

# Supplementary Materials: The Combined Effects of Hourly Multi-Pollutant on the Risk of Ambulance Emergency Calls: A Seven-Year Time Series Study

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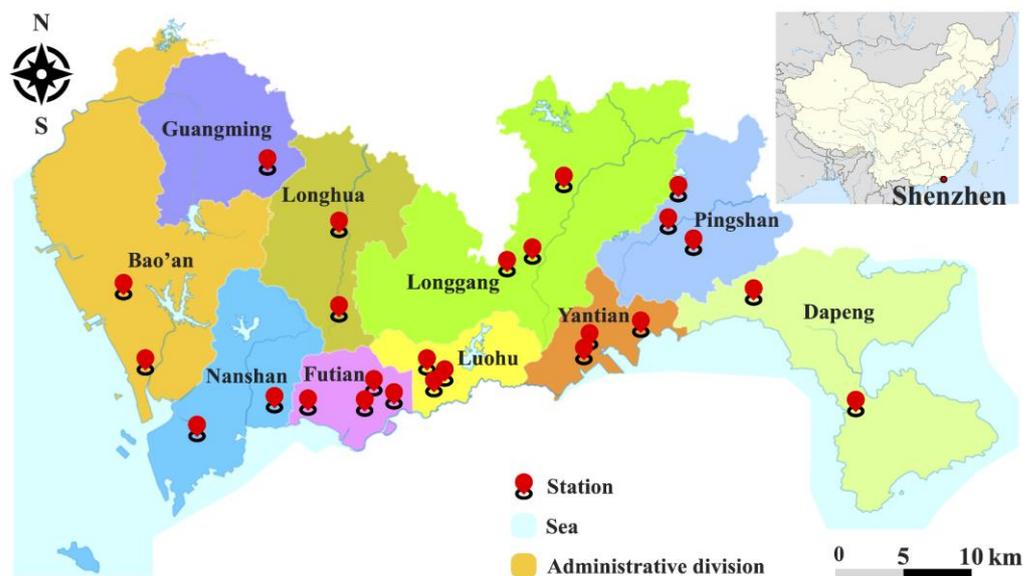
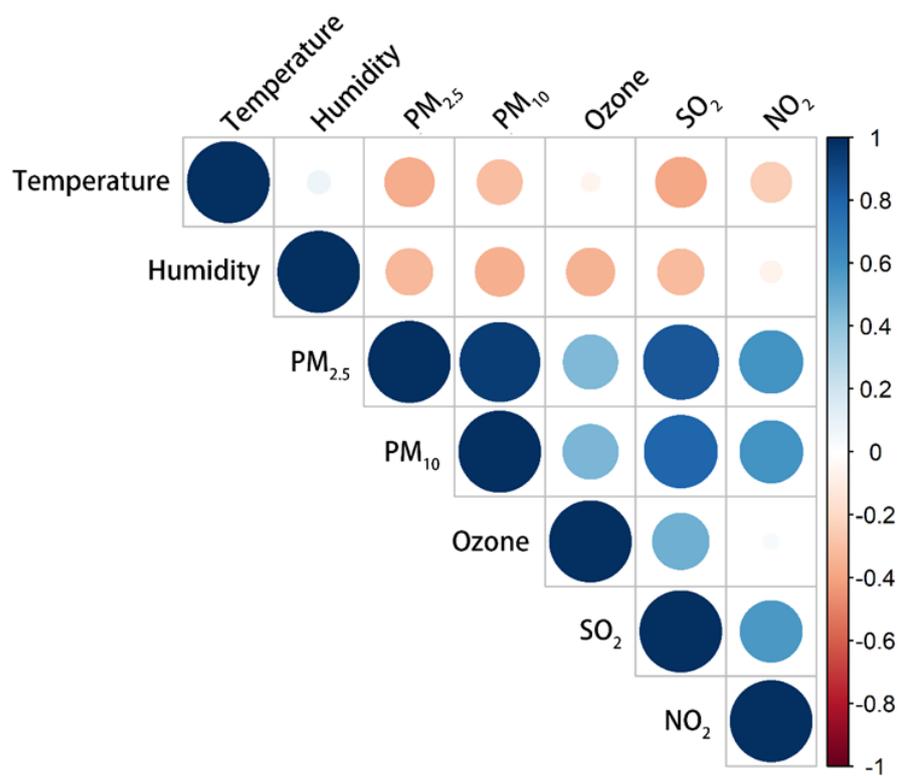
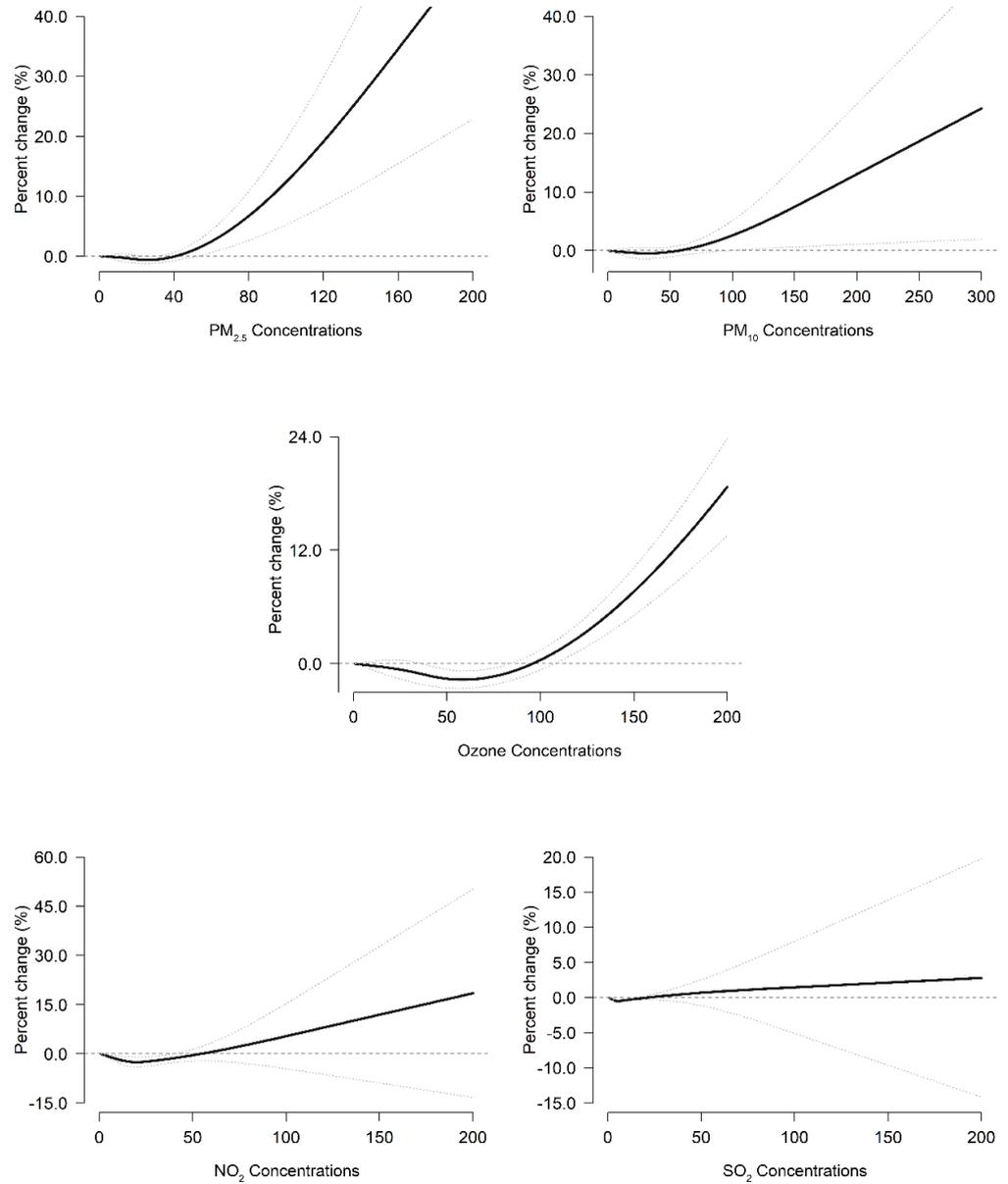


