THE LANCET
Planetary Health

Supplementary appendix

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Supplement to: Chen K, Breitner S, Wolf K, et al. Ambient carbon monoxide and daily mortality: a global time-series study in 337 cities. *Lancet Planet Health* 2021; **5:** e191–99.

Supplemental Material

Ambient Carbon Monoxide and Daily Mortality: A Global Time-Series Study in 337 cities

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Text S1. Additional information on data collection.

Selection of the study locations

We initially collected data on daily mortality, air pollution, and mean temperature for 344 cities across 18 countries or regions with available data on CO from the database of the MCC Collaborative Research Network (http://mccstudy.lshtm.ac.uk/). We then selected 337 cities that have data for more than 2 years (730 days) of complete time-series with both CO and mortality. Among the seven excluded cities, one was in Spain and six were in the US.

Harmonization of CO measurements

All 18 countries provided the CO concentrations using the 24-h average metric, with 10 countries (Australia, Finland, Germany, Italy, Portugal, Romania, Spain, Sweden, Switzerland, and the UK) using the unit of mg/m^3, seven countries (Canada, Chile, China, Japan, Taiwan, Thailand, and the US) using the unit of ppm, and South Korea using the unit of 10 ppm. A conversion factor was used: 1 ppm= 1·15 mg/m^3.

Description of the data collection in each country

<u>Australia (2 cities, 2000-2009)</u>

Daily mortality, gathered from the Australian Bureau of Statistics, is represented by counts of deaths due to non-external causes (ICD-9: 0-799; ICD-10: A00-R99). Mean daily temperature (˚C) and relative humidity (%) were obtained from the Australian Bureau of Meteorology. Hourly measurements of carbon monoxide (CO), particulate matter with an aerodynamic diameter of 10 µm or less (PM_{10}), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and ozone (O_3) were collected from urban monitoring stations run by local EPA. Daily CO, PM_{10}, NO_2, and SO_2 measurements were computed as 24-h average and daily maximum 8-h average for O_3. In the final dataset with available CO and mortality data, missing data amount for 0·0, 1·3, 1·9, 3·7, 0·0, and 0·0% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

<u>Canada (24 metropolitan areas, 2000-2015)</u>

Daily mortality, obtained from Statistics Canada through access to the Canadian Mortality Database, is represented by counts of deaths for all causes. Mean daily temperature (in ˚C), computed as the 24-hour average based on hourly measurements, and relative humidity (%) were obtained from Environment Canada. A single weather station was selected for each city using the airport monitoring station located closest to the CMA center. Hourly measures of CO, NO_2, SO_2, and O_3 were collected from monitors located in urban areas of the National Air Pollution Surveillance (NAPS) network of Environment Canada, a government institution that operates ground monitoring stations across Canada. Daily CO, NO_2, and SO_2 levels were computed as the 24-h average and daily maximum 8-h average for O_3 from hourly measurements in different stations, and then averaged across stations within the same CMA with no missing data, with an average of 4 stations per city. In the final dataset with available CO and mortality data, missing data amount for 0·0, 3·7, 6·5, 0·5, and 1·2% of the CO, NO_2, SO_2, O_3, and mean temperature series, respectively.

<u>Chile (3 cities, 2004-2014)</u>

Data were collected from 4 cities in Chile during 2004-2014. Daily mortality is represented by counts of deaths for all causes (ICD-10: A00-R99). Mean daily temperature (in ˚C) was computed as the 24-h averageased on hourly measurements. The air pollution data were obtained from Chile's national system (SINCA=Sistema informatico nacional de calidad de aire). All of those stations are located in urban areas. Daily levels of CO, PM_{10}, and NO_2 were computed as the 24-h average based on hourly measurements. In the final dataset with available CO and mortality data, missing data amount for 0·0, 1·4, 27·2, and 4·4% of the CO, PM_{10}, NO_2, and mean temperature series, respectively.

<u>China (3 cities, 2013-2015)</u>

We collected mortality data from 3 Chinese cities from the Municipal Center for Disease Control. Daily mortality is represented by counts of deaths for non-external causes (ICD-9: 0-799; ICD-10: A00-R99). Mean daily temperature (in ˚C), computed as the 24-hour average from hourly measurements, and relative humidity (%) were collected from the meteorological departments of each city. Measures of CO, PM_{10}, NO_2, and SO_2 were collected from urban monitoring stations run by China National Environmental Monitoring Center. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·0, 0·0, 0·0, and 0·0% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

Finland (1 city, 1994-2014)

Data were collected from the Helsinki Metropolitan Area between 1st of January 1994 and 31st of December 2014. Daily number of deaths were obtained from Statistics Finland and are represented by counts of deaths for non-external causes (ICD-9: 0-799; ICD-10: A00-R99). A dataset containing weather variables was obtained from Helsinki Region Environmental Services Authority. Measures of SO_2, NO_2, O_3, PM_{10}, $PM_{2.5}$, and CO were extracted, from a nation-wide dataset compiled by the Finnish Meteorological Institute, for a single coordinate at Helsinki city center using GIS with kind assistance from Dr. Harri Antikainen, Unit of Geography, University of Oulu, Finland. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·0, 0·0, 0·0, and 5·0% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

Germany (12 cities, 1993-2015)

Daily mortality, obtained from the Research Data Centres of the Federation and the Federal States of Germany (Forschungsdatenzentrum der Statistischen Ämter des Bundes und der Länder), is represented by counts of deaths for all causes. Mean daily temperature (in ˚C), computed as the 24-h average based on hourly measurements, was obtained from the Climate Data Centre of the German National Meteorological Service (Deutscher Wetterdienst). Where several weather stations existed within the city boundaries, stations closest to the city centre were chosen, provided that measurements were available for the whole study period. Hourly measurements of CO, PM_{10}, NO_2 and O_3 were collected through the German Environment Agency (Umweltbundesamt) from urban background stations. Daily CO, PM_{10}, and NO_2 levels were computed as 24-h average and daily maximum 8-hour average for O_3. Measurements were obtained from multiple stations (with different numbers for each city). In the final dataset with available CO and mortality data, missing data amount for 0·0, 59·4, 5·6, 14·8, 4·9 and 0·0% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Italy (12 cities, 2013-2015)

Daily mortality, obtained from local mortality registries and from the rapid mortality surveillance system, is represented by counts of deaths for all causes (ICD-9: 0-799; ICD-10: A00-R99). Mean daily temperature (in ˚C) was computed as the 24-h average based on 6-h measurements obtained from the Meteorological Service of the Italian Air Force. A single weather station was selected for each city, using the airport monitoring station located closest to the city center. Hourly measurements of CO, PM_{10} and O_3 were obtained from the same period. Daily CO and PM_{10} levels were computed as 24-h average and daily maximum 8-hour average for O_3. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·2, 67·2 and 0·8% of the CO, PM_{10}, O_3, and mean temperature series, respectively.

Japan (6 cities, 1979-2009)

Daily mortality, obtained from computerized death certificate data from the Ministry of Health, Labour and Welfare, Japan, is represented by counts of deaths for all causes. Mean daily temperature (in ˚C) and relative humidity (in %), computed as the 24-h average based on hourly measurements, were obtained from the Japan Meteorological Agency. A single weather station located within the urban area of the city was selected. Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were collected from the urban monitors within the capital cities maintained by the Ministry of the Environment of Japan. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as 24-h average and daily maximum 8-h average for O_3. In the final dataset with available CO and mortality data, missing data amount for 0·0, 1·3, 0·0, 0·0, 56·6, and 0·0% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Portugal (2 cities, 1995-2012)

Daily mortality, obtained from Statistics Portugal, is represented by counts of deaths for non-external causes only (ICD-9: 0-799; ICD-10: A00-R99). Mean daily temperature (in ˚C) was computed as the 24-h average based on hourly measurements collected from the National Oceanic and Atmospheric Administration (NOAA). Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were gathered from the "online database of air quality" through Portuguese Environment Agency from urban monitors. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average and daily maximum 8-h average for O_3 from hourly measurements. In the final dataset with available CO and mortality data, missing data amount for 0·0, 17·4, 0·2, 0·1, 11·6, and 0·1% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Romania (7 cities, 2008-2016)

Daily mortality, obtained from the National Institute for Statistics (NIS) in Romania, is represented by counts of deaths for all causes. The mortality dataset includes the decedents with the stable residence (permanent) or normal residence (defined as the place/city where a person lived mostly in the last 12 months of his/her life) in the seven Romanian cities. Daily mean temperature and relative humidity were obtained from Romanian National Meteorological Administration (RNMA). From 2008, daily CO, PM_{10}, NO_2, and SO_2 levels were obtained from the National Monitoring and Air Quality Network (RNMCA). All invalid values have been deleted. In the final dataset with available CO and mortality data, missing data amount for 0·0, 71·9, 33·5, 29·3, and 0·0% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

South Korea (7 cities, 1999-2015)

Daily mortality was obtained from the Korea National Statistics Office and is represented by counts of deaths for all causes. Mean daily temperature (in ˚C) and relative humidity (%) were computed as the 24-h average based on hourly measurements. Measures of CO, PM_{10}, NO_2, SO_2, and O_3 were available in the period 1999-2015 from monitors of the National Institute of Environmental Research. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average and daily maximum 8-h average for O_3 from hourly measurements. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·5, 0·0, 0·0, 0·0 and 0·0% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Spain (46 cities, 2003-2014)

Daily mortality, obtained from Spain National Institute of Statistics, is represented by counts of deaths for non-external causes (ICD-9: 0-799; ICD-10: A00-R99). Mean daily temperature (in ˚C), computed as the 24-h average based on hourly measurements, and was obtained from weather stations of the Spain National Meteorology Agency. A single weather station, located within the urban area or at the near airport, was selected for each city. Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were collected from the free national repository (Magrama) from urban and suburban monitors. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as 24-h average and daily maximum 8-h average for O_3. In the final dataset with available CO and mortality data, missing data amount for 0·0, 33·2, 3·2, 2·5, 16·8, and 0·5% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Sweden (1 city, 1990-2010)

Daily mortality, obtained from the Swedish Cause of Death Register at the Swedish National Board of Health and Welfare, is represented by counts of deaths for all causes. Mean daily temperature (in °C) and relative humidity (%), computed as the 24-hour average based on hourly measurements, were obtained from the Environment and Health Administration. A single weather station, located at Torkel Knutssongatan in Central Stockholm, was selected. Hourly measurements of PM_{10}, NO_2, and O_3 were collected from the main urban background (roof-top level) monitor run by the local monitoring network, however CO was measured 3 m above the ground. Daily CO, PM_{10}, and NO_2 levels were computed as the 24-h average and for O_3 as 8-h maximum. In the final dataset with available CO and mortality data, missing data amount for 0·0, 23·1, 0·1, 4·3, and 0·3% of the CO, PM_{10}, NO_2, O_3, and mean temperature series, respectively.

Switzerland (4 cities, 1995-2013)

Daily mortality, provided by the Federal Office of Statistics (Switzerland), is represented by counts of non-external deaths other than accidents (ICD-10codes A00-R99, V01-V99, W00-X59). Mean daily temperature (in °C) and relative humidity (%), computed as the 24-h average based on hourly measurements, were obtained from the IDAWEB database (a service provided by MeteoSwiss, the Swiss Federal Office of Meteorology and Climatology). A single weather station located within or near the urban area was selected for each city. Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were provided by the Immissionsdatenbank Luft (IDB, Federal Office of the Environment, Bern, Switzerland). Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average from urban monitoring stations, and as 8h-maximum for O_3 from urban and sub-urban monitoring stations. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·9, 0·1, 37·0, 16·4, and 0·0% of the CO, PM_{10}, NO_2, SO_2, O_3, and mean temperature series, respectively.

Taiwan (3 cities, 1996-2014)

Daily mortality, obtained from the Department of Health in Taiwan, is represented by counts of deaths for all causes. Mean daily temperature (in ˚C) and relative humidity (%) were computed as the 24-h average based on hourly measurements. Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were obtained from urban monitors of the local monitoring network. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average and for O_3 as 8-

h maximum. Data were pooled from 1 meteorological station and 11 air quality monitoring stations in Kaohsiung, 2 meteorological station and 5 air quality monitoring stations in Taichung, and 3 meteorological station and 15 air quality monitoring stations in Taipei. In the final dataset with available CO and mortality data, missing data amount for 0·0, 0·0, 0·0, 0·0, 63·1, and 0·0% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

<u>Thailand (19 cities, 1999-2008)</u>

Daily data on air pollution were obtained from the Pollution Control Department, Ministry of Natural Resources and Environment for 19 cities during 1999-2008 (Air Quality and Noise Management Bureau 2010). For each city and air pollutant, daily concentration was averaged by fixed air quality monitoring stations within the city. If monitored data for an individual pollutant were insufficient to calculate a daily average, all measurements from that day were excluded for that pollutant and monitor. In the final dataset with available CO and mortality data, missing data amount for 0·0, 4·6, 5·7, 11·5, and 4·5% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

<u>United Kingdom (30 cities, 1990-2016)</u>

Daily mortality, gathered from Office for National Statistics, is represented by counts of deaths for all causes. Mean daily temperature (in ˚C) and relative humidity (in %) were obtained from the Meteorological Department obtained from British Atmospheric Data Centre. Series for each city daily mean temperatures were similarly constructed from all meteorological stations providing data for at least 75% of days. Daily CO, PM_{10}, NO_2, and SO_2 levels were obtained from the Automatic Urban and Rural Network (AURN) repository, the Welsh Air Quality Network (WAQN) archive and the King's College London (KCL) dataset. The urban and sub-urban monitoring stations, within the selected boundaries, were considered. Those classified as “Roadside/Trac”, “Industrial”, “Portable/ Mobile”, “Indoor” were excluded, due to the unrepresentative nature of the average exposure. In the final dataset with available CO and mortality data, missing data amount for 0·0, 11·5, 5·7, 5·3, and 0·0% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

<u>United States (162 cities, 1985-2006)</u>

Initially we collected data from 162 cities in the US, but six cities with less than two years of data on CO and mortality were excluded. Daily mortality is represented by counts of deaths for all causes. Mean daily temperature (in ˚C) and relative humidity (%), computed as the 24-h average based on hourly measurements, were obtained from the National Climatic Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA). Hourly measurements of CO, PM_{10}, NO_2, SO_2, and O_3 were gathered from the U.S. Environmental Protection Agency (EPA) Air Quality System (AQS), from urban and sub-urban monitoring stations. Daily CO, PM_{10}, NO_2, and SO_2 levels were computed as the 24-h average from urban monitoring stations, and as 8-h-maximum for O_3 from monitors located in the county or set of contiguous counties in which the city is located. PM_{10} and $PM_{2.5}$ were collected between 2005 and 2006, and 2004 and 2006, respectively. In the final dataset with available CO and mortality data, missing data amount for 0·0, 62·9, 29·9, 23·3, 24·8, and 0·1% of the CO, PM_{10}, NO_2, SO_2, and mean temperature series, respectively.

Text S2. Detailed information on statistical method.
We used a two-stage analytic framework to estimate the association between short-term exposure to ambient CO and daily mortality.

First-stage analysis

We applied generalized additive models with a quasi-Poisson distribution to evaluate the city-specific associations between CO and mortality.

$$Y_t \sim quasi\_Poisson(E(\mathrm{Y}_t))$$

$$\log\big(E(\mathrm{Y}_t)\big) = \beta_0 + \beta_1 CO_l + s(Time, df = 7 \times years) + factor(DOW) + ns(tempcold, k = ktempcold) + ns(temphot, k = ktemphot)$$

where Y_t is the observed death count on day *t*; $E(\mathrm{Y}_t)$ is expected daily death count on day *t*; β_0 is the intercept; β_1 represents the log-relative risk of daily mortality associated with a 1 mg/m^3 increase of CO concentration at lag day *l*; s(·) denotes a penalized cubic spline with 7 degrees of freedom (*df*) per year to control the long-term time trend and seasonal variations; *DOW* is an indicator of day of week. Temperature was adjusted by fitting separate natural spline smooth terms (*ns*) for cold temperatures (i.e., low temperatures below the median value) at lag 1–6 days and hot temperatures (i.e., high temperatures above the median value) at lag 0–1 days. *ktempcold* denotes one inner knot (*k*) at the 25th percentile for low temperatures, whereas *ktemphot* denotes two inner knots at the 75th and 90th percentiles for high temperatures.

R codes for fitting the main model were provided in Text S3, using Chicago, US as an example.

Second-stage analysis

We pooled city-specific estimates using a random-effects multilevel meta-analytical model that accounts for variations in risk across two nested groups (cities and countries). We applied restricted maximum likelihood (REML) estimator in this multilevel meta-analysis. This approach provides improved effect estimates at the city and country levels, defined as best linear unbiased prediction (BLUP).

