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Figure S3. Lag-response relationships between heat exposure (97.5 percentile relative to MMIT) and MI

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Figure S5. Lag-cumulative relative risk estimates for daily nonfatal MI cases (95% CI) associated with cold exposure (2.5th percentile relative to minimum myocardial infarction temperature (MMIT)) and heat exposure (97.5th percentile relative to MMIT) predicted for 1987-2000 (blue) and 2001-2014 (red) stratified by education levels, smoking status, and obesity. Asterisks indicate statistical significance for differences in relative risk estimates between 1987-2000 and 2001-2014.

Figure S6. Percent increase (95% CI) in daily MI cases per 10 μg/m^3 increase in air pollutants (PM_{10}, NO_2, and O_3) using different lag days. Lag0 represents the same day of MI occurrence, lag1 to lag4 represent 1 to 4 days before MI occurrence, and the average exposure over 2 days (lag01) and 5 days (lag04)

Figure S7. Modified overall cumulative air temperature-MI associations by PM_{10} with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

Figure S8. Modified overall cumulative air temperature-MI associations by NO_2 with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

Figure S9. Modified overall cumulative air temperature-MI associations by O_3 with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

Figure S10. Percent change (95% CIs) in MI associated with a 1 °C increase in temperature variability on different exposure days in 1987-2000 and 2001-2014. Temperature variability is calculated from the standard deviation of the minimum and maximum temperatures during the exposure days (i.e., lag01, lag02, …, and lag07).

Supplementary Methods

MONICA/KORA MI registry

The MONICA/KORA MI registry was founded in 1984 as part of the WHO MONICA (Monitoring Trends and Determinants in Cardiovascular Disease) project and since 1996 has been continued as part of the KORA (Cooperative Health Research in the Augsburg Region) research program. Since 1984, all cases of MI in eight hospitals in the study area and coronary deaths occurring among residents aged 25 to 74 years old (about 400,000 inhabitants) have been continuously registered in the MONICA/KORA MI registry. Following the MONICA protocol, MI patients who survived at least 24 hours after hospitalization are interviewed about the event, demographic information, co-morbidities, medication, and family history. If a patient survives the 28th day after hospital admission, the MI is identified as nonfatal, otherwise as fatal. Coronary deaths are fatal cases outside the hospital or within the 24-hour after admission to a hospital. All coronary deaths (ICD-9 codes: 410-414) were identified by checking all death certificates through the regional health departments and by information from the last treating physician and/or coroner. For infarction type, bundle branch block was not included in this analysis due to its small sample size (38.6 cases/year).

Over the whole study period, we used a consistent MONICA definition for MI diagnosis.[1] Within the MONICA-defined MI events, additional NSTEMI cases were categorized since 2000 if symptomatic patients had elevated concentrations troponin and no typical ECG changes.[2] Clinical history of diabetes mellitus (yes/no), hyperlipidemia (yes/no), and pre-existing cardiovascular diseases (angina, coronary heart disease, hypertension, and stroke) (yes/no) were obtained from patient interview and chart review during the hospital stay. Self-reported history of diabetes mellitus, hyperlipidemia, and pre-existing cardiovascular diseases were only considered if the chart review confirmed these diseases.[3] More details of the Augsburg MI registry have been described elsewhere.[2, 4]

Meteorological, air pollution, and influenza data

Data on air temperature, relative humidity, barometric pressure, and ozone (O_3) concentrations were obtained from an urban background monitoring station located 7km (Haunstetten, until 2000) and 5km south of the city center (Landesamt-für-Umwelt, from 2001 on). Particulate matter with an aerodynamic diameter <10 µm (PM_{10}) and nitrogen dioxide (NO_2) were continuously measured at an urban background station (Bourges-Platz) located 2km north of the city center. Daily 24-hour average meteorological variables, PM_{10}, NO_2, and daily maximum 8-hour average O_3 concentrations were calculated if at least 75% of the hourly measurements were available. Data on influenza epidemics during 1992 to 2014 were obtained from the German Influenza Working Group (https://influenza.rki.de/).

Statistical analyses

We applied a time-stratified case-crossover design, which is a type of self-matched case-control study in which each individual serves as his or her own control.[5] For each individual, the exposure on the day of MI occurrence ("case" day) was compared with exposures on days at the same day of the week during the same month ("control" day). This approach thus controls for long-term time-trends, seasonality, day of the week, and confounders that do not vary within a month, such as time-invariant individual-level characteristics (e.g., occupation, socioeconomic status, and pre-existing cardiovascular disease). To estimate the temperature effects on the occurrence of MIs, we used a conditional Poisson regression model, which is a flexible alternative to conditional logistic models and allows for over-dispersion in daily cases of MIs.[6]

We tested the statistical significance of the difference in relative risk (RR) between the two sub-periods by calculating the z score as $(\hat{E}_1 - \hat{E}_2)/\sqrt{(S\hat{E}_1)^2 + (S\hat{E}_2)^2}$, where $\hat{E}_1$and $\hat{E}_2$ are the natural logarithms of RR estimates, and $S\hat{E}_1$and $S\hat{E}_2$ are their respective standard errors calculated from the widths of 95% CIs. We tested the statistical significance of difference in RR estimates between the two sub-periods for each subgroup of a potential effect modifier. To test the statistical significance between exposure-response curves in each sub-period, we used a multivariate Wald test based on the reduced coefficients of the cross-basis matrix for temperature in each sub-period.[7]

Sensitivity analysis

To examine the robustness of the results, we conducted several sensitivity analyses with regard to: (1) using different cutoffs (1st/99th and 5th/95th) for heat and cold exposures; (2) using alternative daily temperature metrics (maximum, minimum, and apparent temperature); (3) further adjusting for influenza epidemics; (4) investigating potential effect modification of air pollutants on the temperature-MI associations by including an interaction term between the temperature cross-basis matrix and an air pollutant strata indicator as described by Chen et al.;[8] (5) exploring whether extreme temperature events (i.e., heat waves and cold spells) were also associated with the occurrence of MI; (6) using continuously measured meteorological data from the Augsburg airport weather station; (7) further adjusting for changing percentages of people aged ≥ 60 years and foreigners; (8) examining the effects of temperature variability (both intra-day and inter-day changes) on MI occurrence; (9) using equal ranges for cold (2.5th percentile vs. 25th percentile) and heat (97.5th percentile vs. 75th percentile) exposures; and (10) using three internal knots placed at equally spaced values in the log scale for the lag-response.

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Table S1. Spearman's rank correlation coefficients between daily meteorology and air pollution in Augsburg, Germany during 1987-2014

	Tmean	Tmin	Tmax	Tapp	RH	BP	PM_{10}	NO_2
Tmin (°C)	0.95							
Tmax (°C)	0.97	0.87						
Tapp (°C)	1.00	0.95	0.97					
RH (%)	-0.57	-0.38	-0.65	-0.57				
BP (hPa)	0.03	-0.02	0.06	0.03	-0.13			
PM_{10} (µg/m^3)	-0.07	-0.15	0	-0.07	-0.06	0.26		
NO_2 (µg/m^3)	-0.12	-0.24	-0.02	-0.12	-0.07	0.18	0.69	
O_3 (µg/m^3)	0.70	0.58	0.73	0.70	-0.75	-0.01	-0.07	-0.06

Tmean, mean temperature; Tmin, minimum temperature; Tmax, maximum temperature; Tapp, apparent temperature; RH, relative humidity; BP, barometric pressure; PM_{10}, particulate matter with an aerodynamic diameter <10 µm; NO_2, nitrogen dioxide; O_3, ozone.

Table S2. Cumulative RR estimates for daily MI cases (95% CI) associated with heat and cold exposure using different temperature cut-offs.

