Environ Health Perspect

DOI: 10.1289/EHP4898

Supplemental Material

Suicide and Ambient Temperature: A Multi-Country Multi-City Study

Yoonhee Kim, Ho Kim, Antonio Gasparrini, Ben Armstrong, Yasushi Honda, Yeonseung Chung, Chris Fook Sheng Ng, Aurelio Tobias, Carmen Íñiguez, Eric Lavigne, Francesco Sera, Ana M. Vicedo-Cabrera, Martina S. Ragettli, Noah Scovronick, Fiorella Acquaotta, Bing-Yu Chen, Yue-Liang Leon Guo, Xerxes Seposo, Tran Ngoc Dang, Micheline de Sousa Zanotti Stagliorio Coelho, Paulo Hilario Nascimento Saldiva, Anna Kosheleva, Antonella Zanobetti, Joel Schwartz, Michelle L. Bell, and Masahiro Hashizume

Table of Contents

Figure S1. Quasi-Akaike Information Criteria (AIC modified with overdispersion) between linear and nonlinear models using a quadratic B-spline with one to three internal knots for the temperature-suicide association (A) pooled across all locations, locations in western countries (Brazil, Canada, South Africa, Spain, Switzerland, UK, and US), and locations in eastern countries (Japan, South Korea, Philippines, Taiwan, and Vietnam), (B) pooled for each country, and (C) in capital cities/regions where the number of suicides was largest for each country. BR, Brazil; CA, Canada; JP, Japan; KR, South Korea; PH, the Philippines; SA, South Africa; SP, Spain; SW, Switzerland; TW, Taiwan; UK, the UK; US, the United States; VN, Vietnam.

Figure S2. Country-specific lag-response associations for maximum suicide temperature (MaxST) vs. minimum suicide temperature (MinST) over the extended lags of up to 6 days (with 95% confidence interval, shaded grey) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day-of-week. RR, relative risk.

Figure S3. Location-specific lag-cumulative temperature-suicide associations as the best linear unbiased prediction (BLUP) (with 95% CIs, shaded grey) and the corresponding temperature distributions. The temperature-suicide associations were estimated by using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. The blue and red vertical dotted lines indicate the minimum suicide temperature and maximum suicide temperature, respectively. CI, confidence interval; RR, relative risk.

Figure S4. Country-specific pooled lag-response associations for the maximum suicide temperature (MaxST) vs. the minimum suicide temperature (MinST) with the 95% confidence intervals (vertical bars) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. RR, relative risk.

Figure S5. Distributions of the location-specific (A) minimum suicide temperature (ºC) (MinST) and (B) maximum suicide temperature (ºC) (MaxST) against summer average temperature (ºC) by country. Larger symbols indicate the country-specific median values of the MinST and MaxST against the average of the summer temperature by country. The summer temperature was defined as the average of daily ambient temperature during June to September in the countries in Northern Hemisphere and during December to March in the countries in Southern Hemisphere.

Figure S6. Country-specific and location-specific lag-cumulative temperature-suicide associations for maximum suicide temperature (MaxST) vs. minimum suicide temperature (MinST) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. Larger symbols indicate the country-specific pooled estimates, and the location-specific estimates were derived from the first-stage modeling. The grey lines indicate the 95% confidence intervals. RR, relative risk.

Figure S7. Pooled lag-cumulative relative risks (RRs) with 95% CIs (vertical bars) by country in sensitivity analyses. The main model (Main) included a quadratic B-spline with three internal knots for the temperature-suicide association over the lag of 0–2 d. A linear distributed lag model (Linear) included the same lag of 0–2 d and estimated the RR between the 1st and the 99th percentiles of mean temperature. Different parameterizations for the temperature-suicide association were applied by including one internal knot at 50th percentile (1 knot), two internal knots at 33rd and 66th percentiles (2 knot), and a cubic B-spline at the same three internal knots (Cubic). The maximum lag was extended up to 6 d (Lag6). Additional covariates such as the averages of relative humidity (Humidity) and sunshine duration (Sunshine) over the current day and a day before, respectively, were adjusted in a subset of data. The temperature-suicide associations were estimated using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. CI, confidence intervals.

References

Data collection

Brazil

We collected data from 15 cities from 1 January 1997 to 31 December 2005 and excluded two cities (Belem with no suicide since 2002 and Rio de Janeiro with no temperature data before 2002). A total of 13 cities were included in our study (see the full list in Table S2). Daily suicide counts were obtained from the Ministry of Health, Brazil. Daily mean temperature and relative humidity were obtained from the National Institute of Meteorology of Brazil. The missing rates for the daily series of temperature ranged 0.0%–8.6% (0.0%–10.4% after removing stratum without suicide) across the cities.

Canada

We collected data from 26 cities (see the full list in Table S2) from 1 January 1986 to 31 December 1999. Daily suicide counts were obtained from Statistics Canada. Daily mean temperature and relative humidity were obtained from Environment Canada. The missing rates for the daily series of temperature ranged 0.0%–2.4% (0.0%–3.2% after removing stratum without suicide) across the cities.

Japan

We collected data from 47 prefectures (see the full list in Table S2) from 1 January 1973 to 31 December 2012. Daily suicide counts were obtained from the Ministry of Health, Labour and Welfare, Japan. Daily mean temperature and relative humidity and the daily total of sunshine duration were obtained from the Japan Meteorological Agency. The missing rates for the daily series of temperature ranged 0.0%–0.1% (0.0%–0.1% after removing stratum without suicide) across the prefectures.

Korea (South)

We collected data from 6 cities (see the full list in Table S2) from 1 January 1992 to 31 December 2013. Daily suicide counts were obtained from Statistics Korea, Ministry of Strategy and Finance in South Korea. Daily mean temperature and relative humidity and the daily total of sunshine duration were obtained from the Korea Meteorological Administration. The missing rates for the daily series of temperature ranged 0.0%–0.0% across the cities.

Philippines

We collected data from 4 cities (see the full list in Table S2) from 1 January 2006 to 31 December 2010. Daily suicide counts were obtained from the Philippine Statistics Authority-National Statistics Office. Daily mean temperature series were obtained from the National Oceanic and Atmospheric Administration. The missing rates for the daily series of temperature ranged 0.0%–0.8% (0.0%–0.7% after removing stratum without suicide) across the cities.

South Africa

We collected data from 52 districts from 1 January 2000 to 31 December 2013 and excluded 13 districts (6 with substantial missing values of temperature above 30% and 7 with a few suicides less than 30 for the entire study period). Therefore, a total of 39 districts were included in our study (see the full list in Table S2). Daily suicide counts were kindly supplied by Statistics South Africa, who had no role in the data analysis or interpretation. It is likely that the suicide dataset was underreported, compared with the previous publications (Pillay-van Wyk et al. 2016; WHO 2014). Daily mean temperature was obtained from the Agricultural Research Council of South Africa and the National Oceanographic and Atmospheric Association (NOAA) of the United States; the latter was also the source of the daily total of sunshine duration. The missing rates for the daily series of temperature ranged 0.0%–28.9% (0.0%–22.2% after removing stratum without suicide) across the districts.

Spain

We collected data from 52 provincial capital cities from 1 January 1990 to 31 December 2013 and excluded two cities (Palencia with no temperature data since 1991 and Ceuta with no temperature data before 2003). A total of 50 cities were included in our study (see the full list in Table S2). Daily suicide counts were obtained from Spain National Institute of Statistics. Daily mean temperature and the daily total of sunshine duration were obtained from Spain National Meteorology Agency. The missing rates for the daily series of temperature ranged 0.0%–16.8% (0.0%–15.2% after removing stratum without suicide) across the cities.

Switzerland

We collected data from 8 regions (cantons; see the full list in Table S2) from 1 January 1995 to 31 December 2013. Daily suicide counts were obtained from the Federal Office of Statistics. The suicide data includes in part assisted suicide from 1995 to 2008. Daily mean temperature, relative humidity, and the daily total of sunshine duration were collected from the IDAWEB web database (a service provided by MeteoSwiss, the Swiss Federal Office of Meteorology and Climatology, MeteoSwiss). A single weather station within each canton was selected (Basel-Stadt: Basel/Binningen; Berne: Berne/Zollikofen;
Geneva: Genève/Cointrin; Ticino: Lugano; Lucerne: Lucerne; Vaud: Pully; St. Gallen: St. Gallen; Zurich: Zurich/Fluntern). The missing rates for the daily series of temperature ranged 0.0%–0.0% across the regions.

Taiwan

We collected data from 3 cities (see the full list in Table S2) from 1 January 1994 to 31 December 2007. Daily suicide counts were obtained from the Department of Statistics, Ministry of Health and Welfare in Taiwan. Daily mean temperature, relative humidity, and the daily total of sunshine duration were obtained from the Taiwan Environmental Protection Administration. The missing rates for the daily series of temperature ranged 0.0%–0.0% across the cities.

UK

We collected data from 10 regions in England and Wales (see the full list in Table S2) from 1 January 1990 to 31 December 2011. Daily suicide counts were obtained from the Office of National Statistics. Daily mean temperature and the daily total of sunshine duration were obtained from the British Atmospheric Data Centre. The missing rates for the daily series of temperature ranged 0.0%–0.0% across the regions.

USA

We collected data from 135 cities from 1 January 2001 to 31 December 2005 and excluded Honolulu with no suicide in the study period. A total of 134 cities were included in our study (see the full list in Table S2). Daily suicide counts were obtained from the National Center for Health Statistics. Daily mean temperature and relative humidity were obtained from the National Climate Data Center of the National Oceanic and Atmospheric Administration. The missing rates for the daily series of temperature ranged 0.0%–11.2% (0.0%–11.7% after removing stratum without suicide) across the cities.

Vietnam

We collected data from Ho Chi Minh City from 1 January 2010 to 31 December 2013. Daily suicide counts were obtained from the official book named A6 provided by Vietnam Ministry of Health. Daily mean temperature and relative humidity were obtained from the National Climate Data Center of the National Oceanic and Atmospheric Administration. There was no missing of the daily series of temperature.

Table S1. Summary statistics of other weather variables and additional information by country.

Country	Latitude[a]	Longitude[a]	Relative humidity (RH)[b]	Locations for RH	Sunshine hours (SH)[b]	Locations for SH	Days with high temperature[c]	RR per 1 °C increase[d]
Brazil	-14.4 (-30.0, -3.1)	-43.4 (-60.0, -35.2)	76.1 (64.3–83.9)	13	NA	NA	182 (41–339)	1.042 (1.005, 1.080)
Canada	45.5 (42.3, 53.5)	-81.1 (-123.3, -52.7)	73.1 (61.7–83.5)	24	NA	NA	3 (0–6)	1.010 (1.006, 1.014)
Japan	35.2 (26.2, 43.1)	136.2 (127.7, 141.3)	70.0 (62.0–77.4)	47	5.3 (4.4–6.1)	47	59 (45–69)	1.013 (1.011, 1.014)
South Korea	36.1 (35.2, 37.6)	127.2 (126.6, 129.1)	64.5 (58.9–68.3)	6	6.0 (5.5–6.3)	6	43 (41–49)	1.016 (1.013, 1.019)
Philippines	12.4 (7.1, 14.7)	122.5 (121.0, 125.6)	NA	NA	NA	NA	358 (354–360)	1.061 (0.924, 1.218)
South Africa	-28.6 (-34.5, -23.3)	27.6 (18.0, 32.5)	NA	NA	NA	NA	15 (3–47)	1.031 (1.014, 1.049)
Spain	40.7 (28.2, 43.5)	-3.7 (-16.3, 2.8)	NA	NA	7.1 (4.5–8.3)	50	29 (7–57)	1.017 (1.010, 1.024)
Switzerland	47.0 (46.0, 47.6)	7.9 (6.1, 9.4)	74.2 (68.6–77.5)	8	4.9 (4.1–5.9)	8	3 (1–4)	1.013 (1.007, 1.020)
Taiwan	24.2 (22.6, 25.0)	120.7 (120.3, 121.6)	75.6 (74.8–76.1)	3	5.3 (4.0–6.1)	3	177 (166–198)	1.031 (1.021, 1.042)
UK	52.4 (51.0, 55.0)	-1.5 (-3.7, 0.4)	NA	NA	4.3 (3.9–4.6)	10	0 (0–0)	1.014 (1.009, 1.018)
USA	39.0 (25.8, 47.7)	-83.4 (-122.7, -70.3)	67.0 (29.8–77.2)	134	NA	NA	37 (17–95)	1.008 (1.005, 1.011)
Vietnam	10.8 (10.8, 10.8)	106.7 (106.7, 106.7)	74.1 (74.1–74.1)	1	NA	NA	363 (363–363)	1.169 (0.993, 1.375)
Total				236		124		

[a] Median values and ranges (minimum and maximum) of the location-specific latitude and longitude.

[b] Mean values and ranges (minimum and maximum) of the location-specific relative humidity and sunshine duration over the study periods. NA: not applicable.

[c] Median values and IQRs (25th–75th percentiles) of the annual number of hotter days, defined as the daily mean temperature above 25 ºC that is the absolute mean temperature of maximum suicide temperature (MaxST) approximately between Japan and South Korea.

[d] The RRs per 1 °C increase in temperature. The point estimates of the RRs varied considerably in the range of temperature distributions: from the broader ranges in north America (the USA and Canada), temperate regions (Japan, Switzerland, the UK, Spain, and South Korea), subtropics (South Africa, Brazil, and Taiwan), to the narrower ranges in tropics (the Philippines and Vietnam).

Table S2. Location-specific total number of suicide, average temperature (°C), maximum suicide temperature (°C) (MaxST) and lag-cumulative relative risk (RR) for the MaxST vs. MinST, estimated by using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day-of-week from the first-stage modeling.

Country	Location	Suicide	Temperature	MaxST	RR (95% CI)
Brazil	Belo Horizonte	843	22.0	23.2	1.4 (0.97, 2.04)
Brazil	Brasilia	622	21.3	22.1	1.35 (0.88, 2.07)
Brazil	Campo Grande	266	25.8	27.9	0.84 (0.43, 1.63)
Brazil	Curitiba	635	17.6	19.6	0.97 (0.61, 1.54)
Brazil	Fortaleza	886	27.0	27.5	1.61 (1.00, 2.59)
Brazil	Maceio	169	24.9	25.7	2.05 (0.82, 5.09)
Brazil	Manaus	442	27.1	27.8	0.96 (0.58, 1.59)
Brazil	Natal	140	19.7	22.2	0.87 (0.33, 2.32)
Brazil	Porto Alegre	800	19.7	22.2	1.51 (0.98, 2.33)
Brazil	Salvador	178	25.7	26.5	0.91 (0.35, 2.39)
Brazil	Sao Paulo	3301	20.3	22.0	0.99 (0.80, 1.23)
Brazil	Teresina	301	27.6	28.4	1.78 (0.85, 3.73)
Brazil	Vitoria	218	26.8	27.3	0.60 (0.27, 1.34)
Canada	Abbotsford	253	10.7	22.7	4.14 (0.62, 27.71)
Canada	Calgary	1656	4.6	21.2	1.66 (0.96, 2.88)
Canada	Edmonton	2290	4.8	23.0	1.28 (0.77, 2.11)
Canada	Halifax	566	6.4	23.1	2.12 (0.71, 6.33)
Canada	Hamilton	536	7.9	25.7	1.19 (0.40, 3.53)
Canada	Kingston	313	7.4	25.3	2.07 (0.44, 9.78)
Canada	Kitchener - Waterloo	426	7.1	25.1	1.58 (0.48, 5.21)
Canada	London	581	8.0	25.8	0.67 (0.22, 2.03)
Canada	Montreal	4022	6.7	25.7	1.33 (0.90, 1.99)
Canada	Niagara	621	9.1	26.2	1.66 (0.62, 4.45)
Canada	Oakville	384	8.3	26.0	2.31 (0.55, 9.70)
Canada	Oshawa	453	7.6	24.9	3.80 (1.06, 13.59)
Canada	Ottawa	1281	6.4	25.9	2.44 (1.18, 5.02)
Canada	Regina	426	3.4	24.5	1.69 (0.56, 5.09)
Canada	Saint John NB	276	5.1	20.9	0.54 (0.11, 2.69)
Canada	Sarnia	179	8.7	26.9	5.87 (1.01, 34.13)
Canada	Saskatoon	456	2.7	24.0	1.23 (0.41, 3.65)
Canada	Sault Ste. Marie	218	4.9	23.5	5.92 (1.25, 28.1)

