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Supplemental Material

Heatwave and mortality: a multi-country multi-community study

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Data Collection

Australia

We collected data from Melbourne, Sydney and Brisbane between 1st of January 1988 and 31st of May 2009. Daily mortality, obtained from the Australian Bureau of Statistics, is represented by counts of deaths for non-external causes only (ICD-9: 0-799; ICD-10: A00-R99). Daily minimum, mean (24-hour average) and maximum temperature (in °C) and relative humidity (in %) were obtained from the Australian Bureau of Meteorology. We selected all available meteorological stations located within ≤ 30 km of each city's Central Business District (CBD) (7 stations in Brisbane, 7 stations in Melbourne and 11 stations in Sydney). We calculated the daily averages of climatic variables using all records from meteorological stations in each city. When there was a missing value ($\leq 1.3\%$) for a particular meteorological station, observations recorded from the remaining weather stations were used to compute the daily average values.

Brazil

Data on daily deaths for non-external causes only (ICD-10 codes: A00-R99) in 18 cities (see full list in Table S1 below) between 1st of January 1997 and 31st of December 2011 were collected from Ministry of Health, Brazil. Data on mean daily temperature (computed as the 24-hours average based on hourly measurements) and relative humidity were obtained during the same study period from Weather Meteorological Service of Brazil.

Canada

We obtained daily data on non-accidental mortality from Statistics Canada through access to the Canadian Mortality Database for the period of 1986 to 2009 for 21 census metropolitan areas (CMA). Daily meteorological data were obtained from Environment Canada using the airport monitoring station located closest to the CMA centre. Daily averages of temperature and relative humidity were computed based on hourly measurements.

China

We obtained daily data from 6 cities (Hong Kong, Beijing, Tianjin, Shanghai, Wuhan, and Guangzhou,) in China. Daily data on non-accidental mortality in urban areas of Beijing, Tianjin, Shanghai, and Guangzhou were obtained from the China Information System for Death Register and Report of Chinese Centre for Disease Control and Prevention (China CDC) from 2004 to 2008. Daily weather data were obtained from the China Meteorological Data Sharing Service System for each city.

For Hong Kong data, daily non-accidental mortality data were obtained from the Hong Kong Census and Statistics Department during 2002–2009. Daily minimum, mean, and maximum temperatures and relative humidity data were obtained from the Hong Kong Observatory for the same period.

Colombia

We gathered daily data from the 5 biggest Colombian cities (Bogotá, Cali, Medellín, Barranquilla and Cartagena), from 1998 to 2013. Meteorological data including daily maximum, mean, minimum temperatures (Celsius grades), and mean relative humidity (%) were gathered from one station at each city. Daily non-accidental mortality data were obtained from each city's Statistics Department during the same study period.

Iran

Data on daily deaths for non-external causes only (ICD-10 codes: A00-R99) in Mashhad, Iran, between 1st of January 2004 and 31st of December 2013 were collected from the Database of Mashhad Municipality. Data on mean daily temperature (computed as the 24-hours average based on hourly measurements) and relative humidity were obtained during the same study period from the Iran Meteorological Organization.

Ireland

Daily non-accidental deaths were obtained from the Irish Central Statistics Office for data in the republic of Ireland (ROI), and Northern Ireland Social Research Agency for data in Northern Ireland (NI) for the period of January 1st 1984 and December 31st 2007. Daily time-series weather data for the study period were obtained from Met Eireann, the Irish Meteorological Service, for ten weather stations in the ROI: Birr, Clones, Casement Aerodrome, Cork, Dublin, Kilkenny, Malin Head, Rosslare, Shannon and Valentia. The weather for NI was obtained from the United Kingdom Meteorological Office for four weather stations with full time-series data: Aldergrove, Armagh, Ballywatticock, and Banagher. The data included daily maximum, minimum, and mean temperatures, relative humidity and air pressure.

Italy data

We obtained daily data on mortality from all causes among the resident population dying within the city for Palermo, Bari, Latina, Frosinone, Roma, Viterbo, Bologna and Brescia; no-accidental causes were collected for Genova and Torino. Data were extracted from local mortality registries and from the rapid mortality surveillance system operational since 2004.

Meteorological data referring to the airport station located closest to the city centre were obtained from the Meteorological Service of the Italian Air Force.

Japan

Data on daily deaths for non-external causes only (ICD-9 codes: 1-799; ICD-10 codes: A00-R99) in 47 prefectures (see full list in Table S1 below) between 1st of January 1972 and 31st of December 2012 were collected. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained for the same study period.

Moldova

Data on daily deaths for non-external causes only (ICD-10 codes: A00-R99) in 4 cities (see full list in Table S1 below) between 1st of January 2001 and 31st of December 2010 were collected from National Centre of Public Health Management. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained by State Hydrometeorological Service for the same study period.

Philippines

Data on daily deaths for non-external causes only (ICD-10 codes: A00-R99) in 4 cities (see full list in Table S1 below) between 1st of January 2006 and 31st of December 2010 were collected from the Philippine Statistics Authority. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for the same study period.

South Korea

Data on daily deaths for non-external causes only (ICD-9 codes: 1-799; ICD-10 codes: A00-R99) in 7 cities (see full list in Table S1 below) between 1st of January 1992 and 31st of December 2010 were collected. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained for the same study period.

Spain

We obtained daily data on non-accidental causes for the 51 capital cities from the Spain National Institute of Statistics for summer months (from 1st June to 30th September) from 1990 to 2010. Daily minimum, mean and maximum temperatures for the 51 capital cities were collected from the Spain National Meteorology Agency for the same study period. We did not get the data on relative humidity, because it is not available.

Taiwan

Data on daily deaths for non-external causes (ICD-9 codes: 1-799; ICD-10 codes: A00-R99) in Kaohsiung, Taipei and Taichung between 1st of January 1994 and 31st of December 2007 were collected. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained for the same study period.

Thailand data

We obtained daily data on non-accidental deaths from the Ministry of Public Health, Thailand for 62 provinces during 1999–2008. The daily weather data (daily minimum, mean,

and maximum temperatures and mean relative humidity) were obtained from the Meteorological Department, Ministry of Information and Communication Technology. There were 117 weather stations in 62 provinces, with at least one weather monitoring station in each province.

UK data

We obtained daily data on non-accidental mortality from the Office of National Statistics during 1993–2006. Records include the date of death and postcode of residence at time of death. The postcodes were used to divide deaths into 10 government regions and date to make daily series of counts for each region. The daily weather data (daily minimum, mean, and maximum temperatures and mean relative humidity) were downloaded from the British Atmospheric Data Centre. There was a mean of 29 stations contributing data to each regional series, from a minimum of 7 in London to a maximum of 44 in Wales.

USA data

We collected data from 135 cities (see full list in Table S1) between 1st of January 1985 and 31st of December 2006. Daily mortality, obtained from the National Center for Health Statistics (NCHS), is represented by counts of deaths for non-external causes only (ICD-9: 0-799; ICD-10: A00-R99). Daily minimum, mean (in °C, computed as the 24-hour average based on hourly measurements) and maximum temperatures and relative humidity (in %, computed from the 24-h average of hourly measurements of dew point temperature) were obtained from the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA). A single weather station was selected for each city in the land based station data or NCDC, based on the proximity to the city's population centre. In 6 cities where multiple observations were missing from all the nearby monitors, hourly

data from the Integrated Surface Database Lite of NCDC were converted in daily values. For 25 stations missing dew point data, dew point data were obtained from the nearest station with dew point data.

Vietnam

Data on daily deaths for non-external causes only (ICD-10 codes: A00-R99) in 2 cities (Ho Chi Minh City and Hue) between 1st of January 2009 and 31st of December 2013 were collected from the A6 mortality reporting system, Vietnam. Data on daily minimum, mean (computed as the 24-hours average based on hourly measurements) and maximum temperatures and relative humidity were obtained by the US National Oceanic and Atmospheric Administration's National Climate Data Center for the same study period.

Table S1: Summary of the study periods, number of deaths, and annual average number of heatwaves in 400 communities in 18 countries/regions. HW1: 90th percentile with ≥ 2 duration days; HW2: 90th percentile with ≥ 3 duration days; HW3: 90th percentile with ≥ 4 duration days; HW4: 92.5th percentile with ≥ 2 duration days; HW5: 92.5th percentile with ≥ 3 duration days; HW6: 92.5th percentile with ≥ 4 duration days; HW7: 95th percentile with ≥ 2 duration days; HW8: 95th percentile with ≥ 3 duration days; HW9: 95th percentile with ≥ 4 duration days; HW10: 97.5th percentile with ≥ 2 duration days; HW11: 97.5th percentile with ≥ 3 duration days; HW12: 97.5th percentile with ≥ 4 duration days.

Community	Period	Number of death	Heatwave type											
			HW 1	HW 2	HW 3	HW 4	HW 5	HW6	HW7	HW 8	HW 9	HW1 0	HW1 1	HW1 2
MELBOURNE, AUSTRALIA	1988-2009	140400	23	15	9	16	9	6	10	5	2	6	2	1
SYDNEY, AUSTRALIA	1988-2009	161899	25	20	15	16	11	7	10	6	3	4	2	1
BRISBANE, AUSTRALIA	1988-2009	59685	29	23	19	21	16	13	14	10	8	5	3	2
PORTO ALEGRE, BRAZIL	1997-2011	66822	27	21	17	19	14	11	13	9	7	6	3	2
CURITIBA, BRAZIL	1997-2011	47278	24	17	14	17	11	9	9	6	4	4	3	2
SAP PAULO, BRAZIL	1997-2011	288006	23	17	15	16	11	8	10	8	6	5	3	2
VITORIA, BRAZIL	1997-2011	17165	27	23	20	20	16	15	14	11	10	6	4	3
BELO HORIZONTE, BRAZIL	1997-2011	155502	19	16	14	14	12	8	8	7	4	4	3	2
GOIANIA, BRAZIL	1997-2011	44611	23	20	17	18	15	13	13	10	8	6	4	3
BRASILIA, BRAZIL	1997-2011	37087	24	21	19	19	16	13	13	11	8	6	4	3
CUIABA, BRAZIL	1997-2011	16659	19	13	8	14	9	6	9	6	4	4	2	1
SALVADOR, BRAZIL	1997-2011	73998	28	22	17	21	17	14	13	11	9	7	5	4
MACEIO, BRAZIL	1997-2011	30648	18	13	11	13	9	7	9	6	5	4	2	1
RECIFE, BRAZIL	1997-2011	85922	26	19	16	18	14	12	12	10	9	6	5	4
JOAO PESSOA, BRAZIL	1997-	23282	24	20	17	17	15	12	12	10	8	6	5	4

	2011													
NATAL, BRAZIL	1997-2011	26323	27	21	17	19	14	11	13	9	7	6	3	2
TERESINA, BRAZIL	1997-2011	21556	28	24	22	21	18	15	13	10	8	5	3	2
FORTALEZA, BRAZIL	1997-2011	65341	17	12	9	11	7	5	6	4	2	1	1	0
MANAUS, BRAZIL	1997-2011	31989	26	24	20	21	19	15	14	11	8	7	5	3
SAO LUIS, BRAZIL	1997-2011	26123	19	16	12	13	10	7	7	5	4	2	1	1
BELEM, BRAZIL	1997-2011	42837	17	13	9	12	8	6	8	6	5	4	4	3
ABBOTSFORD, CANADA	1986-2011	8572	32	26	22	23	18	14	15	12	9	7	5	3
CALGARY, CANADA	1986-2011	42293	30	24	20	22	17	14	14	11	8	6	4	2
EDMONTON, CANADA	1986-2011	49262	31	26	23	22	18	15	14	11	9	7	4	3
HALIFAX, CANADA	1986-2011	22407	32	27	24	23	18	15	15	11	9	7	5	3
HAMILTON, CANADA	1986-2011	35884	31	26	22	23	19	14	15	12	10	7	4	3
KINGSTON, CANADA	1986-2011	12362	30	26	23	24	19	15	14	11	8	6	4	3
KITCHENER-WATERLOO, CANADA	1986-2011	22176	28	24	20	21	17	13	13	10	9	6	4	3
LONDON ONTARIO, CANADA	1986-2011	30429	30	26	22	22	18	15	15	12	10	6	5	4
MONTREAL, CANADA	1986-2009	79813	31	27	23	22	19	16	15	12	9	7	4	3
NIAGARA, CANADA	1986-2011	30931	32	27	23	23	19	15	14	12	10	7	4	3
OAKVILLE, CANADA	1986-2011	18543	30	25	21	22	17	14	14	11	8	7	5	3
OSHAWA, CANADA	1986-2011	22707	31	26	22	22	18	14	14	11	8	6	4	3
OTTAWA, CANADA	1986-2011	43017	31	27	22	22	19	15	15	12	9	7	4	2
REGINA, CANADA	1986-2011	15797	29	23	19	21	16	12	13	8	6	6	4	2
SARNIA, CANADA	1986-	8874	29	25	21	21	18	14	15	12	9	7	4	2

	2011													
SUDBURY, CANADA	1986-2011	13079	31	27	23	23	19	16	15	12	9	7	5	4
SAINT JOHN NB, CANADA	1986-2011	13676	31	24	20	21	16	12	13	9	7	6	4	2
ST. JOHN'S NFL, CANADA	1986-2011	17001	30	24	20	22	17	14	14	10	7	6	4	3
SAULT STE. MARIE, CANADA	1986-2011	9327	31	25	22	22	18	16	15	11	9	7	5	2
SASKATOON, CANADA	1986-2011	18102	29	24	19	21	16	12	13	9	7	6	4	2
THUNDER BAY, CANADA	1986-2011	11437	29	24	19	22	16	12	13	9	6	6	3	2
TORONTO, CANADA	1986-2011	215163	32	28	23	23	18	15	14	12	9	7	6	4
VICTORIA, CANADA	1986-2011	26457	30	25	21	22	17	12	14	10	7	7	5	3
VANCOUVER, CANADA	1986-2011	103396	33	29	25	24	19	15	15	12	9	7	5	3
WINDSOR, CANADA	1986-2011	20264	30	26	21	22	19	15	15	11	8	7	5	3
WINNIPEG, CANADA	1986-2011	53136	30	24	19	21	16	12	14	10	6	6	4	2
HONG KONG, CHINA	2002-2009	89337	54	49	44	54	49	44	21	15	12	21	15	12
GUANGZHOU, CHINA	2005-2007	10033	32	29	24	25	23	19	17	15	12	7	4	3
WUHAN, CHINA	2004-2008	5998	33	30	26	25	22	18	17	15	10	8	6	5
SHANGHAI, CHINA	2005-2007	22743	34	30	27	26	22	18	16	14	10	8	5	2
TIANJIN, CHINA	2005-2007	19409	35	26	22	24	19	16	14	10	8	7	5	4
BEIJING, CHINA	2005-2007	25183	33	29	21	25	19	11	14	8	6	6	5	4
BOGOTA, COLOMBIA	1998-2013	124605	14	9	6	9	6	4	6	4	2	2	1	1
BARRANQUILLA, COLOMBIA	1998-2013	28656	14	9	5	7	5	2	5	3	1	2	1	0
CALI, COLOMBIA	1998-2013	47457	11	8	6	8	5	3	5	3	2	3	1	1
CARTAGENA, COLOMBIA	1998-	16166	19	12	8	15	9	5	10	6	2	5	2	1

