Table 3 Formula for estimating undiagnosed infections by behavioural categories, adults aged 16–59, United Kingdom, 2003

	Behavioural categories	Formula	Estimated population 16–44 (London, ROEWS, and overall Britain)	Adjusted undiagnosed HIV prevalence Britain (%)	Prevalent infections 2003 *(Overall adjusted to include NI and 45–59 year olds)*
g1	Current MSM, STD clinic attenders	$\sum_i$ (((($\hat{\rho}_{i,IL,MSM-STD}$) x ($N_{i,IL}$ – diagnosed positive $MSM_{i,IL}$) x $\hat{\pi}^U_{i,IL,MSM-STD}$ + (($\hat{\rho}_{i,OL,MSM-STD}$) x ($N^*_{i,OL}$ – diagnosed positive $MSM_{i,OL}$) x $\hat{\pi}^U_{i,OL,MSM-STD}$ † + (($\hat{\rho}_{i,ROB,MSM-STD}$) x ($N_{i,ROB}$ – diagnosed positive $MSM_{i,ROB}$) x $\hat{\pi}^U_{i,ROB,MSM-STD}$ ‡ x $adjustment_{NI}$) x $adjustment_{45-59}$)	23,862 69,406 93,268	6.61 1.74 2.41	3100
g2	Current MSM, non-STD clinic attenders	$\sum_i$ (((($\hat{\rho}_{i,IL,MSM-nonSTD}$) x ($N_{i,IL}$ – diagnosed positive $MSM_{i,IL}$) x $\hat{\pi}^U_{i,IL,MSM-STD}$ x $adjustment_{non-STD}$)) + (($\hat{\rho}_{i,OL,MSM-nonSTD}$) x ($N^*_{i,OL}$ – diagnosed positive $MSM_{i,OL}$) x $\hat{\pi}^U_{i,OL,MSM-STD}$ x $adjustment_{non-STD}$)) + (($\hat{\rho}_{i,ROB,MSM-nonSTD}$) x ($N_{i,ROB}$ – diagnosed positive $MSM_{i,ROB}$) x $\hat{\pi}^U_{i,ROB,MSM-STD}$ ‡ x $adjustment_{non-STD}$) x $adjustment_{NI}$)x $adjustment_{45-59}$)	55,260 134,724 189,984	3.32 0.79 1.34	3000
g3a	Current male IDUs	$\sum_i$ ((($\hat{\rho}_{i,IL,IDU}$) x ($N_{i,IL,male}$) x $\hat{\pi}^U_{i,IL,IDU}$ + (($\hat{\rho}_{i,OL,IDU}$) x ($N^*_{i,OL,male}$) x $\hat{\pi}^U_{i,OL,IDU}$	17,035 116,408 133,443	0.92 0.07 0.19	300

		+ (($\hat{\rho}_{i,ROB,IDU}$) x ($N_{i.ROB,male}$) x $\hat{\pi}^{U}_{i,ROB,IDU}$) x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)			
g3b	Current female IDUs	$\sum_{i}$ ((($\hat{\rho}_{i,IL,IDU}$) x ($N_{i,IL,female}$) x $\hat{\pi}^{U}_{i,IL,IDU}$ + (($\hat{\rho}_{i,OL,IDU}$) x ($N^{*}_{I,OL,female}$) x $\hat{\pi}^{U}_{i,OL,IDU}$ + (($\hat{\rho}_{i,ROB,IDU}$) x ($N_{i.ROB,female}$) x $\hat{\pi}^{U}_{i,ROB,IDU}$) x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	5146 35,706 40,852	1.00 0.07 0.20	250
g4	Past MSM	$\sum_{i}$ ((($\hat{\rho}_{i,IL,pastMSM}$) x ($N_{I,IL}$) x $\hat{\pi}^{U}_{i,IL,MSM-STD}$ x $adjustment_{pastMSM}$) + (($\hat{\rho}_{i,OL,pastMSM}$) x ($N_{i,OL}$) x $\hat{\pi}^{U}_{i,OL,MSM-STD}$ x $adjustment_{pastMSM}$) + (($\hat{\rho}_{i,RIB,pastMSM}$) x ($N_{i.ROB}$) x $\hat{\pi}^{U}_{i,ROB,MSM-STD}$ x $adjustment_{pastMSM}$) x $adjustment_{NI}$) $adjustment_{45\text{-}59}$)	17,158 35,602 52,761	0.75 0.32 0.43	100
