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Supplemental Material

Mortality Risk of Hot Nights: A Nationwide Population-Based Retrospective Study in Japan

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Figure S6. Pooled RRs (95% CIs) for cause-specific mortality associated with hot nights (HN_{25}) estimated from a time-series quasi-Poisson regression with distributed lag models in Japan (1973 – 2015). Models were adjusted for the daily maximum temperature, day of the week, seasonality, and the long-term trend. Points correspond to estimates, and whiskers reflect 95% CIs (See Excel Table S4 for corresponding numerical data).

Figure S7. Pooled RRs (95% CIs) for cause-specific mortality associated with hot nights [(A) HN_{25} and (B) HN_{95th}] without (black circles) and with (white triangles) variable in the model estimated from a time-series quasi-Poisson regression with distributed lag models in 47 Japan (1973 – 2015). Models were adjusted for the daily mean temperature, day of the week, seasonality, and the long-term trend. The black circles correspond to estimates derived from the model without the heatwave variable and the white triangles with the heatwave variable. Whiskers reflect 95% CIs (See Excel Table S5 for corresponding numerical data).

Additional File- Excel Document

Table S1. Summary statistics for population and number of deaths in 47 Japanese prefectures (1973 – 2015).

	Prefecture	Population[1]	All cause		CVD[2]				RD[3]			
			All year	Study period[4]	All year		Study period[4]		All year		Study period[4]	
	Japan	127,094,745	39,261,333	24,721,226	13,346,208	(34%)	8,094,644	(33%)	4,983,272	(13%)	3,015,164	(12%)
1	Hokkaido	5,381,733	1,786,579	1,164,447	596,346	(33%)	379,269	(33%)	226,325	(13%)	142,751	(12%)
2	Aomori	1,308,265	537,153	345,793	187,387	(35%)	117,198	(34%)	65,131	(12%)	40,408	(12%)
3	Iwate	1,279,594	531,890	333,486	198,450	(37%)	121,704	(36%)	67,956	(13%)	41,193	(12%)
4	Miyagi	2,333,899	705,309	437,744	252,826	(36%)	153,217	(35%)	79,882	(11%)	48,318	(11%)
5	Akita	1,023,119	486,539	311,908	175,790	(36%)	109,170	(35%)	57,498	(12%)	35,765	(11%)
6	Yamagata	1,123,891	493,961	314,229	182,276	(37%)	112,040	(36%)	58,700	(12%)	36,029	(11%)
7	Fukushima	1,914,039	770,155	481,486	286,162	(37%)	172,571	(36%)	93,487	(12%)	56,388	(12%)
8	Ibaraki	2,916,976	930,890	578,128	332,838	(36%)	198,513	(34%)	112,224	(12%)	66,050	(11%)
9	Tochigi	1,974,255	647,274	402,448	239,655	(37%)	142,956	(36%)	81,251	(13%)	47,949	(12%)
10	Gunma	1,973,115	665,132	415,813	238,333	(36%)	143,332	(34%)	91,165	(14%)	54,777	(13%)
11	Saitama	7,266,534	1,599,904	1,006,591	539,186	(34%)	325,160	(32%)	199,507	(12%)	120,326	(12%)
12	Chiba	6,222,666	1,479,073	927,412	510,460	(35%)	307,097	(33%)	177,436	(12%)	106,519	(11%)
13	Tokyo	13,515,271	3,335,837	2,113,309	1,106,201	(33%)	677,144	(32%)	422,660	(13%)	256,665	(12%)
14	Kanagawa	9,126,214	1,982,605	1,253,600	632,417	(32%)	386,698	(31%)	246,902	(12%)	149,815	(12%)
15	Niigata	2,304,264	911,803	579,491	325,755	(36%)	199,298	(34%)	106,296	(12%)	65,474	(11%)
16	Toyama	1,066,328	409,572	260,216	138,217	(34%)	84,877	(33%)	54,793	(13%)	33,807	(13%)
17	Ishikawa	1,154,008	394,606	250,226	135,692	(34%)	83,051	(33%)	51,181	(13%)	31,436	(13%)
18	Fukui	786,740	292,905	184,409	101,521	(35%)	61,573	(33%)	38,119	(13%)	23,355	(13%)
19	Yamanashi	834,930	309,983	192,149	108,486	(35%)	64,594	(34%)	38,067	(12%)	22,434	(12%)
20	Nagano	2,098,804	799,447	501,869	310,111	(39%)	187,850	(37%)	91,815	(11%)	55,114	(11%)
21	Gifu	2,031,903	679,221	426,087	240,605	(35%)	144,638	(34%)	83,638	(12%)	50,670	(12%)
22	Shizuoka	3,700,305	1,149,292	714,270	402,800	(35%)	240,260	(34%)	137,979	(12%)	81,802	(11%)
23	Aichi	7,483,128	1,842,129	1,157,000	620,068	(34%)	373,847	(32%)	220,259	(12%)	133,252	(12%)
24	Mie	1,815,865	634,368	394,631	225,679	(36%)	134,777	(34%)	75,362	(12%)	45,001	(11%)

[1] Population census in 2015 obtained from Statistics Bureau, Ministry of Internal Affairs and Communications, Japan (http://www.stat.go.jp/english/data/kokusei/, accessed on 5th of March 2022)

[2] Cardiovascular deaths (ICD-10, I00-I99)

[3] Respiratory deaths (ICD-10, J00-J99)