	2013													
MEDELLIN, COLOMBIA	1998-2013	50852	16	12	8	12	8	5	6	3	2	3	1	1
MASHHAD, IRAN	2004-2013	40824	34	31	27	25	22	16	18	15	12	8	6	4
WEST, NORTHERN IRELAND	1984-2007	39306	31	26	22	23	18	15	15	12	8	8	6	4
EAST, NORTHERN IRELAND	1984-2007	65690	31	25	21	23	19	15	15	12	9	7	5	4
NORTHEAST, REPUBLIC OF IRELAND	1984-2007	33862	30	25	22	22	18	16	14	11	9	7	5	4
SOUTHWEST, REPUBLIC OF IRELAND	1984-2007	81484	31	28	24	23	19	17	15	12	10	7	6	5
NORTHWEST, REPUBLIC OF IRELAND	1984-2007	22464	31	27	23	22	18	16	15	11	8	6	5	3
SOUTHEAST, REPUBLIC OF IRELAND	1984-2007	73846	30	24	21	23	17	14	14	10	7	6	4	3
PALERMO, ITALY	1997-2001	8009	30	25	23	21	17	16	13	11	8	6	4	2
BARI, ITALY	1996-2007	9487	31	27	24	22	18	15	14	11	8	6	4	3
LATINA, ITALY	1995-2006	2532	34	33	31	25	24	23	17	16	14	8	7	6
FROSINONE, ITALY	1995-2006	996	33	30	29	24	22	20	16	13	12	8	6	5
ROMA, ITALY	1987-2010	159066	35	33	30	26	24	23	17	15	14	8	6	5
VITERBO, ITALY	1995-2006	1898	35	34	31	25	23	21	16	15	13	8	6	5
GENOVA, ITALY	1999-2007	21779	33	30	27	24	22	19	14	13	11	7	6	5
BOLOGNA, ITALY	1996-2010	17787	32	29	27	24	20	19	15	13	10	7	5	4
TORINO, ITALY	1991-1999	20441	34	32	28	24	22	17	15	13	10	7	6	4
BRESCIA, ITALY	1993-2003	6813	34	30	28	25	22	18	15	13	11	7	6	5
AICHI, JAPAN	1972-2012	467918	35	33	30	26	24	21	18	15	13	8	6	5
AKITA, JAPAN	1972-2012	126294	34	31	30	26	24	21	17	15	14	8	7	6
AOMORI, JAPAN	1972-	141127	35	32	29	25	23	21	17	14	13	8	6	5

	2012													
CHIBA, JAPAN	1972-2012	369536	35	33	30	25	22	19	17	15	13	8	6	5
EHIME, JAPAN	1972-2012	148563	35	33	30	25	23	21	16	14	12	8	6	5
FUKUSHIMA, JAPAN	1972-2012	195153	35	31	29	25	23	20	17	14	12	8	6	5
FUKUI, JAPAN	1972-2012	74642	34	32	29	26	23	21	16	14	12	8	7	5
FUKUOKA, JAPAN	1972-2012	402377	34	31	29	26	23	21	17	15	12	7	6	5
GIFU, JAPAN	1972-2012	171340	35	33	29	26	23	20	17	14	12	9	7	5
GUNMA, JAPAN	1972-2012	168499	34	31	28	25	22	19	17	13	11	8	6	5
HOKKAIDO, JAPAN	1972-2012	479712	35	32	30	26	24	22	17	15	13	8	6	6
HIROSHIMA, JAPAN	1972-2012	244198	35	33	30	26	24	22	17	16	14	9	8	7
HYOGO, JAPAN	1972-2012	442187	36	34	32	26	23	22	18	15	13	9	7	7
IBARAKI, JAPAN	1972-2012	232953	34	30	27	25	22	19	16	14	11	7	5	4
ISHIKAWA, JAPAN	1972-2012	102457	34	32	29	26	23	21	17	14	12	8	6	5
IWATE, JAPAN	1972-2012	133664	34	32	30	26	23	21	17	15	14	8	7	6
KAGAWA, JAPAN	1972-2012	97113	35	32	30	26	23	22	16	15	13	8	7	6
KANAGAWA, JAPAN	1972-2012	504261	34	31	28	26	23	20	16	14	12	8	6	4
KAGOSHIMA, JAPAN	1972-2012	189598	34	31	28	25	22	19	17	14	12	8	6	5
KOCHI, JAPAN	1972-2012	91372	34	31	29	26	23	21	16	13	12	8	7	6
KUMAMOTO, JAPAN	1972-2012	173796	36	33	30	26	23	21	16	14	12	8	6	5
KYOTO, JAPAN	1972-2012	217675	36	33	30	25	23	20	17	14	13	8	6	5
MIE, JAPAN	1972-2012	160694	36	33	29	26	24	22	16	13	12	8	7	5
MIYAGI, JAPAN	1972-	175850	34	31	29	25	22	20	16	14	12	7	6	5

	2012													
MIYAZAKI, JAPAN	1972-2012	106365	33	29	25	26	22	18	16	13	11	7	6	4
NAGANO, JAPAN	1972-2012	203609	35	32	29	26	24	21	17	14	12	8	6	5
NAGASAKI, JAPAN	1972-2012	150753	34	32	30	26	24	22	17	16	14	9	7	6
NARA, JAPAN	1972-2012	108660	34	31	28	26	23	21	18	15	13	8	6	5
NIIGATA, JAPAN	1972-2012	232181	35	33	30	26	23	21	16	14	13	8	6	5
OITA, JAPAN	1972-2012	122626	34	31	28	24	21	19	16	14	12	7	5	4
OKAYAMA, JAPAN	1972-2012	179087	35	33	31	26	25	23	17	15	13	8	7	7
OKINAWA, JAPAN	1973-2012	80349	33	30	28	29	26	24	18	16	15	10	8	7
OSAKA, JAPAN	1972-2012	648975	35	33	30	25	23	21	17	15	13	8	6	5
SAGA, JAPAN	1972-2012	85154	34	32	30	27	25	23	17	15	13	8	6	5
SAITAMA, JAPAN	1972-2012	402072	35	31	29	26	22	20	16	14	12	8	6	5
SHIGA, JAPAN	1972-2012	97398	36	34	32	26	23	21	16	14	13	8	7	6
SHIMANE, JAPAN	1972-2012	84635	36	33	31	26	24	22	17	15	14	8	6	4
SHIZUOKA, JAPAN	1972-2012	289420	33	29	26	24	21	18	16	13	10	7	5	3
TOKUSHIMA, JAPAN	1972-2012	85970	35	32	30	25	22	20	17	15	13	8	7	6
TOCHIGI, JAPAN	1972-2012	162919	34	31	28	26	23	20	17	14	12	8	6	5
TOKYO, JAPAN	1972-2012	878865	34	31	28	26	22	19	16	14	11	8	6	5
TOTTORI, JAPAN	1972-2012	62032	34	32	30	26	23	20	16	14	11	8	6	5
TOYAMA, JAPAN	1972-2012	106444	34	31	29	25	22	19	16	13	11	7	6	4
WAKAYAMA, JAPAN	1972-2012	111229	35	32	30	26	23	20	18	16	14	7	5	3
YAMAGATA, JAPAN	1972-	127750	35	32	30	26	23	21	17	15	13	8	7	6

	2012													
YAMAGUCHI, JAPAN	1972-2012	159778	36	33	31	26	24	22	17	15	13	8	7	6
YAMANASHI, JAPAN	1972-2012	78156	35	33	30	25	23	20	16	14	12	7	6	5
GWANGJU, KOREA	1992-2010	29141	34	32	30	26	24	23	17	14	13	7	6	5
BUSAN, KOREA	1992-2010	93483	35	33	31	26	24	23	17	16	14	8	7	6
ULSAN, KOREA	1992-2010	14906	25	23	21	19	17	16	12	10	9	6	4	3
DAEGU, KOREA	1992-2010	56425	34	30	28	25	23	20	17	15	13	8	6	6
DAEJEON, KOREA	1992-2010	27575	33	31	30	26	24	22	17	15	14	8	6	5
INCHEON, KOREA	1992-2010	52896	34	29	28	25	23	21	17	15	13	8	6	6
SEOUL, KOREA	1992-2010	197995	33	29	26	25	21	20	16	14	13	8	7	6
CAHUL, MOLDOVA	2003-2010	834	34	30	26	25	22	20	16	14	11	8	8	5
CHISINAU, MOLDOVA	2001-2010	17309	33	29	25	24	20	16	16	14	12	8	7	6
ANENII NOI, MOLDOVA	2003-2010	240	33	29	26	24	20	16	14	12	10	8	7	6
FALESTI, MOLDOVA	2003-2010	445	34	29	25	24	18	16	16	12	11	8	7	6
CEBU, PHILIPPINES	2006-2010	14984	25	22	18	21	18	14	11	9	8	7	6	6
DAVAO, PHILIPPINES	2006-2010	14907	16	12	9	15	11	7	7	5	4	4	2	2
MANILA, PHILIPPINES	2006-2010	30590	28	24	23	23	20	18	15	12	10	7	5	4
QUEZON, PHILIPPINES	2006-2010	30436	26	22	21	21	17	14	15	12	11	7	6	4
PALMAS G. CANARIA, SPAIN	1990-2010	27039	29	24	20	23	18	14	13	9	6	6	4	3
TENERIFE, SPAIN	1990-2010	16326	29	26	21	22	18	14	14	10	8	7	5	4
MELILLA, SPAIN	1990-2010	2738	34	30	27	24	20	17	14	11	8	6	3	2
CEUTA, SPAIN	1990-	3069	11	9	7	8	6	4	5	3	3	2	1	0

	2010													
CÁDIZ, SPAIN	1990-2010	12588	31	26	22	23	19	16	15	12	9	8	5	4
MÁLAGA, SPAIN	1990-2010	35549	32	26	20	21	16	12	13	9	5	6	3	2
ALMERÍA, SPAIN	1990-2010	12709	32	26	21	23	18	13	14	10	7	7	4	3
GRANADA, SPAIN	1990-2010	23194	35	32	29	26	22	18	17	14	10	8	7	4
HUELVA, SPAIN	1990-2010	13142	33	28	25	24	19	16	16	12	10	7	5	4
SEVILLA, SPAIN	1990-2010	52635	35	31	27	25	22	19	17	14	11	8	5	5
JAÉN, SPAIN	1990-2010	11011	35	32	27	27	24	19	17	14	11	7	6	5
CÓRDOBA, SPAIN	1990-2010	21505	35	32	29	26	23	21	17	14	12	8	5	4
MURCIA, SPAIN	1990-2010	23245	34	30	27	24	20	17	14	11	8	6	3	2
ALICANTE, SPAIN	1990-2010	15634	33	29	26	23	19	17	15	12	9	7	5	2
BADAJOS, SPAIN	1990-2010	11335	34	32	25	25	22	16	16	13	11	8	5	4
ALBACETE, SPAIN	1990-2010	10495	35	30	27	25	21	18	17	13	11	7	6	3
CIUDAD REAL, SPAIN	1990-2010	6933	35	33	29	26	23	20	17	14	11	7	5	3
CÁCERES, SPAIN	1990-2010	11104	34	32	28	27	23	18	17	13	10	8	6	4
VALENCIA, SPAIN	1990-2010	63467	33	30	28	25	21	18	14	11	9	6	4	3
PALMA MALLORCA, SPAIN	1990-2010	25347	34	29	25	22	18	15	15	12	8	6	4	2
TOLEDO, SPAIN	1990-2010	9639	35	32	29	27	24	21	18	15	11	7	5	3
CASTELLÓN, SPAIN	1990-2010	12557	34	31	28	24	21	19	15	12	10	6	5	4
CUENCA, SPAIN	1990-2010	5159	36	32	29	25	23	20	16	14	9	8	5	3
TERUEL, SPAIN	1990-2010	3844	35	31	27	26	22	18	16	12	8	7	5	2
MADRID, SPAIN	1990-	171996	36	33	29	26	22	20	17	14	10	8	5	4

	2010													
GUADALAJARA, SPAIN	1990-2010	6275	29	27	23	21	18	16	14	12	9	6	4	3
AVILA, SPAIN	1990-2010	6736	34	31	27	26	21	18	16	12	10	8	5	3
SALAMANCA, SPAIN	1990-2010	13985	34	31	27	25	21	17	16	12	10	8	5	4
SEGOVIA, SPAIN	1990-2010	5424	34	30	25	25	21	16	16	12	9	7	4	3
TARRAGONA, SPAIN	1990-2010	8439	36	32	30	25	22	20	15	12	9	7	4	3
BARCELONA, SPAIN	1990-2010	110440	34	32	30	26	23	22	17	16	14	8	6	5
ZAMORA, SPAIN	1990-2010	6435	33	30	25	25	22	17	16	13	10	7	5	3
LLEIDA, SPAIN	1990-2010	11309	35	32	29	25	21	17	16	13	10	7	5	3
VALLADOLID, SPAIN	1990-2010	20582	34	31	26	25	21	17	16	12	11	7	5	3
ZARAGOZA, SPAIN	1990-2010	43127	33	30	26	25	21	18	15	12	9	7	5	3
SORIA, SPAIN	1990-2010	4055	34	32	28	25	22	20	16	13	11	7	4	3
GIRONA, SPAIN	1990-2010	9619	34	30	28	24	21	19	16	14	11	7	6	4
HUESCA, SPAIN	1990-2010	4824	32	27	24	24	19	16	15	12	9	7	5	3
BURGOS, SPAIN	1990-2010	13026	33	30	26	25	22	18	16	11	8	7	4	3
OURENSE, SPAIN	1990-2010	11763	33	29	25	23	20	16	15	12	9	7	6	5
PONTEVEDRA, SPAIN	1990-2010	9707	31	27	21	22	18	13	15	12	8	7	4	3
LOGROÑO, SPAIN	1990-2010	10081	33	29	24	24	20	16	16	11	9	7	4	2
LEÓN, SPAIN	1990-2010	13663	33	30	24	25	22	17	16	11	8	7	4	3
PAMPLONA, SPAIN	1990-2010	17661	32	27	21	25	20	15	15	10	7	7	5	3
VITORIA, SPAIN	1990-2010	11721	31	25	19	23	18	12	15	10	6	7	4	3
LUGO, SPAIN	1990-	10413	30	25	19	22	17	12	13	8	6	6	3	2

