**Supplement**

**Table S.1 Classification of main causes of death**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **External causes** | **ICD-9 codes** | **ICD-10 codes** |  | **Internal causes** | **ICD-9 codes** | **ICD-10 codes** |
| Drug-related | 292, 304, 305.2-305.9, E850-E858 | F11-F16, F18-F19, X40-X44 |  | Ischaemic heart disease (IHD) | 410-414 | I20-I25 |
| Suicide | E950-E959, E980-E989 | X60-X84, Y10-Y34, Y87.0, Y87.2 |  | Malignant neoplasms | 140-208 | C00-C97 |
| Alcohol-related | 291, 303, 305.0, 357.5, 425.5, 535.3, 571 (excluding 571.6), E860 | F10, K70, K73, X45, G31.2, G62.1, I42.6, K29.2, K74.0-K74.2, K74.6, K86.0 |  | Respiratory disease | 460-517 | J00-J99 |
| Assault | E960-E969 | X85-Y09 |  | Diabetes mellitus | 250 | E10-E14 |
| Traffic accidents | E800-E848 | V01-V99 |  | Digestive system disease (excluding alcohol) | 520-579 (excluding alcohol-related) | K00-K93 (excluding alcohol-related) |
| Accidental poisoning | E861-E869 | X46-X49 |  | Epilepsy | 345 | G40 |
| Other accidents | E849-E928 (excluding E850-E879) | W00-X30, X50 |  | Nervous system disease (excluding epilepsy) | 320-359 (excluding 345 and 357.5) | G00-G99 (excluding G40 and G31.2, G62.1) |
|  |  |  |  | Infectious diseases | 001-139 | A00-B99 |
|  |  |  |  | Stroke | 430-438 | I60-I69 |

**Table S.2 Mortality rates by deprivation quintiles and inequalities in mortality from 2001-2003 to 2016-2018 for five main causes of death among men aged 15-44**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2001-2003 | |  | 2004-2006 | |  | 2007-2009 | |  | 2010-2012 | |  | 2013-2015 | |  | 2016-2018 | |
| Deprivation | Value | 95% CI |  | Value | 95% CI |  | Value | 95% CI |  | Value | 95% CI |  | Value | 95% CI |  | Value | 95% CI |
| External |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 42.5 | (37.4-47.7) |  | 39.7 | (34.6-44.7) |  | 37.4 | (32.4-42.5) |  | 33.6 | (28.7-38.4) |  | 29.2 | (24.8-33.5) |  | 29.4 | (25-33.7) |
| 2 | 55.9 | (49.9-61.8) |  | 56.5 | (50.4-62.6) |  | 62.5 | (56.1-68.9) |  | 48.4 | (42.7-54.1) |  | 45.8 | (40.3-51.4) |  | 49.3 | (43.6-55) |
| 3 | 81.9 | (74.6-89.1) |  | 81.6 | (74.4-88.8) |  | 81.6 | (74.4-88.7) |  | 74.0 | (67.3-80.8) |  | 65.6 | (59.1-72.2) |  | 76.3 | (69.2-83.4) |
| 4 | 118.0 | (109.3-126.7) |  | 111.8 | (103.4-120.2) |  | 114.6 | (106.1-123) |  | 103.6 | (95.5-111.7) |  | 92.5 | (84.8-100.3) |  | 114.9 | (106.2-123.6) |
| Most deprived | 220.0 | (207.8-232.1) |  | 198.5 | (187.1-209.8) |  | 207.2 | (195.7-218.6) |  | 181.6 | (170.9-192.3) |  | 154.6 | (144.5-164.6) |  | 188.9 | (177.9-200) |
| Overall | 101.6 | (98-105.2) |  | 97.2 | (93.7-100.7) |  | 101.3 | (97.7-104.9) |  | 89.5 | (86.1-92.9) |  | 78.0 | (74.8-81.2) |  | 92.3 | (88.8-95.8) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 209.4 | (197.4-221.4) |  | 189.4 | (178.8-201.4) |  | 198.8 | (187.9-210.7) |  | 178.6 | (167.1-190.1) |  | 153.9 | (143.4-163.8) |  | 197.6 | (186.3-208.9) |