[4] Between April and November

25	Shiga	1,412,916	384,705	240,603	133,752	(35%)	79,937	(33%)	47,893	(12%)	28,843	(12%)
26	Kyoto	2,610,353	833,405	525,889	280,599	(34%)	169,444	(32%)	104,449	(13%)	63,744	(12%)
27	Osaka	8,839,469	2,484,120	1,573,891	766,631	(31%)	466,609	(30%)	322,817	(13%)	197,000	(13%)
28	Hyogo	5,534,800	1,727,324	1,080,919	552,739	(32%)	332,342	(31%)	208,741	(12%)	125,635	(12%)
29	Nara	1,364,316	423,524	266,176	144,975	(34%)	87,314	(33%)	53,159	(13%)	32,303	(12%)
30	Wakayama	963,579	428,132	268,053	147,213	(34%)	88,173	(33%)	50,931	(12%)	30,791	(11%)
31	Tottori	573,441	243,329	152,727	86,931	(36%)	52,473	(34%)	28,013	(12%)	16,878	(11%)
32	Shimane	694,352	331,128	207,742	116,359	(35%)	70,083	(34%)	42,830	(13%)	25,779	(12%)
33	Okayama	1,921,525	703,388	439,399	239,763	(34%)	143,716	(33%)	99,818	(14%)	60,273	(14%)
34	Hiroshima	2,843,990	954,304	600,535	314,522	(33%)	190,291	(32%)	125,921	(13%)	76,237	(13%)
35	Yamaguchi	1,404,729	615,517	387,317	212,197	(34%)	128,620	(33%)	87,384	(14%)	52,999	(14%)
36	Tokushima	755,733	332,910	208,439	114,024	(34%)	68,754	(33%)	46,561	(14%)	28,130	(13%)
37	Kagawa	976,263	383,091	238,870	127,949	(33%)	76,121	(32%)	54,025	(14%)	32,600	(14%)
38	Ehime	1,385,262	580,731	363,090	203,370	(35%)	121,721	(34%)	74,788	(13%)	45,661	(13%)
39	Kochi	728,276	354,917	221,712	130,064	(37%)	78,426	(35%)	48,500	(14%)	28,983	(13%)
40	Fukuoka	5,101,556	1,569,265	989,408	483,609	(31%)	295,023	(30%)	212,965	(14%)	128,226	(13%)
41	Saga	832,832	332,054	207,892	110,809	(33%)	66,944	(32%)	44,997	(14%)	26,787	(13%)
42	Nagasaki	1,377,187	577,998	363,092	195,748	(34%)	118,603	(33%)	80,388	(14%)	48,459	(13%)
43	Kumamoto	1,786,170	679,312	422,808	233,056	(34%)	139,557	(33%)	93,813	(14%)	55,336	(13%)
44	Oita	1,166,338	472,347	296,213	167,087	(35%)	100,744	(34%)	65,133	(14%)	39,132	(13%)
45	Miyazaki	1,104,069	422,296	262,556	149,730	(35%)	89,336	(34%)	57,899	(14%)	34,177	(13%)
46	Kagoshima	1,648,177	735,861	456,339	260,381	(35%)	155,513	(34%)	106,001	(14%)	62,441	(14%)
47	Okinawa	1,433,566	316,048	200,814	87,439	(28%)	54,066	(27%)	48,613	(15%)	29,452	(15%)

Table S2. Summary statistics for meteorological data including the temperatures, relative humidity, and hot nights (HN_{25}[1] and HN_{95th}[2]) in 47 Japanese prefectures (1973 – 2015).

	Daily mean temperature (°C)			Extremes (°C)		Relative humidity	HN_{25}		HN_{95th}		
Prefecture	Mean	Min	Max	Min of daily min temperature	Max of daily max temperature		Total	Annual mean	Threshold temperature (°C)	Total[3]	Annual mean
1 Hokkaido	8.9	-14.1	30.1	-19.4	36.2	69.5	2	0.05	20.64	525	12.21
2 Aomori	10.3	-8.7	30.1	-14.7	36.7	74.8	11	0.26	21.50	537	12.49
3 Iwate	10.2	-8.9	29.6	-16.2	36.6	73.8	4	0.09	21.80	532	12.37
4 Miyagi	12.4	-5.2	31.2	-10.1	37.2	71.1	63	1.47	23.10	550	12.79
5 Akita	11.7	-6.4	31.6	-11.8	38.2	73.0	107	2.49	23.10	530	12.33
6 Yamagata	11.7	-7.4	31.5	-12.4	38.9	74.4	19	0.44	22.40	548	12.74
7 Fukushima	13.0	-5.2	31.4	-10.0	39.0	68.9	150	3.49	23.60	538	12.51
8 Ibaraki	13.7	-3.8	31.3	-11.0	38.4	74.3	91	2.12	23.40	546	12.70
9 Tochigi	13.8	-4.5	31.7	-11.1	38.7	69.5	102	2.37	23.70	552	12.84
10 Gunma	14.6	-3.8	32.6	-9.0	40.0	63.2	225	5.23	24.10	541	12.58
11 Saitama	15.0	-2.8	33.7	-8.4	40.9	65.4	325	7.56	24.50	541	12.58
12 Chiba	15.7	-1.4	32.2	-5.0	38.5	68.4	886	20.60	25.70	552	12.84
13 Tokyo	16.2	-0.6	33.2	-3.9	39.5	62.1	1,166	27.12	26.20	536	12.47
14 Kanagawa	15.8	-1.0	32.2	-4.8	37.4	67.1	798	18.56	25.40	563	13.09
15 Niigata	13.8	-3.9	32.6	-10.6	38.5	71.8	435	10.12	24.70	554	12.88
16 Toyama	14.0	-4.4	33.8	-9.6	39.5	77.1	249	5.79	24.04	525	12.21
17 Ishikawa	14.6	-3.9	32.4	-6.7	38.0	71.7	502	11.67	24.90	562	13.07
18 Fukui	14.5	-3.8	32.1	-9.5	37.5	75.0	401	9.33	24.60	559	13.00
19 Yamanashi	14.6	-4.4	31.8	-10.7	40.7	65.0	170	3.95	24.10	526	12.23
20 Nagano	11.9	-7.7	30.7	-13.3	38.7	72.1	26	0.60	22.54	525	12.21
21 Gifu	15.8	-3.0	32.9	-6.5	39.8	67.1	851	19.79	25.60	538	12.51
22 Shizuoka	16.6	-0.9	31.9	-5.6	38.7	67.8	501	11.65	24.90	545	12.67
23 Aichi	15.8	-2.9	32.7	-6.2	39.8	66.5	780	18.14	25.40	559	13.00
24 Mie	15.8	-2.4	33.5	-5.8	39.5	68.8	924	21.49	25.60	560	13.02