Text S3. Example of R codes.

```
##################################################################
### Sample R code for estimating CO-mortality association ###
### Using Chicaco dataset as an example ###
##################################################################
### Load the packages
library(mgcv); library(splines); library(tsModel)

##################################
### Create variables for confounders ###
##################################
## Define time trend
data$trend <- as.numeric(data$date)
# determin the number of years data for each pollutant
nyears.co <- round(length(na.omit(data$co))/365)

## Define the hot and cold temperature
data$tempmean_lag16 <- runMean(data$tmean, 1:6)
data$tempcold_lag16 <- ((data$tempmean_lag16 - median(data$tempmean_lag16, na.rm=T))*
(data$tempmean_lag16 <= median(data$tempmean_lag16, na.rm=T)))+median(data$tempmean_lag16, na.rm=T)

data$tempmean_lag01 <- runMean(data$tmean, 0:1)
data$temphot_lag01 <- ((data$tempmean_lag01 - median(data$tempmean_lag01, na.rm=T))*
(data$tempmean_lag01 >= median(data$tempmean_lag01, na.rm=T)))+median(data$tempmean_lag01,na.rm=T)

## Define the knots for adjustment of temperature
# hot
perc.hot <- c(75/100, 90/100)
ktemphot.lag01 <- as.vector(quantile(data$temphot_lag01, perc.hot, na.rm=T))

# cold
perc.cold <- c(25/100)
ktempcold.lag16  <- as.vector(quantile(data$tempcold_lag16, perc.cold, na.rm=T))

## Define the lag structure for CO, using lag 1
data$CO.lag <- Lag(data$co, 1)

####################################
#### Model parameters definition #######
####################################
# Df per year for time trend
dfperyear <- 7

# Model Formula
formula <- all ~ CO.lag + s(trend, k=dfperyear*nyears.co+1,fx=T, bs="cr")+ dow +
  ns(tempcold_lag16,k=ktempcold.lag16) + ns(temphot_lag01,k=ktemphot.lag01)

###################
### Run the model ###
###################
model <- gam(formula, data, family=quasipoisson, na.action="na.exclude")
summary(model)

#get the coef
coeff<-as.data.frame(model$coeff)
p<-which(row.names(coeff)=="CO.lag")
```

```
est.co <- coeff[p,1]

#get the SE
cov<-summary(model)$cov.scaled
index<-which(row.names(cov)=="CO.lag")
var1<-cov[index,index]
se.co <- sqrt(var1)

#set unit increment to be 1 mg/m3
unit <- 1

#calculation of percent changes per unit increment (95% CI)
Pincrease <- (exp(est.co*unit)-1)*100
Plow <- (exp((est.co-1.96*se.co)*unit)-1)*100
Phigh <- (exp((est.co+1.96*se.co)*unit)-1)*100

#print results
paste0(sprintf("%.2f", round(Pincrease,2)), " (",  sprintf("%.2f", round(Plow,2)), ", ",  sprintf("%.2f",
round(Phigh,2)), ")")
```

Table S1. Summary statistics of country-specific daily air pollution.

	Cities (N)	Period	PM_{10} (μg/m^3) Median (IQR)	NO_2 (μg/m^3) Median (IQR)	SO_2 (μg/m^3) Median (IQR)	O_3 (μg/m^3) Median (IQR)
Australia	2	2000-2009	17·3 (14·1; 21·5)	17·3 (11·7; 24·6)	3·1 (2·3; 5·7)	33·3 (26·8; 40·5)
Canada	24	2000-2015	NA	20·9 (13·1; 31·2)	2·8 (1·0; 6·8)	70·6 (56·8; 86·2)
Chile	3	2004-2014	47·8 (31·1; 72·1)	20·8 (10·4; 34·6)	NA	NA
China	3	2013-2015	70·5 (47·1; 106·9)	81·4 (61·7; 109·0)	37·4 (25·5; 56·6)	NA
Finland	1	1994-2014	14·7 (8·9; 25·5)	6·8 (4·3; 11·7)	6·2 (3·5; 11·6)	NA
Germany	12	1993-2015	21·7 (15·4; 31·2)	32·1 (23·4; 42·1)	5·1 (3·0; 9·3)	55·5 (33·5; 78·2)
Italy	12	2013-2015	23·0 (17·0; 32·3)	NA	NA	81·3 (58·8; 101·8)
Japan	6	1979-2009	32·9 (20·8; 50·2)	24·5 (17; 33·0)	5·3 (3·7; 8·1)	63·7 (45·3; 85·7)
Portugal	2	1995-2012	27·2 (18·5; 41·1)	26·8 (17·4; 38·9)	2·9 (1·0; 5·7)	64·5 (50; 79·8)
Romania	7	2008-2016	29·5 (20·7; 42·0)	23·8 (16·3; 35·6)	6·4 (4·0; 10·8)	NA
South Korea	7	1999-2015	45·8 (33·2; 63·2)	42·7 (31·2; 57·8)	13·9 (10·0; 19·2)	59·9 (42·6; 82·0)
Spain	45	2003-2014	25·3 (18·4; 34·8)	27·6 (19·1; 37·2)	5·0 (3·2; 7·1)	67·9 (51·7; 84·2)
Sweden	1	1990-2010	12·6 (9·3; 18·1)	26·9 (20·1; 34·8)	NA	61·9 (49·0; 76·0)
Switzerland	4	1995-2013	24·4 (16·1; 36·0)	41·2 (30·1; 51·8)	4·0 (1·9; 8·0)	73·6 (47·2; 101·0)
Taiwan	3	1996-2014	53·7 (37·2; 81·0)	41·4 (30·7; 53·6)	11·7 (7·8; 17·8)	106·3 (80·8; 139·4)
Thailand	19	1999-2008	42·5 (30·2; 63·0)	22·0 (13·9; 33·2)	8·3 (4·4; 13·5)	NA
UK	30	1990-2016	20·9 (15·5; 28·9)	31·4 (21·3; 43·4)	5·6 (3·0; 10·9)	NA
USA	156	1985-2006	24·6 (16·7; 35·9)	32·1 (21·3; 45·4)	10·3 (4·5; 20·0)	76·3 (53·7; 102·9)

IQR: Interquartile range

Table S2. Summary statistics of the city-specific data deaths, air pollutants, and temperature.

City	Country	Period	Deaths	CO (mg/m^3)			PM_{10} (µg/m^3) Median (IQR)	NO_2 (µg/m^3) Median (IQR)	SO_2 (µg/m^3) Median (IQR)	O_3 (µg/m^3) Median (IQR)	Temperature (°C) Median (IQR)
				1st percentile	Median (IQR)	99th percentile					
Brisbane	Australia	2000-2009	89,299	0·05	0·39 (0·21; 0·69)	1·74	17·2 (14·6; 20·5)	12·9 (9·5; 17·9)	3·8 (2·8; 5·8)	35·1 (29; 41·6)	20·8 (17·1; 23·5)
Melbourne	Australia	2000-2009	190,111	0	0·38 (0·25; 0·62)	2	17·5 (13·6; 23·3)	24·6 (16·4; 30·8)	2·9 (0; 5·7)	31·2 (23·8; 38·9)	15·5 (12·3; 19·1)
Abbotsford	Canada	2000-2015	33,727	0·12	0·31 (0·23; 0·41)	0·87	NA	18·5 (13·6; 24)	0·5 (0·1; 1·4)	66·6 (51; 80·4)	10·4 (6·1; 15·8)
Calgary	Canada	2000-2015	97,707	0·08	0·36 (0·26; 0·5)	1·34	NA	32·1 (21·7; 45·2)	3·6 (2·1; 5·7)	78·4 (64·7; 94·1)	5·6 (-1·6; 13)
Edmonton	Canada	2000-2015	111,674	0·11	0·33 (0·25; 0·46)	1·35	NA	28·3 (18·8; 41·9)	3 (1·7; 5·3)	74·5 (58·8; 92·1)	4·4 (-5; 13·1)
Halifax	Canada	2000-2015	34,656	0	0·33 (0·18; 0·55)	1·28	NA	24·3 (17·7; 32)	9·7 (3·6; 20·9)	58·8 (47; 70·6)	8·1 (0·3; 15·9)
Hamilton	Canada	2000-2015	65,403	0	0·32 (0·23; 0·52)	1·32	NA	24·8 (16·3; 35·7)	7·5 (3·4; 15·3)	76·4 (60·8; 98)	9 (0·6; 17·5)
Kingston	Canada	2007-2010	5,461	0·12	0·23 (0·19; 0·25)	0·43	NA	8·3 (6; 11·8)	1·3 (0·2; 2·6)	78·4 (66·6; 100)	8·5 (0·1; 17·2)
Kitchener-Waterloo	Canada	2000-2003	10,701	0	0·45 (0·32; 0·62)	1·28	NA	23·3 (15·7; 32·6)	6·6 (3·7; 10·7)	74·5 (58·8; 100)	8·1 (-0·6; 16·8)
London Ontario	Canada	2000-2010	36,714	0	0·2 (0·11; 0·31)	1·41	NA	21·5 (14·6; 31·9)	4·1 (2·2; 7·9)	72·5 (54·9; 94·1)	8·5 (-0·4; 17·4)
Montreal	Canada	2000-2015	238,738	0·12	0·33 (0·26; 0·43)	1·02	NA	23 (16·4; 32·5)	4·8 (2·4; 8·8)	76·4 (62·7; 94·1)	8·4 (-1·4; 17·9)
Oakville	Canada	2000-2004	10,984	0	0·54 (0·39; 0·72)	1·3	NA	27·5 (19·4; 36·5)	7·2 (3·6; 13·1)	74·5 (56·8; 98)	10·9 (2·3; 19)
Ottawa	Canada	2000-2015	102,121	0·12	0·35 (0·25; 0·52)	1·21	NA	16·4 (9; 29·1)	2·1 (0·2; 5·3)	70·6 (56·8; 86·2)	7·9 (-2·1; 17·3)
Regina	Canada	2000-2013	24,043	0·06	0·35 (0·25; 0·55)	1·32	NA	19·4 (14·1; 26·7)	0·9 (0·1; 2·5)	52·9 (39·2; 68·6)	4·5 (-6·9; 14·4)
Sarnia	Canada	2000-2002	3,429	0	0·29 (0; 0·45)	0·82	NA	30·2 (21·5; 40·8)	14 (6·7; 35·7)	77·4 (60·8; 103·9)	9·1 (0·9; 17·9)
Sudbury	Canada	2000-2004	7,527	0	0·31 (0·17; 0·54)	1·34	NA	13·2 (8·7; 19·3)	3·7 (1·1; 9·9)	74·5 (62·7; 90·2)	4·7 (-5·5; 14·8)
Saint John NB	Canada	2000-2015	24,811	0	0·3 (0·19; 0·59)	1·19	NA	8·8 (5·2; 14·5)	3·9 (1·5; 9·3)	72·5 (60·8; 84·3)	6·7 (-1·4; 14·1)
St· John's NFL	Canada	2000-2015	35,216	0	0·29 (0·2; 0·43)	1·81	NA	11·4 (6·7; 17·5)	2·6 (0·7; 5·6)	68·6 (56·8; 76·4)	5·6 (-0·3; 12·7)
Sault Ste· Marie	Canada	2004-2008	6,074	0·12	0·3 (0·22; 0·46)	0·83	NA	8·1 (5·2; 12·2)	2·5 (0·5; 5)	74·5 (60·8; 92·1)	6·1 (-3·6; 14·8)
Saskatoon	Canada	2000-2015	29,670	0	0·26 (0·18; 0·35)	0·77	NA	17·2 (11·7; 25·5)	0·4 (0; 1·8)	62·7 (51; 76·4)	5·2 (-6·8; 14·5)
Thunder Bay	Canada	2000-2003	5,441	0	0·63 (0·41; 0·93)	1·77	NA	20·4 (14·4; 28·6)	0·4 (0; 1·7)	72·5 (60·8; 86·2)	4·1 (-5·8; 13·5)
Toronto	Canada	2000-2015	466,006	0·09	0·33 (0·25; 0·56)	2·12	NA	31·2 (22·9; 42)	3·5 (1·7; 7·3)	80·4 (64·7; 101·9)	9·4 (1·2; 18·2)
Victoria	Canada	2000-2015	38,570	0	0·36 (0·23; 0·57)	1·35	NA	14·6 (9·9; 20·1)	1·8 (1·1; 2·8)	70·6 (56·8; 84·3)	10·4 (7; 15·1)
Vancouver	Canada	2000-2015	218,203	0·15	0·36 (0·25; 0·5)	1·18	NA	26·8 (20·9; 33·4)	3·6 (2·1; 5·9)	72·5 (62·7; 84·3)	10·4 (6·5; 15·7)
Windsor	Canada	2000-2015	45,309	0·03	0·29 (0·23; 0·4)	1·3	NA	27·8 (20·1; 37·5)	9 (4; 16·5)	76·4 (56·8; 101·9)	10·5 (1·4; 19·5)
Winnipeg	Canada	2000-2015	106,940	0·09	0·34 (0·23; 0·51)	1	NA	16·6 (10·8; 24·9)	0 (0; 0·8)	64·7 (52·9; 80·4)	5·7 (-7·2; 16·1)
Beijing	China	2013-2015	85,071	0·31	1·07 (0·71; 1·72)	5·76	97·7 (61·3; 148)	86·4 (66; 119)	28 (13·9; 66·5)	NA	15·9 (3·6; 23·9)
Guangzhou	China	2013-2015	46,786	0·66	1·05 (0·92; 1·23)	2·16	59·8 (42·4; 84·6)	79·5 (62·7; 105)	39·7 (29·6; 54·2)	NA	23·7 (17·6; 27·3)
Shanghai	China	2013-2015	114,389	0·39	0·76 (0·62; 0·97)	1·83	64·7 (47·5; 97·5)	77 (57·5; 102·4)	38·5 (30·2; 55·9)	NA	18·4 (9·6; 24)
Santiago	Chile	2008-2014	250,724	0·11	0·51 (0·32; 1·09)	3·22	63·3 (48·1; 87·9)	35·7 (24·5; 53·1)	NA	NA	15·2 (10·9; 20·2)
Temuco	Chile	2004-2012	11,067	0	0·67 (0·35; 1·23)	4·43	35·4 (22·9; 70·3)	9·2 (4·9; 15·3)	NA	NA	11·1 (8·6; 14·3)
Valparaiso	Chile	2004-2009	20,441	0·13	0·54 (0·38; 0·83)	2·8	38 (29·3; 50·3)	20 (12·5; 28·8)	NA	NA	14·4 (12·5; 16·9)
Helsinki	Finland	1994-2014	153,308	0·11	0·25 (0·19; 0·35)	0·95	14·7 (8·9; 25·5)	6·8 (4·3; 11·7)	6·2 (3·5; 11·6)	NA	5·9 (0; 13·8)
Berlin	Germany	1993-2008	487,634	0	0·39 (0·28; 0·54)	1·4	22·4 (16·6; 32·4)	28·6 (21·8; 35·9)	5·7 (2·9; 11·4)	52·1 (31·5; 77·8)	10·3 (4·2; 16·5)
Bremen	Germany	1993-2009	94,759	0·05	0·38 (0·27; 0·57)	1·44	18·4 (14·1; 24·3)	23·6 (16·9; 31·5)	3·6 (2·7; 6)	53 (34·3; 73·1)	9·7 (4·7; 14·7)
Dresden	Germany	1993-2002	48,964	0	0·2 (0·12; 0·38)	1·58	NA	31·3 (24·2; 39·3)	8 (3·5; 20·3)	60·2 (40·2; 83·5)	10·2 (3·7; 16)
Dortmund	Germany	1993-2002	63,230	0·2	0·69 (0·37; 1)	2·46	NA	34·8 (26·2; 43·7)	6·7 (5·2; 10·7)	48·6 (28·6; 70·5)	10·5 (5·6; 15·2)
Duesseldorf	Germany	1993-1999	47,940	0	0·52 (0·33; 0·78)	1·67	NA	34·5 (25·3; 44·5)	8·1 (5·9; 12·9)	51·2 (27·2; 72·4)	10·8 (5·6; 15·7)
Frankfurt	Germany	1993-2008	110,565	0·18	0·52 (0·37; 0·75)	2·04	24·7 (17·4; 34·4)	44 (33·9; 53·6)	5·1 (3·3; 8·9)	50·1 (24·8; 75·9)	11·1 (5·2; 16·8)
Hamburg	Germany	1993-2012	365,462	0·1	0·38 (0·26; 0·56)	1·23	23·9 (17·5; 33·2)	31·3 (23·4; 40·2)	5·1 (2·7; 10)	53·1 (32·4; 71·9)	10·1 (4·7; 15·2)
Hannover	Germany	1993-2007	176,972	0·3	0·35 (0·3; 0·5)	1·34	22·8 (16·1; 32·6)	26·6 (18·9; 34·8)	4·5 (3; 8·7)	60·6 (41·1; 80·2)	10·2 (4·7; 15·3)
Koeln	Germany	1993-1999	67,648	0	0·54 (0·31; 0·88)	2·01	NA	35·8 (27·1; 45)	7·8 (5·7; 12·5)	52·5 (28; 75·4)	10·7 (5·3; 15·5)