| RIIL | 1.28 | (1.24-1.31) |  | 1.21 | (1.18-1.25) |  | 1.26 | (1.22-1.29) |  | 1.24 | (1.2-1.29) |  | 1.18 | (1.14-1.22) |  | 1.38 | (1.34-1.42) |
| % from total SII | 69.5 |  |  | 69.2 |  |  | 68.7 |  |  | 68.2 |  |  | 65.2 |  |  | 71.3 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Internal |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 32.1 | (27.7-36.4) |  | 32.7 | (28.3-37.2) |  | 27.3 | (23.1-31.5) |  | 24.8 | (20.6-28.9) |  | 28.1 | (23.8-32.4) |  | 26.2 | (22.1-30.4) |
| 2 | 44.8 | (39.5-50) |  | 41.4 | (36.3-46.4) |  | 36.8 | (32-41.6) |  | 34.2 | (29.4-38.9) |  | 32.4 | (27.7-37) |  | 31.0 | (26.4-35.5) |
| 3 | 56.4 | (50.4-62.4) |  | 52.4 | (46.7-58.2) |  | 53.3 | (47.6-59.1) |  | 53.0 | (47.2-58.7) |  | 44.8 | (39.3-50.3) |  | 46.5 | (40.9-52.2) |
| 4 | 82.2 | (74.9-89.4) |  | 68.6 | (62-75.2) |  | 67.5 | (61-74) |  | 66.0 | (59.5-72.5) |  | 63.7 | (57.1-70.2) |  | 62.9 | (56.3-69.4) |
| Most deprived | 104.5 | (96.1-113) |  | 102.6 | (94.4-110.8) |  | 102.3 | (94.2-110.4) |  | 91.0 | (83.4-98.7) |  | 92.2 | (84.3-100.1) |  | 88.3 | (80.5-96.1) |
| Overall | 62.4 | (59.6-65.2) |  | 58.9 | (56.1-61.6) |  | 57.1 | (54.4-59.8) |  | 54.1 | (51.4-56.7) |  | 51.9 | (49.3-54.6) |  | 50.8 | (48.1-53.4) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 92.1 | (81.8-101.5) |  | 84.4 | (74.5-93.3) |  | 90.5 | (81.7-98.8) |  | 83.4 | (74.1-91.8) |  | 82.1 | (73.5-91.3) |  | 79.4 | (70.4-87.6) |
| RIIL | 0.56 | (0.51-0.6) |  | 0.54 | (0.49-0.58) |  | 0.57 | (0.53-0.61) |  | 0.58 | (0.53-0.62) |  | 0.63 | (0.58-0.68) |  | 0.56 | (0.51-0.59) |
| % from total SII | 30.5 |  |  | 30.8 |  |  | 31.3 |  |  | 31.8 |  |  | 34.8 |  |  | 28.7 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Drugs |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 4.9 | (3.1-6.7) |  | 4.1 | (2.5-5.8) |  | 7.5 | (5.2-9.8) |  | 5.7 | (3.7-7.8) |  | 6.1 | (4.1-8.2) |  | 6.8 | (4.7-8.9) |
| 2 | 7.8 | (5.6-10.1) |  | 7.7 | (5.4-10) |  | 11.5 | (8.7-14.2) |  | 10.4 | (7.7-13) |  | 13.4 | (10.4-16.4) |  | 18.0 | (14.5-21.5) |
| 3 | 10.3 | (7.7-12.9) |  | 14.6 | (11.5-17.6) |  | 23.6 | (19.8-27.5) |  | 18.3 | (14.9-21.7) |  | 22.4 | (18.6-26.3) |  | 34.3 | (29.5-39.1) |
| 4 | 24.6 | (20.6-28.5) |  | 25.9 | (21.9-30) |  | 36.2 | (31.5-41) |  | 30.0 | (25.6-34.3) |  | 31.7 | (27.2-36.3) |  | 56.0 | (49.9-62.1) |
| Most deprived | 61.2 | (54.8-67.5) |  | 51.1 | (45.4-56.8) |  | 70.5 | (63.9-77.2) |  | 61.0 | (54.8-67.2) |  | 70.1 | (63.3-76.8) |  | 106.2 | (97.8-114.6) |
| Overall | 21.5 | (19.8-23.2) |  | 20.9 | (19.2-22.5) |  | 30.4 | (28.4-32.3) |  | 25.6 | (23.8-27.4) |  | 29.0 | (27.1-31) |  | 44.5 | (42.1-47) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 65.4 | (60.6-70.1) |  | 57.8 | (52.9-62.2) |  | 77.9 | (72-83.7) |  | 66.8 | (61.6-72) |  | 76.3 | (70.2-81.8) |  | 120.9 | (113.9-128.3) |