[1] HN_{25}, days on which the daily minimum temperature is ≥25°C.

[2] HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature of that prefecture during the study period (i.e., April–November 1973–2015).

[3] Variation in the total number of HN_{95th} among the prefectures was caused by ties.

25 Shiga	14.7	-3.2	31.8	-7.0	37.7	74.0	485	11.28	24.90	530	12.33
26 Kyoto	15.9	-3.4	32.8	-7.0	39.8	66.1	852	19.81	25.60	528	12.28
27 Osaka	16.8	-2.1	32.9	-5.5	39.1	63.6	1,538	35.77	26.70	574	13.35
28 Hyogo	16.3	-4.3	32.5	-7.2	38.8	66.2	1,371	31.88	26.40	540	12.56
29 Nara	14.9	-3.7	31.7	-7.8	39.3	72.8	115	2.67	23.80	566	13.16
30 Wakayama	16.6	-2.7	32.7	-4.4	38.5	66.4	1,049	24.4	25.90	548	12.74
31 Tottori	14.9	-5.6	32.3	-7.4	39.1	73.7	324	7.53	24.34	525	12.21
32 Shimane	14.8	-5.3	32.2	-8.7	38.5	75.9	424	9.86	24.70	540	12.56
33 Okayama	15.9	-4.8	32.3	-9.1	39.3	68.1	1,061	24.67	25.80	574	13.35
34 Hiroshima	16.0	-5.8	32.7	-7.5	38.7	69.1	993	23.09	25.80	539	12.53
35 Yamaguchi	15.3	-5.4	31.2	-8.9	38.4	73.6	463	10.77	24.80	542	12.60
36 Tokushima	16.5	-4.0	32.6	-5.9	38.4	66.8	923	21.47	25.50	603	14.02
37 Kagawa	16.2	-3.3	33.0	-6.0	38.6	68.2	865	20.12	25.60	542	12.60
38 Ehime	16.4	-3.1	31.9	-5.3	37.0	66.6	764	17.77	25.30	565	13.14
39 Kochi	16.9	-2.3	32.1	-7.9	38.3	68.4	646	15.02	25.10	570	13.26
40 Fukuoka	16.9	-3.2	32.8	-5.2	37.9	68.1	1,356	31.53	26.40	547	12.72
41 Saga	16.5	-3.6	32.3	-6.2	39.6	70.7	932	21.67	25.50	586	13.63
42 Nagasaki	17.1	-2.5	32.2	-4.3	37.7	70.5	1,439	33.47	26.20	567	13.19
43 Kumamoto	16.8	-3.2	31.7	-7.8	38.8	70.8	934	21.72	25.70	526	12.23
44 Oita	16.4	-3.4	31.7	-7.1	37.8	69.9	521	12.12	24.90	583	13.56
45 Miyazaki	17.5	-1.0	32.0	-6.4	38.0	73.8	895	20.81	25.50	561	13.05
46 Kagoshima	18.3	-2.1	31.7	-5.8	37.1	70.6	1,909	44.40	26.60	585	13.60
47 Okinawa	22.9	9.1	31.1	7.0	35.6	74.3	4,128	96.00	27.70	587	13.65

Note: min, minimum; max, maximum.

Table S3. Cause-specific mortality[1] and corresponding ICD codes.

Cause categories	ICD-8[2]	ICD-9[3]	ICD-10[4]
Total cardiovascular disease (CVD)	390–458	390–459	I00-99
Ischemic heart disease (IHD)	410–414	410–414	I20-25
Cerebrovascular disease (CBVD)	430–438	430–438	I60-69
Cerebral hemorrhage (CH)	430–431	430–432	I60-62
Cerebral infarction (CIN)	432–435 or 437	433–435 or 437	I65–I66 or I63
Total respiratory disease (RD)	460–519	460–519	J00-99
Pneumonia	480–486	480–486	J12-18
COPD	491–492	491–492 or 496	J41-44
Asthma	493	493	J45-46
Renal disease	580–599	580–599	N00-39
Advanced age	794	797	R54

Note: ICD, The International Classification of Diseases; CVD, cardiovascular diseases; IHD, ischemic heart disease; CBVD, cerebrovascular disease; CH, cerebral hemorrhage; CIN, cerebral infarction; RD, respiratory disease; COPD, chronic obstructive pulmonary disease

[1] Completeness of death registration in Japan is 100% (World Health Organization. "WHO methods and data sources for country-level causes of death 2000-2019." Geneva: World Health Organization (2020)).

[2] 8th (ICD-8) codes were used from 1973 to 1978.

[3] 9th (ICD-9) codes were used from 1979 to 1994.

[4] 10th (ICD-10) codes were used from 1995 to 2015.