Cut-offs	Group	Period	Cold effects		Heat effects	
			RR [a]	*p* value [b]	RR [a]	*p* value [b]
1st/99th percentiles	Total MI	1987-2014	**1.30 (1.08, 1.56)**	0.38	1.11 (0.95, 1.30)	0.09
		1987-2000	**1.43 (1.09, 1.87)**		0.92 (0.71, 1.20)	
		2001-2014	1.21 (0.95, 1.54)		**1.22 (1.01, 1.47)**	
	Fatal MI	1987-2014	**1.34 (1.04, 1.74)**	0.54	0.98 (0.78, 1.23)	0.30
		1987-2000	**1.45 (1.02, 2.08)**		0.85 (0.60, 1.21)	
		2001-2014	1.23 (0.84, 1.81)		1.08 (0.80, 1.47)	
	Nonfatal MI	1987-2014	1.26 (0.98, 1.61)	0.63	1.23 (1.00, 1.51)	0.29
		1987-2000	1.37 (0.90, 2.07)		1.02 (0.69, 1.52)	
		2001-2014	1.2 (0.88, 1.65)		**1.31 (1.03, 1.66)**	
	Incident MI	1987-2014	**1.26 (1.02, 1.57)**	0.42	1.12 (0.93, 1.34)	0.48
		1987-2000	**1.39 (1.00, 1.93)**		1.02 (0.74, 1.40)	
		2001-2014	1.16 (0.87, 1.56)		1.17 (0.94, 1.46)	
	Recurrent MI	1987-2014	1.34 (0.93, 1.95)	0.44	1.22 (0.88, 1.69)	0.03
		1987-2000	1.14 (0.66, 1.99)		0.76 (0.44, 1.30)	
		2001-2014	1.53 (0.92, 2.54)		**1.61 (1.08, 2.42)**	
	STEMI	1987-2014	**1.47 (1.02, 2.13)**	0.64	1.19 (0.88, 1.61)	0.72
		1987-2000	1.61 (0.91, 2.84)		1.08 (0.63, 1.85)	
		2001-2014	1.34 (0.82, 2.20)		1.22 (0.85, 1.75)	
	NSTEMI	1987-2014	1.09 (0.78, 1.50)	0.64	1.30 (0.99, 1.69)	0.04
		1987-2000	1.24 (0.70, 2.19)		0.77 (0.44, 1.34)	
		2001-2014	1.05 (0.70, 1.58)		**1.49 (1.09, 2.03)**	
5th/95th percentiles	Total MI	1987-2014	**1.23 (1.07, 1.42)**	0.15	1.04 (0.97, 1.11)	0.08
		1987-2000	**1.38 (1.12, 1.71)**		0.95 (0.84, 1.07)	
		2001-2014	1.12 (0.93, 1.35)		1.08 (1.00, 1.18)	
	Fatal MI	1987-2014	**1.31 (1.07, 1.60)**	0.54	0.98 (0.89, 1.09)	0.27
		1987-2000	**1.39 (1.05, 1.84)**		0.92 (0.78, 1.08)	
		2001-2014	1.22 (0.91, 1.65)		1.03 (0.90, 1.18)	
	Nonfatal MI	1987-2014	1.17 (0.96, 1.42)	0.22	1.08 (0.99, 1.18)	0.27
		1987-2000	1.36 (0.99, 1.87)		0.99 (0.83, 1.19)	
		2001-2014	1.06 (0.83, 1.35)		**1.11 (1.00, 1.24)**	
	Incident MI	1987-2014	**1.23 (1.04, 1.46)**	0.12	1.04 (0.96, 1.13)	0.45
		1987-2000	**1.43 (1.11, 1.84)**		1.00 (0.86, 1.15)	
		2001-2014	1.08 (0.86, 1.36)		1.07 (0.97, 1.18)	
	Recurrent MI	1987-2014	1.18 (0.88, 1.57)	0.43	1.07 (0.93, 1.24)	0.03
		1987-2000	1.04 (0.68, 1.59)		0.87 (0.68, 1.11)	
		2001-2014	1.31 (0.89, 1.95)		**1.21 (1.01, 1.45)**	
	STEMI	1987-2014	**1.54 (1.15, 2.06)**	0.54	1.06 (0.93, 1.21)	0.62
		1987-2000	**1.69 (1.08, 2.66)**		1.00 (0.79, 1.28)	
		2001-2014	1.41 (0.96, 2.07)		1.08 (0.92, 1.27)	
	NSTEMI	1987-2014	0.94 (0.73, 1.21)	0.29	1.12 (0.99, 1.26)	0.04
		1987-2000	1.16 (0.75, 1.78)		0.88 (0.68, 1.13)	
		2001-2014	0.87 (0.63, 1.19)		**1.19 (1.03, 1.36)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Conditional Poisson Regression adjusted for relative humidity, barometric pressure, and population.

[b] Significance test on temporal vibration, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S3. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile relative to minimum myocardial infarction temperature (MMIT)) and cold exposure (2.5 percentile relative to MMIT) using different temperature metrics

Metric (MMIT)	Group	Period	Cold effects RR [a]	Cold effects *p* value [b]	Heat effects RR [a]	Heat effects *p* value [b]
Tmin (12.9 °C)	Total MI	1987-2014	**1.27 (1.09, 1.48)**	0.32	1.05 (0.94, 1.18)	0.01
		1987-2000	**1.39 (1.10, 1.75)**		0.86 (0.71, 1.05)	
		2001-2014	1.18 (0.97, 1.45)		**1.16 (1.01, 1.34)**	
	Fatal MI	1987-2014	**1.31 (1.05, 1.63)**	0.74	0.98 (0.83, 1.16)	0.26
		1987-2000	**1.36 (1.00, 1.85)**		0.88 (0.67, 1.14)	
		2001-2014	1.26 (0.92, 1.74)		1.07 (0.85, 1.34)	
	Nonfatal MI	1987-2014	1.23 (1.00, 1.52)	0.35	1.11 (0.95, 1.29)	0.03
		1987-2000	1.41 (0.98, 2.01)		0.83 (0.62, 1.12)	
		2001-2014	1.14 (0.88, 1.48)		**1.22 (1.02, 1.45)**	
	Incident MI	1987-2014	**1.26 (1.05, 1.51)**	0.41	1.06 (0.93, 1.22)	0.30
		1987-2000	**1.36 (1.02, 1.80)**		0.96 (0.76, 1.21)	
		2001-2014	1.16 (0.91, 1.48)		1.11 (0.94, 1.31)	
	Recurrent MI	1987-2014	1.30 (0.95, 1.77)	0.62	1.09 (0.85, 1.39)	<0.01
		1987-2000	1.22 (0.76, 1.96)		0.67 (0.45, 0.99)	
		2001-2014	1.43 (0.94, 2.18)		**1.49 (1.10, 2.02)**	
	STEMI	1987-2014	**1.43 (1.05, 1.96)**	0.49	1.09 (0.88, 1.37)	0.21
		1987-2000	1.25 (0.76, 2.04)		0.89 (0.60, 1.31)	
		2001-2014	**1.57 (1.04, 2.36)**		1.20 (0.92, 1.57)	
	NSTEMI	1987-2014	1.06 (0.81, 1.40)	0.09	1.11 (0.91, 1.35)	<0.01
		1987-2000	1.53 (0.94, 2.49)		0.62 (0.41, 0.93)	
		2001-2014	0.91 (0.65, 1.28)		**1.29 (1.03, 1.63)**	
Tmax (26.5 °C)	Total MI	1987-2014	**1.17 (1.01, 1.37)**	0.13	1.02 (0.91, 1.14)	0.46
		1987-2000	**1.36 (1.08, 1.71)**		0.96 (0.80, 1.16)	
		2001-2014	1.06 (0.86, 1.32)		1.05 (0.92, 1.20)	
	Fatal MI	1987-2014	**1.27 (1.02, 1.59)**	0.39	0.96 (0.82, 1.13)	0.98
		1987-2000	**1.42 (1.05, 1.92)**		0.96 (0.75, 1.23)	
		2001-2014	1.16 (0.83, 1.63)		0.95 (0.76, 1.19)	
	Nonfatal MI	1987-2014	1.09 (0.88, 1.35)	0.31	1.07 (0.93, 1.24)	0.39
		1987-2000	1.26 (0.89, 1.79)		0.96 (0.72, 1.28)	
		2001-2014	1.01 (0.76, 1.33)		1.11 (0.94, 1.32)	
	Incident MI	1987-2014	1.19 (0.98, 1.43)	0.12	1.01 (0.89, 1.15)	0.63
		1987-2000	**1.40 (1.06, 1.85)**		0.97 (0.78, 1.22)	
		2001-2014	1.04 (0.81, 1.34)		1.04 (0.89, 1.22)	
	Recurrent MI	1987-2014	1.05 (0.76, 1.45)	0.55	1.10 (0.87, 1.39)	0.29
		1987-2000	0.96 (0.60, 1.53)		0.93 (0.62, 1.37)	
		2001-2014	1.17 (0.75, 1.83)		1.21 (0.90, 1.61)	
	STEMI	1987-2014	1.33 (0.97, 1.83)	0.22	1.08 (0.87, 1.34)	0.90
		1987-2000	**1.66 (1.02, 2.69)**		1.05 (0.71, 1.56)	
		2001-2014	1.10 (0.72, 1.70)		1.08 (0.84, 1.41)	
	NSTEMI	1987-2014	0.92 (0.70, 1.22)	0.80	1.08 (0.89, 1.31)	0.05
		1987-2000	1.01 (0.63, 1.61)		0.76 (0.51, 1.14)	
		2001-2014	0.93 (0.65, 1.33)		1.20 (0.96, 1.50)	
Tappmean (15.8 °C)	Total MI	1987-2014	**1.26 (1.08, 1.47)**	0.22	1.07 (0.96, 1.18)	0.08
		1987-2000	**1.40 (1.11, 1.76)**		0.93 (0.78, 1.12)	
		2001-2014	1.16 (0.94, 1.42)		**1.14 (1.00, 1.29)**	
	Fatal MI	1987-2014	**1.33 (1.07, 1.66)**		0.98 (0.84, 1.15)	