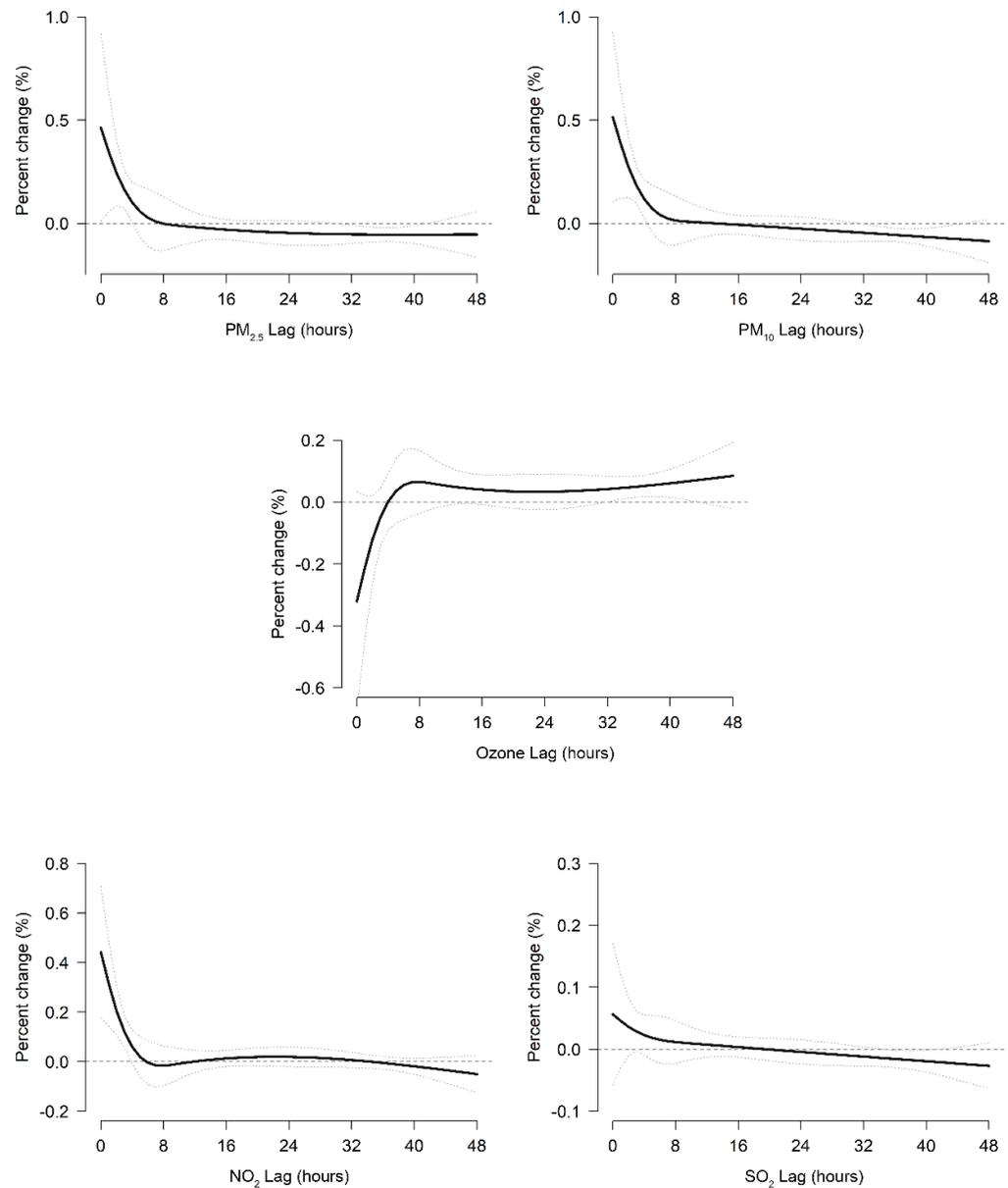
Figure S1. Distribution of environmental monitors in Shenzhen city, China.