Table S4. Pooled RRs (95% CIs) for cause-specific mortality associated with hot nights (HN_{25} and HN_{95th}) estimated from a time-series quasi-Poisson regression with distributed lag models in Japan (1973 – 2015). The main model was tested for sensitivity considering the following modelling alterations; (A) relative humidity as a possible confounder or effect modifier, and (B) the lagged effect of the cross-basis from 21 days to 14 and 28 days.

Modeling choice		Main model[1]	(A) With relative humidity[2]	Lag periods of hot nights[3]	
	Cause of death			14 days	28 days
HN_{25}[4]	All cause	1.093 (1.082,1.105)	1.095 (1.083,1.106)	1.094 (1.082,1.105)	1.093 (1.082,1.105)
	CVD	1.166 (1.147,1.187)	1.165 (1.146,1.185)	1.166 (1.147,1.186)	1.167 (1.147,1.187)
	IHD	1.252 (1.207,1.298)	1.244 (1.200,1.290)	1.252 (1.207,1.298)	1.252 (1.208,1.298)
	CBVD	1.128 (1.106,1.151)	1.131 (1.109,1.153)	1.128 (1.106,1.150)	1.128 (1.106,1.151)
	CH	1.090 (1.052,1.129)	1.084 (1.045,1.124)	1.090 (1.052,1.129)	1.090 (1.051,1.129)
	CIN	1.145 (1.111,1.179)	1.151 (1.117,1.186)	1.144 (1.111,1.179)	1.145 (1.112,1.180)
	RD	1.093 (1.070,1.116)	1.098 (1.075,1.121)	1.093 (1.070,1.116)	1.093 (1.070,1.116)
	Pneumonia	1.085 (1.059,1.111)	1.091 (1.065,1.117)	1.085 (1.059,1.111)	1.085 (1.059,1.111)
	COPD	1.111 (1.039,1.187)	1.114 (1.041,1.193)	1.110 (1.038,1.186)	1.112 (1.040,1.188)
	Asthma	1.172 (1.056,1.300)	1.172 (1.056,1.301)	1.172 (1.057,1.301)	1.171 (1.056,1.300)
	Renal disease	1.081 (1.035,1.130)	1.082 (1.036,1.131)	1.082 (1.036,1.131)	1.081 (1.034,1.130)
	Advanced age	1.164 (1.119,1.211)	1.168 (1.122,1.216)	1.164 (1.119,1.210)	1.165 (1.12,1.211)
HN_{95th}[5]	All cause	1.101 (1.088,1.114)	1.102 (1.089,1.115)	1.101 (1.088,1.114)	1.101 (1.088,1.114)
	CVD	1.170 (1.149,1.192)	1.169 (1.148,1.191)	1.170 (1.149,1.192)	1.170 (1.149,1.192)
	IHD	1.243 (1.199,1.289)	1.237 (1.193,1.282)	1.243 (1.199,1.289)	1.243 (1.199,1.289)
	CBVD	1.127 (1.100,1.153)	1.129 (1.102,1.156)	1.126 (1.100,1.153)	1.127 (1.101,1.153)
	CH	1.095 (1.055,1.137)	1.091 (1.051,1.133)	1.095 (1.055,1.137)	1.095 (1.055,1.137)
	CIN	1.150 (1.115,1.186)	1.156 (1.121,1.192)	1.149 (1.114,1.185)	1.151 (1.116,1.187)
	RD	1.117 (1.090,1.144)	1.122 (1.095,1.149)	1.117 (1.090,1.144)	1.117 (1.090,1.144)
	Pneumonia	1.124 (1.091,1.159)	1.129 (1.095,1.164)	1.124 (1.090,1.159)	1.125 (1.091,1.159)
	COPD	1.134 (1.065,1.208)	1.138 (1.068,1.212)	1.133 (1.064,1.207)	1.135 (1.066,1.209)

[1] Main model was adjusted for daily mean temperature, seasonality, long-term trend, and the day of week. Lag period was set at 21days.

[2] Model was adjusted for the same covariates as in the main model and for the relative humidity as an additional covariate.

[3] We tested alternative maximum lag periods of 14 and 28 days in cross-basis functions of hot nights and mean temperature.

[4] HN_{25}, days on which the daily minimum temperature is ≥25°C.

[5] HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature of that prefecture during the study period (i.e., April–November 1973–2015).

Asthma	1.114 (0.993,1.250)	1.113 (0.992,1.249)	1.114 (0.993,1.250)	1.114 (0.993,1.249)
Renal disease	1.040 (0.995,1.087)	1.040 (0.996,1.087)	1.040 (0.996,1.087)	1.040 (0.996,1.087)
Advanced age	1.142 (1.096,1.190)	1.146 (1.099,1.196)	1.141 (1.095,1.189)	1.142 (1.096,1.190)

Note: RR, relative risk; CI, confidence interval; CVD, cardiovascular diseases; IHD, ischemic heart disease; CBVD, cerebrovascular disease; CH, cerebral hemorrhage; CIN, cerebral infarction; RD, respiratory disease; COPD, chronic obstructive pulmonary disease.

