**Supplementary appendix**

Supplementary Table 1. Detailed search strategies used in this review

Supplementary Table 2. Characteristics of the studies included in the systematic review and meta-analysis of prevalence.

Supplementary Table 3. Characteristics of the cohort studies included in the systematic review and meta-analysis of incidence.

Supplementary Figure 1. Funnel plot of stroke prevalence among adults living with HIV

Supplementary Figure 2. Forest plots and funnel plot of ischemic stroke prevalence among adults living with HIV.

Supplementary Figure 3. Forest plots of stroke prevalence among older adults and general population living with HIV.

Supplementary Figure 4. Funnel plots of stroke prevalence among older adults and general population living with HIV.

Supplementary Figure 5. Funnel plots of stroke incidence (per 10,000 person-years) among adults living with HIV.

Supplementary Table 4. Univariable meta-regression of stroke incidence and study characteristics among adults living with HIV.

Supplementary Figure 6. Funnel plots of ischemic stroke and hemorrhagic stroke incidence (per 10,000 person-years) among adults living with HIV.

**Supplementary Table 1. Detailed search strategies used in this review**

|  |  |
| --- | --- |
| Database | Search terms |
| PubMed |  ((“HIV”[Title/Abstract]) OR (“AIDS”[Title/Abstract]) OR (“human immunodeficiency virus” [Title/Abstract]) OR (“acquired immunodeficiency syndrome” [Title/Abstract])) and (“stroke”[Title/Abstract]) |
| EMBASE | (((“HIV”) OR (“AIDS”) OR (“human immunodeficiency virus”) OR (“acquired immunodeficiency syndrome”)) and (“stroke”)):ab |
| Web of Science | (AB= “HIV” OR AB= “AIDS” OR AB=“human immunodeficiency virus” OR AB= “acquired immunodeficiency syndrome”) AND (AK=“stroke”) |

**Supplementary Table 2. Characteristics of the studies included in the systematic review and meta-analysis of prevalence.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| First author, year (Country) | Median year of sampling (y) | Study design | Population group | Sample size, n | Age, y | Stroke cases | Proportion of ART, % | Region | World Bank Income level | Risk of bias |
| Tiffany E. Gooden et al, 2022 (UK)[1] | 2010 | Cohort | Adult | 9233 | Mean (SD): 41 (11) | 152 | NA | European Region | High income | Low |
| Fred Stephen Sarfo et al, 2021 (Ghana)[2] | NA | Cohort | Adult | 261 | NA | 5 | 100 | African Region | Lower middle income | Low |
| Amaraporn Rerkasem et al, 2021 (Thailand)[3] | 2016 | Cross-sectional | Adult | 892 | Mean (SD): 43 (10) | 8 (ischemic) | 100 | South-East Asia Region | Upper middle income | Moderate |
| Urvish K. Patel MBBS et al, 2021 (USA)[4] | 2008 | Cross-sectional | Adult | 1559351 | NA | 14895 (ischemic) | NA | Region of the Americas | High income | Low |
| Robert S. Rosenson et al, 2020 (USA)[5] | 2013 | Cohort | Adult | 82426 | NA | 596 | 95.96 | Region of the Americas | High income | Low |
| Alyson Kaplan et al, 2020 (USA)[6] | 2013 | Cohort | Adult | 232 | NA | 8 | NA | Region of the Americas | High income | Moderate |
| Joseph Kamtchum-Tatuene et al, 2019 (Malawi)[7] | NA | Case-control | Adult | 51 | NA | 19 (ischemic) | 50.98 | African Region | Low income | Moderate |
| Lene Ryom et al, 2018 (Australia, Europe, and the USA)[8] | 2007 | Cohort | Adult | 35711 | Median (IQR): 44 (38–51) | 379 | 85.16 | NA | NA | Low |
| Kenneth H. Mayer et al, 2018 (USA)[9] | 2010 | Cross-sectional | Adult | 12837 | Mean (SD): 40 (12) | 184 | NA | Region of the Americas | High income | Low |
| Joseph Kamtchum-Tatuene et al, 2018 (Malawi)[10] | 2011 | Case-control | Adult | 139 | NA | 12 | 45.6 | African Region | Low income | Moderate |
| Yung-Feng Yen et al, 2016 (China)[11] | 2005 | Cohort | Adult | 23507 | NA | 309 | 66.19 | Western Pacific Region | Upper middle income | Low |
| Claire E Kendall et al, 2014 (Canada)[12] | 2005 | Cross-sectional | Adult | 14005 | NA | 173 | NA | Region of the Americas | High income | Low |
| Joshua Okyere et al, 2022 (South Africa)[13] | 2011 | Cross-sectional | Older adults | 516 | NA | 21 | NA | African Region | Upper middle income | Moderate |
| Delphine Sauce et al, 2021 (France)[14] | NA | Cohort | Older adults | 111 | Median (IQR): 81 (78–84) | 4 | NA | European Region | High income | Moderate |
| Bethan I. Jones et al, 2022 (United Kingdom)[15] | 2002 | Cohort | General population | 2945 | Mean (SD): 39 (13) | 33 | NA | European Region | High income | Low |
| Hui-Lin Lin et al, 2019 (China)[16] | 2004 | Cohort | General population | 6078 | Mean (SD): 34 (11) | 609 | NA | Western Pacific Region | Upper middle income | Low |
| Jowi, J. O. et al, 2007 (Kenya)[17] | 2002 | Cross-sectional | General population | 708 | NA | 19 | NA | African Region | Lower middle income | Moderate |

