Supplementary appendix to the article:
The past, present and future impact of HIV prevention and control on HPV and cervical disease in Tanzania: a modelling study

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Additional equations for calculating the force of infection

Following on from the calculation of the force of infection for HIV and HPV 16/18 contained in the main manuscript, the force of infection of HPV H5 and HPV OHR, for high activity males aged \( a \) at time \( t \) are calculated using the below equations s1 to s4. Recall that HPV H5 refers to HPV types 31, 33, 45, 52 and 58, whereas HPV OHR refers to all oncogenic HPV types excluding HPV 16/18 and HPV H5.

\[
\Lambda^\text{HPV H5}_M(a, r, t) = c_M(a, r, t)(1 - \kappa_{HPV}(t))(1 - v_{HPV}(t))T^\text{HPV H5}_{FM}(\rho_M(a) \cdot I^\text{HPV H5}_F(t)) + \lambda^\text{HPV H5}_M(a, r, t) \tag{s1}
\]

\[
\lambda^\text{HPV H5}_M(a, r, t) = \zeta_M(a, r, t)(1 - \kappa_{HPV}(t))(1 - v_{HPV}(t))T^\text{HPV H5}_{FM}(\rho_M(a) \cdot I^\text{CSW}_{HPV H5}(t)) \tag{s2}
\]

\[
\Lambda^\text{HPV OHR}_M(a, r, t) = c_M(a, r, t)(1 - \kappa_{HPV}(t))(1 - v_{HPV}(t))T^\text{HPV OHR}_{FM}(\rho_M(a) \cdot I^\text{HPV OHR}_F(t)) + \lambda^\text{HPV OHR}_M(a, r, t) \tag{s3}
\]

\[
\lambda^\text{HPV OHR}_M(a, r, t) = \zeta_M(a, r, t)(1 - \kappa_{HPV}(t))(1 - v_{HPV}(t))T^\text{HPV OHR}_{FM}(\rho_M(a) \cdot I^\text{CSW}_{HPV OHR}(t)) \tag{s4}
\]

Here, \( T^\text{HPV H5}_{FM} \) and \( T^\text{HPV OHR}_{FM} \) are per sex-act female-to-male HPV H5 and HPV OHR transmission probabilities, and \( I^\text{HPV H5}_F(t) \) and \( I^\text{HPV OHR}_F(t) \) are vectors specifying the age-specific probability of a female being HPV H5 and HPV OHR positive, respectively.

We can define the force of infection for females in a similar way as for males; except that we have no need to account for the protective effects of VMMC, and we consider HIV acquisition among commercial sex workers from their male clients. Therefore, we define the force of HIV, HPV16/18 and HPV OHR infection in females as follows:

\[
\Lambda^\text{HIV}_F(a, r, t) =
\]
\[ c_F(a, r, t) \left( 1 - \kappa_{HI}(t) \right) \sum_i \left( \sum_{T_s} \left( \rho_F(a) \cdot T_{MF}^{HI}(T_s) \right) I_{HI}^{HI}(T_s) + \lambda_F^{HI}(a, r, t) \right) \]

\[ \lambda_F^{HI}(a, r, t) = \]

\[ c_F(a, r, t) \left( 1 - \kappa_{HI}(t) \right) \sum_i \left( \sum_{T_s} \left( \rho_F(a) \cdot T_{MF}^{HI}(T_s) \right) I_{Client}^{HI}(T_s) + \lambda_F^{HI}(a, r, t) \right) \]

\[ \Lambda_F^{HPV1618}(a, r, t) = \]

\[ c_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPV1618} \left( \rho_F(a) \cdot I_{Client}^{HPV1618}(t) \right) + \lambda_F^{HPV1618}(a, r, t) \]

\[ \lambda_F^{HPV1618}(a, r, t) = \]

\[ \zeta_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPV1618} \left( \rho_F(a) \cdot I_{Client}^{HPV1618}(t) \right) \]

\[ \Lambda_F^{HPVHS}(a, r, t) = \]