City	Country	Period	Deaths	CO (mg/m^3)			PM$_{10}$ (μg/m^3) Median (IQR)	NO$_2$ (μg/m^3) Median (IQR)	SO$_2$ (μg/m^3) Median (IQR)	O$_3$ (μg/m^3) Median (IQR)	Temperature (°C) Median (IQR)
				1st percentile	Median (IQR)	99th percentile					
Leipzig	Germany	1994-2001	45,109	0·09	0·27 (0·12; 0·5)	1·52	NA	23·6 (17·7; 31·6)	4·5 (2·2; 10·3)	62·6 (41·6; 83·2)	10·3 (4·2; 16·1)
Muenchen	Germany	1993-2015	289,093	0·16	0·45 (0·3; 0·73)	2·2	20·6 (13·8; 30·8)	36·5 (28·2; 46·2)	3·3 (2·3; 5·9)	59·9 (35·9; 83·4)	10·3 (3·9; 16·2)
Stuttgart	Germany	1993-2010	100,328	0·05	0·3 (0·18; 0·48)	1·56	20 (14; 29)	34·6 (26·1; 44·2)	4 (2·4; 6·7)	59·1 (33·6; 86·1)	10·8 (4·9; 16·5)
Bari	Italy	2013-2015	6,299	0·15	0·66 (0·54; 0·83)	1·65	22·9 (17·8; 29·7)	NA	NA	NA	16·7 (11·2; 22·1)
Civitavecchia	Italy	2013-2015	1,245	0·14	0·28 (0·23; 0·36)	0·96	21 (15·5; 26·5)	NA	NA	NA	17·6 (12·7; 22·5)
Florence	Italy	2013-2015	11,263	0·1	0·77 (0·5; 1·13)	2·13	21·1 (16·8; 29)	NA	NA	NA	15·5 (10·3; 21·1)
Frosinone	Italy	2013-2015	1,076	0·13	0·3 (0·23; 0·53)	1·55	26 (19; 49)	NA	NA	86·5 (64·2; 108·4)	15·8 (9·3; 21·7)
Genoa	Italy	2013-2015	22,657	0·15	0·39 (0·29; 0·52)	1·08	21·4 (16·6; 27·1)	NA	NA	NA	16·2 (11·8; 21·5)
Latina	Italy	2013-2015	2,619	0·13	0·36 (0·26; 0·62)	1·48	23·3 (18; 30·7)	NA	NA	86·8 (68·5; 101·2)	17·2 (11·6; 22·7)
Milan	Italy	2013-2015	33,986	0·65	1·13 (0·88; 1·41)	2·52	30·7 (21·4; 47)	NA	NA	NA	14·5 (7·4; 20·6)
Naples	Italy	2013-2015	27,434	0·51	1·18 (0·95; 1·48)	2·66	26·6 (20·3; 36·7)	NA	NA	NA	17·2 (12·1; 22·9)
Rieti	Italy	2013-2015	1,270	0·11	0·29 (0·22; 0·49)	1·35	17 (12; 26)	NA	NA	75·5 (51·2; 98·5)	17·5 (10·5; 23)
Rome	Italy	2013-2015	71,948	0·25	0·51 (0·41; 0·71)	1·35	24·1 (19; 32)	NA	NA	77 (47·8; 97·7)	15·9 (10·2; 21·6)
Trieste	Italy	2013-2015	7,620	0·21	0·44 (0·34; 0·58)	1·27	19·7 (13·3; 28·7)	NA	NA	NA	15·3 (9·9; 20·7)
Turin	Italy	2013-2015	25,077	0·74	1·26 (1·04; 1·61)	2·69	28·3 (18·2; 50·1)	NA	NA	NA	13·2 (6·2; 19·2)
Kitakyushu	Japan	1983-2009	207,500	0·18	0·59 (0·45; 0·75)	1·29	29·9 (20·7; 43·5)	19·1 (14·1; 25)	4·3 (3·3; 5·5)	70·2 (52·8; 88·9)	17·2 (10·1; 23·4)
Nagoya	Japan	1979-2009	415,929	0·14	0·91 (0·58; 1·34)	2·87	40·2 (26·9; 57·9)	26·2 (20·2; 33·3)	6·2 (4·1; 9)	63·8 (44·6; 87·4)	16·3 (8; 23)
Osaka	Japan	1979-2009	615,227	0·28	0·77 (0·57; 1·08)	2·63	38·5 (25·8; 56·4)	31·6 (24·1; 39·9)	7·3 (4·7; 10·8)	71·1 (52·4; 95·5)	17·3 (9·2; 24)
Sendai	Japan	1984-1997	51,537	0·2	0·57 (0·45; 0·75)	1·5	24·7 (17·8; 35·4)	12·7 (9·3; 17·3)	4·6 (3·7; 5·7)	NA	12·4 (5; 18·8)
Sapporo	Japan	1992-2009	184,313	0·14	0·46 (0·35; 0·59)	1·31	13·1 (9·4; 18·5)	17·8 (13·3; 24·5)	3·9 (2·9; 5·2)	58·4 (44·6; 75·2)	9·8 (0·4; 17·5)
Tokyo	Japan	1979-2009	1,637,796	0·29	0·77 (0·56; 1·14)	3·04	40·2 (27·5; 59·9)	30·3 (23·4; 38·2)	6·7 (3·9; 11)	57·9 (38·8; 80·9)	16·5 (9·2; 22·6)
Busan	South Korea	1999-2015	322,873	0·26	0·52 (0·41; 0·7)	1·73	47·9 (36·3; 64·5)	40 (30·5; 51·7)	16·2 (12·4; 21·4)	64·5 (49·9; 82·7)	16 (8·3; 21·6)
Daegu	South Korea	1999-2015	197,978	0·25	0·64 (0·49; 0·85)	1·8	48 (35; 64·9)	42·4 (31·4; 56·9)	12·8 (9·3; 18·6)	61·3 (43·8; 87·4)	15·8 (6·3; 22·8)
Daejeon	South Korea	1999-2015	102,238	0·28	0·66 (0·49; 0·95)	2·29	40·9 (28·7; 56·8)	36 (26·5; 49·8)	10·7 (7·3; 15·7)	59·2 (40·4; 84)	14·5 (4·5; 22·2)
Gwangju	South Korea	1999-2015	104,678	0·21	0·59 (0·47; 0·78)	1·66	41·2 (29·8; 56·9)	36·2 (27·1; 48·3)	9·8 (7·4; 12·9)	60·8 (43; 84·2)	15·4 (6; 22·6)
Incheon	South Korea	1999-2015	195,684	0·34	0·66 (0·54; 0·84)	1·68	50 (36; 68·2)	49·7 (37·2; 65·5)	17·5 (14; 22·3)	57·1 (40·7; 78·5)	14 (4·3; 21·6)
Seoul	South Korea	1999-2015	666,658	0·31	0·65 (0·51; 0·89)	1·92	49·9 (34·1; 71·3)	64·6 (49·6; 83)	12·9 (10·1; 17)	49·6 (31·5; 72·9)	14·4 (4; 22·3)
Ulsan	South Korea	1999-2015	71,450	0·27	0·57 (0·45; 0·74)	1·41	43·8 (33·2; 58·3)	36·9 (28·7; 47·2)	17·2 (12·8; 23·2)	64·2 (49·6; 83·9)	15·5 (7; 21·6)
Lisboa	Portugal	1995-2012	380,393	0·01	0·23 (0·16; 0·33)	0·96	24·4 (17·1; 35·5)	28·2 (17·9; 41·8)	1·3 (0·6; 3·3)	66·8 (52·2; 82·2)	17·1 (13·4; 20·9)
Porto	Portugal	1999-2011	178,754	0·11	0·33 (0·25; 0·47)	1·16	30·9 (20·2; 47·5)	25·2 (16·8; 35·2)	5 (3·4; 7·9)	62·2 (48·3; 77·2)	15·2 (11·8; 18·5)
Bucharest	Romania	2008-2016	143,969	0·01	0·57 (0·2; 1·71)	3·51	31 (21; 44)	21·8 (13·4; 33)	9·2 (5·7; 14·8)	NA	12·7 (5; 20·4)
Brasov	Romania	2008-2016	14,693	0·06	0·28 (0·17; 0·57)	2·78	NA	43·8 (31; 58·1)	4·6 (3·6; 6)	NA	9·3 (1·4; 16·8)
Constanta	Romania	2008-2016	21,134	0·01	0·06 (0·04; 0·1)	0·45	NA	24·8 (16·7; 34·9)	6·3 (4·9; 8·8)	NA	13·4 (6·6; 21)
Craiova	Romania	2009-2016	11,812	0·03	0·16 (0·09; 0·35)	1·93	23·7 (14·9; 35·4)	21·3 (15·8; 30)	11·2 (8; 14·9)	NA	12·5 (5·5; 20·2)
Galati	Romania	2008-2016	15,572	0·02	0·1 (0·06; 0·15)	0·73	NA	13·1 (7·9; 20·5)	2·6 (1·8; 3·8)	NA	13·9 (5·3; 21·3)
Iasi	Romania	2008-2016	13,426	0·05	0·27 (0·15; 0·48)	1·71	NA	23·1 (18·1; 30·4)	4·6 (3·6; 5·9)	NA	11·2 (3·8; 19·7)
Timisoara	Romania	2008-2016	21,408	0·02	0·18 (0·09; 0·33)	1·2	30·2 (21·6; 42)	25·1 (19·1; 34·5)	10·2 (6·6; 14·7)	NA	12·5 (5·9; 19·3)
A Coruna	Spain	2008-2014	15,573	0·03	0·16 (0·11; 0·24)	0·81	24·9 (19·5; 31·9)	25·2 (17·5; 35·5)	4·1 (2·5; 6·2)	57·8 (35·9; 75·1)	15·1 (12·2; 18·4)
Albacete	Spain	2003-2014	11,773	0·05	0·23 (0·16; 0·32)	0·76	37·5 (28·2; 49·1)	13·2 (8·8; 19·3)	2·8 (2; 4·5)	85·4 (64·4; 103·1)	14·6 (8·5; 22·3)
Alicante	Spain	2003-2013	26,780	0·09	0·25 (0·19; 0·35)	0·75	19 (14·6; 22·9)	29·6 (23·9; 36·5)	4·1 (3·4; 4·9)	76·1 (61·1; 88·1)	18·5 (13·6; 23·8)
Almeria	Spain	2006-2014	8,910	0·13	0·32 (0·25; 0·39)	0·67	23·5 (19·2; 29·6)	21·4 (16·1; 27·8)	7·2 (6·8; 8)	79·7 (67·8; 92·1)	18·6 (14·6; 23·7)
Avila	Spain	2003-2008	2,437	0·23	0·73 (0·54; 1·05)	1·88	21·4 (17·7; 25·6)	21·3 (16·6; 26·5)	4 (2·3; 5)	69·1 (59·1; 82)	10·8 (5·8; 17·9)
Badajoz	Spain	2003-2014	10,748	0	0·1 (0·04; 0·42)	1·61	47·5 (14·7; 100·2)	8 (4·8; 11·8)	2·3 (1·2; 3·7)	51·5 (36; 67·2)	16·8 (11·5; 23·2)
Bilbao	Spain	2003-2014	40,897	0·16	0·32 (0·26; 0·38)	0·71	35·5 (30·5; 42)	35·9 (28·2; 44·7)	7·6 (6·2; 9·5)	56·8 (42·3; 68·5)	15·4 (11; 19·4)

City	Country	Period	Deaths	CO (mg/m^3)			PM$_{10}$ (µg/m^3) Median (IQR)	NO$_2$ (µg/m^3) Median (IQR)	SO$_2$ (µg/m^3) Median (IQR)	O$_3$ (µg/m^3) Median (IQR)	Temperature (°C) Median (IQR)
				1st percentile	Median (IQR)	99th percentile					
Barcelona	Spain	2003-2014	183,810	0·25	0·44 (0·37; 0·52)	0·83	28·7 (21; 40·1)	44·3 (34·6; 55·1)	2·7 (2; 3·7)	60·2 (40·6; 75·3)	16·6 (11·7; 22·5)
Burgos	Spain	2003-2014	12,504	0·24	0·44 (0·37; 0·54)	0·85	27 (21·9; 33·2)	23·8 (18·1; 31·3)	5·2 (4; 6·4)	74·1 (58·5; 91·4)	11·2 (5·6; 16·9)
Cadiz	Spain	2008-2014	8,256	0·1	0·48 (0·34; 0·63)	1	29·5 (23·3; 35·4)	16·9 (11·5; 23·9)	6·5 (5·1; 8·3)	81·5 (66·6; 94·4)	18·2 (14·6; 23)
Caceres	Spain	2003-2014	7,018	0	0·12 (0·07; 0·36)	1·43	52·9 (19; 86)	10·1 (5·8; 16·3)	2·6 (1·5; 4·6)	64·1 (56·3; 72·1)	15·9 (10·4; 22·8)
Cordoba	Spain	2003-2014	28,674	0·27	0·49 (0·42; 0·57)	0·81	42·9 (36·2; 50·9)	29·6 (25·2; 34·7)	7·4 (6·6; 8·3)	76·8 (64·1; 89·1)	17·8 (12; 24·8)
Castellon	Spain	2003-2014	12,143	0·19	0·37 (0·32; 0·44)	0·64	32 (26·7; 38·3)	40·4 (34·5; 47·6)	5·9 (4·8; 7·1)	63·6 (55·2; 71·3)	17·1 (12·8; 22·7)
Guadalajara	Spain	2003-2014	5,682	0·06	0·34 (0·2; 0·5)	1·16	23·2 (15·2; 33·6)	25·6 (16·3; 36·7)	4·5 (2·8; 7)	83·2 (58·1; 107·5)	12·5 (7·1; 19·9)
Girona	Spain	2005-2014	5,382	0·21	0·34 (0·29; 0·42)	0·69	NA	32 (28·2; 36·3)	2·7 (2·1; 3·5)	NA	14·5 (9·4; 20·6)
Granada	Spain	2003-2014	25,481	0·33	0·56 (0·47; 0·68)	1·17	34 (25·1; 44·3)	38·6 (30·4; 47·6)	9·6 (8·4; 11·2)	72 (56·5; 85·8)	15 (9·2; 22·3)
Huesca	Spain	2003-2012	3,350	0·05	0·33 (0·18; 0·52)	1·17	18 (12·6; 23·6)	19 (13·6; 27·8)	3·1 (2; 4·5)	83·2 (61·8; 101·5)	14 (8·4; 20·6)
Jaen	Spain	2003-2014	8,876	0·1	0·3 (0·24; 0·37)	0·7	36·1 (24·9; 50·8)	17·7 (13; 24·5)	5·3 (4·5; 6·4)	88·9 (69·1; 106·9)	16·4 (10·8; 23·8)
Leon	Spain	2003-2014	15,454	0·22	0·53 (0·39; 0·73)	1·47	22·8 (17·1; 30·2)	27·1 (20·6; 36·3)	5·8 (3; 9·6)	61·1 (43·7; 77·8)	10·6 (5·4; 16·8)
Logrono	Spain	2003-2014	13,285	0·04	0·51 (0·38; 0·71)	1·99	23·7 (18; 32·1)	11·7 (6·1; 21·5)	3·1 (2·2; 4·6)	NA	14 (8·6; 20)
Lleida	Spain	2003-2014	12,036	0·2	0·28 (0·21; 0·41)	0·86	NA	25·5 (17·9; 34·3)	1·9 (1·1; 3·3)	71·2 (43·1; 92·1)	15·7 (9; 22·2)
Lugo	Spain	2008-2014	5,515	0·1	0·22 (0·11; 0·35)	0·73	20·4 (15·3; 24·9)	22·3 (18·8; 26)	5 (3·9; 6·9)	62·6 (48; 77·3)	12 (8·1; 16·8)
Malaga	Spain	2003-2014	51,981	0·34	0·49 (0·44; 0·55)	0·74	24·7 (20·9; 29·9)	31·9 (26·4; 37·6)	8·2 (7·1; 9·4)	78·4 (66·5; 89·4)	18·6 (14·3; 23·8)
Madrid	Spain	2003-2014	311,612	0·21	0·4 (0·31; 0·54)	1·22	24·7 (17; 34·9)	44·2 (34·4; 56·5)	8·3 (6·3; 10·9)	58 (38·2; 77·1)	14·5 (8·8; 22·2)
Murcia	Spain	2003-2014	23,530	0·1	0·35 (0·25; 0·6)	1·87	21·4 (17·7; 25·7)	43·3 (38·2; 49·4)	6·6 (5·8; 7·3)	81·1 (55·9; 98·8)	19·7 (13·9; 25·6)
Ourense	Spain	2008-2014	6,856	0	0·16 (0·11; 0·3)	0·94	14 (10·5; 19·6)	28·5 (20·8; 37·4)	2·9 (1·6; 4·5)	63·8 (46·1; 79·7)	15·2 (10·6; 20·2)
Oviedo	Spain	2003-2014	25,094	0·21	0·4 (0·33; 0·5)	0·79	29·3 (21·6; 40·8)	28·6 (21·6; 38·7)	11·4 (6·9; 18·9)	61·1 (46·9; 73·2)	13·6 (9·5; 17·5)
Palmas G· Canaria	Spain	2004-2014	26,086	0·1	0·27 (0·2; 0·31)	0·55	23·9 (17·7; 31·8)	21·8 (15·8; 29·8)	5·6 (4·4; 7)	49·7 (40·6; 60·8)	21·3 (19; 23·8)
Palma Mallorca	Spain	2003-2014	32,238	0·1	0·31 (0·22; 0·46)	0·93	21·5 (16·5; 27·2)	26·1 (20·2; 32·6)	2·6 (2; 4)	69·4 (56·9; 81·2)	16·8 (11·8; 22·6)
Palencia	Spain	2004-2012	3,096	0·14	0·46 (0·37; 0·56)	1·05	26·6 (23; 30·8)	26·7 (21·6; 32·2)	4·3 (3·6; 5·3)	69 (60·5; 79)	11·3 (5·8; 18)
Pontevedra	Spain	2009-2014	3,797	0·05	0·19 (0·13; 0·29)	1·01	18·4 (13·7; 25)	20·7 (14·3; 30)	2·1 (1·2; 4·1)	NA	14·6 (10·8; 18·5)
Segovia	Spain	2003-2008	2,772	0·11	0·54 (0·3; 0·94)	1·82	20·3 (15·3; 26·2)	28·7 (23·7; 34·3)	3·3 (2·4; 4·7)	73·1 (62·7; 83)	12·1 (6·6; 19)
Salamanca	Spain	2003-2013	13,488	0·32	0·57 (0·44; 0·74)	1·25	20·3 (16·1; 26·2)	31·6 (26·1; 38·5)	7·4 (5·7; 9·5)	61·9 (48·5; 75·7)	12·6 (7; 18·9)
San Sebastian	Spain	2003-2014	18,524	0·11	0·26 (0·2; 0·33)	0·67	23 (17·5; 30·2)	27·8 (20·8; 37·3)	4·5 (3·9; 5·2)	57·1 (43·5; 70·5)	14·2 (9·9; 18)
Santander	Spain	2003-2014	19,483	0·15	0·39 (0·29; 0·52)	1·04	26·4 (20·7; 33·8)	27·2 (21·5; 34·3)	3·9 (2·6; 5·4)	53·1 (40·9; 65·7)	15 (11; 18·8)
Sevilla	Spain	2003-2014	69,687	0·26	0·49 (0·38; 0·64)	1·13	37·9 (30·4; 47·1)	31·8 (24·3; 40·5)	5·1 (4·5; 5·9)	76·7 (53·9; 96·1)	19·2 (13·8; 25·7)
Teruel	Spain	2003-2014	2,841	0·1	0·31 (0·21; 0·48)	0·85	18·4 (13·3; 27·5)	14·5 (9·9; 20·9)	4·2 (2·7; 5·9)	82 (64·9; 97·9)	12·6 (6·5; 19·2)
Tenerife	Spain	2010-2014	7,884	0·1	0·24 (0·2; 0·32)	0·66	15·7 (11·8; 21·9)	17·9 (12·2; 25·7)	9·4 (7·4; 11·8)	74 (63·6; 84·1)	21·8 (19·2; 24·4)
Toledo	Spain	2003-2014	5,741	0·18	0·34 (0·29; 0·41)	0·73	34 (29·2; 39·9)	24·7 (20·8; 29·6)	4·7 (4; 5·5)	84·3 (70·7; 96·4)	15·3 (9·4; 23)
Tarragona	Spain	2003-2014	10,225	0·2	0·32 (0·28; 0·39)	0·64	NA	25 (17·9; 33·5)	2·4 (1·5; 4·4)	77·9 (54·5; 93·6)	18 (12·5; 24)
Vitoria	Spain	2003-2014	17,787	0·14	0·28 (0·22; 0·37)	0·9	20·4 (13·9; 29·7)	27·2 (19·8; 36·2)	5·7 (5; 6·6)	65·8 (50; 81·1)	11·8 (7; 16·7)
Valladolid	Spain	2003-2014	31,999	0·19	0·33 (0·28; 0·41)	0·8	17·7 (12·5; 23·9)	28·4 (21·5; 36·7)	5·2 (4·6; 5·7)	74·5 (54·3; 91·8)	12·5 (6·8; 19·2)
Valencia	Spain	2003-2014	84,131	0·2	0·41 (0·34; 0·5)	0·92	24·2 (18; 32)	38·5 (29·7; 48·8)	4·1 (3·5; 5)	60·1 (43·7; 71·3)	18·4 (13·8; 23·7)
Zamora	Spain	2003-2013	4,460	0·18	0·53 (0·4; 0·66)	1·16	22·6 (19·5; 26·5)	28·5 (24·6; 33)	3·8 (2·8; 4·8)	69·5 (59·2; 79·1)	13·2 (7·7; 19·8)
Zaragoza	Spain	2003-2014	68,798	0·1	0·3 (0·21; 0·47)	0·94	27·4 (18·6; 39·5)	40·9 (32·7; 49·4)	5·5 (4·5; 8·5)	49 (30·6; 63·9)	15·9 (9·8; 22·5)
Bern	Switzerland	1995-2013	27,992	0·3	0·8 (0·5; 1·3)	3·3	29·3 (21·1; 40·6)	48 (39·4; 57)	3·9 (1·8; 6·8)	74·3 (50·3; 97·3)	9·7 (3·2; 15·5)
Lausanne	Switzerland	1995-2013	20,687	0·2	0·6 (0·4; 1)	2·3	23·2 (15·7; 34·2)	44·7 (35·5; 53·4)	NA	73·5 (50·7; 97·1)	11·5 (5·5; 17·2)
Lugano	Switzerland	1995-2013	28,306	0·2	0·5 (0·3; 0·7)	1·8	24·8 (15·8; 37·7)	35·8 (24·2; 49)	4·9 (2·1; 11)	73·8 (33·6; 112)	12·8 (6·6; 19)
Zürich	Switzerland	1995-2013	73,018	0·2	0·4 (0·3; 0·6)	1·5	19·9 (13·1; 29·7)	33·2 (24·7; 43·3)	3·4 (1·7; 6·7)	73·2 (50·5; 98·6)	10·1 (3·7; 15·7)
Stockholm	Sweden	1990-2010	194,239	0·31	0·92 (0·65; 1·45)	3·48	12·6 (9·3; 18·1)	26·9 (20·1; 34·8)	NA	61·9 (49; 76)	6·7 (1·1; 13·6)
Ayutthaya	Thailand	1999-2008	13,817	0·17	0·61 (0·43; 0·9)	1·38	53 (34·9; 80·2)	23·1 (16·1; 29·8)	6·4 (3·9; 9·2)	NA	28·5 (27·2; 29·6)
Bangkok	Thailand	1999-2008	242,841	0·65	1·23 (1·01; 1·48)	2·35	53·4 (44·6; 67·3)	42·8 (34·4; 58·9)	14·3 (11·7; 17·2)	NA	29·5 (28·4; 30·3)

