

**This supplementary appendix supports the study “Depression attributable to intimate partner violence among women before, during, and after the COVID-19 pandemic: regional trends, inequalities, and projections to 2050”**

**Contents**

|                                                                                                                                                                               |   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| Table S1. List of countries in Low and Low-middle SDI regions .....                                                                                                           | 2 |
| Table S2. Panel structure and diagnostic summary by SDI level .....                                                                                                           | 4 |
| Table S3. Two-way fixed-effects models of age-standardised COVID-19 incidence rates and age-standardised IPV-attributable depression YLD rates among females, 2020–2023 ..... | 5 |
| Figure S1. Projected age-standardised DALY rates of depression attributable to IPV among females, by SDI, 1990–2050 .....                                                     | 6 |
| Table S4. Scenario-based projections of age-standardised DALY rates of depression attributable to IPV among females, by SDI level, 2030–2050 .....                            | 7 |
| Table S5. Projected age-specific DALY rates of depression attributable to IPV among females in Low and Low-middle SDI regions, 2030–2050 .....                                | 8 |

**Abbreviation**

Global Burden of Disease, GBD

Intimate Partner Violence, IPV

Sociodemographic Index, SDI

Uncertainty Intervals, UIs

Disability-adjusted life-year, DALY

Years Lived with Disability, YLD

**Table S1. List of countries in Low and Low-middle SDI regions**

| <b>SDI category</b>                 | <b>Location (country)</b>             |
|-------------------------------------|---------------------------------------|
| <i><b>Low-middle SDI (n=43)</b></i> | Angola                                |
|                                     | Bangladesh                            |
|                                     | Belize                                |
|                                     | Bhutan                                |
|                                     | Bolivia (Pluritiol State of)          |
|                                     | Cabo Verde                            |
|                                     | Cambodia                              |
|                                     | Cameroon                              |
|                                     | Comoros                               |
|                                     | Congo                                 |
|                                     | Democratic People's Republic of Korea |
|                                     | Djibouti                              |
|                                     | Egypt                                 |
|                                     | El Salvador                           |
|                                     | Eswatini                              |
|                                     | Ghana                                 |
|                                     | Guatemala                             |
|                                     | Honduras                              |
|                                     | India                                 |
|                                     | Kenya                                 |
|                                     | Kiribati                              |
|                                     | Kyrgyzstan                            |
|                                     | Lao People's Democratic Republic      |
|                                     | Lesotho                               |
|                                     | Marshall Islands                      |
|                                     | Mauritania                            |
|                                     | Micronesia (Federated States of)      |
|                                     | Mongolia                              |
|                                     | Morocco                               |
|                                     | Myanmar                               |
|                                     | Namibia                               |
|                                     | Nicaragua                             |
|                                     | Nigeria                               |
|                                     | Pakistan                              |
|                                     | Samoa                                 |
|                                     | Sao Tome and Principe                 |
|                                     | Sudan                                 |
|                                     | Tajikistan                            |
|                                     | Tuvalu                                |

|                              |                                    |
|------------------------------|------------------------------------|
|                              | Vanuatu                            |
|                              | Venezuela (Bolivarian Republic of) |
|                              | Zambia                             |
|                              | Zimbabwe                           |
|                              |                                    |
| <b><i>Low SDI (n=33)</i></b> | Afghanistan                        |
|                              | Benin                              |
|                              | Burkina Faso                       |
|                              | Burundi                            |
|                              | Central African Republic           |
|                              | Chad                               |
|                              | Côte d'Ivoire                      |
|                              | Democratic Republic of the Congo   |
|                              | Eritrea                            |
|                              | Ethiopia                           |
|                              | Guinea                             |
|                              | Guinea-Bissau                      |
|                              | Haiti                              |
|                              | Liberia                            |
|                              | Madagascar                         |
|                              | Malawi                             |
|                              | Mali                               |
|                              | Mozambique                         |
|                              | Nepal                              |
|                              | Niger                              |
|                              | Papua New Guinea                   |
|                              | Rwanda                             |
|                              | Senegal                            |
|                              | Sierra Leone                       |
|                              | Solomon Islands                    |
|                              | Somalia                            |
|                              | South Sudan                        |
|                              | United Republic of Tanzania        |
|                              | Timor-Leste                        |
|                              | The Gambia                         |
|                              | Togo                               |
|                              | Uganda                             |
|                              | Yemen                              |

**Table S2. Panel structure and diagnostic summary by SDI level**

| SDI level             | Number of countries | Country–year observations | Years covered | Missing observations for lagged exposure* |
|-----------------------|---------------------|---------------------------|---------------|-------------------------------------------|
| <b>Low SDI</b>        | 33                  | 132                       | 2020–2023     | 33                                        |
| <b>Low-middle SDI</b> | 43                  | 172                       | 2020–2023     | 43                                        |

\* Missing observations reflect the absence of a one-year lagged exposure in the first year of the panel (2020).