\[ c_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPVHS} \left( \rho_F(a) \cdot I_{Client}^{HPVHS}(t) \right) + \lambda_F^{HPVHS}(a, r, t) \]

\[ \lambda_F^{HPVHS}(a, r, t) = \]

\[ \zeta_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPVHS} \left( \rho_F(a) \cdot I_{Client}^{HPVHS}(t) \right) \]

\[ \Lambda_F^{HPVOHR}(a, r, t) = \]

\[ c_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPVOHR} \left( \rho_F(a) \cdot I_{Client}^{HPVOHR}(t) \right) + \lambda_F^{HPVOHR}(a, r, t) \]

\[ \lambda_F^{HPVOHR}(a, r, t) = \]

\[ \zeta_F(a, r, t) \left( 1 - \kappa_{HPV}(t) \right) T_{MF}^{HPVOHR} \left( \rho_F(a) \cdot I_{Client}^{HPVOHR}(t) \right) \]

The parameter definitions for the female force of infection equations (s5-s12) are translatable from their male equivalents, with the exception of \( \zeta_F(a, r, t) \), which denotes the per-timestep volume of clients for commercial sex workers (this is assumed to be zero for women who are not commercial-sex-workers).
Detailed parameter inputs relating to sexual behaviour and force of infection

Model input parameter assumptions specific to sexual behaviour and force of infection are summarised in Table S1. We define the following equations which are referred to in Table S1:

\[
y = \lambda e^{-\left(\frac{x-\mu}{\sigma}\right)^2}
\]

\[
y = \frac{a_1 x - a_2}{b_1 x^2 - b_2 x + b_3}
\]

Table S1 Model parameters relating to sexual behaviour in Tanzania.