	2010													
BILBAO, SPAIN	1990-2010	24210	27	22	16	21	15	11	11	8	6	5	3	2
SAN SEBASTIÁN, SPAIN	1990-2010	20326	27	21	16	19	14	10	12	8	5	5	3	2
OVIEDO, SPAIN	1990-2010	21508	29	23	19	21	16	12	12	8	5	6	4	2
A CORUÑA, SPAIN	1990-2010	18713	28	22	17	21	17	12	13	10	7	5	4	2
SANTANDER, SPAIN	1990-2010	17796	31	25	22	20	16	12	13	8	5	5	3	2
KAOHSIUNG, TAIWAN	1994-2007	60822	36	32	30	24	21	19	18	15	13	10	9	7
TAIPEI, TAIWAN	1994-2007	112364	34	29	27	26	22	18	16	14	12	7	6	4
TAICHUNG, TAIWAN	1994-2007	45116	34	29	26	24	20	16	16	12	10	8	6	4
NARATHIWAT, THAILAND	1999-2008	5068	26	21	18	23	18	14	14	10	7	5	4	3
YALA, THAILAND	1999-2008	3575	11	9	7	9	6	5	5	3	3	3	2	1
PATTANI, THAILAND	1999-2008	4006	25	20	18	20	16	14	13	10	8	6	4	3
SONGKHLA, THAILAND	1999-2008	11280	22	18	14	16	13	10	10	8	5	4	3	3
TRANG, THAILAND	1999-2008	4495	27	24	21	20	17	14	14	12	9	6	6	4
KRABI, THAILAND	1999-2008	2462	20	17	15	14	12	11	10	8	6	4	2	2
NAKHON SI THAMMARAT, THAILAND	1999-2008	13085	11	8	7	8	6	5	4	3	2	2	2	1
SURAT THANI, THAILAND	1999-2008	7687	25	21	20	21	17	15	12	10	8	6	5	3
CHUMPHON, THAILAND	1999-2008	4209	31	29	27	24	21	18	16	14	12	8	7	4
PRACHUAP KHIRI KHAN, THAILAND	1999-2008	4906	26	21	16	17	14	8	14	11	7	6	4	3
CHANTHABURI, THAILAND	1999-2008	7443	25	20	16	18	13	11	11	9	7	7	6	4
RAYONG, THAILAND	1999-2008	6189	34	33	32	26	24	22	17	15	14	8	7	6
PHETCHABURI, THAILAND	1999-	4743	31	26	23	23	20	16	16	14	11	7	5	4

	2008													
CHON BURI, THAILAND	1999-2008	16072	20	16	13	16	11	9	9	7	5	5	4	3
SAMUTPRAKAN, THAILAND	1999-2008	10063	26	22	18	19	16	12	14	11	8	6	5	2
RATCHABURI, THAILAND	1999-2008	9918	32	30	28	25	22	20	17	15	14	7	6	6
SAMUT SAKHON, THAILAND	1999-2008	5155	16	10	8	16	10	8	9	6	3	5	4	2
CHACHOENSAO, THAILAND	1999-2008	6948	26	24	20	19	17	14	14	12	9	6	5	4
BANGKOK, THAILAND	1999-2008	81210	30	27	23	22	18	13	14	12	9	7	5	4
SA KAE0, THAILAND	1999-2008	4684	27	23	20	19	19	16	14	12	10	7	6	4
NONTHABURI, THAILAND	1999-2008	10489	31	28	25	24	21	19	16	15	14	8	6	4
NAKHON PATHOM, THAILAND	1999-2008	8492	33	30	27	25	22	20	17	13	10	8	7	6
KANCHANABURI, THAILAND	1999-2008	7249	29	25	23	23	20	19	15	14	13	8	7	5
PATHUM THANI, THAILAND	1999-2008	7398	23	21	18	20	17	14	12	10	8	7	5	5
PRACHIN BURI, THAILAND	1999-2008	4935	22	18	17	16	14	12	11	9	7	5	4	4
AYUTTHAYA, THAILAND	1999-2008	8173	30	27	25	24	21	20	15	14	12	8	6	4
SUPHANBURI, THAILAND	1999-2008	8073	27	23	22	24	21	19	15	14	12	7	6	5
SARABURI, THAILAND	1999-2008	7652	35	31	29	28	25	23	16	14	12	8	6	4
LOP BURI, THAILAND	1999-2008	9947	20	15	11	15	10	8	9	6	4	3	2	1
SURIN, THAILAND	1999-2008	10238	30	26	23	23	20	15	16	13	10	8	6	5
NAKHON RATCHASIMA, THAILAND	1999-2008	25182	29	26	22	23	19	17	16	14	12	7	6	4
BURI RAM, THAILAND	1999-2008	10646	12	11	10	10	10	9	6	5	5	3	3	2
SI SA KET, THAILAND	1999-2008	12043	30	25	22	24	20	17	15	13	10	7	6	4
UBON RATCHATHANI, THAILAND	1999-	16204	30	28	24	24	20	18	15	12	10	8	7	5

	2008													
NAKHON SAWAN, THAILAND	1999-2008	12885	33	30	28	26	24	22	17	15	14	8	7	5
YASOTHON, THAILAND	1999-2008	5233	25	21	19	19	16	15	14	11	10	7	6	5
CHAIYAPHUM, THAILAND	1999-2008	9470	32	27	25	23	19	16	17	15	11	7	6	3
AMNAT CHAROEN, THAILAND	1999-2008	3447	20	16	13	16	12	9	11	7	6	5	2	0
ROI ET, THAILAND	1999-2008	13239	23	19	16	18	14	13	12	10	7	5	5	3
MAHA SAKHAM, THAILAND	1999-2008	8452	28	24	20	22	19	15	15	12	9	7	6	5
PHETCHABUN, THAILAND	1999-2008	8941	6	4	3	4	3	2	3	2	2	2	1	1
KALASIN, THAILAND	1999-2008	10235	26	22	20	17	14	11	12	10	9	6	5	5
KHON KAEN, THAILAND	1999-2008	20322	30	27	23	23	19	16	15	12	10	7	6	5
PHICHIT, THAILAND	1999-2008	5148	30	28	24	23	20	19	16	14	12	8	7	6
MUKDAHAN, THAILAND	1999-2008	2496	31	27	24	25	22	20	15	13	12	8	6	4
KAMPHAENG PHET, THAILAND	1999-2008	4551	23	20	15	17	14	11	12	10	8	6	5	4
PHITSANULOK, THAILAND	1999-2008	10489	30	26	25	22	19	17	15	13	12	8	7	4
TAK, THAILAND	1999-2008	3925	24	22	18	18	14	12	14	11	9	5	3	3
SUKHOTHAI, THAILAND	1999-2008	6057	30	26	22	23	19	17	15	13	11	8	7	6
SAKON NAKHON, THAILAND	1999-2008	10656	22	20	16	17	14	12	11	9	7	6	4	3
NONG BUA LAM PHU, THAILAND	1999-2008	4236	31	29	27	24	22	19	18	15	13	8	6	5
NAKHON PHANOM, THAILAND	1999-2008	5384	26	21	16	18	13	9	14	10	6	6	4	3
UDON THANI, THAILAND	1999-2008	15321	25	23	20	20	17	14	14	12	10	6	5	4
UTTARADIT, THAILAND	1999-2008	6835	31	28	23	24	20	16	15	12	9	8	6	4
NONG KHAI, THAILAND	1999-	6945	30	27	23	22	19	16	17	14	12	8	6	4

	2008													
PHRAE, THAILAND	1999-2008	7548	30	26	22	22	18	16	15	13	11	8	7	5
LAMPANG, THAILAND	1999-2008	12937	33	30	28	24	22	22	17	14	11	8	6	5
LAMPHUN, THAILAND	1999-2008	5461	27	24	22	22	20	20	15	14	12	8	6	6
NAN, THAILAND	1999-2008	6419	29	28	25	23	20	18	16	14	13	9	8	6
CHIANG MAI, THAILAND	1999-2008	26170	20	18	16	15	14	12	11	9	8	6	4	4
PHAYAO, THAILAND	1999-2008	8185	34	31	28	26	24	21	16	15	12	8	6	5
CHIANG RAI, THAILAND	1999-2008	18526	24	19	15	19	14	10	13	10	7	6	4	2
EAST, UK	1990-2012	349071	31	27	22	23	20	16	15	11	9	7	5	4
EAST MIDLANDS, UK	1990-2012	281307	30	25	22	22	19	16	14	11	9	7	6	4
LONDON, UK	1990-2012	384191	31	26	23	22	19	16	15	12	10	7	5	4
NORTH EAST, UK	1990-2012	190551	30	25	21	22	18	16	14	11	9	7	5	3
NORTH WEST, UK	1990-2012	495075	30	26	23	22	19	17	15	12	9	7	6	4
SOUTH EAST, UK	1990-2012	526489	31	27	23	23	20	16	15	12	10	8	6	4
SOUTH WEST, UK	1990-2012	360927	31	27	24	23	19	17	15	12	9	7	6	5
WALES, UK	1990-2012	219114	31	27	24	23	20	16	15	13	11	7	6	5
WEST MIDLANDS, UK	1990-2012	356808	29	25	22	22	18	16	15	12	10	7	6	4
YORKSHIRE & HUMBER, UK	1990-2012	349510	31	27	23	23	20	17	15	12	9	7	5	4
AKRON, OH, USA	1985-2006	33295	33	29	25	25	21	19	17	14	11	7	5	3
ALBUQUERQUE, NM, USA	1985-2006	22151	37	33	29	24	22	19	17	14	11	8	6	5
ALLENTOWN-BETHLEHEM, PA, USA	1985-2006	18616	33	27	23	23	19	16	16	13	10	8	6	5
ATLANTA, GA, USA	1985-	96303	36	32	29	25	22	19	18	16	14	9	7	5

	2006													
ATLANTIC CITY, NJ, USA	1985-2006	15199	32	27	20	23	17	14	14	10	6	7	4	3
AUSTIN, TX, USA	1985-2006	21831	39	36	34	28	25	23	17	16	14	8	7	5
BAKERSFIELD, CA, USA	1985-2006	27716	33	30	25	26	22	19	17	15	12	8	7	6
BALTIMORE, MD, USA	1985-2006	99401	33	28	21	23	18	15	17	13	11	8	5	4
BARNSTABLE-YARMOUTH, MA, USA	1985-2006	16153	32	27	22	25	21	16	16	13	9	6	4	2
BERGEN-PASSAIC, NJ, USA	1985-2006	73212	34	29	22	24	18	14	17	13	9	7	4	3
BIRMINGHAM, AL, USA	1985-2006	53165	35	32	28	25	21	20	16	14	12	10	8	6
BOSTON, MA, USA	1985-2006	145615	31	25	20	23	17	11	15	10	6	7	5	3
BATON ROUGE, LA, USA	1985-2006	19473	36	32	28	28	25	22	16	13	10	8	6	4
BROWNSVILLE, TX, USA	1985-2006	10965	32	28	24	32	28	24	15	12	10	9	7	5
BUFFALO, NY, USA	1985-2006	65843	33	28	24	23	19	16	15	12	10	7	5	4
CANTON-MASSILLON, OH, USA	1985-2006	23766	33	29	25	25	21	19	17	14	11	7	5	3
CHARLESTON, WV, USA	1985-2006	15363	34	30	26	26	22	19	16	13	11	9	7	5
CHARLOTTE, NC, USA	1985-2006	25311	34	30	26	25	21	18	18	15	12	9	7	5
CHATTANOOGA, TN, USA	1985-2006	18913	37	34	30	27	24	21	18	15	14	10	8	7
CHICAGO, IL, USA	1985-2006	349050	29	23	19	24	19	15	15	13	9	8	6	4
CINCINNATI, OH, USA	1985-2006	53094	33	29	26	22	18	15	16	13	11	7	6	5
CLEVELAND, OH, USA	1985-2006	125455	31	26	21	22	18	15	16	12	10	6	4	3
COLUMBIA, SC, USA	1985-2006	23635	36	31	28	26	23	20	18	15	12	10	7	5
COLUMBUS, OH, USA	1985-2006	49586	32	28	24	23	19	16	15	12	10	7	6	4
DALLAS, TX, USA	1985-	81635	37	34	31	27	24	22	19	18	16	8	7	6

	2006													
DAYTONA BEACH, FL, USA	1985-2006	33248	36	30	25	26	21	18	19	15	11	9	6	4
DAYTON, OH, USA	1985-2006	33728	31	27	23	25	21	18	17	14	11	8	6	5
DENVER, CO, USA	1985-2006	56583	33	28	23	23	19	15	15	10	7	7	3	3
DES MOINES, IA, USA	1985-2006	16899	33	29	24	25	20	16	16	12	10	7	5	4
DETROIT, MI, USA	1985-2006	229193	31	27	23	22	19	16	16	14	11	8	5	5
DUTCHESS COUNTY, NY, USA	1985-2006	13143	31	26	21	21	16	13	14	10	8	7	5	4
EL PASO, TX, USA	1985-2006	22366	31	28	24	24	20	18	17	15	12	8	6	5
ERIE, PA, USA	1985-2006	16916	31	25	20	22	17	14	15	11	8	7	4	2
FLINT, MI, USA	1985-2006	23674	30	25	22	24	20	15	14	11	8	7	4	3
FRESNO, CA, USA	1985-2006	31852	35	32	28	26	23	20	18	15	12	9	7	6
FT. LAUDERDALE, FL, USA	1985-2006	97450	31	24	19	22	16	12	14	10	7	6	3	2
FORT MYERS-CAPE CORAL, FL, USA	1985-2006	27339	32	25	21	20	15	11	12	8	5	6	4	2
FORT PIERCE-PORT ST. LUCIE, FL, USA	1985-2006	20681	39	32	26	27	22	18	19	14	11	6	3	2
FORT WORTH-ARLINGTON, TX, USA	1985-2006	53579	20	18	16	16	14	13	10	9	9	5	5	3
GALVESTON, TX, USA	1985-2006	12921	28	25	20	22	18	14	10	8	7	6	5	3
GARY, IN, USA	1985-2006	28345	30	26	21	24	20	16	16	12	9	7	5	4
GRAND RAPIDS, MI, USA	1985-2006	24572	31	27	23	22	19	16	16	12	10	8	6	4
GREENSBORO, NC, USA	1985-2006	20318	34	29	25	25	22	17	18	14	10	8	6	4
GREENVILLE, SC, USA	1985-2006	17982	37	34	30	27	25	22	16	14	12	8	6	5
HAMILTON, OH, USA	1985-2006	15447	33	29	26	22	18	15	16	13	11	7	6	5
HARRISBURG-CARLISLE, PA, USA	1985-	15600	23	21	18	17	14	11	11	10	8	5	4	3

