

Additional file 1

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Figure 2 The local drifts of migraine incidence rate in High SDI countries, 1990-2019

Figure 3 The local drifts of migraine incidence rate in High-middle SDI countries, 1990-2019

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Figure 24 Cohort effects on migraine incidence rate in Middle SDI countries

Figure 25 Cohort effects on migraine incidence rate in Low-middle SDI countries

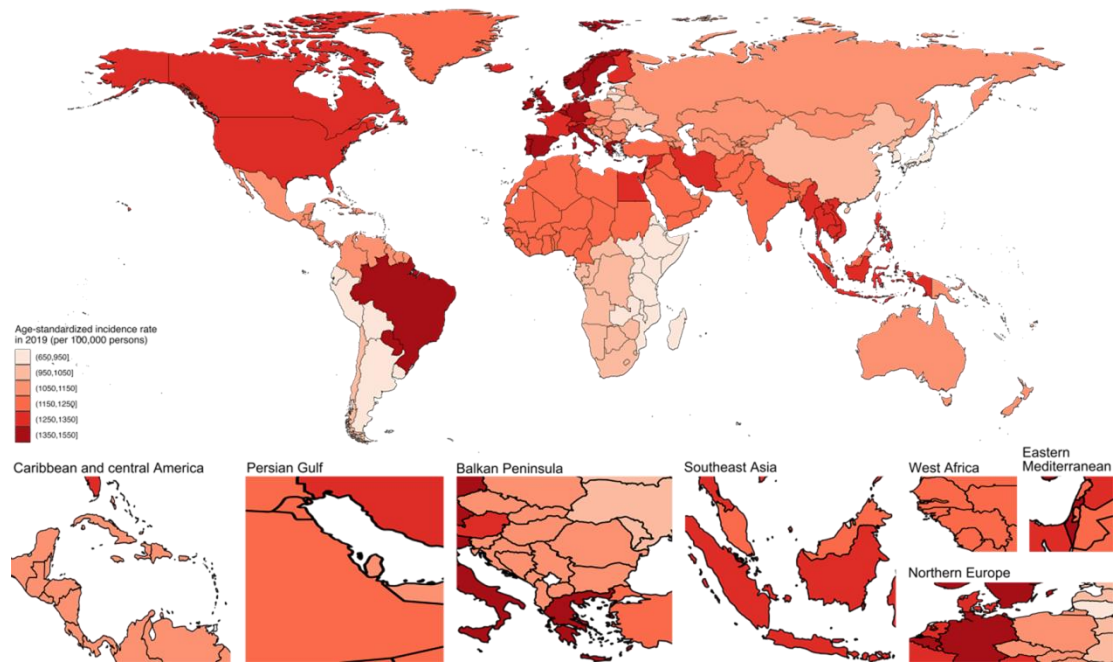
Figure 26 Cohort effects on migraine incidence rate in Low SDI countries

Figure 27 Favorable (A) and unfavorable (B) age-period-cohort effects on exemplar countries across SDI quintiles

Table 1 The lexis diagram of GBD data for the APC model

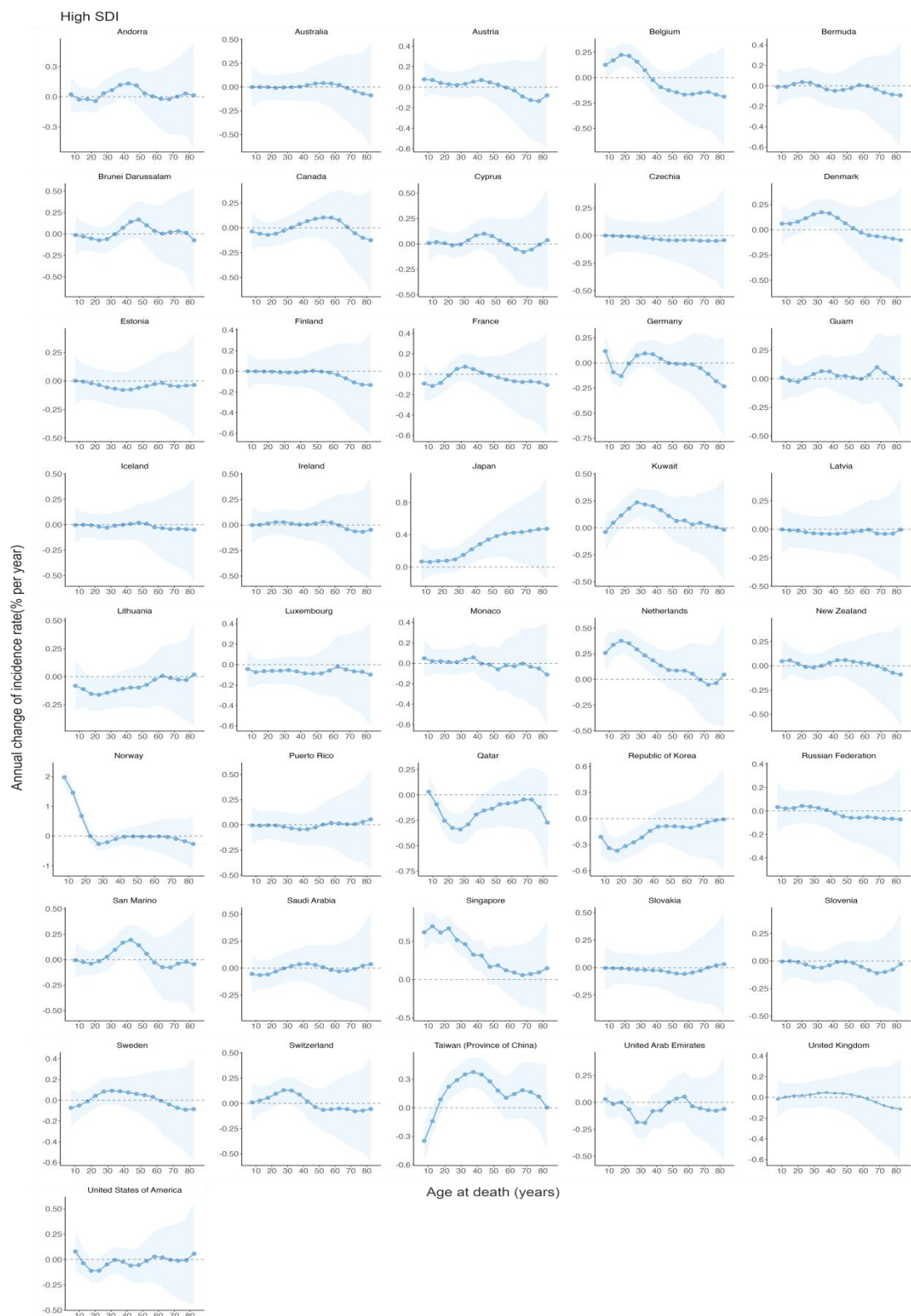
Table 2 Time trends in migraine incidence rate for both sexes in 204 countries, 1990-2019

Figure 1 The world map of age-standardized incidence rate for migraine, 1990-2019



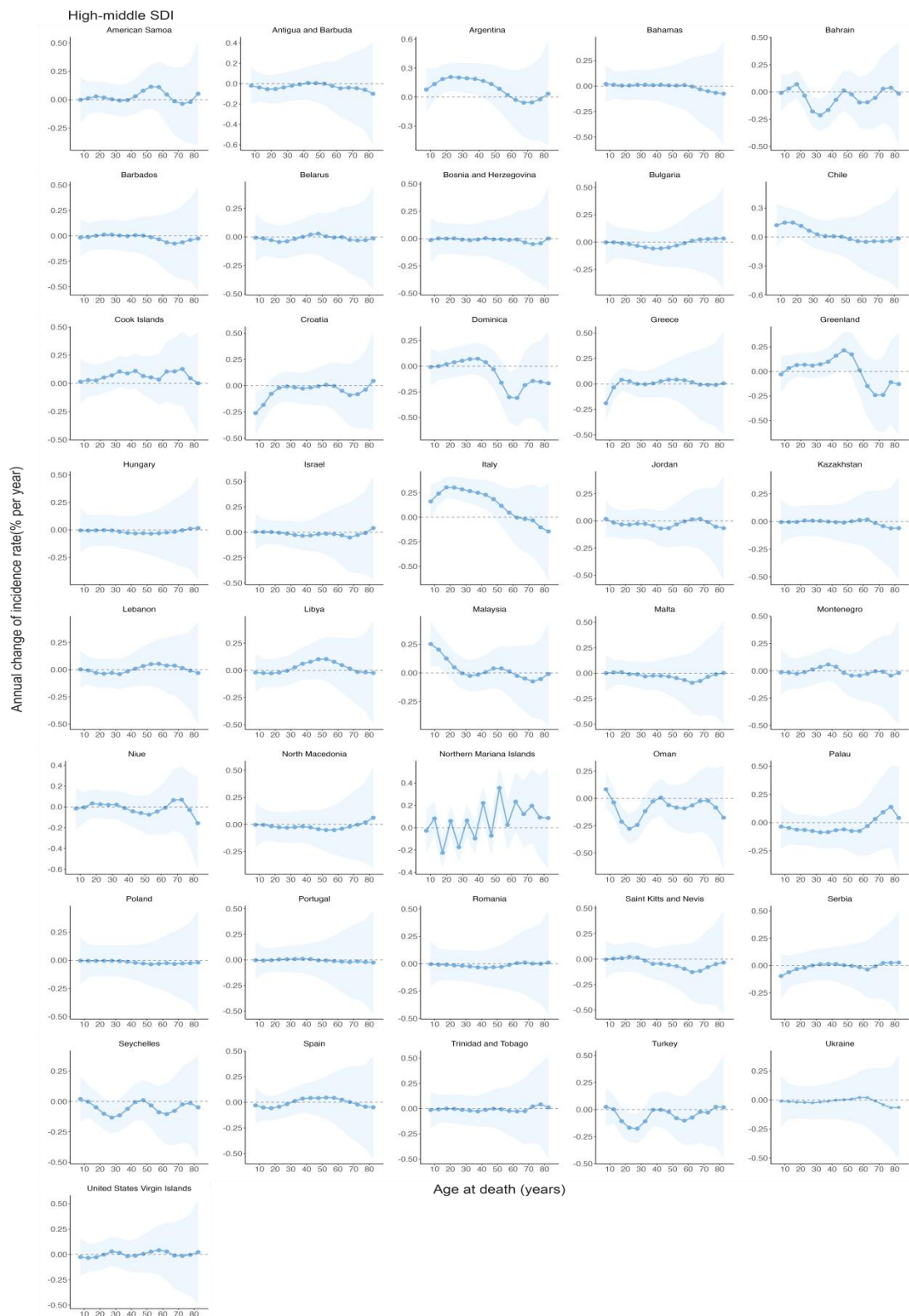
Note: In 2019, global age-standardized incidence rate was 1142.54 (95%UI: 995.9, 1289.44) per 100,000 population.

Figure 2 The local drifts of migraine incidence rate in High SDI countries, 1990-2019



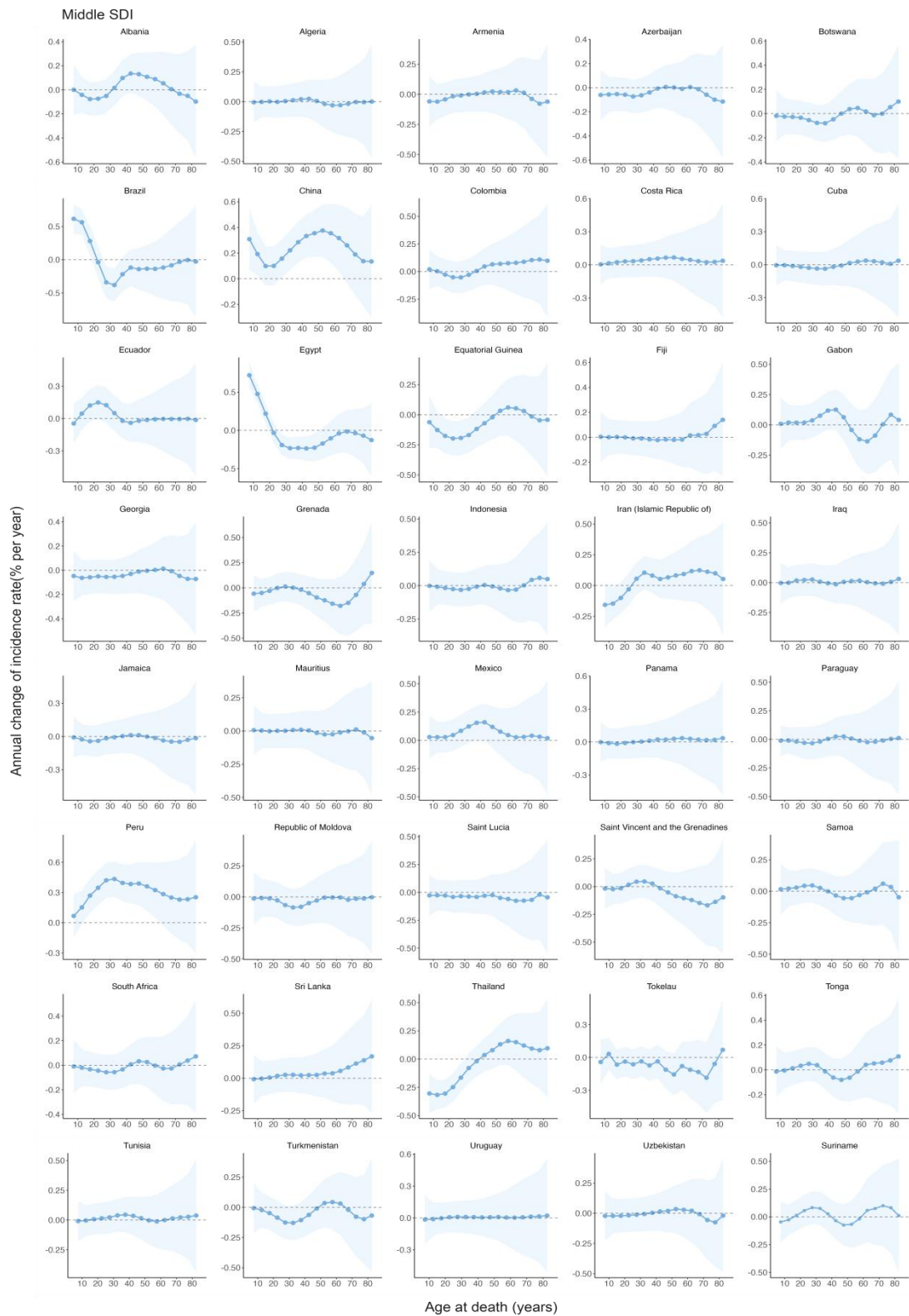
The dots and shaded areas indicate the values of local drift (annual percentage change in incidence rate) and its 95% CIs for migraine in 16 age groups (5-9 to 80-84 years). SDI=Socio-demographic Index.

