

## Additional File 4 - Multivariate probabilistic sensitivity analysis input data

| Variable names                                  | Distribution                        | Distribution parameters |                                         |
|-------------------------------------------------|-------------------------------------|-------------------------|-----------------------------------------|
|                                                 |                                     | HIV- subpopulation      | HIV+ subpopulation                      |
| <b>Transition probability</b>                   |                                     |                         |                                         |
| HPV-Onc to CIN1                                 | Normal distribution between 0 and 1 | 0.049(SD. 0.009) [1]    | 0.096 (0.007) [2]                       |
| HPV-Onc clearance to normal                     | Uniform distribution                | 0.234-0.664 [1,3-5]     | 0.170-0.254 [2]                         |
| CIN1 to CIN2/3                                  | Normal distribution between 0 and 1 | 0.091 (SD.0.021) [4-6]  | 0.098 (SD.0.013) [2]                    |
| CIN2/3 cured                                    | Normal distribution between 0 and 1 | 0.227 (SD.0.058) [4-6]  | Assumption (same as HIV- subpopulation) |
| CIN2/3 to persistent CIN2/3                     | Uniform distribution                | 0.091-0.137 [5,6]       | Assumption (same as HIV- subpopulation) |
| Persistent CIN2/3 to cervical cancer            | Uniform distribution                | 0-0.098                 | 0-0.181 [7]                             |
| <b>Mortality rate</b>                           |                                     |                         |                                         |
| Age-dependent mortality data                    | Uniform distribution                | 0.001-0.064 [8]         | 0.001-0.449 [8]                         |
| <b>HPV and HIV incidence</b>                    |                                     |                         |                                         |
| HIV incidence rate in women                     | Uniform distribution                | N/A                     | 0.001-0.036 [8]                         |
| Oncogenic HPV incidence                         | Uniform distribution                | 0.033-0.468 [9]         | 0.088-1 [9] [10]                        |
| <b>Cervical cancer parameters</b>               |                                     |                         |                                         |
| Cervical cancer mortality                       | Uniform distribution                | 0.088-0.132 [11]        | 0.233-0.349 [12]                        |
| Cervical cancer cured                           | Uniform distribution                | 0.121-0.181 [11]        | 0.022-0.033 [12]                        |
| <b>HPV screening-related parameters</b>         |                                     |                         |                                         |
| CIN1 detected                                   | Normal distribution between 0 and 1 | 0.58 (SD.0.045) [13]    | 0.58 (SD.0.045) [13]                    |
| CIN2/3 detected                                 | Normal distribution between 0 and 1 | 0.61 (SD. 0.045) [13]   | 0.61 (SD. 0.045) [13]                   |
| <b>HPV-related disease management</b>           |                                     |                         |                                         |
| Proportion of women treated if CIN1 is detected | Uniform distribution                | 0.4-0.6 (assumption)    | Assumption (same as HIV- subpopulation) |
| CIN1 treatment success                          | Uniform distribution                | 0.72-1 (assumption)     | Assumption (same as HIV- subpopulation) |
| CIN2/3 treatment success                        | Uniform distribution                | 0.72-1 (assumption)     | Assumption (same as HIV- subpopulation) |
| <b>Vaccine efficacy [14]</b>                    |                                     |                         |                                         |
| Vaccine efficacy for CIN1+                      | Normal distribution between 0 and 1 | 0.503 (SD.0.054)        | 0.503 (SD.0.047)                        |
| Vaccine efficacy for CIN2/3                     | Normal distribution between 0 and 1 | 0.649 (SD.0.054)        | 0.649 (SD.0.054)                        |
| Vaccine efficacy for CC                         | Normal distribution between 0 and 1 | 0.932 (SD.0.050)        | 0.932 (SD.0.050)                        |
| <b>Disutility data [3,15-18]</b>                |                                     |                         |                                         |
| No HPV (baseline value)                         | Fix at 0                            | N/A                     | N/A                                     |
| HIV+ (baseline value)                           | Uniform distribution                | N/A                     | 0.648-0.972 [19]                        |
| HPV-Onc                                         | Fix at 0                            | N/A                     | N/A                                     |
| CIN1                                            | Fix at 0                            | N/A                     | N/A                                     |

| Variable names                               | Distribution         | Distribution parameters |                    |
|----------------------------------------------|----------------------|-------------------------|--------------------|
|                                              |                      | HIV- subpopulation      | HIV+ subpopulation |
| CIN1 detected                                | Uniform distribution | 0.010-0.015             | 0.010-0.015        |
| CIN2/3                                       | Fix at 1             | N/A                     | N/A                |
| CIN2/3 detected                              | Uniform distribution | 0.010-0.015             | 0.010-0.015        |
| Cervical cancer                              | Uniform distribution | 0.218-0.328             | 0.218-0.328        |
| Cervical cancer cured                        | Uniform distribution | 0.050-0.074             | 0.050-0.074        |
| <b>Cost data</b>                             |                      |                         |                    |
| Cost of regular screening negative Pap smear | Uniform distribution | ZAR 205-307             | ZAR 205-307        |
| Regular screening + false positive           | Uniform distribution | ZAR 231-347             | ZAR 231-347        |
| Treatment CIN1 detected                      | Uniform distribution | ZAR 664-996             | ZAR 664-996        |
| Treatment CIN2/3 detected                    | Uniform distribution | ZAR 1 971-2 957         | ZAR 1 971-2 957    |
| Cervical cancer stage I-IV                   | Uniform distribution | ZAR 32 406-48 608       | ZAR 32 406-48 608  |

### Abbreviations

CC, cervical cancer; CIN, cervical intraepithelial neoplasia; CIN1, CIN grade 1; CIN2/3, CIN grade 2 or 3; HPV, human papillomavirus; HPV-Onc, oncogenic HPV types; HIV, human immunodeficiency virus; HIV-, HIV-negative; HIV+, HIV+positive; Pap, Papanicolou smear test; SD, standard deviation; ZAR, South African Rand.

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