**S2 Table.** **Model assumptions in terms of parameter values**

|  |  |  |  |
| --- | --- | --- | --- |
| Assumption | Parameter value | Sources | Range for uncertainty analysis |
| **HIV Biological parameters** |  |
| HIV transmission probability per coital act per stage of infection(): |  |
|  Acute stage | 0.0107 | [1-4] | ±20% |
|  Latent stage | 0.0008 | [4, 5] | ±20% |
|  Late stageDuration of each of HIV stages (): | 0.0042 | [1, 2, 4] | ±20% |
|  |  |  |
|  Acute stage  | 49 days  | [1, 4, 6-9] | ±20% |
|  Latent stage | 9.0 years | [1, 4, 6-9] | ±20% |
|  Late stage | 2.0 years  | [1, 4, 6-9] | ±20% |
| **Behavioral and demographic parameters** |  |  |  |
| Frequency of coital acts per HIV stage (): |  |  |  |
|  Acute stage  | 10.6 per month | [4] | ±20% |
|  Latent stage | 11.0 per month | [4] | ±20% |
|  Late stage | 7.1 per month | [4] | ±20% |
| Duration of sexual partnerships (): | 6 month  | Representative value | ±20% |
| Degree of assortativeness for age group mixing () | 0.7 | Representative value | ±20% |
| Degree of assortativeness for risk group mixing () | 0.3 | [5]  | ±20% |
| The scale parameter in the gamma distribution of the population across the risk groups () | 1.1 | [10] | ±20% |
| The exponent parameter in the power law function of the distribution of sexual risk behavior ()  | 2.3 | [11, 12] | ±20% |
| The average level parameter of sexual risk behavior (*C*) | 0.14 | Model fitting | Model fitting |
| The scale of the reduction in average level of sexual risk behavior in the population (*Z*) | 0.59 | Model fitting | Model fitting |
| The duration of the sexual risk transition  | 5.6 | Model fitting | Model fitting |
| The turning-point year of the transition  | 1999 | Model fitting | Model fitting |
| **Circumcision related parameters\***  |  |  |  |
| The efficacy of male circumcision against HIV acquisition among circumcised males (*q*) | 60% | [13-15] | - |
| Baseline male circumcision () | 12.85% | [16] | - |
| The efficacy of male circumcision against male-to-female HIV transmission (*g*) | 0% 20% 46% | Representative value[17][18] | - |
| Duration of wound healing ()  | 6 weeks | [19] | Used in a sensitivity analysis |
| Relative risk of HIV male-to-female transmission *during* wound healing compared with males not circumcised ()  | 3.5  | [19] | Used in a sensitivity analysis |
| Relative risk of HIV male-to-female transmission *after* wound healing compared with males not circumcised ()  | 1  | [19] | Used in a sensitivity analysis |
| Percentage of males who have sex during wound healing period () | 24% | [19] | Used in a sensitivity analysis |
| Age-specific unit cost of voluntary medical male circumcision (VMMC; $ USD)0-45-910-1415-1920-2425-2930-3435-3940-4445-49 | 3090.2590.259599.75104.74109.97109.97109.97109.97 | Based on VMMC program data [20]. | - |

\* These were not included in the uncertainty analysis, as the analysis was performed to examine the impact of uncertainty in model structure parameters including HIV natural history and transmission parameters and behavioral parameters.

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