Figure 3 The local drifts of migraine incidence rate in High-middle SDI countries, 1990-2019



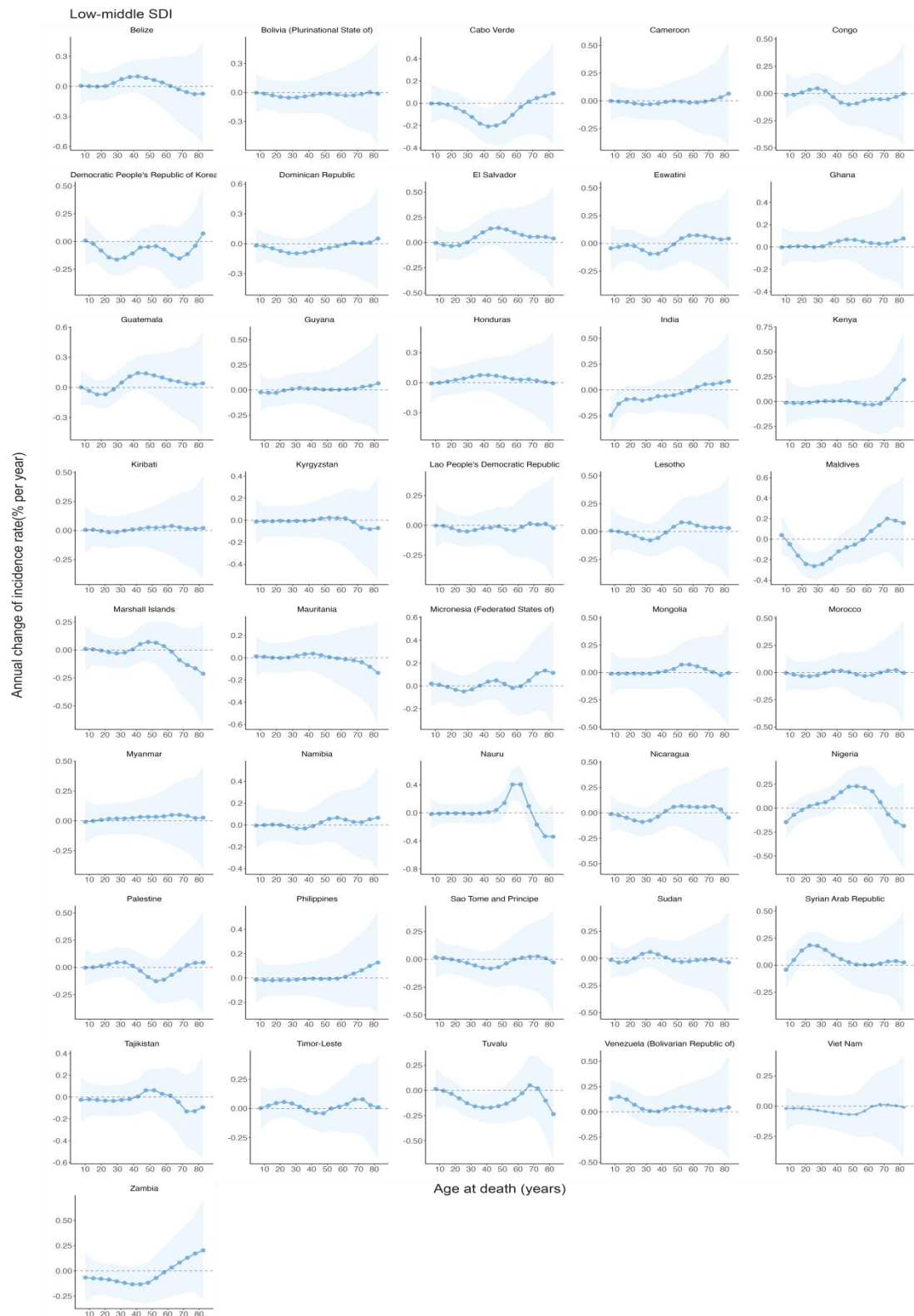
The dots and shaded areas indicate the values of local drift (annual percentage change in incidence rate) and its 95% CIs for migraine in 16 age groups (5-9 to 80-84 years). SDI=Socio-demographic Index.

Figure 4 The local drifts of migraine incidence rate in Middle SDI countries, 1990-2019



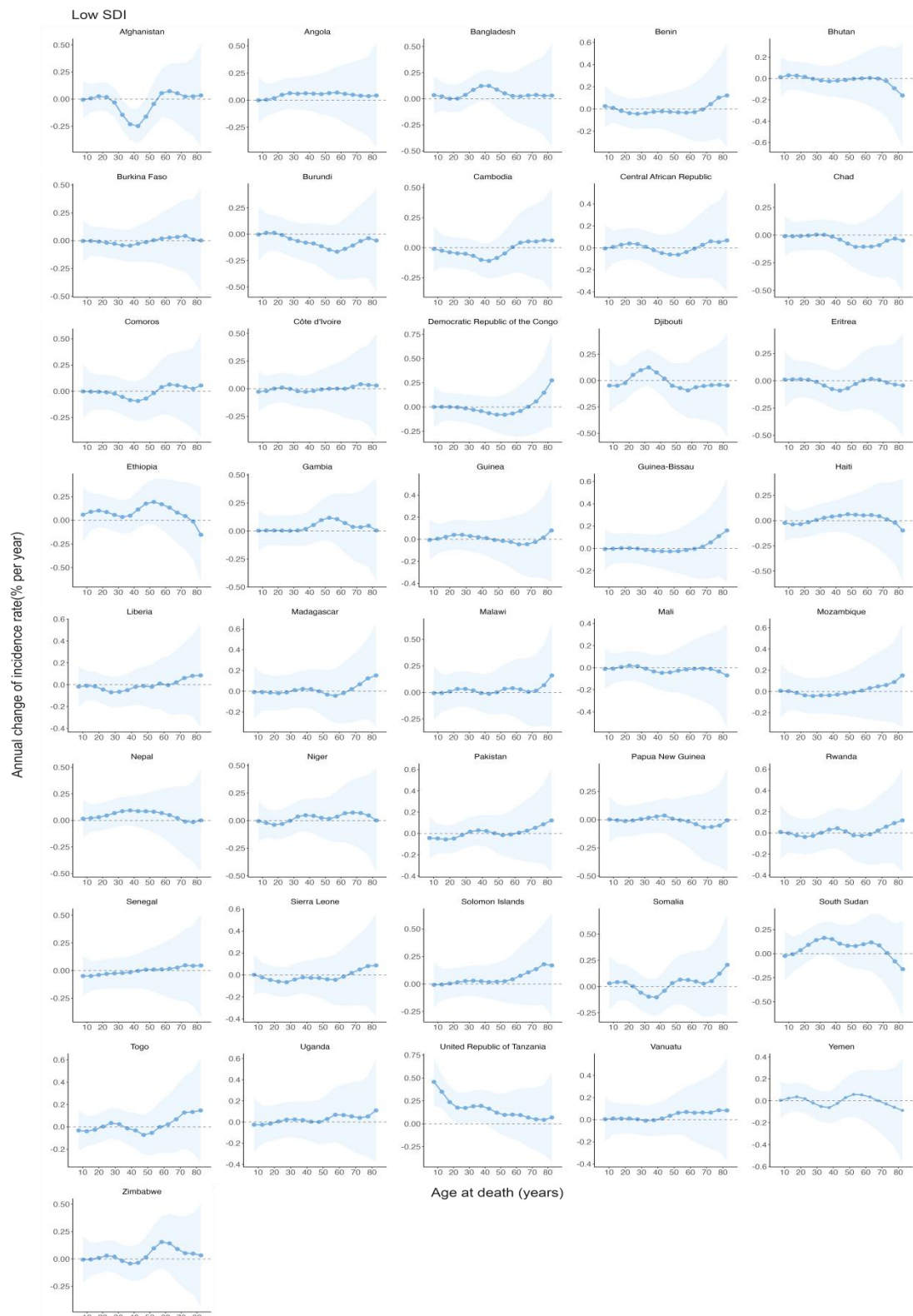
The dots and shaded areas indicate the values of local drift (annual percentage change in incidence rate) and its 95% CIs for migraine in 16 age groups (5-9 to 80-84 years). SDI=Socio-demographic Index.

Figure 5 The local drifts of migraine incidence rate in Low-middle SDI countries, 1990-2019



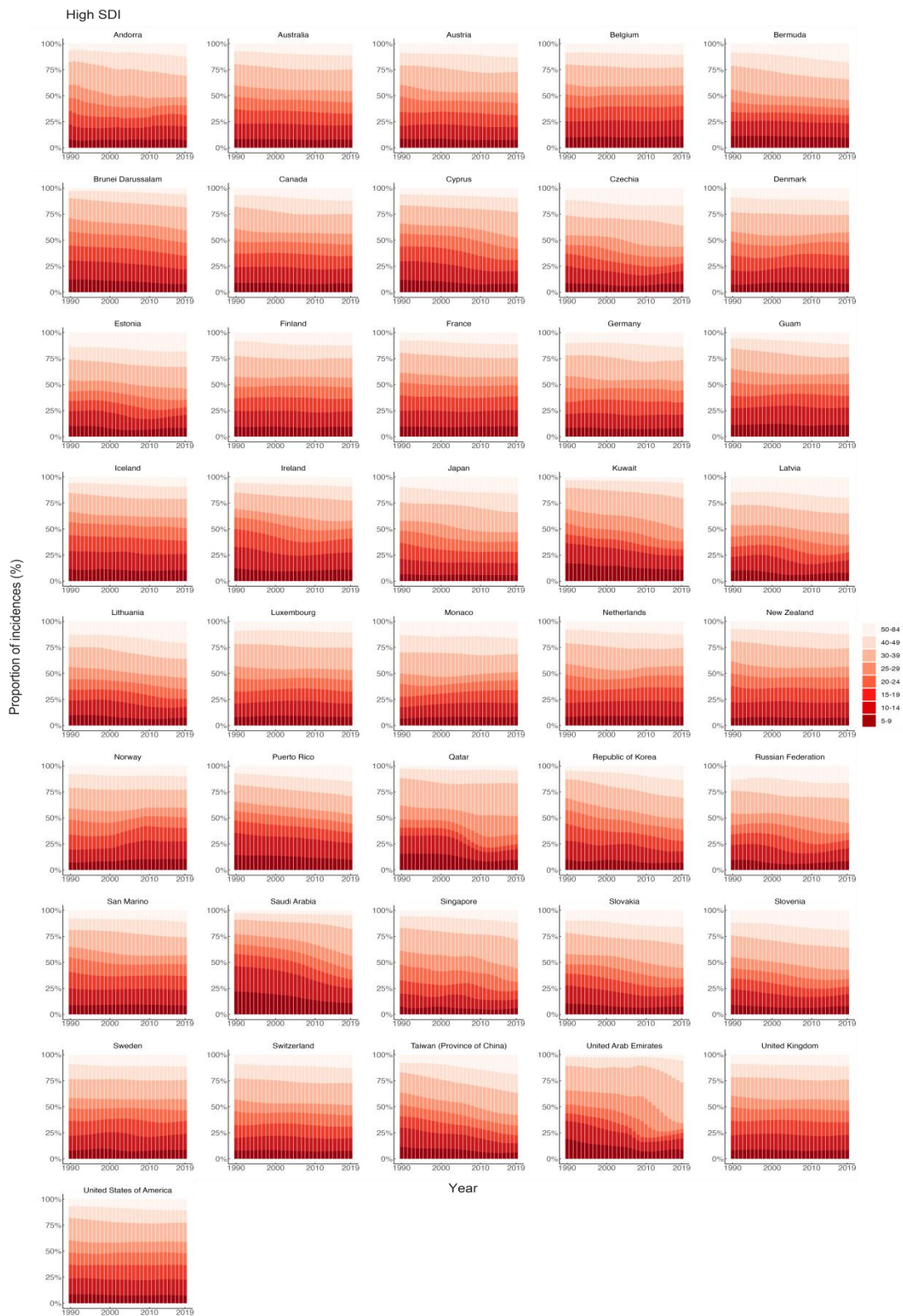
The dots and shaded areas indicate the values of local drift (annual percentage change in incidence rate) and its 95% CIs for migraine in 16 age groups (5-9 to 80-84 years). SDI=Socio-demographic Index.