City	Country	Period	Deaths	CO (mg/m³) 1st percentile	CO (mg/m³) Median (IQR)	CO (mg/m³) 99th percentile	PM_{10} (µg/m³) Median (IQR)	NO_2 (µg/m³) Median (IQR)	SO_2 (µg/m³) Median (IQR)	O_3 (µg/m³) Median (IQR)	Temperature (°C) Median (IQR)
Chachoengsao	Thailand	2004-2008	7,886	0·07	0·37 (0·23; 0·48)	0·84	33·1 (24·2; 50·4)	8·6 (5·8; 12)	5·5 (3·3; 8·4)	NA	26·3 (23·9; 27·8)
Chon Buri	Thailand	1999-2008	45,049	0·17	0·51 (0·4; 0·67)	1·22	40·3 (31·3; 51·7)	22·9 (18·4; 28·7)	9·2 (7; 12)	NA	28·5 (27·6; 29·3)
Chiang Mai	Thailand	1999-2008	71,545	0·18	0·74 (0·57; 0·99)	1·99	41 (28·6; 64·2)	18·2 (12·8; 26·6)	3·4 (1·9; 5·4)	NA	26·9 (24·8; 28)
Khon Kaen	Thailand	1999-2008	55,564	0·41	1·06 (0·77; 1·42)	3·11	33·6 (22·1; 49·9)	35·6 (25·6; 48·1)	6 (3·9; 8·5)	NA	27·7 (25·9; 28·9)
Lampang	Thailand	1999-2008	37,325	0·13	0·39 (0·28; 0·57)	1·47	38 (27·3; 63·7)	9·3 (6·3; 15·2)	2·4 (1·5; 3·5)	NA	28·3 (26·8; 29·3)
Nakhon Ratchasima	Thailand	1999-2008	53,571	0·16	0·6 (0·44; 0·85)	4·14	47·5 (31·5; 71)	17·7 (13·3; 24·6)	4·7 (2·6; 7·7)	NA	27·7 (26·4; 28·8)
Nakhon Sawan	Thailand	1999-2008	29,499	0·21	0·74 (0·55; 0·96)	1·65	42 (31·5; 61·8)	17·7 (14·1; 23·1)	3·9 (2·1; 6)	NA	28·8 (27·6; 29·8)
Nonthaburi	Thailand	1999-2008	29,722	0·46	0·99 (0·78; 1·27)	2·28	42 (33·8; 57·4)	33·4 (25·4; 44·7)	12·1 (9·2; 15·7)	NA	28·2 (26·7; 29·3)
Pathum Thani	Thailand	1999-2008	20,218	0·16	0·54 (0·42; 0·68)	1·98	42·8 (31·5; 61)	29·8 (20·6; 39·1)	10·7 (7·4; 15·4)	NA	27·6 (25·5; 29)
Ratchaburi	Thailand	1999-2008	27,874	0·2	0·54 (0·39; 0·76)	1·46	38·6 (27·8; 62·8)	11·8 (8·3; 19·6)	8·4 (5·5; 12·3)	NA	27·3 (25·1; 28·6)
Rayong	Thailand	1999-2008	17,878	0·17	0·45 (0·35; 0·6)	1·8	36·4 (26·9; 53·4)	16·1 (12·4; 22)	10·1 (7·5; 13·4)	NA	26·1 (24·6; 27·2)
Samutprakan	Thailand	1999-2008	24,533	0·09	0·45 (0·25; 0·78)	1·53	85·3 (66·2; 113·9)	29·8 (21·8; 47·6)	15·8 (10·8; 21·3)	NA	28·6 (27·5; 29·4)
Samut Sakhon	Thailand	1999-2008	15,116	0·35	0·79 (0·64; 1·02)	1·58	41·8 (32; 59·2)	30·1 (22·9; 42·4)	32·8 (20·4; 47·8)	NA	28·5 (27·3; 29·4)
Songkhla	Thailand	1999-2008	26,391	0·16	0·57 (0·44; 0·71)	1·26	35·5 (28·2; 44·6)	16·2 (11; 20·8)	5 (3·5; 7·2)	NA	28 (27·2; 28·8)
Saraburi	Thailand	1999-2008	21,516	0·12	0·54 (0·44; 0·7)	1·44	55·9 (40·1; 77·5)	24·7 (20; 32)	6·9 (4·8; 9·4)	NA	28·3 (26·8; 29·4)
Surat Thani	Thailand	1999-2008	15,012	0·09	0·45 (0·29; 0·67)	1·09	27·7 (21·1; 38·5)	9·8 (6·2; 14·3)	5·1 (3; 8)	NA	27·8 (25·8; 29·2)
Yala	Thailand	2006-2008	2,776	0·04	0·36 (0·25; 0·51)	0·91	25·5 (19; 35·9)	NA	NA	NA	27·5 (26·7; 28·2)
Kaohsiung	Taiwan	1996-2014	305,372	0·24	0·66 (0·49; 0·84)	1·32	75 (43·7; 104·5)	40·7 (27·7; 55·7)	19·7 (14·5; 26·5)	127·1 (88; 161·2)	26·3 (22·5; 28·5)
Taipei	Taiwan	1996-2014	571,716	0·36	0·92 (0·69; 1·22)	2·2	44·7 (33; 60·4)	45·9 (37·1; 56)	9·8 (6·8; 14·1)	98·2 (79·4; 123·5)	23·7 (19; 27·8)
Taichung	Taiwan	1996-2014	236,011	0·26	0·61 (0·47; 0·76)	1·33	53·4 (37·4; 75·2)	36·8 (28·1; 48)	8·7 (6·6; 11·6)	101·9 (78·9; 131·2)	24·7 (19·7; 27·7)
Blackpool	UK	2000-2007	14,236	0·08	0·21 (0·16; 0·31)	1·05	23·1 (17·8; 29·7)	15·5 (9·6; 25·4)	7·1 (3·2; 13·3)	NA	11 (7·3; 14·9)
Barnsley/Dearne Valley	UK	2002-2007	4,408	0·01	0·2 (0·15; 0·24)	0·73	NA	18 (12·6; 27·2)	5·4 (3·2; 9·8)	NA	10 (6·3; 14·8)
Birkenhead	UK	2000-2007	17,311	0·08	0·21 (0·16; 0·27)	0·78	17·7 (13·8; 23·4)	16·7 (11·3; 26·4)	6·1 (3·5; 11·4)	NA	11·3 (7·4; 15·2)
Bournemouth/ Poole	UK	2002-2007	20,487	0·04	0·25 (0·2; 0·34)	0·87	NA	15·2 (10·1; 24·5)	1·9 (0·3; 3·2)	NA	11·7 (7·9; 15·9)
Bristol	UK	1993-2012	77,821	0·13	0·43 (0·28; 0·66)	1·97	22·1 (16·4; 31·3)	34 (23·5; 48·4)	5 (2·5; 10·2)	NA	11 (7·2; 15·1)
Cardiff	UK	1992-2016	66,327	0·08	0·34 (0·21; 0·54)	1·55	24 (17·8; 32·6)	31 (22·5; 41·6)	5·8 (3·9; 9·6)	NA	11·1 (7·2; 15·1)
Coventry	UK	1997-2007	22,696	0·06	0·22 (0·15; 0·34)	1·13	15·6 (11·8; 21)	20·4 (13·3; 30)	9 (2·1; 15·5)	NA	10·7 (6·8; 15)
Kingston upon Hull	UK	1994-2012	41,467	0·1	0·35 (0·19; 0·65)	1·5	22·6 (15·9; 30·8)	32·3 (22·4; 43·4)	6·8 (4·7; 10·9)	NA	10·5 (6·4; 14·7)
Leicester	UK	1994-2012	57,303	0·1	0·36 (0·21; 0·59)	1·59	19·3 (14·2; 26·4)	34·6 (25·2; 45·4)	4 (2; 8·2)	NA	10·2 (6·1; 14·4)
London	UK	1990-2016	1,616,599	0·19	0·4 (0·3; 0·64)	2·59	21·4 (16·1; 29·9)	39·9 (30; 51·8)	4·3 (2·5; 9·9)	NA	11·4 (7·2; 15·8)
Liverpool	UK	1993-2002	76,727	0·14	0·45 (0·32; 0·6)	1·4	25·7 (19·7; 35·5)	41·2 (28·8; 54·9)	10·5 (5·1; 23·7)	NA	10·5 (6·6; 14·5)
Medway Towns	UK	1997-2009	18,364	-0·04	0·24 (0·16; 0·38)	1·24	17·1 (12·7; 24·2)	22·8 (15·1; 33·7)	5 (2·7; 8·4)	NA	11·2 (7·2; 15·8)
Manchester	UK	1991-2012	398,143	0·03	0·28 (0·23; 0·4)	1·9	19·6 (14·7; 27·1)	36·7 (27·6; 47·9)	4·7 (2; 7·9)	NA	10·1 (6·2; 14·2)
Northampton	UK	2002-2007	7,301	0·03	0·2 (0·14; 0·25)	0·64	18·3 (14; 24·6)	17·5 (11·6; 26·1)	3 (1·6; 4·5)	NA	11·1 (6·9; 15·4)
Norwich	UK	1997-2007	13,294	0·1	0·28 (0·19; 0·43)	1·16	18·5 (14·5; 24·5)	22·5 (15·9; 31)	10·5 (4·8; 15·1)	NA	10·5 (6·4; 14·7)
Nottingham	UK	1996-2007	55,382	0·12	0·42 (0·27; 0·59)	1·82	22·6 (17·5; 29·9)	36·8 (28·5; 46·8)	12 (6·6; 17·2)	NA	10·5 (6·6; 14·8)
Newport	UK	2002-2007	6,860	0	0·2 (0·14; 0·3)	0·78	18·6 (14·8; 24·4)	20·9 (14·3; 30·3)	3·1 (2·2; 4·3)	NA	10·7 (7·1; 14·9)
Plymouth	UK	1997-2007	16,844	0·1	0·27 (0·2; 0·4)	1·14	17·8 (12·8; 25)	24·6 (17·6; 33·1)	3·9 (2·6; 5·4)	NA	11·1 (7·9; 14·8)
Preston	UK	2000-2007	11,423	0·11	0·27 (0·2; 0·39)	1·07	17·4 (13·2; 23·3)	23·1 (16·6; 31·7)	5·1 (3; 11·1)	NA	10·7 (6·9; 14·7)
Reading	UK	1997-2007	13,436	0·12	0·35 (0·23; 0·59)	1·74	19·4 (15·1; 25·7)	29·3 (19·1; 40·7)	4·8 (2·5; 7·4)	NA	10·8 (6·9; 15·3)