Canada	St. John NFL	275	4.8	20.9	0.46 (0.09, 2.33)
Canada	Sudbury	429	4.1	24.5	1.61 (0.49, 5.32)
Canada	Thunder bay	328	2.9	22.7	0.84 (0.2, 3.46)
Canada	Toronto	4896	8.1	26.5	1.75 (1.18, 2.59)
Canada	Vancouver	2450	10.6	21.2	1.41 (0.81, 2.46)
Canada	Victoria	496	10.2	20.4	0.72 (0.24, 2.16)
Canada	Windsor	524	9.9	27.7	1.13 (0.36, 3.56)
Canada	Winnipeg	1284	3.1	25.1	1.88 (1.00, 3.54)
Japan	Aichi	46915	15.7	25.8	1.19 (1.04, 1.36)
Japan	Akita	15016	11.7	23.6	1.47 (1.16, 1.86)
Japan	Aomori	14835	10.3	22.4	1.71 (1.36, 2.16)
Japan	Chiba	37585	15.7	25.5	1.30 (1.13, 1.51)
Japan	Ehime	12820	16.3	25.8	1.16 (0.91, 1.47)
Japan	Fukui	6305	14.5	25.4	1.48 (1.05, 2.09)
Japan	Fukuoka	39820	16.9	25.9	1.22 (1.07, 1.40)
Japan	Fukushima	17515	13.0	23.9	1.31 (1.07, 1.61)
Japan	Gifu	16552	15.8	26.4	1.38 (1.10, 1.72)
Japan	Gunma	17283	14.5	25.8	1.49 (1.21, 1.83)
Japan	Hiroshima	21819	15.9	26.8	1.38 (1.14, 1.67)
Japan	Hokkaido	47342	8.8	21.5	1.52 (1.33, 1.74)
Japan	Hyogo	42307	16.3	26.4	1.33 (1.16, 1.53)
Japan	Ibaraki	21673	13.6	24.1	1.33 (1.10, 1.60)
Japan	Ishikawa	8731	14.6	25.2	1.09 (0.81, 1.48)
Japan	Iwate	16034	10.2	22.0	1.52 (1.21, 1.91)
Japan	Kagawa	7786	16.1	26.4	1.54 (1.12, 2.13)
Japan	Kagoshima	16712	18.3	26.8	1.38 (1.13, 1.68)
Japan	Kanagawa	52862	15.7	24.9	1.27 (1.13, 1.43)
Japan	Kochi	8019	16.9	26.2	1.31 (0.97, 1.76)
Japan	Kumamoto	15142	16.8	26.4	1.41 (1.14, 1.75)
Japan	Kyoto	19373	15.8	26.7	1.51 (1.24, 1.84)
Japan	Mie	12964	15.8	26.9	1.43 (1.10, 1.86)
Japan	Miyagi	17308	12.4	23.6	1.37 (1.11, 1.68)
Japan	Miyazaki	11839	17.5	26.9	1.75 (1.37, 2.23)
Japan	Nagano	17761	11.9	23.9	1.58 (1.28, 1.95)
Japan	Nagasaki	12655	17.1	26.6	1.52 (1.20, 1.92)
Japan	Nara	9058	14.8	25.3	1.20 (0.90, 1.61)

Japan	Niigata	26981	13.8	25.4	1.52 (1.27, 1.83)
Japan	Oita	10164	16.3	25.8	1.20 (0.91, 1.59)
Japan	Okayama	13825	15.9	26.2	1.50 (1.18, 1.91)
Japan	Okinawa	10063	22.9	28.4	1.39 (1.10, 1.76)
Japan	Osaka	68076	16.8	26.2	1.24 (1.12, 1.39)
Japan	Saga	6958	16.5	26.5	1.53 (1.10, 2.11)
Japan	Saitama	45259	14.9	25.5	1.23 (1.08, 1.41)
Japan	Shiga	8977	14.6	25.0	1.42 (1.05, 1.93)
Japan	Shimane	8270	14.8	25.4	1.66 (1.23, 2.24)
Japan	Shizuoka	25607	16.5	25.8	1.38 (1.16, 1.63)
Japan	Tochigi	16532	13.7	24.1	1.32 (1.06, 1.65)
Japan	Tokushima	6315	16.5	26.2	1.41 (1.00, 2.00)
Japan	Tokyo	87045	16.2	25.9	1.27 (1.15, 1.39)
Japan	Tottori	5156	14.8	25.4	1.35 (0.93, 1.95)
Japan	Toyama	10355	14.0	25.7	1.65 (1.25, 2.18)
Japan	Wakayama	9975	16.6	26.5	1.45 (1.09, 1.92)
Japan	Yamagata	11630	11.7	23.9	1.56 (1.19, 2.05)
Japan	Yamaguchi	13966	15.3	25.7	1.52 (1.21, 1.91)
Japan	Yamanashi	7161	14.6	25.4	1.44 (1.03, 2.01)
South Korea	Busan	16111	14.9	24.3	1.45 (1.18, 1.78)
South Korea	Daegu	9637	14.4	25.6	1.43 (1.10, 1.86)
South Korea	Daejeon	5812	13.0	24.9	1.48 (1.04, 2.10)
South Korea	Gwangju	4913	14.0	25.2	1.77 (1.22, 2.59)
South Korea	Incheon	11535	12.4	24.4	1.64 (1.27, 2.12)
South Korea	Seoul	35817	12.8	25.4	1.78 (1.54, 2.05)
Philippines	Cebu	254	28.0	28.1	1.43 (0.68, 2.98)
Philippines	Davao	214	28.3	28.6	0.83 (0.38, 1.81)
Philippines	Manila	509	28.6	28.7	0.95 (0.59, 1.52)
Philippines	Quezon	290	27.4	27.4	1.78 (0.95, 3.33)
South Africa	Alfred Nzo	89	16.6	25.7	0.94 (0.07, 12.33)
South Africa	Amathole	200	17.9	27.9	0.74 (0.13, 4.13)
South Africa	Bojanala	69	18.7	26.5	3.60 (0.09, 147.61)
South Africa	Buffalo City	37	12.4	19.8	0.19 (0.01, 7.40)
South Africa	Cape Winelands	85	15.8	26.3	1.01 (0.16, 6.42)
South Africa	Capricorn	30	19.3	26.5	84.18 (0.87, 8120.45)
South Africa	Chris Hani	59	15.6	25.8	0.40 (0.02, 6.60)

South Africa	City of Cape Town	439	17.8	27.1	1.46 (0.47, 4.46)
South Africa	City of Johannesburg	74	16.5	23.6	3.31 (0.18, 60.56)
South Africa	City of Tshwane	117	16.1	23.9	0.47 (0.03, 6.38)
South Africa	Dr Kenneth Kaunda	60	18.2	27.1	3.60 (0.22, 58.16)
South Africa	Dr Ruth Segomotsi Mompati	35	20.0	29.4	0.33 (0.00, 136.32)
South Africa	Eden	174	17.7	28.5	3.18 (0.39, 26.02)
South Africa	Ehlanzeni	255	20.4	27.5	0.91 (0.19, 4.49)
South Africa	Ekurhuleni	49	16.3	23.5	0.09 (0.00, 15.06)
South Africa	Frances Baard	135	18.9	28.3	4.03 (0.46, 35.50)
South Africa	Gert Sibande	197	16.4	23.3	0.78 (0.13, 4.66)
South Africa	Joe Gqabi	45	16.0	25.0	4.17 (0.12, 141.44)
South Africa	Lejweleputswa	130	17.1	26.1	1.67 (0.20, 13.9)
South Africa	Mangaung	113	16.6	26.2	12.40 (0.94, 163.73)
South Africa	Mopani	293	21.7	29.8	3.62 (0.77, 17.06)
South Africa	Namakwa	47	18.8	29.4	1.56 (0.10, 25.32)
South Africa	Nelson Mandela Bay	149	17.7	25.6	42.14 (1.62, 1092.78)
South Africa	Ngaka Modiri Molema	240	19.8	27.6	4.17 (0.90, 19.23)
South Africa	Nkangala	65	16.1	23.6	0.02 (0.00, 1.69)
South Africa	O. R. Tambo	59	17.1	26.6	174.82 (0.39, 77958.33)
South Africa	Overberg	73	16.9	26.5	4.88 (0.16, 150.61)
South Africa	Pixley ka Seme	77	18.1	27.8	16.7 (1.13, 246.66)
South Africa	Sisonke	326	14.2	22.0	1.42 (0.24, 8.41)
South Africa	Siyanda	312	20.6	31.3	1.13 (0.26, 4.84)
South Africa	Thabo Mofutsanyane	46	14.9	22.6	4.60 (0.07, 320.43)
South Africa	Ugu	110	21.2	26.9	1.73 (0.27, 11.17)
South Africa	West Coast	38	19.2	30.5	0.49 (0.02, 11.97)
South Africa	eThekwini	96	21.5	28.1	5.83 (0.75, 45.38)
South Africa	uMgungundlovu	175	14.1	22.3	2.53 (0.34, 18.72)
South Africa	uMkhanyakude	90	22.5	29.9	5.41 (0.30, 98.55)
South Africa	uMzinyathi	208	16.1	25.0	1.34 (0.16, 10.93)
South Africa	uThukela	58	15.6	23.1	8.86 (0.16, 482.85)
South Africa	uThungulu	274	22.7	30.9	0.73 (0.21, 2.48)
Spain	A Coruna	532	15.0	23.0	0.84 (0.30, 2.38)
Spain	Albacete	227	14.5	28.4	3.30 (0.64, 16.97)
Spain	Alicante	585	18.4	28.4	1.33 (0.44, 4.08)
Spain	Almeria	321	19.1	30.4	5.47 (1.26, 23.68)

Spain	Avila	63	11.2	25.7	1.00 (0.03, 31.78)
Spain	Badajoz	141	17.2	30.8	1.53 (0.13, 17.44)
Spain	Barcelona	2578	16.4	27.6	1.71 (0.91, 3.23)
Spain	Bilbao	662	14.8	26.0	1.98 (0.90, 4.33)
Spain	Burgos	308	10.9	24.6	1.66 (0.54, 5.15)
Spain	Caceres	99	16.4	31.2	3.95 (0.23, 68.11)
Spain	Cadiz	242	18.6	29.0	1.72 (0.33, 8.92)
Spain	Castellon	317	17.8	28.2	2.92 (0.67, 12.78)
Spain	Ciudad Real	88	15.8	30.6	0.33 (0.04, 3.10)
Spain	Cordoba	489	18.3	31.8	1.01 (0.33, 3.11)
Spain	Cuenca	87	13.4	27.8	5.06 (0.34, 74.54)
Spain	Girona	117	15.0	27.2	1.11 (0.08, 16.24)
Spain	Granada	520	21.3	27.6	0.49 (0.17, 1.36)
Spain	Guadalajara	94	13.4	27.4	3.00 (0.23, 38.97)
Spain	Huelva	186	18.3	30.1	1.23 (0.20, 7.64)
Spain	Huesca	103	14.2	28.8	1.87 (0.21, 16.94)
Spain	Jaen	233	17.0	31.7	1.47 (0.36, 5.95)
Spain	Palmas G. Canaria	671	21.3	27.6	1.21 (0.40, 3.69)
Spain	Leon	223	11.1	24.9	1.81 (0.43, 7.53)
Spain	Lleida	238	15.2	28.8	2.31 (0.55, 9.64)
Spain	Logrono	296	14.1	27.8	0.83 (0.22, 3.06)
Spain	Lugo	228	12.1	23.4	1.00 (0.24, 4.08)
Spain	Madrid	2180	15.2	29.9	1.17 (0.66, 2.05)
Spain	Malaga	1113	18.7	30.2	1.68 (0.73, 3.84)
Spain	Palma Mallorca	553	16.8	28.2	1.99 (0.63, 6.24)
Spain	Melilla	66	19.1	29.0	1.20 (0.01, 115.59)
Spain	Murcia	585	18.8	30.4	2.78 (0.87, 8.86)
Spain	Ourense	233	15.1	27.4	1.87 (0.40, 8.75)
Spain	Oviedo	517	13.3	23.2	2.44 (1.08, 5.47)
Spain	Pamplona	413	13.1	27.2	1.66 (0.42, 6.58)
Spain	Pontevedra	133	14.8	25.4	1.20 (0.23, 6.32)
Spain	Salamanca	242	12.3	25.7	1.33 (0.27, 6.50)
Spain	San Sebastian	344	13.7	24.8	5.14 (1.27, 20.80)
Spain	Santander	207	14.6	23.9	0.27 (0.06, 1.16)
Spain	Segovia	78	12.4	27.5	1.06 (0.05, 24.16)
Spain	Sevilla	1173	19.5	32.4	1.43 (0.69, 2.97)

Spain	Soria	105	11.1	24.8	6.39 (0.20, 204.57)
Spain	Tarragona	226	17.9	29.4	0.57 (0.12, 2.77)
Spain	Tenerife	337	21.6	28.4	1.34 (0.22, 8.18)
Spain	Teruel	67	12.3	25.7	1.98 (0.11, 34.36)
Spain	Toledo	82	16.0	30.8	14.22 (0.71, 285.31)
Spain	Valencia	1458	18.5	28.6	2.34 (1.14, 4.78)
Spain	Valladolid	605	12.9	27.2	1.21 (0.37, 3.92)
Spain	Vitoria	447	11.9	25.1	1.28 (0.46, 3.58)
Spain	Zamora	110	13.3	27.5	3.02 (0.31, 29.60)
Spain	Zaragoza	1076	15.7	29.8	0.99 (0.42, 2.31)
Switzerland	Basel-Stadt	1435	9.7	24.2	2.00 (1.09, 3.65)
Switzerland	Berne	3366	9.4	23.6	1.81 (1.20, 2.72)
Switzerland	Geneva	1341	9.9	24.3	1.05 (0.54, 2.08)
Switzerland	Vaud	2081	10.8	25.0	1.22 (0.72, 2.05)
Switzerland	Ticino	670	8.6	23.5	0.69 (0.28, 1.70)
Switzerland	Lucerne	1019	12.9	25.9	1.75 (0.76, 4.03)
Switzerland	St. Gallen	1533	11.3	25.2	1.69 (0.91, 3.13)
Switzerland	Zurich	4577	11.0	25.3	1.37 (0.95, 1.98)
Taiwan	Kaohsiung	5050	25.2	29.3	2.07 (1.54, 2.79)
Taiwan	Taichung	3352	23.6	28.8	1.95 (1.34, 2.84)
Taiwan	Taipei	9481	23.2	29.0	1.49 (1.24, 1.79)
UK	East	7502	10.4	21.4	1.46 (1.09, 1.94)
UK	East Midlands	6120	10.0	21.0	1.46 (1.07, 2.00)
UK	London	8976	11.6	23.2	1.46 (1.13, 1.87)
UK	North East	3806	9.4	19.5	1.42 (0.97, 2.07)
UK	North West	11074	10.0	19.7	1.12 (0.90, 1.40)
UK	South East	12089	10.7	21.2	1.22 (0.97, 1.52)
UK	South West	8011	10.6	20.2	1.16 (0.89, 1.52)
UK	Wales	5329	10.2	19.7	1.28 (0.92, 1.77)
UK	West Midlands	7438	10.0	20.8	1.62 (1.22, 2.14)
UK	Yorkshire & Humber	7770	9.9	20.6	1.52 (1.16, 2.00)
USA	Akron, OH	367	10.2	25.3	1.97 (0.70, 5.54)
USA	Albuquerque, NM	620	14.6	29.2	0.94 (0.29, 2.99)
USA	Allentown-Bethlehem, PA	227	11.1	25.8	1.61 (0.40, 6.53)
USA	Atlanta, GA	1603	17.0	28.9	1.03 (0.54, 1.97)
USA	Atlantic City, NJ	134	12.6	29.4	22.59 (1.49, 343.68)