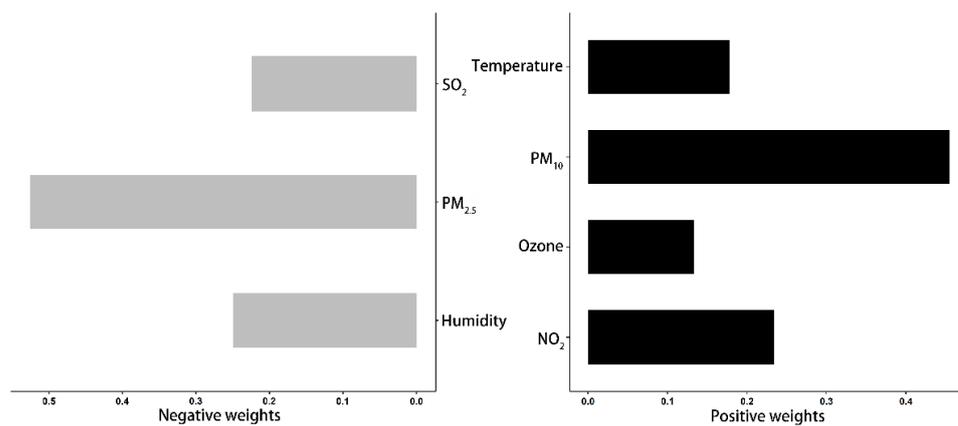
**Figure S2.** Spearman correlations among air pollutants and meteorological factors. Abbreviations: PM<sub>2.5</sub>, PM<sub>10</sub>, particulate matter less than 2.5,10 μm in diameter; NO<sub>2</sub>, nitrogen dioxide; SO<sub>2</sub>, sulfur dioxide.