City	Country	Period	Deaths	CO (mg/m^3)			PM_{10} (µg/m^3)	NO_2 (µg/m^3)	SO_2 (µg/m^3)	O_3 (µg/m^3)	Temperature (°C)
				1st percentile	Median (IQR)	99th percentile	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Sheffield	UK	1991-2007	75,887	0·09	0·41 (0·27; 0·6)	2·25	20·3 (14·6; 29·7)	39·3 (29·9; 50·9)	13·5 (9·3; 18)	NA	10 (6·1; 14·2)
South Hampshire	UK	1994-2012	97,168	0·06	0·33 (0·21; 0·57)	1·98	22·1 (17·2; 29·3)	30·9 (22·8; 40·9)	4·4 (2·4; 7·2)	NA	11·4 (7·5; 15·7)
Southend-on-Sea	UK	2000-2007	15,587	0·1	0·22 (0·17; 0·32)	0·84	18·4 (14·2; 24·4)	20·8 (14·5; 29·9)	6·6 (4; 9·7)	NA	11·6 (7·5; 16·2)
Stoke-on-Trent	UK	1997-2007	27,387	0·15	0·46 (0·32; 0·66)	1·92	21 (15·8; 28·1)	29 (21·5; 38·4)	11·2 (6·5; 15·2)	NA	9·7 (6·1; 13·8)
Swansea	UK	1994-2006	19,256	0·11	0·39 (0·26; 0·56)	1·54	24·4 (18·9; 32·2)	35·6 (25·6; 45·8)	5·5 (3·1; 10·2)	NA	11 (7·6; 15·1)
Teesside	UK	1997-2007	27,570	0·1	0·29 (0·21; 0·4)	0·99	21·6 (16·4; 29·4)	21·4 (14·8; 29·4)	9·4 (5·3; 15·2)	NA	10·3 (6·4; 14·3)
Tyneside	UK	1992-2012	128,848	0·04	0·33 (0·16; 0·6)	1·46	19 (13·5; 27·9)	35·2 (25·5; 47·4)	5·1 (3; 10·4)	NA	9·8 (6; 13·7)
Wigan	UK	2004-2007	2,859	0·1	0·2 (0·15; 0·27)	0·98	20·3 (16·1; 27)	24·6 (16; 35·7)	2·2 (0·8; 3·9)	NA	10·5 (7; 14·8)
West Midlands	UK	1992-2007	323,957	0·16	0·38 (0·27; 0·54)	1·55	21·8 (16·6; 30·7)	34·5 (24·8; 45·5)	6·6 (3·8; 12·2)	NA	10·2 (6·3; 14·5)
West Yorkshire	UK	1993-2016	269,029	0·14	0·44 (0·27; 0·64)	1·71	22·6 (16·3; 31·8)	38·8 (29·5; 50)	5·7 (3·1; 10)	NA	9·7 (5·9; 13·9)
Akron	USA	1985-2006	107,388	0·21	0·71 (0·52; 0·93)	2·03	21·2 (15·3; 29·8)	NA	22·5 (11·8; 37)	87·7 (60·3; 116·6)	11·1 (2; 19·1)
Albany	USA	1997-2006	23,630	0·03	0·45 (0·34; 0·57)	1·21	18·5 (12·8; 28·6)	24·8 (18·1; 33·9)	8·8 (4·9; 14·1)	67·9 (49·7; 89·6)	10·5 (1·9; 19)
Albuquerque	USA	1985-2006	73,197	0·11	0·89 (0·56; 1·31)	3·38	25·7 (17·9; 35·7)	30·9 (22·4; 42·1)	NA	84·3 (64·9; 102·7)	14·5 (6·3; 22·1)
Allentown	USA	1985-2006	61,098	0	0·69 (0·32; 1·03)	2·49	21 (14; 31·8)	30·4 (21·8; 41·3)	17·9 (11·2; 28·6)	78·1 (50·2; 108·2)	11·6 (3·2; 19·8)
Anchorage	USA	1985-2006	9,259	0·37	1·53 (1·05; 2·22)	5·44	16 (9·2; 28·6)	NA	NA	32·2 (17·7; 45·6)	-3·1 (-8·3; 1·2)
Anaheim	USA	1985-2006	320,343	0·14	0·98 (0·58; 1·66)	4·58	34 (24·7; 43·6)	53 (37·5; 74·5)	3·4 (0·8; 7)	77·8 (54·5; 99·4)	18·8 (15·4; 22)
Annandale	USA	1985-2006	71,042	0·3	0·69 (0·54; 0·89)	2·29	21 (14·4; 29)	35·7 (26·5; 46·5)	16·4 (11·3; 23·8)	67·8 (42·5; 103·7)	14·6 (6·4; 22·6)
Austin	USA	1988-2006	57,309	0·04	0·39 (0·24; 0·81)	2·61	19 (15; 25)	13·4 (6·1; 30·2)	0 (0; 0·1)	79·4 (62·2; 101·9)	21·6 (15; 26·9)
Atlantic City	USA	1990-1997	14,822	0·76	1·69 (1·37; 2·04)	3·15	29 (23; 36)	NA	6·7 (3·9; 10·9)	76·7 (54·9; 104·4)	11·7 (4·4; 19·6)
Atlanta	USA	1985-2006	306,327	0·26	0·85 (0·6; 1·2)	2·87	25·5 (18·2; 34·8)	35 (25·5; 46)	10·1 (5; 17·9)	95·1 (68·2; 123·7)	17·2 (9·8; 23·5)
Atzec	USA	1985-1993	2,849	0·18	0·73 (0·5; 1·08)	1·95	16·2 (12·7; 20·7)	10·3 (5·5; 16·5)	12 (5·9; 18·3)	NA	11·3 (2·1; 19·4)
Buffalo	USA	1985-2006	211,539	0·24	0·65 (0·5; 0·88)	2	19·4 (13·9; 28·3)	33·1 (24·7; 42·7)	19·4 (9·9; 32·9)	68·4 (49·5; 94·1)	9·3 (1·2; 18)
Bakersfield	USA	1985-2006	88,641	0·18	0·69 (0·49; 1·05)	2·54	36·6 (24·1; 52·5)	31·2 (24·2; 41·2)	7·2 (3·9; 11·7)	106 (68·1; 143·7)	17·9 (11·8; 25·2)
boulder	USA	1985-2006	24,416	0·23	0·83 (0·62; 1·15)	3·07	20·6 (14·6; 28·7)	NA	NA	80·2 (57·3; 102·2)	12·2 (4·5; 20·3)
Baltimore	USA	1985-2006	316,365	0·15	0·89 (0·56; 1·4)	3·85	27·1 (18·8; 38·3)	44·7 (34·4; 56·4)	18·3 (11·3; 27·7)	68·6 (42·7; 101·6)	13·9 (5·8; 22·1)
Boise	USA	1985-2000	18,515	0·48	1·84 (1·25; 2·65)	5·86	27 (16·5; 39·7)	38·1 (29·3; 46·3)	NA	NA	9·4 (2·8; 17·8)
Bergen	USA	1985-2006	237,679	0·42	1·22 (0·88; 1·66)	3·55	29·7 (21; 40·7)	50·5 (37·4; 65·6)	14·2 (8; 25·1)	58·7 (35·5; 87)	12·8 (4·5; 20·9)
Burlington	USA	1985-2006	14,659	0·14	0·8 (0·54; 1·15)	2·32	16·2 (11·3; 23·3)	29·6 (23·4; 36·9)	7·5 (3; 15·3)	79·9 (63·5; 98)	8·6 (-0·1; 17·6)
Birmingham	USA	1985-2006	171,109	0·04	1·02 (0·66; 1·48)	3·6	29·5 (19·2; 43·9)	19·3 (14; 25·5)	11·7 (6·7; 19)	83·5 (59·1; 109·9)	18·3 (10·8; 24·4)
Brownsville	USA	1993-2006	22,681	0	0·47 (0·36; 0·63)	1·63	22·2 (16; 31)	NA	0 (0; 0)	60·3 (42·6; 81·1)	24·4 (19·8; 27·9)
Boston	USA	1985-2006	475,524	0·12	1·04 (0·59; 1·45)	3·07	23 (17·1; 31·4)	43·1 (32·8; 54·2)	15·1 (9·7; 24·9)	58·1 (39·1; 82·2)	10·7 (3·6; 18·7)
Baton Rouge	USA	1990-2006	49,607	0	0·67 (0·44; 0·94)	1·84	26 (20·2; 34)	22·7 (17·7; 29·7)	13·3 (8·4; 19·1)	72·6 (53·3; 98·7)	21·1 (14·4; 25·8)
Cedar Rapids	USA	1985-2006	27,913	0·03	0·53 (0·23; 0·8)	1·82	24·3 (17·3; 33·5)	6·7 (4·4; 9·1)	6·8 (3; 13·8)	62·8 (45·2; 84·2)	10·3 (0·5; 19·4)
Chicago	USA	1985-2006	1,114,503	0·34	0·94 (0·74; 1·18)	2·19	28·7 (20·2; 39·7)	43·2 (34·4; 53·4)	12·9 (8·3; 19·6)	56 (37; 79·5)	11·4 (2·9; 20·7)
Charlotte	USA	1985-2006	81,954	0·3	1·02 (0·71; 1·42)	3·51	27·1 (19·7; 36·7)	29·9 (21·3; 39·2)	8·5 (5·7; 13·2)	100·7 (72·8; 127·1)	17·1 (9·5; 23·5)
Charleston, SC	USA	1985-2006	46,834	0·03	0·52 (0·3; 0·84)	2·28	18·9 (14; 24·7)	11·1 (7·1; 17)	2·7 (0·5; 6·5)	74·2 (57·1; 94·8)	19·5 (12·9; 25·1)
Charleston, WV	USA	1985-1999	28,860	0·3	0·63 (0·49; 0·83)	1·86	25 (16·4; 37)	38·9 (31; 47·9)	22·1 (14·4; 33·7)	69·1 (43·1; 102·2)	13·8 (5·4; 20·9)
Columbus	USA	1985-2006	159,323	0·23	0·71 (0·5; 1·07)	2·28	25·8 (18·6; 36·4)	45·3 (34·4; 58·3)	10·7 (5·2; 20·2)	88·3 (61·2; 113)	12·7 (3·6; 20·7)
Colorado Springs	USA	1985-2006	51,313	0·26	0·75 (0·54; 1·09)	3·29	19·5 (14·8; 26·6)	27·3 (20·5; 35·7)	6·4 (4·2; 8·9)	80·1 (61·7; 98)	9·7 (2·2; 17·6)
Cleveland	USA	1985-2006	403,998	0·29	0·91 (0·64; 1·33)	2·77	28·2 (18·8; 41·4)	41·1 (32; 52·6)	17·6 (10·7; 27·9)	79·3 (59·1; 106·7)	11·6 (2·9; 20·3)
Cincinnati	USA	1985-2006	171,869	0·07	0·89 (0·61; 1·2)	2·51	26·9 (19·4; 37·3)	45·3 (36·2; 55·6)	19·3 (9·3; 35·3)	89·1 (63·1; 114·3)	13·6 (4·9; 21·2)

City	Country	Period	Deaths	CO (mg/m³) 1st percentile	CO Median (IQR)	CO 99th percentile	PM_{10} (μg/m³) Median (IQR)	NO_2 (μg/m³) Median (IQR)	SO_2 (μg/m³) Median (IQR)	O_3 (μg/m³) Median (IQR)	Temperature (°C) Median (IQR)
Canton	USA	1985-2006	74,472	0	0·63 (0·41; 0·88)	2·02	22·9 (16·6; 31·6)	26·6 (17·2; 37·3)	18·1 (10·8; 29·4)	93·3 (68·2; 118·5)	10·9 (1·8; 18·9)
Columbia	USA	1985-2006	71,799	0·03	0·84 (0·53; 1·27)	3·11	24·1 (15; 35)	11·6 (7·4; 17·1)	3·5 (0·9; 6·6)	81·3 (58·8; 108·8)	18·4 (11·1; 24·7)
Davis	USA	1985-2003	6,534	0·3	1 (0·68; 1·58)	4·23	21 (13; 39)	46·8 (33·3; 65·8)	9 (4; 19·8)	62 (43·4; 79)	1·7 (-2·3; 5·9)
Dallas	USA	1985-2006	252,904	0·05	0·5 (0·34; 0·81)	2·57	26 (19·4; 34·3)	26·4 (19; 36·1)	2·9 (0·8; 6·8)	74·4 (52·4; 102·3)	20·5 (12·7; 27·1)
Denver	USA	1985-2006	182,490	0·35	1·06 (0·71; 1·64)	5·12	25·1 (17·1; 35·2)	41 (27·8; 57·5)	9·1 (4·8; 15·3)	78 (56·3; 103)	10·6 (3·1; 18·8)
Durham	USA	1985-2006	25,367	0·25	1·07 (0·65; 1·71)	4·89	24 (18; 33)	17·5 (12·8; 22·1)	NA	105·3 (81·6; 126·7)	18·1 (9·8; 23·8)
Des Moines	USA	1985-2006	53,750	0·23	0·94 (0·74; 1·17)	2·36	25·9 (18; 37·6)	20·1 (15·4; 27)	NA	45·9 (22·8; 71·3)	11·3 (1·3; 20·5)
Detroit	USA	1985-2006	728,971	0·14	0·56 (0·37; 0·81)	2·09	29 (19·1; 43·5)	34·6 (25; 45·8)	14 (7·2; 23·6)	73·1 (51·5; 98·3)	10·9 (2·1; 19·8)
Davenport	USA	1985-2006	14,966	0·21	1·23 (0·92; 1·59)	2·86	26·3 (18·7; 38)	18·9 (14·1; 25·9)	8·2 (3·7; 15·2)	74·2 (53·4; 100·9)	11 (1·6; 20·2)
Dayton	USA	1985-2006	108,776	0·21	0·68 (0·47; 1·04)	2·33	24 (17·3; 33·9)	NA	10·5 (5·6; 18·5)	90·9 (64·4; 115·6)	12·6 (3·4; 20·6)
El Centro	USA	1994-2006	9,512	0·07	0·52 (0·29; 1·02)	4·03	48·2 (34·5; 64·4)	21·2 (13; 35·3)	1·3 (0·4; 6)	90·2 (71·7; 110·1)	22·7 (15·9; 31·1)
El Paso	USA	1985-2006	73,269	0·25	0·98 (0·59; 1·53)	4·18	30·6 (20·3; 45·8)	36·9 (26·9; 49·3)	7·5 (2; 25·7)	78·9 (61·6; 99)	19·3 (11·2; 25·7)
Elizabeth	USA	1985-2006	96,071	0·46	1·49 (1·01; 2·3)	5·64	28·6 (20·3; 38·2)	60·9 (46·5; 76·1)	18·7 (12; 29·1)	62·5 (39·4; 91·6)	13·3 (5·3; 21·7)
Erie	USA	1985-2006	48,689	0·03	0·87 (0·51; 1·31)	2·84	16·5 (11; 25)	24 (17·3; 32·1)	23 (15·6; 33·3)	79·4 (59·3; 105·8)	10·8 (2·3; 19)
Eugene	USA	1985-2006	52,030	0·37	1·24 (0·87; 1·78)	4·21	20·6 (12·9; 33·6)	NA	NA	71·5 (56; 88·7)	11·2 (7; 16·2)
Evansville	USA	1985-2006	34,400	0·29	0·81 (0·54; 1·14)	2·42	26·6 (20; 35·9)	20 (14·8; 26·6)	18·4 (8·6; 29·1)	103·3 (82; 125·1)	15·2 (6·1; 22·8)
Everett	USA	1987-2006	56,003	0·37	1·94 (1·16; 2·99)	5·85	17·2 (11·6; 26·6)	NA	10·5 (6·8; 15·6)	63·2 (47·8; 78·2)	11 (7·1; 15·8)
Fresno	USA	1985-2006	102,444	0·21	0·69 (0·45; 1·1)	2·5	39·2 (26·5; 57)	31·7 (23·5; 41·9)	5·2 (0·8; 10·6)	100·5 (63·9; 137·7)	17·6 (11·4; 24·8)
Ft Lauderdale	USA	1985-2006	306,996	0·34	0·8 (0·61; 1·06)	2·22	16·9 (13·4; 21·3)	15·6 (9·5; 22)	3·3 (1·4; 6·2)	63·4 (47·9; 80·5)	25·7 (22·9; 27·9)
Ft Worth	USA	1985-2006	171,967	0·2	0·76 (0·46; 1·28)	3·01	21·1 (16; 28·6)	24·8 (15·8; 35·8)	0 (0; 2·8)	79·7 (59·5; 109·3)	19·9 (11·9; 26·5)
Ft Wayne	USA	1986-2006	46,343	0·23	0·84 (0·54; 1·09)	2·25	19·3 (13·6; 28·3)	17 (10·6; 25)	8·5 (5·5; 14·5)	97·6 (78·3; 118·3)	11·4 (2·2; 19·8)
Fayetteville	USA	1988-2006	20,652	0·29	1·04 (0·74; 1·41)	3·36	22 (16; 29)	NA	8·1 (7; 13·1)	97·1 (74·1; 118·3)	13·7 (7·8; 20·4)
Gary	USA	1985-2006	89,847	0·34	0·92 (0·66; 1·25)	2·65	23·8 (15·8; 35·7)	36·2 (27·2; 46·4)	13·7 (8·3; 21·7)	89·5 (69·6; 114·9)	12·1 (3·2; 21)
Greensburg	USA	1997-2006	36,700	0	0·16 (0·02; 0·37)	1·13	22·8 (16·8; 31·1)	27·9 (20·8; 35·7)	17·7 (9·1; 27·7)	85·5 (63·1; 107·3)	13 (4·1; 20·8)
Grand Junction	USA	1991-2006	8,355	0·26	1 (0·71; 1·46)	3·51	24·1 (17·9; 32·1)	NA	1·1 (0; 3·5)	87·5 (72·7; 97·8)	12 (2·9; 21·1)
Grand Rapids	USA	1985-2006	77,814	0·09	0·5 (0·36; 0·71)	2·06	20 (14; 28·8)	27·3 (19·8; 36·4)	4·4 (1·9; 8·5)	84·3 (64·9; 109·7)	9·4 (0·7; 18·4)
Greensboro	USA	1989-2006	37,782	0·18	1·07 (0·74; 1·49)	3·02	21 (14·5; 29·6)	NA	17·7 (9·9; 24·5)	101·4 (77·7; 123·2)	11·6 (5·7; 18·7)
Greenville	USA	1993-2006	38,467	0	0·45 (0·28; 0·72)	2·27	21·7 (14·9; 29·4)	26·5 (18·2; 36·9)	4 (1·1; 8·4)	120·8 (97; 140·6)	17·9 (10·4; 24)
Gettysburg	USA	2001-2006	2,587	0	0·11 (0; 0·25)	0·89	NA	5·2 (3·3; 7·8)	NA	93·8 (73·3; 113·5)	18·9 (13·7; 22·6)
Honolulu	USA	1985-2000	75,636	0·35	0·72 (0·59; 0·91)	2·21	15·8 (13; 19·5)	6 (4·1; 8·4)	1·9 (1·1; 2·8)	NA	25·2 (23·5; 26·6)
Harrisburg	USA	1985-2006	42,847	0	0·69 (0·4; 1·27)	3·37	19·6 (13; 28·1)	32·7 (23·3; 43·2)	12·8 (6·8; 21·6)	78·3 (52·4; 107·7)	12·4 (3·9; 20·8)
Hartford	USA	1985-2006	158,009	0·48	1·28 (0·98; 1·75)	5·08	16·7 (11·1; 25·8)	31·7 (22·2; 43·8)	10·4 (5·8; 18·6)	76·2 (55·1; 98·3)	11·7 (3·4; 19·8)
Houston	USA	1985-2006	366,068	0·2	0·77 (0·48; 1·14)	2·58	27 (19·1; 36·9)	31·9 (23; 43)	8·3 (5·4; 12·3)	66·4 (47·8; 95·8)	22·2 (16·3; 26·9)
Indianapolis	USA	1985-2006	149,459	0·37	0·84 (0·65; 1·09)	2·28	27 (19·1; 38)	33·1 (25·2; 42·1)	15·5 (9·4; 24·3)	98·9 (77·2; 121·5)	12·9 (3·5; 21·1)
Jacksonville	USA	1985-2006	123,614	0·14	0·7 (0·5; 0·97)	2·21	26 (20; 33)	25·9 (19·6; 33·7)	4·5 (2·3; 8·2)	77·3 (59·6; 99)	22·4 (16·9; 26·5)
Jersey city	USA	1985-2006	101,223	0·4	1·76 (1·23; 2·57)	5·38	28·5 (20; 39·4)	48·9 (36·8; 62·9)	20·5 (13·5; 31·1)	60 (36·3; 90·6)	10·3 (3·6; 17·7)
Klamath	USA	1988-2005	2,857	0·24	1·6 (0·94; 2·56)	6·46	36·8 (18·7; 63·9)	NA	NA	NA	2·3 (-0·9; 5·6)
Kalamazoo	USA	1991-1996	8,157	0·01	0·54 (0·34; 0·77)	1·61	16 (10; 24·8)	24·6 (18·3; 32)	8·1 (4·9; 13·1)	69·8 (49·2; 94)	11·1 (1·6; 20·4)
Kenosha	USA	1990-1992	2,139	0·29	0·48 (0·31; 0·83)	1·57	NA	20·1 (13·5; 29·8)	3·4 (0·3; 10·6)	88·7 (68·5; 123·1)	9·8 (1·6; 19)
Kansas	USA	1985-2006	217,513	0·11	0·78 (0·58; 1·03)	2·16	29·2 (21; 40·3)	23·7 (16·7; 32)	7·9 (4·6; 12·8)	62·7 (39·2; 91·6)	14·7 (5·2; 23·1)
Knoxville	USA	1988-2002	49,685	0·17	1·16 (0·81; 1·59)	3·41	29·1 (21·3; 38·8)	5·8 (2·6; 14·9)	14·3 (9·3; 21·7)	91·6 (72·3; 115·8)	15·8 (8·2; 22·8)
Lafayette, IN	USA	1987-1996	3,907	0·23	0·29 (0·29; 0·39)	0·87	29·6 (21·5; 41·9)	21·7 (14; 30·1)	11·8 (6·6; 19·9)	101·7 (80·6; 125·9)	12·7 (3; 21·1)
Lancaster	USA	1985-2006	79,408	0	0·49 (0·29; 0·8)	1·97	19·8 (13·5; 28·5)	28·5 (20·5; 37·5)	12·4 (6·8; 20·3)	83·1 (53·2; 113·9)	12·6 (4·1; 20·8)
Louisville	USA	1985-2006	138,815	0·21	0·99 (0·7; 1·48)	3·26	23·5 (17; 33)	33·6 (25·8; 43·9)	16 (9·3; 25·2)	80·4 (52·7; 108·6)	15·2 (6·4; 22·9)
Los Angeles	USA	1985-2006	1,239,036	0·3	1·23 (0·82; 1·96)	4·91	34·3 (25·4; 43·5)	62·5 (47·3; 80·5)	6 (3·4; 9·1)	80·3 (49·5; 115·5)	17·9 (15·2; 20·2)

