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Supplemental Material

Short-Term Exposure to Ambient Air Pollution and Influenza: A Multicity Study in China

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Table S1. Distribution of daily average temperature and relative humidity in 82 cities in China, 2015–2019.

City	Temperature (℃)						Relative humidity (%)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Beijing	10.6	-21.1	-1.1	12.1	21.6	30.3	54.7	12.2	40.4	54.0	69.4	96.0
Tianjin	12.5	-18.4	1.2	13.9	23.3	32.1	57.4	16.2	43.7	57.1	71.9	95.0
Shijiazhuang	11.8	-16.5	1.5	13.2	21.8	30.1	56.9	15.4	42.4	56.2	71.7	95.8
Handan	13.8	-12.1	4.1	15.1	23.4	31.3	59.9	17.3	46.3	60.0	74.3	96.5
Xingtai	13.4	-13.8	3.3	14.7	23.3	31.0	59.1	18.4	45.1	59.1	73.6	96.6
Baoding	11.4	-18.7	0.4	12.9	21.8	30.3	56.3	14.8	41.8	55.5	71.1	95.9
Zhangjiakou	7.9	-23.9	-3.8	9.3	19.1	28.6	52.4	12.2	40.5	51.9	64.6	92.0
Cangzhou	13.5	-16.0	2.6	14.8	23.7	32.6	59.4	18.5	46.3	59.4	73.6	96.1
Hengshui	13.5	-15.0	2.9	14.8	23.6	31.9	60.2	18.9	46.7	60.7	74.5	97.3
Datong	8.1	-21.9	-2.7	9.8	18.8	28.2	52.7	14.0	39.5	52.2	65.6	94.2
Jincheng	13.3	-10.6	4.1	14.4	22.3	30.3	60.2	16.0	47.1	61.2	73.9	97.5
Linfen	12.3	-13.3	2.8	13.4	21.5	30.8	57.6	15.0	44.7	57.9	71.0	97.0
Shanghai	17.0	-6.1	9.5	17.9	23.9	33.7	76.7	39.9	69.8	78.0	84.8	98.8
Nanjing	16.6	-7.5	8.4	17.4	24.1	34.3	75.3	38.9	67.9	76.6	84.3	98.0
Wuxi	16.9	-6.8	8.9	17.6	24.2	34.7	75.8	38.7	68.6	77.0	84.5	99.1
Hangzhou	17.6	-5.3	10.0	18.4	24.5	33.7	76.7	40.7	69.1	78.0	85.5	98.3
Ningbo	17.7	-4.2	10.7	18.5	24.1	32.8	78.2	37.8	71.9	79.6	85.8	99.1
Shaoxing	17.8	-4.5	10.6	18.6	24.5	33.8	77.2	37.4	69.9	78.8	85.5	99.0
Jinhua	18.2	-3.8	10.9	19.0	24.8	33.5	76.2	36.3	68.0	77.4	85.5	99.4
Taizhou	18.2	-2.8	11.3	19.0	24.7	32.0	78.3	36.7	71.9	79.6	86.2	98.8
Lishui	18.7	-2.2	11.8	19.6	25.2	32.1	77.1	41.3	69.6	78.1	85.7	98.3
Hefei	16.5	-7.1	8.3	17.3	24.3	33.9	76.2	39.1	69.1	77.3	84.7	98.4
Maanshan	16.6	-7.3	8.4	17.4	24.1	33.8	75.7	39.6	68.4	76.9	84.7	98.4
Huangshan	16.9	-5.9	9.3	17.9	23.8	32.3	76.9	37.5	69.2	78.2	85.9	99.5
Chuzhou	16.2	-8.2	7.8	17.1	24.2	33.9	75.0	34.6	67.5	76.4	84.0	98.2
Fuyang	16.1	-7.3	7.4	16.9	24.4	33.2	72.9	26.4	64.2	74.6	82.5	97.5
Luan	16.5	-6.5	8.2	17.4	24.3	33.8	76.1	36.9	68.6	77.2	84.8	97.9
Chizhou	16.9	-6.0	9.2	17.9	24.2	32.5	77.5	41.2	70.8	78.7	85.4	98.7
Fuzhou	19.8	0.8	13.9	20.5	25.9	30.5	78.4	35.6	72.4	79.4	86.2	98.2
Quanzhou	20.1	1.4	14.7	20.9	25.8	30.2	79.8	45.2	74.3	81.2	86.9	98.6
Nanchang	18.1	-2.9	10.7	19.1	25.2	32.5	76.8	35.3	69.1	78.2	85.1	97.7
Yingtan	18.5	-2.8	11.3	19.6	25.3	32.5	78.0	37.9	70.0	79.0	86.9	99.2
Ganzhou	19.7	-0.1	13.4	21.1	26.5	31.1	78.6	38.2	72.5	79.8	86.2	99.4
Jian	18.8	-1.3	11.8	20.0	25.8	31.9	78.7	41.7	71.6	80.1	86.7	98.0
Shangrao	18.1	-3.5	10.8	19.1	25.1	32.5	77.5	37.1	69.7	78.5	86.2	98.9
Dezhou	13.9	-13.5	3.6	15.2	23.7	31.9	61.5	19.8	48.8	62.0	75.2	97.5
Liaocheng	14.1	-11.7	4.3	15.5	23.7	32.0	62.5	19.3	49.9	62.8	75.7	97.7
Heze	14.9	-9.8	5.5	16.0	24.0	32.4	66.3	18.8	55.6	67.4	78.5	97.1
Luoyang	14.5	-8.2	5.9	15.4	23.2	31.6	63.3	18.7	51.4	65.0	76.4	97.2
Pingdingshan	15.2	-6.9	6.5	16.1	23.9	32.5	66.0	19.6	55.3	67.4	78.4	98.0
Anyang	14.3	-10.4	4.8	15.7	23.7	31.8	61.2	16.4	48.4	61.3	75.3	97.1

Table S1. (continued).

City	Temperature (℃)						Relative humidity (%)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Xinxiang	14.6	-8.9	5.5	15.9	23.9	32.2	62.3	16.2	50.7	62.8	75.7	97.2
Nanyang	15.6	-6.2	7.2	16.6	24.0	32.5	68.1	18.5	58.3	69.7	78.8	97.9
Shangqiu	15.3	-8.9	6.2	16.3	24.2	32.5	69.2	20.2	59.8	70.8	80.2	96.4
Xinyang	16.5	-5.6	8.1	17.3	24.6	33.4	73.5	31.7	64.9	75.0	82.9	97.8
Zhoukou	15.7	-7.5	6.8	16.6	24.5	32.8	68.9	20.8	59.3	70.4	80.0	96.6
Zhumadian	16.0	-6.0	7.4	17.0	24.6	33.1	70.3	25.3	60.5	71.9	80.9	97.8
Wuhan	17.2	-3.5	9.2	18.3	24.9	33.7	75.5	35.0	68.2	76.6	84.1	98.8
Jingzhou	17.5	-3.4	9.8	18.4	25.1	33.9	77.1	36.8	70.4	78.1	85.2	99.4
Huanggang	17.0	-4.6	9.1	17.9	24.7	33.5	75.5	35.5	67.8	76.9	84.2	98.2
Enshi	16.6	-3.8	9.2	17.3	23.8	31.1	77.7	44.6	71.8	77.9	84.5	96.4
Changsha	18.0	-1.4	10.5	18.8	25.2	32.7	78.7	39.0	72.1	79.8	86.4	99.2
Zhuzhou	18.3	-1.0	11.2	19.4	25.4	31.9	78.7	42.8	72.2	80.2	86.3	98.3
Shaoyang	18.0	-0.8	10.8	19.0	25.1	31.9	79.0	29.8	72.4	80.0	86.2	98.9
Yueyang	17.9	-2.1	10.2	18.6	25.2	33.5	78.1	38.4	71.0	79.0	86.1	99.5
Chenzhou	18.9	0.1	12.5	20.2	25.9	31.4	79.2	44.1	73.2	80.7	86.7	99.0
Yongzhou	19.0	-0.1	12.2	20.3	26.1	31.6	78.4	39.6	71.5	80.1	86.4	99.6
Huaihua	17.6	-1.4	10.3	18.4	24.5	31.8	79.7	34.0	73.6	81.0	86.6	98.4
Loudi	17.7	-1.5	10.4	18.6	24.9	32.5	78.7	35.2	72.2	80.1	85.7	98.6
Guangzhou	22.0	3.1	17.1	23.3	27.4	31.7	79.6	26.5	74.6	81.3	86.6	98.9
Shaoguan	20.2	1.6	14.3	21.6	26.6	31.2	79.4	32.8	74.3	80.6	86.2	98.7
Shenzhen	22.8	3.9	18.4	24.1	27.7	32.2	78.6	28.9	73.9	80.5	85.8	98.2
Zhuhai	23.2	4.2	19.0	24.5	28.0	32.3	79.4	28.3	74.6	81.2	86.7	98.6
Foshan	22.4	3.4	17.6	23.7	27.5	31.8	79.8	28.9	74.8	81.7	87.0	99.0
Jiangmen	23.0	3.9	18.7	24.4	27.9	32.1	80.1	28.8	75.4	82.0	87.1	98.2
Zhaoqing	21.7	3.0	16.3	23.0	27.3	31.6	80.3	40.0	74.9	81.7	86.9	98.6
Huizhou	22.2	3.3	17.4	23.5	27.4	31.8	78.7	28.8	73.9	80.3	85.9	98.8
Shanwei	22.5	4.2	18.0	23.7	27.5	31.6	79.2	37.5	74.3	80.7	85.7	98.2
Heyuan	21.3	2.4	16.1	22.6	27.0	31.0	79.0	33.6	74.1	80.5	85.7	97.7
Yangjiang	23.1	3.9	18.9	24.6	27.8	31.8	81.0	32.6	76.7	82.7	87.4	98.5
Qingyuan	20.8	2.4	14.9	22.2	26.9	31.4	79.6	34.3	74.5	80.9	86.5	99.1
Dongguan	22.5	3.5	17.9	23.9	27.6	32.1	79.0	27.0	74.2	80.9	86.3	98.6
Zhongshan	22.9	3.9	18.6	24.3	27.8	32.2	79.2	26.9	74.4	81.2	86.6	99.0
Nanning	21.9	4.0	16.8	23.3	27.1	31.8	79.8	36.1	74.5	81.7	86.5	99.0
Chongqing	17.0	-3.2	9.8	17.5	23.7	32.1	78.1	49.3	72.3	78.8	84.9	95.7
Chengdu	14.3	-4.2	7.6	14.9	20.9	28.7	75.8	37.9	69.8	76.4	82.3	95.5
Guiyang	16.4	-1.3	10.3	17.3	22.7	28.6	79.9	45.3	74.6	81.0	86.4	98.0
Kunming	16.4	-3.2	12.5	17.4	20.8	26.3	71.1	27.3	63.7	74.1	80.6	94.1
Xian	13.6	-9.0	5.1	14.0	21.7	31.7	65.8	22.7	55.0	66.2	76.6	97.3
Hanzhong	13.8	-6.9	6.2	14.2	21.1	29.5	72.7	27.2	65.4	73.5	80.8	96.9
Tianshui	10.0	-13.0	1.8	10.8	17.8	27.1	65.5	24.1	55.4	65.8	75.4	95.2
Dingxi	8.4	-15.1	0.1	9.5	16.3	25.2	63.2	25.5	53.5	63.5	73.2	94.6