Note: ART=antiretroviral therapy; IQR=interquartile range; NA=not available; SD=standard deviation; UK=United Kingdom; USA=United States of America.

**Supplementary Table 3. Characteristics of the cohort studies included in the systematic review and meta-analysis of incidence.**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| First author, year (Country) | Median year of sampling (y) | Sample size, n | Age, y | Follow up duration (years) or incidence rate and its 95%CI | Case | Proportion of AR, % | Region |  World Bank Income level | Risk of bias |
| All  | Ischemic stroke | Hemorrhagic stroke | All | Ischemic stroke | Hemorrhagic stroke |
| Bastian Neesgaard et al, 2022 (European and Australian)[18] | 2016  | 29340  | Median (IQR): 44.3 (36.2-51.3). | 160252.00  | NA | NA | 228  | NA | NA | 75.60  | NA | NA | Low |
| Akarin Hiransuthikul et al, 2022 (Thailand)[19] | 2008  | 2020  | Median (IQR): 32.2 (27.3–38) | NA | 23579  | NA | NA | 15  | NA | 100.00  | South-East Asia Region | Upper middle income | Low |
| Tiffany E. Gooden et al, 2022 (UK)[1] | 2010  | 9081  | Mean (SD): 41 (11) | 40205.10  | NA | NA | 72  | NA | NA | NA | European Region | High income | Low |
| Olof Elvstam et al, 2022 (Sweden)[20] | 2006  | 6562  | NA | 44937.00  | NA | NA | 98  | NA | NA | 100.00  | European Region | High income | Low |
| Frédérique Chammartin et al, 2022 (Switzerland)[21] | 2004  | 15303  | NA | 174947.00  | NA | NA | 275  | NA | NA | 95.67  | European Region | High income | Low |
| Jason J. Sico et al, 2021 (USA)[22] | 2006  | 33528  | NA | NA | 180975  | NA | NA | 1396  | NA | 44.88  | Region of the Americas | High income | Low |
| Fred Stephen Sarfo et al, 2021 (Ghana)[2] | NA | 255  | NA | 245.00  | NA | NA | 3  | NA | NA | 100.00  | African Region | Lower middle income | Low |
| Barbara N Harding et al, 2021 (USA)[23] | 2010  | 15974  | Median (IQR): 42 (35-49) | 18.9 (16.0-22.3) | 15.4 (12.8-18.5) | 2.5 (1.5-3.9) | 139  | 113  | 18.00  | 100.00  | Region of the Americas | High income | Low |
| Robert S. Rosenson et al, 2020 (USA)[5] | 2013  | 82426  | NA | 169412.00  | NA | NA | 253  | NA | NA | 95.96  | Region of the Americas | High income | Low |
| Jane A. O’Halloran et al, 2020 (USA)[24] | 2011  | 20242  | NA | 39823.00  | NA | NA | 78  | NA | NA | 100.00  | Region of the Americas | High income | Low |
| Raquel de Vasconcellos Carvalhaes de Oliveira et al, 2018 (Brazil)[25] | 1998  | 1135  | NA | 9011.68  | NA | NA | 23  | NA | NA | NA | Region of the Americas | Upper middle income | Low |
| Giuseppe Vittorio De Socio et al, 2017 (Italy)[26] | 2009  | 369  | Mean (SD): 43 (9) | 3097.00  | NA | NA | 5  | NA | NA | NA | European Region | High income | Low |
| Yung-Feng Yen et al, 2016 (China)[11] | 2005  | 22581  | NA | 109514.00  | 109514  | 109514.00  | 228  | 169  | 59.00  | 66.19  | Western Pacific Region | Upper middle income | Low |
| Eugenia Quiros-Roldan et al, 2016 (Italy)[27] | 2006  | 3766  | NA | 28768.00  | NA | NA | 51  | NA | NA | 60.09  | European Region | High income | Low |
| Michael J. Vinikoor et al, 2013 (USA)[28] | 2004  | 2515  | NA | NA | 13708  | 13708.00  | NA | 31  | 9.00  | 89.03  | Region of the Americas | High income | Low |
| Giustino Parruti et al, 2013 (Italy)[29] | 2012  | 201  | Mean (SD): 45 (10) | 430.50  | NA | NA | 5  | NA | NA | 79.60  | European Region | High income | Low |
| Felicia C. Chow et al, 2012 (USA)[30] | 2006  | 4308  | Mean (SD): 42 (11) | NA | 25100  | NA | NA | 132  | NA | NA | Region of the Americas | High income | Low |