USA	Austin, TX	605	21.0	31.9	0.97 (0.34, 2.76)
USA	Bakersfield, CA	419	18.8	33.6	0.74 (0.22, 2.52)
USA	Baltimore, MD	731	13.2	28.6	0.90 (0.38, 2.11)
USA	Barnstable-Yarmouth, MA	120	10.7	25.8	1.42 (0.11, 18.69)
USA	Baton Rouge, LA	221	20.1	30.0	2.18 (0.35, 13.62)
USA	Bergen-Passaic, NJ	474	13.1	30.3	1.08 (0.27, 4.38)
USA	Birmingham, AL	649	17.4	29.5	1.12 (0.38, 3.29)
USA	Boston, MA	957	11.0	27.2	1.49 (0.66, 3.34)
USA	Brownsville, TX	116	24.0	31.4	1.14 (0.16, 8.15)
USA	Buffalo, NY	381	9.5	25.3	1.58 (0.52, 4.80)
USA	Canton-Massillon, OH	213	10.2	25.3	7.51 (1.70, 33.04)
USA	Charleston, WV	173	13.3	26.7	0.78 (0.13, 4.70)
USA	Charlotte, NC	420	15.8	28.3	0.82 (0.21, 3.17)
USA	Chattanooga, TN	206	16.3	29.2	0.78 (0.08, 7.24)
USA	Chicago, IL	2886	10.4	28.6	1.27 (0.79, 2.03)
USA	Cincinnati, OH	513	12.6	26.7	0.79 (0.28, 2.20)
USA	Cleveland, OH	1197	10.7	25.6	0.78 (0.46, 1.35)
USA	Columbia, SC	326	17.8	30.3	0.67 (0.16, 2.89)
USA	Columbus, OH	658	12.0	27.2	2.68 (1.03, 6.98)
USA	Dallas, TX	1263	19.4	32.8	0.86 (0.39, 1.91)
USA	Dayton, OH	395	11.3	26.4	1.32 (0.40, 4.30)
USA	Daytona Beach, FL	537	21.8	29.2	0.45 (0.15, 1.33)
USA	Denver, CO	1419	10.6	26.9	1.51 (0.78, 2.90)
USA	Des Moines, IA	263	10.9	28.1	1.02 (0.26, 4.03)
USA	Detroit, MI	2386	10.5	26.4	0.87 (0.58, 1.29)
USA	Dutchess County, NY	96	10.4	27.2	0.50 (0.04, 6.37)
USA	El Paso, TX	291	18.6	32.2	1.99 (0.38, 10.33)
USA	Erie, PA	158	10.1	25.8	0.63 (0.11, 3.47)
USA	Flint, MI	287	9.1	26.1	3.54 (1.03, 12.12)
USA	Fort Myers-Cape Coral, FL	494	23.7	29.7	0.90 (0.23, 3.63)
USA	Fort Pierce-Port St. Lucie, FL	327	23.0	29.2	1.54 (0.40, 5.97)
USA	Fort Worth-Arlington, TX	917	19.1	33.1	1.68 (0.62, 4.57)
USA	Fresno, CA	436	18.3	33.1	1.04 (0.30, 3.55)
USA	Ft. Lauderdale, FL	1267	22.9	29.4	1.65 (0.78, 3.48)
USA	Galveston, TX	208	20.5	29.4	1.06 (0.14, 8.16)
USA	Gary, IN	274	10.2	26.9	1.76 (0.41, 7.53)

USA	Grand Rapids, MI	292	9.4	26.1	0.63 (0.17, 2.41)
USA	Greensboro, NC	269	15.2	28.3	2.64 (0.52, 13.50)
USA	Greenville, SC	303	16.2	28.6	0.81 (0.16, 4.24)
USA	Hamilton, OH	227	12.6	27.2	2.14 (0.35, 12.94)
USA	Harrisburg-Carlisle, PA	140	12.2	28.1	0.23 (0.02, 2.17)
USA	Hartford, CT	393	10.5	27.2	2.07 (0.65, 6.53)
USA	Houston, TX	2072	21.1	30.9	1.80 (1.07, 3.04)
USA	Indianapolis, IN	618	12.1	27.2	0.82 (0.31, 2.12)
USA	Jacksonville, FL	674	20.3	29.4	2.39 (0.81, 7.09)
USA	Jersey City, NJ	162	13.1	30.3	3.47 (0.29, 41.67)
USA	Kansas City, MO-KS	1077	13.3	31.1	1.26 (0.55, 2.90)
USA	Knoxville, TN	410	15.3	28.1	1.44 (0.38, 5.47)
USA	Lakeland-Winter Haven, FL	389	22.7	29.2	0.31 (0.07, 1.31)
USA	Lancaster, PA	250	12.0	28.3	2.84 (0.57, 14.12)
USA	Lansing, MI	145	9.0	26.1	0.96 (0.12, 7.45)
USA	Las Vegas, NV-AZ	1891	20.9	37.5	2.07 (1.10, 3.89)
USA	Little Rock, AR	272	17.2	30.9	1.71 (0.36, 8.16)
USA	Los Angeles, CA	4167	17.2	24.7	1.48 (1.01, 2.16)
USA	Louisville, KY	525	14.7	28.9	1.30 (0.45, 3.74)
USA	Lubbock, TX	172	16.4	30.6	31.53 (4.36, 227.84)
USA	Madison, WI	300	8.7	25.3	1.70 (0.52, 5.55)
USA	McAllen-Edinburg-Mission, TX	176	24.3	32.8	0.45 (0.06, 3.38)
USA	Melbourne-Titusville-Palm Bay, FL	542	22.5	29.2	2.65 (0.78, 9.06)
USA	Memphis, TN	519	17.5	31.1	2.24 (0.67, 7.52)
USA	Miami, FL	1207	25.0	30.6	1.78 (0.81, 3.91)
USA	Middlesex, NJ	244	12.0	28.7	0.86 (0.18, 4.21)
USA	Milwaukee, WI	784	9.3	27.0	1.18 (0.54, 2.58)
USA	Minneapolis-St. Paul, MN	887	8.7	28.9	2.57 (1.03, 6.38)
USA	Mobile, AL	233	19.8	29.2	0.63 (0.13, 3.00)
USA	Monmouth-Ocean, NJ	515	12.1	28.9	0.70 (0.22, 2.20)
USA	Myrtle Beach, SC	186	17.8	29.4	2.42 (0.34, 16.93)
USA	Naples, FL	210	24.1	30.0	18.46 (1.56, 218.44)
USA	Nashua, NH	237	9.0	25.8	1.58 (0.32, 7.85)
USA	Nashville, TN	458	15.7	29.4	5.25 (1.40, 19.6)
USA	Nassau-Suffolk, NY	827	11.5	28.1	1.03 (0.34, 3.08)
USA	New Haven-Meriden, CT	398	10.5	27.2	2.62 (0.82, 8.37)

USA	New London, CT	151	10.7	26.9	0.89 (0.13, 6.08)
USA	New York, NY	2642	13.5	30.3	1.23 (0.72, 2.10)
USA	Newark, NJ	393	13.1	30.3	2.65 (0.63, 11.18)
USA	Newburgh, NY	125	9.7	25.6	0.23 (0.03, 1.67)
USA	Oakland, CA	1184	15.3	23.1	0.67 (0.38, 1.17)
USA	Ocala, FL	302	21.7	29.4	5.53 (0.93, 32.78)
USA	Oklahoma City, OK	570	16.2	31.7	1.27 (0.40, 4.03)
USA	Omaha, NE	277	11.3	30.6	0.91 (0.21, 3.88)
USA	Orange County, CA	1376	18.7	27.5	1.15 (0.58, 2.26)
USA	Orlando, FL	851	22.7	29.7	1.44 (0.54, 3.82)
USA	Pensacola, FL	239	20.2	29.7	1.59 (0.27, 9.20)
USA	Philadelphia, PA-NJ	2580	13.6	30.0	0.94 (0.54, 1.65)
USA	Phoenix, AZ	2744	24.3	38.6	1.43 (0.87, 2.36)
USA	Pittsburgh, PA	868	11.0	25.8	1.93 (0.84, 4.44)
USA	Portland, ME	165	8.2	24.7	1.57 (0.19, 12.90)
USA	Portland, OR	1132	12.7	25.8	0.97 (0.48, 1.98)
USA	Providence-Fall River, RI-MA	116	11.1	28.6	0.60 (0.05, 7.57)
USA	Punta Gorda, FL	160	23.4	29.7	3.79 (0.57, 25.38)
USA	Raleigh, NC	337	16.0	29.4	5.62 (0.89, 35.62)
USA	Reading, PA	271	16.0	29.4	5.43 (0.96, 30.66)
USA	Riverside-San Bernardino, CA	2037	19.1	30.9	1.15 (0.68, 1.96)
USA	Rochester, NY	277	9.5	26.2	2.43 (0.47, 12.48)
USA	Rockford, IL	173	9.8	27.8	0.47 (0.07, 3.14)
USA	Sacramento, CA	917	16.4	28.9	2.00 (0.98, 4.07)
USA	Saginaw, MI	125	8.7	26.7	2.73 (0.40, 18.81)
USA	Salinas, CA	201	14.3	22.5	0.75 (0.20, 2.79)
USA	Salt Lake City, UT	805	11.9	29.2	1.16 (0.51, 2.60)
USA	San Antonio, TX	870	21.0	31.7	1.27 (0.51, 3.19)
USA	San Diego, CA	1758	17.6	25.0	1.67 (0.94, 2.97)
USA	San Francisco, CA	897	14.6	23.6	0.88 (0.45, 1.71)
USA	San Jose, CA	737	16.4	26.9	1.16 (0.54, 2.47)
USA	Sarasota-Bradenton, FL	594	23.1	29.7	1.12 (0.39, 3.17)
USA	Scranton--Wilkes-Barre--Hazleton, PA	435	10.1	25.6	1.96 (0.71, 5.41)
USA	Seattle, WA	1189	11.4	23.3	0.96 (0.52, 1.77)
USA	Shreveport, LA	166	19.2	31.4	3.09 (0.30, 31.76)
USA	Spokane, WA	396	9.0	25.6	1.49 (0.47, 4.72)

USA	Springfield, MA	212	10.5	28.1	5.81 (0.91, 37.12)
USA	St. Louis, MO-IL	1027	14.3	31.1	1.31 (0.55, 3.10)
USA	Stamford-Norwalk, CT	337	11.6	27.8	1.03 (0.16, 6.53)
USA	Stockton-Lodi, CA	300	16.7	30.0	2.85 (0.77, 10.62)
USA	Syracuse, NY	201	9.5	27.0	4.70 (0.66, 33.47)
USA	Tacoma, WA	549	12.3	22.5	1.18 (0.45, 3.11)
USA	Tampa-St. Petersburg-Clearwater, FL	811	23.0	30.0	0.96 (0.38, 2.44)
USA	Toledo, OH	316	10.6	26.9	1.38 (0.41, 4.67)
USA	Trenton, NJ	108	12.0	28.1	1.09 (0.14, 8.58)
USA	Tucson, AZ	867	21.2	34.2	0.90 (0.38, 2.12)
USA	Tulsa, OK	507	16.5	32.5	0.88 (0.32, 2.45)
USA	Utica-Rome, NY	122	8.3	24.4	5.08 (0.40, 63.83)
USA	Ventura County, CA	445	16.0	23.3	4.71 (1.59, 13.94)
USA	Virginia Beach, VA	766	16.0	30.0	1.82 (0.72, 4.59)
USA	Washington, DC-MD-VA	244	14.6	30.3	2.71 (0.50, 14.55)
USA	West Palm Beach-Boca Raton, FL	921	24.3	30.0	1.18 (0.48, 2.92)
USA	Wichita, KS	334	14.4	31.9	0.86 (0.23, 3.27)
USA	Wilmington, DE	311	12.7	28.9	1.76 (0.40, 7.72)
USA	Worcester, MA	319	9.2	24.7	1.34 (0.37, 4.83)
USA	York, PA	264	12.5	27.5	4.05 (0.77, 21.46)
USA	Youngstown-Warren, OH	258	9.8	24.8	1.00 (0.29, 3.44)
Vietnam	Ho Chi Minh City	460	28.5	30.0	1.73 (0.98, 3.04)

Table S3. P-values of the LRT (log-likelihood ratio test) between linear and nonlinear models with different number of internal knots of the distributed lag nonlinear function for temperature.

Level	**Name of locations**	**Linear vs. 1 knot**	**Linear vs. 2 knots**	**Linear vs. 3 knots**
Overall		<0.001*	<0.001*	<0.001*
Regional	Western countries [a]	0.195	0.359	0.114
	Eastern countries [b]	<0.001*	<0.001*	<0.001*
Country	Brazil	0.156	0.447	0.258
	Canada	0.175	0.174	0.020*
	Japan	<0.001*	<0.001*	<0.001*
	South Korea	0.454	0.082	0.031*
	Philippines	0.374	0.442	0.274
	South Africa	0.482	0.591	0.836
	Spain	0.757	0.501	0.217
	Switzerland	0.717	0.904	0.701
	Taiwan	0.381	0.370	0.183
	UK	0.684	0.702	0.563
	USA	0.110	0.242	0.194
	Vietnam	0.331	0.412	0.429
Capital [c]	Sao Paulo, Brazil	0.860	0.679	0.618
	Toronto, Canada	0.915	0.389	0.594
	Tokyo, Japan	0.008*	0.002*	0.017*
	Seoul, South Korea	0.146	0.002*	0.002*
	Manila, Philippines	0.637	0.782	0.622
	City of Cape Town, South Africa	0.928	0.513	0.364
	Barcelona, Spain	0.885	0.522	0.419
	Zurich, Switzerland	0.205	0.385	0.609
	Taipei, Taiwan	0.075	0.160	0.039*
	South East, UK	0.085	0.160	0.313
	Los Angeles, CA, USA	0.201	0.393	0.559
	Ho Chi Minh City, Vietnam	0.331	0.412	0.429

[a] Brazil, Canada, South Africa, Spain, Switzerland, UK, and US; [b] Japan, South Korea, Philippines, Taiwan, and Vietnam; [c] Location where the total number of suicides was the largest for each country; *<0.05

Table S4. Random-effects meta-regression models in the second-stage analysis.

Model	Predictor	Test for predictor[a]	Q-test[b]	I^2
Intercept only	-	-	0.158	3.3%
Single predictor	Temperature range	0.204	0.181	3.0%
	Summer temperature[c]	<0.001	0.221	2.6%
	Country	<0.001	0.585	1.0%
Two predictors	Temperature range	0.203	0.252	2.2%
	Summer temperature[c]	0.001		
Full model	Temperature range	0.449	0.590	1.0%
	Summer temperature[c]	0.395		
	Country	<0.001		

[a] *p*-value for the multivariate Wald test for the significance of the meta predictors.

[b] *p*-value for the Cochran Q-test.

[c] Summer temperature was defined as the average of daily ambient temperature during June to September in the countries in Northern Hemisphere and during December to March in the countries in Southern Hemisphere.

Table S5. Country-specific minimum suicide temperature (°C) (MinST) and maximum suicide temperature (°C) (MaxST) and pooled lag-cumulative relative risks (RRs) with 95% confidence intervals (CIs) by country in subgroup analyses by sex and age groups (young, < 65 years of age; elder, ≥ 65 years of age) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day-of-week.

	MinST[a]	MaxST[a]	Total[b]	Men[b]	Women[b]	Young[b]	Elder[b]
Brazil	21.4	24.8	1.15 (1.02–1.30)	1.10 (0.96-1.26)	1.33 (1.04-1.69)	NA	NA
Canada	-15.3	24.2	1.46 (1.26–1.70)	1.50 (1.26-1.78)	1.43 (1.06-1.93)	1.43 (1.22-1.68)	1.55 (1.02-2.33)
Japan	0.4	25.5	1.37 (1.32–1.41)	1.32 (1.27-1.38)	1.45 (1.37-1.52)	1.26 (1.22-1.31)	1.68 (1.59-1.79)
South Korea	-5.2	25.0	1.61 (1.46–1.78)	1.59 (1.40-1.81)	1.62 (1.37-1.92)	1.50 (1.35-1.67)	2.20 (1.77-2.73)
Philippines	26.0	28.2	1.14 (0.84–1.55)	1.04 (0.73-1.49)	1.29 (0.73-2.26)	NA	NA
South Africa	7.6	26.4	1.79 (1.30–2.46)	1.74 (1.18-2.55)	1.90 (0.91-3.96)	NA	NA
Spain	3.7	27.8	1.49 (1.27–1.76)	1.57 (1.29-1.92)	1.30 (0.97-1.76)	1.40 (1.15-1.71)	1.62 (1.22-2.16)
Switzerland	-4.7	24.6	1.47 (1.21–1.78)	1.46 (1.15-1.84)	1.52 (1.08-2.14)	1.48 (1.17-1.87)	1.42 (1.02-1.97)
Taiwan	13.1	29.2	1.65 (1.40–1.93)	1.56 (1.27-1.91)	1.88 (1.42-2.49)	1.71 (1.44-2.04)	1.39 (0.99-1.94)
UK	-0.7	20.7	1.34 (1.22–1.46)	1.39 (1.25-1.54)	1.20 (1-10.44)	1.34 (1.22-1.47)	1.33 (1.07-1.64)
USA	-3.6	28.8	1.31 (1.19–1.44)	1.29 (1.15-1.44)	1.15 (0.94-1.42)	1.21 (1.08-1.35)	1.54 (1.20-1.97)
Vietnam	26.5	30.0	1.73 (0.98–3.05)	1.74 (0.91-3.34)	1.57 (0.55-4.46)	NA	NA

[a]Median values of the location-specific MinST and MaxST, repectively.

[b]RR (95% CI) for MaxST vs. MinST. All 341 locations were included for total. The subgroup analyses included 245 locations for sex and 206 locations for age groups because of the low numbers of suicide cases in women and older adults in small cities/regions. Data not shown (NA: not applicable) for age groups in Brazil, the Philippines, South Africa, and Vietnam, where the results were highly unstable due to the low suicide cases.

