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# MATHEMATICAL MODELLING IN DENGUE EPIDEMICS ENCOMPASSING TRANSOVARIAL TRANSMISSION

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The anthropophilic and peridomestic female *Aedes aegypti* bites humans to suck blood to mature fertilized eggs, during which dengue virus can be spread between mosquito and human populations. Besides this route of transmission, there is a possibility of dengue virus being passed directly to offsprings through transovarial transmission. The effects of both horizontal and vertical transmissions on the dengue virus transmission are assessed by mathematical modelling. From the model, the gross reproduction number is obtained, which is the sum of the basic reproduction number and the vertical reproduction number. Notably, the transovarial transmission plays an important role in dengue spread out when the basic reproduction number is less than one, but near one. Another threshold parameter arises, which is the product of the fractions of the susceptible populations of humans and mosquitoes. Interestingly, these two threshold parameters can be obtained from three different approaches: the spectral radius of the next generation matrix, the Routh-Hurwitz criteria and M-matrix theory [1].

## References

- [1] H.M Yang. (2016). *Assessing the contribution of transovarial transmission in the dynamics of dengue infection*, Math. Biosc., submitted.