# SUPPLEMENTARY DIGITAL CONTENT

Supplementary Table 1 - Risk factors for non-AIDS-defining malignancies

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Univariable | | | Multivariable | | |
| **Rate ratio** | **95% CI** | **p** | **Rate ratio** | **95% CI** | **p** |
| Demographics, at entry to HIV care | | | | | | | |
| Sex | Female | 0.63 | 0.29, 1.36 | 0.243 | 0.70 | 0.32, 1.52 | 0.373 |
| Male | 1.00 | - | 1.00 | - |
| Region | UK/Ireland | 1.00 | - | 0.448 | 1.00 | - | 0.820 |
| Thailand | 0.47 | 0.06, 4.04 | 0.38 | 0.04, 3.54 |
| Russia/Ukraine | 1.22 | 0.33, 4.54 | 0.95 | 0.23, 4.01 |
| Rest of Europe | 1.75 | 0.65, 4.74 | 1.07 | 0.34, 3.35 |
| Mode of infection | Vertical | 1.00 | - | <0.001 | 1.00 | - | 0.049 |
| Other | 5.28 | 2.31, 12.07 | 3.13 | 1.01, 9.74 |
| Time-updated | | | | | | | |
| ART status | Not on ART | 1.00 | - | 0.066 | 1.00 | - | 0.262 |
| <6 months on ART | 4.40 | 0.40, 48.57 | 3.43 | 0.30, 38.65 |
| ≥6 months on ART | 5.55 | 1.31, 23.48 | 2.30 | 0.36, 14.61 |
| Calendar year | <1996 | 1.00 | - | 0.332 | 1.00 | - | 0.636 |
| 1996 - 2003 | 2.03 | 0.24, 17.38 | 1.85 | 0.21, 16.29 |
| 2004 - 2009 | 3.67 | 0.47, 28.70 | 3.13 | 0.35, 27.90 |
| ≥2010 | 4.25 | 0.55, 32.89 | 3.54 | 0.36, 34.93 |
| Age (years) | <5 | 1.00 | - | 0.015 | 1.00 | - | 0.092 |
| 5 - <10 | 6.50 | 1.44, 29.31 | 4.48 | 0.96, 21.07 |
| 10 - <15 | 3.02 | 0.55, 16.48 | 1.42 | 0.23, 8.59 |
| ≥15 | 9.53 | 2.09, 43.48 | 2.12 | 0.32, 13.84 |
| WHO immune stage | Not severe | 1.00 | - | 0.231 | 1.00 | - | 0.038 |
| Severe | 1.72 | 0.71, 4.16 | 2.91 | 1.06, 7.97 |
| Viral load | Suppressed | 1.00 | - | 0.279 | 1.00 | - | 0.990 |
| Not suppressed | 0.61 | 0.25, 1.49 | 0.99 | 0.34, 2.89 |
| BMI-for-age z-score | >2 | 1.00 | - | 0.354 | 1.00 | - | 0.550 |
| -2 to 2 | 0.84 | 0.11, 6.42 | 0.68 | 0.09, 5.43 |
| <-2 | 3.56 | 0.11, 111.64 | 0.88 | 0.05, 91.73 |