This study used a country–year panel design covering the period from 2020 to 2023. Analyses were conducted separately for low SDI and low-middle SDI countries. The panel structure was balanced within each SDI group, with one observation per country per year.

For models including a one-year lag of COVID-19 incidence, observations from the first year (2020) were unavailable by design, resulting in expected missingness for lagged exposure terms. No additional exclusion due to missing outcome data was observed.

**Table S3. Two-way fixed-effects models of age-standardised COVID-19 incidence rates and age-standardised IPV-attributable depression YLD rates among females, 2020–2023**

| <b>Panel a. Low SDI countries</b> |                             |                               |
|-----------------------------------|-----------------------------|-------------------------------|
| <b>Variables</b>                  | <b>Main model (log–log)</b> | <b>Lagged model (log–log)</b> |
| <b>COVID-19 incidence (t)</b>     | 0.028*** (0.007)            | —                             |
| <b>COVID-19 incidence (t–1)</b>   | —                           | –0.017** (0.005)              |
| <b>Country fixed effects</b>      | Yes                         | Yes                           |
| <b>Year fixed effects</b>         | Yes                         | Yes                           |
| <b>Observations</b>               | 132                         | 99                            |
| <b>Countries</b>                  | 33                          | 33                            |
| <b>R<sup>2</sup></b>              | 0.997                       | 0.998                         |

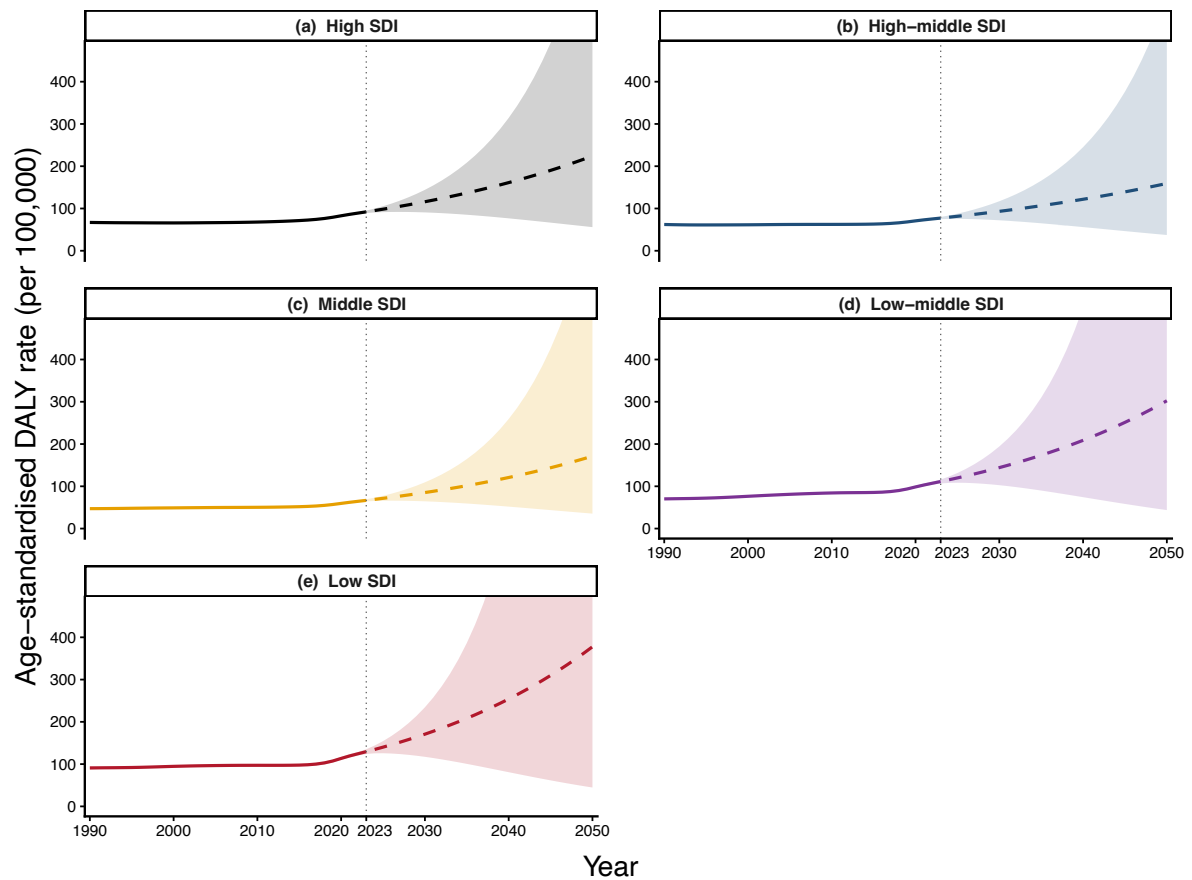
| <b>Panel b. Low-middle SDI countries</b> |                             |                               |
|------------------------------------------|-----------------------------|-------------------------------|
| <b>Variables</b>                         | <b>Main model (log–log)</b> | <b>Lagged model (log–log)</b> |
| <b>COVID-19 incidence (t)</b>            | 0.003 (0.002)               | —                             |
| <b>COVID-19 incidence (t–1)</b>          | —                           | –0.002 (0.003)                |
| <b>Country fixed effects</b>             | Yes                         | Yes                           |
| <b>Year fixed effects</b>                | Yes                         | Yes                           |
| <b>Observations</b>                      | 172                         | 129                           |
| <b>Countries</b>                         | 43                          | 43                            |
| <b>R<sup>2</sup></b>                     | 0.998                       | 0.999                         |