Figure 6 The local drifts of migraine incidence rate in Low SDI countries, 1990-2019



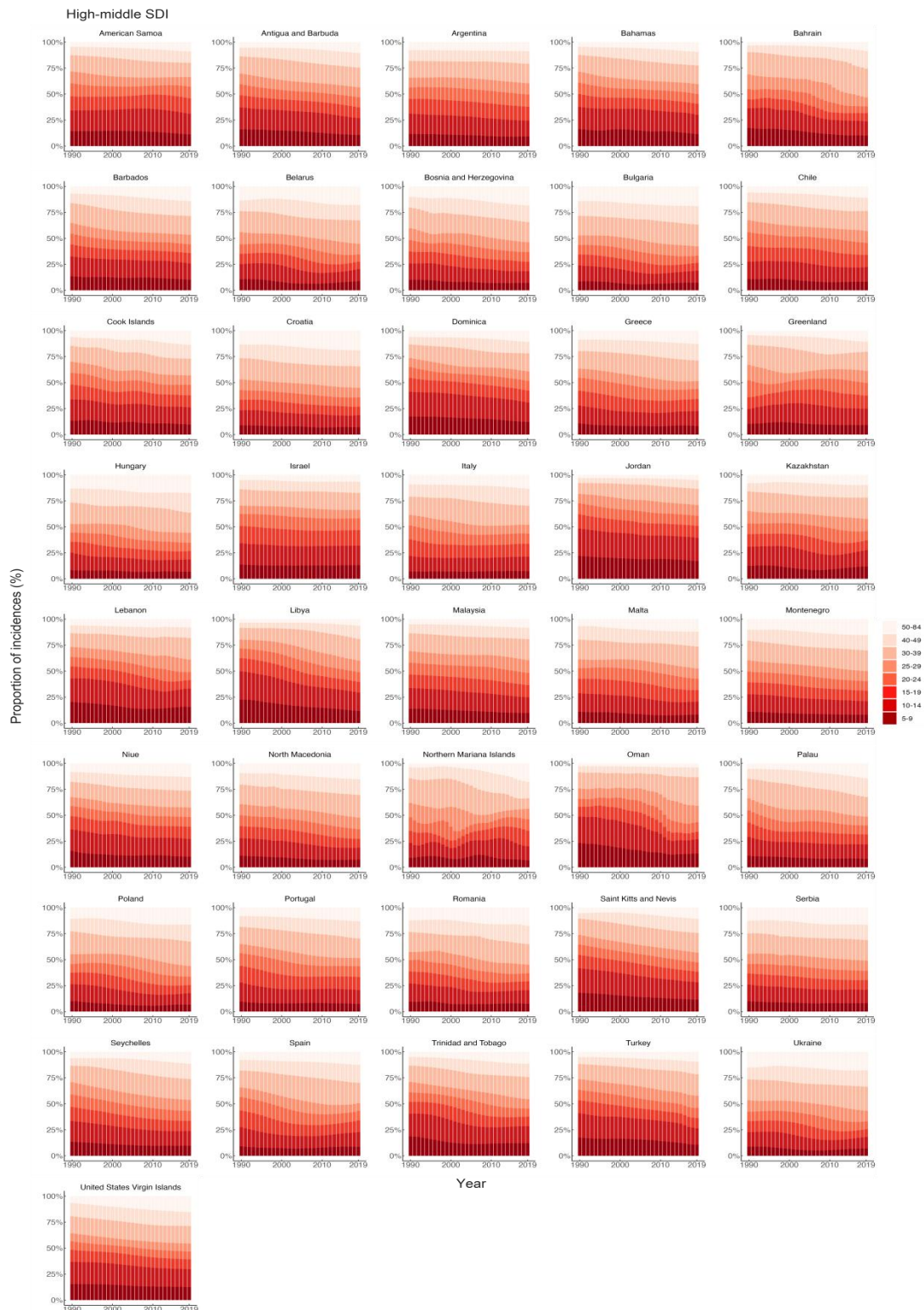
The dots and shaded areas indicate the values of local drift (annual percentage change in incidence rate) and its 95% CIs for migraine in 16 age groups (5-9 to 80-84 years). SDI=Socio-demographic Index.

Figure 7 Age distribution of incidences from migraine in High SDI countries, 1990-2019



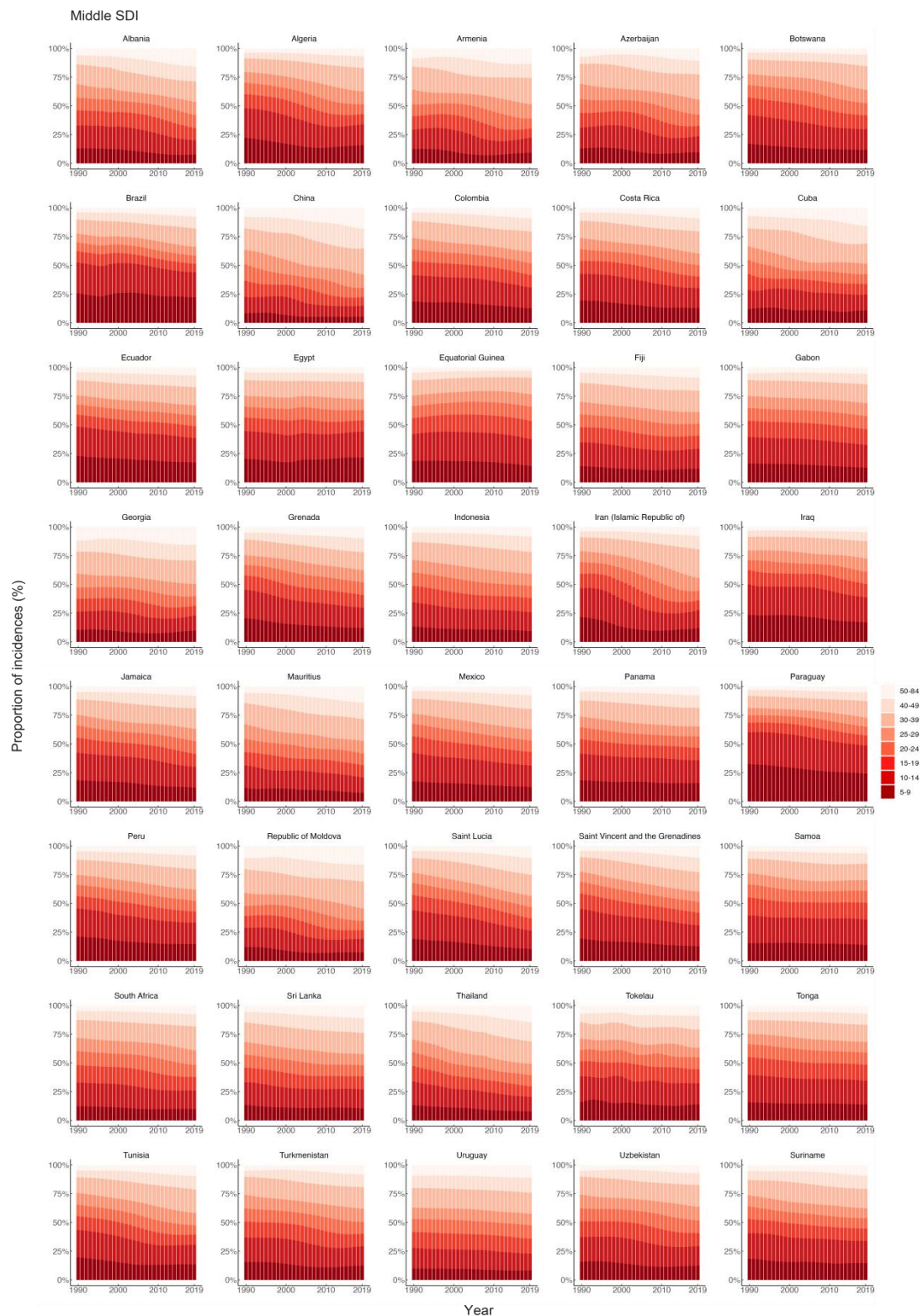
Age distribution of incidences is represented as temporal change in the relative proportion of incidences across age groups (5-9, 10-14, 15-19, 20-24, 25-29, 30-39, 40-49, 50-84 years) during 1990-2019. SDI=Socio-demographic Index.

Figure 8 Age distribution of incidences from migraine in High-middle SDI countries, 1990-2019



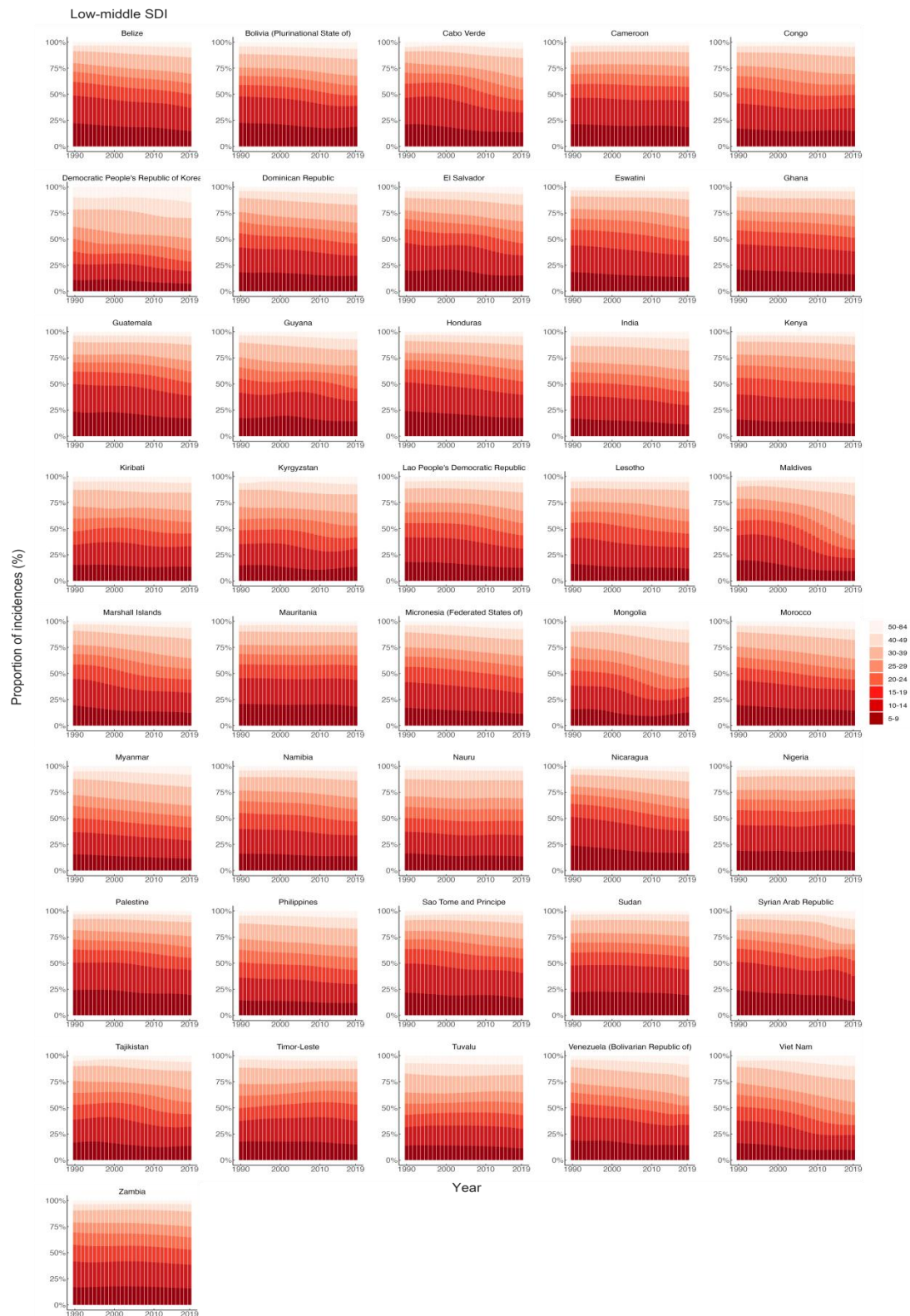
Age distribution of incidences is represented as temporal change in the relative proportion of incidences across age groups (5-9, 10-14, 15-19, 20-24, 25-29, 30-39, 40-49, 50-84_years) during 1990-2019. SDI=Socio-demographic Index.

Figure 9 Age distribution of incidences from migraine in Middle SDI countries, 1990-2019



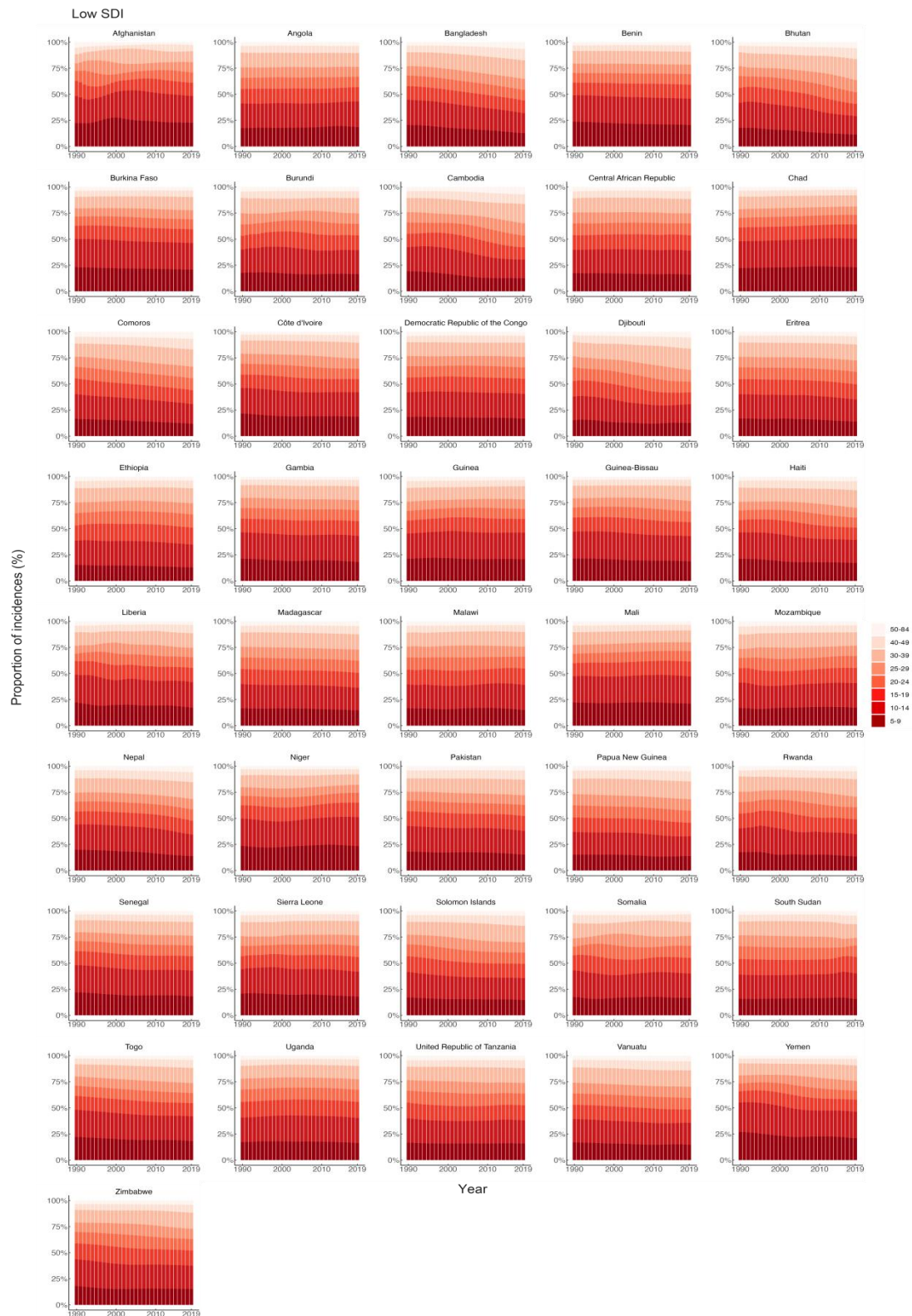
Age distribution of incidences is represented as temporal change in the relative proportion of incidences across age groups (5-9, 10-14, 15-19, 20-24, 25-29, 30-39, 40-49, 50-84 years) during 1990-2019. SDI=Socio-demographic Index.

