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| **Supplemental Table 1.** Trends for Alzheimer's disease and other dementias ASIR, ASMR ,DALY rate in Different SDI Quintiles, 1990–2019 |
|  Join-point model |  ASIR ASMR DALY  |
| Year  |  APC\*(95%CI) Year APC \* (95% CI) Year APC \* (95% CI)  |
| Global |  | 　 | 　 |   | 　 |
|  Trend1 | 1990-2006 | -0.0\*(-0.0,-0.0) | 1990-2005  | 0.3\*(0.2,0.4) | 1990-1995 0.2\*(0.2,0.3) |
|  Trend2 | 2006-2011 | 0.1\* (0.0,0.2) | 1995-1999  | -0.1\*(-0.3,0.1) | 1995-1999 0.0(-0.2,0.2) |
|  Trend3 | 2011-2017 | 0.3\* (0.2,0.4) | 1999-2009  | 0.3\*(0.3,0.3) | 1999-2008 0.3\*(0.2,0.3) |
|  Trend4 | 2017-2019 | -0.1\*(-0.4,0.2) | 2009-2019 | -0.1\*(-0.2,-0.1) | 2008-2019 -0.0(-0.0,0.0) |
|  AAPC \* | 1990-2019 | 0.1\*(0.0,0.1) | 1990-2019  | 0.1\*(0.1,0.1) | 1990-2019 0.1\*(0.1,0.2) |
|  High SDI |  |  | 　 | 　 | 　 |
|  Trend1 | 1990-1995 | -0.6\*(-0.7,-0.5) | 1990-1995 | 0.8\*(0.6,0.9) | 1990-1995 0.4\*(0.3,0.5)  |
|  Trend2 | 1995-1999 | 0.3\*(0.2,0.5) | 1995-2001 | -0.5\*(-0.6,-0.4) | 1995-2000 -0.3\*(-0.4,-0.2) |
|  Trend3 | 1999-2006 | 0.1\*(0.0,0.1) | 2001-2013 | 0.3\*(0.3,0.4) | 2000-2014 0.2\*(0.2,0.3) |
|  Trend4 | 2006-2019 | 0.2\*(0.2,0.2) | 2013-2019 | -0.4\*(-0.5,-0.3) | 2014-2019 -0.3\*(-0.4,-0.2 |
|  AAPC \* | 1990-2019 | 0.1\*(0.0,0.1) | 1990-2019 | 0.0(-0.1,0.1) | 1990-2019 0.1\*(0.1,0.1) |
| High-Middle SDI |  |  |  |  |  |
|  Trend1 | 1990-2005 | 0.2\*(0.1,0.3) | 1990-2000 | 0.2\*(0.1,0.3) | 1990-2000 0.2\*(0.2,0.3) |
|  Trend2 | 1995-2007 | -0.0(0.0,0.0) | 2000-2003 | 0.9\*(0.0,1.7) | 2000-2004 0.7\*(0.4,1.0) |
|  Trend3 | 2007-2017 | 0.4\*(0.3,0.4) | 2003-2009 | 0.1(-0.1,0.3) | 2004-2009 0.1(-0.1,0.3) |
|  Trend4 | 2017-2019 | -0.1(-0.4,0.2) | 2009-2019 | -0.4\*(-0.5,-0.4) | 2009-2019 -0.2\*(-0.2,-0.1) |
| AAPC \* | 1990-2019 | 0.1\*(0.1,0.2) | 1990-2019 | 0.0(-0.1,0.1) | 1990-2019 0.1\*(0.1,0.2) |
|  Middle SDI |  |  |  |  |  |
|  Trend1 | 1990-1994 | 0.7\*(0.6,0.8) | 1990-1996 | -0.2\*(-0.3,-0.1) | 1990-1998 0.1\*(0.0,0.1) |
|  Trend2 | 1994-2009 | -0.1\*(-0.1,-0.1) | 1996-2010 | 0.3\*(0.2,0.3) | 1998-2009 0.3\*(0.2,0.3) |
|  Trend3 | 2009-2017 | 0.5\*(0.4,0.5) | 2010-2014 | -0.5\*(-0.8,-0.2) | 2009-2014 -0.2\*(-0.3,-0.0) |
|  Trend4 | 2017-2019 | -0.0(-0.4,0.3) | 2014-2019 | 0.2\*(0.0,0.3) | 2014-2019 0.2\*(0.1,0.3) |
|  AAPC \* | 1990-2019 | 0.2\*(0.2,0.2) | 1990-2019 | 0.0(-0.0,0.1) | 1990-2019 0.1\*(0.1,0.2) |
|  Low-Middle SDI |  |  |  |  |  |
|  Trend1 | 1990-1994 | -0.0(-0.1,0.0) | 1990-1993 | -0.3(-0.9,0.2) | 1990-1992 -0.4(-1.0,0.3) |
