

## Comparison between pharmacological, ecological and pollutant control strategies for dengue

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Dengue is the most common mosquito-borne viral infection transmitted disease. It is due to the four types of viruses (DENV-1, DENV-2, DENV-3, DENV-4), which transmit through the bite of infected *Aedes aegypti* and *Aedes albopictus* female mosquitoes during the daytime. The first globally commercialized vaccine is Dengvaxia, also known as the CYD-TDV vaccine, manufactured by Sanofi Pasteur. I will present a Ross-type epidemic model to describe the vaccine interaction between humans and mosquitoes accounting the life cycle. We present different control strategies : vaccination, pesticide, and copepodes. We use Pontryagin's minimum principle to characterize optimal control and apply numerical simulations to determine which strategies best suit each compartment. Results show that vector control requires shorter time applications in minimizing mosquito populations. Whereas vaccinating the primary susceptible human population requires a shorter time compared to the secondary susceptible human.

### Références

- [1] Mentuda, Cheryl Q. "Optimal Control of a Dengue-Dengvaxia Model : Comparison Between Vaccination and Vector Control" *Computational and Mathematical Biophysics*, vol. 9, no. 1, 2021, pp. 198-213. <https://doi.org/10.1515/cmb-2020-0124>.