Figure 10 Age distribution of incidences from migraine in Low-middle SDI countries, 1990-2019



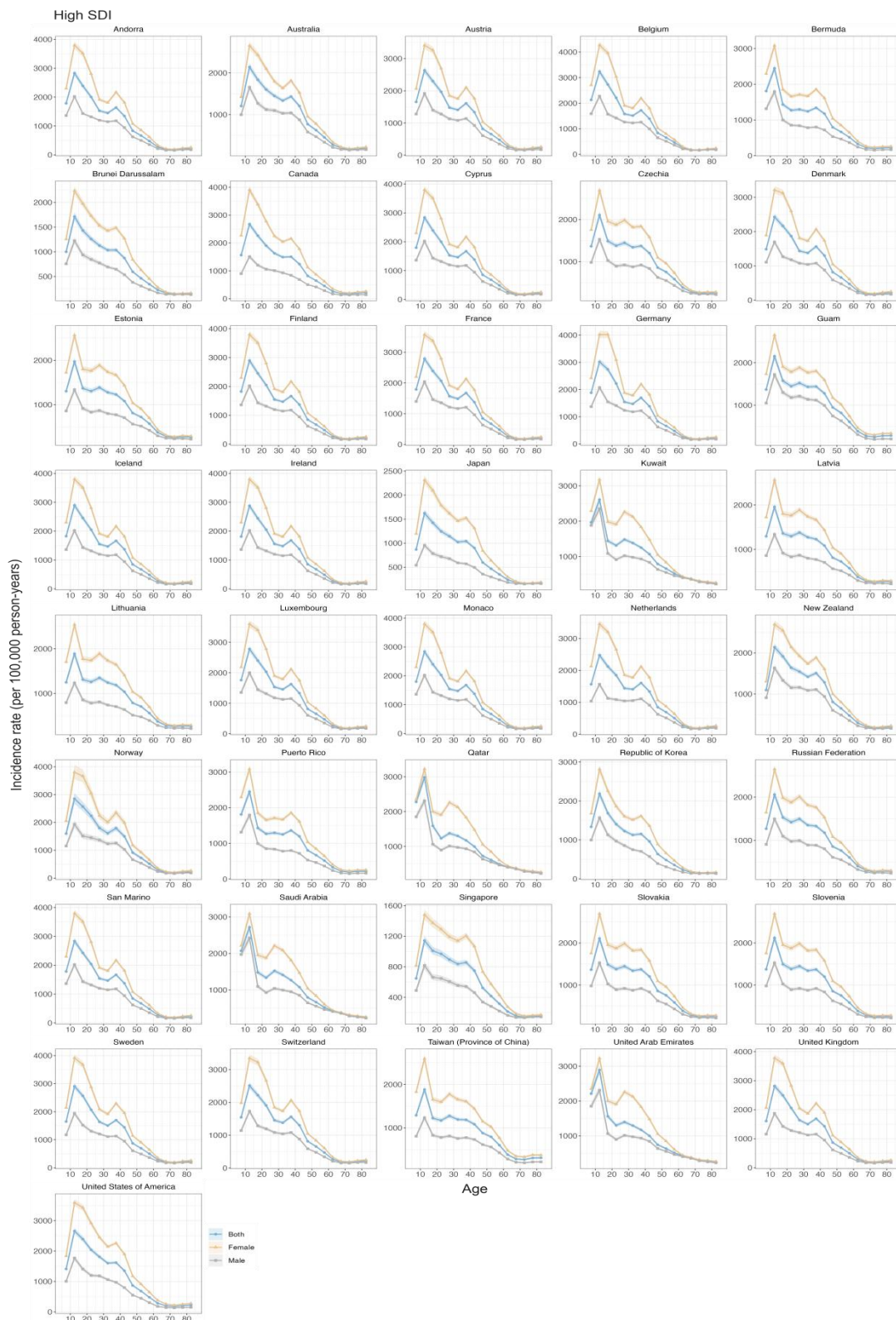
Age distribution of incidences is represented as temporal change in the relative proportion of incidences across age groups (5-9, 10-14, 15-19, 20-24, 25-29, 30-39, 40-49, 50-84 years) during 1990-2019. SDI=Socio-demographic Index.

Figure 11 Age distribution of incidences from migraine in Low SDI countries, 1990-2019



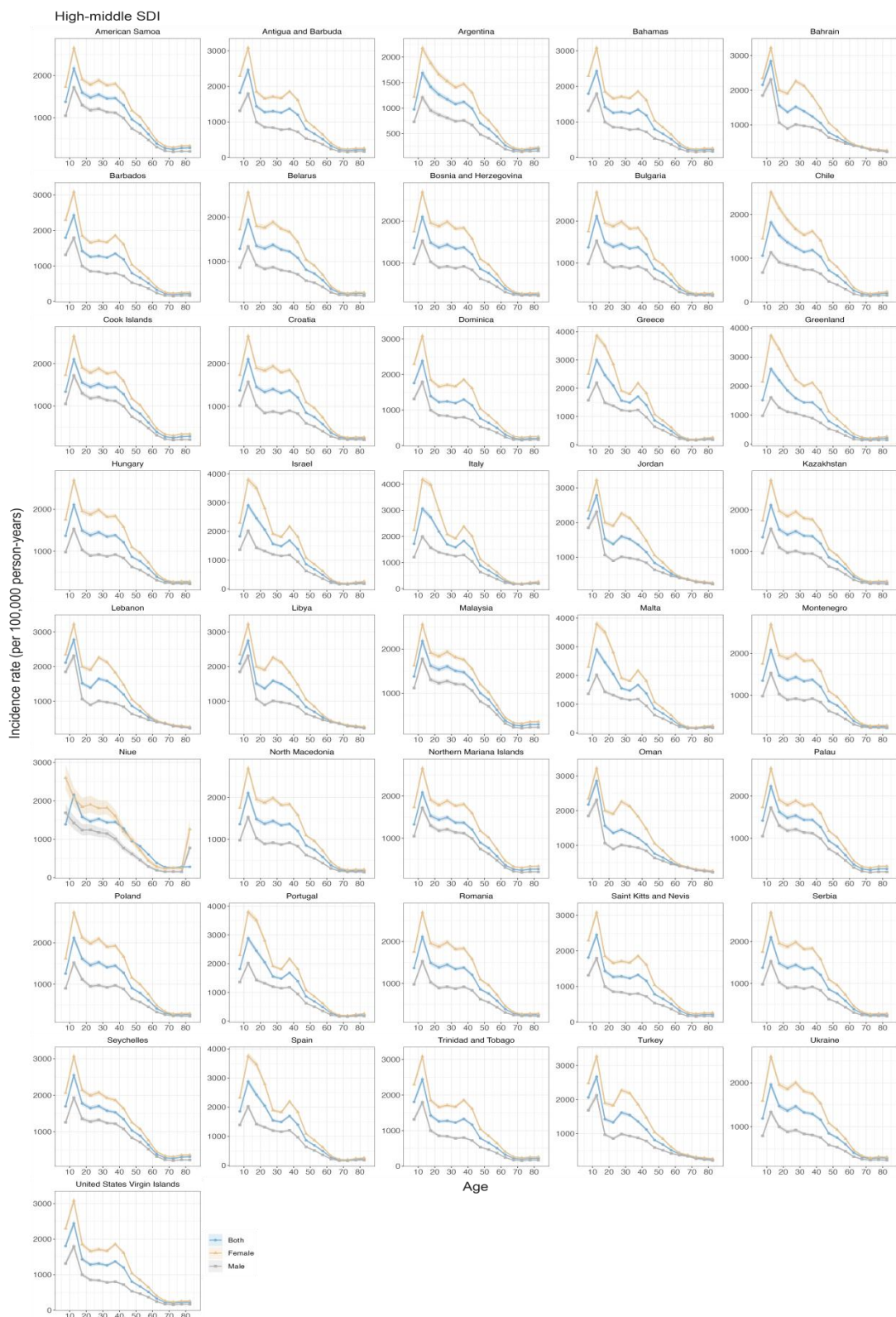
Age distribution of incidences is represented as temporal change in the relative proportion of incidences across age groups (5-9, 10-14, 15-19, 20-24, 25-29, 30-39, 40-49, 50-84 years) during 1990-2019. SDI=Socio-demographic Index.

Figure 12 Age effects on migraine incidence rate in High SDI countries



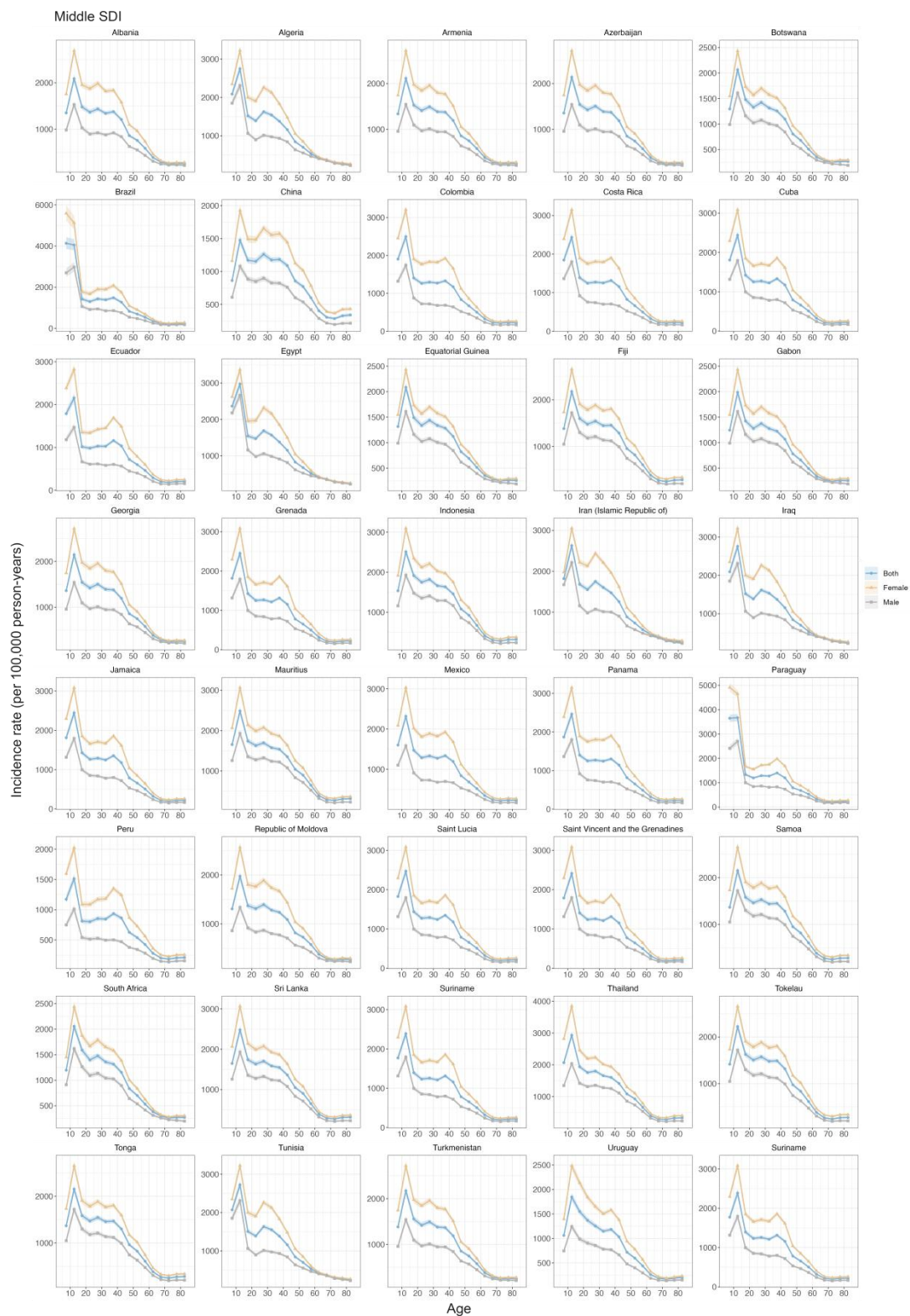
Age effects indicate age-associated natural history and are shown by the fitted longitudinal age curves of incidence rate (per 100000 person-years) adjusted for period deviations, with the dots and shaded areas denoting incidence rates with 95% CIs. SDI=Socio-demographic Index.