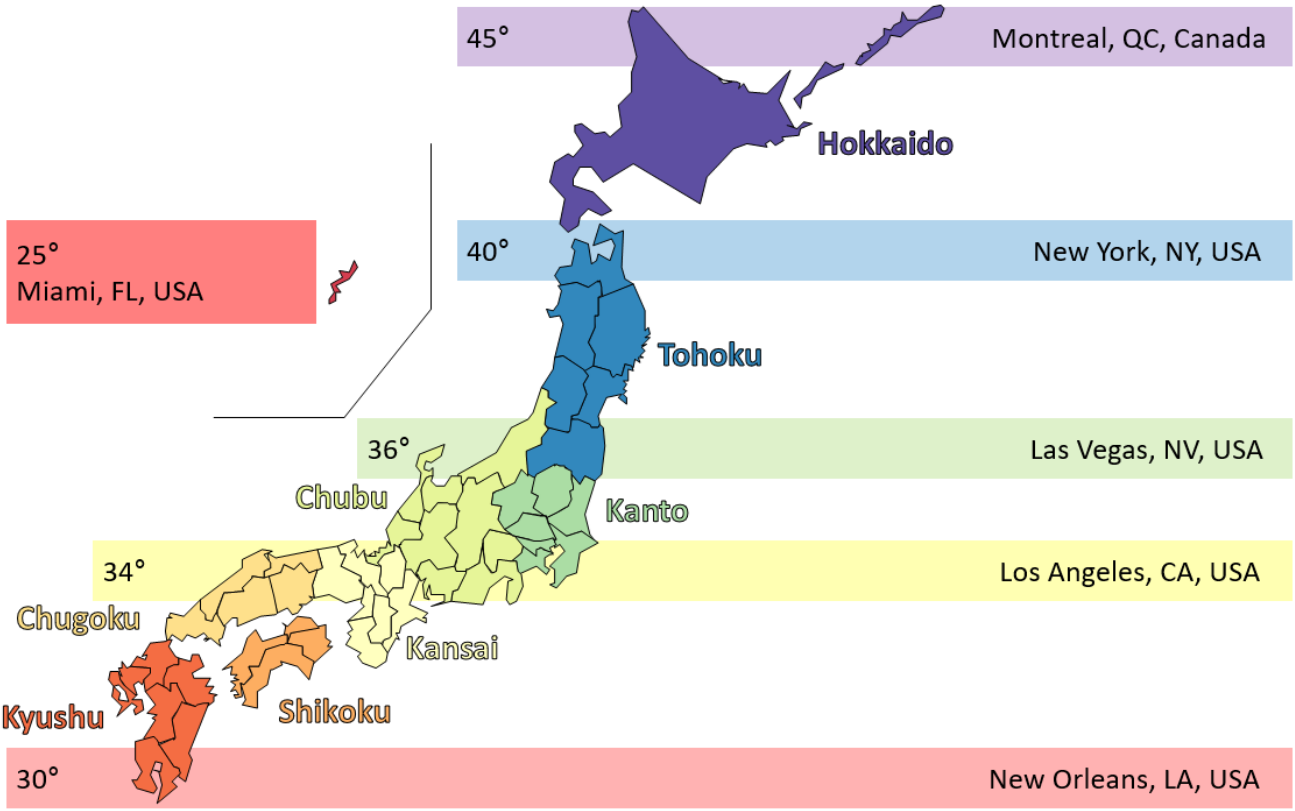

Figure S1. Latitude comparison of Japan with the cities from North America.

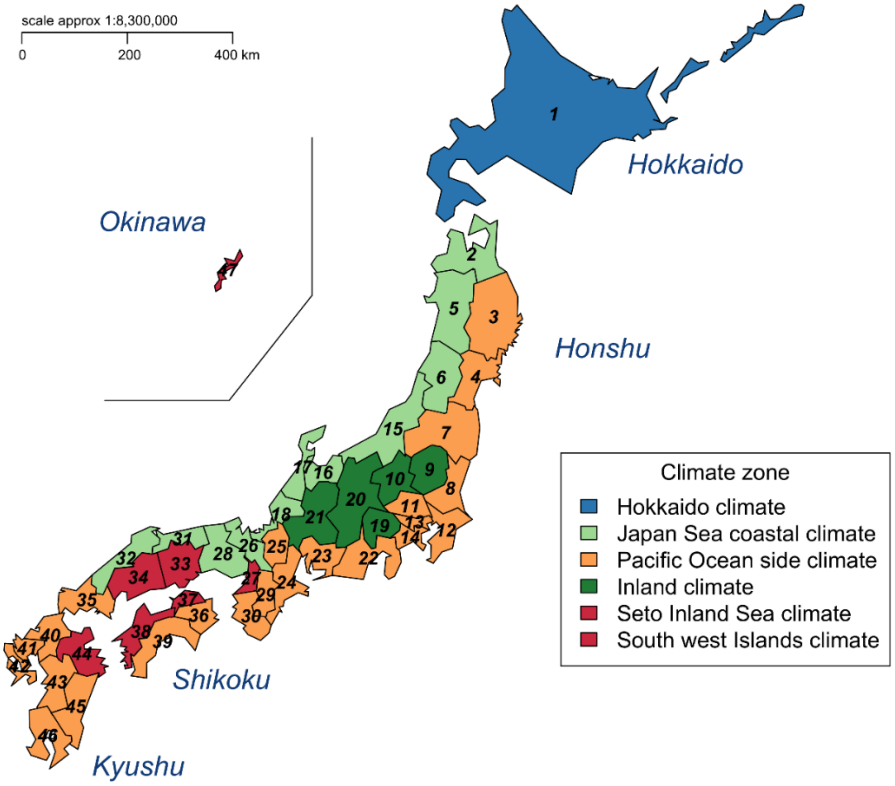

Figure S2. Climate zone of Japan (See Excel Table S1 for prefecture numbers).