Metric (MMIT)	Group	Period	Cold effects		Heat effects	
			RR [a]	*p* value [b]	RR [a]	*p* value [b]
		1987-2000	**1.42 (1.05, 1.92)**	0.58	0.89 (0.70, 1.13)	0.29
		2001-2014	1.25 (0.91, 1.73)		1.05 (0.86, 1.3)	
	Nonfatal MI	1987-2014	1.19 (0.97, 1.47)		1.14 (0.99, 1.31)	
		1987-2000	1.36 (0.96, 1.93)	0.34	1.00 (0.76, 1.31)	0.27
		2001-2014	1.10 (0.85, 1.44)		**1.19 (1.01, 1.4)**	
	Incident MI	1987-2014	**1.24 (1.03, 1.49)**		1.07 (0.95, 1.22)	
		1987-2000	**1.42 (1.07, 1.87)**	0.19	1.00 (0.81, 1.25)	0.46
		2001-2014	1.10 (0.86, 1.41)		1.11 (0.95, 1.29)	
	Recurrent MI	1987-2014	1.25 (0.91, 1.70)		1.13 (0.91, 1.42)	
		1987-2000	1.08 (0.68, 1.71)	0.40	0.82 (0.56, 1.19)	0.03
		2001-2014	1.41 (0.92, 2.16)		**1.37 (1.04, 1.80)**	
	STEMI	1987-2014	**1.50 (1.09, 2.06)**		1.11 (0.90, 1.36)	
		1987-2000	**1.66 (1.02, 2.69)**	0.55	1.03 (0.71, 1.49)	0.67
		2001-2014	1.36 (0.90, 2.08)		1.14 (0.89, 1.46)	
	NSTEMI	1987-2014	0.99 (0.75, 1.30)		1.19 (0.99, 1.43)	
		1987-2000	1.19 (0.74, 1.91)	0.39	0.82 (0.56, 1.21)	0.04
		2001-2014	0.92 (0.65, 1.30)		**1.31 (1.06, 1.61)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Conditional Poisson Regression adjusted for relative humidity, barometric pressure, and population.

[b] Significance test on temporal vibration, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S4. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile (23.5 °C) relative to minimum myocardial infarction temperature (MMIT, 18.4 °C)) and cold exposure (2.5th percentile (-5.5 °C) relative to MMIT) during 1992-2014 with and without adjustment for influenza [a]

Group	Adjustment for influenza	Cold effects [a]	Heat effects [a]
Total MI	With	**1.19 (1.01, 1.41)**	1.09 (0.96, 1.23)
	Without	**1.20 (1.02, 1.41)**	1.09 (0.96, 1.23)
Fatal MI	With	1.20 (0.94, 1.54)	0.99 (0.81, 1.20)
	Without	1.20 (0.94, 1.52)	0.99 (0.82, 1.20)
Nonfatal MI	With	1.18 (0.94, 1.48)	1.16 (0.99, 1.37)
	Without	1.19 (0.96, 1.49)	1.16 (0.98, 1.37)
Incident MI	With	1.20 (0.98, 1.46)	1.09 (0.93, 1.26)
	Without	1.20 (0.99, 1.46)	1.08 (0.93, 1.26)
Recurrent MI	With	1.23 (0.87, 1.74)	1.21 (0.92, 1.58)
	Without	1.23 (0.87, 1.73)	1.21 (0.92, 1.58)
STEMI	With	**1.52 (1.08, 2.14)**	1.17 (0.92, 1.50)
	Without	**1.54 (1.10, 2.16)**	1.17 (0.92, 1.50)
NSTEMI	With	1.00 (0.75, 1.34)	1.24 (1.00, 1.55)
	Without	1.01 (0.76, 1.35)	1.24 (1.00, 1.55)

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] A weekly doctor's practice index (PI) for each winter season (October to April), representing the relative deviation of the observed acute respiratory activity in comparison to the background level in Germany, was used to denote days with high influenza episodes (PI > 115).

[b] Conditional Poisson Regression adjusted for relative humidity, barometric pressure, and population.

Table S5. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile (21.7 °C) relative to minimum myocardial infarction temperature (MMIT, 16.7 °C)) and cold exposure (2.5th percentile (-6.0 °C) relative to MMIT) using the Augsburg airport weather station.

Group	Period	Cold effects		Heat effects	
		RR [a]	*p* value [b]	RR [a]	*p* value [b]
Total MI	1987-2014	**1.27 (1.10, 1.47)**	0.14	1.09 (0.97, 1.21)	0.06
	1987-2000	**1.44 (1.16, 1.78)**		0.95 (0.80, 1.13)	
	2001-2014	1.15 (0.94, 1.41)		**1.18 (1.02, 1.36)**	
Fatal MI	1987-2014	**1.33 (1.08, 1.64)**	0.63	1.04 (0.88, 1.22)	0.46
	1987-2000	**1.41 (1.06, 1.87)**		0.97 (0.77, 1.22)	
	2001-2014	1.27 (0.93, 1.74)		1.10 (0.87, 1.38)	
Nonfatal MI	1987-2014	1.22 (1.00, 1.49)	0.15	1.13 (0.97, 1.31)	0.08
	1987-2000	**1.47 (1.06, 2.03)**		0.93 (0.71, 1.20)	
	2001-2014	1.09 (0.84, 1.41)		**1.24 (1.03, 1.48)**	
Incident MI	1987-2014	**1.26 (1.06, 1.50)**	0.12	1.08 (0.95, 1.23)	0.27
	1987-2000	**1.47 (1.13, 1.90)**		0.98 (0.80, 1.21)	
	2001-2014	1.11 (0.87, 1.41)		1.14 (0.96, 1.35)	
Recurrent MI	1987-2014	1.26 (0.93, 1.70)	0.38	1.19 (0.94, 1.50)	0.03
	1987-2000	1.08 (0.70, 1.68)		0.9 (0.63, 1.28)	
	2001-2014	1.42 (0.94, 2.16)		**1.50 (1.10, 2.03)**	
STEMI	1987-2014	**1.51 (1.12, 2.04)**	0.58	1.15 (0.93, 1.44)	0.33
	1987-2000	**1.64 (1.04, 2.59)**		1.00 (0.70, 1.43)	
	2001-2014	1.38 (0.92, 2.07)		1.25 (0.95, 1.65)	
NSTEMI	1987-2014	1.03 (0.79, 1.35)	0.17	1.13 (0.93, 1.38)	0.01
	1987-2000	1.34 (0.86, 2.10)		0.74 (0.52, 1.07)	
	2001-2014	0.91 (0.65, 1.27)		**1.32 (1.05, 1.68)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Conditional Poisson regression adjusted for relative humidity, barometric pressure, and population.

[b] Significance test on temporal variation, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S6. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile (23.5 °C) relative to minimum myocardial infarction temperature (MMIT, 18.4 °C)) and cold exposure (2.5th percentile (-5.5 °C) relative to MMIT) with adjustment for percentage of people aged 60 years and above and percentage of foreigners.

Group	Period	Cold effects		Heat effects	
		RR [a]	*p* value [b]	RR [a]	*p* value [b]
Total MI	1987-2014	**1.26 (1.08, 1.47)**	0.22	1.07 (0.96, 1.18)	0.08
	1987-2000	**1.40 (1.11, 1.76)**		0.93 (0.78, 1.12)	
	2001-2014	1.15 (0.94, 1.42)		**1.14 (1.00, 1.29)**	
Fatal MI	1987-2014	**1.33 (1.06, 1.65)**	0.53	0.98 (0.84, 1.15)	0.29
	1987-2000	**1.42 (1.05, 1.92)**		0.89 (0.70, 1.13)	
	2001-2014	1.23 (0.89, 1.70)		1.05 (0.86, 1.30)	
Nonfatal MI	1987-2014	1.20 (0.97, 1.48)	0.36	1.14 (0.99, 1.31)	0.28
	1987-2000	1.36 (0.96, 1.93)		1.00 (0.76, 1.32)	
	2001-2014	1.11 (0.85, 1.45)		**1.19 (1.01, 1.40)**	
Incident MI	1987-2014	**1.24 (1.04, 1.49)**	0.20	1.07 (0.95, 1.22)	0.47
	1987-2000	**1.42 (1.07, 1.87)**		1.01 (0.81, 1.25)	
	2001-2014	1.11 (0.87, 1.42)		1.11 (0.95, 1.29)	
Recurrent MI	1987-2014	1.24 (0.91, 1.69)	0.42	1.13 (0.91, 1.41)	0.03
	1987-2000	1.08 (0.68, 1.71)		0.82 (0.56, 1.19)	
	2001-2014	1.39 (0.91, 2.13)		**1.37 (1.04, 1.80)**	
STEMI	1987-2014	**1.52 (1.11, 2.07)**	0.58	1.11 (0.90, 1.36)	0.67
	1987-2000	**1.66 (1.02, 2.69)**		1.03 (0.71, 1.49)	
	2001-2014	1.38 (0.91, 2.10)		1.14 (0.89, 1.46)	
NSTEMI	1987-2014	0.99 (0.76, 1.31)	0.41	1.19 (0.99, 1.43)	0.04
	1987-2000	1.19 (0.74, 1.91)		0.83 (0.56, 1.21)	
	2001-2014	0.93 (0.66, 1.31)		**1.31 (1.06, 1.61)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Conditional Poisson regression adjusted for relative humidity, barometric pressure, and population.

