

Notation	Parameter	Value
	<i>Age progression rate</i> <sup>a</sup>	
$\alpha_1$	Group 1 [18-27]	1/9/365 <i>day</i> <sup>-1</sup>
$\alpha_2$	Group 2 [27-33]	1/6/365 <i>day</i> <sup>-1</sup>
$\alpha_3$	Group 3 [33-40]	1/7/365 <i>day</i> <sup>-1</sup>
$\alpha_4$	Group 4 [40-80.5]	1/40.5/365 <i>day</i> <sup>-1</sup>
	<i>Stage progression rate</i> <sup>b</sup>	
$\gamma_1$	Stage 1 (early HIV infection)	1/0.5/365 <i>day</i> <sup>-1</sup>
$\gamma_2$	Stage 2 (CD4 < 500 cells/mm3)	1/3.32/365 <i>day</i> <sup>-1</sup>
$\gamma_3$	Stage 3 (350 < CD4 ≤ 500 cells/mm3)	1/2.7/365 <i>day</i> <sup>-1</sup>
$\gamma_4$	Stage 4 (200 < CD4 ≤ 350 cells/mm3)	1/5.5/365 <i>day</i> <sup>-1</sup>
$\gamma_5$	Stage 5 (CD4 ≤ 200 cells/mm3)	1/5.06/365 <i>day</i> <sup>-1</sup>
	<i>Fraction of individuals transitioning from</i> <sup>b</sup>	
$\pi_1$	Stage 1 to stage 2	0.76
$\pi_2$	Stage 1 to stage 3	0.19
$\pi_3$	Stage 1 to stage 4	0.05
$\pi_4$	Stage 1 to stage 5	0
$a$	Age assortativity factor <sup>c</sup>	0.5
$p$	Proportion of individuals in low-risk group	0.8
$m$	Per lineage rate of migration to source compartment	1/50/365 <i>day</i> <sup>-1</sup>
$g$	Rate of growth of source compartment	1/3/365 <i>day</i> <sup>-1</sup>
$s$	Initial size of source compartment	1000
$i$	Incidence scaling factor for London MSM <sup>d</sup>	0.03
	<i>Diagnosis rate</i>	
$d_{85}$	Fixed rate prior to 1985	1/10 <i>year</i> <sup>-1</sup>
$\mu_d$	Maximum value of logistic function after 1985 <sup>d</sup>	1/3 <i>year</i> <sup>-1</sup>
$k_d$	Steepness of logistic function after 1985 <sup>d</sup>	1/7 <i>year</i> <sup>-1</sup>
	<i>Treatment rate</i>	
$t_{95}$	Fixed rate prior to 1995	0
$\mu_t$	Maximum value of logistic function after 1995	1
$k_t$	Steepness of logistic function after 1995	0.5
$e$	Treatment effectiveness	0.95
	<i>Transmission weight conferred to individuals in</i>	
$w_{s1}$	Stage 1	1
$w_{s2}$ to $w_{s4}$	Stages 2 to 4	0.1
$w_{s5}$	Stage 5	0.3
$w_{a1}$ to $w_{a4}$	Age groups 1 to 4	1
$w_{c1}$	Care status 1 (undiagnosed)	1
$w_{c2}$	Care status 2 (diagnosed and untreated)	0.5
$w_{c3}$	Care status 3 (diagnosed and treated)	0.05
$w_{r1}$	Risk status 1 (low risk)	1
$w_{r2}$	Risk status 2 (high risk)	10

<sup>a</sup> From quartiles of age of MSM diagnosed in London available in UKDRDB

<sup>b</sup> From Cori et al. AIDS 2015

<sup>c</sup> Arbitrary factor raised to the power of age class difference

<sup>d</sup> Initial value later fitted to retrieve observed number of diagnosed cases ...