1. Hokkaido, 2. Aomori, 3. Iwate, 4. Miyagi, 5. Akita, 6. Yamagata, 7. Fukushima, 8. Ibaraki, 9. Tochigi, 10. Gunma, 11. Saitama, 12. Chiba, 13. Tokyo, 14. Kanagawa, 15. Niigata, 16. Toyama, 17. Ishikawa, 18. Fukui, 19. Yamanashi, 20. Nagano, 21. Gifu, 22. Shizuoka, 23. Aichi, 24. Mie, 25. Shiga, 26. Kyoto, 27. Osaka, 28. Hyogo, 29. Nara, 30. Wakayama, 31. Tottori, 32. Shimane, 33. Okayama, 34. Hiroshima, 35. Yamaguchi, 36. Tokushima, 37. Kagawa, 38. Ehime, 39. Kochi, 40. Fukuoka, 41. Saga, 42. Nagasaki, 43. Kumamoto, 44. Oita, 45. Miyazaki, 46. Kagoshima, and 47. Okinawa

Figure S3. Prefecture-specific distribution of daily mean temperature in 47 Japanese prefectures (1973 – 2015).

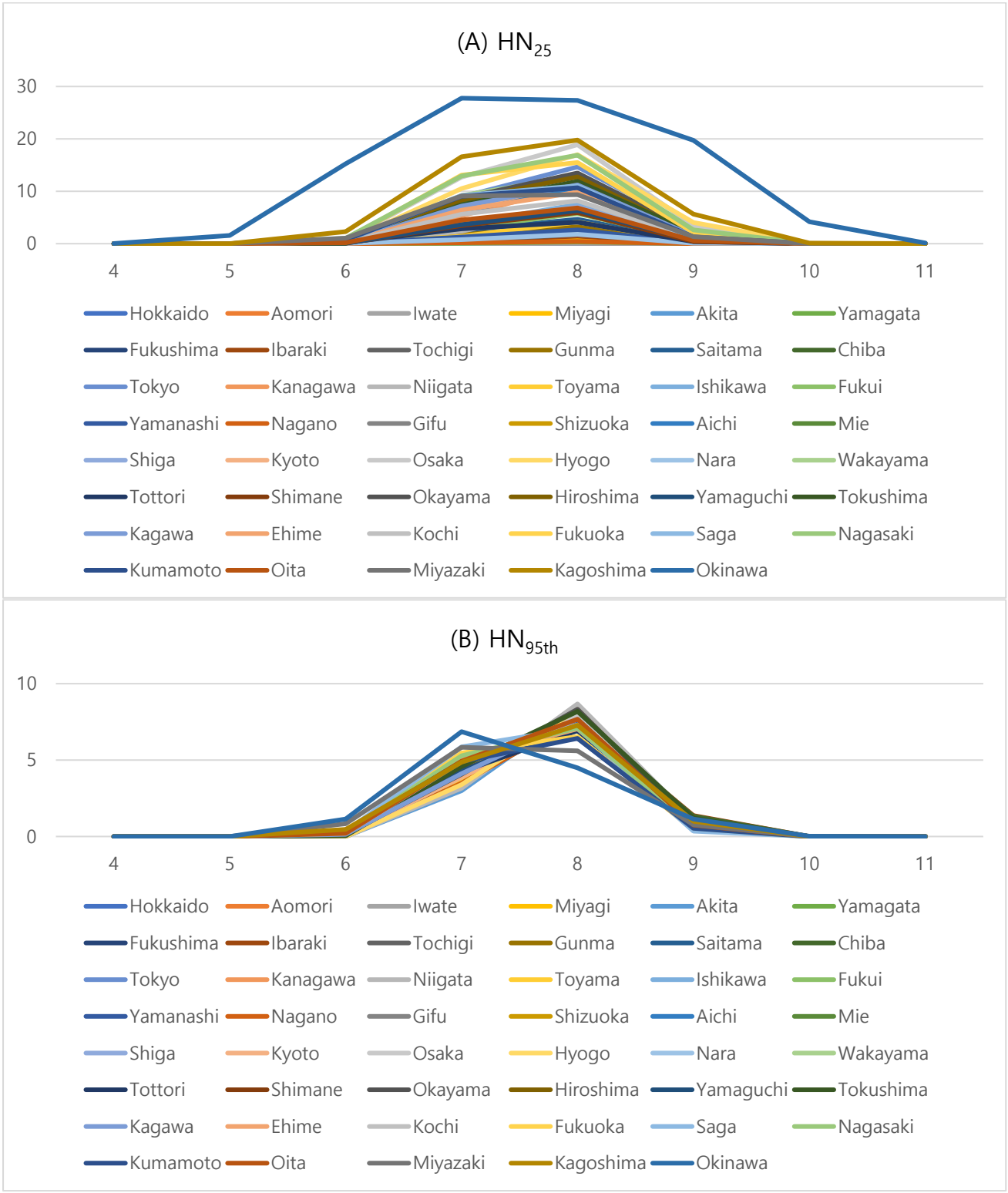

Figure S4. Monthly occurrence of hot nights [(A) HN_{25} and (B) HN_{95th}] in 47 Japanese prefectures (1973 – 2015) (See Excel Table S3 for corresponding numerical data).

HN_{25}, days on which the daily minimum temperature is ≥25°C; HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature.