[b] Significance test on temporal variation, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S7. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile (23.5 °C) relative to minimum myocardial infarction temperature (MMIT, 18.4 °C)) and cold exposure (2.5th percentile (-5.5 °C) relative to MMIT) using three internal knots for the lag response.

Group	Period	Cold effects		Heat effects	
		RR [a]	*p* value [b]	RR [a]	*p* value [b]
Total MI	1987-2014	**1.25 (1.07, 1.46)**	0.25	1.07 (0.96, 1.19)	0.10
	1987-2000	**1.38 (1.10, 1.75)**		0.94 (0.78, 1.13)	
	2001-2014	1.15 (0.94, 1.42)		1.14 (1.00, 1.29)	
Fatal MI	1987-2014	**1.31 (1.05, 1.63)**	0.58	0.99 (0.84, 1.15)	0.30
	1987-2000	**1.39 (1.03, 1.88)**		0.89 (0.70, 1.14)	
	2001-2014	1.23 (0.89, 1.69)		1.06 (0.86, 1.30)	
Nonfatal MI	1987-2014	1.20 (0.97, 1.48)	0.36	1.14 (0.99, 1.31)	0.32
	1987-2000	1.37 (0.96, 1.94)		1.01 (0.76, 1.33)	
	2001-2014	1.11 (0.85, 1.45)		**1.19 (1.01, 1.40)**	
Incident MI	1987-2014	**1.25 (1.04, 1.50)**	0.24	1.07 (0.94, 1.21)	0.56
	1987-2000	**1.42 (1.07, 1.87)**		1.01 (0.82, 1.26)	
	2001-2014	1.13 (0.88, 1.45)		1.10 (0.94, 1.28)	
Recurrent MI	1987-2014	1.2 (0.87, 1.64)	0.33	1.14 (0.92, 1.43)	0.03
	1987-2000	1.00 (0.63, 1.60)		0.83 (0.57, 1.21)	
	2001-2014	1.38 (0.90, 2.12)		**1.38 (1.04, 1.81)**	
STEMI	1987-2014	**1.48 (1.08, 2.04)**	0.53	1.11 (0.90, 1.37)	0.66
	1987-2000	**1.64 (1.01, 2.67)**		1.03 (0.71, 1.50)	
	2001-2014	1.33 (0.87, 2.03)		1.14 (0.89, 1.47)	
NSTEMI	1987-2014	1.01 (0.77, 1.33)	0.54	1.19 (0.99, 1.43)	0.06
	1987-2000	1.16 (0.72, 1.88)		0.84 (0.57, 1.24)	
	2001-2014	0.96 (0.68, 1.36)		**1.29 (1.05, 1.60)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.
[a] Conditional Poisson regression adjusted for relative humidity, barometric pressure, and population.
[b] Significance test on temporal variation, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S8. Cumulative RR estimates for daily MI cases (95% CI) associated with heat exposure (97.5th percentile (23.5 °C) relative to 75th percentile (16.0 °C)) and cold exposure (2.5th percentile (-5.5 °C) relative to 25th percentile (3.4 °C)).

Group	Period	Cold effects		Heat effects	
		RR [a]	*p* value [b]	RR [a]	*p* value [b]
Total MI	1987-2014	1.06 (0.96, 1.16)	0.92	1.05 (0.93, 1.19)	0.07
	1987-2000	1.07 (0.93, 1.23)		0.89 (0.72, 1.10)	
	2001-2014	1.06 (0.93, 1.20)		1.14 (0.98, 1.32)	
Fatal MI	1987-2014	1.09 (0.95, 1.24)	0.70	0.96 (0.80, 1.15)	0.24
	1987-2000	1.11 (0.93, 1.33)		0.85 (0.64, 1.13)	
	2001-2014	1.05 (0.86, 1.29)		1.06 (0.83, 1.34)	
Nonfatal MI	1987-2014	1.03 (0.90, 1.17)	0.69	1.12 (0.95, 1.32)	0.25
	1987-2000	1.00 (0.80, 1.24)		0.95 (0.69, 1.32)	
	2001-2014	1.06 (0.90, 1.25)		1.19 (0.98, 1.43)	
Incident MI	1987-2014	1.04 (0.93, 1.16)	0.84	1.06 (0.92, 1.23)	0.42
	1987-2000	1.03 (0.87, 1.22)		0.98 (0.76, 1.26)	
	2001-2014	1.05 (0.91, 1.22)		1.11 (0.93, 1.32)	
Recurrent MI	1987-2014	1.08 (0.89, 1.31)	0.84	1.11 (0.85, 1.44)	0.04
	1987-2000	1.06 (0.79, 1.41)		0.76 (0.49, 1.19)	
	2001-2014	1.10 (0.84, 1.43)		1.36 (0.99, 1.88)	
STEMI	1987-2014	0.97 (0.81, 1.18)	0.75	1.07 (0.84, 1.36)	0.53
	1987-2000	0.93 (0.70, 1.24)		0.95 (0.62, 1.47)	
	2001-2014	0.99 (0.77, 1.28)		1.13 (0.84, 1.51)	
NSTEMI	1987-2014	1.06 (0.90, 1.26)	0.99	1.20 (0.97, 1.49)	0.04
	1987-2000	1.08 (0.80, 1.46)		0.78 (0.49, 1.22)	
	2001-2014	1.08 (0.88, 1.34)		**1.34 (1.05, 1.71)**	

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Conditional Poisson regression adjusted for relative humidity, barometric pressure, and population.

[b] Significance test on temporal variation, based on difference between RR estimates in 1987-2000 and 2001-2014.

Table S9. Summary statistics of heat waves and cold spells and the RR estimates (95% CI) for daily cases of MI on heat wave or cold spell days compared with non-heat wave or non-cold spell days in Augsburg, Germany

Group	Overall period (1987-2014)		1987-2000		2001-2014	
	Heat waves [a]	Cold spells [b]	Heat waves [a]	Cold spells [b]	Heat waves [a]	Cold spells [b]
Summary statistics						
Days per year	18.9	12.1	17.6	10.1	20.1	14.1
Intensity (°C) [c]	15.3	1.4	14.6	0.4	16.0	2.1
RR estimates (95% CI) [d]						
Total MI	0.88 (0.44, 1.77)	1.04 (0.45, 2.39)	0.88 (0.30, 2.56)	0.82 (0.23, 2.91)	0.91 (0.36, 2.31)	1.23 (0.40, 3.76)
Fatal MI	0.79 (0.28, 2.18)	1.23 (0.37, 4.08)	0.71 (0.17, 2.96)	1.31 (0.25, 6.95)	0.89 (0.20, 3.84)	1.10 (0.19, 6.26)
Nonfatal MI	0.97 (0.38, 2.52)	0.88 (0.28, 2.79)	1.16 (0.24, 5.73)	0.42 (0.06, 2.89)	0.92 (0.28, 3.04)	1.33 (0.31, 5.70)
Incident MI	0.70 (0.30, 1.62)	0.90 (0.33, 2.45)	0.86 (0.24, 3.12)	1.04 (0.22, 4.85)	0.65 (0.21, 1.95)	0.76 (0.20, 2.85)
Recurrent MI	1.32 (0.32, 5.50)	2.32 (0.39, 13.72)	0.34 (0.04, 2.93)	0.37 (0.03, 4.77)	3.32 (0.48, 22.90)	14.51 (1.21, 174.67)
STEMI	0.60 (0.15, 2.41)	0.42 (0.08, 2.27)	0.21 (0.03, 1.73)	0.80 (0.06, 11.42)	1.52 (0.23, 10.00)	0.24 (0.03, 2.23)
NSTEMI	1.58 (0.45, 5.54)	1.20 (0.26, 5.47)	8.33 (0.83, 83.42)	1.00 (0.07, 14.17)	0.80 (0.17, 3.68)	1.47 (0.22, 9.61)

STEMI, ST segment elevation MI; NSTEMI, non-ST segment elevation MI.