|  Trend2 | 1994-2005 | -0.2\*(-0.2,-0.1) | 1993-2007 | 0.4\*(0.4,0.5) | 1992-2007 0.3\*(0.3,0.3) |
|  Trend3 | 2005-2013 | 0.0\*(0.0,0.1) | 2007-2011 | -0.5(-1.0,0.0) | 2007-2011 -0.3(-0.6,0.0) |
|  Trend4 | 2013-2019 | 0.2\*(0.2,0.3) | 2011-2019 | 0.6\*(0.5,0.7) | 2011-2019 0.5\*(0.4,0.6) |
|  AAPC \* | 1990-2019 | -0.0(-0.0,0.0) | 1990-2019 | 0.3\*(0.3,0.4) | 1990-2019 0.2\*(0.1,0.3) |
|  Low SDI |  |  |  |  |  |
|  Trend1 | 1990-1998 | -0.3\*(-0.3,-0.2) | 1990-1995 | 0.0(-0.2,0.2) | 1990-1994 -0.1(-0.3,0.1) |
|  Trend2 | 1998-2004 | -0.2\*(-0.2,-0.1) | 1995-2001 | 0.6\*(0.4,0.8) | 1994-2000 0.3\*(0.1,0.4) |
|  Trend3 | 2004-2015 | 0.0\*(0.0,0.0) | 2001-2005 | 0.8\*(0.4,1.3) | 2000-2005 0.6\*(0.3,0.8) |
|  Trend4 | 2015-2019 | 0.2\*(0.1,0.2) | 2005-2019 | 0.2\*(0.2,0.2) | 2005-2019 0.2\*(0.1,0.2) |
|  AAPC \* | 1990-2019 | -0.1\*(-0.1,-0.1) | 1990-2019 | 0.3\*(0.3,0.4) | 1990-2019 0.2\*(0.2,0.3) |

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| Supplemental Table 2 The Alzheimer's disease and other dementias death and its attributable burden to risk factors by sex in 2019(%). |
| **Region** | **Attributable to Smoking** | **Attributable to High fasting plasma glucose** | **Attributable death to High BMI****BMI** |
| **Both sexes sexes** | **Female** |  **Male Male** | **Both sexes** |  **Female** |  **Male** |  **Both sexes** | **Female**  | **Male** |
|  Central Asia | 2.19 | 0.35 | 6.18 | 2.22 | 2.29 | 2.08 | 4.02 | 4.51 | 2.90 |
| Central Europe | 3.09 | 2.10 | 5.13 | 2.48 | 2.43 | 2.61 | 4.59 | 4.90 | 3.96 |
|  Eastern Europe | 2.13 | 0.66 | 6.20 | 1.33 | 1.33 | 1.34 | 4.40 | 4.69 | 3.63 |
| Australasia | 2.29 | 2.41 | 2.03 | 2.05 | 2.10 | 1.95 | 4.05 | 4.67 | 3.09 |
| High-income Asia Pacific | 3.33 | 1.57 | 6.42 | 2.00 | 1.88 | 2.19 | 1.78 | 1.92 | 1.52 |
| Southern Latin America  | 3.42 | 3.79 | 2.73 | 2.19 | 2.25 | 2.06 | 3.42 | 3.79 | 2.73 |
| Western Europe | 3.35 | 3.71 | 2.69 | 2.37 | 2.47 | 2.18 | 3.35 | 3.71 | 2.69 |
| Andean Latin America | 1.06 | 0.35 | 1.90 | 2.13 | 2.15 | 2.10 | 3.27 | 3.62 | 2.85 |
| Caribbean | 2.70 | 1.64 | 4.10 | 2.82 | 2.68 | 3.03 | 2.96 | 3.24 | 2.58 |
| Central Latin America | 1.82 | 0.92 | 3.00 | 3.32 | 3.26 | 3.40 | 3.67 | 4.03 | 3.20 |
| North Africa and Middle East | 3.44 | 0.89 | 6.03 | 3.17 | 3.36 | 2.97 |  4.61 5.42  | 3.78 |
| South Asia | 2.09 | 0.85 | 3.57 | 2.02 | 2.07 | 1.96 |  1.26 1.44  | 1.04 |
| East Asia | 3.44 | 1.51 | 6.75 | 1.72 | 1.80 | 1.58 |  1.67 1.84 |  1.37 |
| Oceania | 1.93 | 1.36 | 2.68 | 2.86 | 2.98 | 2.70 |  2.87 2.18 |  1.47 |