City	Country	Period	Deaths	CO (mg/m^3)			PM$_{10}$ (µg/m^3) Median (IQR)	NO$_2$ (µg/m^3) Median (IQR)	SO$_2$ (µg/m^3) Median (IQR)	O$_3$ (µg/m^3) Median (IQR)	Temperature (°C) Median (IQR)
				1st percentile	Median (IQR)	99th percentile					
Las Vegas	USA	1985-2006	179,807	0·04	1·04 (0·51; 1·92)	6·84	31·9 (23·2; 41·9)	30·1 (18·3; 53·2)	0·2 (0; 2·1)	85·9 (62·9; 108)	20·3 (12; 29·3)
Little Rock	USA	1993-2006	41,369	0·07	1·24 (0·58; 1·72)	3·2	25 (17·5; 33·4)	20·1 (14·4; 28)	5·6 (3·8; 8)	76·1 (56; 101·8)	18·2 (9·8; 24·9)
middles	USA	1985-2006	107,773	0·32	1·09 (0·78; 1·48)	3·12	22·3 (16·6; 30·8)	30·9 (22; 43·2)	12·4 (7·2; 20·9)	68·7 (45·8; 101·2)	13 (4·6; 21·1)
Medford	USA	1985-2006	33,223	0·49	1·99 (1·35; 2·75)	6·41	28·5 (18·8; 43·8)	NA	NA	83·3 (67·6; 102·4)	11·9 (6·4; 18·8)
Madison, IL	USA	1985-2000	34,077	0·29	0·98 (0·71; 1·32)	2·73	35·2 (22·2; 53·2)	NA	21·9 (13·2; 33·8)	68·1 (45·2; 96·6)	16 (6·2; 24·1)
Modesto	USA	1985-2006	63,469	0·1	0·58 (0·38; 1·01)	3·01	31·9 (22·6; 45·3)	32·4 (24·5; 41·8)	1·1 (0; 4·6)	80·2 (52·1; 111·1)	17·9 (11·7; 24·2)
Madison, WI	USA	1985-2001	33,130	0·14	1·06 (0·65; 1·52)	2·81	21·2 (14·9; 30)	NA	6·4 (3·2; 11·7)	81·3 (60·8; 100·9)	9·3 (-0·2; 18·3)
Miami	USA	1985-2006	371,071	0·36	1 (0·76; 1·32)	2·93	24·6 (19·8; 30·4)	18·3 (12·5; 27·1)	1·6 (0; 3·5)	65·1 (49·8; 82·7)	25·4 (22·8; 27·7)
Milwaukee	USA	1985-2006	231,422	0·16	0·53 (0·35; 0·8)	1·9	25·1 (17·3; 35·3)	35·6 (26·4; 46·5)	7·5 (5·2; 13·9)	76·2 (56·5; 98·4)	9·1 (1·1; 18·3)
Memphis	USA	1985-2006	151,872	0·36	0·98 (0·65; 1·45)	3·53	24·2 (17·5; 32·7)	43·3 (31·4; 56·6)	11·2 (7·6; 18·3)	101·4 (78·8; 124·3)	18·4 (10·1; 25·2)
Monmouth	USA	1985-1998	137,887	0·44	1·52 (1·12; 1·99)	3·93	NA	NA	NA	83·3 (58·6; 113·4)	13·7 (5·8; 21·9)
Minneapolis	USA	1985-2006	241,325	0·04	1·19 (0·67; 1·68)	3·75	24 (17·1; 33·2)	36·5 (27·2; 47)	5·3 (2; 10·2)	52·7 (36·3; 70·1)	8·9 (-1; 19·1)
Montgomery	USA	1995-1997	4,259	0	0·02 (0; 0·11)	0·55	23·5 (16·5; 29·2)	19 (14·2; 24·7)	2·4 (0·3; 5·5)	83·5 (62·7; 102·9)	23 (16·8; 27·2)
Marlboro	USA	1985-1999	48,873	0·13	0·98 (0·61; 1·52)	4·59	20 (14; 28)	NA	19·2 (10·6; 31·9)	86·1 (55·9; 123·8)	13·4 (5·4; 21·4)
Nashua	USA	1985-2006	50,608	0·06	0·85 (0·53; 1·3)	4·05	16·2 (11; 23·4)	24·4 (16; 35·3)	11·2 (6; 20·3)	77·3 (58·9; 97·1)	11·2 (2·6; 20)
Nassau	USA	1985-2006	448,240	0	0·65 (0·27; 1·03)	3·06	17·3 (12·3; 24)	43·2 (31; 57·6)	13·3 (8; 22·6)	65·4 (45·8; 90·8)	12·3 (5; 20·4)
Norfolk	USA	1987-2006	172,121	0·1	0·61 (0·43; 0·84)	2·15	20 (14·4; 27·6)	33·4 (25·1; 42·5)	13·5 (7·9; 20)	59·8 (47; 70·1)	16·4 (8·9; 23·4)
Nashville	USA	1985-2006	97,358	0·37	1·08 (0·82; 1·47)	3·43	29·2 (21·6; 39·7)	25·5 (16·3; 35·6)	17·9 (8·6; 26·2)	65·5 (41; 92·7)	16·7 (8·3; 23·7)
New Haven	USA	1986-2006	130,887	0·31	1·04 (0·71; 1·6)	3·87	22·8 (15; 33·9)	44·2 (32·8; 56·9)	13·5 (7·9; 23·8)	79·9 (61·5; 101·9)	12·3 (4·9; 20·3)
New Orleans	USA	1985-2006	175,011	0·3	0·94 (0·71; 1·28)	2·89	24·4 (18·6; 31·8)	28·4 (21; 37·4)	3·3 (1·5; 5·8)	73·3 (50·4; 103·3)	22·6 (16·4; 27·4)
Newark	USA	1985-2006	220,165	0·36	1·09 (0·79; 1·5)	3·47	31·5 (22; 43·6)	43·6 (32·2; 56·9)	13·5 (7·5; 22·6)	66·3 (45·3; 95·1)	13·4 (5·3; 21·7)
New York	USA	1985-2006	1,364,169	0·53	1·69 (1·07; 2·47)	5·34	22·3 (16·3; 31·5)	64·6 (52·4; 79·7)	25·7 (16·3; 40·2)	50·5 (30·9; 77·8)	10·2 (3·5; 17·7)
Oklahoma	USA	1985-2006	118,137	0·21	0·9 (0·64; 1·19)	2·88	21·6 (15·7; 30)	20·6 (14·7; 29·4)	6·3 (3·2; 11)	80·1 (58·6; 105·2)	16·8 (8·1; 24·3)
Oakland	USA	1985-2006	325,028	0·3	0·78 (0·53; 1·09)	2·61	19·9 (14·2; 28·2)	30·4 (21·7; 40·4)	3·6 (2; 5·5)	60·7 (46; 74·1)	14·4 (11·9; 16·4)
Omaha	USA	1985-2006	71,121	0·2	0·75 (0·52; 1·08)	2·56	33·3 (24·3; 45·9)	NA	2·1 (0·3; 5·1)	64·8 (47·2; 84·5)	11·6 (1·7; 20·8)
Orlando	USA	1985-2006	154,765	0·22	0·9 (0·66; 1·18)	2·45	19 (14·9; 23·9)	19·4 (13·9; 26·5)	2·4 (0·5; 4·7)	77·1 (60·7; 97·2)	23·4 (19·3; 26·4)
Philadelphia	USA	1985-2006	911,888	0·27	0·84 (0·57; 1·14)	2·69	24·2 (17·7; 34·2)	45·3 (35·2; 56·7)	16·3 (9·5; 26·5)	64·3 (40·1; 99·3)	13·1 (5·1; 21·2)
Phoenix	USA	1985-2006	386,676	0·22	1·18 (0·75; 1·84)	4·22	42·8 (30·9; 57·7)	42·2 (29·9; 56·8)	5·4 (2·6; 9)	89·1 (63·3; 110·4)	24·1 (16·1; 31·9)
Palm beach	USA	1986-2006	216,228	0·07	0·62 (0·38; 0·93)	1·83	19 (15·1; 24)	23·2 (16·8; 30·2)	2·2 (0·1; 4·6)	61·7 (46·4; 79)	24·9 (22; 27·2)
Portland, OR	USA	1985-2006	208,697	0·4	1·36 (0·97; 1·92)	3·95	20·2 (13·7; 29·1)	26·5 (20·1; 35·2)	10·9 (5·3; 18·7)	63·7 (49·4; 80·2)	11·9 (7·3; 17·3)
Provo	USA	1985-2006	26,489	0·35	1·4 (0·92; 2·07)	5·76	28·1 (18·8; 39·9)	41·5 (31·8; 53·9)	NA	111·4 (99; 124·2)	10·1 (2·2; 19·3)
Port Arthur	USA	1985-2006	28,009	0·28	0·7 (0·34; 1·04)	2·15	20 (14; 26)	14·5 (7; 22·4)	12·3 (4·2; 25·2)	71·1 (50·7; 98)	21·3 (15·1; 26·3)
Portland, ME	USA	2001-2006	5,115	0·12	0·4 (0·24; 0·53)	0·87	18·4 (13·9; 25·9)	26·2 (19·8; 33·7)	4·1 (2·2; 6·4)	73 (58·7; 92·1)	17·9 (14·2; 20·7)
Providence	USA	1985-2006	254,162	0·31	0·88 (0·65; 1·24)	3·05	22·5 (16·2; 31·6)	29·5 (18·8; 42·6)	17 (9·5; 28·4)	83·5 (64·9; 104·4)	11·1 (3·6; 19)
Pittsburgh	USA	1985-2006	315,172	0·09	0·88 (0·53; 1·31)	3·44	24·4 (15·2; 38·5)	43·8 (33·2; 55·3)	27·9 (17·7; 44)	63·1 (39·9; 96·5)	12·2 (3·2; 19·9)
Richmond	USA	1985-2006	116,646	0·08	0·59 (0·41; 0·81)	1·84	21 (15; 29·3)	38·1 (28·4; 48·6)	11·1 (5·9; 18·8)	93·7 (64·7; 119·4)	15·3 (7·5; 22·7)
Rochester	USA	1985-2006	126,514	0·26	0·6 (0·48; 0·77)	1·68	19·5 (13·9; 28)	NA	18·5 (10·2; 32)	62·5 (45·3; 84·8)	9·5 (1·2; 18·1)
Rockville	USA	1985-1997	45,773	0·28	1·19 (0·72; 1·84)	4·17	23 (16; 32)	NA	NA	83·1 (53·9; 116·9)	14·1 (6; 22·4)
Reading	USA	1985-2006	69,870	0·1	0·77 (0·49; 1·11)	2·8	20·2 (14·3; 28·4)	37·9 (29·7; 47)	20·2 (12·8; 31·4)	77·2 (51; 106·6)	12·6 (4·1; 20·7)
Reno	USA	1985-2006	45,270	0·23	0·95 (0·61; 1·64)	5·22	33 (22; 49·5)	25·7 (13·9; 42·3)	NA	78·7 (57·8; 98·5)	11·3 (4·5; 19·6)
Raleigh	USA	1985-2006	54,884	0·2	1·04 (0·7; 1·71)	4·64	20 (14·5; 27)	21·9 (15·2; 31·6)	5 (2·6; 8·8)	97·3 (70·8; 123·8)	16·1 (8·3; 22·9)
Riverside	USA	1985-2006	433,285	0·23	0·88 (0·58; 1·28)	2·59	36·3 (25·9; 46·5)	43 (32·9; 53·5)	3·1 (1·7; 4·8)	101·5 (69·2; 139·7)	17·1 (13; 22·1)
Sacramento	USA	1985-2006	172,136	0·18	0·72 (0·46; 1·18)	3·81	22·9 (16·4; 31·4)	25·8 (18·5; 35·3)	2·7 (0·8; 6)	80·6 (55·7; 105·7)	15·8 (10·8; 20·8)