(A)

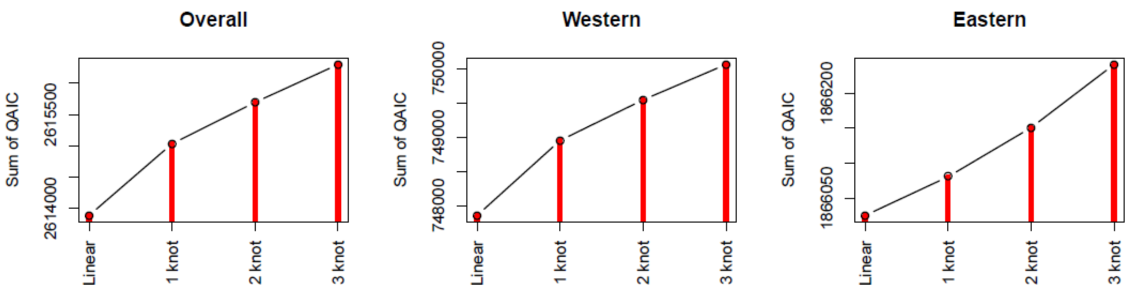

Figure S1. Quasi-Akaike Information Criteria (AIC modified with overdispersion) between linear and nonlinear models using a quadratic B-spline with one to three internal knots for the temperature-suicide association (A) pooled across all locations, locations in western countries (Brazil, Canada, South Africa, Spain, Switzerland, UK, and US), and locations in eastern countries (Japan, South Korea, Philippines, Taiwan, and Vietnam), (B) pooled for each country, and (C) in capital cities/regions where the number of suicides was largest for each country. BR, Brazil; CA, Canada; JP, Japan; KR, South Korea; PH, the Philippines; SA, South Africa; SP, Spain; SW, Switzerland; TW, Taiwan; UK, the UK; US, the United States; VN, Vietnam.

(B)

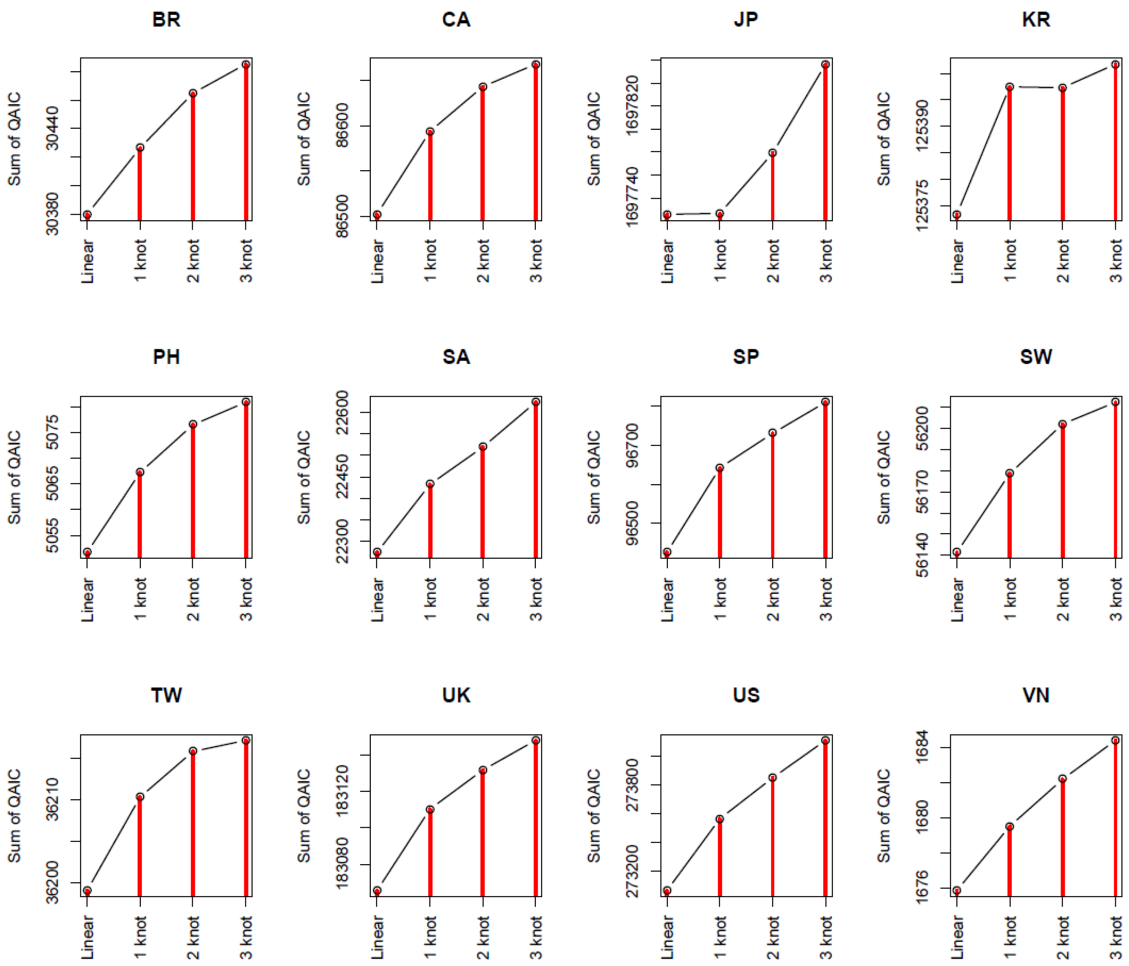

Figure S1. (continued).

(C)

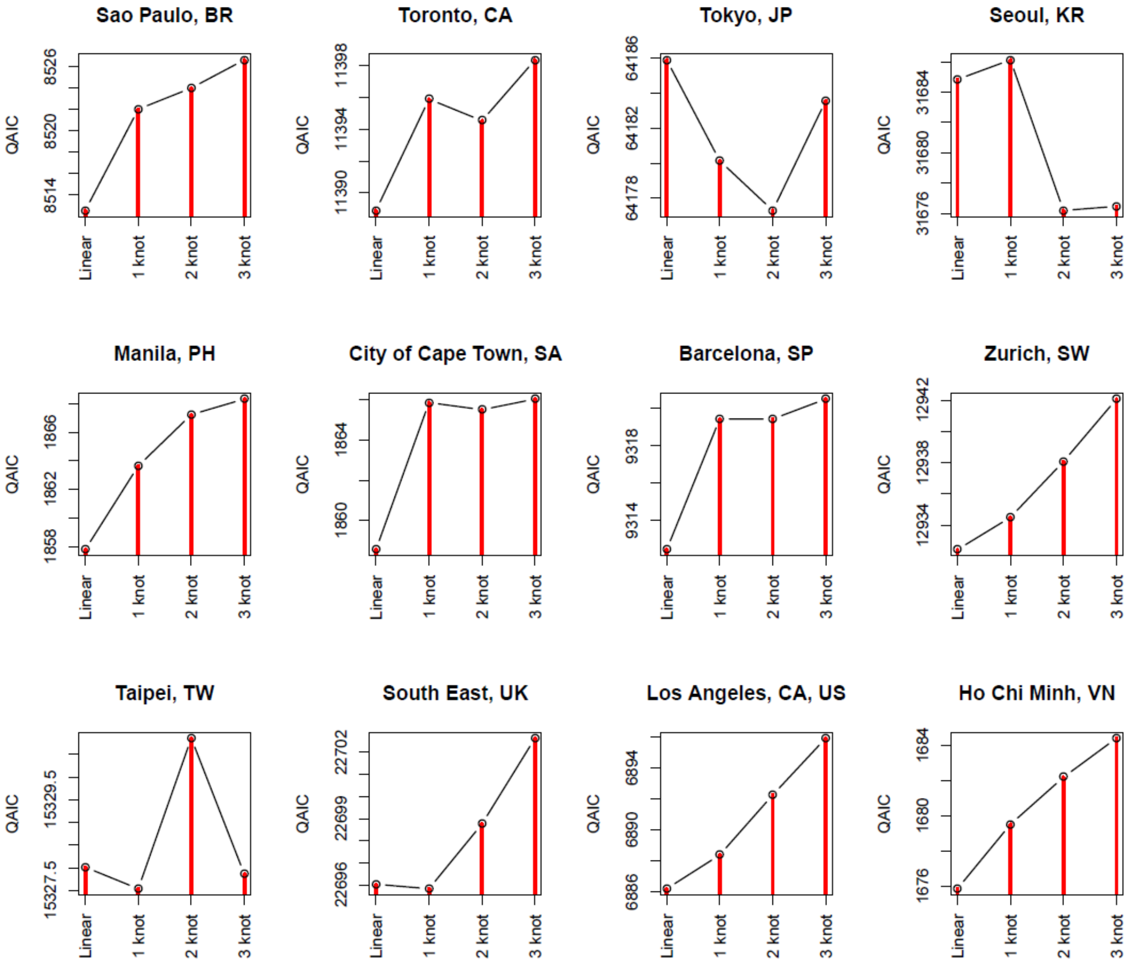

Figure S1. (continued).

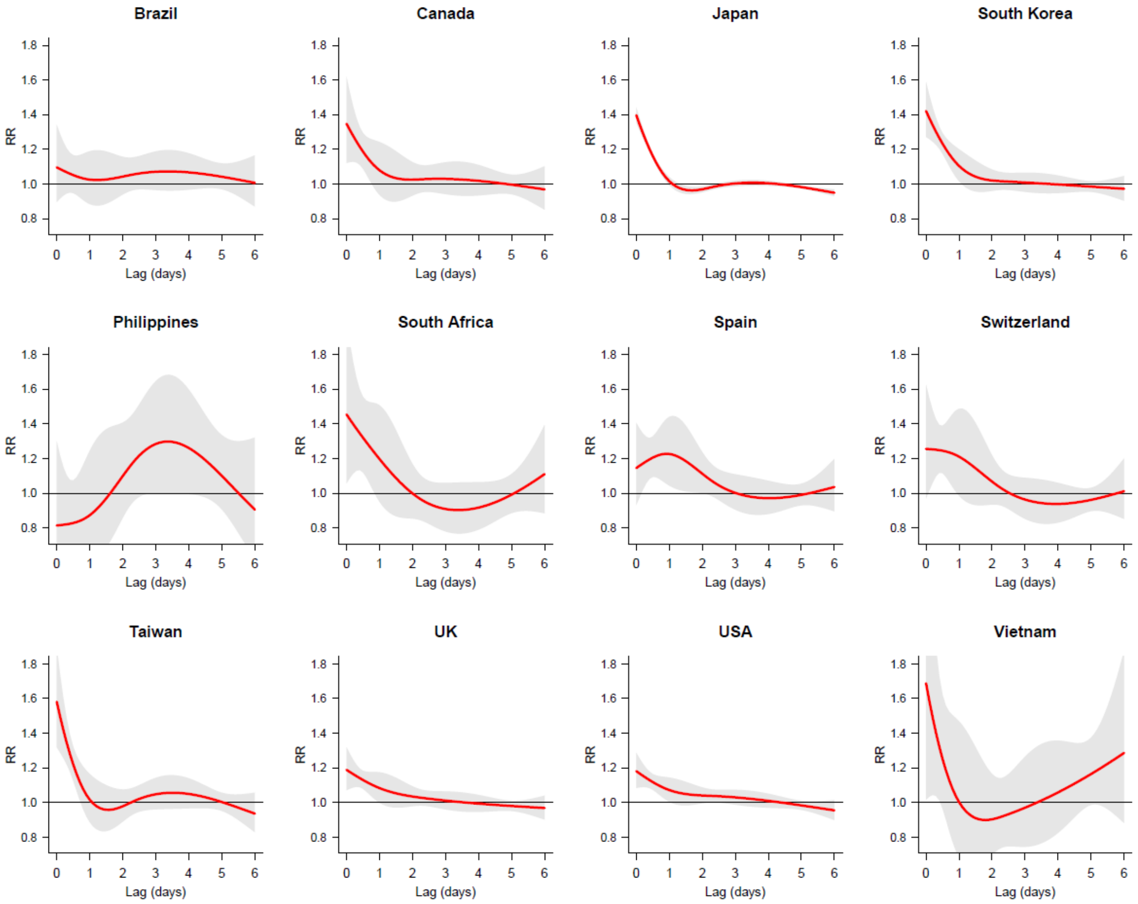

Figure S2. Country-specific lag-response associations for maximum suicide temperature (MaxST) vs. minimum suicide temperature (MinST) over the extended lags of up to 6 days (with 95% confidence interval, shaded grey) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day-of-week. RR, relative risk.

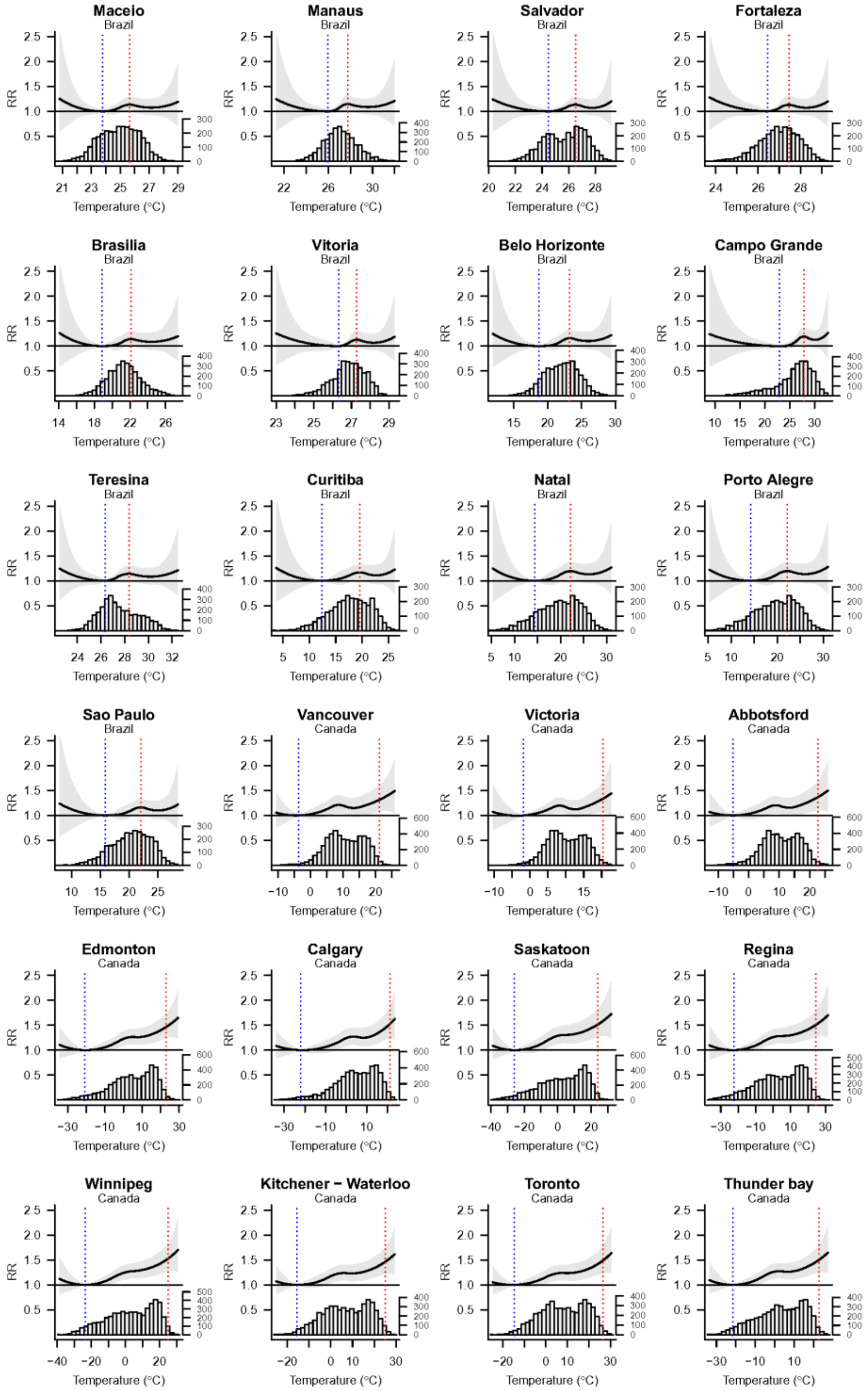

Figure S3. Location-specific lag-cumulative temperature-suicide associations as the best linear unbiased prediction (BLUP) (with 95% CIs, shaded grey) and the corresponding temperature distributions. The temperature-suicide associations were estimated by using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. The blue and red vertical dotted lines indicate the minimum suicide temperature and maximum suicide temperature, respectively. CI, confidence interval; RR, relative risk.