Note: Q, quantile.

Table S2. Distribution of daily average concentrations of $PM_{2.5}$ and PM_{10} in 82 cities in China, 2015–2019.

City	$PM_{2.5}$ (μg/m^3)						PM_{10} (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Beijing	60.1	3.0	23.0	45.0	78.8	478.0	90.6	10.0	47.0	73.0	114.0	941.0
Tianjin	60.5	6.0	30.0	48.0	75.0	339.0	100.0	10.0	58.0	82.0	124.0	929.0
Shijiazhuang	82.1	6.0	37.0	59.0	100.0	627.0	144.7	17.0	80.0	120.0	181.3	853.0
Handan	78.5	8.0	40.0	62.0	94.0	697.0	147.2	20.0	89.0	124.0	179.0	876.0
Xingtai	80.3	9.0	39.0	61.0	99.0	569.0	144.2	17.0	84.0	124.0	179.0	693.0
Baoding	81.7	9.0	38.0	60.0	103.0	568.0	135.8	15.0	71.0	111.0	171.0	996.0
Zhangjiakou	31.0	6.0	16.0	25.0	38.0	283.0	79.3	7.0	44.0	62.0	96.0	1552.0
Cangzhou	62.5	7.0	34.0	49.0	76.0	387.0	106.6	9.0	63.0	89.0	132.9	861.0
Hengshui	75.4	8.0	39.0	58.0	94.0	730.0	135.0	14.0	74.0	111.0	166.0	911.0
Datong	36.7	5.0	20.0	31.0	46.0	418.0	82.3	11.0	49.0	70.0	103.0	973.0
Jincheng	59.7	5.0	31.0	48.0	76.8	306.0	116.1	16.0	71.0	103.0	144.8	393.0
Linfen	68.3	5.0	34.0	51.4	81.0	472.0	115.5	15.0	67.9	96.0	137.0	623.0
Shanghai	41.4	5.0	22.0	34.0	53.0	217.0	59.1	9.0	35.0	50.0	74.6	249.0
Nanjing	45.6	4.0	24.0	37.0	58.0	257.0	82.2	7.0	49.0	72.0	104.0	381.0
Wuxi	48.3	6.0	28.0	41.0	60.0	235.0	81.0	13.0	51.0	70.0	101.0	315.0
Hangzhou	45.6	6.0	27.0	39.0	57.0	225.0	74.5	8.0	45.0	66.0	94.0	299.0
Ningbo	36.3	3.0	20.0	31.0	45.0	225.0	58.1	7.0	34.0	50.0	72.9	288.0
Shaoxing	45.4	5.0	26.0	39.0	56.0	213.0	69.5	8.0	41.0	60.0	86.0	286.0
Jinhua	41.5	1.0	24.0	36.0	53.0	225.0	62.0	4.0	39.0	55.5	79.0	262.0
Taizhou	33.3	3.0	20.0	29.0	42.0	181.0	57.4	10.0	36.0	51.0	72.8	250.0
Lishui	31.3	2.0	18.0	27.0	40.0	150.0	49.3	2.0	32.0	45.0	62.0	187.0
Hefei	54.2	5.0	31.0	46.0	68.8	238.0	84.3	11.0	54.0	77.5	106.0	360.0
Maanshan	49.8	6.0	28.0	42.0	62.8	241.0	80.0	9.0	50.0	71.0	99.0	321.0
Huangshan	27.4	5.0	14.0	24.0	36.0	188.0	45.9	6.0	27.4	41.0	58.0	217.0
Chuzhou	54.8	6.0	32.0	48.0	71.0	223.0	83.6	6.0	52.0	75.0	108.0	374.0
Fuyang	56.9	4.0	30.0	46.0	74.0	341.0	90.6	10.0	55.0	79.0	113.0	673.0
Luan	47.4	5.0	28.0	41.0	60.0	257.0	80.0	11.0	52.0	73.0	99.0	377.0
Chizhou	43.6	4.0	23.0	35.0	54.0	288.0	68.1	6.0	37.0	57.0	85.0	359.0
Fuzhou	26.5	3.0	17.0	24.0	33.0	110.0	50.8	8.0	34.0	47.0	64.0	188.0
Quanzhou	27.0	4.0	17.0	24.0	33.0	205.0	51.1	10.0	34.0	47.0	63.0	301.0
Nanchang	37.7	5.0	19.0	31.0	49.0	273.0	74.4	7.0	43.0	65.0	97.0	284.0
Yingtan	39.3	4.0	23.0	35.0	50.0	191.0	58.8	6.0	36.0	52.0	75.0	234.0
Ganzhou	40.7	7.0	26.0	36.0	52.0	197.0	63.6	11.0	40.0	55.0	80.0	258.0
Jian	42.8	6.0	27.0	38.0	53.0	219.0	66.4	15.0	43.0	59.0	84.0	289.0
Shangrao	39.1	5.0	26.0	36.0	48.0	262.0	65.1	11.0	42.0	59.0	82.0	368.0
Dezhou	72.1	3.0	36.0	57.0	92.0	532.0	131.7	9.0	76.0	113.0	163.1	897.0
Liaocheng	77.2	6.0	42.3	63.0	96.0	593.0	139.1	8.0	88.0	124.0	172.0	705.0
Heze	73.1	3.0	39.0	58.0	92.0	472.0	133.9	6.0	85.0	117.0	167.8	675.0
Luoyang	68.9	6.0	35.0	54.0	83.5	488.0	122.6	9.0	71.0	105.0	152.0	609.0
Pingdingshan	70.4	10.0	37.0	57.5	89.0	396.0	117.8	13.0	69.0	101.0	150.0	551.0
Anyang	80.1	5.0	40.0	59.0	96.1	685.0	140.4	19.0	83.0	115.0	170.0	875.0

Table S2. (continued).