[a] Heat waves were defined as periods of at least two days with 1) daily maximum apparent temperature > its monthly 90th percentile or 2) daily maximum apparent temperature > its monthly median value and daily minimum temperature > its monthly 90th percentile (based on the method proposed by D'Ippoliti et al.). Reference: D'Ippoliti D, Michelozzi P, Marino C, de'Donato F, Menne B, Katsouyanni K, Kirchmayer U, Analitis A, Medina-Ramón M, Paldy A, Atkinson R, Kovats S, Bisanti L, Schneider A, Lefranc A, Iñiguez C, Perucci CA. The impact of heat waves on mortality in 9 European cities: results from the EuroHEAT project. Environ Health 2010;9(1):37.

[b] Cold spells were defined as periods of at least two days with daily minimum apparent temperature < its monthly 10th percentile.

[c] Intensity was defined as average daily mean temperature during the heat waves or cold spells.

[d] Conditional Poisson regression adjusted for daily mean temperature, relative humidity, barometric pressure, and population.

Figure S1. Overall lag-cumulative exposure-response relationships between air temperature and myocardial infarction throughout the study period with 95% CI. The vertical lines represent the minimum myocardial infarction temperature (dotted) and the 1st and the 99th percentiles of the temperature distribution (dashed).

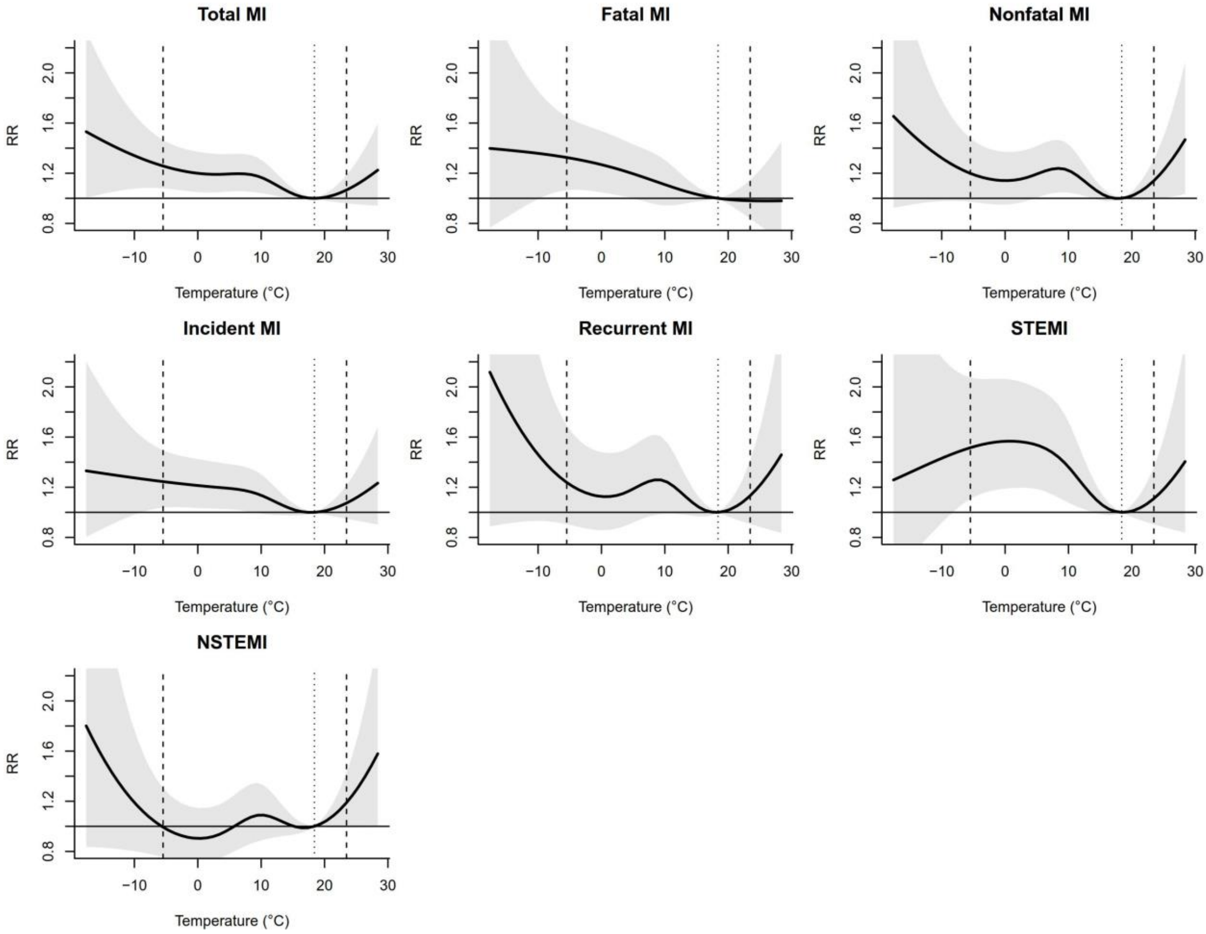

Figure S2. Lag-response relationships between cold exposure (2.5 percentile relative to MMIT) and MI

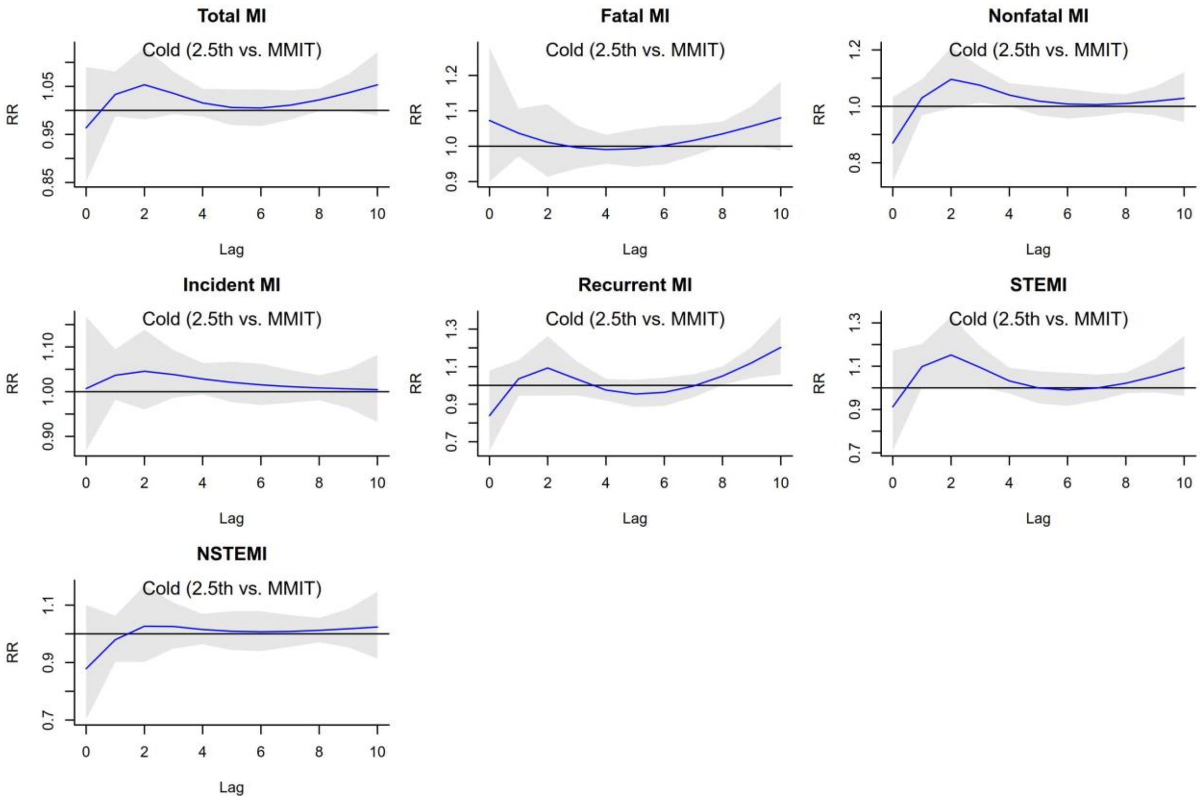

Figure S3. Lag-response relationships between heat exposure (97.5 percentile relative to MMIT) and MI