| Parameter Description | Parameter Value | Data Source and/or Rationale |
|-----------------------|-----------------|-------------------------------|
| Commercial sex worker population size and distribution. | 1% of females aged 15-54 are sex workers. These 1% are broken down into the following age-groups: 36% of CSW are aged 15-24 years, 40% are 25-34 years, 22% are 35-49 years and 2% are 50-54 years. | The total CSW population size is based on UNAIDS 2018 update (UNAIDS estimate of 155,450 CSWs in 2014)[1]. The age-distribution of CSW’s was based on the NACP report on Female Sex Workers in Dar es Salaam (2010)[2]. |
| Age-specific per timestep CSW client volume. Used to calculate \( c_F(a, r, t) \). | Normally distributed around a mean age of 39 for female sex workers aged 15-49 years. Defined by equation s13 where \( x \) is equal to the youngest age in each specified age group. Here, \( \lambda_{CSW} = 20, \mu_{CSW} = 39 \) and \( \sigma_{CSW} = 42 \). | This is based on the age-distributions provided in the NACP report on FSW in Dar es Salaam, in addition to qualitative data which indicates that on average, Tanzanian FSWs have 26 clients per month, as reported in qualitative data [2, 3]. |
| Age-specific per-timestep probability of a male paying for commercial sex. Used to calculate \( c_M(a, r, t) \). | Specified by equation s14 for males aged 15 years and over where \( x \) is equal to the youngest age in the specified age group, and \( a_1 = 0.5294, a_2 = 7.608, b_1 = 1, b_2 = 23.34 \) and \( b_3 = 153.6 \). | This was based on fitting the age-specific probability of a male having paid for sex in the last 12 months, as published in the 2007-08 HIV/AIDS and Malaria indicator survey [4]. |
| Probability of condom usage for commercial sex interactions. This is used to calculate \( \kappa_{HIV}(t) \) and \( \kappa_{HPV}(t) \). | Specified by equation s14 where \( x \) is equal to the calendar year (for 1993 onwards), and \( a_1 = 1.01, a_2 = 2016, b_1 = 0, b_2 = 1 \) and \( b_3 = 1987 \). | Parameter equation specified to fit survey data on condom use among commercial sex interactions[4-6]. |
| Parameter Description | Parameter Value | Data Source and/or Rationale |
|-----------------------|-----------------|-----------------------------|
| Age-specific probability of males being in the high-activity sexual activity group. | The age-specific probability of a male being in the high-activity groups are as follows: 15-19 years: 0.05 20-24 years: 0.13 25-44 years: 0.12 45+ years: 0.03 | Specified for consistency with the observed data (Munguti et al)[7]. The ‘high-activity’ group is equivalent to having 5+ sexual partners in a 12-month period as published in Munguti et al. |
| Age-specific probability of females being in the high-activity sexual activity group (excludes commercial sex workers). | The age-specific probability of a female being in the high-activity groups are as follows: 15-24 years: 0.03 25+ years: 0.01 | Specified for consistency with the observed data (Munguti et al)[7]. Note that the probability of being in the high-risk sexual activity group for females aged 25 years and over was modified from zero to one percent. The ‘high-activity’ group is equivalent to having 5+ sexual partners in a 12-month period as published in Munguti et al. |
| Volume of sexual interactions possibly resulting in HIV transmission per timestep for high-activity males and females $c_M(a, 1, t)$ and $c_F(a, 1, t)$. Note that $r = 1$ for high-activity individuals. | Normally distributed around a mean age of 30 for males and 17 for females. Defined by equation s1 where $x$ is equal to the youngest age in each specified age group. For males: $\lambda_{HAM} = 162$, $\mu_{HAM} = 30$ and $\sigma_{HAM} = 19$. And for females: $\lambda_{HAF} = 294$, $\mu_{HAF} = 17$ and $\sigma_{HAF} = 6$. Note that $\lambda_{HAM}$ and $\lambda_{HAF}$ are varied in sensitivity analysis. | Determined via calibration algorithm. |