City	$PM_{2.5}$ (μg/m^3)						PM_{10} (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Xinxiang	72.3	10.0	37.0	56.0	89.0	687.0	127.0	16.0	74.0	108.0	159.8	928.0
Nanyang	62.4	7.0	33.0	49.0	79.0	316.0	112.5	14.0	64.1	97.0	146.0	508.0
Shangqiu	67.0	9.0	37.0	54.0	85.0	467.0	115.8	17.0	73.0	102.0	143.0	604.0
Xinyang	56.7	5.0	30.0	45.0	73.0	343.0	94.5	12.0	54.0	81.0	120.0	461.0
Zhoukou	65.8	6.0	33.0	51.0	84.0	549.0	112.6	9.0	67.0	96.0	142.0	583.0
Zhumadian	62.4	5.0	33.0	51.0	79.0	449.0	110.0	12.0	67.0	96.0	138.0	583.0
Wuhan	54.4	5.0	30.0	45.0	69.0	292.0	89.3	9.0	54.0	80.0	116.0	614.0
Jingzhou	54.9	9.0	32.0	46.0	68.0	255.0	95.0	14.0	58.0	82.0	119.0	382.0
Huanggang	47.7	2.0	28.0	41.0	60.0	289.0	79.3	14.0	52.0	71.0	98.0	357.0
Enshi	43.3	8.0	24.0	34.0	53.0	249.0	65.8	16.0	40.0	55.0	80.0	294.0
Changsha	51.7	3.0	28.0	43.0	65.0	277.0	72.5	6.0	44.0	64.0	93.0	422.0
Zhuzhou	50.1	7.0	28.0	41.0	62.0	301.0	79.1	9.0	46.0	67.2	102.0	340.0
Shaoyang	51.6	6.0	29.0	44.0	64.0	399.0	74.7	7.0	44.0	63.0	94.8	424.0
Yueyang	47.5	7.0	30.0	42.0	58.0	458.0	75.7	12.0	47.0	67.0	94.0	596.0
Chenzhou	37.1	6.0	19.0	31.0	50.0	210.0	66.3	10.0	41.0	57.0	83.0	281.0
Yongzhou	45.4	6.0	26.0	39.0	57.0	194.0	67.5	10.0	41.0	60.0	85.0	274.0
Huaihua	40.5	5.0	21.0	34.0	52.0	168.0	79.5	13.0	49.0	71.0	100.0	340.0
Loudi	43.1	7.0	24.0	36.0	54.0	311.0	72.5	13.0	41.0	62.0	94.0	370.0
Guangzhou	35.0	5.0	21.0	30.0	44.8	154.0	56.7	10.0	37.0	50.0	71.8	213.0
Shaoguan	33.9	5.0	21.0	29.0	43.0	172.0	50.9	6.0	33.0	46.0	64.0	216.0
Shenzhen	26.9	5.0	16.0	24.0	35.0	102.0	44.5	10.0	28.0	40.0	57.0	160.0
Zhuhai	27.7	3.0	14.0	24.0	36.0	125.0	44.8	7.0	26.0	40.0	57.0	160.0
Foshan	36.3	4.0	21.0	31.0	45.0	227.0	59.5	8.0	38.0	52.0	75.0	276.0
Jiangmen	32.4	4.0	18.0	27.0	41.0	154.0	55.6	11.0	34.0	49.0	70.0	194.0
Zhaoqing	37.3	5.0	21.0	32.0	48.0	147.0	56.6	9.0	36.0	50.0	70.0	196.0
Huizhou	27.2	5.0	16.0	24.0	35.0	141.0	48.9	9.0	33.0	45.0	61.0	188.0
Shanwei	24.7	4.0	14.5	22.0	32.0	84.0	41.3	7.0	27.0	38.0	53.0	124.0
Heyuan	30.0	4.0	19.0	27.0	39.0	136.0	47.2	7.0	31.2	44.0	60.0	202.0
Yangjiang	31.1	5.0	16.1	26.0	41.0	123.0	46.8	8.0	29.0	40.0	60.0	143.0
Qingyuan	35.8	2.0	20.8	30.0	46.0	171.0	55.8	8.0	35.0	49.0	70.0	217.0
Dongguan	35.3	6.0	21.0	31.0	45.9	141.0	51.6	8.0	34.0	46.0	65.0	168.0
Zhongshan	30.7	4.0	16.0	26.0	40.0	120.0	47.1	8.0	27.0	41.0	61.0	166.0
Nanning	35.3	5.0	19.0	29.0	45.0	240.0	60.6	9.0	37.0	51.0	75.0	255.0
Chongqing	46.0	8.0	27.0	39.0	57.0	205.0	71.5	13.0	45.0	64.0	88.0	278.0
Chengdu	55.4	5.0	29.0	45.0	71.0	329.0	90.5	8.0	50.0	75.0	116.0	484.0
Guiyang	33.1	6.0	20.0	30.0	42.0	206.0	56.5	11.0	37.0	52.0	71.0	244.0
Kunming	27.7	7.0	19.0	25.0	35.0	99.0	54.1	14.0	37.0	50.0	68.0	175.0
Xian	64.7	6.0	30.0	46.0	76.0	499.0	123.5	11.0	68.1	99.0	153.0	605.0
Hanzhong	52.0	3.0	25.0	39.0	65.0	283.0	82.3	9.0	47.0	68.0	105.0	381.0
Tianshui	39.4	4.0	20.0	31.0	50.0	216.0	79.5	9.0	42.0	64.0	103.0	740.0
Dingxi	37.0	5.0	21.0	30.0	48.0	240.0	81.7	8.0	44.6	65.0	101.0	1060.0

Note: PM, particulate matter; Q, quantile.

Table S3. Distribution of daily average concentrations of NO_2 and SO_2 in 82 cities in China, 2015–2019.

City	NO_2 (μg/m^3)						SO_2 (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Beijing	44.3	7.0	29.0	39.0	54.0	154.0	8.3	2.0	3.0	5.0	10.0	85.0
Tianjin	45.8	9.0	30.0	41.0	58.0	163.0	17.8	2.0	8.0	13.0	21.0	172.0
Shijiazhuang	50.9	9.0	33.0	47.0	64.0	180.0	31.8	3.0	13.0	22.0	40.0	251.0
Handan	46.4	9.0	31.0	43.0	57.6	167.0	32.3	2.0	13.0	24.0	42.0	249.0
Xingtai	54.2	8.0	38.0	51.0	66.0	181.0	39.5	3.0	17.0	28.0	48.0	268.0
Baoding	49.5	10.0	31.0	43.0	62.0	177.0	31.6	4.0	13.0	21.0	38.0	242.0
Zhangjiakou	24.7	4.0	17.0	22.0	29.0	96.0	19.1	3.0	10.0	14.0	22.0	141.0
Cangzhou	42.8	7.0	29.0	39.0	54.0	126.0	29.6	5.0	16.0	23.0	36.0	198.0
Hengshui	39.3	7.0	25.0	35.0	49.0	157.0	22.4	2.0	10.0	16.0	28.0	153.0
Datong	28.0	5.0	19.0	26.5	35.6	67.0	37.5	8.0	18.2	28.0	47.0	232.0
Jincheng	39.6	9.0	26.0	36.0	51.0	109.0	43.0	3.0	16.0	27.0	52.0	329.0
Linfen	37.1	7.0	24.0	34.0	46.0	122.0	59.0	2.0	17.0	31.0	61.0	784.0
Shanghai	43.3	6.0	29.0	40.0	54.0	138.0	12.0	4.0	8.0	10.0	14.0	76.0
Nanjing	45.1	9.0	32.0	41.0	55.0	127.0	14.7	4.0	9.0	13.0	18.0	72.0
Wuxi	43.2	7.0	30.0	40.0	53.0	127.0	15.5	3.0	9.0	13.0	19.0	72.0
Hangzhou	44.5	8.0	31.0	42.0	55.0	119.0	11.2	3.0	7.0	10.0	13.0	52.0
Ningbo	38.1	6.0	25.0	35.0	49.0	119.0	11.3	4.0	7.8	10.0	14.0	59.0
Shaoxing	35.3	3.0	22.0	33.0	46.0	105.0	14.4	2.0	7.0	11.0	18.0	84.0
Jinhua	35.7	7.0	23.0	33.0	46.0	118.0	13.1	2.0	7.1	11.0	17.0	89.0
Taizhou	22.7	2.0	14.0	21.0	29.0	78.0	6.9	1.0	4.0	6.0	8.0	35.0
Lishui	24.1	6.0	17.0	22.0	30.0	87.0	8.5	2.0	6.0	7.0	10.0	137.0
Hefei	42.6	11.0	29.0	38.0	53.0	138.0	11.4	2.0	6.0	10.0	14.0	59.0
Maanshan	36.3	7.0	25.0	33.0	45.0	116.0	17.5	3.0	11.0	15.0	22.0	89.0
Huangshan	17.6	6.0	14.0	16.0	21.0	48.0	11.2	4.0	8.0	10.0	13.0	51.0
Chuzhou	36.3	4.0	23.0	32.0	45.4	136.0	13.6	3.0	9.0	12.0	16.0	65.0
Fuyang	32.6	5.0	22.0	30.0	40.0	100.0	15.6	2.0	7.0	12.0	21.0	194.0
Luan	31.6	8.0	21.0	28.0	39.0	111.0	10.4	3.0	7.0	10.0	13.0	69.0
Chizhou	31.6	8.0	21.0	28.0	39.0	93.0	16.3	2.0	9.0	14.0	21.0	120.0
Fuzhou	28.0	4.0	19.0	26.0	34.0	87.0	6.1	2.0	5.0	6.0	7.0	20.0
Quanzhou	25.6	4.0	19.0	24.0	30.0	89.0	10.3	3.0	7.0	9.0	12.0	41.0
Nanchang	34.6	10.0	23.0	31.0	42.0	104.0	15.4	3.0	8.0	13.0	20.8	93.0
Yingtan	23.9	5.0	15.0	21.0	31.0	76.0	26.9	3.0	15.0	22.0	35.0	139.0
Ganzhou	23.9	7.0	15.0	20.0	29.0	84.0	22.4	3.0	13.0	19.0	28.0	132.0
Jian	21.2	5.0	12.0	18.0	28.0	69.0	22.7	3.0	15.0	20.0	28.0	104.0
Shangrao	27.0	4.0	17.0	24.0	35.0	83.0	30.9	2.0	14.0	24.0	42.0	168.0
Dezhou	37.4	5.0	24.0	34.0	47.0	138.0	26.0	2.0	12.0	20.0	32.0	179.0
Liaocheng	40.2	8.0	26.8	37.0	51.0	113.0	25.7	2.0	12.0	20.0	33.3	123.0
Heze	36.7	7.0	25.0	34.0	46.0	102.0	24.8	4.0	12.0	20.0	32.0	135.0
Luoyang	42.4	12.0	29.0	39.0	52.0	110.0	27.1	2.0	12.6	20.3	35.0	156.0
Pingdingshan	39.0	12.0	28.0	37.0	48.0	117.0	28.0	5.0	14.0	21.0	36.0	133.0
Anyang	45.8	8.0	31.0	43.0	56.0	160.0	32.9	2.0	14.0	24.0	41.0	198.0

Table S3. (continued).

