THE LANCET
Planetary Health

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: Chen K, Wang M, Huang C, Kinney PL, Anastas PT. Air pollution reduction and mortality benefit during the COVID-19 outbreak in China. *Lancet Planet Health* 2020; published online May 13. https://doi.org/10.1016/S2542-5196(20)30107-8.

Supplementary Material

Air Pollution Reduction and Mortality Benefit during the COVID-19 Outbreak in China

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Table S1. Cause-specific coefficients (β) and 95% confidence intervals of the concentration-response functions for daily $PM_{2.5}$ and NO_2 applied in this study. [a]

Cause of deaths	NO_2	$PM_{2.5}$
Total	0·9 (0·7, 1·1)	0·22 (0·15, 0·28)
Cardiovascular disease	0·9 (0·7, 1·2)	0·27 (0·18, 0·36)
Hypertensive disease	1·4 (0·8, 2·0)	0·39 (0·13, 0·65)
Coronary heart disease	0·9 (0·6, 1·2)	0·30 (0·19, 0·40)
Stroke	0·9 (0·5, 1·2)	0·23 (0·13, 0·34)
Respiratory disease	1·2 (0·9, 1·5)	0·29 (0·17, 0·42)
COPD [b]	1·6 (1·1, 2·0)	0·38 (0·23, 0·53)

[a] β is expressed as the percentage change in daily mortality associated with a 10 $\mu g/m^3$ increase in daily NO_2 or $PM_{2.5}$ concentrations, which is obtained from a previous study of 272 Chinese cities. NO_2 estimates were from Chen R, Yin P, Meng X, et al. Associations between ambient nitrogen dioxide and daily cause-specific mortality: evidence from 272 Chinese cities. Epidemiology 2018; 29(4): 482-9. $PM_{2.5}$ estimates were from Chen R, Yin P, Meng X, et al. Fine particulate air pollution and daily mortality. A nationwide analysis in 272 Chinese cities. Am J Respir Crit Care Med 2017; 196(1): 73-81.

[b] COPD represents chronic obstructive pulmonary disease.

Table S2. Air pollution changes due to the quarantine in Wuhan, Hubei, and China.

	Main analysis defining before quarantine period as 5 to 20 days before the Chinese Lunar New Year			Using alternative before quarantine period as 5 to 24 days before the Chinese Lunar New Year		
	During vs before in 2020	During vs before in 2016-2019	Difference in difference	During vs before in 2020	During vs before in 2016-2019	Difference in difference
NO_2 ($\mu g/m^3$)						
Wuhan	-21·7	1·1	-22·8	-23·8	2·5	-26·3
Hubei (Outside Wuhan)	-16·9	-4·7	-12·2	-16·9	-4·7	-12·2
China (Outside Hubei)	-15·6	-2·7	-12·9	-17·5	-3·4	-14·2
China	-15·7	-2·7	-12·9	-17·5	-3·4	-14·2
$PM_{2.5}$ ($\mu g/m^3$)						
Wuhan	-20·0	-18·6	-1·4	-25·4	-20·8	-4·7
Hubei (Outside Wuhan)	-18·5	-22·2	3·7	-18·5	-22·2	3·7
China (Outside Hubei)	-26·3	-6·6	-19·7	-27·8	-9·6	-18·2
China	-26·0	-7·1	-18·9	-27·8	-9·6	-18·2

Note: During quarantine was defined as the period from 17 to 50 days after the Chinese Lunar New Year.

Table S3. Avoided cause-specific deaths (95% confidence interval) due to air pollution reduction due to the quarantine.

	Main analysis defining before quarantine period as 5 to 20 days before the Chinese Lunar New Year		Using alternative before quarantine period as 5 to 24 days before the Chinese Lunar New Year	
	NO_2	$PM_{2.5}$	NO_2	$PM_{2.5}$
Total	8911 (6950, 10866)	3214 (2340, 4087)	9803 (7647, 11953)	3095 (2253, 3936)
Hypertensive disease	490 (283, 695)	202 (68, 335)	539 (311, 764)	194 (65, 323)
Coronary heart disease	1757 (1177, 2335)	863 (577, 1150)	1933 (1296, 2569)	831 (555, 1107)
Stroke	2074 (1390, 2756)	782 (409, 1154)	2282 (1529, 3032)	753 (394, 1112)
COPD	1427 (1076, 1776)	503 (305, 700)	1569 (1184, 1952)	484 (294, 674)

Note: During quarantine was defined as the period from 17 to 50 days after the Chinese Lunar New Year.