| Southeast Asia  | 2.70 | 0.99 | 5.33 | 2.63 | 2.86 | 2.26 |  1.64 1.91 |  1.22 |
| Central Sub-Saharan Africa | 0.77 | 0.22 | 1.80 | 2.37 | 2.21 | 2.68 |  1.55 1.51 |  1.65 |
| Eastern Sub-Saharan Africa | 1.31 | 0.79 | 2.06 | 1.70 | 1.66 | 1.76 |  1.72 1.96 |  1.36 |
| Southern Sub-Saharan Africa | 1.76 | 1.20 | 2.95 | 2.57 | 2.72 | 2.25 |  4.35 5.04 |  2.84 |
| Western Sub-Saharan Africa | 0.88 | 0.31 | 1.55 | 2.07 | 2.14 | 1.99 |  2.35 2.68 |  1.97 |

Supplemental Table 3 Alzheimer's disease and other dementias DALY attributable to Risk factors estimated coefficients for the age, period, and cohort effects

|  |  |
| --- | --- |
|  Risk factors | Coef,95%CI |
|  Global High SDI High-middle SDI Middle SDI Low-middle SDI Low SDI  |
|  Smoking | 　 |  | 　 |  |  | 　 |
|  40-44 | -4.06(-8.36,0.25) | -3.70(-6.98,-0.42) |  -4.01(-8.00,-0.03) | -4.20(-8.91,0.51) |  -4.16(19.48,1.16) | -4.06(-10.32,2.20) |
|  45-49 | -2.40(-4.19,-0.61) | -2.21(-3.68,-0.74) | --2.34(-3.99,-0.69) | -2.47(-4.37,-0.57) | -2.45(-4.62,-0.29) | -2.41(-5.01,0.19) |
|  50-54 | -1.73(-3.10,-0.37) | -1.78(-2.99,-0.57) | -1.64(-2.89,-0.40) | -1.69(-3.10,-0.29) |  -1.75(-3.39,-0.12) | -1.76(-3.76,0.23) |
|  55-59 | -1.09(-2.15,-0.02) | -1.25(-2.20,-0.30) | -1.00(-1.97,-0.02) | -0.97(-2.05,0.12) | -1.11(-2.39,0.17) | -1.19(2.77,0.39) |
|  60-64 | -0.43(-1.26,0.40) | -0.62(-1.36,0.11) |  -0.36(-1.13,0.41) | -0.29(-1.15,0.57) | -0.43(-1.44,0.57) | -0.53(-1.77,0.71) |
|  65-69 | 0.16(-0.50,0.82) | 0.04(-0.52,0.60) |  0.21(-0.41,0.82) | 0.27(-0.42,0.96) |  0.14(-0.66,0.94) | 0.13(-0.84,1.10) |
|  70-74 | 0.74(0.21,1.26) | 0.70(0.27,1.14) |  0.74(0.26,1.23) | 0.77(0.21,1.32) |  0.73(0.10,1.36) | 0.76(0.00,1.53) |
|  75-79 | 1.32(0.89,1.74) | 1.33(0.98,1.68) |  1.28(0.89,1.68) | 1.31(0.85,1.76) | 1.30(0.79,1.82) | 1.31(0.69,1.92) |
|  80-84 | 2.11(1.73,2.50) | 2.12(1.80,2.44) | 2.04(1.68,2.39) | 2.08(1.67,2.49) | 2.15(1.69,2.61) | 2.13(1.59,2.68) |
|  85-89 | 2.55(2.13,2.97) | 2.57(2.21,2.93) | 2.42(2.03,2.80) | 2.48(2.04,2.92) | 2.59(2.10,3.09) | 2.57(1.99,3.15) |
|  90-94 | 2.82(2.31,3.34) | 2.81(2.36,3.25) | 2.68(2.21,3.14) | 2.72(2.19,3.25) | 2.99(2.39,3.59) | 3.04(2.33,3.74) |
| High fasting plasma glucose | 　 |  | 　 |  | 　 | 　 |
|  40-44 | -5.04(19.33,9.26) | -4.99(-20.24,10.25) | -4.79(-17.96,8.39) | -5.14(19.91,9.64) | -5.15(19.56,9.27) | -4.99(19.19,9.21) |
|  45-49 | -3.08(-8.23,2.07) | -3.07(-8.61,2.48) | -2.97(-7.97,2.04) | -3.14(-8.40,2.12) | -3.14(-8.23,1.95) | -3.04(-8.16,2.08) |