City	NO_2 (μg/m^3)						SO_2 (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Xinxiang	48.3	10.0	33.0	45.0	61.0	166.0	30.6	4.0	15.0	23.0	37.0	229.0
Nanyang	30.2	8.0	20.0	27.0	38.0	102.0	16.1	2.0	8.0	13.0	22.0	115.0
Shangqiu	32.6	6.0	20.0	29.6	42.0	106.0	17.3	3.0	8.0	13.0	20.0	159.0
Xinyang	27.4	6.0	17.0	25.0	35.0	120.0	12.5	4.0	7.0	10.0	16.0	86.0
Zhoukou	28.5	4.0	19.0	26.0	36.0	78.0	16.0	4.0	9.0	13.0	20.0	90.0
Zhumadian	33.8	7.0	22.0	31.0	42.0	104.0	21.9	3.0	9.0	15.0	27.0	184.0
Wuhan	47.5	13.0	32.0	44.0	59.0	125.0	12.0	2.0	6.0	10.0	15.0	78.0
Jingzhou	36.7	8.0	25.0	33.0	46.0	100.0	19.4	3.0	10.0	16.0	25.8	100.0
Huanggang	25.4	3.0	15.0	22.0	33.0	87.0	11.3	1.0	6.0	9.0	15.0	90.0
Enshi	21.9	2.0	15.0	20.0	28.0	97.0	8.8	2.0	5.0	7.0	10.0	88.0
Changsha	36.4	10.0	24.0	32.5	45.1	109.0	12.9	3.0	8.0	11.0	16.0	73.0
Zhuzhou	34.3	11.0	23.0	32.0	43.0	102.0	19.1	4.0	11.0	16.0	23.0	99.0
Shaoyang	23.0	6.0	15.0	20.0	29.0	75.0	25.9	3.0	14.0	22.0	33.0	108.0
Yueyang	24.8	5.0	16.0	22.0	31.0	67.0	16.3	3.0	9.0	14.0	21.0	72.0
Chenzhou	25.8	2.0	18.0	24.0	32.0	70.0	15.5	3.0	9.0	13.0	19.0	97.0
Yongzhou	25.4	5.0	16.0	23.0	32.0	95.0	16.8	2.0	7.0	13.0	22.0	133.0
Huaihua	18.5	2.0	11.0	16.0	24.0	78.0	14.8	2.0	6.0	11.0	19.0	186.0
Loudi	23.0	7.0	14.0	20.0	28.0	91.0	18.7	2.0	10.0	15.0	25.0	94.0
Guangzhou	47.9	9.0	34.0	43.0	57.0	177.0	10.7	3.0	8.0	10.0	13.0	38.0
Shaoguan	26.4	8.0	19.0	24.0	31.0	82.0	15.6	5.0	11.0	14.0	19.0	65.0
Shenzhen	29.9	7.0	23.0	28.0	35.0	103.0	7.4	3.0	6.0	7.0	8.0	19.0
Zhuhai	30.1	4.0	18.0	27.0	39.0	102.0	7.5	2.0	4.0	7.0	9.0	31.0
Foshan	41.6	7.0	29.0	37.0	50.0	141.0	12.8	3.0	9.0	12.0	15.0	45.0
Jiangmen	34.0	5.0	19.0	30.0	44.0	149.0	11.2	3.0	7.0	9.0	14.0	52.0
Zhaoqing	33.8	6.0	22.0	30.0	42.0	113.0	14.5	4.0	9.0	13.0	18.0	46.0
Huizhou	23.8	4.0	17.0	22.0	29.0	72.0	8.6	4.0	7.0	8.0	10.0	23.0
Shanwei	12.3	3.0	8.0	11.0	15.0	38.0	9.1	5.0	8.0	9.0	10.0	153.0
Heyuan	21.6	6.0	15.0	19.0	25.0	69.0	8.4	3.0	6.0	7.0	10.0	33.0
Yangjiang	19.3	2.0	11.0	17.5	25.0	74.0	7.8	2.0	5.0	7.0	10.0	29.0
Qingyuan	36.3	9.0	26.0	33.0	43.0	112.0	13.4	3.0	9.0	12.0	16.0	55.0
Dongguan	36.7	9.0	27.0	34.0	45.0	117.0	11.3	3.0	8.0	10.0	14.0	37.0
Zhongshan	32.3	3.0	18.0	29.0	43.0	120.0	9.7	2.0	6.0	8.0	12.0	35.0
Nanning	32.7	10.0	23.0	29.0	38.0	99.0	11.2	5.0	8.0	10.0	13.0	53.0
Chongqing	43.2	15.0	33.1	42.0	51.0	104.0	11.5	4.0	8.0	10.0	14.0	43.0
Chengdu	49.8	13.0	37.0	48.0	59.0	136.0	11.5	4.0	8.0	10.0	14.0	39.0
Guiyang	25.9	9.0	19.0	24.0	31.0	70.0	12.8	3.0	6.0	9.0	15.0	90.0
Kunming	30.9	7.0	24.0	30.0	36.0	78.0	14.8	5.0	11.0	14.0	18.0	44.0
Xian	51.5	12.0	36.0	48.0	64.0	128.0	17.2	3.0	8.0	13.0	22.0	96.0
Hanzhong	29.8	7.0	20.0	27.0	38.0	89.0	13.4	2.0	8.0	12.0	18.0	56.0
Tianshui	35.0	8.0	23.0	31.0	45.0	100.0	22.5	3.0	9.0	12.0	25.0	156.0
Dingxi	27.3	4.0	19.0	26.0	35.0	65.0	20.5	2.0	6.0	10.0	30.0	132.0

Note: SO_2, sulfur dioxide; NO_2, nitrogen dioxide; Q, quantile.

Table S4. Distribution of daily average concentrations of CO and O_3 in 82 cities in China, 2015–2019.

City	CO (mg/m^3)						O_3 (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Beijing	1.0	0.2	0.5	0.8	1.1	8.2	100.1	3.0	55.0	86.0	141.0	288.0
Tianjin	1.2	0.3	0.8	1.0	1.4	8.9	96.3	3.0	51.0	85.0	134.0	285.0
Shijiazhuang	1.3	0.1	0.7	1.0	1.5	10.6	97.2	3.0	49.0	89.0	136.9	297.0
Handan	1.5	0.2	0.8	1.1	1.8	8.8	101.3	4.0	55.0	95.0	138.8	289.0
Xingtai	1.6	0.2	0.9	1.3	1.9	8.8	99.1	3.0	50.0	93.0	138.0	286.0
Baoding	1.3	0.1	0.6	0.9	1.5	9.8	106.0	5.0	53.0	97.0	151.0	300.0
Zhangjiakou	0.7	0.1	0.5	0.6	0.9	3.6	104.7	7.0	72.0	96.0	131.0	262.0
Cangzhou	1.0	0.1	0.6	0.8	1.2	6.2	106.3	5.0	61.0	101.0	144.0	297.0
Hengshui	1.1	0.2	0.7	0.9	1.4	8.3	108.7	4.0	62.0	104.0	151.0	274.0
Datong	1.4	0.4	1.0	1.3	1.8	4.4	92.7	8.0	62.0	88.0	119.0	282.0
Jincheng	1.7	0.3	1.1	1.5	2.1	7.1	103.5	5.0	61.0	90.0	136.8	300.0
Linfen	2.0	0.3	1.2	1.7	2.4	19.5	101.7	3.0	55.0	89.5	138.8	300.0
Shanghai	0.7	0.3	0.6	0.7	0.9	2.3	105.7	13.0	75.0	98.0	130.0	285.0
Nanjing	0.9	0.3	0.7	0.9	1.1	2.3	106.1	8.0	67.0	99.0	139.9	280.0
Wuxi	1.0	0.3	0.8	0.9	1.2	2.6	104.1	5.0	63.0	95.0	141.0	269.0
Hangzhou	0.9	0.4	0.7	0.8	1.0	2.1	98.4	4.0	58.0	90.0	137.0	269.0
Ningbo	0.8	0.4	0.6	0.7	0.9	2.0	98.4	6.0	70.0	94.0	124.0	255.0
Shaoxing	0.8	0.3	0.6	0.8	0.9	1.9	95.4	1.0	60.0	89.0	126.0	271.0
Jinhua	0.8	0.3	0.6	0.7	0.9	2.1	95.2	2.0	59.0	91.1	128.0	251.0
Taizhou	0.7	0.2	0.5	0.6	0.8	3.6	95.6	6.0	69.0	93.0	120.0	221.0
Lishui	0.7	0.2	0.5	0.6	0.8	1.9	86.9	7.0	61.0	86.0	110.8	198.0
Hefei	0.9	0.3	0.7	0.8	1.0	2.9	92.9	4.0	57.2	88.0	121.0	264.0
Maanshan	1.1	0.3	0.8	1.1	1.4	2.9	99.8	2.0	60.0	92.0	133.0	282.0
Huangshan	0.5	0.0	0.4	0.5	0.7	2.0	73.5	20.0	53.0	71.0	89.0	211.0
Chuzhou	0.8	0.2	0.6	0.8	1.0	2.5	94.1	13.0	53.0	88.0	127.0	280.0
Fuyang	0.8	0.1	0.6	0.7	1.0	3.4	92.7	7.0	59.0	86.0	123.0	246.0
Luan	0.7	0.3	0.6	0.7	0.8	2.0	92.0	17.0	62.0	88.0	119.0	225.0
Chizhou	0.8	0.2	0.6	0.8	1.0	2.5	88.7	1.0	56.0	83.0	118.0	225.0
Fuzhou	0.7	0.3	0.6	0.7	0.8	2.0	88.5	11.0	63.0	87.0	112.0	205.0
Quanzhou	0.6	0.1	0.5	0.6	0.7	2.0	91.4	8.0	67.0	89.0	113.0	213.0
Nanchang	1.0	0.3	0.8	1.0	1.1	2.5	88.0	5.0	56.0	87.0	116.0	209.0
Yingtan	0.7	0.1	0.5	0.6	0.8	1.9	92.0	6.0	64.0	90.0	119.0	244.0
Ganzhou	1.3	0.6	1.1	1.3	1.5	3.0	88.2	7.0	61.0	84.0	112.0	213.0
Jian	0.8	0.2	0.6	0.8	0.9	1.8	88.5	5.0	59.0	86.0	114.8	234.0
Shangrao	0.8	0.2	0.6	0.8	0.9	4.6	87.6	2.0	60.0	85.0	113.0	244.0
Dezhou	1.4	0.2	0.9	1.2	1.6	25.7	115.1	5.0	64.0	109.5	161.0	273.0
Liaocheng	1.4	0.2	0.8	1.2	1.7	6.2	107.6	4.0	59.0	100.0	150.0	293.0
Heze	1.3	0.1	0.9	1.2	1.5	7.2	112.3	5.0	71.0	109.0	150.0	300.0
Luoyang	1.5	0.2	1.0	1.4	1.8	6.6	102.0	4.0	57.0	93.0	142.8	277.0
Pingdingshan	1.1	0.3	0.8	1.0	1.3	3.5	108.5	9.0	69.2	105.0	145.8	286.0
Anyang	1.8	0.3	1.1	1.5	2.1	14.2	99.9	5.0	51.0	90.0	141.0	288.0