Figure 13 Age effects on migraine incidence rate in High-middle SDI countries



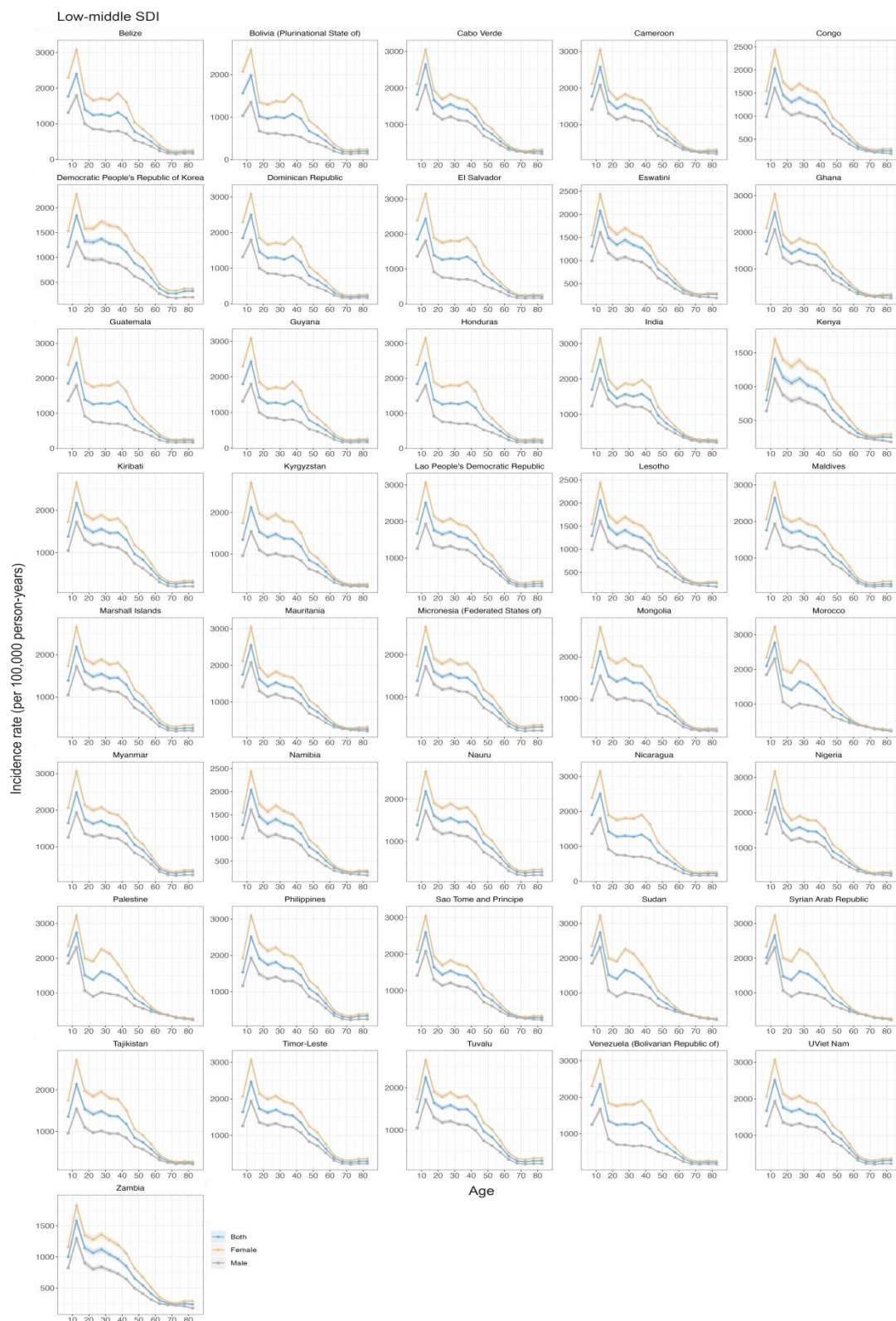
Age effects indicate age-associated natural history and are shown by the fitted longitudinal age curves of incidence rate (per 100000 person-years) adjusted for period deviations, with the dots and shaded areas denoting incidence rates with 95% CIs. SDI=Socio-demographic Index.

Figure 14 Age effects on migraine incidence rate in Middle SDI countries



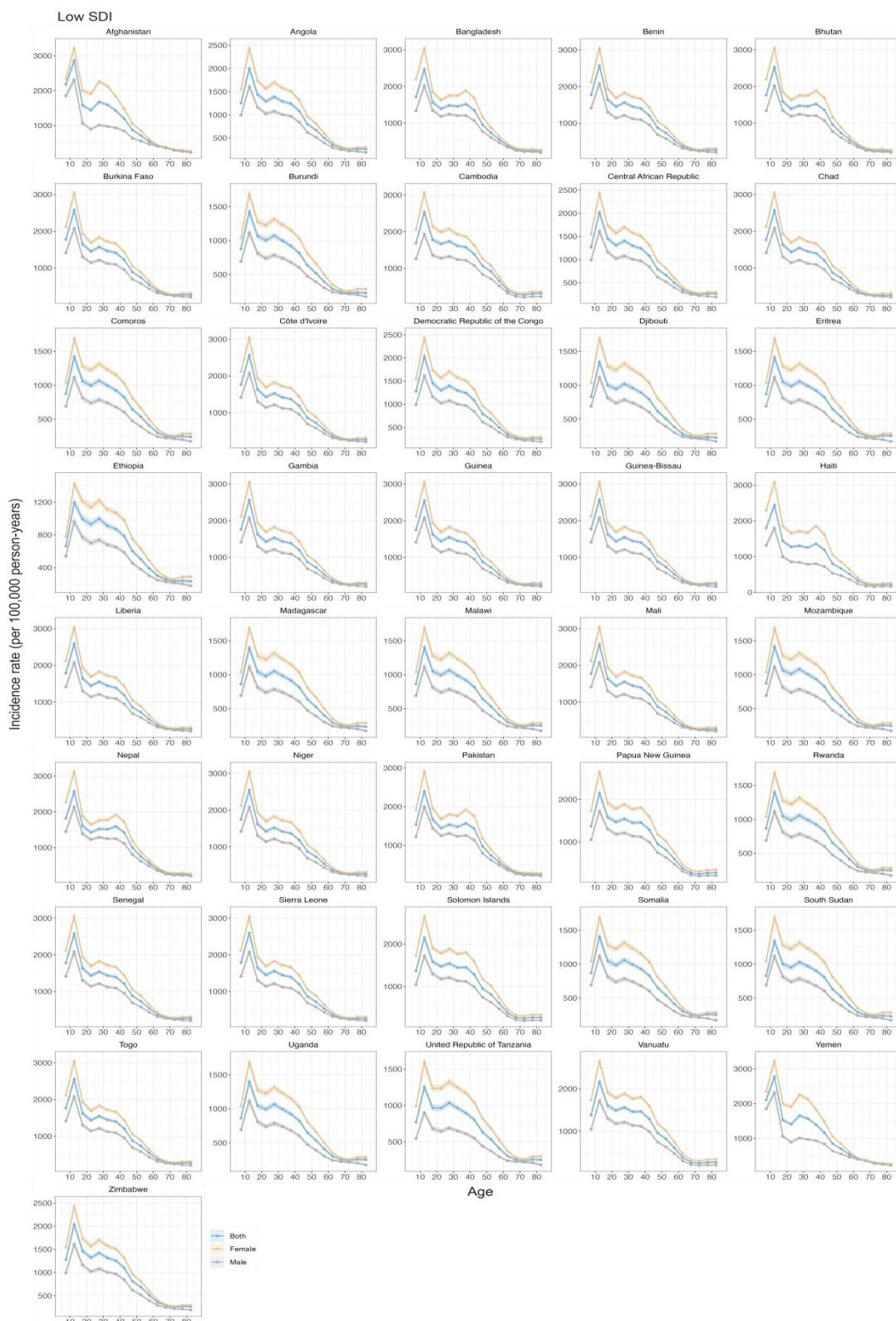
Age effects indicate age-associated natural history and are shown by the fitted longitudinal age curves of incidence rate (per 100000 person-years) adjusted for period deviations, with the dots and shaded areas denoting incidence rates with 95% CIs. SDI=Socio-demographic Index.

Figure 15 Age effects on migraine incidence rate in Low-middle SDI countries



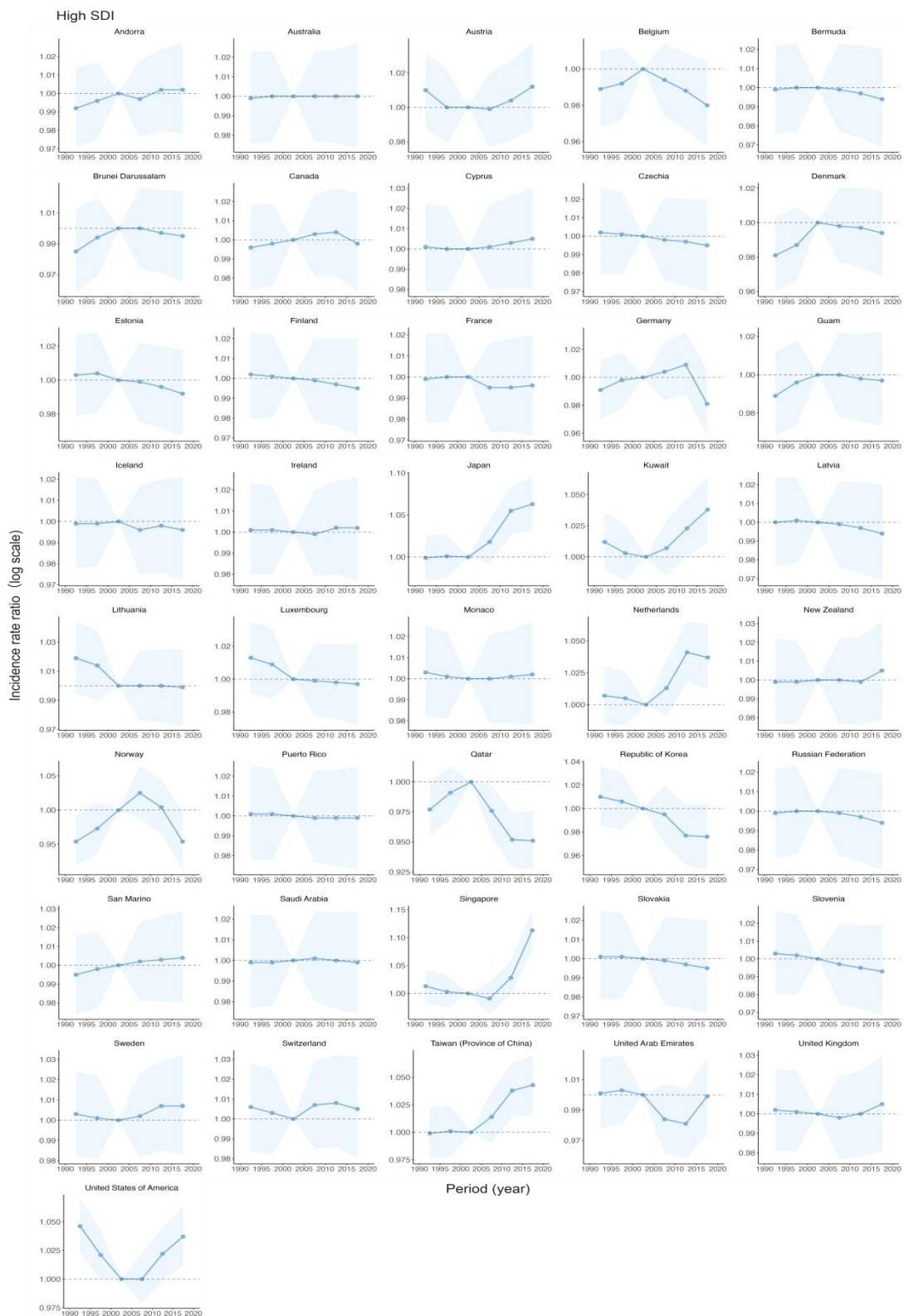
Age effects indicate age-associated natural history and are shown by the fitted longitudinal age curves of incidence rate (per 100000 person-years) adjusted for period deviations, with the dots and shaded areas denoting incidence rates with 95% CIs. SDI=Socio-demographic Index.

Figure 16 Age effects on migraine incidence rate in Low SDI countries



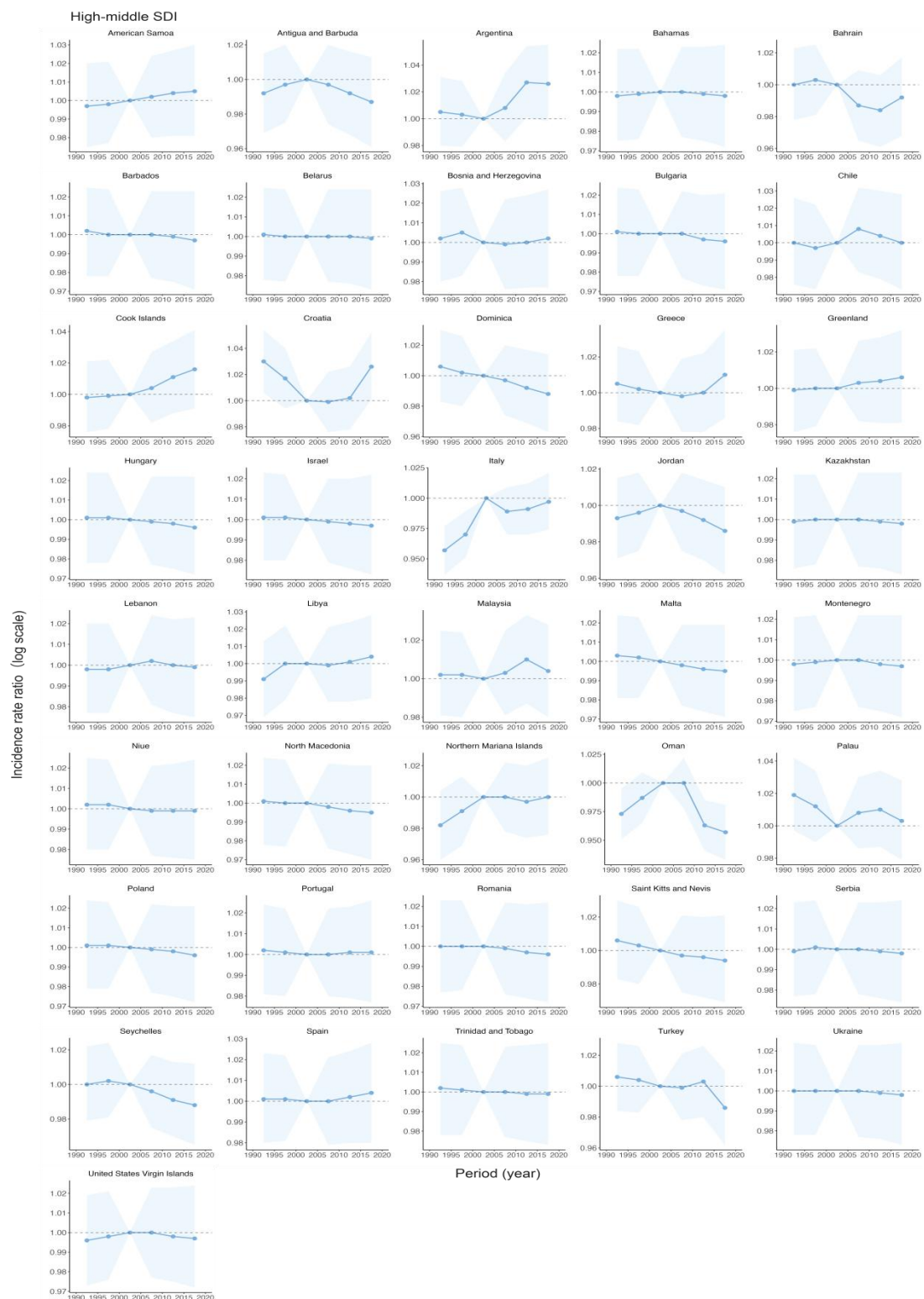
Age effects indicate age-associated natural history and are shown by the fitted longitudinal age curves of incidence rate (per 100000 person-years) adjusted for period deviations, with the dots and shaded areas denoting incidence rates with 95% CIs. SDI=Socio-demographic Index.