|  50-54 | -2.17(-5.86,1.53) | -2.22(-6.27,1.83) | -2.26(-6.03,1.50) | -2.16(-5.89,1.57) | -2.13(-5.73,1.46) | -2.15(-5.85,1.55) |
|  55-59 | -1.30(-4.18,1.57) | -1.44(-4.61,1.72) | -1.49(-4.39,1.41) | -1.27(-4.18,1.64) | -1.22(-4.02,1.58) | -1.32(-4.20,1.56) |
|  60-64 | -0.51(-2.83,1.81) | -0.65(-3.19,1.89) | -0.68(-2.97,1.61) | -0.47(-2.83,1.89) | -0.41(-2.69,1.86) | -0.54(-2.86,1.79) |
|  65-69 |  0.22(-1.67,2.10) | 0.17(-1.87,2.22) | 0.12(-1.70,1.95) | 0.25(-1.68,2.17) | 0.29(-1.57,2.14) | 0.19(-1.69,2.08) |
|  70-74 | 0.93(-0.59,2.45) | 0.96(-0.68,2.60) | 0.91(-0.54,2.36) | 0.95(-0.61,2.50) | 0.95(-0.56,2.46) | 0.90(-0.62,2.42) |
|  75-79 | 1.62(0.39,2.85) | 1.73(0.41,3.05) | 1.63(0.47,2.80) | 1.62(0.36,2.89) | 1.62(0.39,2.85) | 1.62(0.39,2.84) |
|  80-85 | 2.56(1.51,3.62) | 2.68(1.56,3.81) | 2.60(1.60,3.59) | 2.55(1.46,3.65) | 2.55(1.49,3.61) | 2.59(1.55,3.63) |
|  85-89 | 3.18(2.12,4.23) | 3.26(2.14,4.37) | 3.24(2.23,4.24) | 3.18(2.08,4.28) | 3.13(2.08,4.19) | 3.18(2.16,4.21) |
|  90-94 | 3.60(2.39,4.81) | 3.57(2.29,4.86) | 3.68(2.50,4.86) | 3.63(2.36,4.90) | 3.52(2.31,4.73) | 3.55(2.38,4.73) |
|  High BMI | 　 |  | 　 |  | 　 | 　 |
|  40-44 | -4.24(-10.69,2.22) | -4.22(-12.64,4.20) | -3.85(-8.60,0.90) | -4.32(-10.52,1.87) | -4.23(-11.20,2.75) | -4.15(-12.98,4.68) |
|  45-49 | -2.56(-5.21,0.08) | -2.51(-5.89,0.88) | -2.36(-4.47,-0.25) | -2.61(-5.10,-0.11) | -2.51(-5.29,0.28) | -2.42(-5.95,1.11) |
|  50-54 | -1.91(-3.93,0.12) | -1.83(-4.41,0.75) | -1.93(-3.66,-0.21) | -1.90(-3.78,-0.02) | -1.78(-3.86,0.30) | -1.79(-4.53,0.94) |
|  55-59 | -1.27(-2.86,0.32) | -1.20(-3.24,0.85) | -1.41(-2.78,-0.04) | -1.24(-2.72,0.23) | -1.10(-2.74,0.53) | -1.24(-3.45,0.97) |
|  60-64 | -0.63(-1.89,0.64) | -0.58(-2.22,1.07) | -0.78(-1.84,0.28) | -0.59(-1.76,0.58) | -0.48(-1.79,0.83) | -0.62(-2.39,1.14) |
|  65-69 | 0.02(-0.98,1.02) | 0.05(-1.26,1.37) | -0.10(-0.92,0.72) | 0.05(-0.88,0.99) | 0.11(-0.94,1.16) | 0.04(-1.36,1.44) |
|  70-74 | 0.66(-0.13,1.45) | 0.65(-0.38,1.69) | 0.60(-0.03,1.24) | 0.69(-0.04,1.43) | 0.66(-0.19,1.49) | 0.67(-0.42,1.77) |
|  75-79 | 1.32(0.70,1.94) | 1.29(0.48,2.10) | 1.29(0.80,1.79) | 1.33(0.75,1.92) | 1.25(0.59,1.92) | 1.32(0.46,2.18) |
|  80-85 | 2.18(1.65,2,71) | 2.10(1.43,2.77) | 2.17(1.74,2.59) | 2.19(1.68,2.69) | 2.04(1.48,2.60) | 2.09(1.39,2.80) |
|  85-89 | 2.92(2.37,3.47) | 2.81(2.15,3.46) | 2.90(2.44,3.36) | 2.90(2.38,3.43) |  2.73(2.17,3.30) | 2.78(2.09,3.47) |
|  90-94 | 3.50(2.84,4.16) | 3.43(2.66,4.20) | 3.47(2.91,4.03) | 3.49(2.86,4.12) |  3.30(2.63,3.97) | 3.32(2.52,4.13) |