	2006													
HARTFORD, CT, USA	1985-2006	48290	32	26	23	24	19	15	16	13	10	8	6	3
HONOLULU, HI, USA	1985-2006	24364	35	31	26	23	19	16	13	10	8	7	5	3
HOUSTON, TX, USA	1985-2006	115796	31	26	22	24	20	17	19	15	13	9	8	6
INDIANAPOLIS, IN, USA	1985-2006	46853	35	30	28	25	21	18	15	12	10	7	6	4
JACKSONVILLE, FL, USA	1985-2006	38724	36	31	28	28	23	20	16	13	11	9	6	4
JERSEY CITY, NJ, USA	1985-2006	31701	34	29	22	24	18	14	17	13	9	7	4	3
KANSAS CITY, MO-KS, USA	1985-2006	67807	32	28	24	24	20	16	17	13	11	8	6	4
KNOXVILLE, TN, USA	1985-2006	24834	36	33	28	26	23	19	17	15	11	8	6	5
LAKELAND-WINTER HAVEN, FL, USA	1985-2006	29250	39	33	29	27	22	19	18	14	11	7	4	2
LANCASTER, PA, USA	1985-2006	24548	32	26	22	26	21	18	16	13	10	9	6	5
LANSING, MI, USA	1985-2006	11583	29	25	21	22	18	15	14	11	8	6	4	2
LAS VEGAS, NV-AZ, USA	1985-2006	56467	35	32	28	26	23	20	16	14	12	9	8	6
LOS ANGELES, CA, USA	1985-2006	386647	31	27	24	23	20	16	14	11	8	7	4	3
LOUISVILLE, KY, USA	1985-2006	42618	35	31	28	27	24	19	17	14	11	9	7	5
LITTLE ROCK, AR, USA	1985-2006	19999	36	32	29	26	23	21	19	17	15	8	6	6
LUBBOCK, TX, USA	1985-2006	10691	33	28	23	24	19	15	14	12	7	7	6	3
MADISON, WI, USA	1985-2006	15106	30	26	21	23	19	14	16	12	8	7	5	4
MCALLEN-EDINBURG-MISSION, TX, USA	1985-2006	15090	33	30	26	24	21	19	17	14	12	7	5	4
MELBOURNE-TITUSVILLE-PALM BAY, FL, USA	1985-2006	27810	34	27	22	24	18	13	15	11	9	7	5	3
MEMPHIS, TN, USA	1985-2006	47476	37	33	30	28	26	22	16	13	11	9	7	6
MIAMI, FL, USA	1985-	119487	36	31	26	26	21	17	17	13	9	10	7	5

	2006													
MIDDLESEX, NJ, USA	1985-2006	33829	32	25	20	22	18	14	14	11	9	7	5	4
MILWAUKEE, WI, USA	1985-2006	71799	32	26	21	22	16	13	16	11	8	7	5	3
MINNEAPOLIS-ST. PAUL, MN, USA	1985-2006	74244	32	28	25	24	20	16	16	12	10	7	5	4
MOBILE, AL, USA	1985-2006	22679	33	30	26	24	21	17	19	15	13	9	8	5
MONMOUTH-OCEAN, NJ, USA	1985-2006	73356	22	18	15	16	12	10	11	8	6	6	4	3
MYRTLE BEACH, SC, USA	1985-2006	9518	32	28	25	22	18	15	14	11	8	7	5	3
NAPLES, FL, USA	1985-2006	11336	35	28	24	23	18	14	23	18	14	7	4	3
NASHUA, NH, USA	1985-2006	15701	31	26	21	23	19	15	14	10	7	7	6	4
NASHVILLE, TN, USA	1985-2006	30097	32	29	24	24	21	18	18	15	13	8	7	5
NASSAU-SUFFOLK, NY, USA	1985-2006	143694	31	24	20	24	19	14	16	12	10	7	5	4
NEWARK, NJ, USA	1985-2006	68728	34	29	22	24	18	14	17	13	9	7	4	3
NEWBURGH, NY, USA	1985-2006	15476	31	26	22	22	18	15	14	12	10	7	5	4
NEW HAVEN-MERIDEN, CT, USA	1985-2006	48273	32	26	23	24	19	15	16	13	10	8	6	3
NEW LONDON, CT, USA	1985-2006	12576	31	24	20	22	16	13	14	11	8	7	5	4
NEW YORK, NY, USA	1985-2006	426430	32	26	22	23	18	14	16	11	8	7	5	3
OAKLAND, CA, USA	1985-2006	99888	20	15	11	14	10	8	10	7	4	4	2	1
OCALA, FL, USA	1985-2006	17933	32	26	22	23	18	15	17	12	9	7	5	4
OKLAHOMA CITY, OK, USA	1985-2006	36601	36	32	29	24	22	19	18	16	14	7	6	5
OMAHA, NE, USA	1985-2006	22024	33	29	25	25	20	17	16	13	11	7	5	4
ORANGE COUNTY, CA, USA	1985-2006	98795	32	28	25	24	21	18	16	13	10	7	5	4
ORLANDO, FL, USA	1985-	49272	32	27	23	22	18	15	15	12	9	9	6	5

	2006													
PENSACOLA, FL, USA	1985-2006	16165	34	30	24	26	22	19	15	12	9	8	6	4
PHILADELPHIA, PA-NJ, USA	1985-2006	279833	33	28	22	25	20	16	15	12	9	8	6	5
PHOENIX, AZ, USA	1985-2006	117774	36	31	27	27	23	21	19	16	13	9	7	5
PITTSBURGH, PA, USA	1985-2006	97477	32	29	24	25	21	18	15	11	10	9	6	5
PORTLAND, ME, USA	1985-2006	14093	33	27	22	25	19	15	14	10	7	7	4	3
PORTLAND, OR, USA	1985-2006	65670	35	29	25	24	19	16	17	13	9	7	5	3
PROVIDENCE-FALL RIVER, RI-MA, USA	1985-2006	11215	32	25	21	23	18	14	16	11	9	7	4	3
PUNTA GORDA, FL, USA	1985-2006	11663	40	33	26	25	19	15	16	11	8	9	6	4
RALEIGH, NC, USA	1985-2006	18149	36	32	27	27	24	20	16	13	9	8	5	4
READING, PA, USA	1985-2006	22163	36	32	27	27	24	20	16	13	9	8	5	4
RIVERSIDE-SAN BERNARDINO, CA, USA	1985-2006	134247	33	31	27	27	25	22	18	16	14	8	6	5
ROCHESTER, NY, USA	1985-2006	39921	32	28	24	24	19	16	15	12	9	7	5	4
ROCKFORD, IL, USA	1985-2006	14176	31	27	22	23	19	16	16	12	10	8	6	5
SACRAMENTO, CA, USA	1985-2006	53242	34	29	23	24	19	16	16	12	10	9	6	4
SAGINAW, MI, USA	1985-2006	12524	30	25	22	23	19	15	15	12	8	8	5	3
SALINAS, CA, USA	1985-2006	14338	18	15	10	15	11	6	8	5	3	3	2	1
SALT LAKE CITY, UT, USA	1985-2006	27783	34	30	25	24	19	15	16	13	9	9	6	4
SAN ANTONIO, TX, USA	1985-2006	57736	37	34	31	31	28	25	18	15	12	8	6	4
SARASOTA-BRADENTON, FL, USA	1985-2006	46351	32	28	24	24	20	16	13	10	8	9	7	6
SCRANTON--WILKES-BARRE--HAZLETON, PA, USA	1985-2006	46123	32	27	23	23	19	16	15	13	10	7	5	4
SAN DIEGO, CA, USA	1985-	116484	33	29	27	23	21	19	16	14	12	7	5	3

	2006													
SEATTLE, WA, USA	1985-2006	69921	35	30	24	24	18	14	16	12	7	8	6	3
SAN FRANCISCO, CA, USA	1985-2006	77042	22	16	12	18	13	9	10	7	4	4	2	1
SHREVEPORT, LA, USA	1985-2006	16221	34	31	28	29	26	23	19	16	14	9	7	6
SAN JOSE, CA, USA	1985-2006	54245	30	24	18	22	17	12	14	9	6	8	4	2
SPOKANE, WA, USA	1985-2006	21294	33	29	25	26	23	19	17	14	11	8	5	4
SPRINGFIELD, MA, USA	1985-2006	29030	32	26	23	24	19	15	16	13	10	8	6	3
STAMFORD-NORWALK, CT, USA	1985-2006	43691	33	27	22	25	19	16	16	12	9	8	5	4
ST. LOUIS, MO-IL, USA	1985-2006	96368	34	30	26	25	22	18	16	13	10	9	6	4
STOCKTON-LODI, CA, USA	1985-2006	25244	32	28	22	26	21	17	16	12	10	8	5	4
SYRACUSE, NY, USA	1985-2006	26252	32	28	23	24	19	16	14	12	9	7	5	3
TACOMA, WA, USA	1985-2006	29688	33	28	23	24	19	15	15	11	9	8	5	3
TAMPA-ST. PETERSBURG-CLEARWATER, FL, USA	1985-2006	49811	37	30	24	27	21	17	17	13	10	6	3	3
TOLEDO, OH, USA	1985-2006	28669	33	29	25	25	21	17	15	13	10	7	5	4
TRENTON, NJ, USA	1985-2006	17869	31	24	19	22	17	13	16	12	9	7	5	4
TUCSON, AZ, USA	1985-2006	39643	33	30	26	26	22	19	18	15	12	9	7	5
TULSA, OK, USA	1985-2006	29746	35	31	27	25	21	19	16	13	11	8	6	5
UTICA-ROME, NY, USA	1985-2006	16479	30	26	21	24	20	17	15	12	10	7	5	3
VENTURA COUNTY, CA, USA	1985-2006	27134	22	20	17	18	16	14	10	8	7	5	3	3
VIRGINIA BEACH, VA, USA	1985-2006	58165	32	27	22	25	19	15	15	11	8	8	6	3
WASHINGTON, DC-MD-VA, USA	1985-2006	44237	33	28	23	23	19	15	16	12	10	7	5	3
WICHITA, KS, USA	1985-	21215	35	31	26	25	21	18	17	13	12	8	6	5

	2006													
WILMINGTON, DE, USA	1985-2006	23455	31	26	21	23	18	14	16	11	9	7	5	3
WORCESTER, MA, USA	1985-2006	41347	34	28	24	25	20	16	15	11	8	7	5	3
WEST PALM BEACH-BOCA RATON, FL, USA	1985-2006	72824	37	30	25	25	19	15	17	11	8	9	5	3
YORK, PA, USA	1985-2006	19280	32	26	21	25	20	16	16	12	9	8	6	4
YOUNGSTOWN-WARREN, OH, USA	1985-2006	26632	30	25	21	23	19	15	16	12	10	7	5	4
HO CHI MINH CITY, VIETNAM	2010-2013	33722	31	25	21	22	17	15	15	12	11	8	7	6
HUE, VIETNAM	2009-2013	1933	33	28	24	22	18	14	16	11	8	8	4	3

Table S2: Second-stage random-effects meta-analysis and meta-regression models for explaining variation in overall heatwave effects and added heatwave effects: Cochran Q test for heterogeneity, I^2 statistics for residual heterogeneity. Please refer table 1 for heatwave definitions.

Heatwave definition	Model	Predictor	<i>Overall heatwave effect</i>		<i>Added heatwave effect</i>	
			P value for Q test	I^2 (%)	P value for Q test	I^2 (%)
90P_2day	Intercept only	-----	<0.001	73.33	0.372	2.12
	Single predictor	Average temperature	<0.001	70.83	0.376	2.04
		Temperature range	<0.001	73.40	0.399	1.63
		Temperature variability	<0.001	73.03	0.412	1.39
		Longitude	<0.001	72.26	0.359	2.35
		Latitude	<0.001	72.16	0.361	2.31
		Country	<0.001	44.72	0.335	2.86
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.99	0.402	1.61
	Longitude					
		Latitude				
		Country				
92.5P_2day	Intercept only	-----	<0.001	74.37	0.031	12.03
	Single predictor	Average temperature	<0.001	72.84	0.038	11.42
		Temperature range	<0.001	74.34	0.030	12.11
		Temperature variability	<0.001	73.52	0.028	12.25
		Longitude	<0.001	73.72	0.028	12.25
		Latitude	<0.001	73.61	0.028	12.24
		Country	<0.001	46.52	0.024	12.87
		Full	Average temperature			

		Temperature range				
		Temperature variability	<0.001	43.83	0.030	12.39
		Longitude				
		Latitude				
		Country				
95P_2day	Intercept only	-----	<0.001	74.99	0.095	8.59
	Single predictor	Average temperature	<0.001	74.51	0.108	8.13
		Temperature range	<0.001	74.91	0.149	6.88
		Temperature variability	<0.001	74.20	0.116	7.88
		Longitude	<0.001	74.65	0.100	8.40
		Latitude	<0.001	74.61	0.090	8.78
		Country	<0.001	49.54	0.082	9.28
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	46.66	0.097	8.72
		Longitude				
		Latitude				
		Country				
97.5P_2day	Intercept only	-----	<0.001	73.99	0.038	11.47
	Single predictor	Average temperature	<0.001	74.02	0.038	11.47
		Temperature range	<0.001	73.73	0.074	9.45
		Temperature variability	<0.001	73.43	0.057	10.30
		Longitude	<0.001	74.03	0.043	11.11
		Latitude	<0.001	73.92	0.053	10.48
		Country	<0.001	51.82	0.089	9.00
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	47.79	0.080	9.42
		Longitude				

		Latitude				
		Country				
90P_3day	Intercept only	-----	<0.001	72.33	0.765	5.48
	Single predictor	Average temperature	<0.001	70.14	0.775	5.72
		Temperature range	<0.001	72.40	0.817	6.86
		Temperature variability	<0.001	71.92	0.809	6.65
		Longitude	<0.001	71.40	0.754	5.22
		Latitude	<0.001	71.01	0.765	5.48
		Country	<0.001	44.87	0.868	8.75
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.93	0.876	9.12
	Longitude					
	Latitude					
		Country				
92.5P_3day	Intercept only	-----	<0.001	73.31	0.458	0.58
	Single predictor	Average temperature	<0.001	72.18	0.508	-0.31
		Temperature range	<0.001	73.24	0.464	0.48
		Temperature variability	<0.001	72.32	0.448	0.76
		Longitude	<0.001	72.83	0.449	0.74
		Latitude	<0.001	72.61	0.450	0.73
		Country	<0.001	46.88	0.574	1.53
		Full	Average temperature			
	Temperature range					
	Temperature variability		<0.001	43.40	0.585	1.76
	Longitude					
	Latitude					
		Country				
95P_3day	Intercept only	-----	<0.001	73.52	0.091	8.73