Supplementary Table 2 - Risk factors for AIDS-defining malignancies

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Univariable | | | Multivariable | | |
| **Rate ratio** | **95% CI** | **p** | **Rate ratio** | **95% CI** | **p** |
| Demographics, at entry to HIV care | | | | | | | |
| Sex | Female | 0.59 | 0.40, 0.86 | 0.007 | 0.62 | 0.42, 0.92 | 0.016 |
| Male | 1.00 | - | 1.00 | - |
| Region | UK/Ireland | 1.00 | - | <0.001 | 1.00 | - | 0.023 |
| Thailand | 0.09 | 0.01, 0.70 | 0.10 | 0.01, 0.77 |
| Russia/Ukraine | 0.24 | 0.08, 0.70 | 0.53 | 0.17, 1.63 |
| Rest of Europe | 1.60 | 1.02, 2.52 | 1.40 | 0.84, 2.32 |
| Mode of infection | Vertical | 1.00 | - | 0.869 | 1.00 | - | 0.002 |
| Other | 0.94 | 0.44, 2.02 | 0.26 | 0.11, 0.59 |
| Time-updated | | | | | | | |
| ART status | Not on ART | 1.00 | - | 0.003 |  | | |
| <6 months on ART | 3.52 | 1.69, 7.34 |
| ≥6 months on ART | 1.35 | 0.86, 2.13 |
| Calendar year | <1996 | 1.00 | - | <0.001 | Test for interaction: p<0.001 | | |
| 1996 - 2003 | 0.55 | 0.35, 0.86 |
| 2004 - 2009 | 0.20 | 0.11, 0.35 |
| ≥2010 | 0.19 | 0.11, 0.35 |
| Effect of time-updated calendar year among those  not on ART | | | | <1996 | 1.00 | - | 0.326 |
| 1996 - 2003 | 1.24 | 0.47, 3.63 |
| 2004 - 2009 | 0.44 | 0.11, 2.12 |
| ≥2010 | 1.71 | 0.45, 8.01 |
| Effect of time-updated calendar year among those  on ART <6 months | | | | <1996 | 1.00 | - | 0.948 |
| 1996 - 2003 | 1.02 | 0.18, 5.33 |
| 2004 - 2009 | 0.00 | 0.00, >1000.00 |
| ≥2010 | 0.61 | 0.07, 5.12 |
| Effect of time-updated calendar year among those  on ART ≥6 months | | | | <1996 | 1.00 | - | <0.001 |
| 1996 - 2003 | 0.34 | 0.18, 0.64 |
| 2004 - 2009 | 0.15 | 0.06, 0.35 |
| ≥2010 | 0.11 | 0.04, 0.32 |
| Age (years) | <5 | 1.00 | - | 0.200 | Test for interaction: p<0.001 | | |
| 5 - <10 | 0.98 | 0.58, 1.67 |
| 10 - <15 | 1.41 | 0.84, 2.36 |
| ≥15 | 1.59 | 0.93, 2.70 |
| Effect of time-updated age among those  not on ART | | | | <5 | 1.00 | - | 0.001 |
| 5 - <10 | 3.40 | 1.24, 9.33 |
| 10 - <15 | 10.17 | 3.35, 30.86 |
| ≥15 | 8.84 | 0.96, 81.53 |
| Effect of time-updated age among those  on ART <6 months | | | | <5 | 1.00 | - | 0.007 |
| 5 - <10 | 2.65 | 0.37, 18.87 |
| 10 - <15 | 10.98 | 1.86, 64.85 |
| ≥15 | 29.65 | 3.67, 239.62 |
| Effect of time-updated age among those  on ART ≥6 months | | | | <5 | 1.00 | - | 0.001 |
| 5 - <10 | 0.63 | 0.31, 1.24 |
| 10 - <15 | 1.26 | 0.61, 2.63 |
| ≥15 | 3.12 | 1.41, 6.91 |
| WHO immune stage | Not severe | 1.00 | - | <0.001 | 1.00 | - | <0.001 |
| Severe | 5.92 | 3.83, 9.15 | 4.22 | 2.46, 7.25 |
| Viral load | Suppressed | 1.00 | - | <0.001 | 1.00 | - | 0.057 |
| Not suppressed | 4.13 | 1.92, 8.89 | 2.53 | 0.97, 6.55 |
| BMI-for-age z-score | >2 | 1.00 | - | 0.020 | 1.00 | - | 0.094 |
| -2 to 2 | 44.17 | 0.00, >1000.00 | 39.15 | 0.00, >1000.00 |
| <-2 | 150.00 | 0.00, >1000.00 | 105.21 | 0.00, >1000.00 |