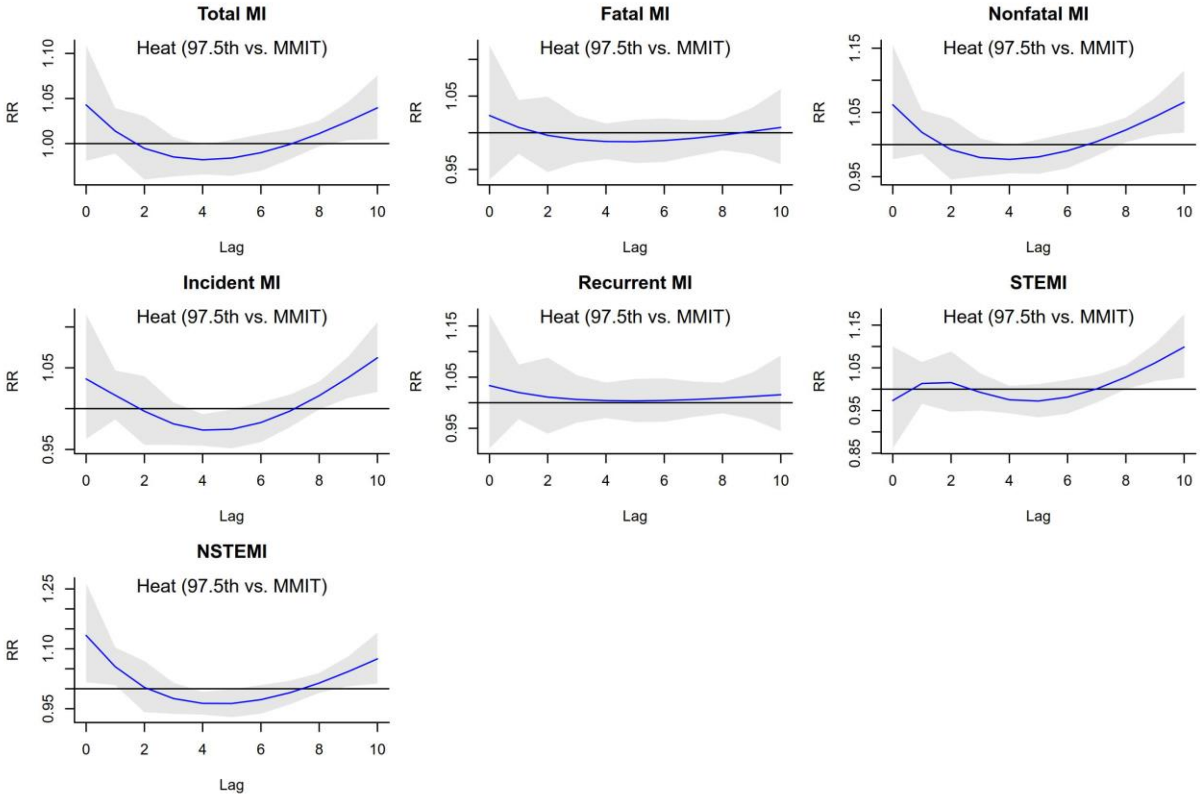

Figure S4. Cumulative relative risk estimates for daily MI cases (95% CI) associated with cold exposure (2.5th percentile relative to MMIT) and heat exposure (97.5th percentile relative to MMIT) throughout the study period stratified by subgroups

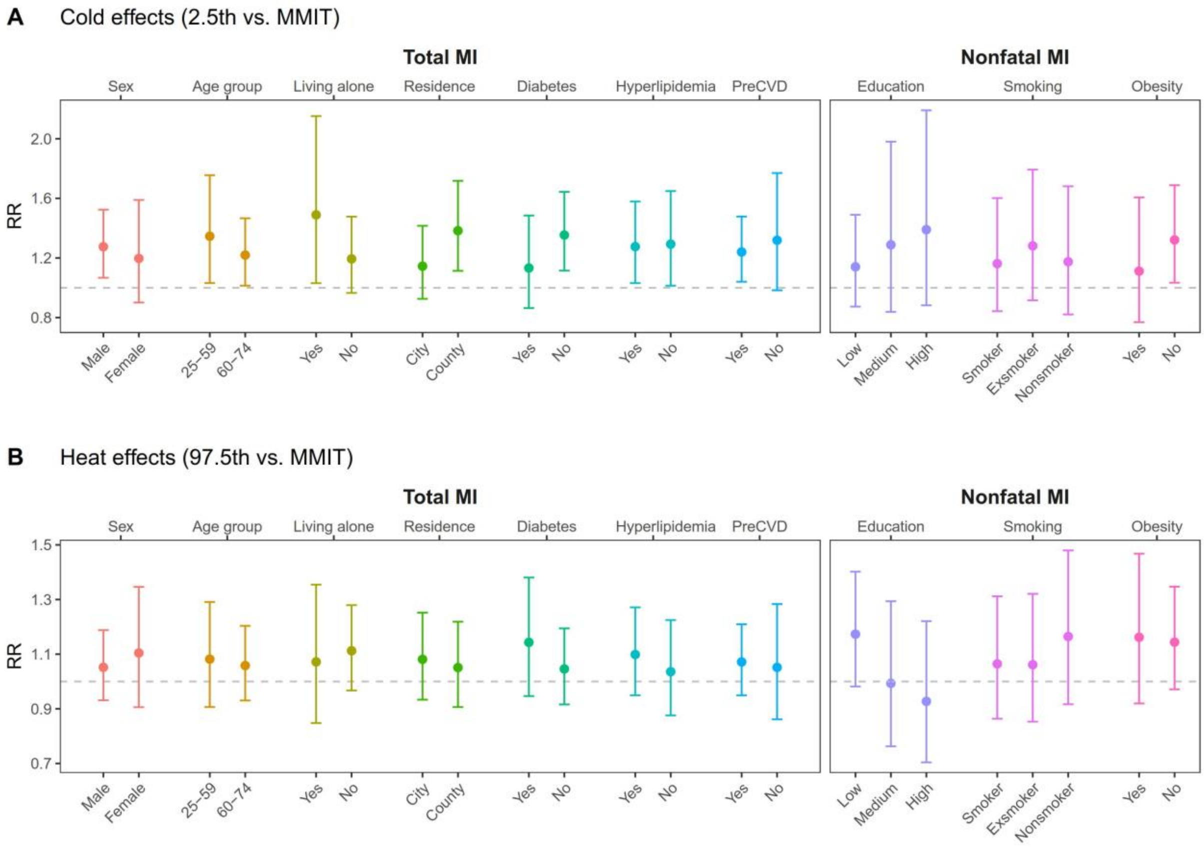

Figure S5. Lag-cumulative relative risk estimates for daily nonfatal MI cases (95% CI) associated with cold exposure (2.5th percentile relative to minimum myocardial infarction temperature (MMIT)) and heat exposure (97.5th percentile relative to MMIT) predicted for 1987-2000 (blue) and 2001-2014 (red) stratified by education levels, smoking status, and obesity. Asterisks indicate statistical significance for differences in relative risk estimates between 1987-2000 and 2001-2014.