	Single predictor	Average temperature	<0.001	73.32	0.103	8.31
		Temperature range	<0.001	73.42	0.133	7.34
		Temperature variability	<0.001	72.76	0.103	8.32
		Longitude	<0.001	73.37	0.088	8.87
		Latitude	<0.001	73.23	0.090	8.77
		Country	<0.001	51.82	0.111	8.18
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	48.36	0.132	7.55
		Longitude				
		Latitude				
		Country				
97.5P_3day	Intercept only	-----	<0.001	71.16	0.207	5.42
	Single predictor	Average temperature	<0.001	71.12	0.201	5.56
		Temperature range	<0.001	70.89	0.258	4.32
		Temperature variability	<0.001	70.66	0.235	4.79
		Longitude	<0.001	71.23	0.197	5.65
		Latitude	<0.001	71.13	0.278	3.89
		Country	<0.001	50.05	0.367	2.25
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	45.41	0.436	0.99
		Longitude				
		Latitude				
		Country				
90P_4day	Intercept only	-----	<0.001	70.58	0.278	3.90
	Single predictor	Average temperature	<0.001	68.76	0.286	3.73
		Temperature range	<0.001	70.65	0.336	2.79
		Temperature variability	<0.001	70.02	0.317	3.15

		Longitude	<0.001	69.79	0.266	4.14
		Latitude	<0.001	69.37	0.271	4.05
		Country	<0.001	44.25	0.436	0.98
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	42.50	0.465	0.45
		Longitude				
		Latitude				
		Country				
92.5P_4day	Intercept only	-----	<0.001	72.05	0.086	8.95
	Single predictor	Average temperature	<0.001	71.42	0.089	8.83
		Temperature range	<0.001	71.97	0.096	8.57
		Temperature variability	<0.001	71.10	0.086	8.96
		Longitude	<0.001	71.79	0.086	8.95
		Latitude	<0.001	71.44	0.089	8.82
		Country	<0.001	47.65	0.173	6.37
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	43.27	0.217	5.33
		Longitude				
		Latitude				
		Country				
95P_4day	Intercept only	-----	<0.001	73.19	0.036	11.59
	Single predictor	Average temperature	<0.001	73.16	0.038	11.44
		Temperature range	<0.001	73.03	0.044	11.05
		Temperature variability	<0.001	72.45	0.035	11.65
		Longitude	<0.001	73.14	0.035	11.66
		Latitude	<0.001	73.00	0.042	11.15
		Country	<0.001	54.10	0.100	8.59

	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	50.15	0.102	8.57
		Longitude				
		Latitude				
		Country				
97.5P_4day	Intercept only	-----	<0.001	69.31	0.004	16.34
	Single predictor	Average temperature	<0.001	69.01	0.004	16.47
		Temperature range	<0.001	68.95	0.005	16.28
		Temperature variability	<0.001	68.86	0.005	16.26
		Longitude	<0.001	69.37	0.004	16.37
		Latitude	<0.001	69.39	0.005	16.00
		Country	<0.001	48.71	0.011	14.69
	Full	Average temperature				
		Temperature range				
		Temperature variability	<0.001	44.06	0.019	13.57
		Longitude				
		Latitude				
		Country				

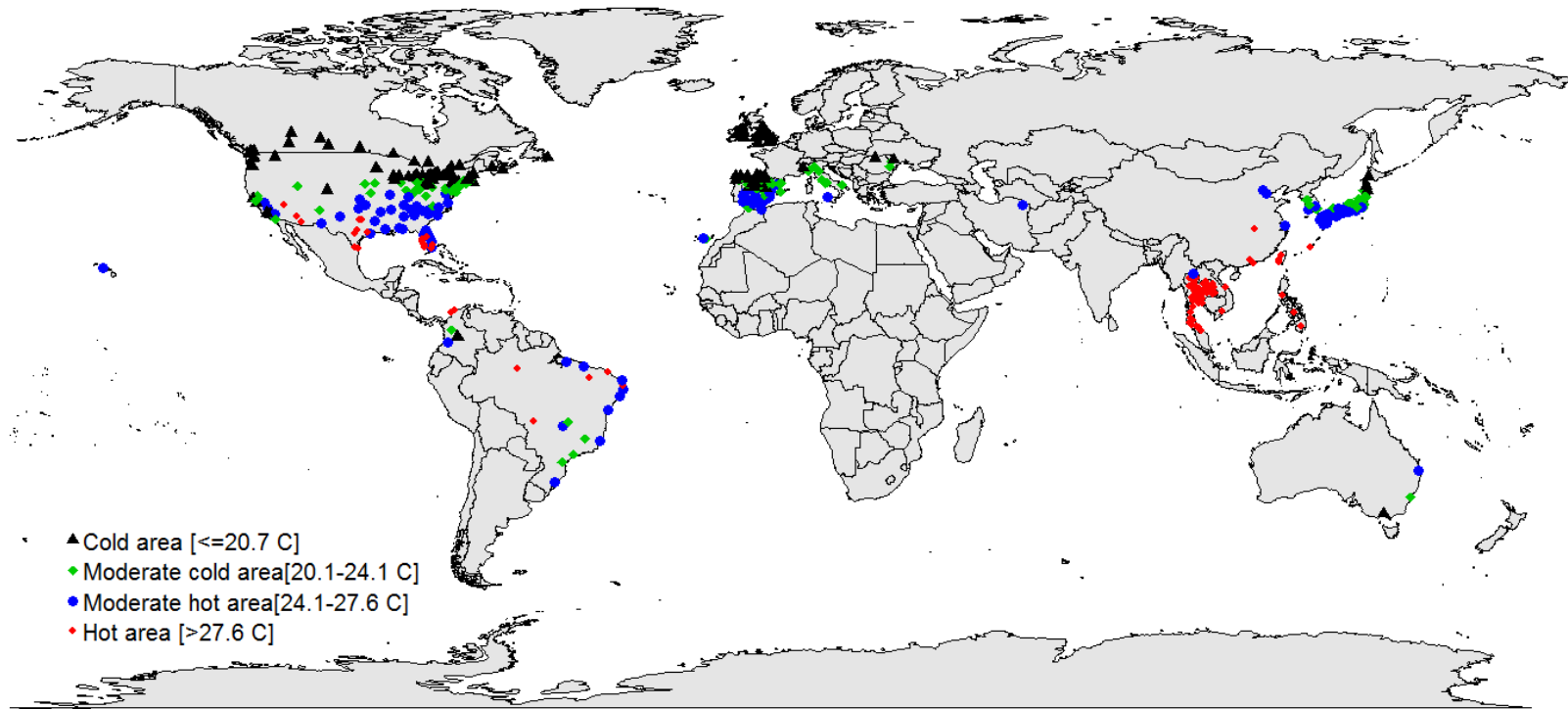


Figure S1: Locations of communities stratified by cold, moderate cold, moderate hot and hot areas, by the quantiles ($\leq 25^{\text{th}}$, $25^{\text{th}}-50^{\text{th}}$, $50^{\text{th}}-75^{\text{th}}$, and $> 75^{\text{th}}$) of their mean temperatures of hot season (each community has one value of annual mean temperature).

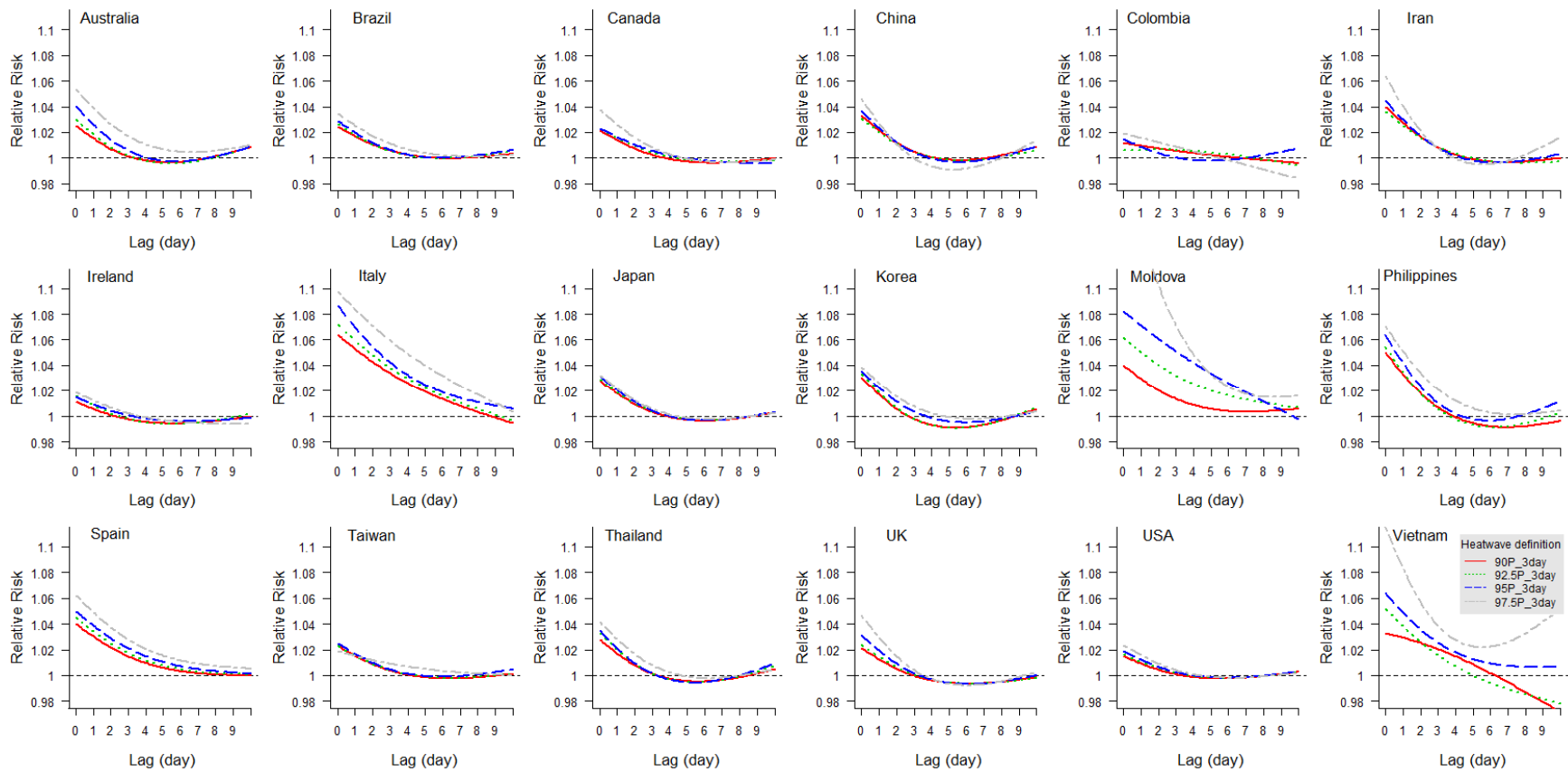


Figure S2: Lag effects of heatwaves on mortality along lag 0–10 days in 18 countries/regions for 4 types of heatwave definitions. 90P_3day: 90th percentile with ≥ 3 days duration; 92.5P_3day: 92.5th percentile with ≥ 3 days duration; 95P_3day: 95th percentile with ≥ 3 days duration; 97.5P_3day: 97.5th percentile with ≥ 3 days duration.

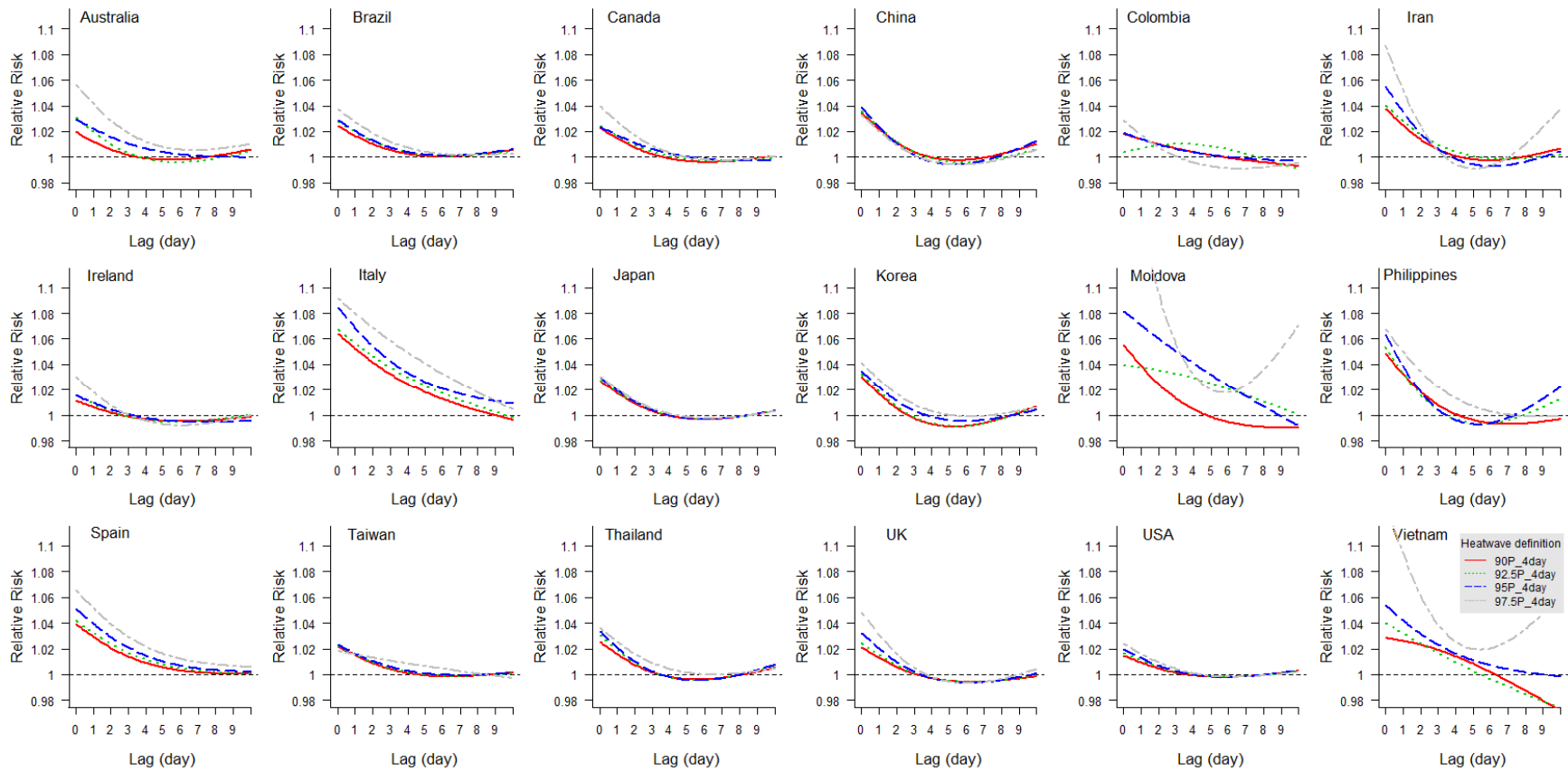


Figure S3: Lag effects of heatwaves on mortality along lag 0–10 days in 18 countries/regions for 4 types of heatwave definitions. 90P_4day: 90th percentile with ≥ 4 days duration; 92.5P_4day: 92.5th percentile with ≥ 4 days duration; 95P_4day: 95th percentile with ≥ 4 days duration; 97.5P_4day: 97.5th percentile with ≥ 4 days duration.