g5a	Past male IDUs	$\sum_{i}$ ((($\hat{\rho}_{i,IL,pastIDU}$) x ($N_{i,IL,male}$) x $\hat{\pi}^{U}_{i,IL,IDU}$ x $adjustment_{pastIDU}$) + (($\hat{\rho}_{i,OL,pastIDU}$) x ($N^{*}_{I,OL,male}$) x $\hat{\pi}^{U}_{i,OL,IDU}$ x $adjustment_{pastIDU}$) + (($\hat{\rho}_{i,ROB,pastIDU}$) x ($N_{i.ROB,male}$) x $\hat{\pi}^{U}_{i,ROB,IDU}$) x $adjustment_{pastIDU}$) x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	13,228 63,908 77,136	0.08 0.01 0.02	50
g5b	Past female IDUs	$\sum_{i}$ ((($\hat{\rho}_{i,IL,pastIDU}$) x ($N_{i,IL,female}$) x $\hat{\pi}^{U}_{i,IL,IDU}$ x $adjustment_{pastIDU}$) + (($\hat{\rho}_{i,OL,pastIDU}$) x ($N^{*}_{I,OL,female}$) x $\hat{\pi}^{U}_{i,OL,IDU}$ x $adjustment_{pastIDU}$) + (($\hat{\rho}_{i,ROB,pastIDU}$) x ($N_{i.ROB,female}$) x $\hat{\pi}^{U}_{i,ROB,IDU}$) x $adjustment_{pastIDU}$) x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	5973 16,359 24,332	0.11 0.01 0.03	0

g6a	Current heterosexual males, STD clinic attendees, black African	$\sum_i$ (((($\hat{\rho}_{i,IL,STD-SSA}$) x ($N_{I,IL}$ – diagnosed positive $HeterosexualmaleSSA_{,IL}$) x $\hat{\pi}^U_{i,IL,STD-SSA}$ + (($\hat{\rho}_{i,OL,STD-SSA}$) x ($N^*_{i,OL}$ – diagnosed positive $HeterosexualmaleSSA_{,OL}$) x $\hat{\pi}^U_{i,OL,STD-SSA}$ † + (($\hat{\rho}_{i,ROB,STD-SSA}$) x ($N_{i.ROB}$ – diagnosed positive $HeterosexualmaleSSA_{,ROB}$) x $\hat{\pi}^U_{i,ROB,STD-SSA}$ ‡ x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	16,354 11,062 27,416	3.20 6.68 4.37	1100
g7a	Current heterosexual males, STD clinic attendees, not black African	$\sum_i$ (((($\hat{\rho}_{i,IL,STD-notSSA}$) x ($N_{I,IL}$ – diagnosed positive $HeterosexualmalenotSSA_{,IL}$) x $\hat{\pi}^U_{i,IL,STD-notSSA}$ + (($\hat{\rho}_{i,OL,STD-notSSA}$) x ($N^*_{i,OL}$ – diagnosed positive $HeterosexualmalenotSSA_{,OL}$) x $\hat{\pi}^U_{i,OL,STD-notSSA}$ † + (($\hat{\rho}_{i,ROB,STD-notSSA}$) x ($N_{i.ROB}$ – diagnosed positive $HeterosexualmalenotSSA_{,ROB}$) x $\hat{\pi}^U_{i,ROB,STD-notSSA}$ ‡ x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	105,628 475,014 580,642	0.47 0.10 0.21	1200
g6b	Current female heterosexual, STD clinic attendees, black African	$\sum_i$ (((($\hat{\rho}_{i,IL,STD-SSA}$) x ($N_{I,IL}$ – diagnosed positive $HeterosexualfemaleSSA_{,IL}$) x $\hat{\pi}^U_{i,IL,STD-SSA}$ + (($\hat{\rho}_{i,OL,STD-SSA}$) x ($N^*_{i,OL}$ – diagnosed positive $HeterosexualfemaleSSA_{,OL}$) x $\hat{\pi}^U_{i,OL,STD-SSA}$ † + (($\hat{\rho}_{i,ROB,STD-SSA}$) x ($N_{i.ROB}$ – diagnosed positive $HeterosexualfemaleSSA_{,ROB}$) x $\hat{\pi}^U_{i,ROB,STD-SSA}$ ‡ x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	14,680 0 14,608	5.16 0.00 5.16	500