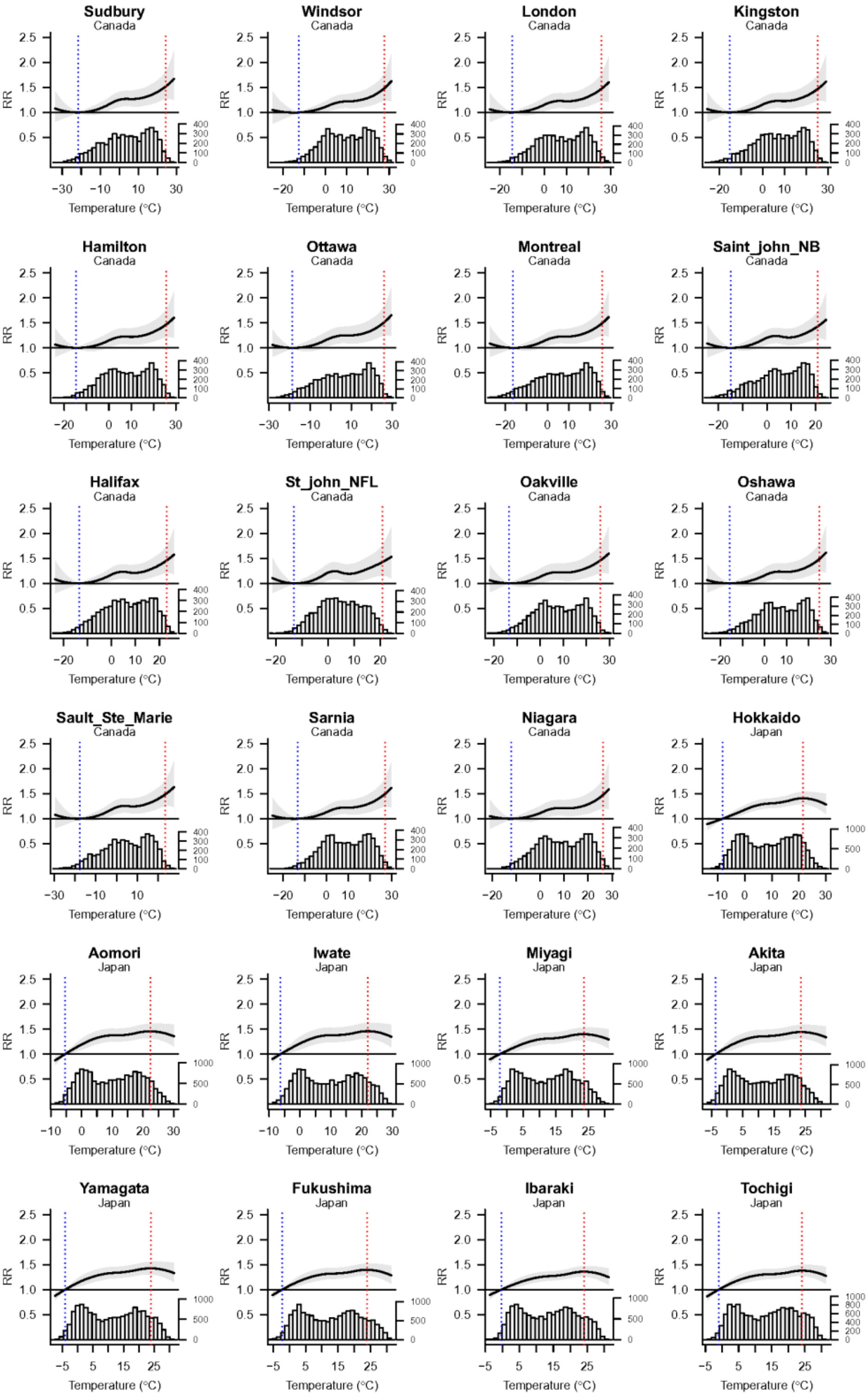

Figure S3. (Continued).

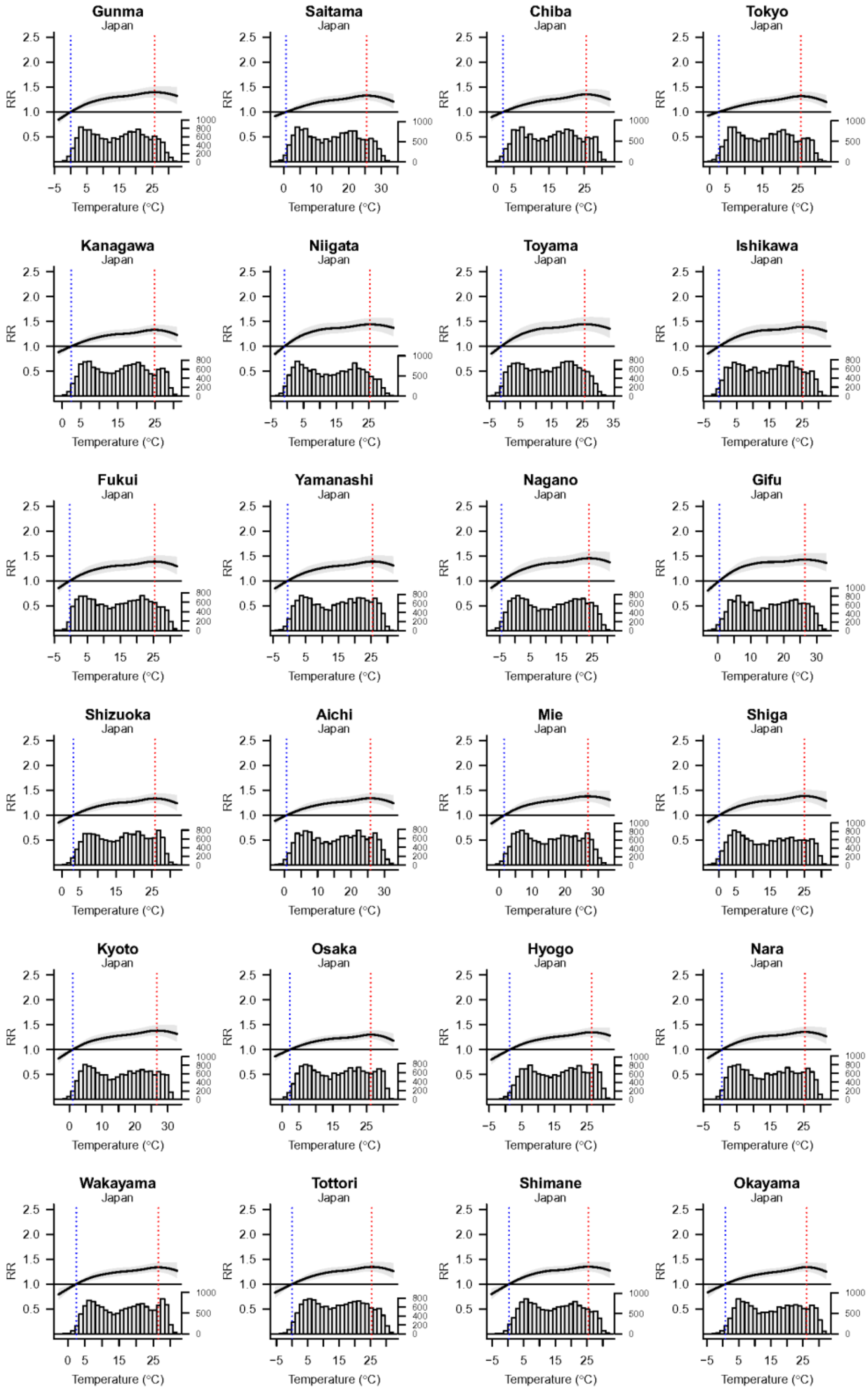

Figure S3. (Continued).

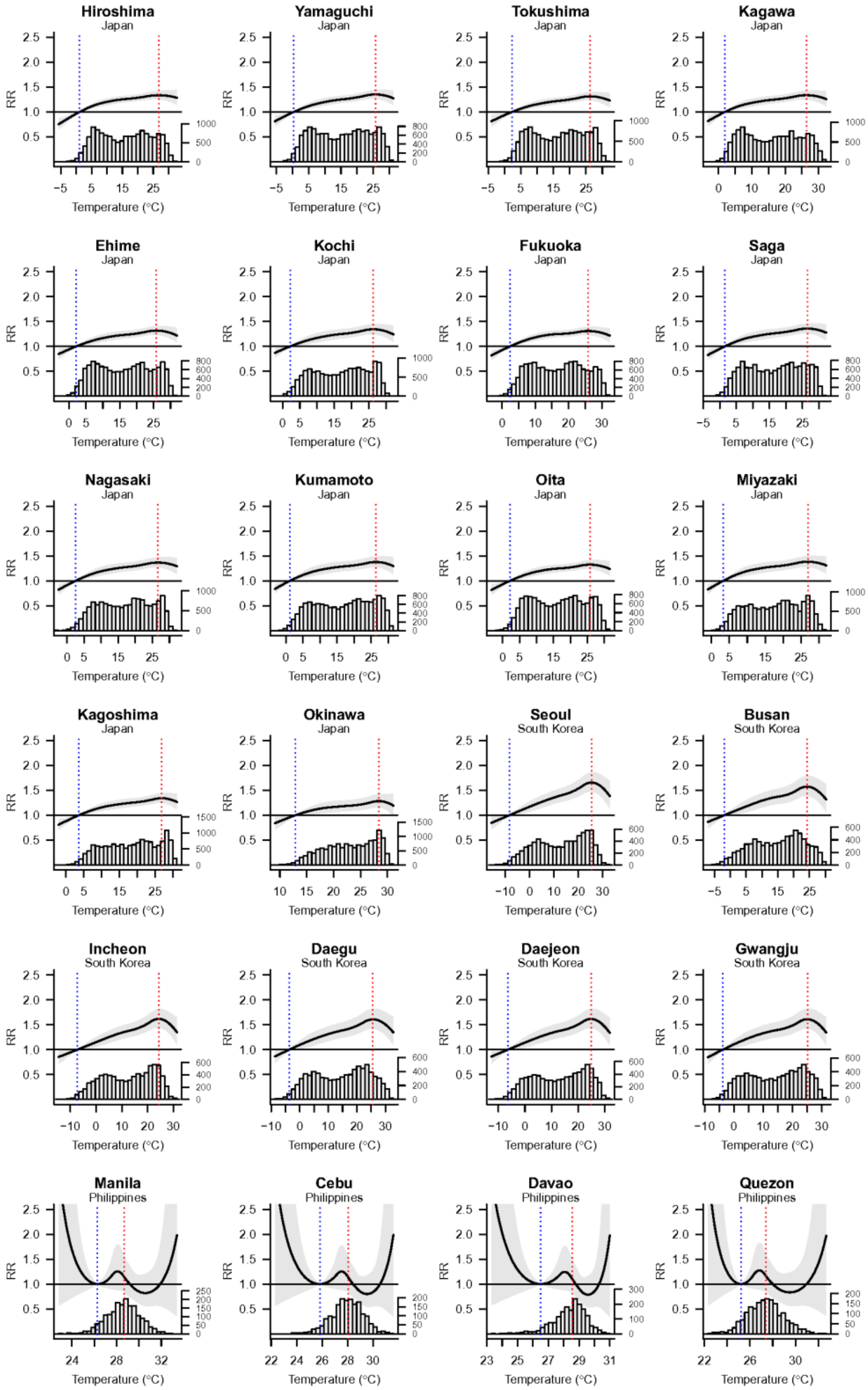

Figure S3. (Continued).

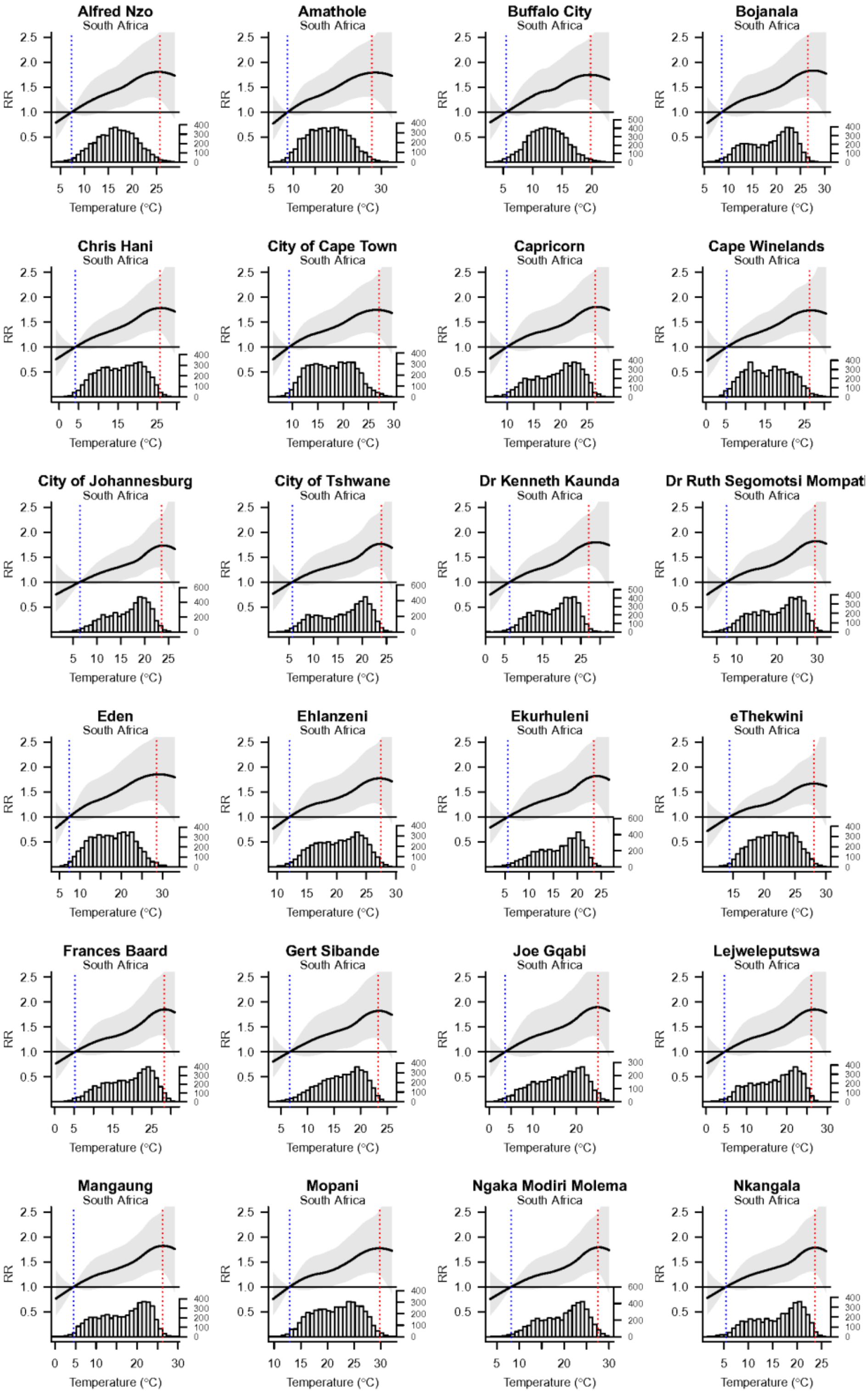

Figure S3. (Continued).