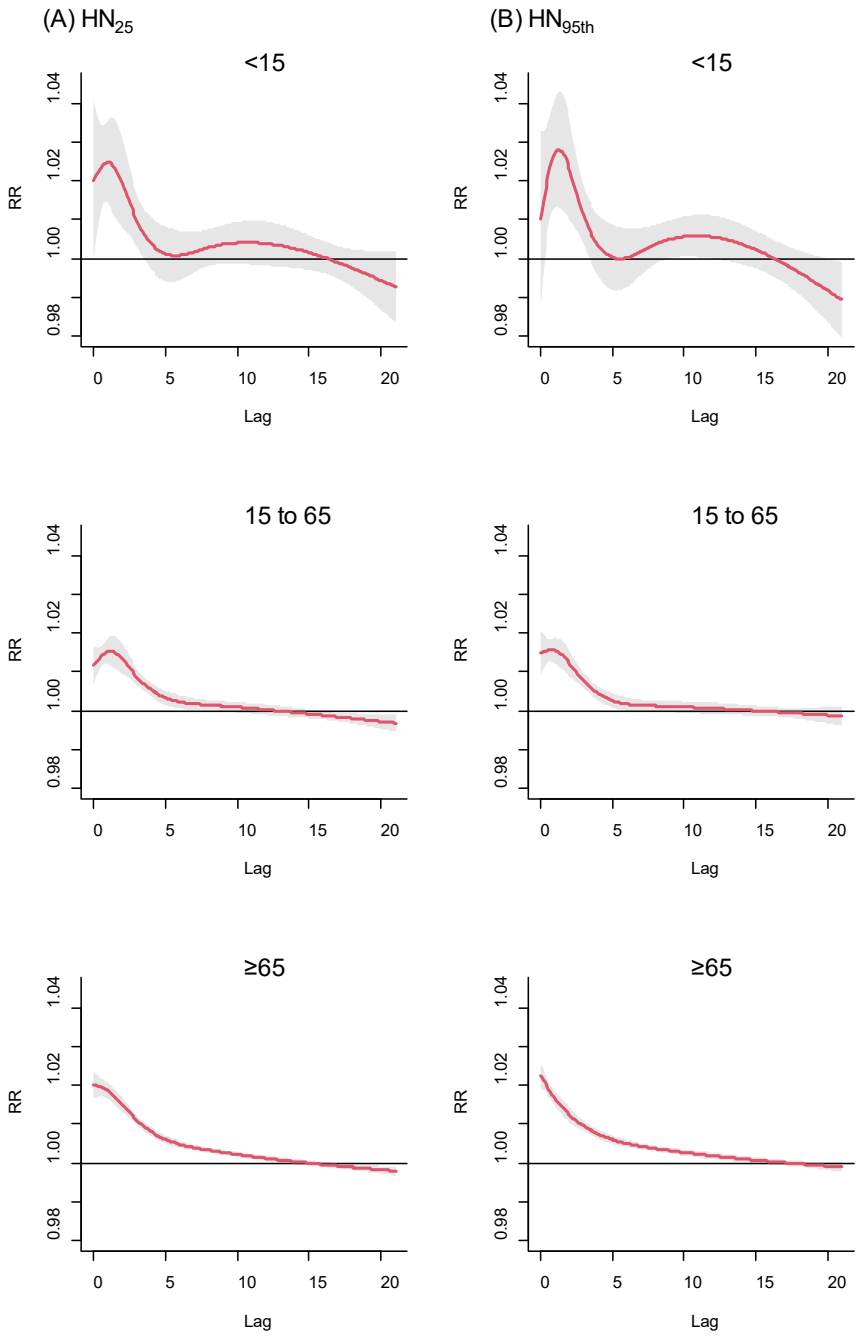

Figure S5. Lag structures in the effects of hot nights [(A) HN_{25} and (B) HN_{95th}] on all-cause mortality in 3 age groups (<15, 15 to 65, and ≥65) estimated from a time-series quasi-Poisson regression with distributed lag models in 47 Japanese prefectures (1973 – 2015). Models were adjusted for the daily mean temperature, day of the week, seasonality, and the long-term trend. Solid lines on the curves reflect estimates, and shaded areas are 95% CI.

HN_{25}, days on which the daily minimum temperature is ≥25°C; HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature of that prefecture during the study period (i.e., April–November 1973–2015); RR, relative risk; CI, confidence interval.