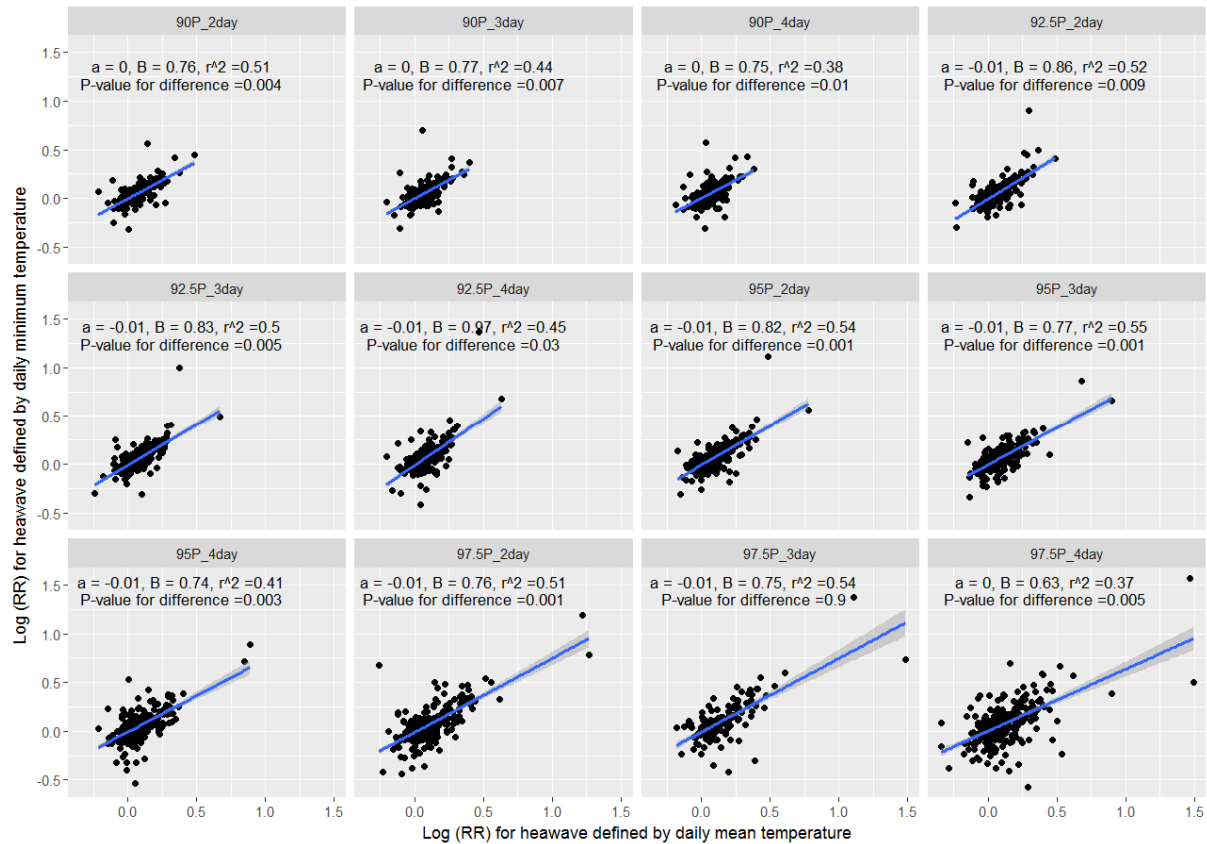


Figure S4: Comparison for cumulative effects of heatwaves on mortality over lag 0–10 days in 16 countries/regions for 12 types of heatwave definitions using daily mean and minimum temperatures. Please refer table 1 for heatwave definitions. a, B, and r² are intercept, coefficient, and r-squared respectively derived from linear regression model for effect estimates modelled by heatwaves defined by daily mean and minimum temperatures. P-value for difference is modelled by the Paired t-test between effect estimates modelled by heatwaves defined by daily mean and minimum temperatures.

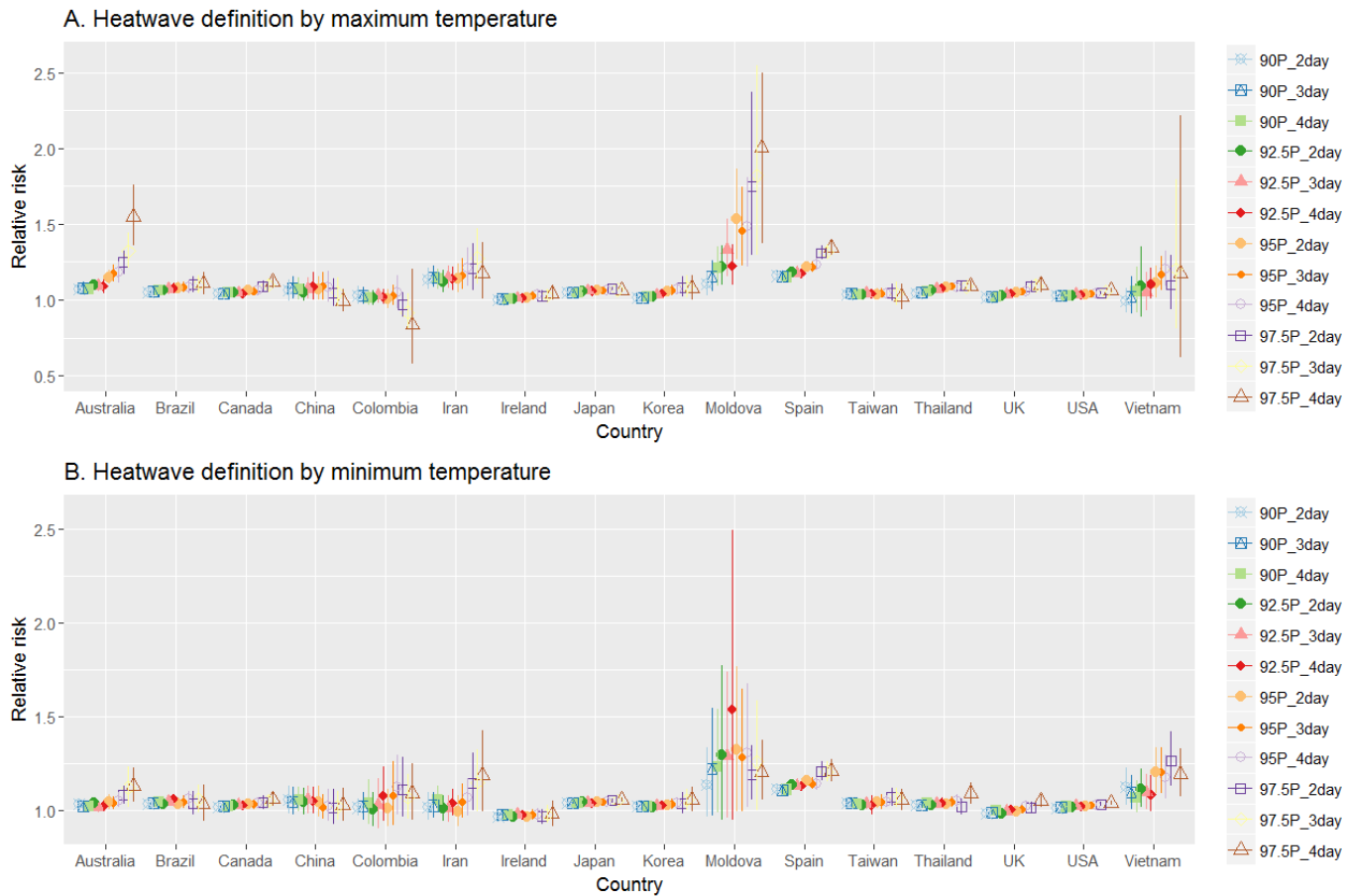
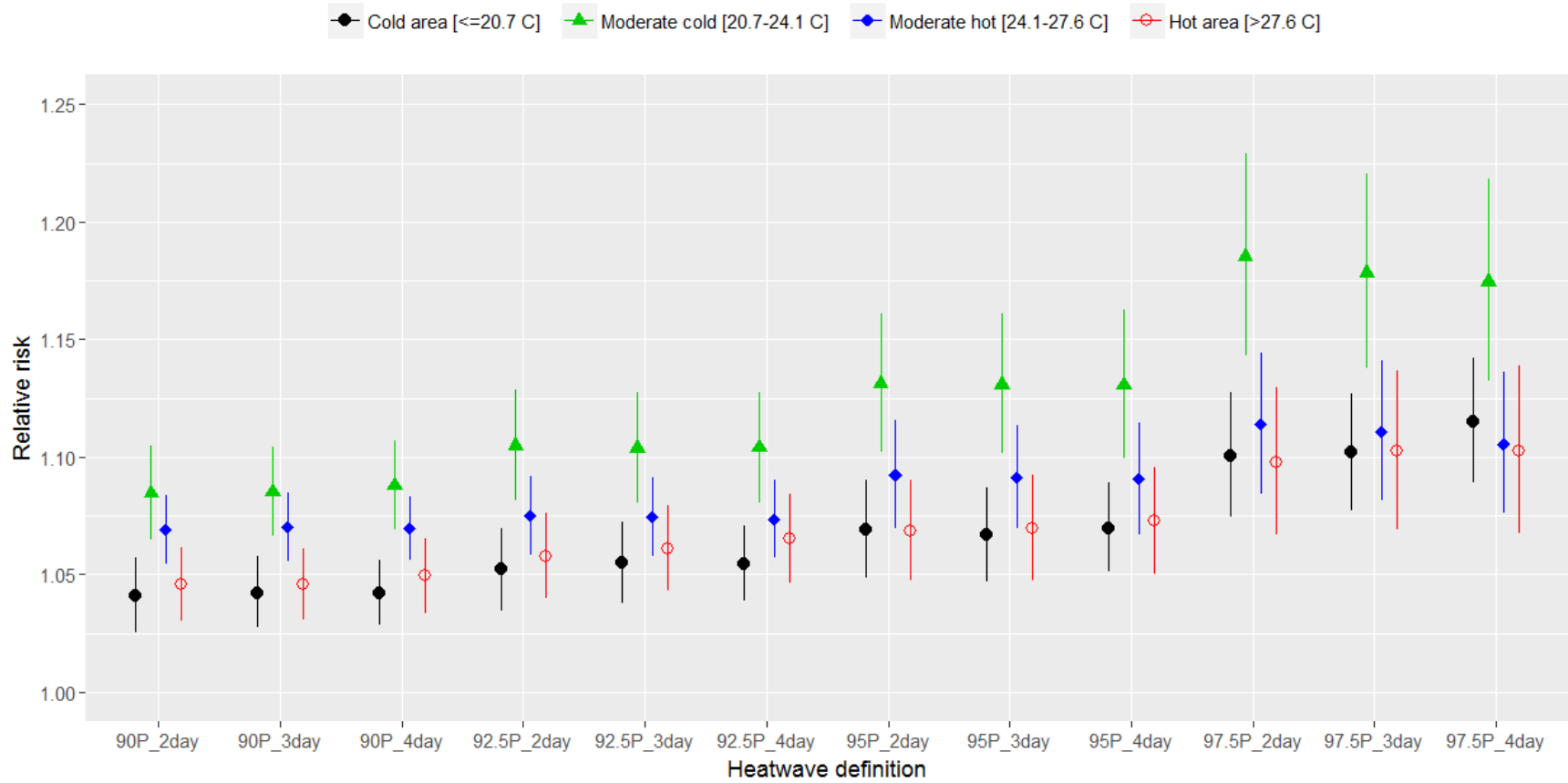


Figure S5: Cumulative effects of heatwaves (A. definition by maximum temperature and B. definition by minimum temperature) on mortality over lag 0–10 days in 18 countries/regions for 12 types of heatwave definitions. Please refer table 1 for heatwave definitions.

Remove USA



F

Figure S6: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding USA. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season > 27.6 °C. Please refer table 1 for heatwave definitions.

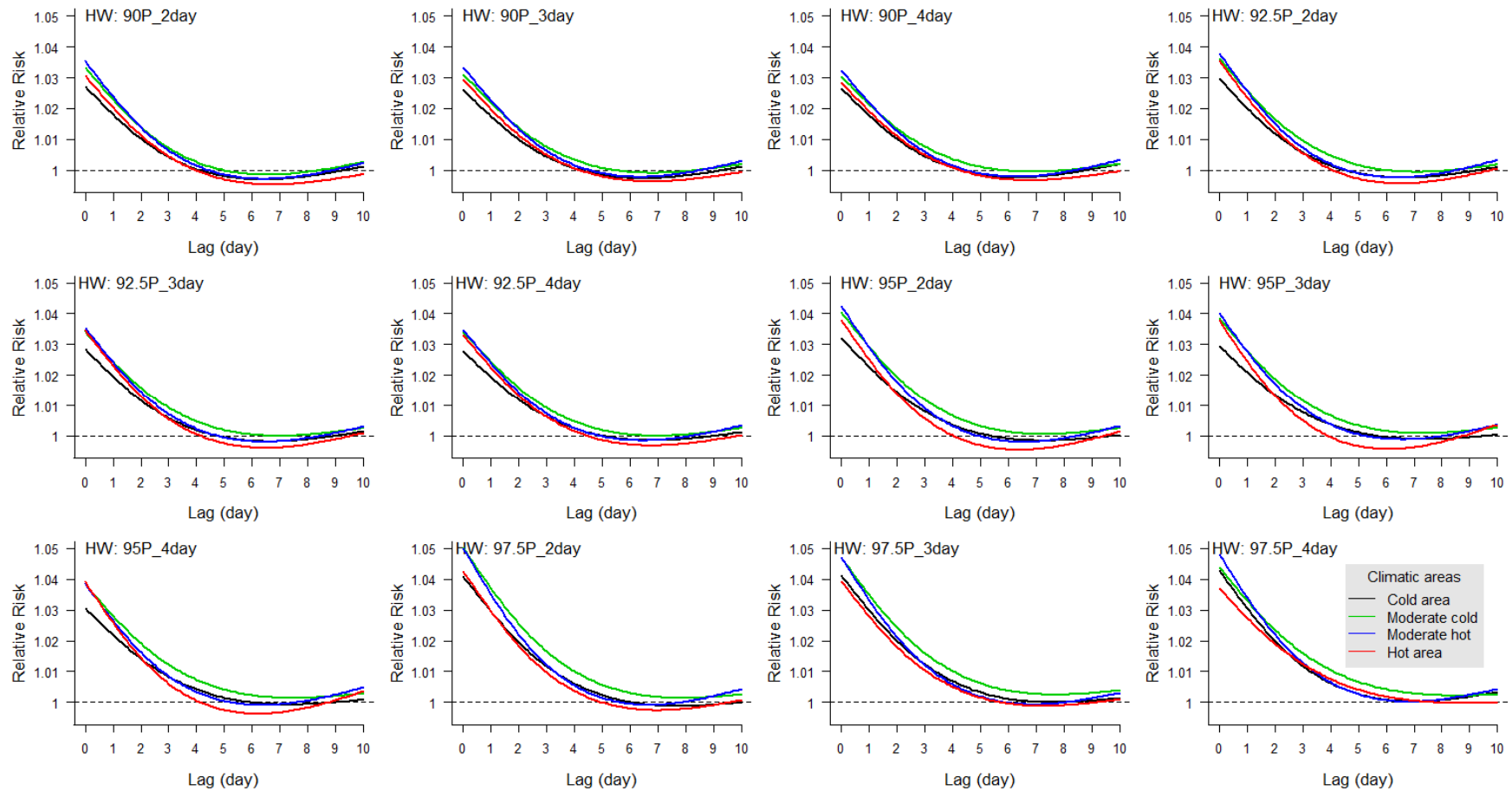


Figure S7: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding USA. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season >27.6 °C. Please refer table 1 for heatwave definitions.

