

| Notation                         | Parameter   | Value      | Unit        |
|----------------------------------|---|------------|-------------|
| $\alpha_1$                       | Age progression rate in age group 1                                 | 1/9/365    | $day^{-1}$  |
| $\alpha_2$                       | Age progression rate in age group 2                                 | 1/6/365    | $day^{-1}$  |
| $\alpha_3$                       | Age progression rate in age group 3                                 | 1/7/365    | $day^{-1}$  |
| $\alpha_4$                       | Age progression rate in age group 4                                 | 1/40.5/365 | $day^{-1}$  |
| $\gamma_1$                       | Stage progression rate in stage 1 (early HIV infection)             | 1/0.5/365  | $day^{-1}$  |
| $\gamma_2$                       | Stage progression rate in stage 2 ( $CD4 < 500$ cells/mm3)          | 1/3.32/365 | $day^{-1}$  |
| $\gamma_3$                       | Stage progression rate in stage 3 ( $350 < CD4 \leq 500$ cells/mm3) | 1/2.7/365  | $day^{-1}$  |
| $\gamma_4$                       | Stage progression rate in stage 4 ( $200 < CD4 \leq 350$ cells/mm3) | 1/5.5/365  | $day^{-1}$  |
| $\gamma_5$                       | Stage progression rate in stage 5 ( $CD4 \leq 200$ cells/mm3)       | 1/5.06/365 | $day^{-1}$  |
| $\pi_1$                          | Fraction of individuals transitioning from stage 1 to stage 2       | 0.76       |             |
| $\pi_2$                          | Fraction of individuals transitioning from stage 1 to stage 3       | 0.19       |             |
| $\pi_3$                          | Fraction of individuals transitioning from stage 1 to stage 4       | 0.05       |             |
| $\pi_4$                          | Fraction of individuals transitioning from stage 1 to stage 5       | 0          |             |
| $a$                              | Age assortativity factor  | 0.5        |             |
| $p$                              | Proportion of individuals in low-risk group                         | 0.8        |             |
| $m$                              | Per lineage rate of migration to source compartment                 | 1/50/365   | $day^{-1}$  |
| $g$                              | Rate of growth of source compartment                                | 1/3/0365   | $day^{-1}$  |
| $s$                              | Initial size of source compartment                                  | 1000       |             |
| $i$                              | Incidence scaling factor for London MSM                             | 0.03       |             |
| $d$                              | Diagnosis rate prior to 1985  | 1/10       | $year^{-1}$ |
| $\mu_d$                          | Maximum value of diagnosis rate post 1985 (logistic function)       | 1/3        | $year^{-1}$ |
| $k_d$                            | Steepness of diagnosis rate post 1985 (logistic function)           | 1/7        |             |
| $\mu_t$                          | Maximum value of treatment rate post 1995 (logistic function)       | 1          | $year^{-1}$ |
| $k_t$                            | Steepness of treatment rate post 1995 (logistic function)           | 1/2        |             |
| $e$                              | Treatment effectiveness   | 0.95       |             |
| $w_{s1}$                         | Transmission weight for individuals in stage 1                      | 1          |             |
| $w_{s2}, w_{s3}, w_{s4}$         | Transmission weights for individuals in stages 2 to 4               | 0.1        |             |
| $w_{s5}$                         | Transmission weight for individuals in stage 5                      | 0.3        |             |
| $w_{a1}, w_{a2}, w_{a3}, w_{a4}$ | Transmission weights for individuals in age groups 1 to 4           | 1          |             |
| $w_{c1}$                         | Transmission weight for individuals undiagnosed                     | 1          |             |
| $w_{c2}$                         | Transmission weight for individuals diagnosed and untreated         | 0.5        |             |
| $w_{c3}$                         | Transmission weight for individuals diagnosed and treated           | 0.05       |             |
| $w_{r1}$                         | Transmission weight for individuals in low risk category            | 1          |             |
| $w_{r2}$                         | Transmission weight for individuals in high risk category           | 10         |             |