Table S4. (continued).

City	CO (mg/m^3)						O_3 (μg/m^3)					
	Mean	Q0	Q25	Q50	Q75	Q100	Mean	Q0	Q25	Q50	Q75	Q100
Xinxiang	1.3	0.2	0.8	1.1	1.5	7.8	103.0	3.0	58.0	96.0	144.0	278.0
Nanyang	1.1	0.2	0.8	1.0	1.4	3.4	106.4	6.0	69.0	104.0	141.0	252.0
Shangqiu	0.8	0.2	0.6	0.7	0.9	4.3	105.1	4.0	68.0	102.0	138.0	252.0
Xinyang	0.8	0.1	0.5	0.7	0.9	2.7	104.3	4.0	72.0	104.0	134.0	238.0
Zhoukou	1.3	0.4	0.8	1.0	1.5	4.9	103.2	5.0	65.0	100.0	136.0	268.0
Zhumadian	0.9	0.1	0.6	0.8	1.0	3.4	106.8	4.0	71.0	102.0	140.0	300.0
Wuhan	1.0	0.4	0.8	1.0	1.2	2.7	93.6	5.0	53.0	88.0	128.0	261.0
Jingzhou	1.1	0.4	0.9	1.0	1.3	3.0	96.7	5.0	64.0	93.5	125.9	250.0
Huanggang	1.0	0.1	0.8	0.9	1.2	3.4	108.6	8.0	72.0	106.0	143.0	281.0
Enshi	0.9	0.0	0.7	0.8	1.0	3.7	62.8	2.0	38.0	61.0	85.0	174.0
Changsha	0.9	0.4	0.7	0.9	1.0	2.2	90.4	6.0	54.0	86.0	122.0	232.0
Zhuzhou	0.8	0.3	0.6	0.8	1.0	2.1	84.7	3.0	51.2	82.0	115.0	230.0
Shaoyang	0.9	0.3	0.7	0.9	1.0	2.9	86.6	6.0	60.0	84.0	110.0	208.0
Yueyang	1.0	0.4	0.8	0.9	1.1	3.3	96.0	7.0	63.0	95.0	126.0	221.0
Chenzhou	1.2	0.4	0.9	1.2	1.4	10.2	80.4	8.0	49.0	79.0	107.0	275.0
Yongzhou	0.7	0.2	0.5	0.7	0.8	2.0	82.7	8.0	58.0	78.0	104.0	203.0
Huaihua	1.1	0.3	0.9	1.1	1.2	2.0	83.6	16.0	61.0	80.0	102.0	193.0
Loudi	1.5	0.3	1.1	1.4	1.8	3.6	91.4	9.0	67.0	88.0	112.8	207.0
Guangzhou	0.9	0.4	0.7	0.9	1.0	2.1	91.1	5.0	52.0	86.0	122.8	275.0
Shaoguan	1.0	0.4	0.8	0.9	1.1	2.9	89.1	7.0	60.2	86.0	115.0	239.0
Shenzhen	0.7	0.4	0.6	0.7	0.8	1.6	88.6	11.0	58.0	82.0	113.0	245.0
Zhuhai	0.7	0.3	0.6	0.7	0.8	2.2	90.3	14.0	56.0	80.0	114.0	276.0
Foshan	0.8	0.4	0.7	0.8	0.9	2.0	94.1	4.0	54.0	87.0	127.0	290.0
Jiangmen	0.9	0.3	0.7	0.8	1.0	2.2	92.2	3.0	50.2	78.0	124.0	300.0
Zhaoqing	0.9	0.4	0.7	0.9	1.0	2.4	90.4	5.0	57.0	84.0	117.0	300.0
Huizhou	0.7	0.4	0.6	0.7	0.8	1.5	92.6	10.0	65.0	90.0	116.0	253.0
Shanwei	0.8	0.4	0.7	0.7	0.8	1.8	95.7	12.0	68.0	93.0	119.0	272.0
Heyuan	0.9	0.4	0.8	0.8	1.0	2.5	86.5	8.0	61.0	84.0	109.0	211.0
Yangjiang	0.9	0.4	0.8	0.9	1.1	2.4	89.0	6.0	57.0	81.0	115.8	233.0
Qingyuan	1.0	0.4	0.8	0.9	1.1	3.5	89.0	4.0	55.0	86.0	117.0	300.0
Dongguan	0.8	0.3	0.7	0.8	0.9	1.7	102.1	5.0	65.0	95.0	134.0	290.0
Zhongshan	0.9	0.3	0.7	0.8	1.0	2.3	89.2	3.0	51.0	74.0	119.0	300.0
Nanning	0.9	0.5	0.8	0.9	1.1	1.9	75.6	6.0	52.0	73.0	97.0	208.0
Chongqing	1.0	0.4	0.8	0.9	1.1	4.1	73.2	3.0	31.0	60.0	108.0	280.0
Chengdu	1.0	0.4	0.8	0.9	1.1	2.9	92.3	3.0	51.0	81.0	130.0	292.0
Guiyang	0.7	0.3	0.6	0.7	0.8	1.7	77.4	9.0	55.0	74.0	99.0	188.0
Kunming	0.9	0.3	0.7	0.8	1.0	2.9	82.3	10.0	62.0	79.0	103.0	187.0
Xian	1.4	0.3	0.9	1.2	1.7	5.3	88.7	6.0	44.0	78.5	129.8	267.0
Hanzhong	1.2	0.4	0.8	1.0	1.5	4.4	82.7	5.0	52.0	82.0	111.0	198.0
Tianshui	0.8	0.2	0.5	0.7	1.1	3.7	90.2	5.0	65.0	91.0	116.0	210.0
Dingxi	0.7	0.1	0.4	0.6	0.9	2.8	95.3	13.0	72.0	94.0	117.0	210.0

Note: CO, carbon monoxide; O_3, ozone; Q, quantile.

Table S5. Detailed information of data sources used in this study on the association between influenza and air pollution in 82 cities in China, 2015–2019.

Items	Time	Scale	Unit	Data sources	
Influenza information					
Case report	2015-01-01 to 2019-12-31	Daily; City-level		Chinese Information System for Disease Control and Prevention	Chinese Center for Disease Prevention and Control
Case identification	2008-09-01 till now			Diagnostic Criteria for Influenza (WS285-2008) (National Health Commission of the People's Republic of China)	http://www.nhc.gov.cn/wjw/s9491/200802/38820.shtml
Meteorological information					
Temperature	2015-01-01 to 2019-12-31	Daily; City-level	℃	China Meteorological Data Service Center	http://data.cma.cn
Relative humidity			%		
Ambient air pollutants information*					
$PM_{2.5}$	2015-01-01 to 2019-12-31	Daily; City-level	$\mu g/m^3$	China National Environmental Monitoring Center	http://www.cnemc.cn/sssj
PM_{10}			$\mu g/m^3$		
SO_2			$\mu g/m^3$		
NO_2			$\mu g/m^3$		
O_3			$\mu g/m^3$		
CO			mg/m^3		
Demographic information					
Population and age structure	2020	City-level		The Seventh National Census of China	http://www.stats.gov.cn/tjsj/pcsj/rkpc/7rp/zk/indexce.htm
Population weighted geometric mean of density (PWD-G)	2020	City-level	$/km^2$	Asia Continental Population Dataset (WorldPop)	https://www.worldpop.org/doi/10.5258/SOTON/WP00013 https://www.worldpop.org/methods/pwd

* PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S6. Data summary of the distribution of daily incidence and distribution of variance/mean ratio for daily counts of influenza case in the 82 Chinese cities.

	Daily incidence (/100,000)	Variance/Mean of daily cases counts
Minimum	0.01	5.00
1st Quarter	0.06	12.25
Median	0.10	57.00
Mean	0.34	187.29
3rd Quarter	0.25	171.00
Maximum	9.15	1663.00

Table S7. Pearson correlation coefficients and p values between daily influenza incidence and air pollutants concentrations.