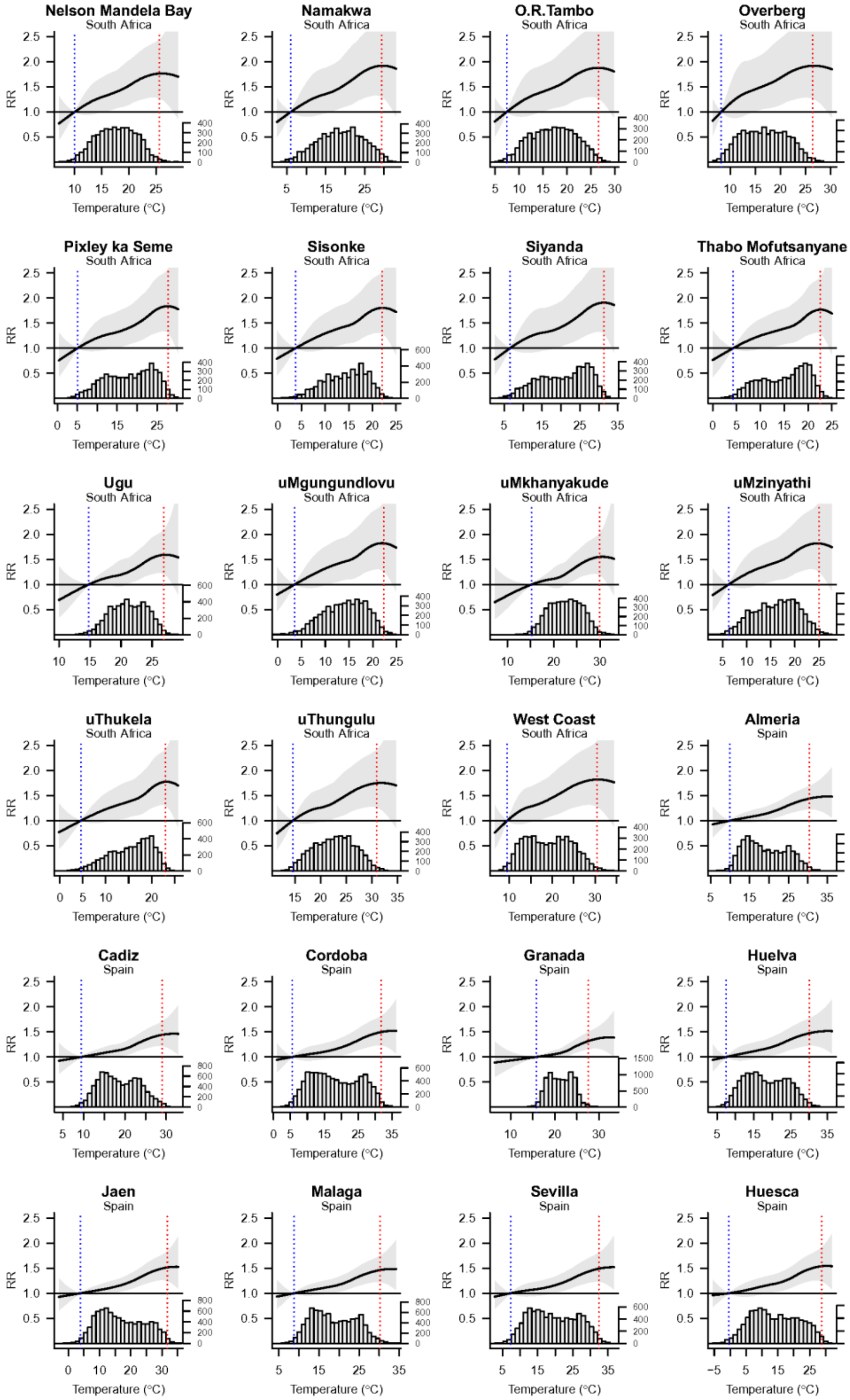

Figure S3. (Continued).

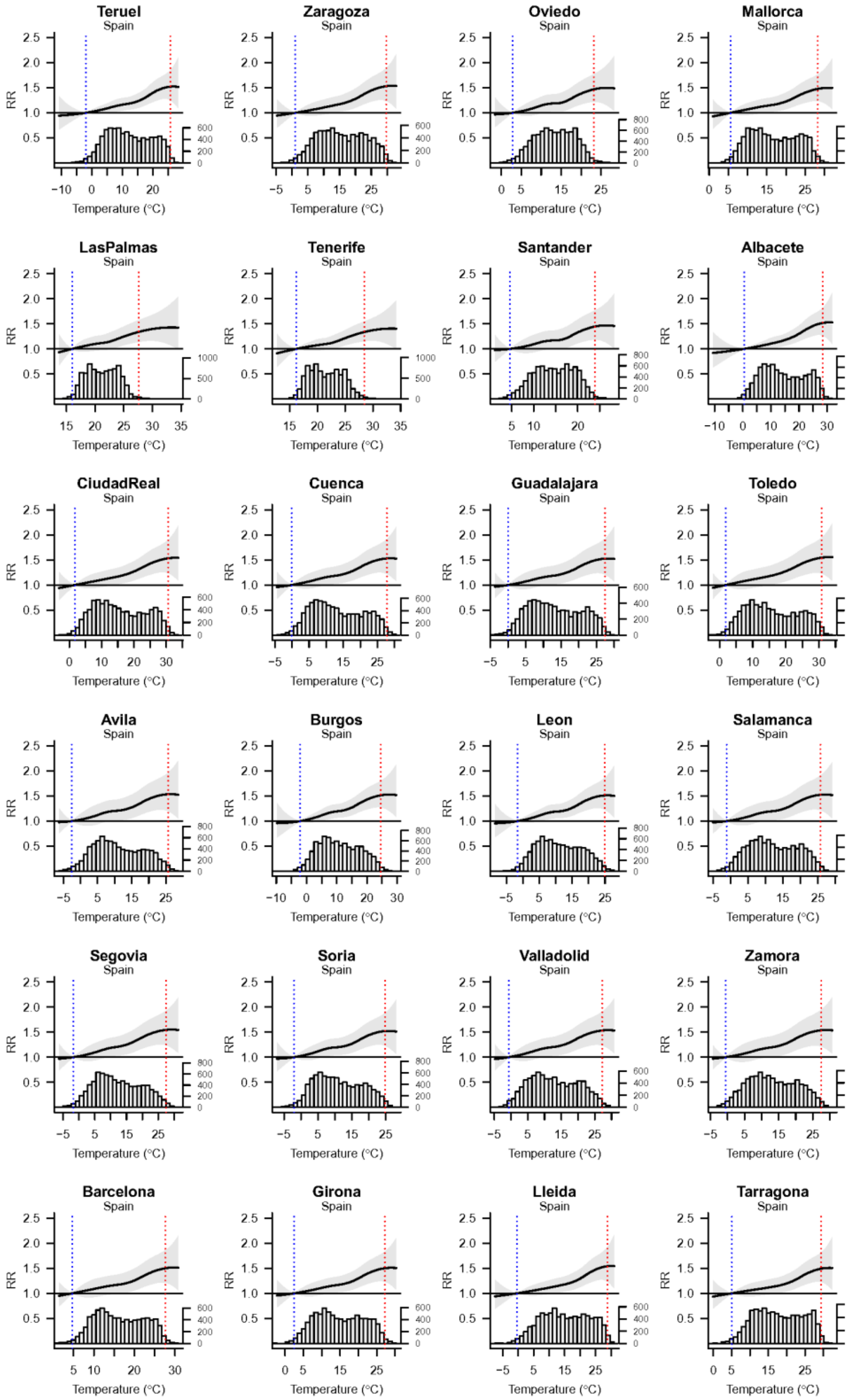

Figure S3. (Continued).

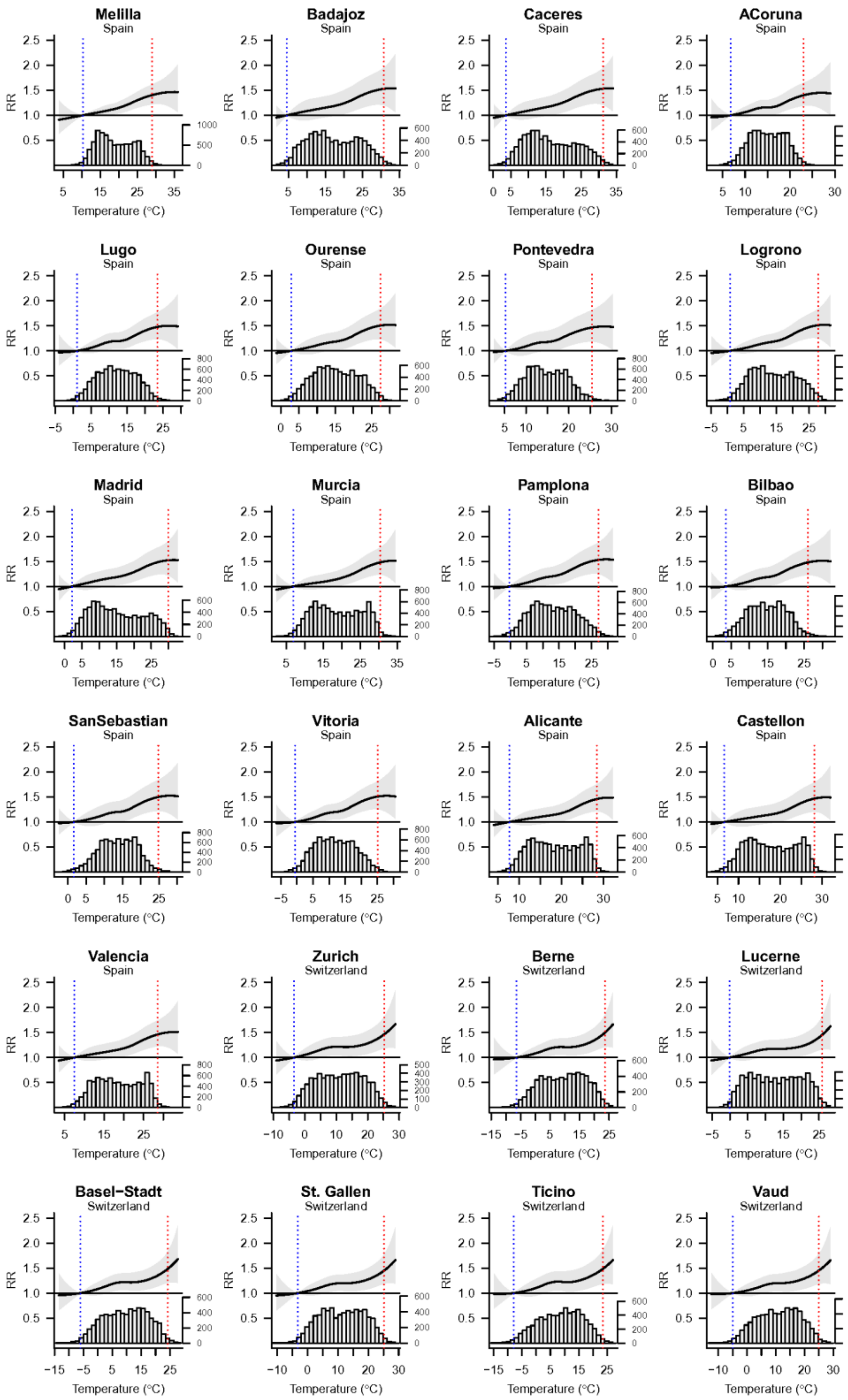

Figure S3. (Continued).

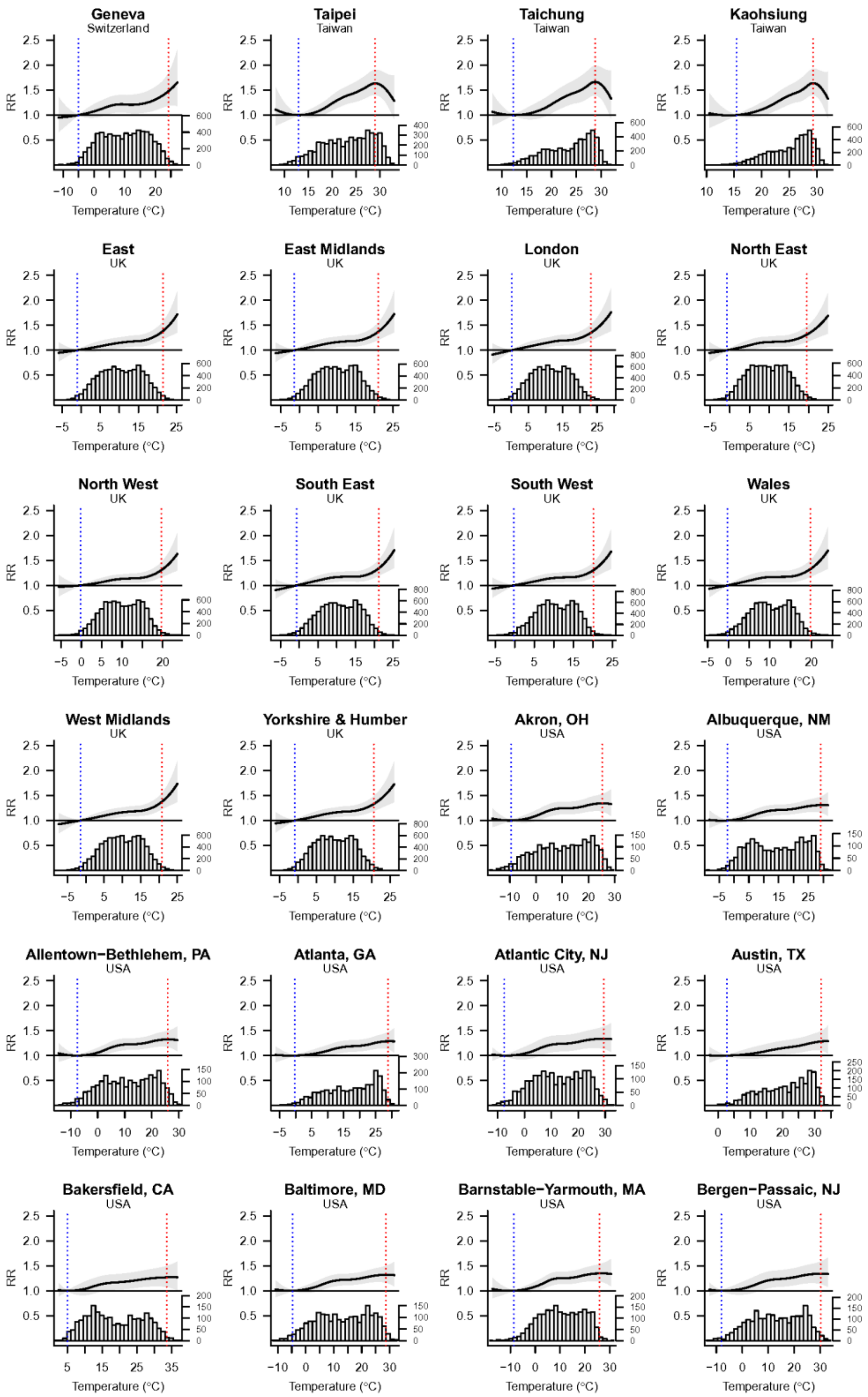

Figure S3. (Continued).

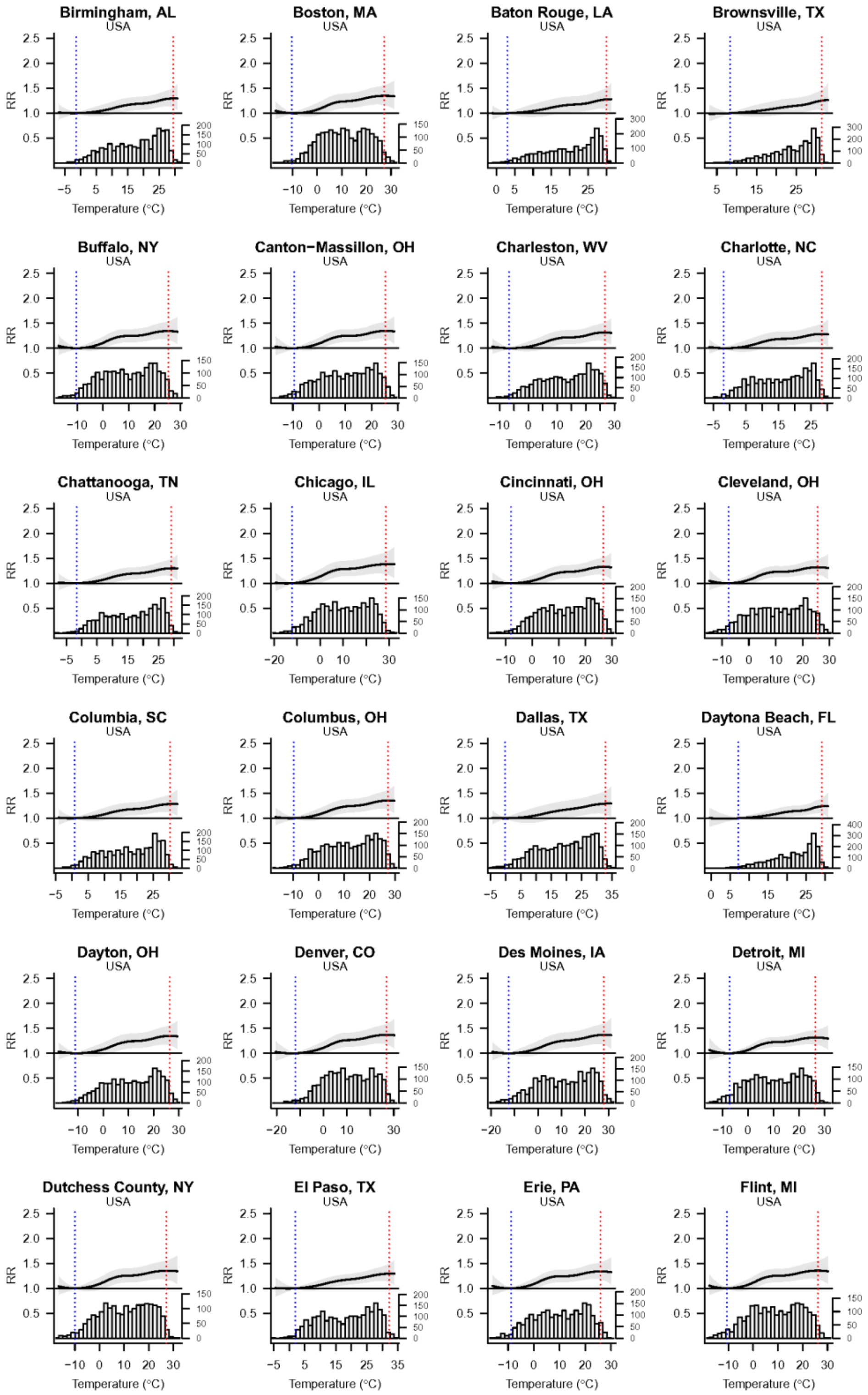

Figure S3. (Continued).