Values are coefficients with country-clustered standard errors in parentheses. All models are estimated using two-way fixed effects, controlling for unobserved country-specific and year-specific factors. Both the exposure (COVID-19 incidence rates) and the outcome (IPV-attributable depression YLD rates among females) are age-standardised and log-transformed.

Lagged models include a one-year lag of COVID-19 incidence; observations from the first year of the panel (2020) are therefore excluded by design.

Statistical significance is indicated as \*p<0.05, \*\*p<0.01, \*\*\*p<0.001.

**Figure S1. Projected age-standardised DALY rates of depression attributable to IPV among females, by SDI, 1990–2050**



In this continuation scenario, observed estimates from 1990 to 2023 are shown as solid lines, and projections from 2024 to 2050 are shown as dashed lines. Shaded areas represent 95% uncertainty intervals. The vertical dotted line indicates the transition from observed estimates to projections (year 2023). Panels a–e correspond to High, High–middle, Middle, Low–middle, and Low SDI regions, respectively.

**Table S4. Scenario-based projections of age-standardised DALY rates of depression attributable to IPV among females, by SDI level, 2030–2050**

| <b>Panel a. Continuation scenario</b> |                  |                        |                       |                        |
|---------------------------------------|------------------|------------------------|-----------------------|------------------------|
| <b>SDI</b>                            | <b>Age group</b> | <b>2030</b>            | <b>2040</b>           | <b>2050</b>            |
| <b>High SDI</b>                       | Age-standardised | 116.0<br>(90.7–144.2)  | 161.2<br>(76.6–314.3) | 224.2<br>(55.9–794.0)  |
| <b>High-middle SDI</b>                | Age-standardised | 93.2<br>(72.1–117.2)   | 121.8<br>(56.0–245.1) | 159.3<br>(37.3–598.0)  |
| <b>Middle SDI</b>                     | Age-standardised | 85.2<br>(64.4–109.4)   | 120.8<br>(51.9–259.3) | 171.3<br>(35.4–726.0)  |
| <b>Low-middle SDI</b>                 | Age-standardised | 144.2<br>(102.6–194.3) | 208.8<br>(74.2–523.7) | 302.4<br>(43.7–1732.2) |
| <b>Low SDI</b>                        | Age-standardised | 170.9<br>(117.2–234.5) | 254.0<br>(80.9–679.2) | 377.6<br>(44.6–2458.6) |

Projected age-standardised DALY rates assuming that age–period–cohort patterns observed up to 2023 continue beyond the observation period.