City	Pearson correlation coefficients (p value)					
	$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Beijing	-0.062 (0.008)	-0.051 (0.031)	0.019 (0.412)	-0.016 (0.481)	-0.233 (<0.001)	-0.036 (0.124)
Tianjin	0.018 (0.445)	-0.032 (0.167)	0.117 (<0.001)	-0.038 (0.103)	-0.208 (<0.001)	0.017 (0.472)
Shijiazhuang	0.035 (0.137)	0.032 (0.17)	0.089 (<0.001)	-0.041 (0.079)	-0.192 (<0.001)	0.052 (0.026)
Handan	0.202 (<0.001)	0.180 (<0.001)	0.245 (<0.001)	0.162 (<0.001)	-0.290 (<0.001)	0.163 (<0.001)
Xingtai	0.090 (<0.001)	0.079 (<0.001)	0.082 (<0.001)	-0.044 (0.06)	-0.236 (<0.001)	0.060 (0.01)
Baoding	0.016 (0.508)	0.001 (0.953)	0.066 (0.005)	-0.093 (<0.001)	-0.229 (<0.001)	0.019 (0.41)
Zhangjiakou	0.005 (0.846)	0.010 (0.665)	0.092 (<0.001)	0.082 (<0.001)	-0.288 (<0.001)	0.152 (<0.001)
Cangzhou	0.145 (<0.001)	0.129 (<0.001)	0.230 (<0.001)	0.052 (0.028)	-0.326 (<0.001)	0.170 (<0.001)
Hengshui	0.122 (<0.001)	0.076 (0.001)	0.224 (<0.001)	0.083 (<0.001)	-0.317 (<0.001)	0.141 (<0.001)
Datong	0.061 (0.009)	0.048 (0.039)	0.096 (<0.001)	0.136 (<0.001)	-0.239 (<0.001)	0.136 (<0.001)
Jincheng	0.150 (<0.001)	0.141 (<0.001)	0.147 (<0.001)	0.043 (0.068)	-0.162 (<0.001)	0.024 (0.302)
Linfen	0.213 (<0.001)	0.195 (<0.001)	0.296 (<0.001)	0.188 (<0.001)	-0.336 (<0.001)	0.148 (<0.001)
Shanghai	0.080 (<0.001)	-0.0001 (0.995)	0.131 (<0.001)	-0.078 (<0.001)	-0.174 (<0.001)	0.063 (0.007)
Nanjing	0.065 (0.006)	0.013 (0.589)	0.041 (0.078)	-0.115 (<0.001)	-0.163 (<0.001)	0.015 (0.511)
Wuxi	0.098 (<0.001)	0.080 (<0.001)	0.081 (<0.001)	-0.138 (<0.001)	-0.202 (<0.001)	0.097 (<0.001)
Hangzhou	0.037 (0.119)	0.035 (0.133)	0.059 (0.011)	-0.12 (<0.001)	-0.171 (<0.001)	0.064 (0.007)
Ningbo	0.049 (0.037)	0.026 (0.266)	0.095 (<0.001)	-0.114 (<0.001)	-0.157 (<0.001)	0.071 (0.002)
Shaoxing	0.039 (0.098)	0.04 (0.089)	0.125 (<0.001)	-0.146 (<0.001)	-0.170 (<0.001)	0.110 (<0.001)
Jinhua	-0.007 (0.754)	0.014 (0.553)	0.172 (<0.001)	-0.101 (<0.001)	-0.224 (<0.001)	0.092 (<0.001)
Taizhou	0.041 (0.078)	0.050 (0.033)	0.173 (<0.001)	-0.102 (<0.001)	-0.125 (<0.001)	-0.014 (0.553)
Lishui	-0.006 (0.799)	-0.002 (0.92)	0.089 (<0.001)	-0.081 (<0.001)	-0.135 (<0.001)	0.148 (<0.001)
Hefei	0.076 (0.001)	-0.022 (0.338)	0.096 (<0.001)	-0.166 (<0.001)	-0.176 (<0.001)	0.002 (0.92)
Maanshan	0.184 (<0.001)	0.089 (<0.001)	0.222 (<0.001)	-0.002 (0.936)	-0.193 (<0.001)	0.012 (0.597)
Huangshan	0.060 (0.01)	0.023 (0.33)	0.145 (<0.001)	-0.179 (<0.001)	-0.052 (0.025)	0.270 (<0.001)
Chuzhou	0.150 (<0.001)	0.103 (<0.001)	0.134 (<0.001)	-0.140 (<0.001)	-0.070 (0.003)	0.082 (<0.001)
Fuyang	0.254 (<0.001)	0.205 (<0.001)	0.131 (<0.001)	-0.143 (<0.001)	-0.202 (<0.001)	0.083 (<0.001)
Luan	0.061 (0.009)	0.035 (0.136)	0.127 (<0.001)	-0.161 (<0.001)	-0.076 (0.001)	0.063 (0.007)
Chizhou	0.086 (<0.001)	0.046 (0.048)	0.193 (<0.001)	-0.099 (<0.001)	-0.152 (<0.001)	0.019 (0.411)
Fuzhou	0.040 (0.088)	-0.027 (0.25)	0.069 (0.003)	-0.090 (<0.001)	-0.106 (<0.001)	0.027 (0.244)
Quanzhou	0.046 (0.05)	-0.005 (0.817)	0.095 (<0.001)	-0.031 (0.183)	-0.087 (<0.001)	0.048 (0.039)
Nanchang	0.098 (<0.001)	0.049 (0.037)	0.092 (<0.001)	-0.127 (<0.001)	-0.151 (<0.001)	0.029 (0.209)
Yingtan	0.097 (<0.001)	0.026 (0.268)	0.166 (<0.001)	-0.072 (0.002)	-0.143 (<0.001)	0.071 (0.002)
Ganzhou	-0.062 (0.008)	-0.026 (0.272)	0.089 (<0.001)	-0.247 (<0.001)	-0.134 (<0.001)	0.091 (<0.001)
Jian	0.024 (0.301)	0.081 (<0.001)	0.203 (<0.001)	-0.113 (<0.001)	-0.095 (<0.001)	0.101 (<0.001)
Shangrao	0.036 (0.12)	0.056 (0.017)	0.132 (<0.001)	0.052 (0.025)	-0.089 (<0.001)	0.087 (<0.001)
Dezhou	0.114 (<0.001)	0.104 (<0.001)	0.272 (<0.001)	0.069 (0.003)	-0.348 (<0.001)	0.02 (0.388)
Liaocheng	0.068 (0.004)	0.056 (0.016)	0.118 (<0.001)	-0.088 (<0.001)	-0.199 (<0.001)	-0.079 (<0.001)
Heze	0.139 (<0.001)	0.148 (<0.001)	0.142 (<0.001)	-0.028 (0.234)	-0.188 (<0.001)	0.085 (<0.001)
Luoyang	0.076 (0.001)	0.071 (0.002)	0.051 (0.028)	-0.187 (<0.001)	-0.147 (<0.001)	-0.208 (<0.001)
Pingdingshan	0.078 (<0.001)	0.033 (0.156)	0.032 (0.178)	-0.111 (<0.001)	-0.170 (<0.001)	0.031 (0.182)
Anyang	0.082 (<0.001)	0.042 (0.071)	0.07 (0.003)	-0.060 (0.01)	-0.121 (<0.001)	-0.020 (0.402)

Table S7. (continued).