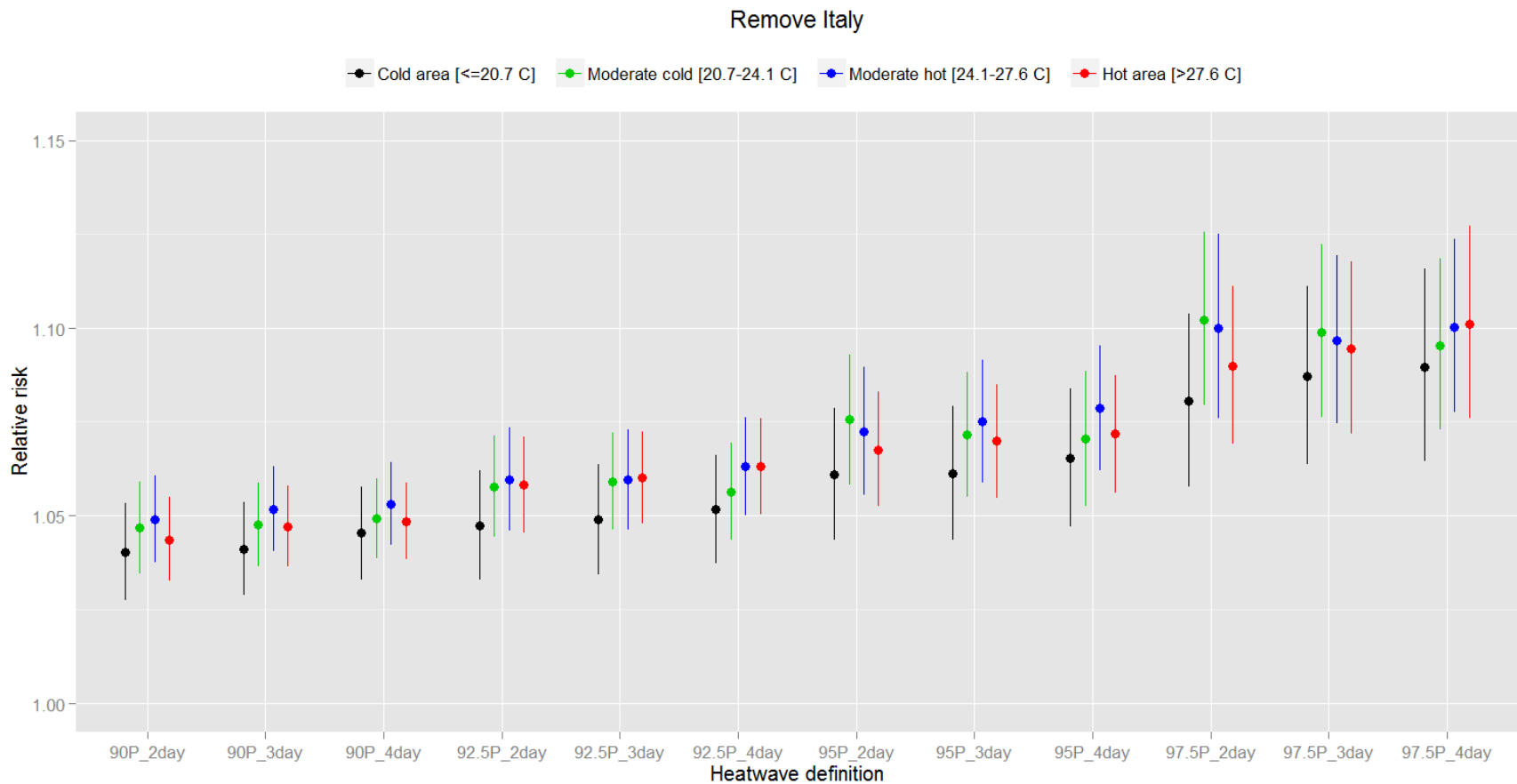


Figure S8: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Italy. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season > 27.6 °C. Please refer table 1 for heatwave definitions.

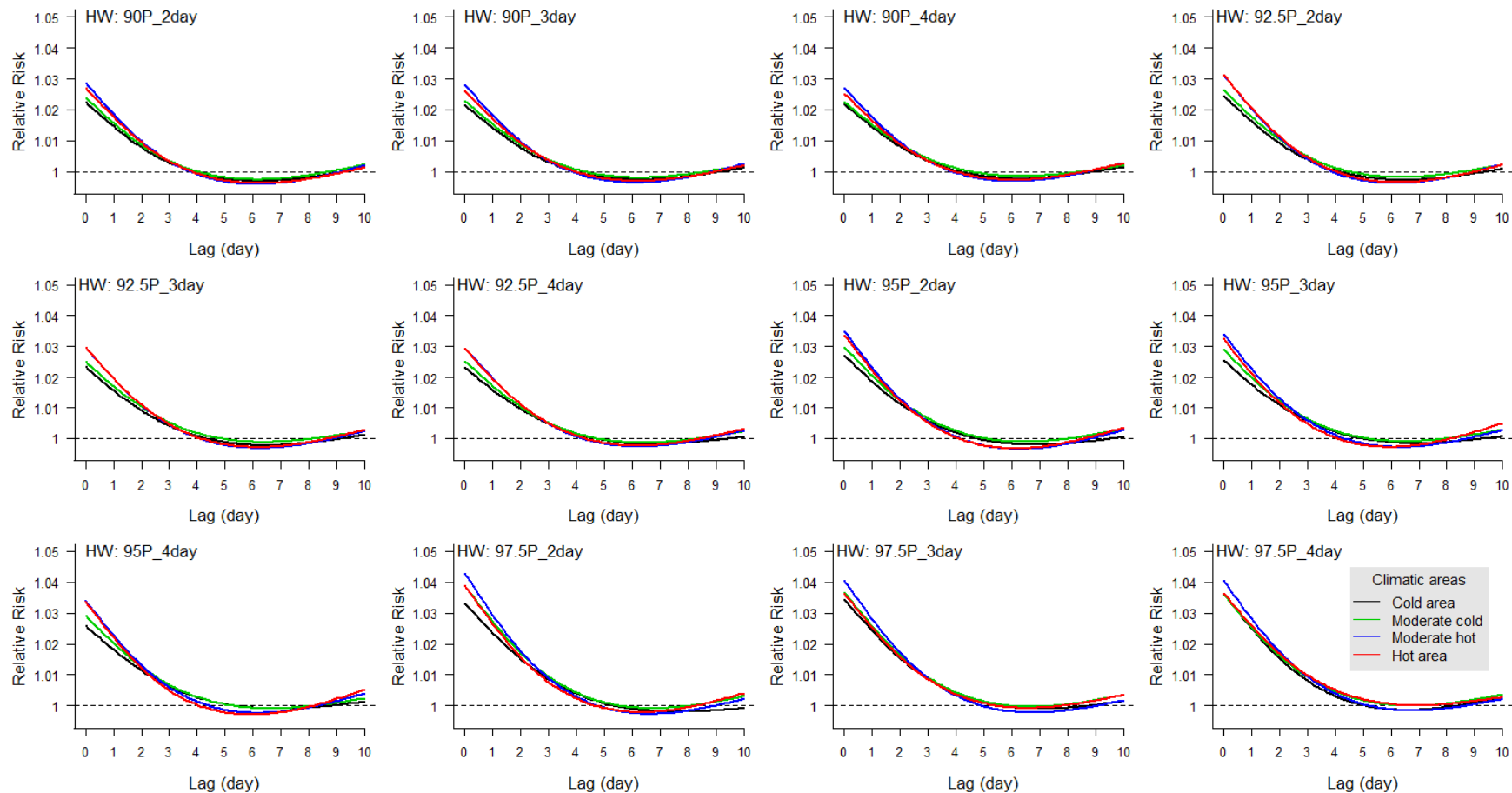


Figure S9: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Italy. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season >27.6 °C. Please refer table 1 for heatwave definitions.

Remove Moldova

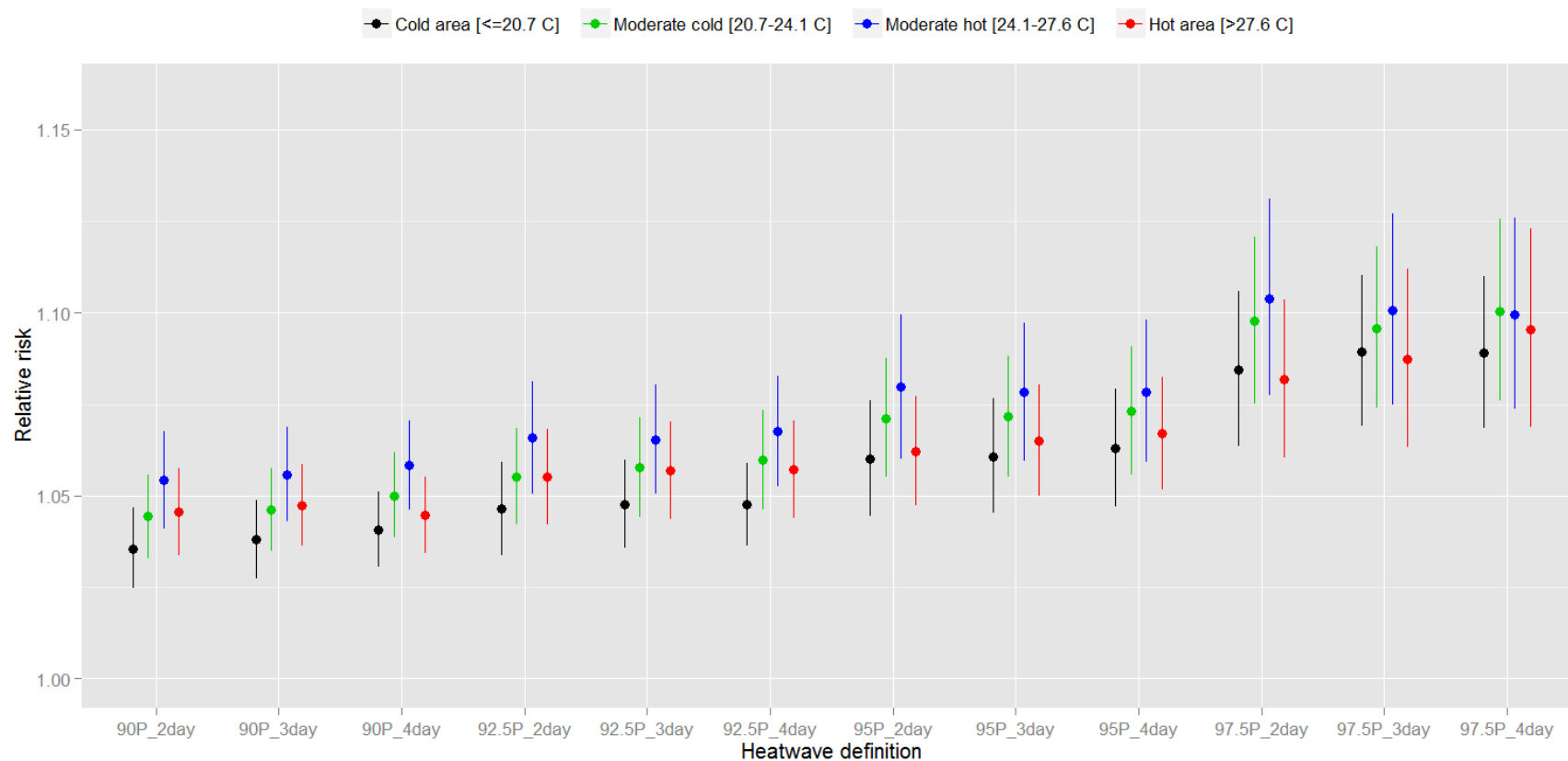


Figure S10: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Moldova. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season > 27.6 °C. Please refer table 1 for heatwave definitions.