Figure 17 Period effects on migraine incidence rate in High SDI countries



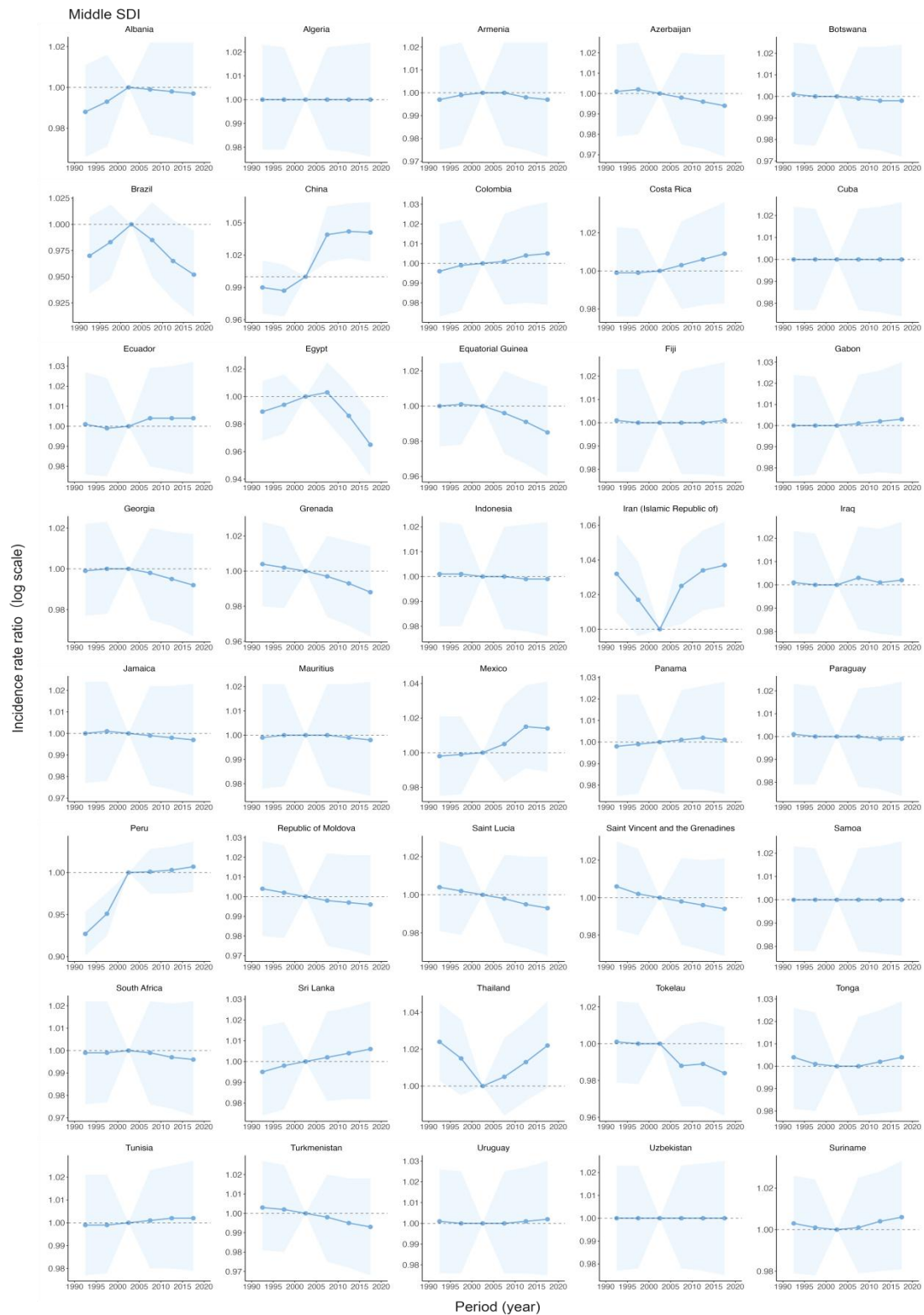
Period effects are shown by the relative risk of incidence rate (incidence rate ratio) for each period from 1990-1994 to 2015-2019, with the dots and shaded areas representing rate ratios and 95% CIs for a given period relative to the referent period (2000-2004). SDI=Socio-demographic Index.

Figure 18 Period effects on migraine incidence rate in High-middle SDI countries



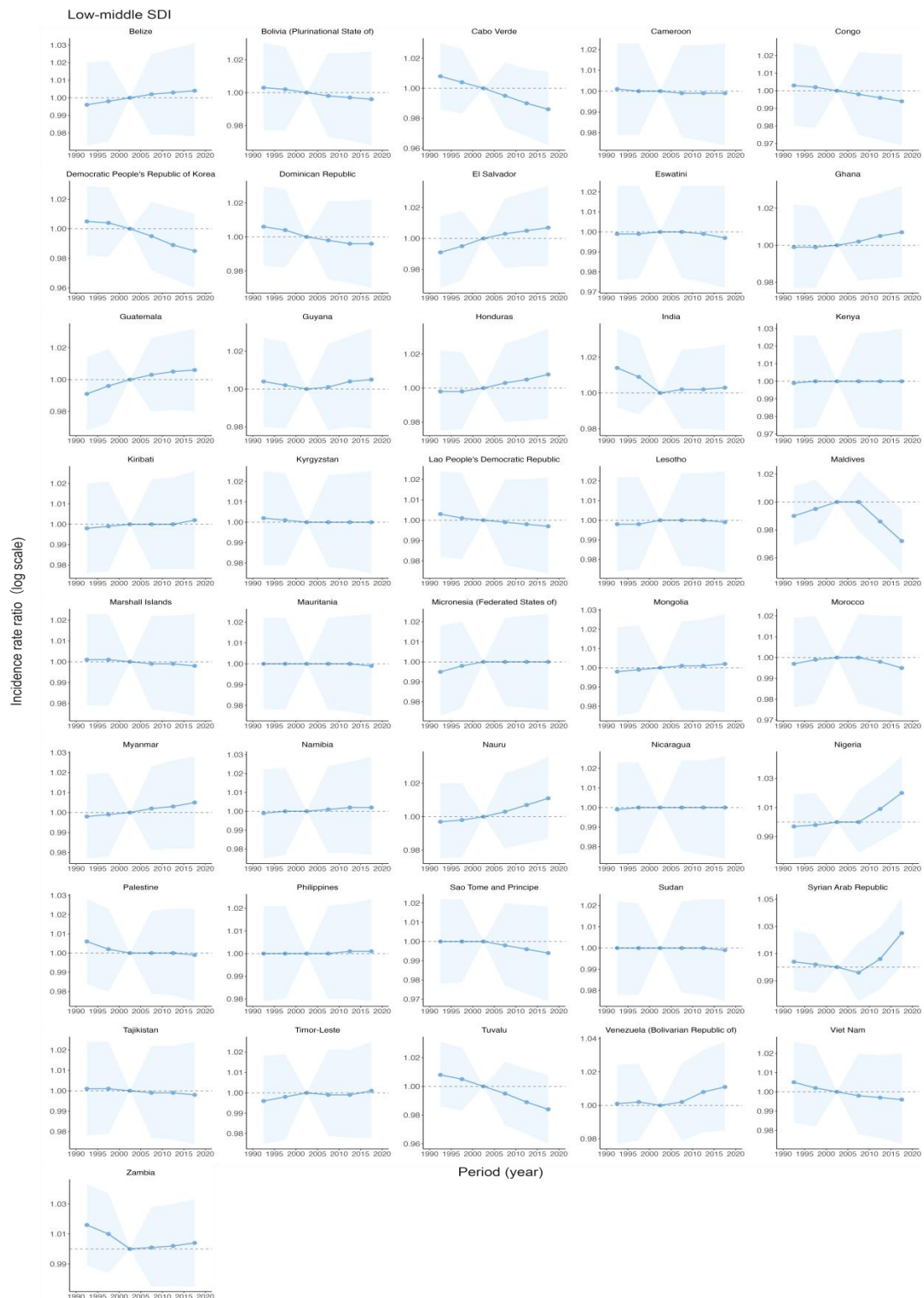
Period effects are shown by the relative risk of incidence rate (incidence rate ratio) for each period from 1990-1994 to 2015-2019, with the dots and shaded areas representing rate ratios and 95% CIs for a given period relative to the referent period (2000-2004). SDI=Socio-demographic Index.

Figure 19 Period effects on migraine incidence rate in Middle SDI countries



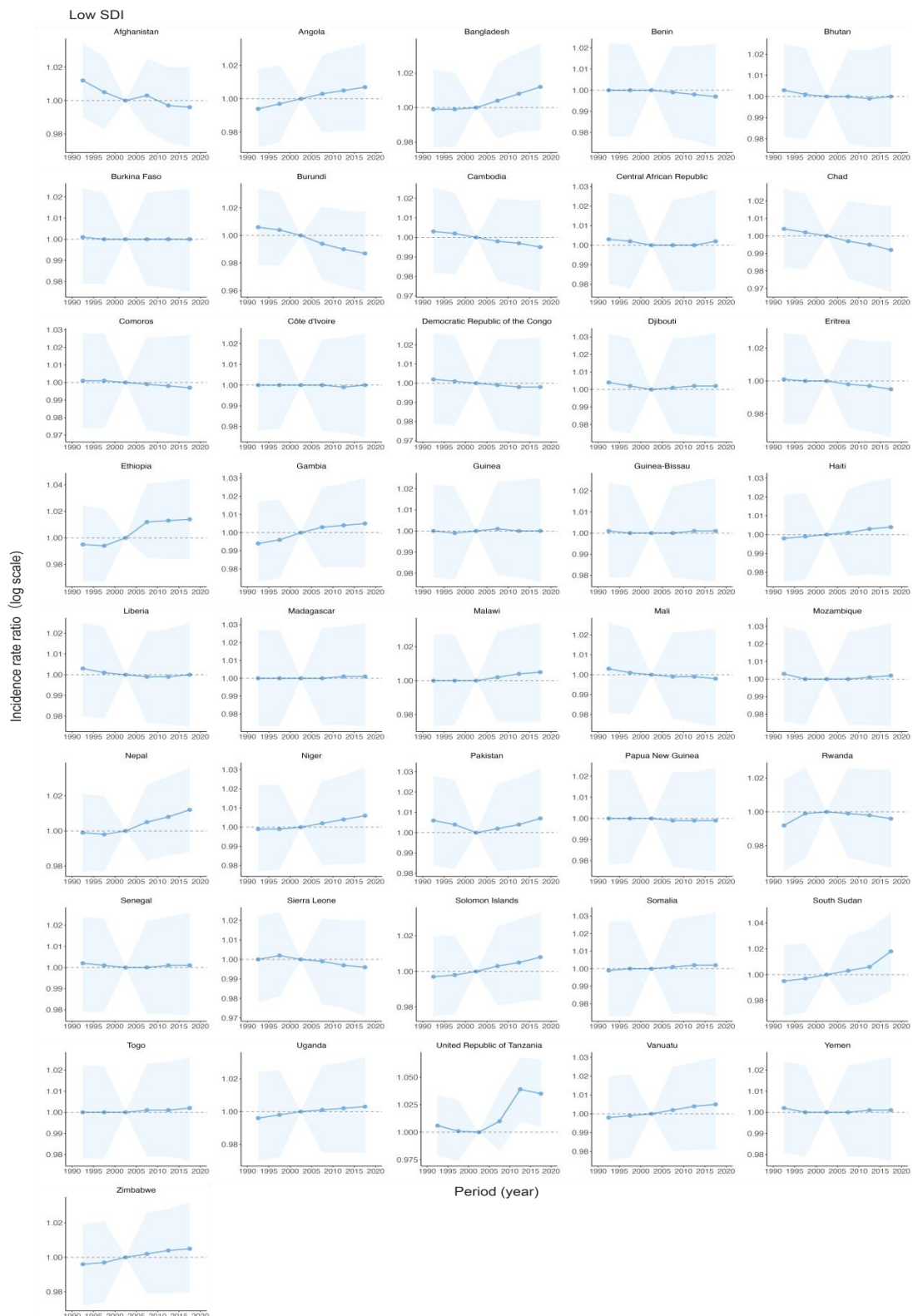
Period effects are shown by the relative risk of incidence rate (incidence rate ratio) for each period from 1990-1994 to 2015-2019, with the dots and shaded areas representing rate ratios and 95% CIs for a given period relative to the referent period (2000-2004). SDI=Socio-demographic Index.