City	Pearson correlation coefficients (p value)					
	$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Xinxiang	0.047 (0.043)	0.020 (0.405)	0.096 (<0.001)	-0.120 (<0.001)	-0.157 (<0.001)	0.036 (0.122)
Nanyang	0.162 (<0.001)	0.105 (<0.001)	0.206 (<0.001)	-0.107 (<0.001)	-0.169 (<0.001)	0.066 (0.005)
Shangqiu	0.112 (<0.001)	0.105 (<0.001)	0.168 (<0.001)	-0.041 (0.081)	-0.158 (<0.001)	0.120 (<0.001)
Xinyang	0.059 (0.011)	0.037 (0.119)	0.046 (0.049)	-0.219 (<0.001)	-0.075 (0.001)	0.017 (0.459)
Zhoukou	0.094 (<0.001)	0.091 (<0.001)	0.096 (<0.001)	0.086 (<0.001)	-0.122 (<0.001)	0.040 (0.086)
Zhumadian	0.096 (<0.001)	0.082 (<0.001)	0.104 (<0.001)	-0.125 (<0.001)	-0.153 (<0.001)	0.037 (0.111)
Wuhan	0.075 (0.001)	0.008 (0.733)	0.061 (0.01)	-0.063 (0.007)	-0.190 (<0.001)	0.065 (0.005)
Jingzhou	0.117 (<0.001)	0.118 (<0.001)	0.015 (0.514)	-0.150 (<0.001)	-0.215 (<0.001)	0.100 (<0.001)
Huanggang	0.070 (0.003)	0.068 (0.004)	0.158 (<0.001)	-0.067 (0.004)	-0.255 (<0.001)	-0.038 (0.106)
Enshi	0.025 (0.285)	0.049 (0.038)	0.157 (<0.001)	-0.165 (<0.001)	-0.081 (<0.001)	0.069 (0.003)
Changsha	0.149 (<0.001)	0.011 (0.629)	0.098 (<0.001)	-0.181 (<0.001)	-0.187 (<0.001)	0.182 (<0.001)
Zhuzhou	0.116 (<0.001)	0.049 (0.036)	0.140 (<0.001)	-0.124 (<0.001)	-0.139 (<0.001)	0.102 (<0.001)
Shaoyang	0.088 (<0.001)	0.044 (0.061)	0.168 (<0.001)	-0.094 (<0.001)	-0.054 (0.02)	0.037 (0.113)
Yueyang	0.066 (0.005)	0.033 (0.156)	0.187 (<0.001)	-0.147 (<0.001)	-0.157 (<0.001)	0.061 (0.009)
Chenzhou	-0.025 (0.29)	-0.095 (<0.001)	0.049 (0.037)	-0.154 (<0.001)	-0.127 (<0.001)	-0.169 (<0.001)
Yongzhou	-0.00004 (0.999)	-0.024 (0.299)	0.116 (<0.001)	-0.231 (<0.001)	-0.086 (<0.001)	0.030 (0.196)
Huaihua	0.076 (0.001)	-0.002 (0.922)	0.126 (<0.001)	-0.085 (<0.001)	-0.103 (<0.001)	-0.143 (<0.001)
Loudi	0.096 (<0.001)	0.102 (<0.001)	0.155 (<0.001)	-0.224 (<0.001)	-0.162 (<0.001)	-0.138 (<0.001)
Guangzhou	0.009 (0.694)	0.041 (0.08)	0.109 (<0.001)	-0.170 (<0.001)	-0.093 (<0.001)	0.089 (<0.001)
Shaoguan	0.012 (0.601)	-0.021 (0.374)	0.108 (<0.001)	-0.106 (<0.001)	-0.159 (<0.001)	0.061 (0.009)
Shenzhen	-0.028 (0.226)	-0.005 (0.845)	-0.022 (0.345)	-0.324 (<0.001)	-0.083 (<0.001)	-0.166 (<0.001)
Zhuhai	-0.072 (0.002)	-0.072 (0.002)	0.034 (0.151)	-0.189 (<0.001)	-0.115 (<0.001)	-0.070 (0.003)
Foshan	0.015 (0.53)	0.090 (<0.001)	0.143 (<0.001)	-0.107 (<0.001)	-0.107 (<0.001)	0.165 (<0.001)
Jiangmen	-0.028 (0.232)	0.001 (0.97)	0.079 (<0.001)	-0.244 (<0.001)	-0.129 (<0.001)	0.029 (0.221)
Zhaoqing	-0.056 (0.016)	-0.055 (0.02)	0.061 (0.009)	-0.231 (<0.001)	-0.077 (<0.001)	-0.084 (<0.001)
Huizhou	0.057 (0.014)	0.024 (0.316)	0.168 (<0.001)	-0.043 (0.068)	-0.14 (<0.001)	0.069 (0.003)
Shanwei	-0.187 (<0.001)	-0.176 (<0.001)	-0.163 (<0.001)	-0.139 (<0.001)	-0.137 (<0.001)	-0.212 (<0.001)
Heyuan	-0.002 (0.919)	-0.008 (0.723)	0.143 (<0.001)	-0.061 (0.009)	-0.116 (<0.001)	0.178 (<0.001)
Yangjiang	0.061 (0.009)	0.023 (0.334)	0.051 (0.028)	-0.030 (0.195)	-0.069 (0.003)	-0.067 (0.004)
Qingyuan	0.122 (<0.001)	0.128 (<0.001)	0.173 (<0.001)	-0.115 (<0.001)	-0.117 (<0.001)	0.028 (0.229)
Dongguan	0.076 (0.001)	0.083 (<0.001)	0.187 (<0.001)	-0.047 (0.044)	-0.071 (0.003)	0.043 (0.067)
Zhongshan	0.09 (<0.001)	0.067 (0.004)	0.200 (<0.001)	-0.145 (<0.001)	-0.142 (<0.001)	0.051 (0.03)
Nanning	0.038 (0.103)	0.031 (0.192)	0.072 (0.002)	-0.023 (0.33)	-0.080 (<0.001)	0.053 (0.023)
Chongqing	0.093 (<0.001)	0.073 (0.002)	0.062 (0.008)	-0.127 (<0.001)	-0.192 (<0.001)	0.018 (0.441)
Chengdu	0.027 (0.255)	-0.009 (0.713)	-0.035 (0.133)	-0.230 (<0.001)	-0.221 (<0.001)	-0.113 (<0.001)
Guiyang	0.102 (<0.001)	0.077 (0.001)	0.051 (0.029)	0.147 (<0.001)	-0.091 (<0.001)	0.160 (<0.001)
Kunming	0.101 (<0.001)	0.010 (0.662)	0.135 (<0.001)	-0.089 (<0.001)	0.054 (0.022)	-0.030 (0.195)
Xian	0.146 (<0.001)	0.078 (<0.001)	0.150 (<0.001)	-0.037 (0.118)	-0.196 (<0.001)	-0.068 (0.003)
Hanzhong	0.185 (<0.001)	0.135 (<0.001)	0.135 (<0.001)	0.049 (0.035)	-0.223 (<0.001)	0.140 (<0.001)
Tianshui	0.240 (<0.001)	0.223 (<0.001)	0.319 (<0.001)	0.244 (<0.001)	-0.281 (<0.001)	0.301 (<0.001)
Dingxi	0.205 (<0.001)	0.125 (<0.001)	0.201 (<0.001)	0.150 (<0.001)	-0.274 (<0.001)	0.189 (<0.001)

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S8. Pooled estimates of lag-specific risk ratios and 95% confidence intervals for influenza per 10μg/m^3 increase in the concentration of each air pollutant based on the single-pollutant models.

Air pollutant	Lag-specific risk ratio per 10μg/m3						
	lag day 1	lag day 2	lag day 3	lag day 4	lag day 5	lag day 6	lag day 7
$PM_{2.5}$	1.0067 (1.0042-1.0091)	1.0052 (1.0035-1.0068)	1.0034 (1.0022-1.0047)	1.0022 (1.0009-1.0036)	1.0019 (1.0005-1.0033)	1.0016 (0.9999-1.0033)	1.0019 (0.9995-1.0043)
PM_{10}	1.0045 (1.0027-1.0064)	1.0036 (1.0024-1.0047)	1.0023 (1.0015-1.0032)	1.0014 (1.0006-1.0023)	1.0013 (1.0004-1.0022)	1.0012 (1.0001-1.0024)	1.0014 (0.9997-1.0031)
SO_2	1.0183 (1.0062-1.0306)	1.0162 (1.0077-1.0248)	1.0121 (1.0058-1.0185)	1.0091 (1.0031-1.015)	1.0087 (1.0034-1.014)	1.0085 (1.0035-1.0135)	1.0084 (1.0007-1.0161)
NO_2	1.0183 (1.0122-1.0245)	1.0147 (1.0105-1.0189)	1.0107 (1.0074-1.014)	1.0086 (1.0053-1.0119)	1.0089 (1.0057-1.0122)	1.0109 (1.0069-1.0148)	1.0129 (1.0073-1.0185)
O_3	1.0033 (1.0015-1.0052)	1.0023 (1.001-1.0036)	1.0014 (1.0001-1.0026)	1.0006 (0.9993-1.0019)	1.0000 (0.9989- 1.0011)	0.9996 (0.9985-1.0007)	0.9993 (0.9977-1.001)
CO	1.0005 (1.0003-1.0008)	1.0004 (1.0003-1.0006)	1.0003 (1.0002-1.0004)	1.0003 (1.0001-1.0004)	1.0003 (1.0001-1.0004)	1.0003 (1.0002-1.0005)	1.0004 (1.0001-1.0006)

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S9. City-specific attributable fractions of the air pollutants on influenza based on the single-pollutant model, China 2015–2019.