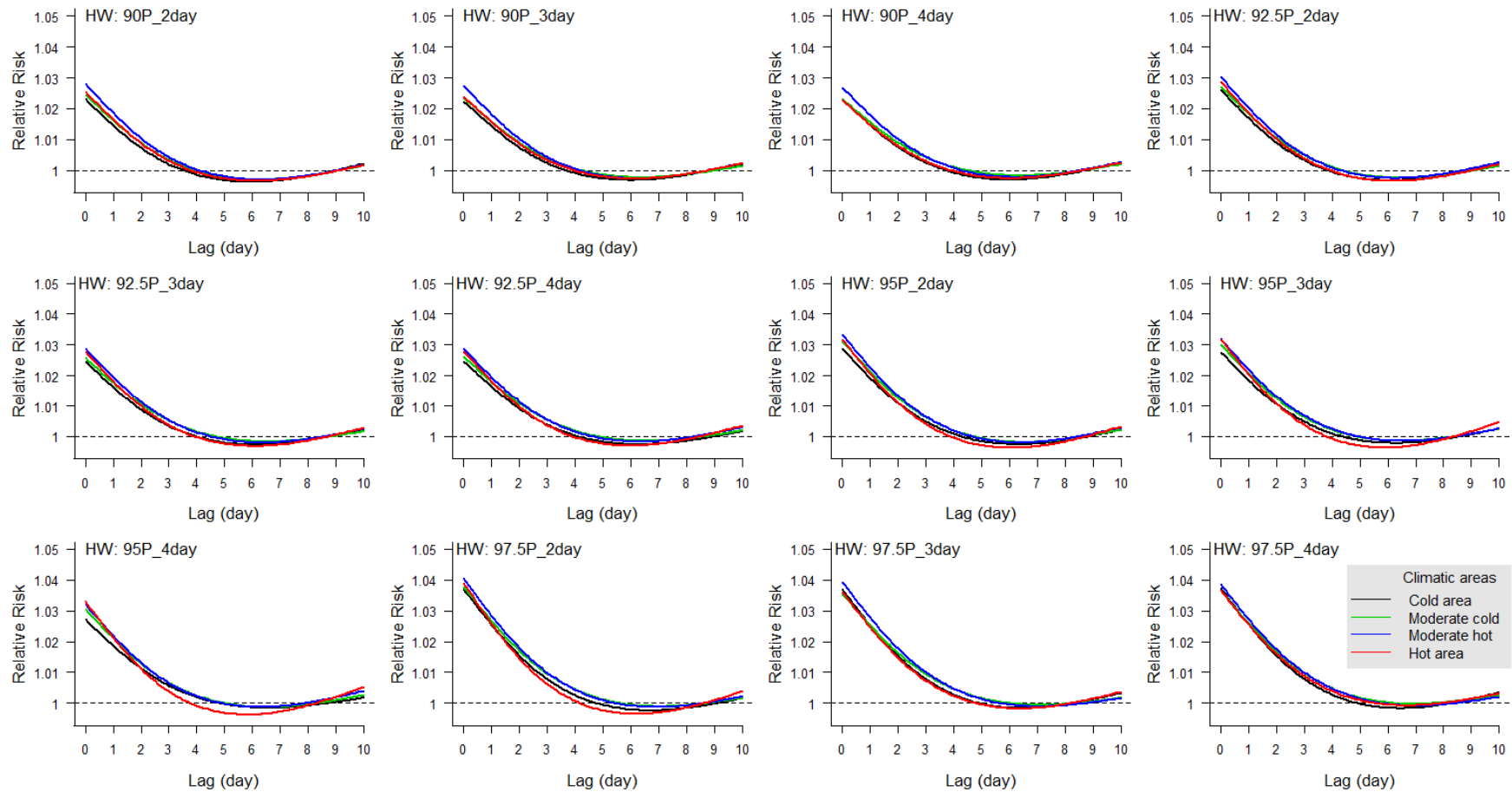


Figure S11: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Moldova. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season > 27.6 °C. Please refer table 1 for heatwave definitions.

Remove Vietnam

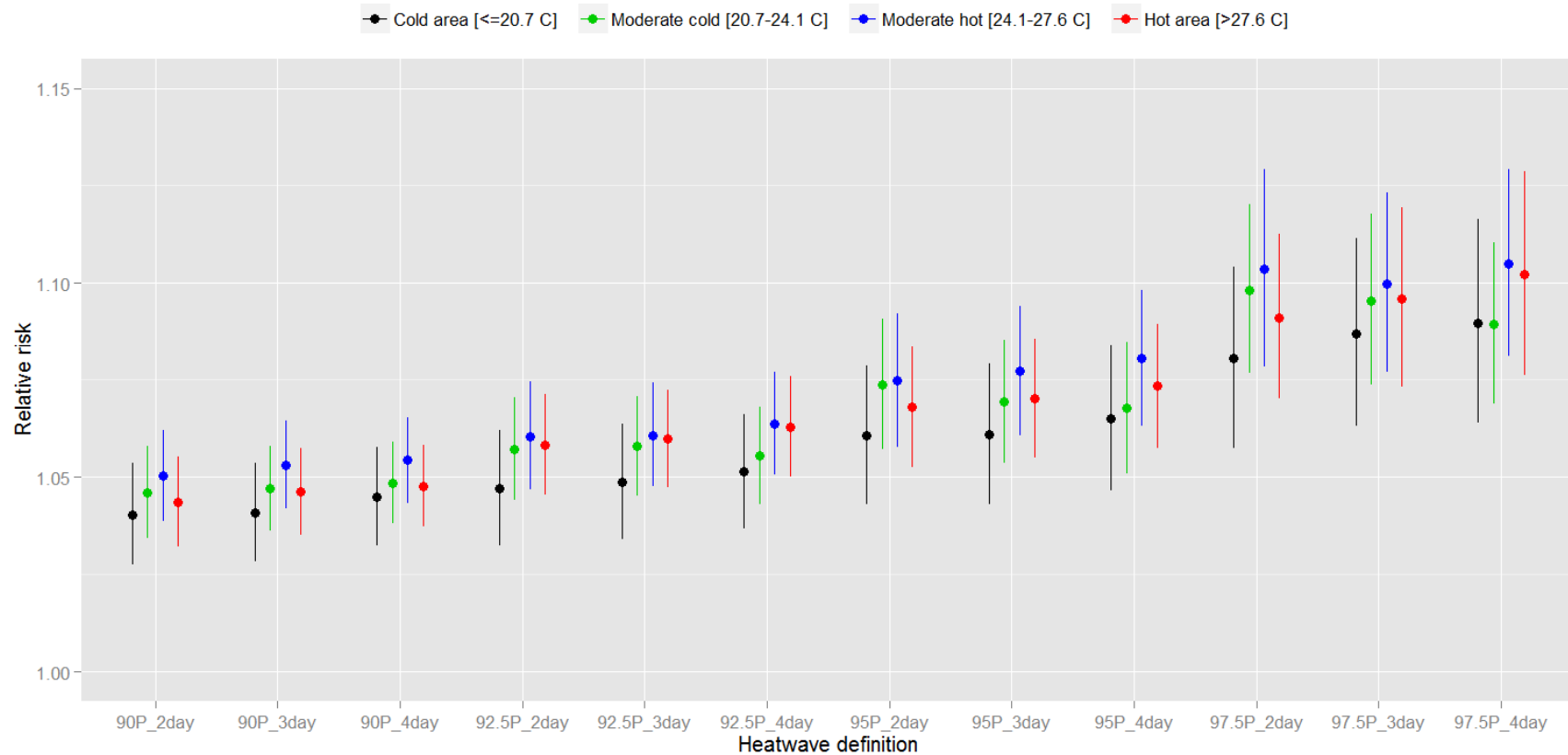


Figure S12: Cumulative effects of heatwaves on mortality over lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Vietnam. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season > 27.6 °C. Please refer table 1 for heatwave definitions.

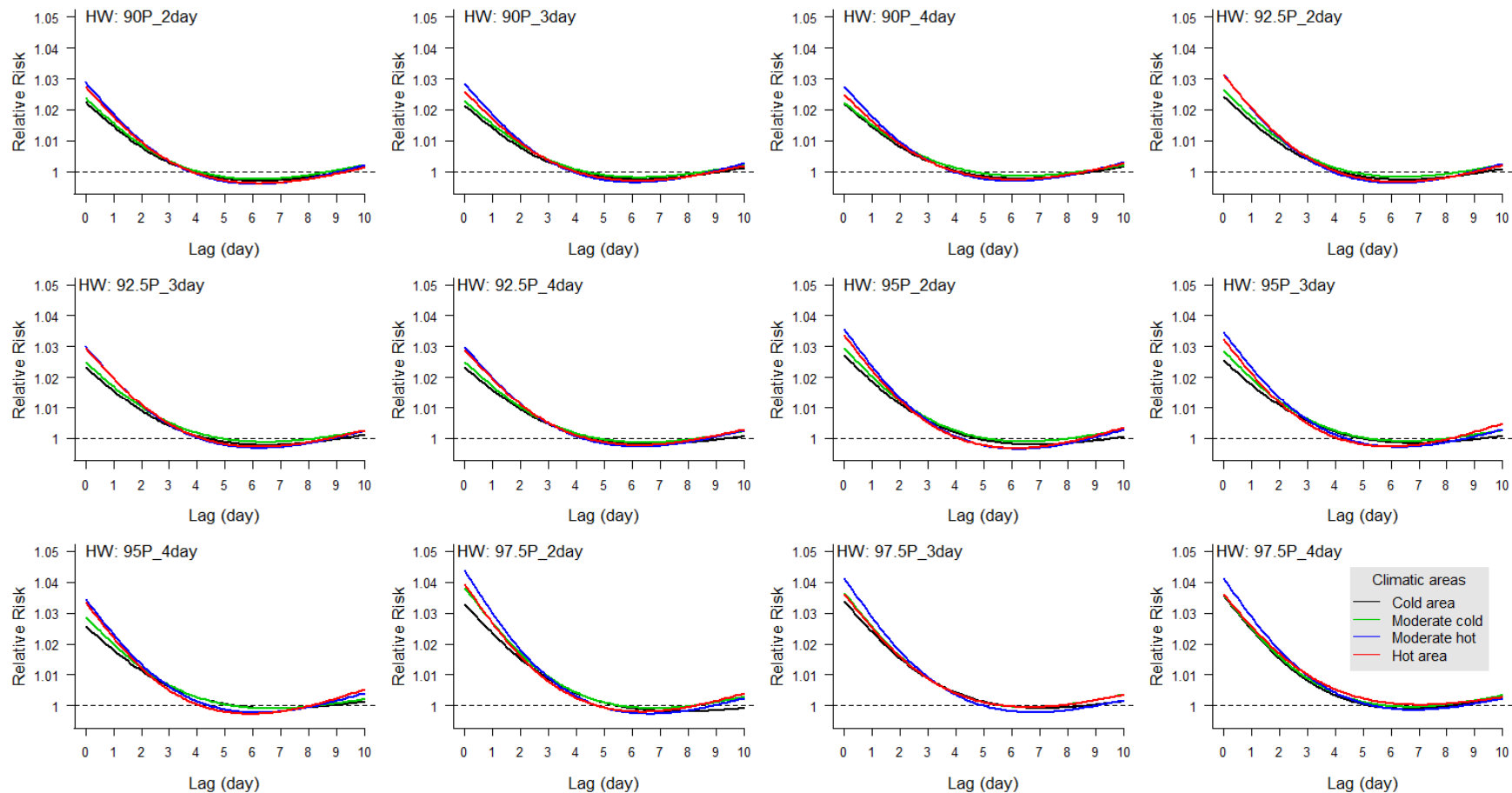


Figure S13: Lag effects of heatwaves on mortality along lag 0–10 days in 4 climatic areas (cold, moderate cold, moderate hot, and hot areas) for 12 types of heatwave definitions when excluding Vietnam. Cold areas: mean temperature of hot season ≤ 20.7 °C; moderate cold areas: mean temperature of hot season 20.7–24.1 °C; moderate hot areas: mean temperature of hot season 24.1–27.6 °C; and hot areas: mean temperature of hot season >27.6 °C. Please refer table 1 for heatwave definitions.

Control for temperature variability

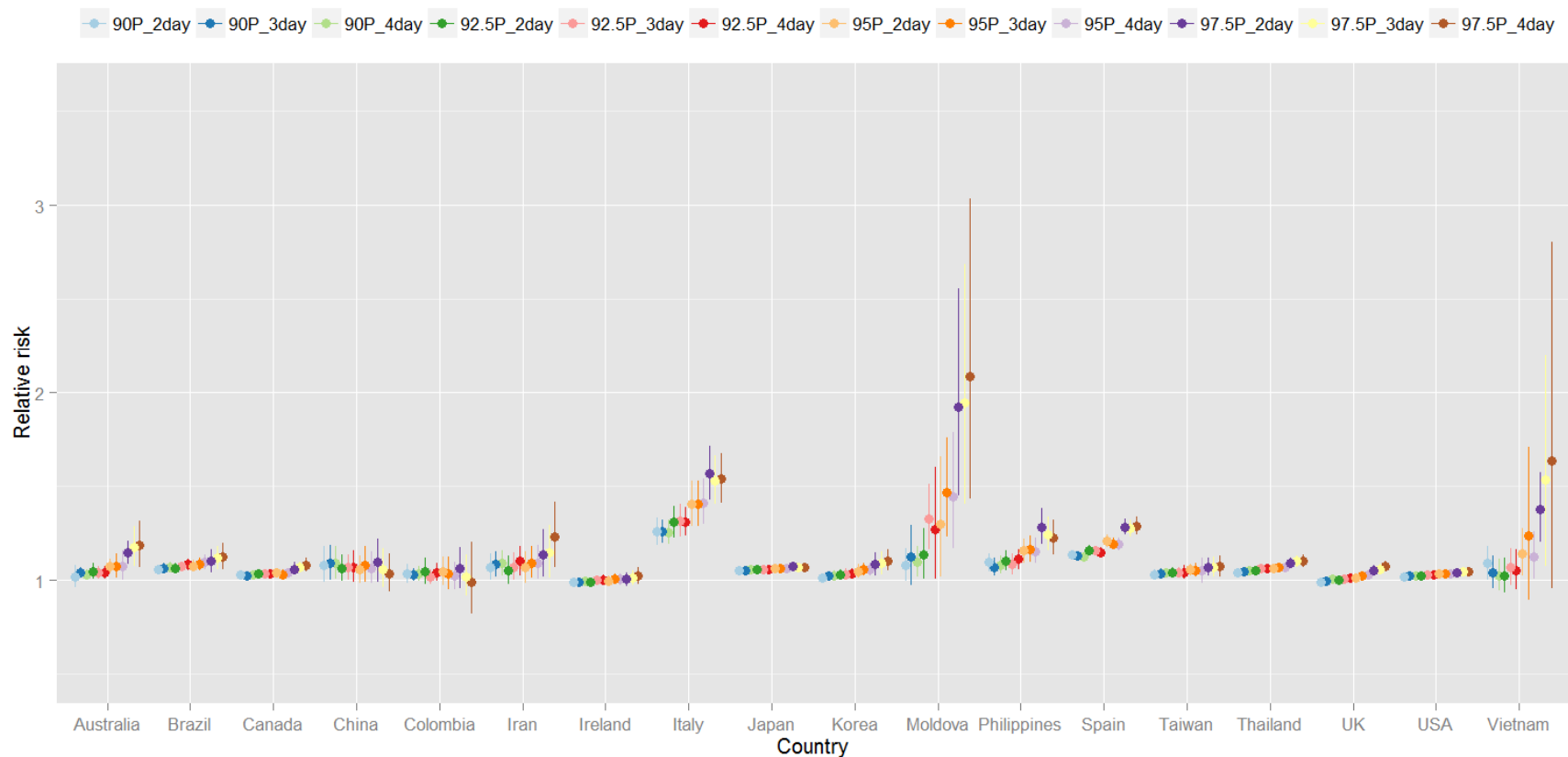


Figure S14: Cumulative effects of heatwaves on mortality over lag 0–10 days after controlling for temperature variability (standard deviation of 10 days' daily mean temperatures) in 18 countries/regions for 12 types of heatwave definitions. Please refer table 1 for heatwave definitions.