Note: ART=antiretroviral therapy; IQR=interquartile range; NA=not available; SD=standard deviation; UK=United Kingdom; USA=United States of America.



**Supplementary Figure 1. Funnel plot of stroke prevalence among adults living with HIV**

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**Supplementary Figure 2. Forest plots and funnel plot of** **ischemic stroke prevalence among adults living with HIV: (A) Forest plots; (B) Funnel plot**

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**Supplementary Figure 3. Forest plots of stroke prevalence among older adults and general population living with HIV: (A) Older adults; (B) General population**

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**Supplementary Figure 4. Funnel plots of stroke prevalence among older adults and general population living with HIV: (A) Older adults; (B) General population**



**Supplementary Figure 5. Funnel plots of stroke incidence (per 10,000 person-years) among adults living with HIV.**

Note: CI=confidence interval; HIV=human immunodeficiency virus.

**Supplementary Table 4. Univariable meta-regression of stroke incidence and study characteristics among adults living with HIV.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Study Characteristic  | Number of studies, n  | Coefficient (95% CI)  | p value  | R2 |
| **Geographic region** |  |  |  | -11.23% |
| Africa | 1 | Ref. |  |  |
| Europe | 6 | -0.010 ( -0.029, 0.008) | 0.231 |  |
| America | 4 | -0.010 ( -0.029, 0.008) | 0.23 |  |
| Western Pacific Region | 1 | -0.010 ( -0.029, 0.009) | 0.243 |  |
| **World Bank Income level** |  |  |  | 33.41% |
| Lower-middle-income | 1 | Ref. |  |  |
| Upper-middle-income | 2 | -0.010 ( -0.027, 0.007) | 0.217 |  |
| High-income | 9 | -0.011 ( -0.028, 0.007) | 0.2 |  |
| **Median year of sampling (y)** | 12 | 0.000 ( 0.000, 0.000) | 0.082 | 31.99% |
| **ART proportion,%** | 10 | 0.000 ( 0.000, 0.000) | 0.959 | 78.16% |

Note: ART=antiretroviral therapy; CI=confidence interval.

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**Supplementary Figure 6. Funnel plots of ischemic stroke and hemorrhagic stroke incidence (per 10,000 person-years) among adults living with HIV.**

Note: CI=confidence interval; HIV=human immunodeficiency virus. A: Ischemic stroke; B: Hemorrhagic stroke.

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