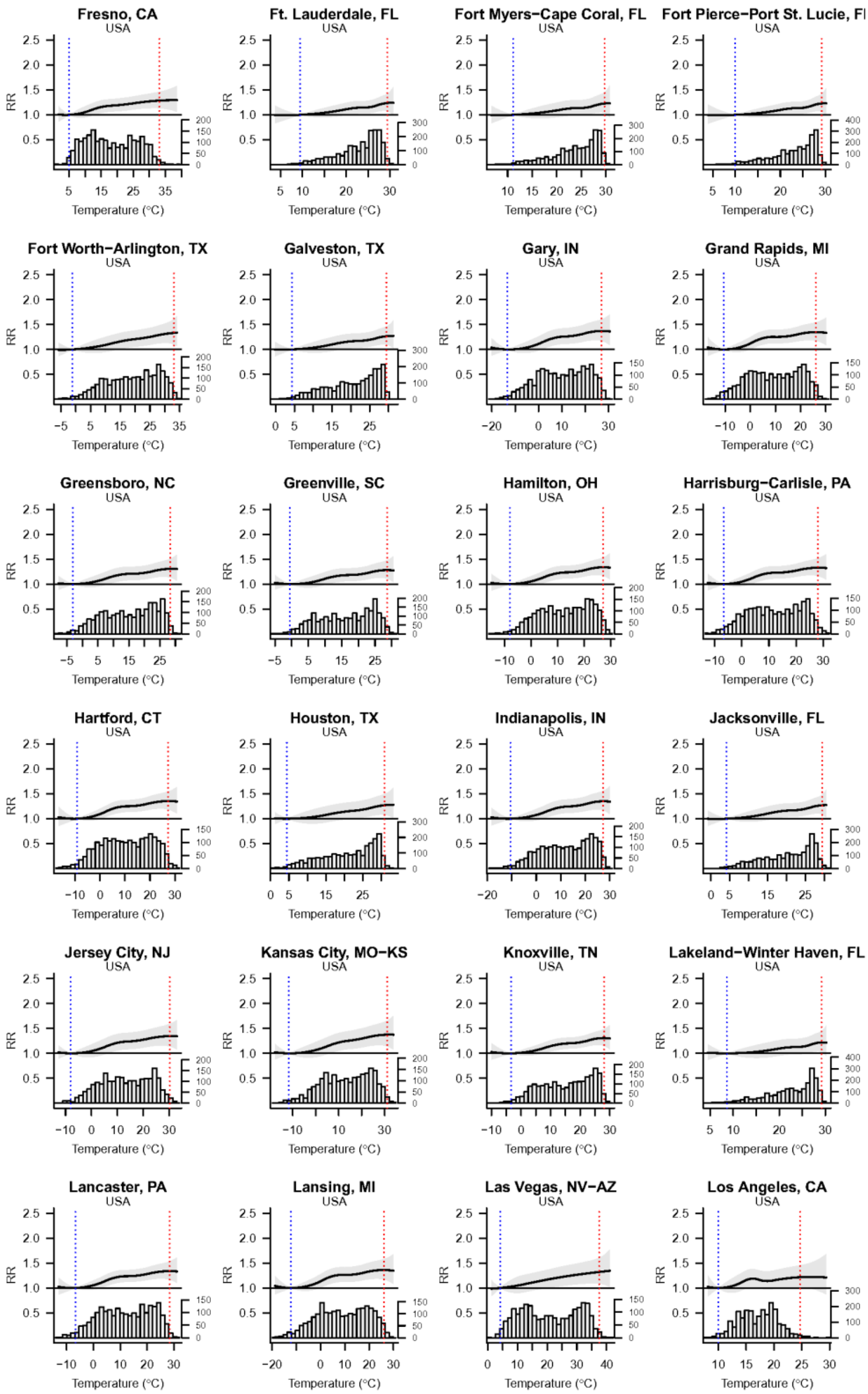

Figure S3. (Continued).

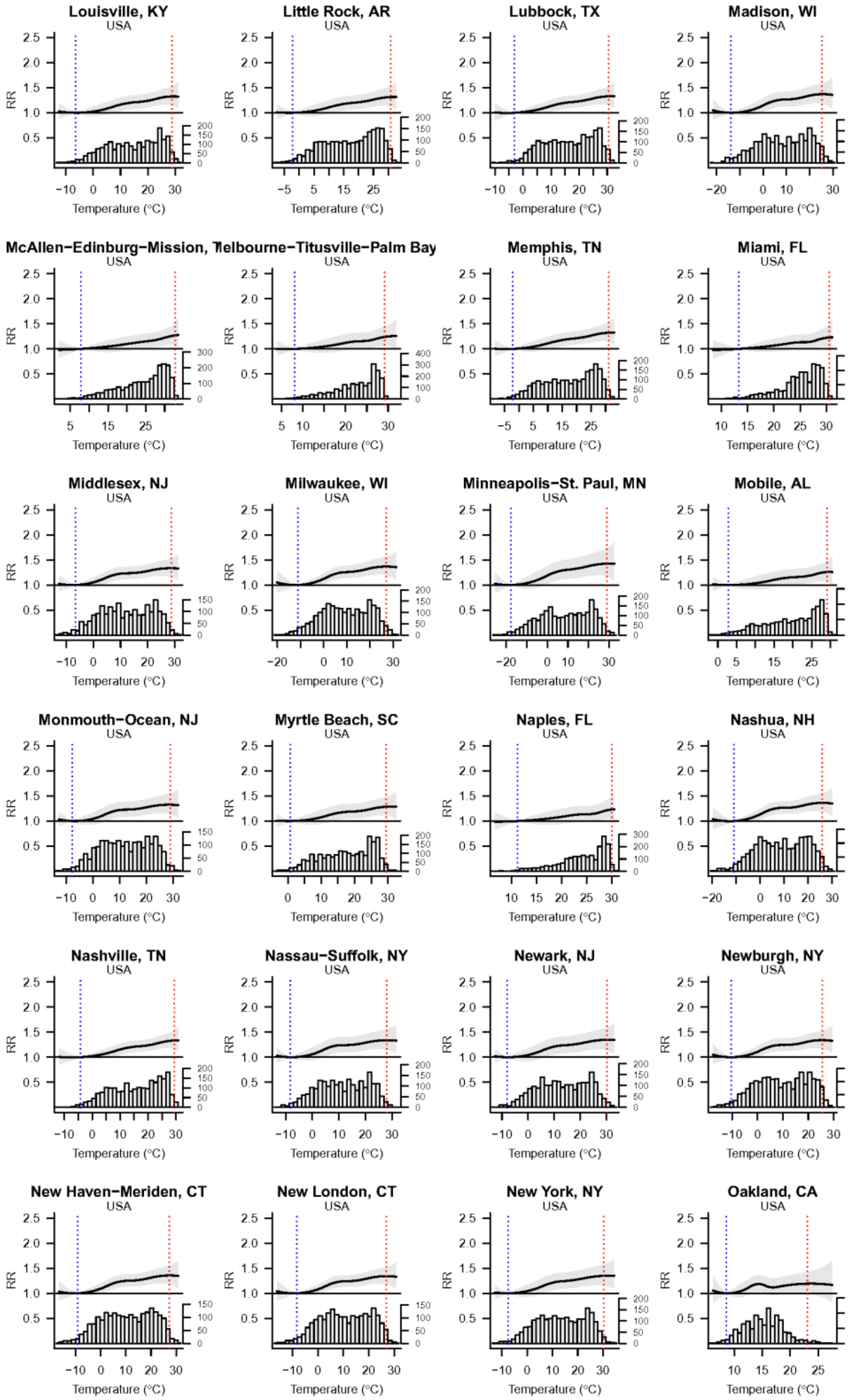

Figure S3. (Continued).

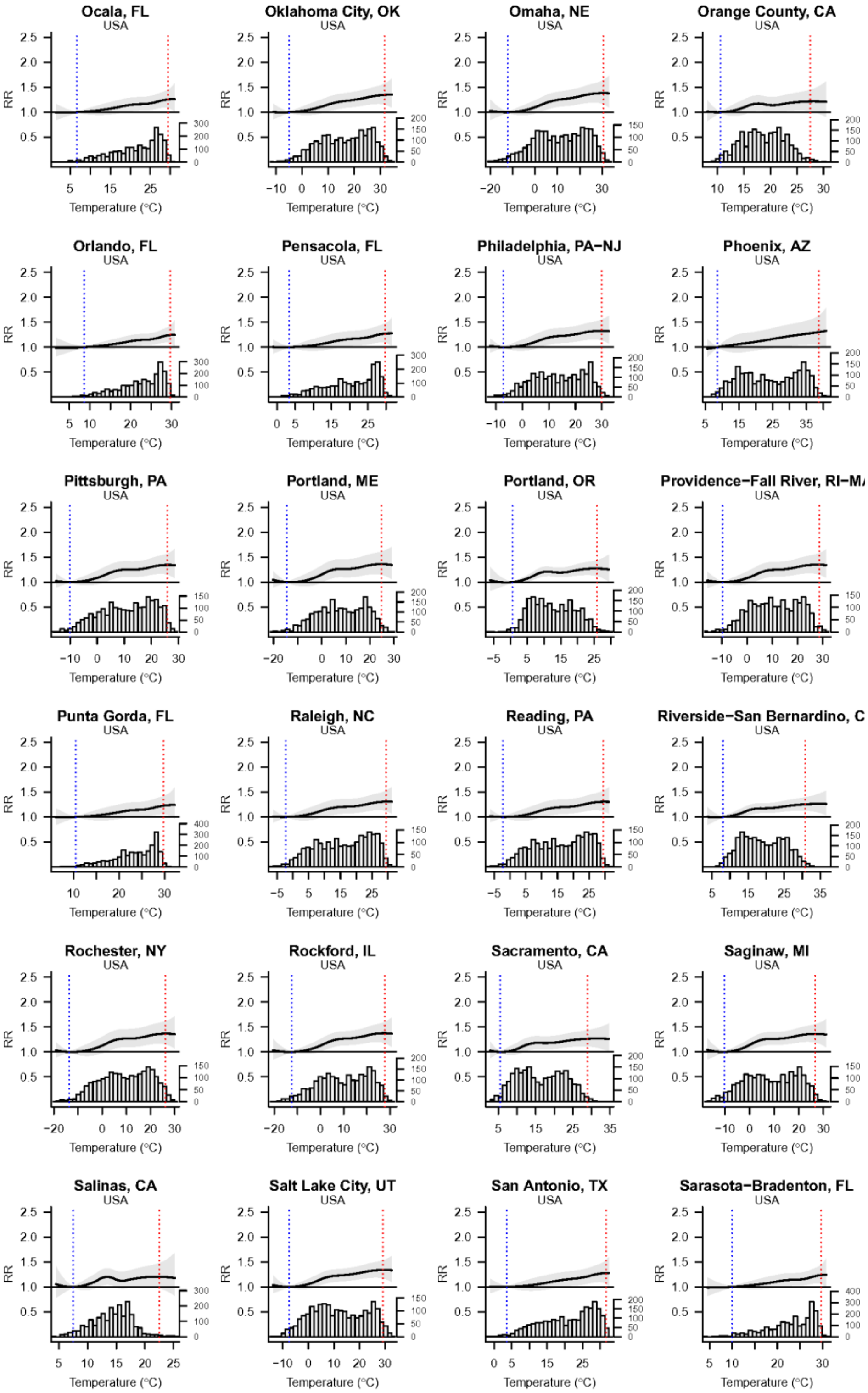

Figure S3. (Continued).

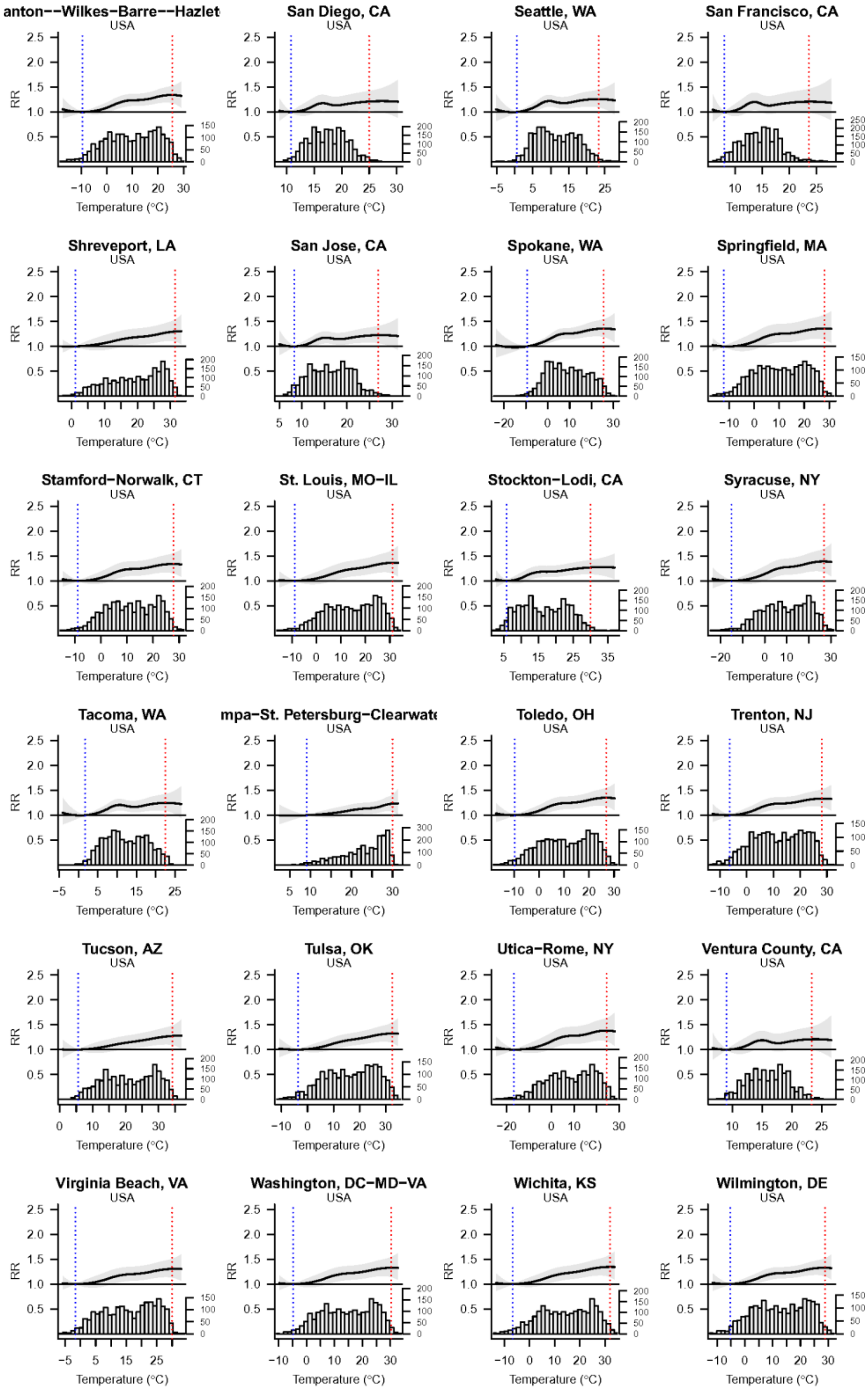

Figure S3. (Continued).

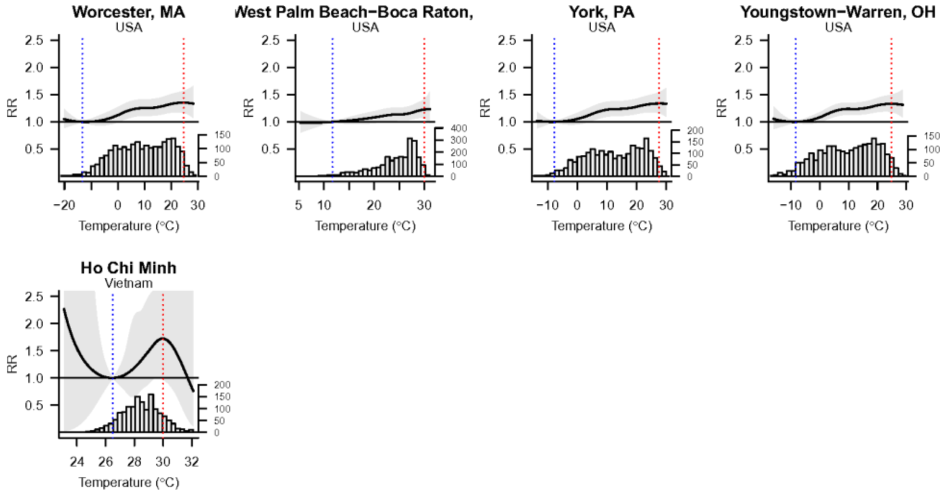

Figure S3. (Continued).