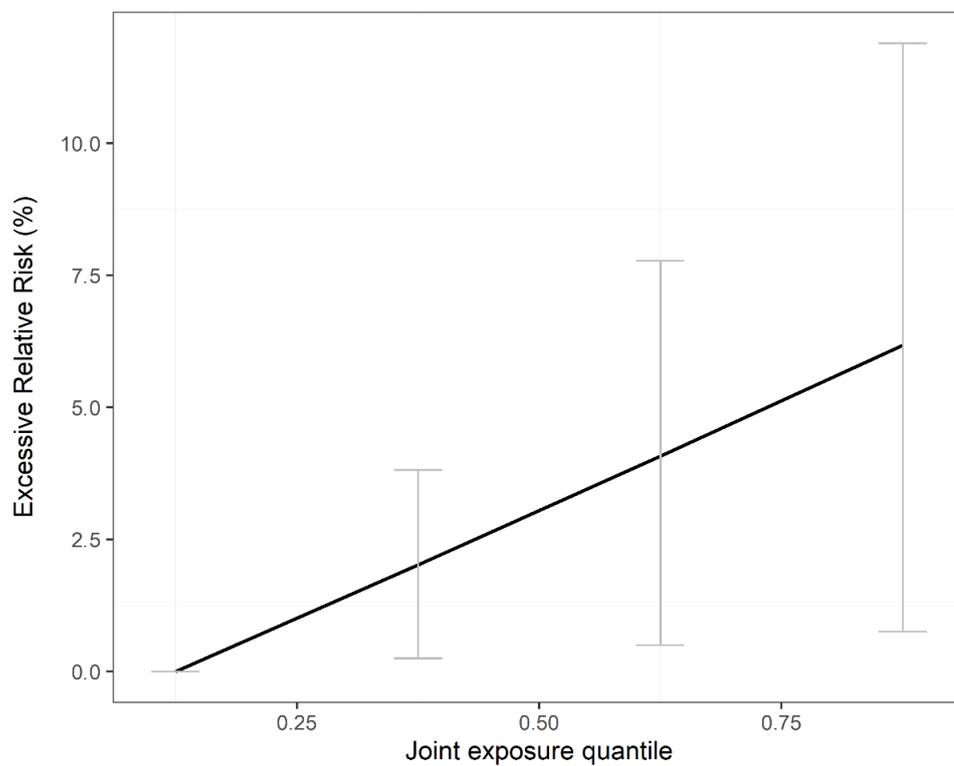
**Figure S3.** Cumulative concentration-response curves for the association of all-cause ambulance emergency calls with PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone, NO<sub>2</sub>, and SO<sub>2</sub> over lags 0-48h in Shenzhen from 2013-19. The cumulative exposure-response curves are calculated using a natural B-spline with two knots to model the exposure-response association. The black solid lines are the average percentage change in the risk of all-cause ambulance emergency calls, and the dotted lines are the 95% confidence intervals. Abbreviations: PM<sub>2.5</sub>, PM<sub>10</sub>, particulate matter less than 2.5,10 μm in diameter; NO<sub>2</sub>, nitrogen dioxide; SO<sub>2</sub>, sulfur dioxide.