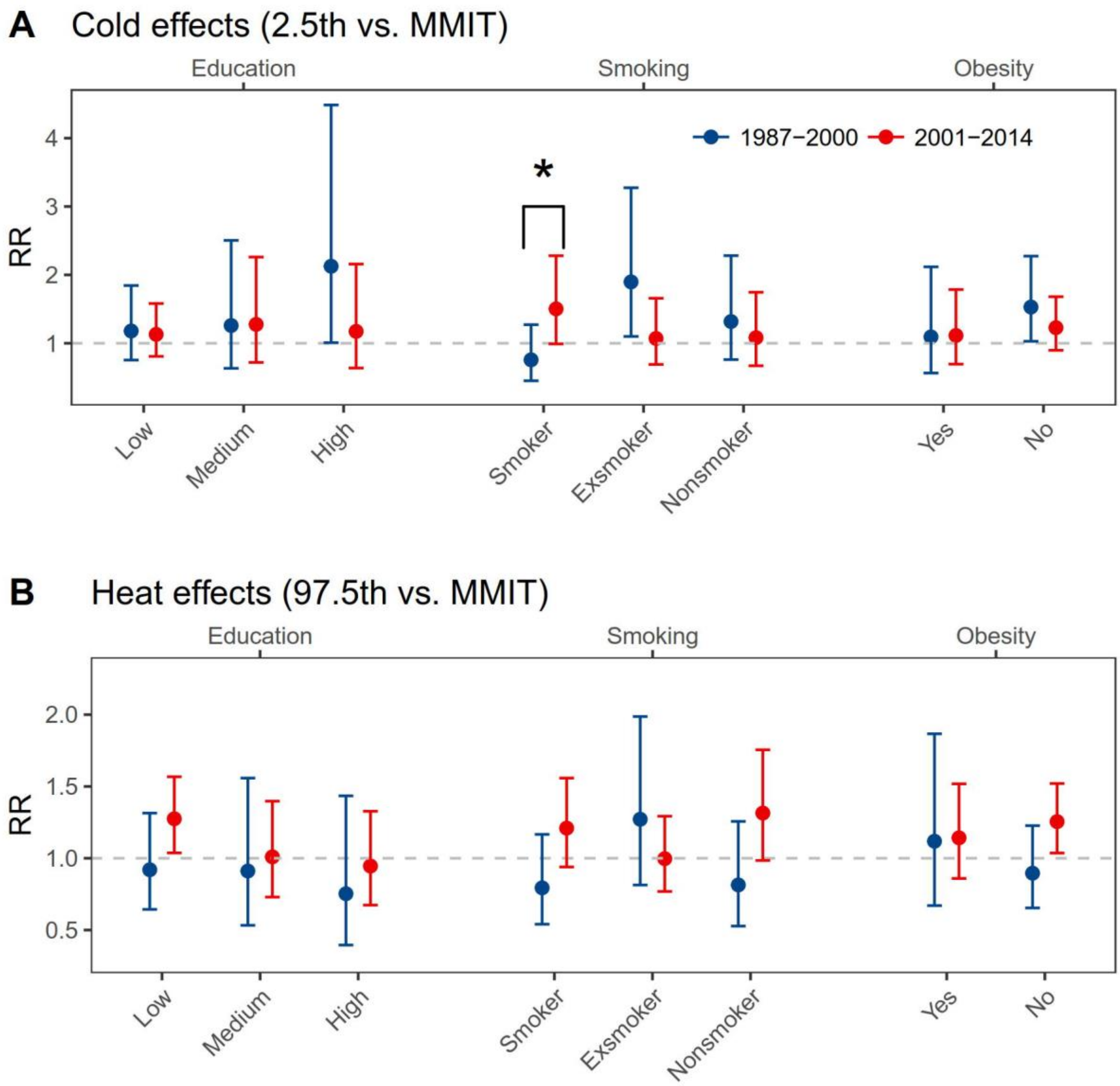

Figure S6. Percent increase (95% CI) in daily MI cases per 10 μg/m[3] increase in air pollutants (PM_{10}, NO_2, and O_3) using different lag days. Lag0 represents the same day of MI occurrence, lag1 to lag4 represent 1 to 4 days before MI occurrence, and the average exposure over 2 days (lag01) and 5 days (lag04).

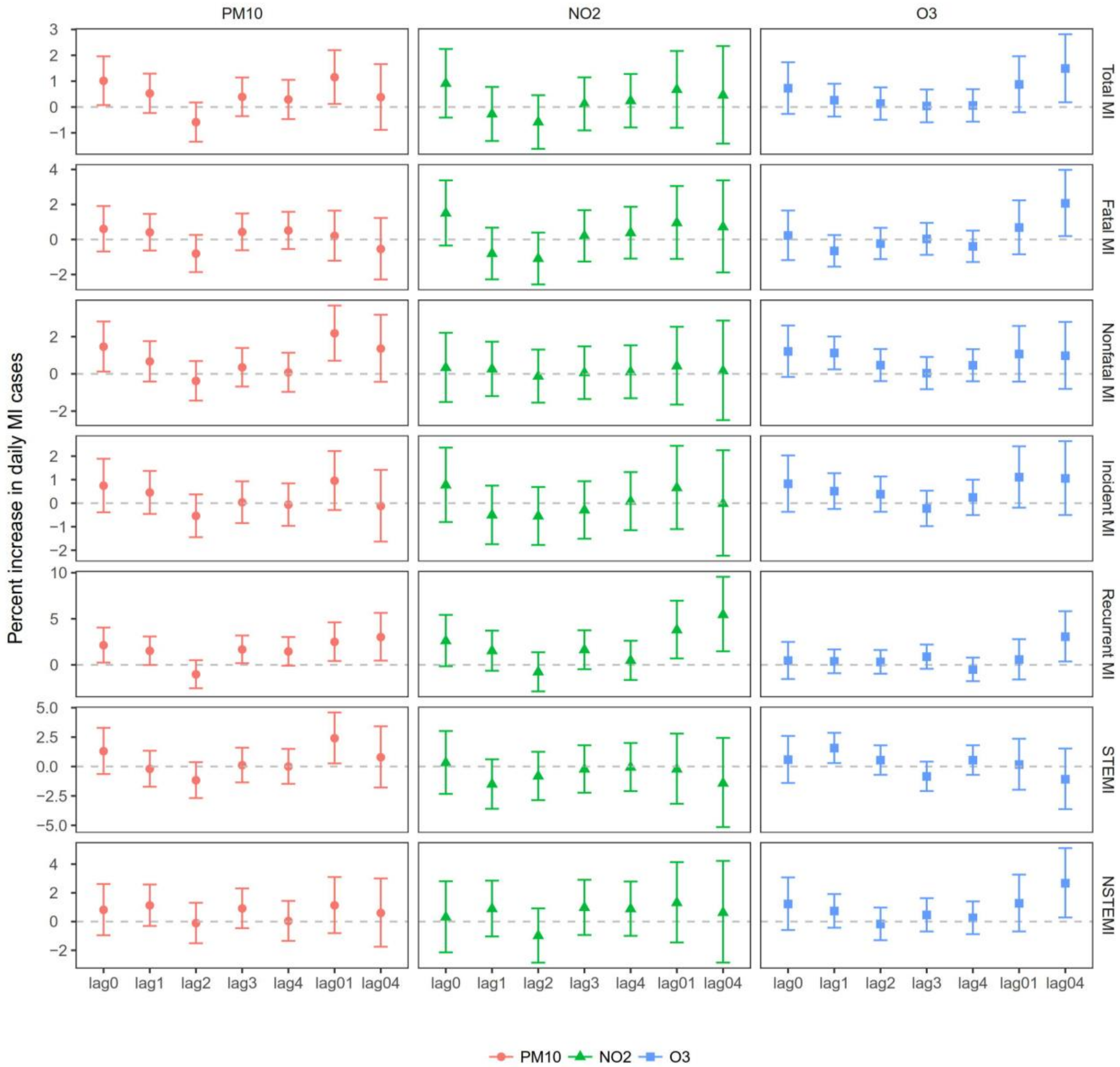

Figure S7. Modified overall cumulative air temperature-MI associations by PM_{10} with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

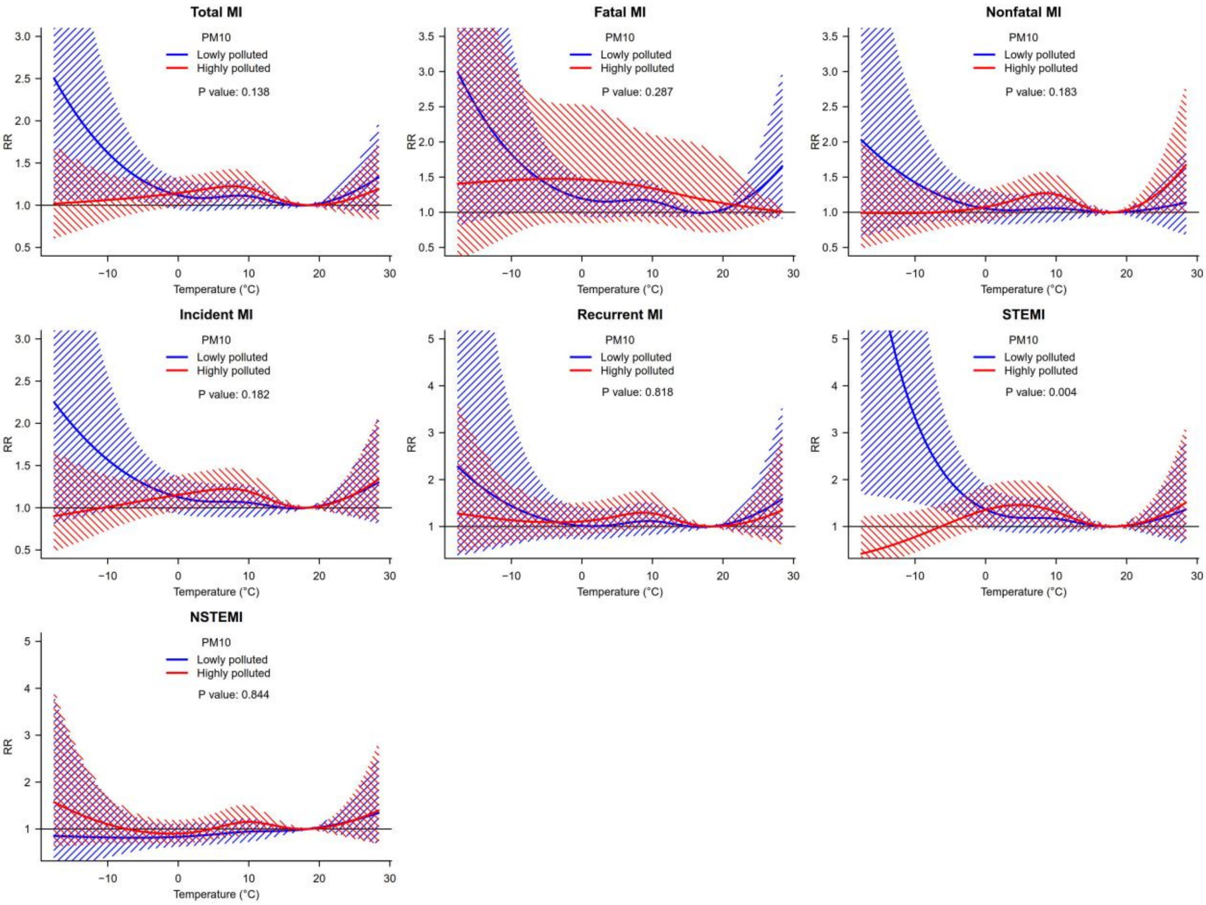

Figure S8. Modified overall cumulative air temperature-MI associations by NO_2 with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