| Volume of sexual interactions possibly resulting in HIV transmission per timestep for general-activity males and females $c_M(a, 0, t)$ and $c_F(a, 0, t)$. Note that $r = 1$ for general-activity individuals. | Normally distributed with mean age of 30 for males and 28 for females. Defined by equation s1 where $x$ is equal to the youngest age in each specified age group. For males: $\lambda_{GAM} = 9.45$, $\mu_{GAM} = 30$ and $\sigma_{GAM} = 12$. And for females: $\lambda_{GAF} = 9.50$, $\mu_{GAF} = 28$ and $\sigma_{GAF} = 6.8$. Note that $\lambda_{GAM}$ and $\lambda_{GAF}$ are varied in sensitivity analysis. | Determined via calibration algorithm. |
| Parameter Description                                                                 | Parameter Value                                                                                                                                                                                                                                                                                                                                 | Data Source and/or Rationale                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Probability of condom use for non-commercial sex interactions and condom efficacy. This is used to calculate $\kappa_{HIV}(t)$ and $\kappa_{HPV}(t)$. | Specified by a smoothed piece-wise linear interpolant from 0 in 1993, to 0.55 in 2011, to 0.37 in 2016 and constant thereafter. Therefore $\kappa_{HIV}(t) = p_{CUse}$ and $\kappa_{HPV}(t) = p_{CUse} \times 0.46$ for males and $\kappa_{HPV}(t) = p_{CUse} \times 0.3$ for females. | Specified to fit survey data on condom use among non-commercial sex interactions [4-6, 8-10].                                                                                                                                                                                                  |
| Year-specific reduction in the number of high-risk sexual interactions among both sexes and all activity groups. Parameter reflects nationwide behavioural change in response to the HIV epidemic. | Specified by equation s13 where $x$ is equal to the calendar year between 1995 and 2010, and $\lambda_{SB} = 0.5$, $\mu_{SB} = 2002$, $\sigma_{SB} = 8$. From 2010 onwards, this function is set to a constant value of 0.05. | Determined via calibration algorithm. This parameter reflects the behavioural change in Tanzania in response to public fear of HIV infection at the peak of the AIDS epidemic.                                                                                                                   |

For each female age, the age-distribution of male partners is determined by the probability density function of the Poisson distribution over a maximum of five age groups (her current age group and the four above her if possible), with a Poisson parameter decreasing linearly with age from some maximum $\lambda_{max}$ to 0 (which refers to the next five-year age group). The baseline value of this maximum is 1.5 (i.e. this is an average of 7.5 years older than the female age). This was based on observed data indicating that males tend to have sex with females younger than themselves[7]. This matrix is utilised to determine $\rho_M(a)$ and $\rho_F(a)$ for use in the force of infection calculation.
Model input parameters for the per-sex-act transmission probability is given in Table S2. These parameters reflect the variability in the probability of transmission among HIV sero-discordant couples, depending on the stage of disease of the HIV positive partner. The stage-specific per-contact transmission probabilities were sourced from Quinn et al[11].