g7b	Current female heterosexual, STD clinic attendees, not black African	$\sum_i$ (((($\hat{\rho}_{i,IL,STD-notSSA}$) x ($N_{I,IL}$ – diagnosed positive $HeterosexualfemalenotSSA_{,IL}$) x $\hat{\pi}^U_{i,IL,STD-notSSA}$ + (($\hat{\rho}_{i,OL,STD-notSSA}$) x ($N^*_{i,OL}$ – diagnosed positive $HeterosexualfemalenotSSA_{,OL}$) x $\hat{\pi}^U_{i,OL,STD-notSSA}$ † + (($\hat{\rho}_{i,ROB,STD-notSSA}$) x ($N_{i.ROB}$ – diagnosed positive $HeterosexualfemalenotSSA_{,ROB}$) x $\hat{\pi}^U_{i,ROB,STD-notSSA}$ ‡ x $adjustment_{NI}$) x $adjustment_{45\text{-}59}$)	121,684 524,663 646,347	0.23 0.14 0.17	1000
g8a	Lower risk male heterosexual, black African	$\sum_i$ (((($\hat{\rho}_{i,IL,notSTD5yr-SSA}$) x ($N^*_{i.inner\ London.maleSSA}$) x $\hat{\pi}^U_{i,IL,DBS-SSA}$ x $adjustment_{overlap}$ x $adjustment_{fertility}$	74,485 20,926 95,411	1.09 1.15 1.11	900

		+ (($\hat{\rho}_{i,OL,notSTD5yr-SSA}$) x (N*$_{i.outer\ London.maleSSA}$)) x $\hat{\pi}^{U}_{i,OL,DBS-SSA}$ x adjustment$_{overlap}$ x adjustment$_{fertility}$) + (($\hat{\rho}_{i,ROB,notSTD5yr-SSA}$) x (N*$_{i.ROBmaleSSA}$) x $\hat{\pi}^{U}_{i,ROB,DBS-SSA}$ x adjustment$_{overlap}$ x adjustment$_{fertility}$) x adjustment$_{NI}$) x adjustment$_{45-59}$)			
g9a	Medium risk male heterosexual, not black African	$\sum_{i}$ ((($\hat{\rho}_{i,IL,STD>5yr-notSSA}$) x (N*$_{i.IL,malenotSSA}$) x $\hat{\pi}^{U}_{i,IL,DBS-notSSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$ + (($\hat{\rho}_{i,OL,STD>5yr-notSSA}$) x (N*$_{i.OL,malenotSSA}$) x $\hat{\pi}^{U}_{i,OL,DBS-SSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) + (($\hat{\rho}_{i,ROB,STD>5yr-notSSA}$) x (N*$_{i.ROB.malenotSSA}$) x $\hat{\pi}^{U}_{i,ROB,DBS-SSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) x adjustment$_{NI}$) x adjustment$_{45-59}$)	47,776 327,248 375,025	0.22 0.07 0.09	300
g10a	Lower risk male heterosexual, not black African	$\sum$ ((($\rho_{I,IL,notSTD - notSSA}$) x (N*$_{i.IL.malenotSSA}$) x $\pi^{U}_{i,IL,DBS-notSSA}$ x adjustment$_{notSTD}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) + ((($\rho_{I,OL,notSTD - notSSA}$ x (N*$_{I,OL,malenotSSA}$)) x $\pi^{U}_{i,OL,DBS-notSSA}$ x adjustment$_{notSTD}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) + (($\rho_{I,ROB,notSTD - notSSA}$) x (N*$_{i.ROB.malenotSSA}$) x $\pi^{U}_{i,ROB,DBS-notSSA}$ x adjustment$_{notSTD}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) x adjustment$_{NI}$) x adjustment$_{45-59}$)	114,631 7,853,962 9,000,594	0.02 0.01 0.01	600
