**Table S1**. The list of parameters used in the model.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **name** | **value** | **unit** | **description** | **References** |
| m | 0.000001 | day-1 | immigration rate | (33) |
| εA | 0.212 | - | seasonal forcing at age group A | Model fitting |
| εB | 0.185 | - | seasonal forcing at age group B | Model fitting |
| μA | 1/70 | year-1 | human death rate at age group A | assumed |
| μB | 1/50 | year-1 | human death rate at age group B | assumed |
| lagA | 8.50 | Month | Seasonal lag in age group A | Model fitting |
| lagB | 8.50 | Month | Seasonal lag in age group B | Model fitting |
| ο | 1/365 | day-1 | Immune waning rate | (33) |
| βA | 0.501 | day-1 | Basic reproduction rate of group A | Model fitting |
| βB | 0.0714 | day-1 | Basic reproduction rate of group B | Model fitting |
| θi | 0.12 | - | proportion of 1st DHF to VCD | (12,57) |
| θij | 0.22 | - | proportion of 2nd DHF to VCD | (12,57) |
| φi | 0.10 | - | proportion of 1st DF to dengue infection | (12,57) |
| φij | 0.20 | - | proportion of 2nd DF to dengue infection | (12,57) |
| ρi | 0.78 | - | proportion of subclinical 1st dengue to dengue infection | (12,57) |
| ρij | 0.58 | - | proportion of subclinical 2nd dengue to dengue infection | (12,57) |
| πi | 0.22 | - | proportion of 1st VCD to dengue infection | (12,57) |
| πij | 0.42 |  | proportion of 2nd VCD to dengue infection | (12,57) |
| h.dhfi,A | 0.0297 | - | proportion of 1st DHF to dengue infection of group A (fitted) | Model fitting |
| h.dhfij,A | 0.0567 | - | proportion of 2nd DHF to dengue infection of group A (fitted) | Model fitting |
| h.dhfi,B | 0.0292 | - | proportion of 1st DHF to dengue infection of group B (fitted) | Model fitting |
| h.dhfij,B | 0.0572 | - | proportion of 2nd DHF to dengue infection of group B (fitted) | Model fitting |
| ω | 0.002739726 | - | Heterologous protective immunity waning rate | Assumed |
| τ | 1/14 | day-1 | Loss of infectiousness rate | (33,58) |
| μdhf | 0.007 | day-1 | Mortality rate of DHF cases | (38) |
| υ | 1/15 | year-1 | Ageing rate | Assumed |
| spec | 0.934 | - | Specificity of screening | (40) |
| sens | 0.952 | - | Specificity of screening | (40) |

**Table S2.** Outcomes of each scenario across 4 different assumptions.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Scenario | DHF cases averted in age group A | | | | DHF cases averted in age group B | | | | Total DHF cases averted | | | |
| Timing 1 | Timing 2 | Timing 3 | Timing 4 | Timing 1 | Timing 2 | Timing 3 | Timing 4 | Timing 1 | Timing 2 | Timing 3 | Timing 4 |
| 1 | 71% | 66% | 74% | 72% | 68% | 63% | 71% | 69% | 69% | 64% | 72% | 70% |
| 2 | 24% | 11% | 6% | 9% | 18% | 4% | -1% | 5% | 20% | 7% | 1% | 6% |
| 3 | 65% | 70% | 66% | 63% | 62% | 67% | 63% | 60% | 63% | 68% | 64% | 61% |
| 4 | 55% | 60% | 44% | 39% | 51% | 57% | 40% | 35% | 52% | 58% | 42% | 36% |
| 5 | 69% | 71% | 74% | 70% | 66% | 68% | 71% | 67% | 67% | 69% | 73% | 68% |

The scenario analysis was further analysed according to the dynamics that occurred during the vaccination campaign. The timing of the one-year vaccination programme was determined based on when the proportion of each serotype was at its highest. The evaluation took place three years after the programme started. The screening scenario consistently resulted in better outcomes compared to its counterpart, as demonstrated in scenario 2 versus scenario 3, and scenario 4 versus scenario 5. Across all four different assumptions, scenario 2 consistently produced the lowest outcome among the five scenarios.