Table S2 Stage-specific per-contact probability of HIV transmission.

| Transmission multipliers against base HIV transmission probability (0.0006)* | Acute infection | WHO clinical stage 1 | WHO clinical stage 2 | WHO clinical stage 3 | WHO clinical stage 4 (AIDS) |
|---|---|---|---|---|---|
| $T_{FM}^{HIV(0)}$ (1) | $0.0006 	imes 7$ | $T_{FM}^{HIV(0)}$ (2) | $0.0006 	imes 5.8$ | $T_{FM}^{HIV(0)}$ (3) | $0.0006 	imes 6.8$ |

*Note that these probabilities are for female to male transmission; for male to female transmission we note that $T_{MF}^{HIV(Tx)} = 2.5 	imes T_{FM}^{HIV(Tx)}$; the probabilities assume no ART treatment $Tx = 0$, during contacts with treated individuals $Tx = 1$ we note that the transmission probability is always reduced by 0.96.

Type-specific per high-risk-sex-act transmission probabilities are given in Table S3. These values were found through calibration. Burchell et al 2011 indicate that the probability of HPV transmission among sero-discordant general partnerships is 20% over a six month period[12].

Table S3 Transmission probabilities per high-risk sexual interaction for HPV 16/18, HPV 31/33/45/52/58 and other oncogenic HPV

| Parameter| Value| Probability of transmission over a six-month period* |
|---|---|---|
| HPV 16/18 transmission probability per high-risk-sex-act $T_{FM}^{HPV_{1618}}$ | 0.0560 | 46% - 76% |
| HPV 31/33/45/52/58 transmission probability per high-risk-sex-act $T_{FM}^{HPV_{HS}}$ | 0.0123 | 14% - 47% |
| Other oncogenic high-risk HPV $T_{FM}^{HPV_{OHR}}$ | 0.0179 | 19% - 57% |

* Note that $T_{FM}^{HPV} = T_{MF}^{HPV}$ for all HPV types. *Calculated for males and females in the general activity group assuming condom use and efficacy (46% for males and 30% for females) as observed in 2011; ranges provided reflect variation in sexual frequency due to age; number included for comparison with Burchell et al 2011 [12].

Table S4 HPV-type specific multipliers for acquisition, progression and regression of HPV associated disease for HIV positive individuals(11)*.

| Parameter description | Parameter value* |
|---|---|
| Multiplier increasing HPV acquisition for HIV positive individuals | 2.75 (1.17-2.75) |
| Clearance of an HPV infection (no CIN) | 0.6 |
| Progression from HPV infection to CIN1 | 3.73 (2.62-3.73) |
| Progression from HPV infection to CIN2 | 1.3 (1.1-1.33) |
| Event                                      | Parameter Value |
|--------------------------------------------|------------------|
| Regression from CIN1 to clearance or HPV infected | 0.7 (0.56-0.7) for HIV 16/18 |
|                                              | 0.67 (0.56-0.67) for all other HPV types. |
| Regression from CIN2/3 to clearance, HPV infection or CIN1 | 0.57 (0.26-0.57) |
| Progression from CIN3 to invasive cervical cancer | 2.5 (2.3-2.5) |

*Please note that the ranges specified are those considered in sensitivity analysis, for information please refer to the following section titled ‘Sensitivity analysis’.

*Note that these parameters are the same for all HPV types except where otherwise stated.*
Additional tables
The natural history transition probabilities for HPV infection are adapted from previously published models (see Tan et al 2018 supplementary appendix Table S25 a][13].