| <b>Panel b. Plateau scenario</b> |                  |                        |                        |                        |
|----------------------------------|------------------|------------------------|------------------------|------------------------|
| <b>SDI</b>                       | <b>Age group</b> | <b>2030</b>            | <b>2040</b>            | <b>2050</b>            |
| <b>High SDI</b>                  | Age-standardised | 87.5<br>(87.5–87.5)    | 87.5<br>(87.5–87.5)    | 87.5<br>(87.5–87.5)    |
| <b>High-middle SDI</b>           | Age-standardised | 74.1<br>(74.1–74.1)    | 74.1<br>(74.1–74.1)    | 74.1<br>(74.1–74.1)    |
| <b>Middle SDI</b>                | Age-standardised | 63.2<br>(63.2–63.2)    | 63.2<br>(63.2–63.2)    | 63.2<br>(63.2–63.2)    |
| <b>Low-middle SDI</b>            | Age-standardised | 105.0<br>(105.0–105.0) | 105.0<br>(105.0–105.0) | 105.0<br>(105.0–105.0) |
| <b>Low SDI</b>                   | Age-standardised | 121.7<br>(121.7–121.7) | 121.7<br>(121.7–121.7) | 121.7<br>(121.7–121.7) |

Projected age-standardised DALY rates under a conservative plateau assumption, in which no further period-related change is assumed after 2023 and rates are stabilised at the mean level observed during 2020–2023.

In panel (a) and panel (b), values are projected age-standardised DALY rates per 100 000 females, with 95% UIs shown in parentheses. Projections were estimated using a Bayesian age–period–cohort modelling framework based on observed data from 1990 to 2023. Estimates are presented for five SDI categories at three future time points (2030, 2040, and 2050). Age-standardised rates were calculated using the GBD standard population.

**Table S5. Projected age-specific DALY rates of depression attributable to IPV among females in Low and Low-middle SDI regions, 2030–2050**