Supplementary Table 3 - Risk factors for death following a malignancy diagnosis

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Univariable | | | Multivariable | | |
| **Hazard ratio** | **95% CI** | **p** | **Hazard ratio** | **95% CI** | **p** |
| At malignancy diagnosis | | | | | | | |
| Calendar year | <1996 | 1.00 | - | 0.001 | 1.00 | - | 0.002 |
| 1996 - 2003 | 0.32 | 0.17, 0.61 | 0.32 | 0.15, 0.64 |
| 2004 - 2009 | 0.24 | 0.10, 0.59 | 0.16 | 0.05, 0.52 |
| ≥2010 | 0.43 | 0.20, 0.93 | 0.19 | 0.05, 0.75 |
| Malignancy type | ADM | 1.08 | 0.54, 2.14 | 0.834 | 0.59 | 0.24, 1.48 | 0.265 |
| NADM | 1.00 | - | 1.00 | - |
| Presented to HIV care in last 6 months | Yes | 0.61 | 0.30, 1.24 | 0.171 | 0.94 | 0.33, 2.66 | 0.905 |
| No | 1.00 | - | 1.00 | - |
| Sex | Female | 1.09 | 0.64, 1.88 | 0.745 | 1.33 | 0.73, 2.42 | 0.352 |
| Male | 1.00 | - | 1.00 | - |
| Region | UK/Ireland | 1.00 | - | 0.772 | 1.00 | - | 0.635 |
| Thailand | 1.27 | 0.16, 9.82 | 1.15 | 0.13, 10.17 |
| Russia/Ukraine | 1.83 | 0.58, 5.74 | 2.66 | 0.57, 12.51 |
| Rest of Europe | 1.27 | 0.65, 2.48 | 0.94 | 0.43, 2.04 |
| Mode of acquisition | Vertical | 1.00 | - | 0.049 | 1.00 | - | 0.050 |
| Other | 0.24 | 0.06, 0.99 | 0.21 | 0.04, 1.00 |
| Age (years) | <5 | 1.00 | - | 0.089 | 1.00 | - | 0.479 |
| 5 - <10 | 1.20 | 0.62, 2.32 | 0.93 | 0.43, 2.01 |
| 10 - <15 | 0.47 | 0.21, 1.06 | 0.77 | 0.31, 1.92 |
| ≥15 | 0.66 | 0.30, 1.46 | 1.79 | 0.60, 5.36 |
| Time since ART initiation | No ART use | 1.00 | - | 0.208 | 1.00 | - | 0.289 |
| <6 months | 0.28 | 0.06, 1.18 | 0.31 | 0.07, 1.40 |
| ≥6 months | 0.81 | 0.47, 1.41 | 1.10 | 0.52, 2.30 |
| WHO immune stage | Not severe | 1.00 | - | 0.403 | 1.00 | - | 0.593 |
| Severe | 1.35 | 0.67, 2.72 | 1.25 | 0.55, 2.84 |

Supplementary Table 4 – Summary of enrolled patients and malignancy events by cohort

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Country** | **Cohort** | **Range of calendar year of entry to HIV care\*** | **Number and proportion of patients with a malignancy event** | | **Number and proportion of patients with a malignancy event, among those born abroad** | |
| **n/N** | **%** | **n/N** | **%** |
| Belgium | St Pierre | **1985-2014** | 6/164 | 6% | **3/116** | **3%** |
| Greece |  | **1996-2016** | 0/21 | **-** | **0/1** | **-** |
| Italy |  | **1980-2015** | 45/1,835 | **2%** | **1/283** | **<0.5%** |
| Latvia |  | **1998-2007** | 0/5 | **-** | **0/0** |  |
| Netherlands | ATHENA | **1984-2015** | 4/366 | **1%** | **4/254** | **2%** |
| Poland |  | **1989-2015** | 0/85 | **-** | **0/4** | **-** |
| Romania |  | **1989-2015** | 13/491 | **3%** | **0/0** | **-** |
| Russia | Irkutsk | **1996-2016** | 0/668 | **-** | **0/0** | **-** |
| Republican Hospital | **1997-2014** | 2/174 | **1%** | **0/0** | **-** |
| St Petersburg | **1997-2016** | 1/79 | **1%** | **0/0** | **-** |
| Thailand | PHPT | **1989-2012** | 2/877 | **<0.5%** | **0/16** | **-** |
| Spain | CORISPE-CAT | **1985-2015** | 6/234 | **3%** | **2/51** | **4%** |
| CORISPES | **1982-2015** | 10/778 | **1%** | **0/130** | **-** |
| Switzerland | MOCHIV | **1980-2013** | 15/272 | **6%** | **0/14** | **-** |
| Sweden |  | **1986-2016** | 0/122 | **-** | **0/106** | **-** |
| UK/Ireland | CHIPS | **1982-2016** | 31/2,069 | **2%** | **21/1,164** | **2%** |
| Ukraine |  | **1994-2016** | 5/1,359 | **<0.5%** | **0/6** | **-** |
| ***Overall*** |  | ***1980-2016*** | ***140/9,599*** | ***1%*** | ***31/2,150*** | ***1%*** |

Supplementary Figure 1- Kaplan-Meier time to death from malignancy diagnosis, by calendar year of malignancy diagnosis

****