Table S5 Per-timestep disease transition probabilities for HPV 16/18 infections and associated disease, by age, in HIV negative women.

| Age | From HPV infected to: | From CIN 1 to: | From CIN 2 infected to: | From CIN 3 to: |
|-----|-----------------------|----------------|-------------------------|----------------|
|     | Well*     | HPV | CIN 1 | CIN 2 | CIN 3 | Well*     | HPV | CIN 1 | CIN 2 | CIN 3 | Well*     | HPV | CIN 1 | CIN 2 | CIN 3 | Undet ICC |
| 10-14| 0.2013 | 0.035 | 0.0569 | 0.0171 | 0 | 0.0684 | 0.0056 | 0.2844 | 0.0088 | 0.0088 | 0.0679 | 0.0066 | 0.0238 | 0.1613 | 0.0369 | 0 | 0 | 0.0134 | 0.0097 | 0.5 | 0 |
| 15-19| 0.2013 | 0.035 | 0.0569 | 0.0171 | 0 | 0.0684 | 0.0056 | 0.2844 | 0.0088 | 0.0088 | 0.0679 | 0.0066 | 0.0238 | 0.1613 | 0.0369 | 0 | 0 | 0.0134 | 0.0097 | 0.5 | 0 |
| 20-24| 0.2013 | 0.0349 | 0.0569 | 0.0171 | 0 | 0.0684 | 0.0056 | 0.2843 | 0.0088 | 0.0088 | 0.0679 | 0.0066 | 0.0238 | 0.1613 | 0.0369 | 0 | 0 | 0.0134 | 0.0097 | 0.5 | 0.001 |
| 25-29| 0.1381 | 0.1222 | 0.0312 | 0.0068 | 0 | 0.0684 | 0.0056 | 0.2767 | 0.0102 | 0.0102 | 0.0679 | 0.0066 | 0.0238 | 0.1352 | 0.0532 | 0 | 0 | 0.0134 | 0.0097 | 0.5 | 0.0014 |
| 30-34| 0.1381 | 0.1214 | 0.0312 | 0.0068 | 0 | 0.0684 | 0.0056 | 0.2751 | 0.0102 | 0.0102 | 0.0679 | 0.0066 | 0.0238 | 0.1343 | 0.0532 | 0 | 0 | 0.0134 | 0.0097 | 0.5 | 0.0033 |
| 35-39| 0.1381 | 0.1246 | 0.0312 | 0.0034 | 0 | 0.0684 | 0.0056 | 0.2719 | 0.0102 | 0.0102 | 0.0679 | 0.0066 | 0.0238 | 0.1183 | 0.0646 | 0 | 0 | 0.0056 | 0.0097 | 0.5 | 0.0033 |
| 40-44| 0.121 | 0.1403 | 0.0312 | 0.0034 | 0 | 0.0684 | 0.0056 | 0.2663 | 0.0102 | 0.0113 | 0.0679 | 0.0066 | 0.0238 | 0.1167 | 0.0646 | 0 | 0 | 0.0056 | 0.0038 | 0.5 | 0.0063 |
| 45-49| 0.1052 | 0.1689 | 0.0241 | 0.0017 | 0 | 0.0684 | 0.0056 | 0.2527 | 0.0136 | 0.0113 | 0.0679 | 0.0066 | 0.0238 | 0.105 | 0.0723 | 0 | 0 | 0.0056 | 0.0038 | 0.5 | 0.0063 |
| 50-54| 0.0906 | 0.1897 | 0.0362 | 0.0025 | 0 | 0.0684 | 0.0056 | 0.2544 | 0.0204 | 0.0169 | 0.0679 | 0.0066 | 0.0238 | 0.106 | 0.1085 | 0 | 0 | 0.0056 | 0.0028 | 0.5 | 0.0095 |
| 55-59| 0.077 | 0.2114 | 0.041 | 0.0029 | 0 | 0.0684 | 0.0056 | 0.2554 | 0.0212 | 0.0191 | 0.0679 | 0.0066 | 0.0238 | 0.098 | 0.1363 | 0 | 0 | 0.0056 | 0.0028 | 0.5 | 0.015 |
| 60-64| 0.0642 | 0.2344 | 0.0458 | 0.0032 | 0 | 0.0684 | 0.0056 | 0.2561 | 0.0259 | 0.0214 | 0.0679 | 0.0066 | 0.0238 | 0.0983 | 0.1523 | 0 | 0 | 0.0019 | 0.0019 | 0.5 | 0.0168 |
| 65-69| 0.0642 | 0.2358 | 0.0506 | 0.0035 | 0 | 0.0684 | 0.0056 | 0.2576 | 0.0286 | 0.0236 | 0.0679 | 0.0066 | 0.0238 | 0.0909 | 0.1852 | 0 | 0 | 0.0019 | 0.0019 | 0.5 | 0.0186 |
| 70-74| 0.0642 | 0.2341 | 0.0554 | 0.0039 | 0 | 0.0684 | 0.0056 | 0.2557 | 0.0314 | 0.0259 | 0.0679 | 0.0066 | 0.0238 | 0.0899 | 0.2028 | 0 | 0 | 0.0019 | 0.0019 | 0.5 | 0.0203 |
| 75-79| 0.0642 | 0.2279 | 0.0603 | 0.0042 | 0 | 0.0684 | 0.0056 | 0.2699 | 0.0341 | 0.0281 | 0.0679 | 0.0066 | 0.0238 | 0.0783 | 0.2408 | 0 | 0 | 0.0019 | 0.0009 | 0.5 | 0.0253 |
| 80-84| 0.0642 | 0.2153 | 0.0241 | 0.0017 | 0 | 0.0684 | 0.0056 | 0.2352 | 0.0136 | 0.0113 | 0.0679 | 0.0066 | 0.0238 | 0.071 | 0.0963 | 0 | 0 | 0.0019 | 0.0009 | 0.5 | 0.0101 |