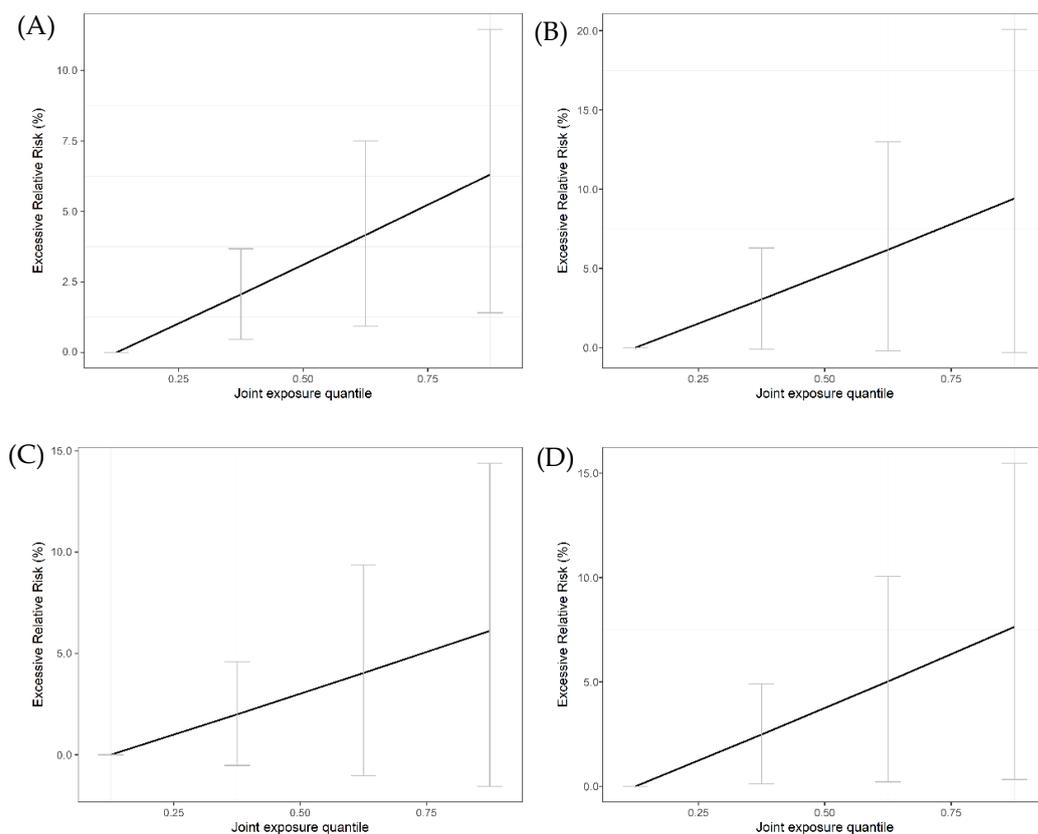
**Figure S4.** Lag structures for the associations of ambulance emergency calls with each interquartile range increase concentration in PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone, NO<sub>2</sub>, and SO<sub>2</sub> over lags 0-48h in Shenzhen from 2013-19. The overall lag structure curves are calculated using a linear with two knots placed on the log scale of lags to model the lag-response association. The solid black lines are the average percent change in the risk of all-cause ambulance emergency calls with each IQR increase in PM<sub>2.5</sub>, PM<sub>10</sub>, Ozone, NO<sub>2</sub>, and SO<sub>2</sub> and the dotted lines are the 95% confidence intervals. Abbreviations: IQR, interquartile range; PM<sub>2.5</sub>, PM<sub>10</sub>, particulate matter less than 2.5,10  $\mu\text{m}$  in diameter; NO<sub>2</sub>, nitrogen dioxide; SO<sub>2</sub>, sulfur dioxide.



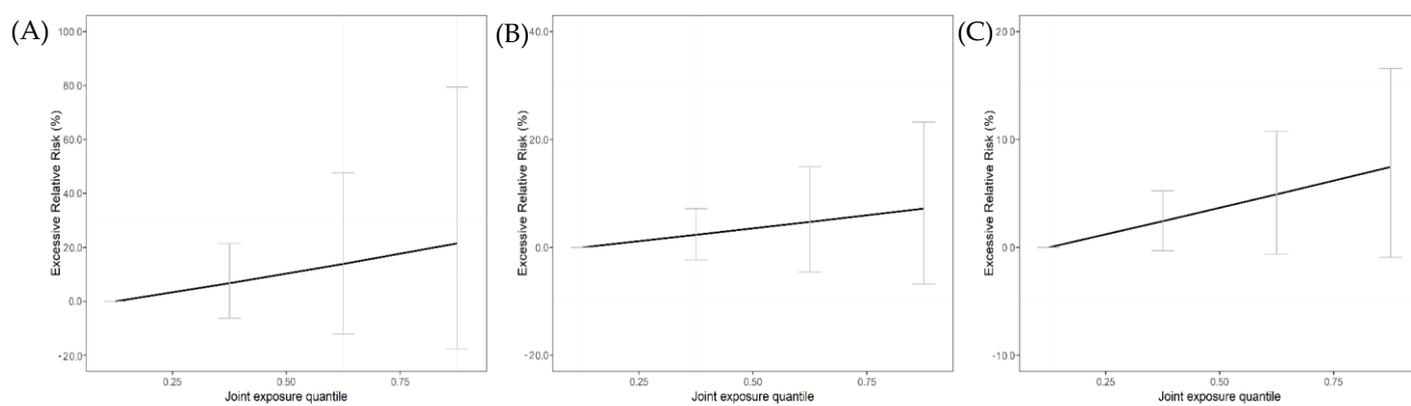
**Figure S5.** Weights representing the proportion of the positive or negative partial effect of each pollutant in quantile g-computation model. Abbreviations: PM<sub>2.5</sub>, PM<sub>10</sub>, particulate matter less than 2.5,10 μm in diameter; NO<sub>2</sub>, nitrogen dioxide; SO<sub>2</sub>, sulfur dioxide.