Figure 20 Period effects on migraine incidence rate in Low-middle SDI countries



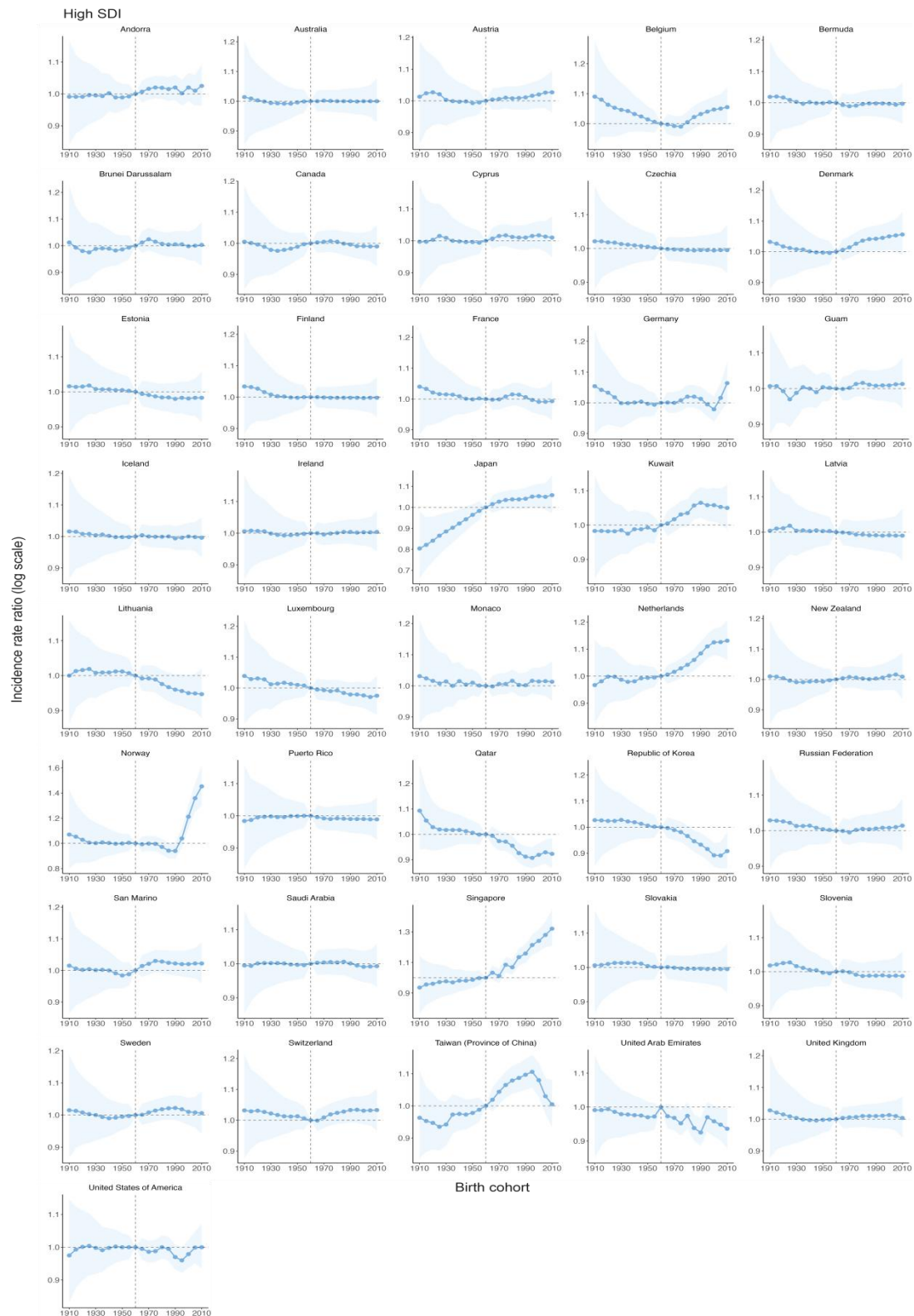
Period effects are shown by the relative risk of incidence rate (incidence rate ratio) for each period from 1990-1994 to 2015-2019, with the dots and shaded areas representing rate ratios and 95% CIs for a given period relative to the referent period (2000-2004). SDI=Socio-demographic Index.

Figure 21 Period effects on migraine incidence rate in Low SDI countries



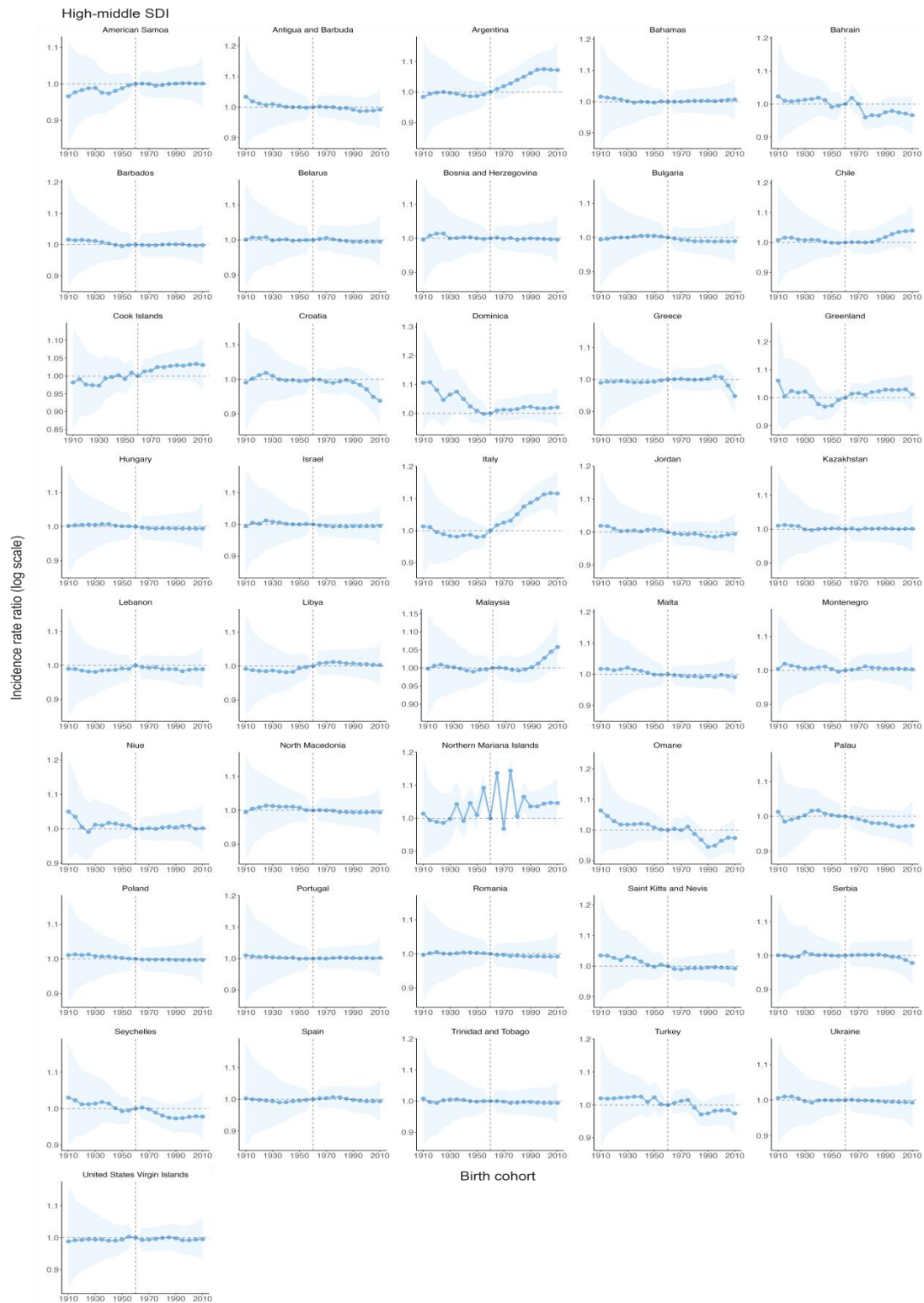
Period effects are shown by the relative risk of incidence rate (incidence rate ratio) for each period from 1990-1994 to 2015-2019, with the dots and shaded areas representing rate ratios and 95% CIs for a given period relative to the referent period (2000-2004). SDI=Socio-demographic Index.

Figure 22 Cohort effects on migraine incidence rate in High SDI countries



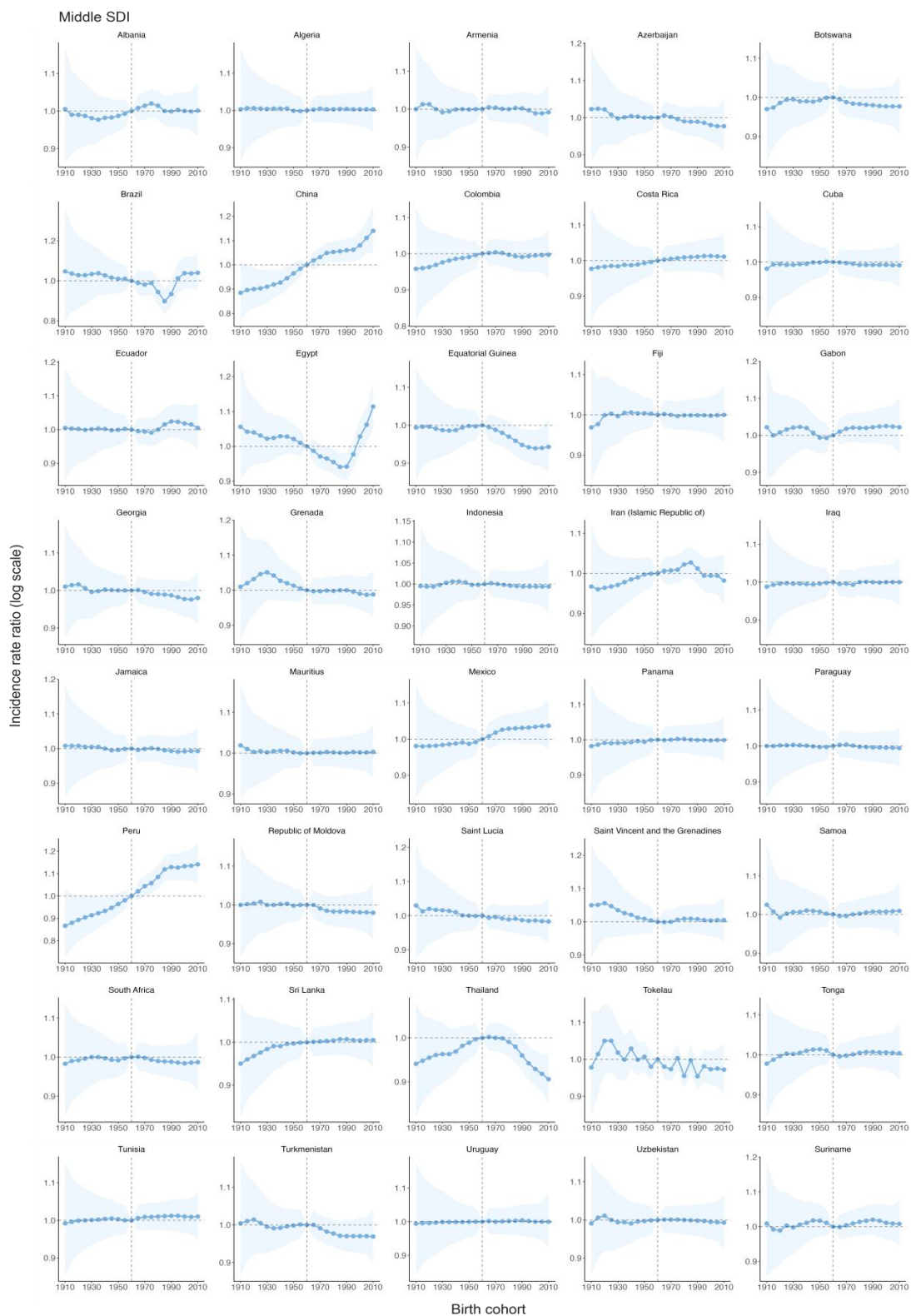
Cohort effects are shown by the relative risk of incidence rate (incidence rate ratio) for each birth cohort from 1910 to 2010, with the dots and shaded areas represent rate ratios and 95% CIs for a given cohort relative to the referent 1960 cohort. SDI=Socio-demographic Index.