| RIIL | 0.40 | (0.38-0.42) |  | 0.37 | (0.35-0.39) |  | 0.49 | (0.47-0.51) |  | 0.47 | (0.44-0.49) |  | 0.59 | (0.56-0.61) |  | 0.85 | (0.82-0.87) |
| % from total SII | 21.7 |  |  | 21.1 |  |  | 26.9 |  |  | 25.5 |  |  | 32.3 |  |  | 43.6 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Suicides |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 17.0 | (13.7-20.3) |  | 15.3 | (12.2-18.5) |  | 14.7 | (11.6-17.9) |  | 15.9 | (12.6-19.3) |  | 14.3 | (11.2-17.3) |  | 13.7 | (10.7-16.6) |
| 2 | 22.4 | (18.6-26.1) |  | 25.2 | (21.2-29.2) |  | 24.6 | (20.6-28.6) |  | 17.4 | (14-20.8) |  | 17.6 | (14.1-21) |  | 18.9 | (15.4-22.4) |
| 3 | 35.2 | (30.4-39.9) |  | 30.5 | (26.1-34.9) |  | 26.6 | (22.6-30.7) |  | 32.9 | (28.4-37.4) |  | 23.6 | (19.7-27.5) |  | 23.3 | (19.4-27.2) |
| 4 | 42.6 | (37.4-47.9) |  | 41.2 | (36.1-46.3) |  | 38.9 | (34-43.9) |  | 39.5 | (34.5-44.5) |  | 32.7 | (28.1-37.3) |  | 32.8 | (28.2-37.4) |
| Most deprived | 69.8 | (63-76.6) |  | 59.0 | (52.8-65.2) |  | 64.0 | (57.6-70.3) |  | 63.0 | (56.8-69.3) |  | 40.4 | (35.4-45.5) |  | 39.1 | (34.2-44) |
| Overall | 36.9 | (34.8-39.1) |  | 34.3 | (32.2-36.4) |  | 34.1 | (32-36.2) |  | 34.3 | (32.2-36.4) |  | 25.9 | (24-27.7) |  | 25.8 | (23.9-27.6) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 62.9 | (55.7-69.7) |  | 52.3 | (44.8-58.5) |  | 55.8 | (49-62.5) |  | 58.2 | (50.9-64.9) |  | 34.7 | (28.5-40.3) |  | 34.1 | (28.1-39.9) |
| RIIL | 0.38 | (0.35-0.41) |  | 0.33 | (0.3-0.36) |  | 0.35 | (0.32-0.38) |  | 0.40 | (0.37-0.44) |  | 0.27 | (0.23-0.3) |  | 0.24 | (0.2-0.27) |
| % from total SII | 20.9 |  |  | 19.1 |  |  | 19.3 |  |  | 22.2 |  |  | 14.7 |  |  | 12.3 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Alcohol |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 3.4 | (2-4.8) |  | 3.2 | (1.8-4.6) |  | 1.9 | (0.8-3) |  | 1.7 | (0.6-2.8) |  | 1.4 | (0.4-2.3) |  | 2.5 | (1.2-3.8) |
| 2 | 4.6 | (2.9-6.2) |  | 4.9 | (3.2-6.6) |  | 5.8 | (3.9-7.7) |  | 3.8 | (2.3-5.4) |  | 5.7 | (3.7-7.7) |  | 3.9 | (2.3-5.6) |
| 3 | 9.0 | (6.7-11.4) |  | 11.6 | (8.9-14.3) |  | 11.0 | (8.4-13.6) |  | 7.9 | (5.7-10.2) |  | 6.4 | (4.3-8.5) |  | 8.1 | (5.7-10.5) |
| 4 | 22.1 | (18.3-25.9) |  | 20.1 | (16.5-23.6) |  | 18.2 | (14.8-21.5) |  | 16.1 | (12.9-19.4) |  | 15.0 | (11.8-18.3) |  | 11.8 | (8.9-14.7) |
| Most deprived | 45.2 | (39.6-50.8) |  | 49.9 | (44.1-55.6) |  | 41.7 | (36.5-47) |  | 31.8 | (27.3-36.4) |  | 23.5 | (19.5-27.6) |  | 23.1 | (19.1-27.1) |
| Overall | 15.9 | (14.5-17.3) |  | 17.3 | (15.9-18.8) |  | 15.5 | (14.1-16.9) |  | 12.4 | (11.1-13.7) |  | 10.4 | (9.2-11.6) |  | 9.9 | (8.7-11.1) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 50.1 | (45.9-54.2) |  | 55.3 | (51-59.6) |  | 46.9 | (43.1-50.9) |  | 37.1 | (33.3-40.6) |  | 27.7 | (24-31.2) |  | 25.0 | (21.3-28.4) |
| RIIL | 0.31 | (0.29-0.32) |  | 0.35 | (0.34-0.37) |  | 0.30 | (0.28-0.31) |  | 0.26 | (0.24-0.27) |  | 0.21 | (0.19-0.23) |  | 0.17 | (0.15-0.19) |