City	Country	Period	Deaths	CO (mg/m^3)			PM_{10} (μg/m^3) Median (IQR)	NO_2 (μg/m^3) Median (IQR)	SO_2 (μg/m^3) Median (IQR)	O_3 (μg/m^3) Median (IQR)	Temperature (°C) Median (IQR)
				1st percentile	Median (IQR)	99th percentile					
Scranton	USA	1985-2006	150,043	0·03	0·62 (0·35; 0·94)	2·48	17·9 (11·9; 26·9)	28 (19·8; 38·3)	13·5 (8·1; 23·2)	77·5 (56·3; 102·2)	10·7 (2·2; 18·7)
San Diego	USA	1985-2006	369,486	0·4	1·03 (0·74; 1·54)	3·49	31·6 (24; 40·5)	37·2 (27·4; 50·5)	7·6 (4·9; 10)	87·4 (70·4; 105·2)	17·8 (14·8; 20·6)
San Francisco	USA	1985-2006	248,607	0·32	1·16 (0·72; 1·67)	3·62	22·6 (15·6; 32·5)	34·3 (23·1; 49·2)	2·7 (0·2; 5·5)	47·9 (35·2; 61·2)	14·6 (12·2; 16·6)
Salt Lake	USA	1985-2006	89,761	0·4	1·19 (0·82; 1·83)	5·18	29·8 (19·5; 43·1)	46·6 (34·2; 62·5)	9 (5·2; 18·5)	94·9 (71·8; 114·5)	11·2 (3·3; 21)
San Jose	USA	1985-2006	170,545	0·21	1·01 (0·68; 1·51)	4·38	25·2 (17·4; 35·5)	42·1 (30·4; 56·4)	NA	61·2 (43·9; 77·2)	17·1 (13·2; 21·1)
San Antonio	USA	1985-2006	182,624	0·19	0·8 (0·55; 1·26)	2·96	22 (16; 29·5)	16·2 (11·2; 23·8)	0 (0; 1·1)	78·3 (62·8; 99·6)	22·5 (15·7; 27·8)
Spokane	USA	1985-2006	68,626	0·65	1·88 (1·36; 2·65)	5·77	24·1 (14·3; 38·3)	NA	NA	87 (73·3; 100·7)	9·2 (2·9; 16·6)
Springfield, MA	USA	1985-2006	94,362	0·14	1·04 (0·68; 1·56)	4·02	23 (16·4; 32·8)	30·9 (21·6; 44·1)	16·2 (9·3; 26·5)	70·3 (51; 93·5)	10·9 (2·2; 19·2)
Springfield, MO	USA	1985-2006	42,857	0	0·6 (0·31; 1·01)	2·25	18 (13; 25)	19·5 (12·8; 27·1)	6·1 (2; 13)	78·4 (57·3; 99)	14·6 (5·6; 22)
Sarasota	USA	1989-2006	125,217	0·41	1·41 (1·07; 1·83)	3·88	19·9 (15·6; 24·6)	8·5 (5·4; 13)	2·4 (0·8; 5·2)	76·3 (59·8; 95·5)	24·2 (20·1; 27·1)
Steubenville	USA	1985-2006	20,161	0·29	0·79 (0·48; 1·49)	6·69	29·2 (19·8; 43·7)	33·6 (26·1; 43·2)	37·6 (23·2; 60)	70·1 (43·1; 101·2)	12·8 (3·8; 20·5)
Stockton	USA	1985-2006	81,491	0·21	0·73 (0·49; 1·16)	3·59	26·5 (18·5; 37·1)	35 (26·2; 45·3)	3·4 (0; 10·3)	72·4 (48·8; 96·8)	16·2 (10·9; 21·8)
Saint Clair	USA	1985-2006	25,465	0·21	0·54 (0·42; 0·72)	1·93	33 (25; 46)	35·5 (28; 43·9)	15·8 (6·9; 32·1)	NA	14·9 (5·8; 23·4)
South bend	USA	1985-1996	13,802	0·29	0·66 (0·44; 0·93)	1·89	26·1 (18·4; 36)	25 (19·1; 32)	14·4 (8·8; 23)	94 (74·2; 117)	9·6 (1·2; 19·1)
St Louis	USA	1985-2006	312,923	0·28	0·79 (0·61; 1·04)	2·23	25·5 (15·2; 39·4)	34·2 (26·4; 43·3)	17·6 (9·7; 28·6)	79·8 (55·9; 106·2)	15·6 (6·1; 23·6)
Stamford	USA	1985-2006	141,982	0·43	1·25 (0·93; 1·62)	3·46	21·5 (15·6; 30·9)	36·6 (25·8; 49·5)	12·8 (7·1; 22·6)	86·3 (66·5; 109·6)	11·3 (3·5; 19·2)
St· Petersburg	USA	1985-2006	158,555	0·26	0·66 (0·51; 0·89)	1·87	21·7 (17·1; 27)	19·6 (11·9; 29·4)	5·7 (1·8; 12)	73·7 (57·4; 94·1)	24·7 (20·3; 27·9)
Seattle	USA	1985-2006	225,371	0·51	1·5 (1·06; 2·09)	4·94	22·7 (15·9; 32·9)	31·7 (22·8; 41·5)	13·7 (7·8; 21·4)	59 (42·8; 77·2)	10·7 (7·7; 14·2)
Tacoma	USA	1985-2006	82,331	0·23	1·17 (0·75; 1·9)	5·61	22·8 (14·7; 35·8)	NA	15·9 (11·5; 21·7)	63·9 (51·7; 78·2)	11·2 (7·3; 16·2)
Tampa	USA	1985-2006	158,555	0·4	0·94 (0·77; 1·14)	1·96	24·6 (19; 30·5)	15·7 (10·4; 22·9)	11·6 (7·3; 17·3)	75·8 (59·3; 97·1)	23·7 (19·4; 26·9)
Tucson	USA	1985-2006	131,031	0·31	0·94 (0·64; 1·34)	2·97	25·3 (18·4; 34·6)	33·3 (24·6; 43·8)	3·4 (2·2; 5·7)	85·4 (67·8; 102·7)	21·3 (14; 27·9)
Toledo	USA	1985-1999	60,204	0·09	1 (0·61; 1·44)	2·91	25·5 (17·3; 35·2)	NA	12·5 (6·6; 22)	78·9 (56·3; 104·5)	10·5 (1·6; 19·4)
Trenton	USA	1985-1991	17,965	0·32	1·12 (0·81; 1·54)	3·48	29 (21; 40)	NA	19·8 (11·9; 31·6)	73·3 (47; 113·6)	13·1 (4·5; 21·4)
Terra Haute	USA	1994-1997	3,495	0·34	0·88 (0·6; 1·19)	2·05	22·9 (17·4; 28·7)	NA	18 (11·1; 26·5)	104·6 (82·7; 128·3)	12·3 (3·4; 20·4)
Tulsa	USA	1985-2006	94,613	0·19	0·81 (0·58; 1·08)	2·27	23·7 (16·8; 32·2)	20·9 (14; 29)	14·7 (6·4; 28·2)	84·5 (62·4; 109·3)	17·1 (8·3; 24·6)
Visalia	USA	1985-2005	47,112	0·12	0·74 (0·48; 1·15)	2·82	46·7 (31·9; 63·8)	35·1 (27·3; 45)	0 (0; 1·3)	101·4 (66·9; 144·6)	17·5 (11·1; 23·9)
Vancouver	USA	1987-2006	33,940	0·41	1·42 (1·04; 2·06)	5·08	15·6 (11; 22)	23 (16·9; 29·8)	11·4 (7·5; 16·7)	64·7 (50·5; 79·9)	12·1 (7·4; 17·3)
Ventura	USA	1985-2004	74,608	0·11	0·64 (0·43; 0·94)	2	29·4 (19·4; 37·8)	22·9 (17·5; 29·5)	1·4 (0; 3·9)	95·5 (73·8; 118·9)	16·6 (13·9; 18·8)
Wichita	USA	1985-2006	68,528	0·05	0·76 (0·53; 1·07)	2·54	21·9 (15·2; 30·4)	17·3 (12·1; 24·1)	12·9 (10·7; 13·1)	69·2 (50; 93·1)	14·5 (5·4; 23·1)
weber	USA	1985-2006	23,478	0·26	1·17 (0·8; 1·68)	4·15	25 (16; 35)	44·7 (32·5; 58)	NA	108·5 (94·6; 123·1)	11·3 (3; 21·4)
Wilmington	USA	1985-2006	74,895	0·18	0·79 (0·53; 1·13)	3	22·6 (16; 31·8)	37 (23·9; 51·1)	21·8 (12·3; 32·5)	67·8 (44·1; 98·7)	13·1 (5·1; 21·3)
Winston	USA	1985-2006	52,312	0·3	0·88 (0·65; 1·23)	2·68	22 (15·7; 29·7)	26·4 (19·1; 35·7)	13 (8·1; 20·2)	101 (79·1; 123)	16·4 (8·7; 23)
Worcester	USA	1985-2006	132,652	0·19	0·81 (0·55; 1·15)	2·86	19·1 (13·5; 28·1)	37·6 (26·5; 50·7)	11·5 (6·7; 19·8)	79·1 (61·5; 101·9)	9·3 (0·9; 17·4)
WDC	USA	1985-2006	140,833	0·4	1·05 (0·8; 1·39)	3·13	25·1 (17·6; 34·9)	43·7 (33·8; 55·1)	20·5 (13·7; 29·6)	56·8 (34·8; 91·5)	14·8 (6·7; 22·8)
Washington	USA	1985-2006	46,493	0	0·4 (0·16; 0·74)	1·6	18 (11·9; 27)	28·1 (20·1; 37·2)	23·7 (16·6; 33·3)	83·1 (54·9; 111·1)	11·9 (3·3; 19·2)
Youngstown	USA	1991-1994	15,464	0·09	0·53 (0·37; 0·67)	1·4	22·8 (16·8; 32·6)	31·4 (23·1; 43·2)	26·6 (15·8; 41)	88·6 (64·4; 118·1)	10·2 (1·6; 18·4)
York	USA	1985-2006	61,457	0	0·52 (0·29; 0·82)	2·24	22·1 (15·3; 31·6)	37·1 (27; 47·4)	15·1 (8·8; 23·8)	79·9 (51·9; 111·7)	12·1 (3·9; 20·4)

Table S3. Percentage of days with 24-h average CO concentration above the WHO indoor air quality guideline (7 mg/m^3) the Chinese ambient air quality guideline (4 mg/m^3).

City	Country	Percentage of days above the Chinese guideline (4 mg/m^3)	Percentage of days above the WHO guideline (7 mg/m^3)
Brisbane	Australia	0	0
Melbourne	Australia	0	0
Abbotsford	Canada	0	0
Calgary	Canada	0	0
Edmonton	Canada	0	0
Halifax	Canada	0	0
Hamilton	Canada	0	0
Kingston	Canada	0	0
Kitchener-Waterloo	Canada	0	0
London Ontario	Canada	0	0
Montreal	Canada	0	0
Oakville	Canada	0	0
Ottawa	Canada	0	0
Regina	Canada	0	0
Sarnia	Canada	0	0
Sudbury	Canada	0	0
Saint John NB	Canada	0	0
St· John's NFL	Canada	0	0
Sault Ste· Marie	Canada	0	0
Saskatoon	Canada	0	0
Thunder Bay	Canada	0	0
Toronto	Canada	0	0
Victoria	Canada	0	0
Vancouver	Canada	0	0
Windsor	Canada	0	0
Winnipeg	Canada	0	0
Beijing	China	3·7	0·4
Guangzhou	China	0·1	0
Shanghai	China	0	0
Santiago	Chile	0·3	0
Temuco	Chile	1·3	0·2
Valparaiso	Chile	0·1	0
Helsinki	Finland	0	0
Berlin	Germany	0	0
Bremen	Germany	0	0
Dresden	Germany	0	0
Dortmund	Germany	0·2	0
Duesseldorf	Germany	0	0
Frankfurt	Germany	0	0
Hamburg	Germany	0	0
Hannover	Germany	0	0
Koeln	Germany	0	0
Leipzig	Germany	0	0
Muenchen	Germany	0·1	0
Stuttgart	Germany	0	0
Bari	Italy	0	0
Civitavecchia	Italy	0	0
Florence	Italy	0	0
Frosinone	Italy	0	0
Genoa	Italy	0	0
Latina	Italy	0	0
Milan	Italy	0	0
Naples	Italy	0	0
Rieti	Italy	0	0
Rome	Italy	0	0
Trieste	Italy	0	0
Turin	Italy	0	0
Kitakyushu	Japan	0	0
Nagoya	Japan	0·1	0
Osaka	Japan	0·1	0
Sendai	Japan	0	0
Sapporo	Japan	0	0
Tokyo	Japan	0·2	0
Busan	South Korea	0	0
Daegu	South Korea	0	0
Daejeon	South Korea	0·1	0
Gwangju	South Korea	0	0

City	Country	Percentage of days above the Chinese guideline (4 mg/m^3)	Percentage of days above the WHO guideline (7 mg/m^3)
Incheon	South Korea	0	0
Seoul	South Korea	0	0
Ulsan	South Korea	0	0
Lisboa	Portugal	0	0
Porto	Portugal	0	0
Bucharest	Romania	0·4	0
Brasov	Romania	0	0
Constanta	Romania	0	0
Craiova	Romania	0	0
Galati	Romania	0	0
Iasi	Romania	0	0
Timisoara	Romania	0	0
A Coruna	Spain	0	0
Albacete	Spain	0	0
Alicante	Spain	0	0
Almeria	Spain	0	0
Avila	Spain	0	0
Badajoz	Spain	0	0
Bilbao	Spain	0	0
Barcelona	Spain	0	0
Burgos	Spain	0	0
Cadiz	Spain	0	0
Caceres	Spain	0	0
Cordoba	Spain	0	0
Castellon	Spain	0	0
Guadalajara	Spain	0	0
Girona	Spain	0	0
Granada	Spain	0	0
Huesca	Spain	0	0
Jaen	Spain	0	0
Leon	Spain	0	0
Logrono	Spain	0	0
Lleida	Spain	0	0
Lugo	Spain	0	0
Malaga	Spain	0	0
Madrid	Spain	0	0
Murcia	Spain	0	0
Ourense	Spain	0	0
Oviedo	Spain	0	0
Palmas G· Canaria	Spain	0	0
Palma Mallorca	Spain	0	0
Palencia	Spain	0	0
Pontevedra	Spain	0	0
Segovia	Spain	0	0
Salamanca	Spain	0	0
San Sebastian	Spain	0	0
Santander	Spain	0	0
Sevilla	Spain	0	0
Teruel	Spain	0	0
Tenerife	Spain	0	0
Toledo	Spain	0	0
Tarragona	Spain	0	0
Vitoria	Spain	0	0
Valladolid	Spain	0	0
Valencia	Spain	0	0
Zamora	Spain	0	0
Zaragoza	Spain	0	0
Bern	Switzerland	0·2	0
Lausanne	Switzerland	0	0
Lugano	Switzerland	0	0
Zürich	Switzerland	0	0
Stockholm	Sweden	0·4	0
Ayutthaya	Thailand	0	0
Bangkok	Thailand	0	0
Chachoengsao	Thailand	0	0
Chon Buri	Thailand	0	0
Chiang Mai	Thailand	0	0
Khon Kaen	Thailand	0·1	0
Lampang	Thailand	0	0
Nakhon Ratchasima	Thailand	1·1	0

City	Country	Percentage of days above the Chinese guideline (4 mg/m^3)	Percentage of days above the WHO guideline (7 mg/m^3)
Nakhon Sawan	Thailand	0	0
Nonthaburi	Thailand	0	0
Pathum Thani	Thailand	0	0
Ratchaburi	Thailand	0	0
Rayong	Thailand	0	0
Samutprakan	Thailand	0	0
Samut Sakhon	Thailand	0	0
Songkhla	Thailand	0	0
Saraburi	Thailand	0	0
Surat Thani	Thailand	0	0
Yala	Thailand	0	0
Kaohsiung	Taiwan	0	0
Taipei	Taiwan	0	0
Taichung	Taiwan	0	0
Blackpool	UK	0	0
Barnsley/Dearne Valley	UK	0	0
Birkenhead	UK	0	0
Bournemouth/ Poole	UK	0	0
Bristol	UK	0	0
Cardiff	UK	0	0
Coventry	UK	0	0
Kingston upon Hull	UK	0	0
Leicester	UK	0	0
London	UK	0·2	0·1
Liverpool	UK	0	0
Medway Towns	UK	0	0
Manchester	UK	0·1	0·1
Northampton	UK	0	0
Norwich	UK	0	0
Nottingham	UK	0	0
Newport	UK	0	0
Plymouth	UK	0	0
Preston	UK	0	0
Reading	UK	0	0
Sheffield	UK	0·3	0
South Hampshire	UK	0·1	0
Southend-on-Sea	UK	0	0
Stoke-on-Trent	UK	0	0
Swansea	UK	0	0
Teesside	UK	0	0
Tyneside	UK	0	0
Wigan	UK	0	0
West Midlands	UK	0·1	0
West Yorkshire	UK	0	0
Akron	USA	0·1	0
Albany	USA	0	0
Albuquerque	USA	0·4	0
Allentown	USA	0·1	0
Anchorage	USA	4·5	0·1
Anaheim	USA	2·2	0
Annandale	USA	0·1	0
Austin	USA	0·5	0
Atlantic City	USA	0	0
Atlanta	USA	0·1	0
Atzec	USA	0	0
Buffalo	USA	0	0
Bakersfield	USA	0	0
boulder	USA	0·3	0
Baltimore	USA	0·8	0
Boise	USA	7·4	0·2
Bergen	USA	0·5	0
Burlington	USA	0	0
Birmingham	USA	0·5	0
Brownsville	USA	0	0
Boston	USA	0·2	0
Baton Rouge	USA	0	0
Cedar Rapids	USA	0	0
Chicago	USA	0	0
Charlotte	USA	0·5	0
Charleston, SC	USA	0	0