| <b>SDI</b>            | <b>Age group</b> | <b>2030</b>         | <b>2040</b>         | <b>2050</b>         |
|-----------------------|------------------|---------------------|---------------------|---------------------|
| <b>Low SDI</b>        | 15-19 years      | 82.7 (42.3–152.2)   | 98.7 (10.6–798.2)   | 117.9 (1.6–7011.5)  |
| <b>Low SDI</b>        | 20-24 years      | 180.6 (93.4–328.7)  | 215.7 (23.5–1718.8) | 257.6 (3.5–15058.0) |
| <b>Low SDI</b>        | 25-29 years      | 230.2 (119.3–418.2) | 275.0 (30.1–2174.5) | 328.4 (4.5–18974.9) |
| <b>Low SDI</b>        | 30-34 years      | 246.5 (127.7–448.0) | 293.9 (32.3–2317.3) | 351.0 (4.9–20134.3) |
| <b>Low SDI</b>        | 35-39 years      | 247.8 (128.3–450.4) | 293.1 (32.2–2310.3) | 350.0 (4.9–20002.4) |
| <b>Low SDI</b>        | 40-44 years      | 247.3 (128.1–449.5) | 288.4 (31.7–2274.7) | 343.9 (4.8–19628.1) |
| <b>Low SDI</b>        | 45-49 years      | 248.4 (128.6–451.6) | 287.2 (31.6–2265.4) | 339.6 (4.7–19387.6) |
| <b>Low SDI</b>        | 50-54 years      | 214.0 (110.8–389.1) | 247.5 (27.2–1951.9) | 288.6 (4.0–16482.4) |
| <b>Low SDI</b>        | 55-59 years      | 189.5 (98.1–344.7)  | 221.1 (24.3–1743.8) | 255.6 (3.6–14597.3) |
| <b>Low SDI</b>        | 60-64 years      | 149.0 (77.1–271.0)  | 176.3 (19.4–1390.5) | 203.8 (2.8–11641.5) |
| <b>Low SDI</b>        | 65-69 years      | 112.9 (58.4–205.5)  | 134.8 (14.8–1063.2) | 157.2 (2.2–8977.3)  |
| <b>Low SDI</b>        | 70-74 years      | 97.2 (50.3–177.1)   | 116.3 (12.8–917.6)  | 137.6 (1.9–7859.9)  |
| <b>Low SDI</b>        | 75-79 years      | 73.9 (38.1–134.9)   | 88.6 (9.7–699.3)    | 105.7 (1.5–6041.6)  |
| <b>Low SDI</b>        | 80-84 years      | 51.8 (26.7–94.7)    | 62.2 (6.8–491.6)    | 74.4 (1.0–4253.7)   |
| <b>Low SDI</b>        | 85-89 years      | 46.9 (24.0–86.2)    | 55.7 (6.1–440.7)    | 66.7 (0.9–3816.9)   |
| <b>Low SDI</b>        | 90-94 years      | 45.0 (22.8–84.2)    | 52.6 (5.7–418.6)    | 63.3 (0.9–3628.4)   |
| <b>Low SDI</b>        | 95+ years        | 43.1 (20.7–86.0)    | 50.7 (5.4–410.3)    | 60.1 (0.8–3476.3)   |
| <b>Low-middle SDI</b> | 15-19 years      | 82.7 (42.3–152.2)   | 98.7 (10.6–798.2)   | 117.9 (1.6–7011.5)  |
| <b>Low-middle SDI</b> | 20-24 years      | 180.6 (93.4–328.7)  | 215.7 (23.5–1718.8) | 257.6 (3.5–15058.0) |
| <b>Low-middle SDI</b> | 25-29 years      | 230.2 (119.3–418.2) | 275.0 (30.1–2174.5) | 328.4 (4.5–18974.9) |
| <b>Low-middle SDI</b> | 30-34 years      | 246.5 (127.7–448.0) | 293.9 (32.3–2317.3) | 351.0 (4.9–20134.3) |
| <b>Low-middle SDI</b> | 35-39 years      | 247.8 (128.3–450.4) | 293.1 (32.2–2310.3) | 350.0 (4.9–20002.4) |
| <b>Low-middle SDI</b> | 40-44 years      | 247.3 (128.1–449.5) | 288.4 (31.7–2274.7) | 343.9 (4.8–19628.1) |
| <b>Low-middle SDI</b> | 45-49 years      | 248.4 (128.6–451.6) | 287.2 (31.6–2265.4) | 339.6 (4.7–19387.6) |
| <b>Low-middle SDI</b> | 50-54 years      | 214.0 (110.8–389.1) | 247.5 (27.2–1951.9) | 288.6 (4.0–16482.4) |
| <b>Low-middle SDI</b> | 55-59 years      | 189.5 (98.1–344.7)  | 221.1 (24.3–1743.8) | 255.6 (3.6–14597.3) |
| <b>Low-middle SDI</b> | 60-64 years      | 149.0 (77.1–271.0)  | 176.3 (19.4–1390.5) | 203.8 (2.8–11641.5) |
| <b>Low-middle SDI</b> | 65-69 years      | 112.9 (58.4–205.5)  | 134.8 (14.8–1063.2) | 157.2 (2.2–8977.3)  |
| <b>Low-middle SDI</b> | 70-74 years      | 97.2 (50.3–177.1)   | 116.3 (12.8–917.6)  | 137.6 (1.9–7859.9)  |
| <b>Low-middle SDI</b> | 75-79 years      | 73.9 (38.1–134.9)   | 88.6 (9.7–699.3)    | 105.7 (1.5–6041.6)  |
| <b>Low-middle SDI</b> | 80-84 years      | 51.8 (26.7–94.7)    | 62.2 (6.8–491.6)    | 74.4 (1.0–4253.7)   |
| <b>Low-middle SDI</b> | 85-89 years      | 46.9 (24.0–86.2)    | 55.7 (6.1–440.7)    | 66.7 (0.9–3816.9)   |
| <b>Low-middle SDI</b> | 90-94 years      | 45.0 (22.8–84.2)    | 52.6 (5.7–418.6)    | 63.3 (0.9–3628.4)   |
| <b>Low-middle SDI</b> | 95+ years        | 43.1 (20.7–86.0)    | 50.7 (5.4–410.3)    | 60.1 (0.8–3476.3)   |

Values are projected age-specific DALY rates per 100 000 females, with 95% UIs shown in parentheses. Projections were generated using Bayesian age–period–cohort models fitted to observed data from 1990 to 2023 and extrapolated to 2050. Estimates are presented for Low and Low-middle SDI regions across 17 age groups at three key future time points (2030, 2040, and 2050).