| % from total SII | 16.6 |  |  | 20.2 |  |  | 16.2 |  |  | 14.1 |  |  | 11.7 |  |  | 9.0 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| IHD |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 4.0 | (2.5-5.5) |  | 3.7 | (2.2-5.1) |  | 3.7 | (2.2-5.2) |  | 3.0 | (1.6-4.5) |  | 3.1 | (1.7-4.6) |  | 1.3 | (0.3-2.2) |
| 2 | 7.6 | (5.5-9.7) |  | 7.3 | (5.3-9.4) |  | 5.3 | (3.6-7.1) |  | 3.5 | (2-5) |  | 4.5 | (2.7-6.2) |  | 4.7 | (2.9-6.5) |
| 3 | 9.6 | (7.1-12) |  | 9.1 | (6.7-11.4) |  | 10.9 | (8.3-13.5) |  | 9.5 | (7.1-12) |  | 7.3 | (5.1-9.5) |  | 6.1 | (4-8.2) |
| 4 | 17.4 | (14-20.7) |  | 15.1 | (12.1-18.2) |  | 11.7 | (8.9-14.4) |  | 12.0 | (9.2-14.8) |  | 9.7 | (7.1-12.3) |  | 10.8 | (8-13.6) |
| Most deprived | 19.5 | (15.8-23.2) |  | 22.2 | (18.4-26.1) |  | 20.5 | (16.8-24.1) |  | 16.6 | (13.3-19.9) |  | 18.1 | (14.6-21.6) |  | 14.2 | (11.1-17.4) |
| Overall | 11.2 | (10-12.4) |  | 11.2 | (10-12.4) |  | 10.3 | (9.2-11.4) |  | 9.0 | (7.9-10) |  | 8.5 | (7.4-9.5) |  | 7.4 | (6.4-8.4) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 20.6 | (16.8-24.3) |  | 22.9 | (19.2-26.6) |  | 20.4 | (16.7-24) |  | 17.8 | (14.4-21.4) |  | 18.6 | (14.9-21.9) |  | 16.1 | (13.2-19) |
| RIIL | 0.13 | (0.11-0.14) |  | 0.15 | (0.13-0.17) |  | 0.13 | (0.11-0.15) |  | 0.12 | (0.10-0.14) |  | 0.14 | (0.12-0.16) |  | 0.11 | (0.10-0.13) |
| % from total SII | 6.8 |  |  | 8.3 |  |  | 7.1 |  |  | 6.8 |  |  | 7.9 |  |  | 5.8 |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Cancers |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Least deprived | 12.9 | (10.1-15.6) |  | 14.2 | (11.3-17.2) |  | 8.4 | (6.1-10.7) |  | 9.1 | (6.6-11.7) |  | 10.8 | (8.1-13.5) |  | 12.1 | (9.2-15) |
| 2 | 13.6 | (10.7-16.5) |  | 13.8 | (10.9-16.7) |  | 10.7 | (8.1-13.3) |  | 11.3 | (8.6-14.1) |  | 10.2 | (7.6-12.8) |  | 10.4 | (7.7-13) |
| 3 | 15.1 | (12-18.2) |  | 15.6 | (12.5-18.8) |  | 14.3 | (11.3-17.2) |  | 14.5 | (11.5-17.5) |  | 13.1 | (10.2-16.1) |  | 11.1 | (8.3-13.8) |
| 4 | 18.9 | (15.4-22.4) |  | 17.6 | (14.2-20.9) |  | 16.0 | (12.8-19.2) |  | 16.3 | (13-19.5) |  | 16.4 | (13-19.7) |  | 14.7 | (11.5-17.9) |
| Most deprived | 18.8 | (15.2-22.4) |  | 18.7 | (15.2-22.2) |  | 20.8 | (17.2-24.5) |  | 18.2 | (14.8-21.6) |  | 16.4 | (13-19.7) |  | 20.1 | (16.4-23.8) |
| Overall | 15.6 | (14.2-17) |  | 16.0 | (14.6-17.4) |  | 14.0 | (12.7-15.3) |  | 13.9 | (12.6-15.3) |  | 13.3 | (12-14.6) |  | 13.6 | (12.2-15) |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| SII | 8.8 | (4-13.7) |  | 6.4 | (1.3-11.6) |  | 14.4 | (10.1-18.5) |  | 11.5 | (7.2-15.9) |  | 8.8 | (4.3-13.4) |  | 10.6 | (5.5-15.4) |
| RIIL | 0.05 | (0.03-0.08) |  | 0.04 | (0.01-0.07) |  | 0.09 | (0.07-0.11) |  | 0.08 | (0.05-0.11) |  | 0.07 | (0.03-0.1) |  | 0.07 | (0.04-0.1) |
| % from total SII | 2.9 |  |  | 2.3 |  |  | 5.0 |  |  | 4.4 |  |  | 3.7 |  |  | 3.8 |  |