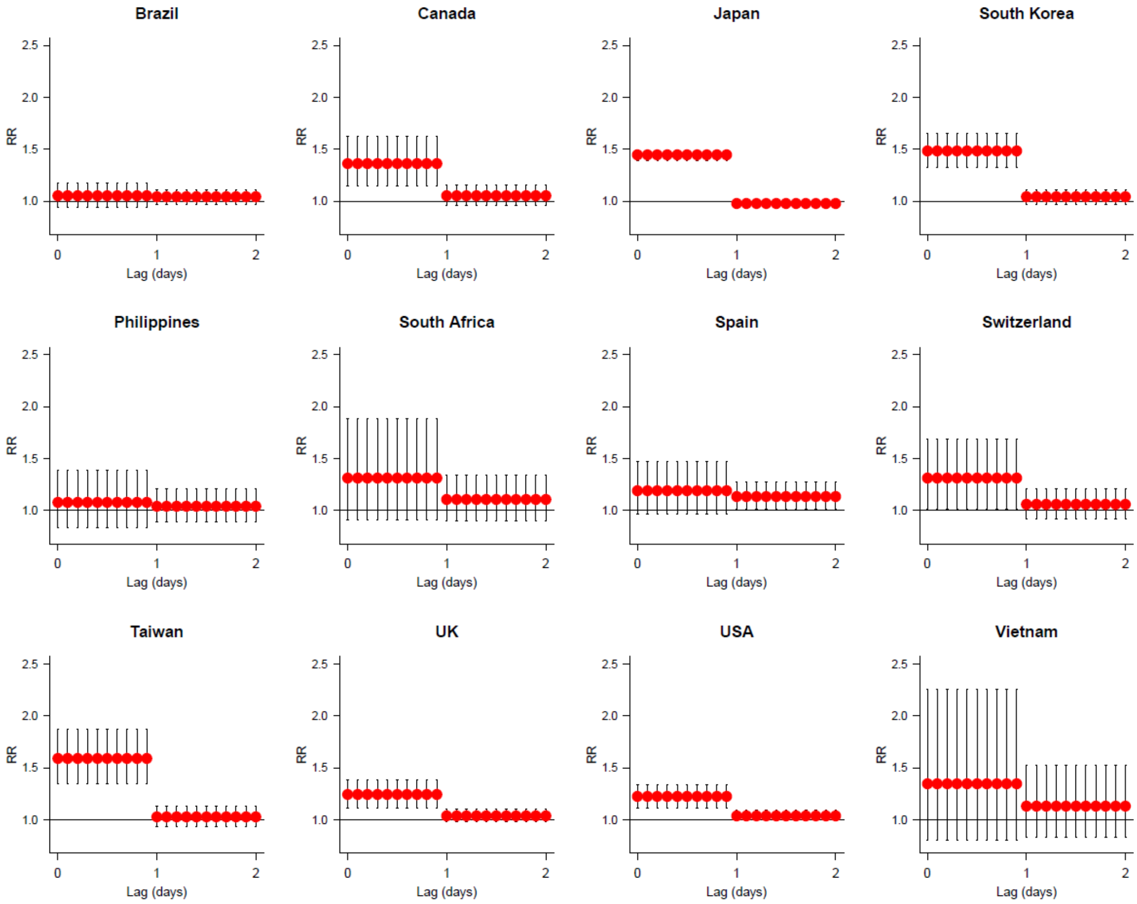

Figure S4. Country-specific pooled lag-response associations for the maximum suicide temperature (MaxST) vs. the minimum suicide temperature (MinST) with the 95% confidence intervals (vertical bars) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. RR, relative risk.

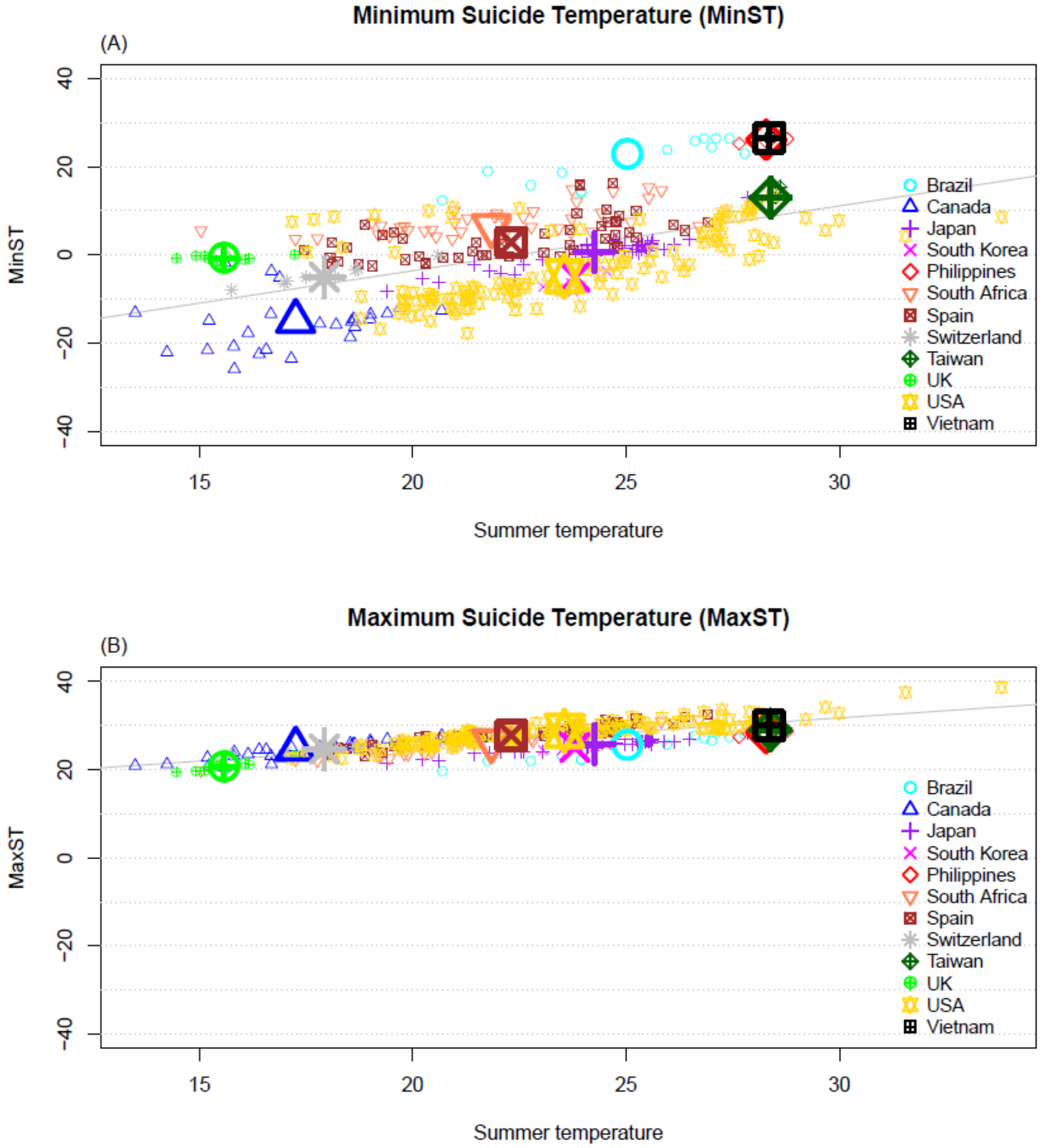

Figure S5. Distributions of the location-specific (A) minimum suicide temperature (ºC) (MinST) and (B) maximum suicide temperature (ºC) (MaxST) against summer average temperature (ºC) by country. Larger symbols indicate the country-specific median values of the MinST and MaxST against the average of the summer temperature by country. The summer temperature was defined as the average of daily ambient temperature during June to September in the countries in Northern Hemisphere and during December to March in the countries in Southern Hemisphere.

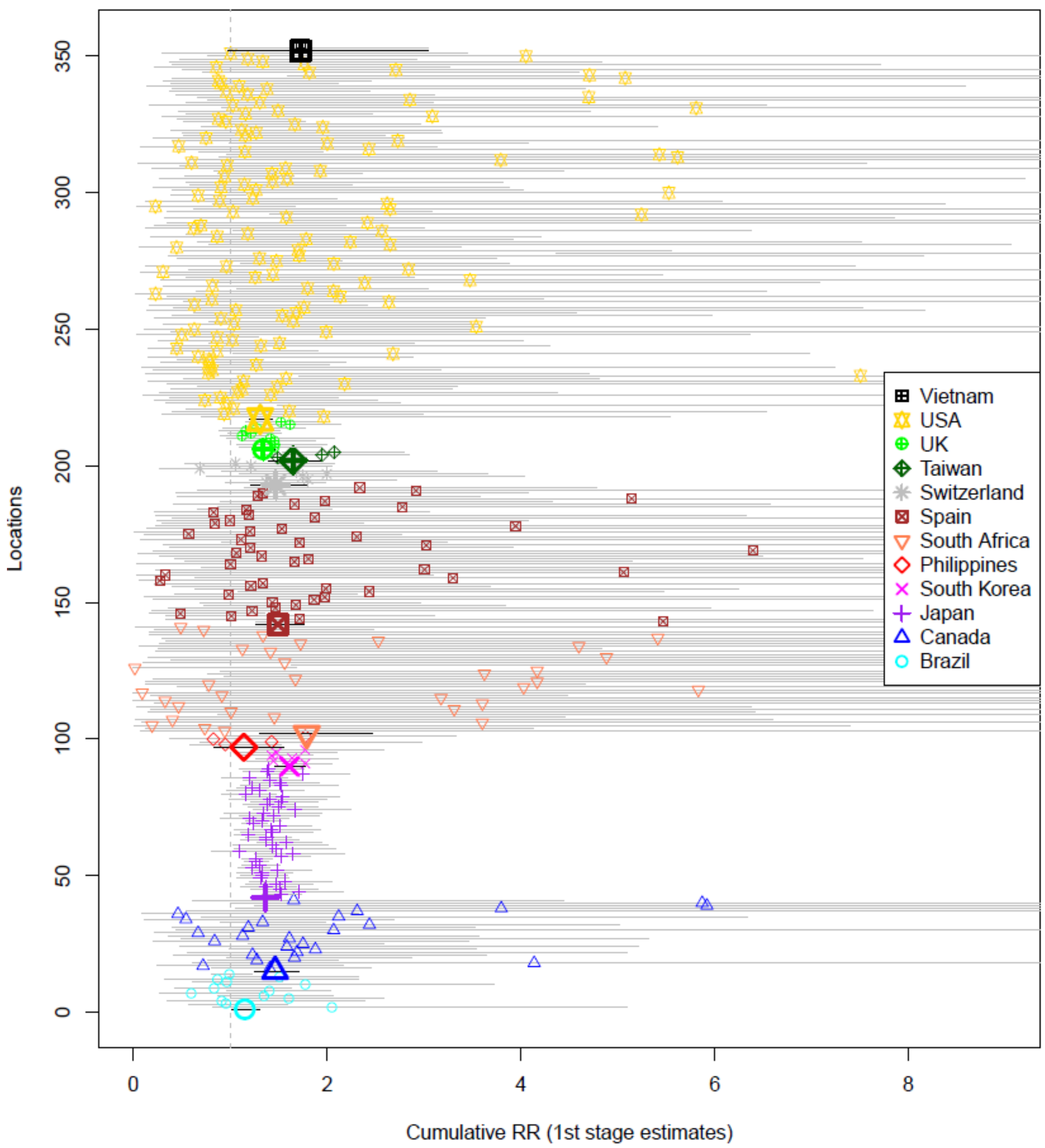

Figure S6. Country-specific and location-specific lag-cumulative temperature-suicide associations for maximum suicide temperature (MaxST) vs. minimum suicide temperature (MinST) using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. Larger symbols indicate the country-specific pooled estimates, and the location-specific estimates were derived from the first-stage modeling. The grey lines indicate the 95% confidence intervals. RR, relative risk.

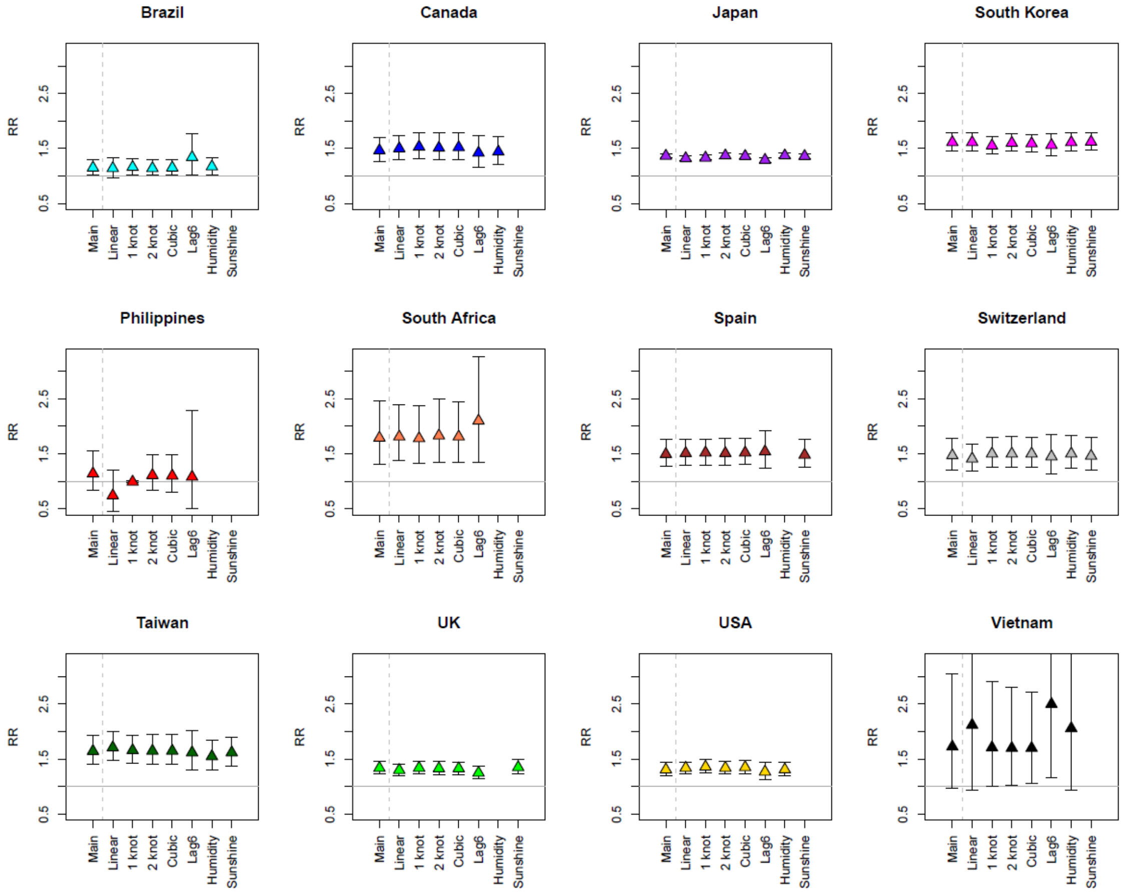

Figure S7. Pooled lag-cumulative relative risks (RRs) with 95% CIs (vertical bars) by country in sensitivity analyses. The main model (Main) included a quadratic B-spline with three internal knots for the temperature-suicide association over the lag of 0–2 d. A linear distributed lag model (Linear) included the same lag of 0–2 d and estimated the RR between the 1st and the 99th percentiles of mean temperature. Different parameterizations for the temperature-suicide association were applied by including one internal knot at 50th percentile (1 knot), two internal knots at 33rd and 66th percentiles (2 knot), and a cubic B-spline at the same three internal knots (Cubic). The maximum lag was extended up to 6 d (Lag6). Additional covariates such as the averages of relative humidity (Humidity) and sunshine duration (Sunshine) over the current day and a day before, respectively, were adjusted in a subset of data. The temperature-suicide associations were estimated using a conditional Poisson model adjusting for seasonality, long-term time trend, and the day of week. CI, confidence intervals.

References

Pillay-van Wyk V, Msemburi W, Laubscher R, Dorrington RE, Groenewald P, Glass T, et al. 2016. Mortality trends and differentials in South Africa from 1997 to 2012: second National Burden of Disease Study. The Lancet Global Health 4(9):e642–e653.

WHO. 2014. Preventing suicide: a global imperative. Geneva, Switzerland: WHO.