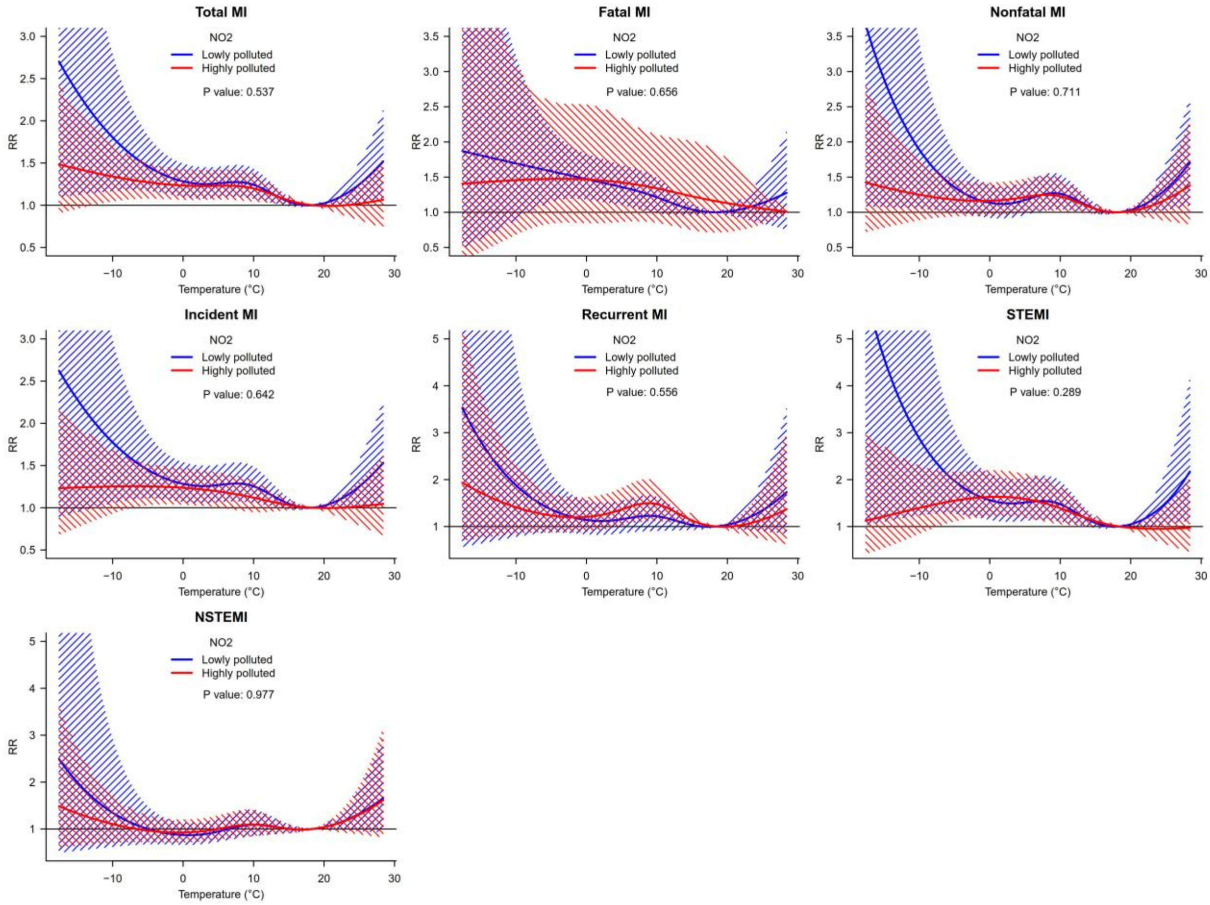

Figure S9. Modified overall cumulative air temperature-MI associations by O_3 with 95% CIs. Blue lines represent for a low air pollution level (concentration below median value) and red lines represent a high air pollution level (concentration above median value). *P* value is the results of significance test between air pollution levels, based on a multivariate Wald test of the reduced coefficients of the temperature effects at low and high air pollution levels

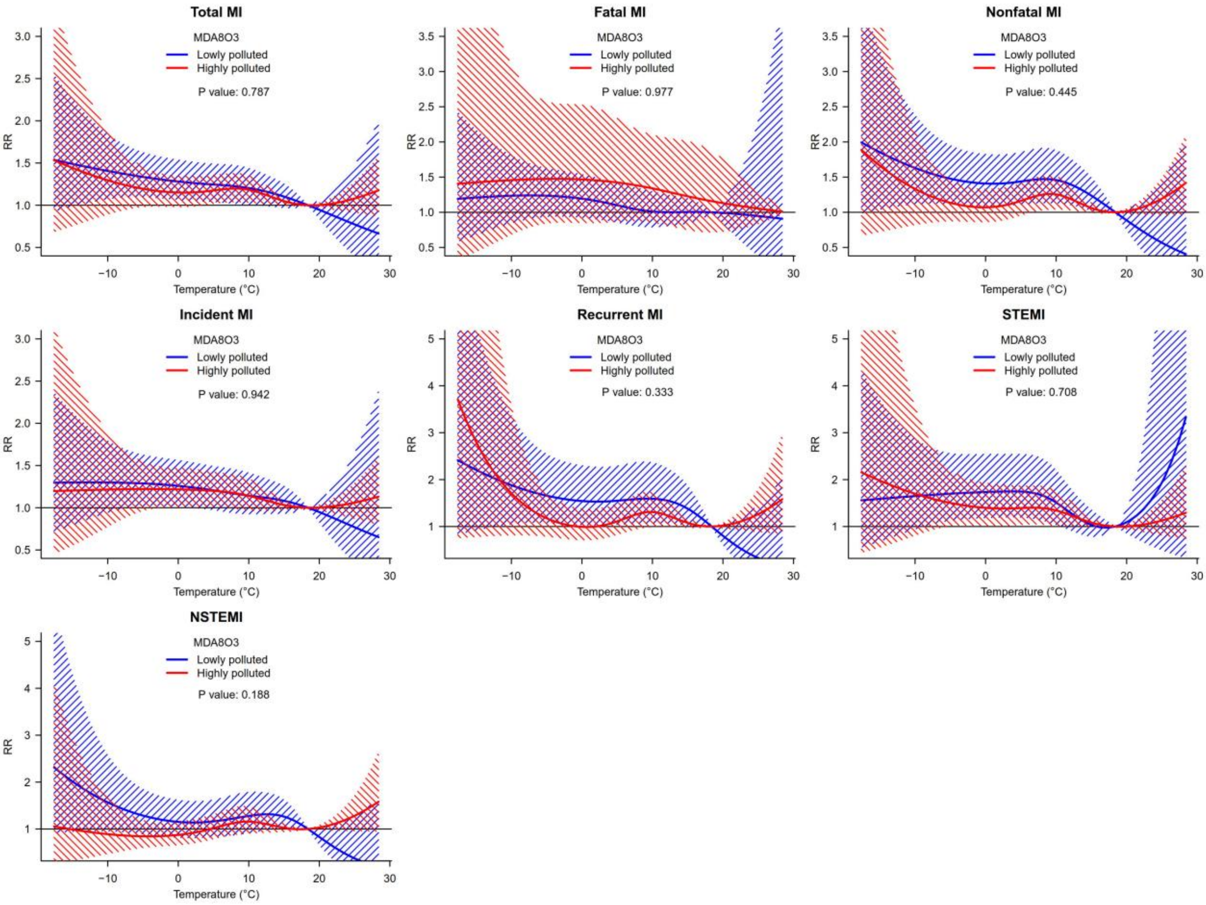

Figure S10. Percent change (95% CIs) in MI associated with a 1 °C increase in temperature variability on different exposure days in 1987-2000 and 2001-2014. Temperature variability is calculated from the standard deviation of the minimum and maximum temperatures during the exposure days (i.e., lag01, lag02, …, and lag07).