g8b	Lower risk female heterosexual, black African	$\sum_{i}$ ((($\hat{\rho}_{i,IL,notSTD5yr-SSA}$) x (N*$_{i.inner\ London.femaleSSA}$) x $\hat{\pi}^{U}_{i,IL,DBS-SSA}$ x adjustment$_{overlap}$ x adjustment$_{fertility}$ + (($\hat{\rho}_{i,OL,notSTD5yr-SSA}$) x (N*$_{i.outer\ London.femaleSSA}$)) x $\hat{\pi}^{U}_{i,OL,DBS-SSA}$ x adjustment$_{overlap}$ x adjustment$_{fertility}$) + (($\hat{\rho}_{i,ROB,notSTD5yr-SSA}$) x (N*$_{i.ROBfemaleSSA}$) x $\hat{\pi}^{U}_{i,ROB,DBS-SSA}$ x adjustment$_{overlap}$ x adjustment$_{fertility}$) x adjustment$_{NI}$) x adjustment$_{45-59}$)	94,642 29,561 124,203	1.09 1.15 1.11	900
g9b	Medium risk female heterosexual, not black African	$\sum_{i}$ ((($\hat{\rho}_{i,IL,STD>5yr-notSSA}$) x (N*$_{i.IL,femalenotSSA}$) x $\hat{\pi}^{U}_{i,IL,DBS-notSSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$ + (($\hat{\rho}_{i,OL,STD>5yr-notSSA}$) x (N*$_{i.OL,femalenotSSA}$) x $\hat{\pi}^{U}_{i,OL,DBS-SSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) + (($\hat{\rho}_{i,ROB,STD>5yr-notSSA}$) x (N*$_{i.ROB.femalenotSSA}$) x $\hat{\pi}^{U}_{i,ROB,DBS-SSA}$ x adjustment$_{STD>5yr}$) x adjustment$_{overlap}$ x adjustment$_{fertility}$) x adjustment$_{NI}$) x adjustment$_{45-59}$)	53,498 350,924 404,422	0.22 0.07 0.09	300

G10b	Lower risk female heterosexual, not black African	$\sum$ (((($\rho_{I,IL,notSTD - notSSA}$) x ($N^*_{i.IL.femalenotSSA}$) x $\pi^U_{i,IL,DBS-notSSA}$ x $adjustment_{notSTD}$) x $adjustment_{overlap}$ x $adjustment_{fertility}$) + ((($\rho_{I,OL,notSTD - notSSA}$ x ($N^*_{I,OL,femalenotSSA}$)) x $\pi^U_{i,OL,DBS-notSSA}$ x $adjustment_{notSTD}$) x $adjustment_{overlap}$ x $adjustment_{fertility}$) + (($\rho_{I,ROB,notSTD - notSSA}$) x ($N^*_{i.ROB.femalenotSSA}$) x $\pi^U_{i,ROB,DBS-notSSA}$ x $adjustment_{notSTD}$) x $adjustment_{overlap}$ x $adjustment_{fertility}$) x $adjustment_{NI}$) x $adjustment_{45-59}$)	1,283,958 8,422,165 9,706,122	0.02 0.01 0.01	600

I, age group (16–24 years, 25–34 years, 35–44 years).
R, area (Inner London, outer London, and Rest of England, Wales and Scotland (ROEWS)).
K, gender.
N = total population aged 16–44.
*Residence population in inner and outer London adjusted for cross-boundary flows for treatment derived from SOPHID 2003.
†UAPMP prevalence adjusted for the ratio of outer to inner London HIV diagnosed cases receiving care from SOPHID 2003.
‡UA prevalence adjusted for the ratio of diagnosed HIV prevalence in urban compared to rural.
SSA, sub-Saharan Africa; NI, Northern Ireland.