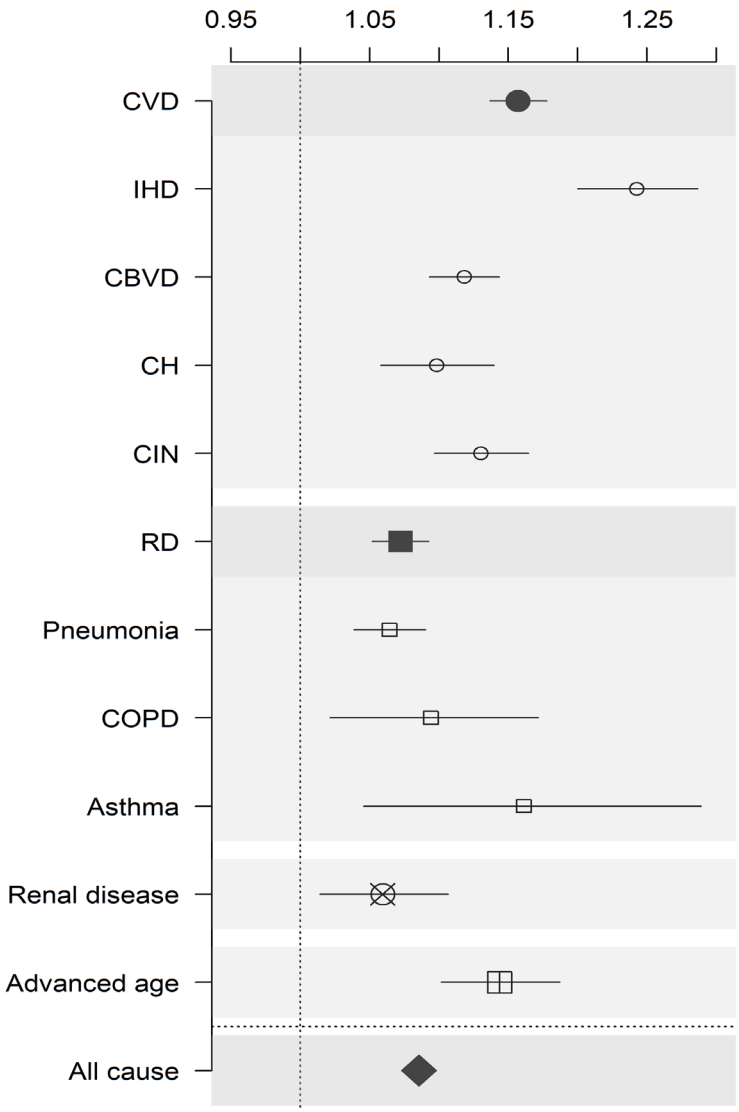

Figure S6. Pooled RRs (95% CIs) for cause-specific mortality associated with hot nights (HN_{25}) estimated from a time-series quasi-Poisson regression with distributed lag models in Japan (1973 – 2015). Models were adjusted for the daily maximum temperature, day of the week, seasonality, and the long-term trend. Points correspond to estimates, and whiskers reflect 95% CIs (See Excel Table S4 for corresponding numerical data).

HN_{25}, days on which the daily minimum temperature is ≥25°C; HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature of that prefecture during the study period (i.e., April–November 1973–2015); RR, relative risk; CI, confidence interval; CVD, cardiovascular diseases; IHD, ischemic heart disease; CBVD, cerebrovascular disease; CH, cerebral hemorrhage; CIN, cerebral infarction; RD, respiratory disease; COPD, chronic obstructive pulmonary disease

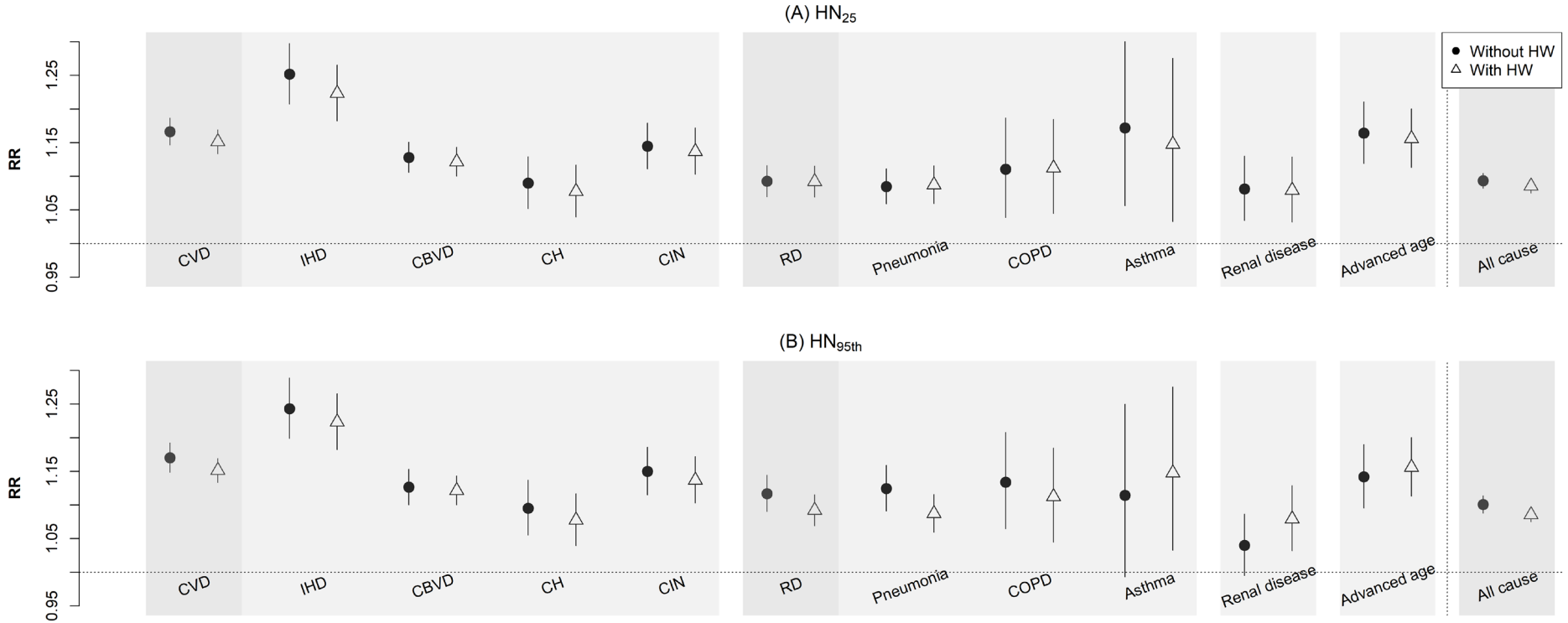

Figure S7. Pooled RRs (95% CIs) for cause-specific mortality associated with hot nights [(A) HN_{25} and (B) HN_{95th}] without (black circles) and with (white triangles) variable in the model estimated from a time-series quasi-Poisson regression with distributed lag models in 47 Japan (1973 – 2015). Models were adjusted for the daily mean temperature, day of the week, seasonality, and the long-term trend. The black circles correspond to estimates derived from the model without the heatwave variable and the white triangles with the heatwave variable. Whiskers reflect 95% CIs (See Excel Table S5 for corresponding numerical data).

HN_{25}, days on which the daily minimum temperature is ≥25°C; HN_{95th}, days on which the daily minimum temperature is ≥ 95th percentile of the daily minimum temperature of that prefecture during the study period (i.e., April–November 1973–2015); RR, relative risk; CI, confidence interval; CVD, cardiovascular diseases; IHD, ischemic heart disease; CBVD, cerebrovascular disease; CH, cerebral hemorrhage; CIN, cerebral infarction; RD, respiratory disease; COPD, chronic obstructive pulmonary disease