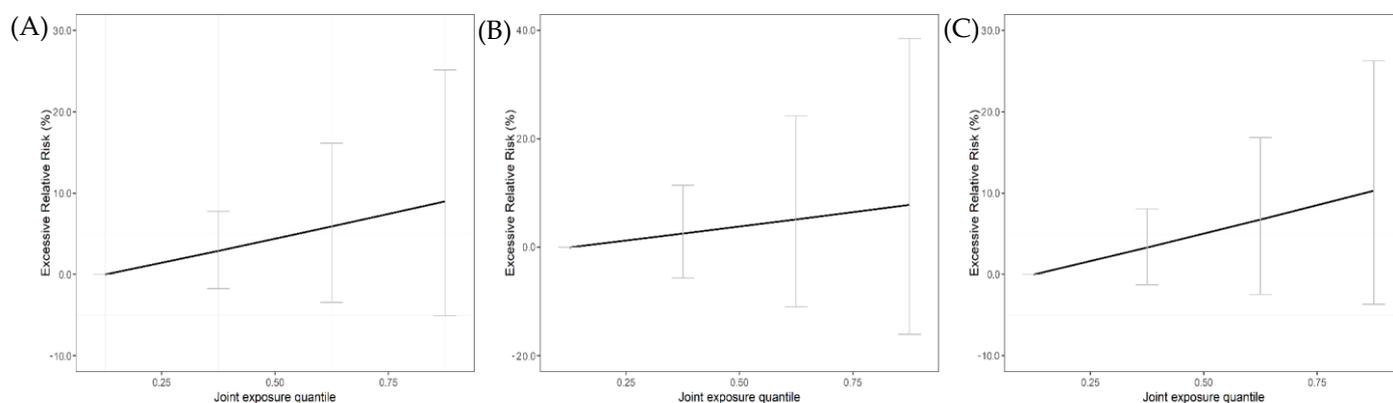
**Figure S6.** Sensitivity analysis: Exposure-response relationship between air pollutant mixtures and all-cause ambulance emergency calls in Shenzhen from 2013-19. The line is the exposure response curve, and the gray error bar is the confidence interval at each percentile. P-value <0.001 for linear relationship.



**Figure S7.** Sensitivity analysis: Exposure-response relationship between air pollutant mixtures and cause-specific ambulance emergency calls in Shenzhen from 2013-19. (A) represents vascular disease; (B) represents respiratory disease; (C) represents reproduction disease; (D) represents injury. The line is the exposure response curve, and the gray error bar is the confidence interval at each percentile. P-value < 0.001 for linear relationship.



**Figure S8.** Sensitivity analysis: Exposure-response relationship between air pollutant mixtures and sub-vascular ambulance emergency calls in Shenzhen from 2013-19. (A) represents myocardial infarction (n=2,770); (B) represents acute coronary syndrome (n=30,892); (C) represents stroke (n=92,302). The line is the exposure response curve, and the gray error bar is the confidence interval at each percentile. P-value < 0.001 for linear relationship.



**Figure S9.** Sensitivity analysis: Exposure-response relationship between air pollutant mixtures and sub-respiratory ambulance emergency calls in Shenzhen from 2013-19. (A) represents pneumonia (n=31,159); (B) represents asthma (n=13,685); (C) represents upper respiratory infection (n=33,305). The line is the exposure response curve, and the gray error bar is the confidence interval at each percentile. P-value < 0.001 for linear relationship.