

Appendix S1. Process for achieving a desired value of PE_9 in model simulations.

To afford the model the flexibility to achieve a range of transmission intensities, as defined by PE_9 , we developed a statistical emulator of PE_9 as a function of three unknown model parameters (rate at which DENV is seeded into the population, mosquito infectiousness, adult female mosquito emergence rate). To do so, we generated 10^3 combinations of these three parameters using the sobol function in the pomp library [25] in R [26]. This function generates points that maximize distance between them within a prescribed range of values for each parameter (DENV seeding rate: 8×10^{-6} - 2×10^{-4} ; mosquito infectiousness: 0-1; adult female mosquito emergence rate: 0-3). After simulating 40 years of transmission with a given set of those three parameters, we retrieved PE_9 from all such simulations and fitted a generalized additive model of PE_9 with independent smooth terms for each of the three parameters ($R^2 = 0.98$). In subsequent simulations focused on vaccination impact, we obtained a set of the three unknown model parameters consistent with a target value of PE_9 by repeatedly drawing sets of the three parameters until we obtained one that was associated with a value of PE_9 within one percent of the target PE_9 value.