Figure 23 Cohort effects on migraine incidence rate in High-middle SDI countries



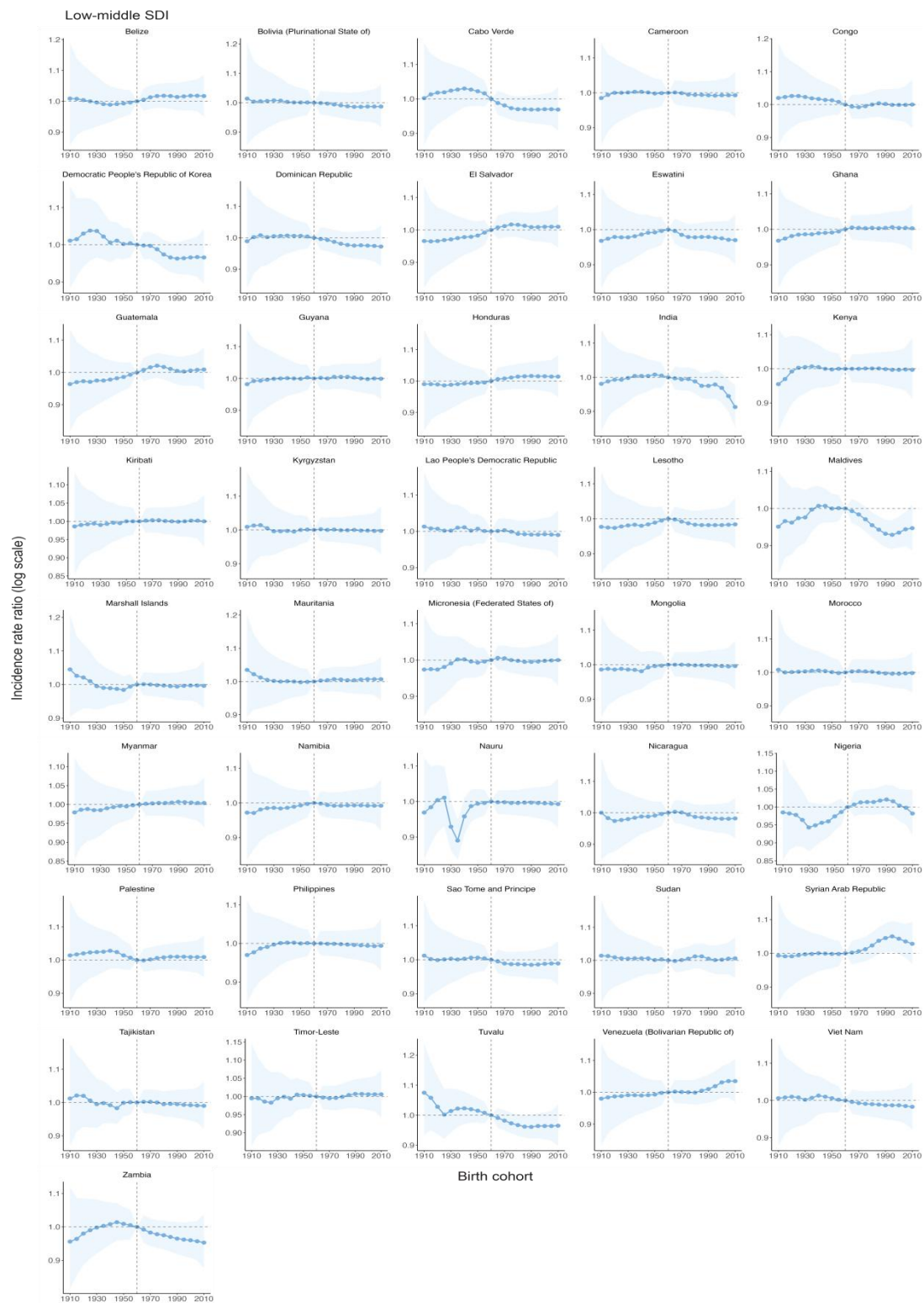
Cohort effects are shown by the relative risk of incidence rate (incidence rate ratio) for each birth cohort from 1910 to 2010, with the dots and shaded areas represent rate ratios and 95% CIs for a given cohort relative to the referent 1960 cohort. SDI=Socio-demographic Index.

Figure 24 Cohort effects on migraine incidence rate in Middle SDI countries



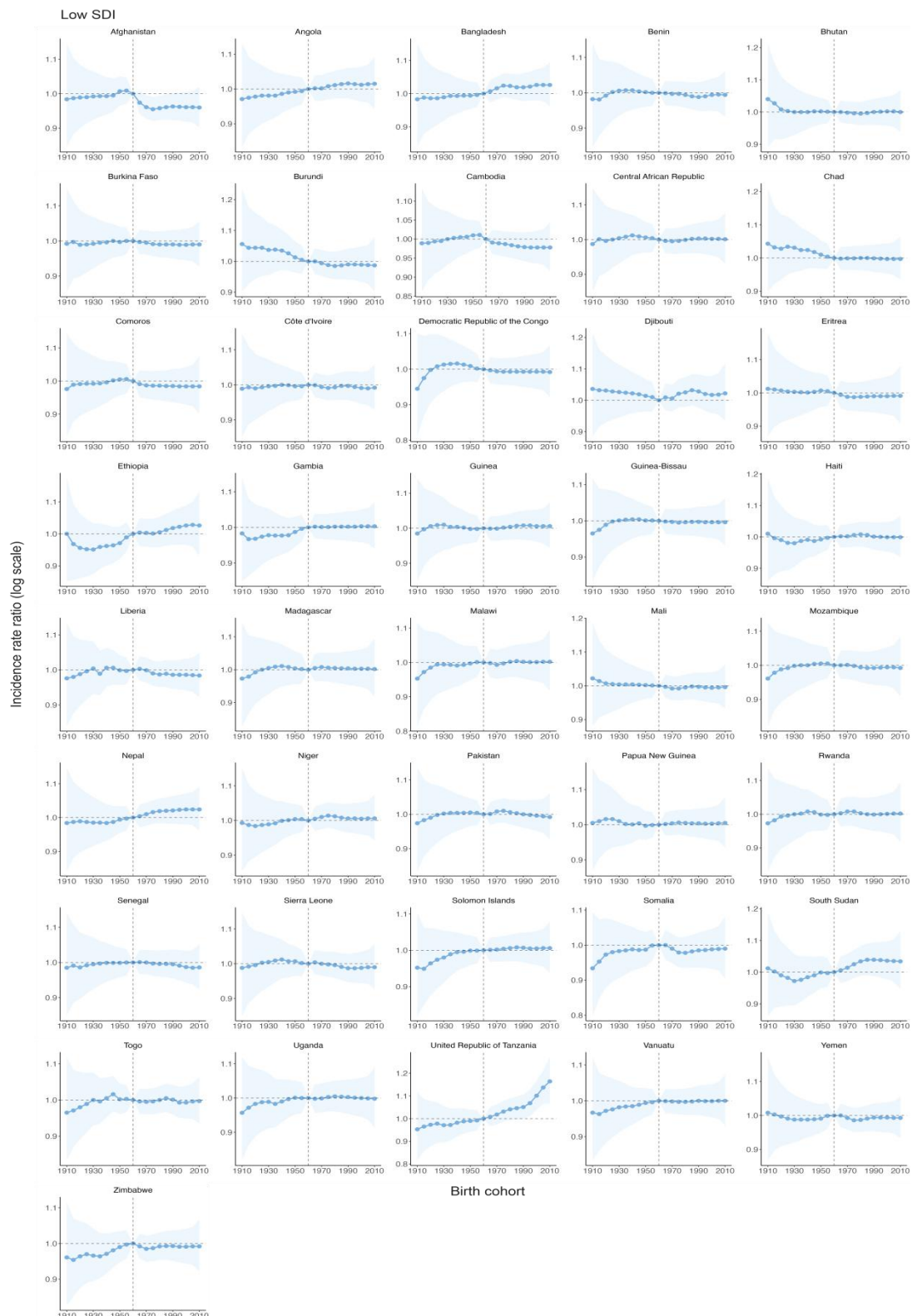
Cohort effects are shown by the relative risk of incidence rate (incidence rate ratio) for each birth cohort from 1910 to 2010, with the dots and shaded areas represent rate ratios and 95% CIs for a given cohort relative to the referent 1960 cohort. SDI=Socio-demographic Index.

Figure 25 Cohort effects on migraine incidence rate in Low-middle SDI countries



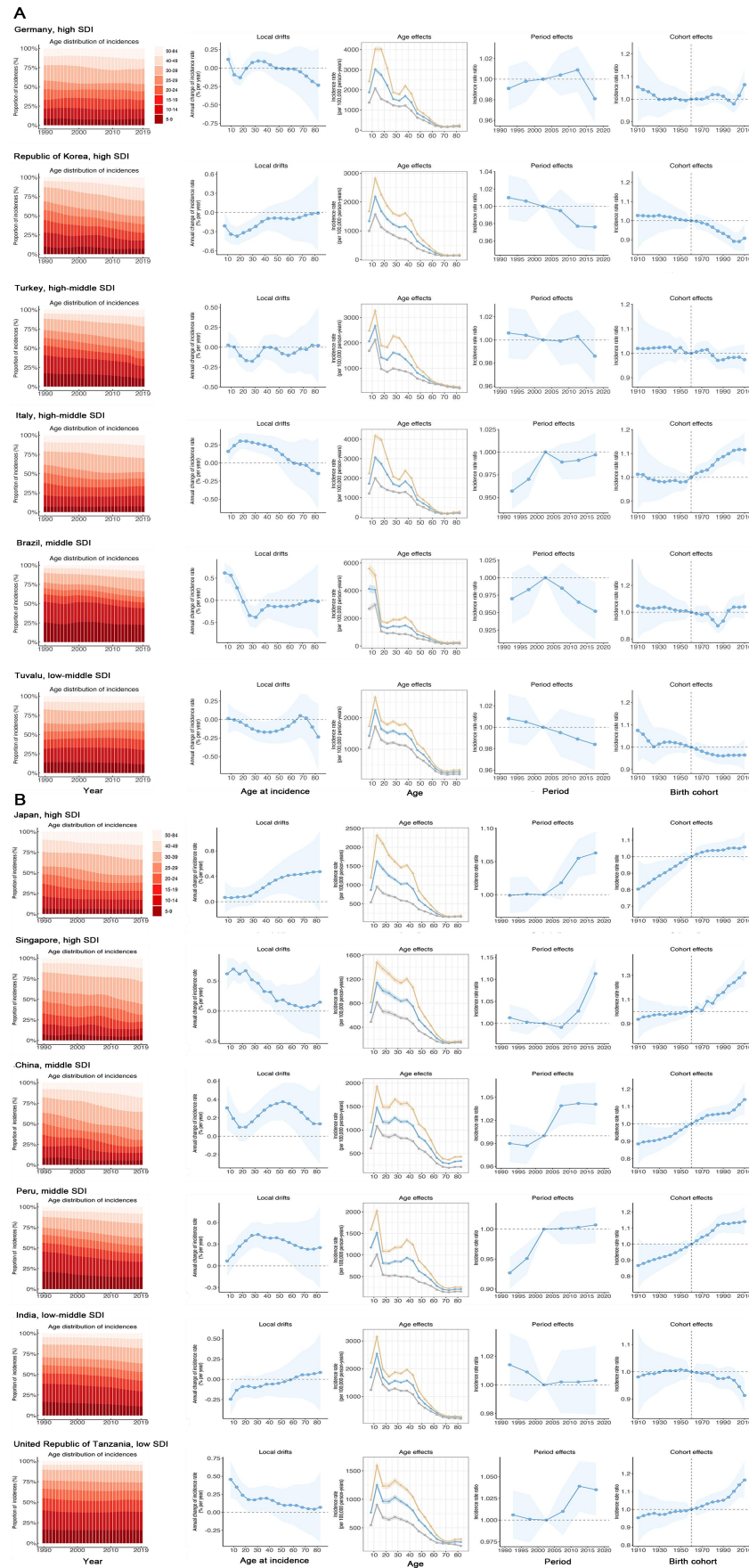
Cohort effects are shown by the relative risk of incidence rate (incidence rate ratio) for each birth cohort from 1910 to 2010, with the dots and shaded areas represent rate ratios and 95% CIs for a given cohort relative to the referent 1960 cohort. SDI=Socio-demographic Index.

Figure 26 Cohort effects on migraine incidence rate in Low SDI countries



Cohort effects are shown by the relative risk of incidence rate (incidence rate ratio) for each birth cohort from 1910 to 2010, with the dots and shaded areas represent rate ratios and 95% CIs for a given cohort relative to the referent 1960 cohort. SDI=Socio-demographic Index

Figure 27 Favorable (A) and unfavorable (B) age-period-cohort effects on exemplary countries across SDI quintiles



Age distribution of incidences shows the relative proportion of incidences from each age group during 1990-2019. Local drifts indicate the annual percentage change of incidence rate (% per year) across five-year age groups (from 5-9 to 80-84 years). Age effects are represented by the fitted longitudinal age curves of incidence rate (per 100,000 person-years) adjusted for period deviations. Period effects are represented by the relative risk of incidence rate (incidence rate ratio) and computed as the ratio of age-specific rates in each period compared to the referent 2000-2004 period. Cohort effects are represented by the relative risk of incidence rate (incidence rate ratio) and computed as the ratio of age-specific rates in each cohort compared to referent 1960 cohort. The shaded areas indicate the corresponding 95% CIs of each point estimate. SDI: Socio-demographic Index.

Table 1 The lexis diagram of GBD data for the APC model

Period (median)	Age groups																Birth cohort (median)
	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	
																X	1906-1914 (1910)
															X	X	1911-1919 (1915)
														X	X	X	1916-1924 (1920)
													X	X	X	X	1921-1929 (1925)
												X	X	X	X	X	1926-1934 (1930)
											X	X	X	X	X	X	1931-1939 (1935)
										X	X	X	X	X	X		1936-1944 (1940)
									X	X	X	X	X	X			1941-1949 (1945)
								X	X	X	X	X	X				1946-1954 (1950)
							X	X	X	X	X	X					1951-1959 (1955)
						X	X	X	X	X	X						1956-1964 (1960)
					X	X	X	X	X	X							1961-1969 (1965)
				X	X	X	X	X	X								1966-1974 (1970)
			X	X	X	X	X	X									1971-1979 (1975)
		X	X	X	X	X	X										1976-1984 (1980)
	X	X	X	X	X	X											1981-1989 (1985)
1990-1994 (1992)	X	X	X	X	X												1986-1994 (1990)
1995-1999 (1997)	X	X	X	X													1991-1999 (1995)
2000-2004 (2002)	X	X	X														1996-2004 (2000)
2005-2009 (2007)	X	X															2001-2009 (2005)
2010-2014 (2012)	X																2006-2014 (2010)
2015-2019 (2017)																	

Note: X denotes incidence rate data of each age group from the corresponding period. For instance, the mortality rate of age 5-9 years in 1992 is filled in the square with a bold X (see table), and this square belongs to the cohort 1981-1989 (1985).

Notes:

All-age incidence rate: crude incidence rate.

Age-standardized incidence rate is computed by direct standardization with global standard population in GBD 2019.

Net drifts are estimates derived from the age-period-cohort model and denotes overall annual percentage change in incidence rate, which captures the contribution of the effects from calendar time and successive birth cohorts.

Parentheses for all GBD health estimate indicate 95% uncertainty intervals; parentheses for net drift indicate 95% confidence intervals.

SDI: Socio-demographic Index; APC: age-period-cohort.