City	Country	Percentage of days above the Chinese guideline (4 mg/m^3)	Percentage of days above the WHO guideline (7 mg/m^3)
Charleston, WV	USA	0·1	0
Columbus	USA	0	0
Colorado Springs	USA	0·5	0
Cleveland	USA	0	0
Cincinnati	USA	0	0
Canton	USA	0	0
Columbia	USA	0·3	0
Davis	USA	1·4	0
Dallas	USA	0·1	0
Denver	USA	2·3	0·3
Durham	USA	2·3	0·2
Des Moines	USA	0·2	0
Detroit	USA	0·1	0
Davenport	USA	0	0
Dayton	USA	0	0
El Centro	USA	1·1	0·2
El Paso	USA	1·3	0
Elizabeth	USA	5·1	0·2
Erie	USA	0	0
Eugene	USA	1·3	0
Evansville	USA	0	0
Everett	USA	10·2	0·2
Fresno	USA	0	0
Ft Lauderdale	USA	0	0
Ft Worth	USA	0	0
Ft Wayne	USA	0·1	0
Fayetteville	USA	0·4	0
Gary	USA	0	0
Greensburg	USA	0	0
Grand Junction	USA	0·4	0
Grand Rapids	USA	0	0
Greensboro	USA	0·1	0
Greenville	USA	0	0
Gettysburg	USA	0	0
Honolulu	USA	0	0
Harrisburg	USA	0·6	0
Hartford	USA	3·1	0·1
Houston	USA	0·1	0
Indianapolis	USA	0	0
Jacksonville	USA	0	0
Jersey city	USA	6·2	0·1
Klamath	USA	9·1	0·3
Kalamazoo	USA	0	0
Kenosha	USA	0	0
Kansas	USA	0	0
Knoxville	USA	0·3	0
Lafayette, IN	USA	0	0
Lancaster	USA	0	0
Louisville	USA	0·3	0
Los Angeles	USA	3·4	0
Las Vegas	USA	6	0·9
Little Rock	USA	0·2	0
middles	USA	0·3	0
Medford	USA	8·1	0·7
Madison, IL	USA	0·1	0
Modesto	USA	0·3	0
Madison, WI	USA	0	0
Miami	USA	0·1	0
Milwaukee	USA	0	0
Memphis	USA	0·6	0
Monmouth	USA	0·9	0
Minneapolis	USA	0·6	0
Montgomery	USA	0	0
Marlboro	USA	1·9	0·1
Nashua	USA	1	0·1
Nassau	USA	0·3	0
Norfolk	USA	0	0
Nashville	USA	0·4	0
New Haven	USA	0·8	0
New Orleans	USA	0·1	0
Newark	USA	0·5	0

City	Country	Percentage of days above the Chinese guideline (4 mg/m^3)	Percentage of days above the WHO guideline (7 mg/m^3)
New York	USA	6·3	0
Oklahoma	USA	0·2	0
Oakland	USA	0	0
Omaha	USA	0·1	0
Orlando	USA	0	0
Philadelphia	USA	0·1	0
Phoenix	USA	1·6	0
Palm beach	USA	0	0
Portland, OR	USA	1	0
Provo	USA	4·7	0·3
Port Arthur	USA	0	0
Portland, ME	USA	0	0
Providence	USA	0·4	0
Pittsburgh	USA	0·6	0
Richmond	USA	0	0
Rochester	USA	0	0
Rockville	USA	1·2	0
Reading	USA	0·1	0
Reno	USA	3	0·2
Raleigh	USA	2·1	0·1
Riverside	USA	0	0
Sacramento	USA	0·8	0
Scranton	USA	0·1	0
San Diego	USA	0·3	0
San Francisco	USA	0·4	0
Salt Lake	USA	3·1	0·1
San Jose	USA	1·7	0
San Antonio	USA	0·1	0
Spokane	USA	5·8	0·2
Springfield, MA	USA	1·1	0·1
Springfield, MO	USA	0·1	0
Sarasota	USA	0·7	0
Steubenville	USA	4·6	0·8
Stockton	USA	0·6	0
Saint Clair	USA	0	0
South bend	USA	0	0
St Louis	USA	0	0
Stamford	USA	0·4	0
St· Petersburg	USA	0	0
Seattle	USA	2·4	0·1
Tacoma	USA	3·9	0·3
Tampa	USA	0	0
Tucson	USA	0·1	0
Toledo	USA	0·1	0
Trenton	USA	0·3	0
Terra Haute	USA	0	0
Tulsa	USA	0	0
Visalia	USA	0	0
Vancouver	USA	3	0·1
Ventura	USA	0	0
Wichita	USA	0·1	0
weber	USA	1·3	0
Wilmington	USA	0·3	0
Winston	USA	0	0
Worcester	USA	0·3	0
WDC	USA	0·3	0
Washington	USA	0	0
Youngstown	USA	0	0
York	USA	0	0

Table S4. Sensitivity analysis of overall percent increase of mortality per 1 mg/m^3 increase in CO at lag 1 day with different adjustment for time trend, relative humidity, and different time periods of data.

	Percent increase
Main model	0·91 (0·32, 1·50)
Adjustment for time trend	
5 df/year	0·89 (0·34, 1·45)
6 df/year	0·91 (0·34, 1·49)
8 df/year	0·96 (0·35, 1·58)
9 df/year	0·96 (0·37, 1·56)
10 df/year	1·00 (0·40, 1·59)
Adjustment for relative humidity in 230 cities	
With adjustment for relative humidity	0·76 (0·03, 1·48)
Without adjustment for relative humidity	0·70 (-0·01, 1·42)
Using different time periods of data	
Restriction to at least three years of data in 315 cities	0·84 (0·23, 1·47)
Restriction to at least two years of data after the year 2000 in 311 cities	0·92 (0·33, 1·51)
Outcome: all-cause or non-external mortality	
In 70 cities with both all-cause and non-external mortality	
All-cause	0·40 (-0·50, 1·31)
Non-external	0·36 (-0·60, 1·34)

Table S5. Sensitivity analysis of overall percent increase of mortality per 1 mg/m^3 increase in CO at lag 1 day with different adjustment for temperature.

Temperature adjustment	Lags of temperature	Percent increase	GCV
Main model: low (below median value) and high (above median value) temperatures	Lag 1-6 for low and lag 0-1 for high temperatures	0·91 (0·32, 1·50)	1·0941
Low (below median value) and high (above median value) temperatures	Lag 1-3 for low and lag 0-1 for high temperatures	1·13 (0·51, 1·75)	1·0947
	Lag 0-5 for low and lag 0 for high temperatures	1·16 (0·50, 1·83)	1·0950
	Lag 0-3 for low and lag 0 for high temperatures	1·29 (0·60, 1·97)	1·0954
Moving average temperature	Lag 0-1 days	1·28 (0·67, 1·88)	1·0958
	Lag 0-3 days	1·49 (0·81, 2·17)	1·0965
	Lag 0-7 days	1·53 (0·74, 2·33)	1·0977
Distributed lag nonlinear term for temperature using a natural spline with 3 df in the log scale of the lag dimension	Lag 0-7 days	0·50 (0·05, 0·96)	1·0944
	Lag 0-14 days	0·91 (0·33, 1·49)	1·0797
	Lag 0-21 days	1·09 (0·46, 1·73)	1·0964

Note: GCV is the average score of generalized cross-validation at the global level.

Table S6. Overall percent increase in CO-related mortality per interquartile range (IQR) increase in economic and climatic characteristics.

Variable	IQR	Percent increase	P-value
Gross domestic product (GDP) per capita (US $)	15,280	-0·19 (-0·90, 0·53)	0·610
Latitude (°)	7·96	-0·05 (-0·19, 0·09)	0·488
Annual mean temperature (°C)	6·52	0·01 (-0·20, 0·21)	0·948

Note the CO-related mortality estimate is percent increase of mortality per 1 mg/m^3 increase in CO at lag 1 day. We explored the effect of economic and climatic characteristics by adding each variable into a meta-regression separately. P-value denotes the statistical significance for the characteristic variables.

Figure S1. Map of the city-specific annual mean CO concentrations of 337 cities included in the analysis.

Figure S2. Country-specific Pearson correlation coefficient between air pollutants and weather.

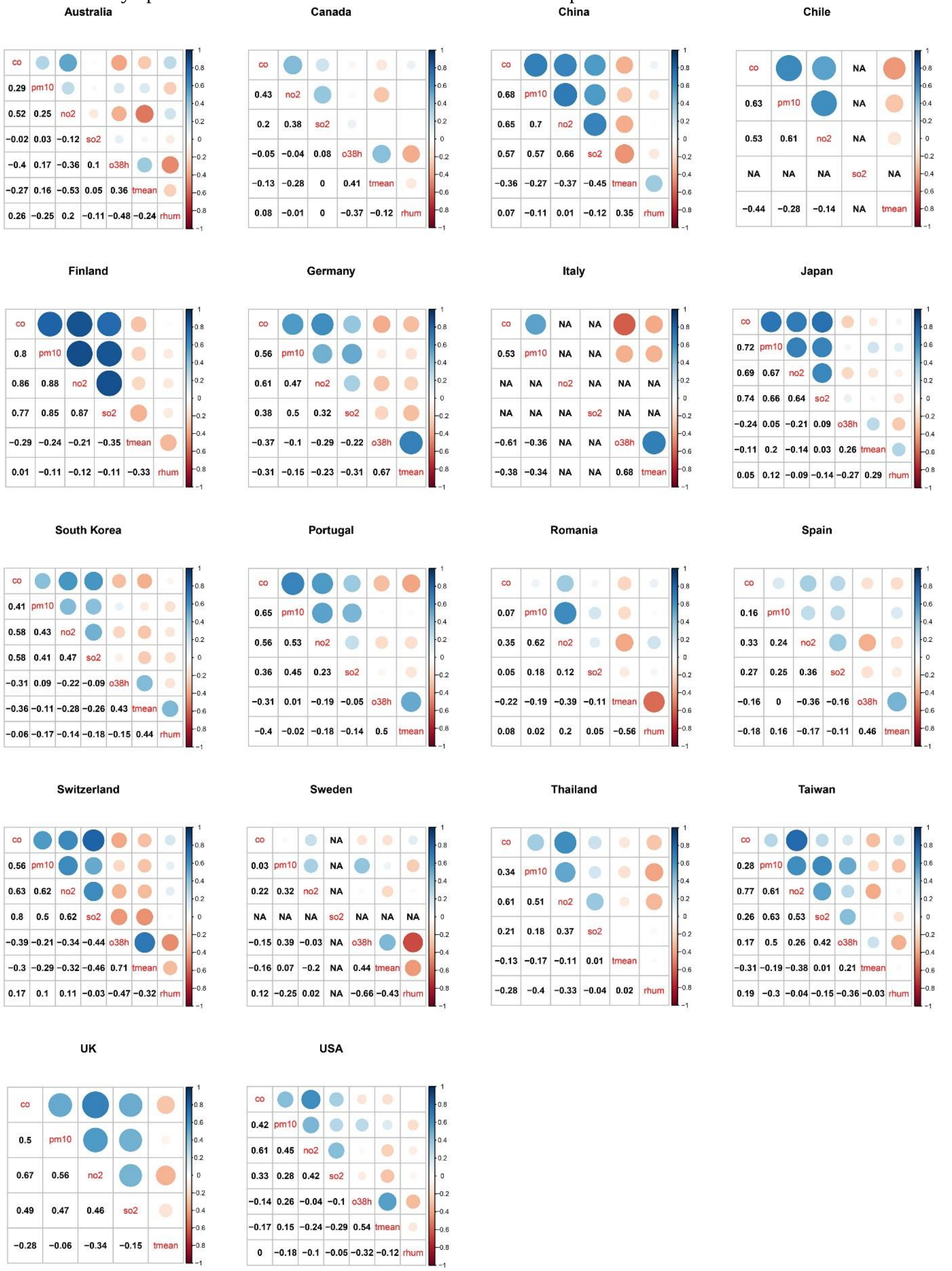

Figure S3. Percent increase in daily mortality per 1 mg/m^3 increase in CO, with and without adjustment for PM_{10} (A), NO_2 (B), SO_2 (C), and O_3 (D) at lag 1 day.

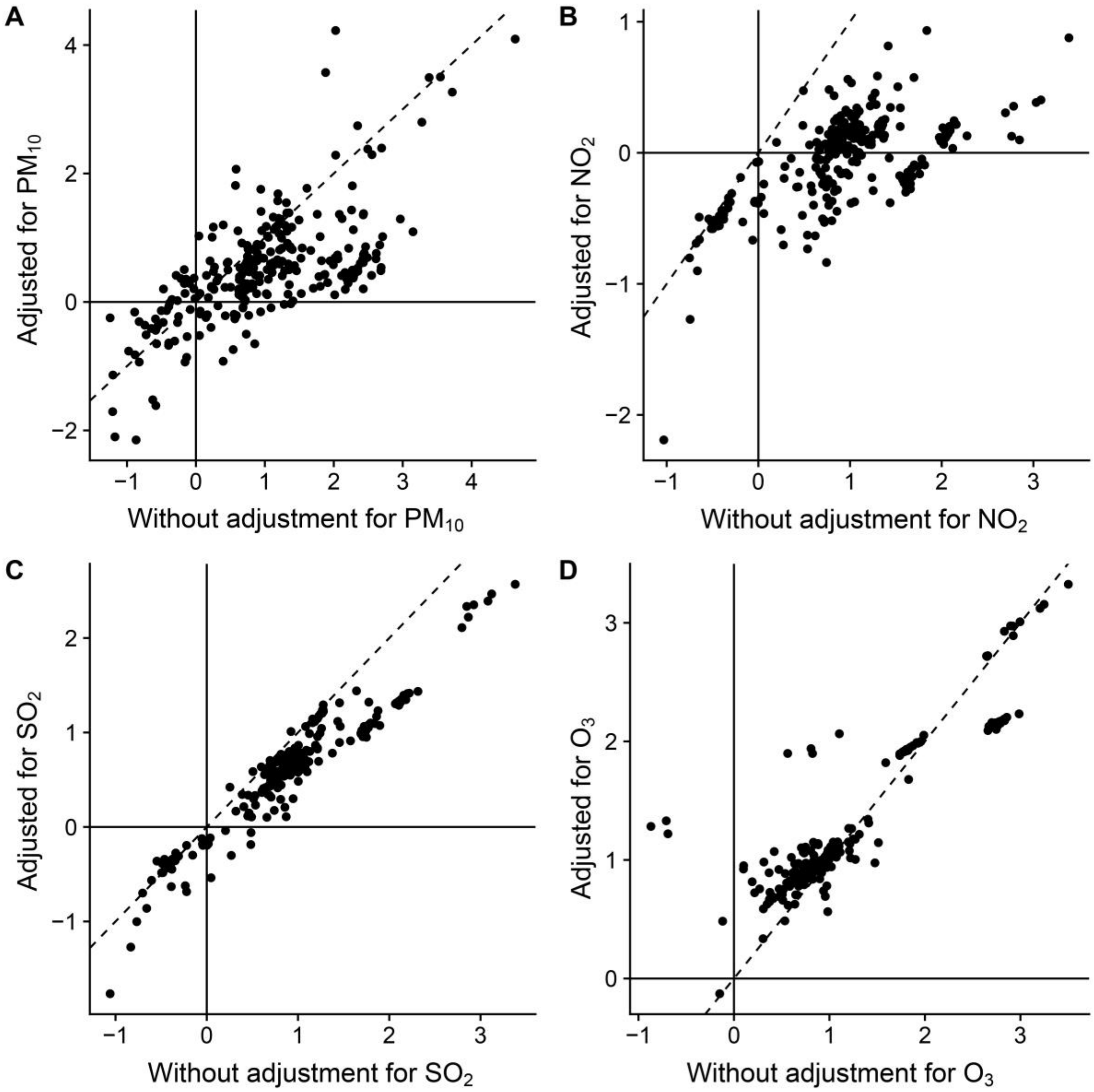

Figure S4. Pooled exposure-response curve between CO (lag1) and daily mortality using knots at the average 30th and 70th percentiles of the CO concentrations across all countries.
The y axis represents the percentage change in daily mortality at a certain CO concentration compared with the median concentration. The X axis represents CO concentration from the 1st to 99th percentiles of CO concentrations across all cities. Shaded area represents the 95% confidence intervals.