* Well refers to per-timestep probability of clearance of HPV infection or CIN.
Table S6 Per-timestep disease transition probabilities for high-risk HPV not 16/18 infections and associated disease, by age, in HIV negative women.

| Age | From HPV infected to: | From CIN 1 to: | From CIN 2 infected to: | From CIN 3 to: | Well* | HPV | CIN 1 | CIN 2 | CIN 3 | Well* | HPV | CIN 1 | CIN 2 | CIN 3 | Well* | HPV | CIN 1 | CIN 2 | CIN 3 | Well* | HPV | CIN 1 | CIN 2 | CIN 3 | Undet ICC |
|-----|----------------------|----------------|----------------------|----------------------|----------------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|-----|-------|-----|-----|-----|-----|---------|
| 10-14 | 0.3298 | 0.012 | 0.0334 | 0.01 | 0 | 0.0804 | 0.0097 | 0.2268 | 0.0051 | 0.0051 | 0.1143 | 0.0114 | 0.0407 | 0.0984 | 0.0203 | 0 | 0 | 0.023 | 0.0163 | 0.4044 | 0 |
| 15-19 | 0.3298 | 0.012 | 0.0334 | 0.01 | 0 | 0.0804 | 0.0097 | 0.2268 | 0.0051 | 0.0051 | 0.1143 | 0.0114 | 0.0407 | 0.0983 | 0.0203 | 0 | 0 | 0.023 | 0.0163 | 0.4042 | 0 |
| 20-24 | 0.3298 | 0.0119 | 0.0334 | 0.01 | 0 | 0.0804 | 0.0097 | 0.2267 | 0.0051 | 0.0051 | 0.1143 | 0.0114 | 0.0407 | 0.0983 | 0.0203 | 0 | 0 | 0.023 | 0.0163 | 0.4002 | 0.0006 |
| 25-29 | 0.2273 | 0.0764 | 0.0182 | 0.0039 | 0 | 0.0804 | 0.0097 | 0.2212 | 0.0059 | 0.0059 | 0.1143 | 0.0114 | 0.0407 | 0.087 | 0.0312 | 0 | 0 | 0.023 | 0.0163 | 0.3989 | 0.0008 |
| 30-34 | 0.2273 | 0.0757 | 0.0182 | 0.0039 | 0 | 0.0804 | 0.0097 | 0.22 | 0.0059 | 0.0059 | 0.1143 | 0.0114 | 0.0407 | 0.0841 | 0.0312 | 0 | 0 | 0.023 | 0.0163 | 0.3887 | 0.0019 |
| 35-39 | 0.2273 | 0.0767 | 0.0182 | 0.002 | 0 | 0.0804 | 0.0097 | 0.2175 | 0.0059 | 0.0059 | 0.1143 | 0.0114 | 0.0407 | 0.0769 | 0.038 | 0 | 0 | 0.0097 | 0.0163 | 0.5 | 0.0019 |
| 40-44 | 0.2 | 0.0923 | 0.0182 | 0.002 | 0 | 0.0804 | 0.0097 | 0.214 | 0.0059 | 0.0065 | 0.1143 | 0.0114 | 0.0407 | 0.0735 | 0.038 | 0 | 0 | 0.0097 | 0.0065 | 0.5 | 0.0036 |
| 45-49 | 0.1769 | 0.115 | 0.0141 | 0.001 | 0 | 0.0804 | 0.0097 | 0.2059 | 0.0079 | 0.0065 | 0.1143 | 0.0114 | 0.0407 | 0.066 | 0.0426 | 0 | 0 | 0.0097 | 0.0065 | 0.5 | 0.0036 |
| 50-54 | 0.1512 | 0.1366 | 0.0211 | 0.0015 | 0 | 0.0804 | 0.0097 | 0.2072 | 0.0119 | 0.0098 | 0.1143 | 0.0114 | 0.0407 | 0.0668 | 0.0639 | 0 | 0 | 0.0097 | 0.0069 | 0.5 | 0.0053 |
| 55-59 | 0.1291 | 0.1601 | 0.0239 | 0.0017 | 0 | 0.0804 | 0.0097 | 0.2081 | 0.0135 | 0.0111 | 0.1143 | 0.0114 | 0.0407 | 0.0623 | 0.1161 | 0 | 0 | 0.0097 | 0.0069 | 0.5 | 0.0085 |
| 60-64 | 0.1081 | 0.1862 | 0.0267 | 0.0019 | 0 | 0.0804 | 0.0097 | 0.2086 | 0.0151 | 0.0124 | 0.1143 | 0.0114 | 0.0407 | 0.0626 | 0.1298 | 0 | 0 | 0.0032 | 0.0032 | 0.5 | 0.0095 |
| 65-69 | 0.1081 | 0.1873 | 0.0295 | 0.0021 | 0 | 0.0804 | 0.0097 | 0.2099 | 0.0167 | 0.0137 | 0.1143 | 0.0114 | 0.0407 | 0.0584 | 0.1094 | 0 | 0 | 0.0032 | 0.0032 | 0.5 | 0.0105 |
| 70-74 | 0.1081 | 0.1859 | 0.0323 | 0.0022 | 0 | 0.0804 | 0.0097 | 0.2083 | 0.0182 | 0.015 | 0.1143 | 0.0114 | 0.0407 | 0.0577 | 0.1199 | 0 | 0 | 0.0032 | 0.0032 | 0.5 | 0.0115 |
| 75-79 | 0.1081 | 0.1808 | 0.0351 | 0.0024 | 0 | 0.0804 | 0.0097 | 0.2027 | 0.0198 | 0.0164 | 0.1143 | 0.0114 | 0.0407 | 0.0493 | 0.1426 | 0 | 0 | 0.0032 | 0.0016 | 0.5 | 0.0143 |
| 80-84 | 0.1081 | 0.1704 | 0.0141 | 0.0001 | 0 | 0.0804 | 0.0097 | 0.1914 | 0.0079 | 0.0065 | 0.1143 | 0.0114 | 0.0407 | 0.0427 | 0.057 | 0 | 0 | 0.0032 | 0.0016 | 0.5 | 0.0057 |

* Well refers to per-timestep probability of clearance of HPV infection or CIN.
References

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