor. The lift pit holds rain, and drums at the workers' quarters are open. The inspector marks every spot with larvae on a site plan. Most fixes take minutes: the floor and pit are cleared, and the drums get lids. The remaining water is treated with an approved larvicide. A week later, the inspector returns and notes the status of larval breeding at these sites. Besides this, interventions like Indoor Residual Spraying are also done at fixed intervals.

Civic data shows why these matters. In a drive reported in early August, Ahmedabad's health teams inspected 1,016 construction sites and found breeding at 211. In my view, the construction site is the easiest place in a city to start. Workers and supervisors are present every day, so a weekly larval check can join the safety routine. Finished buildings can add the same check to the calendar that already covers water tank cleaning.

Envu India makes products for control of mosquitoes and other pests. We see them as one part of IVM, used where local evidence points and alongside the removal of breeding water. Our white paper, The Hundred Metre Disease, sets out a prevention routine for buildings and construction sites. Our role is to support the licensed pest management professionals and civic teams who do this work, with approved products and with training.

Treating patients will always matter. How many people would need that treatment next season depends to a great extent on the work done now. That work happens in the water within a hundred metres of their homes.

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