City	Latitude (°N)	Attributable fractions (95% confidence interval)					
		$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Zhangjiakou	40.87	7.03% (4.43%,9.53%)	11.92% (7.58%,15.97%)	20.14% (15.32%,24.63%)	16.26% (10.07%,21.82%)	5.81% (-0.41%,11.57%)	18.97% (13.07%,24.37%)
Beijing	40.19	10.52% (6.75%,14.02%)	11.93% (7.57%,16%)	32.12% (24.99%,38.43%)	6.83% (4.09%,9.44%)	3.81% (-0.26%,7.66%)	20.87% (14.56%,26.52%)
Datong	39.90	8.73% (5.52%,11.8%)	12.91% (8.19%,17.32%)	22.86% (17.43%,27.87%)	30.66% (19.85%,39.51%)	4.98% (-0.35%,9.97%)	34.45% (24.63%,42.78%)
Tianjin	39.31	13.05% (8.41%,17.32%)	13.57% (8.64%,18.14%)	38.07% (29.8%,45.26%)	12.64% (7.71%,17.18%)	3.22% (-0.22%,6.49%)	28.02% (19.77%,35.23%)
Baoding	39.03	17.42% (11.36%,22.86%)	19.63% (12.72%,25.82%)	37.28% (29.26%,44.22%)	18.70% (11.67%,24.9%)	4.16% (-0.29%,8.3%)	30.11% (21.61%,37.31%)
Cangzhou	38.27	14.80% (9.54%,19.62%)	17.12% (10.99%,22.7%)	34.07% (26.50%,40.74%)	23.59% (14.85%,31.16%)	5.2% (-0.36%,10.34%)	26.78% (18.89%,33.70%)
Shijiazhuang	38.14	17.88% (11.69%,23.41%)	21.42% (13.95%,28.04%)	38.03% (29.88%,45.07%)	22.07% (14.04%,28.92%)	4.59% (-0.32%,9.12%)	30.91% (22.19%,38.31%)
Hengshui	37.77	17.48% (11.37%,22.98%)	20.55% (13.35%,26.96%)	32.39% (25.16%,38.79%)	18.87% (11.79%,25.10%)	5.11% (-0.36%,10.18%)	29.02% (20.60%,36.30%)
Dezhou	37.26	16.07% (10.41%,21.21%)	19.95% (12.90%,26.27%)	30.65% (23.72%,36.85%)	20.65% (12.97%,27.34%)	5.79% (-0.41%,11.49%)	30.80% (21.88%,38.49%)
Xingtai	37.22	18.27% (11.94%,23.92%)	22.05% (14.35%,28.87%)	38.84% (30.52%,46.03%)	26.59% (17.11%,34.50%)	5.04% (-0.35%,10.01%)	35.13% (25.36%,43.28%)
Handan	36.55	17.41% (11.34%,22.87%)	22.07% (14.38%,28.88%)	34.49% (26.91%,41.15%)	24.91% (15.98%,32.38%)	5.70% (-0.40%,11.30%)	33.02% (23.76%,40.83%)
Liaocheng	36.47	17.94% (11.64%,23.63%)	21.60% (13.99%,28.40%)	33.44% (25.99%,40.04%)	17.74% (10.97%,23.81%)	4.92% (-0.34%,9.81%)	28.55% (20.11%,35.93%)
Linfen	36.23	17.49% (11.42%,22.92%)	19.52% (12.64%,25.68%)	31.31% (24.29%,37.56%)	39.69% (28.15%,48.05%)	4.78% (-0.33%,9.54%)	44.36% (32.84%,53.46%)
Anyang	35.88	19.12% (12.54%,24.96%)	21.21% (13.78%,27.82%)	34.59% (26.95%,41.32%)	20.89% (13.21%,27.53%)	5.10% (-0.36%,10.14%)	36.67% (26.53%,45.10%)
Jincheng	35.62	14.82% (9.54%,19.66%)	18.98% (12.21%,25.12%)	31.75% (24.60%,38.13%)	29.95% (19.88%,37.93%)	5.66% (-0.40%,11.26%)	37.63% (27.24%,46.21%)
Xinxiang	35.27	16.13% (10.46%,21.28%)	19.01% (12.26%,25.09%)	35.86% (28.04%,42.71%)	19.97% (12.50%,26.52%)	5.48% (-0.38%,10.88%)	30.49% (21.69%,38.05%)
Heze	35.16	16.87% (10.93%,22.26%)	20.97% (13.56%,27.62%)	28.93% (22.29%,34.92%)	18.35% (11.40%,24.53%)	6.08% (-0.43%,12.07%)	30.58% (21.64%,38.34%)
Dingxi	35.12	9.64% (6.09%,13.02%)	14.09% (8.99%,18.82%)	23.41% (17.85%,28.55%)	19.20% (12.03%,25.47%)	5.30% (-0.37%,10.61%)	20.23% (13.98%,25.92%)
Tianshui	34.65	10.23% (6.49%,13.76%)	13.92% (8.86%,18.60%)	29.46% (22.72%,35.52%)	21.15% (13.39%,27.79%)	5.02% (-0.35%,10.06%)	23.63% (16.48%,30.01%)
Luoyang	34.30	16.94% (10.99%,22.33%)	20.29% (13.08%,26.79%)	33.50% (25.98%,40.18%)	11.56% (7.00%,15.81%)	4.71% (-0.33%,9.41%)	22.86% (15.91%,29.11%)
Shangqiu	34.29	14.92% (9.60%,19.81%)	17.67% (11.32%,23.46%)	25.79% (19.79%,31.26%)	13.49% (8.27%,18.27%)	6.24% (-0.44%,12.38%)	20.76% (14.32%,26.65%)
Xian	34.12	19.21% (12.52%,25.19%)	21.15% (13.67%,27.87%)	42.19% (33.26%,49.83%)	12.87% (7.80%,17.59%)	3.12% (-0.22%,6.31%)	27.96% (19.65%,35.25%)
Pingdingshan	33.80	16.77% (10.83%,22.18%)	18.01% (11.56%,23.89%)	30.46% (23.50%,36.72%)	17.18% (10.64%,23.03%)	5.24% (-0.37%,10.43%)	26.67% (18.60%,33.87%)
Zhoukou	33.73	14.66% (9.45%,19.43%)	17.29% (11.10%,22.94%)	22.51% (17.14%,27.47%)	13.72% (8.35%,18.68%)	6.25% (-0.44%,12.4%)	29.18% (20.62%,36.63%)
Hanzhong	33.10	17.30% (11.16%,22.91%)	16.51% (10.52%,22.02%)	27.42% (21.03%,33.24%)	12.27% (7.42%,16.80%)	2.99% (-0.21%,6.03%)	35.25% (25.13%,43.86%)
Nanyang	33.05	14.16% (9.11%,18.82%)	17.11% (10.97%,22.70%)	24.45% (18.70%,29.72%)	12.06% (7.33%,16.44%)	6.20% (-0.43%,12.30%)	27.14% (18.97%,34.38%)
Zhumadian	32.93	14.07% (9.04%,18.72%)	16.81% (10.76%,22.34%)	26.33% (20.21%,31.90%)	15.43% (9.61%,20.6%)	6.31% (-0.44%,12.51%)	21.06% (14.55%,26.98%)
Fuyang	32.92	14.35% (9.21%,19.11%)	15.26% (9.72%,20.39%)	26.08% (19.98%,31.65%)	11.29% (6.87%,15.38%)	5.22% (-0.36%,10.42%)	20.64% (14.24%,26.50%)
Chuzhou	32.55	13.59% (8.69%,18.15%)	13.89% (8.81%,18.62%)	29.53% (22.84%,35.52%)	10.35% (6.21%,14.28%)	5.49% (-0.38%,10.95%)	21.02% (14.49%,26.99%)
Xinyang	32.09	12.88% (8.25%,17.18%)	14.67% (9.35%,19.59%)	21.84% (16.65%,26.63%)	8.89% (5.34%,12.26%)	6.36% (-0.45%,12.62%)	19.09% (13.13%,24.56%)
Nanjing	31.94	11.26% (7.16%,15.11%)	12.91% (8.18%,17.34%)	33.83% (26.29%,40.49%)	10.52% (6.33%,14.47%)	5.17% (-0.36%,10.32%)	22.88% (15.82%,29.29%)
Hefei	31.77	12.95% (8.27%,17.33%)	12.59% (7.96%,16.94%)	33.78% (26.28%,40.42%)	7.60% (4.55%,10.51%)	4.71% (-0.33%,9.42%)	21.80% (15.04%,27.98%)
Luan	31.76	10.95% (6.95%,14.73%)	12.58% (7.95%,16.93%)	26.35% (20.23%,31.92%)	7.54% (4.50%,10.46%)	5.47% (-0.38%,10.91%)	18.68% (12.79%,24.15%)
Maanshan	31.64	12.91% (8.26%,17.25%)	13.11% (8.30%,17.60%)	30.78% (23.82%,37.00%)	14.66% (8.94%,19.93%)	5.10% (-0.36%,10.18%)	27.12% (18.94%,34.40%)
Wuxi	31.53	12.52% (7.99%,16.77%)	14.12% (8.97%,18.91%)	34.41% (26.80%,41.12%)	9.88% (5.95%,13.6%)	4.35% (-0.03%,8.73%)	25.78% (17.93%,32.81%)
Shanghai	31.18	9.98% (6.33%,13.43%)	9.23% (5.79%,12.50%)	34.51% (26.91%,41.19%)	9.12% (5.48%,12.56%)	5.50% (-0.38%,10.97%)	19.25% (13.21%,24.83%)
Huanggang	30.73	11.76% (7.48%,15.79%)	13.42% (8.49%,18.03%)	24.28% (18.60%,29.48%)	8.27% (4.96%,11.42%)	4.66% (-0.32%,9.33%)	23.52% (16.26%,30.11%)
Chengdu	30.70	12.23% (7.78%,16.4%)	13.08% (8.27%,17.58%)	33.94% (26.30%,40.73%)	6.44% (3.82%,8.98%)	3.52% (-0.24%,7.09%)	21.14% (14.54%,27.2%)
Wuhan	30.63	13.67% (8.73%,18.28%)	13.80% (8.74%,18.52%)	36.80% (28.81%,43.77%)	8.90% (5.33%,12.31%)	3.88% (-0.27%,7.78%)	25.95% (18.04%,33.04%)
Chizhou	30.30	11.22% (7.15%,15.05%)	11.41% (7.21%,15.36%)	28.82% (22.22%,34.76%)	11.79% (7.15%,16.12%)	4.67% (-0.32%,9.33%)	20.56% (14.15%,26.44%)
Enshi	30.20	10.12% (6.42%,13.6%)	11.03% (6.95%,14.88%)	20.67% (15.67%,25.35%)	4.87% (2.89%,6.8%)	3.41% (-0.24%,6.88%)	22.93% (15.86%,29.35%)

Table S9. (continued).

City	Latitude (°N)	Attributable fractions (95% confidence interval)					
		$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Chongqing	30.07	11.49% (7.30%,15.43%)	11.97% (7.56%,16.12%)	32.90% (25.45%,39.55%)	7.89% (4.71%,10.95%)	2.70% (-0.19%,5.43%)	23.56% (16.28%,30.17%)
Jingzhou	30.01	14.41% (9.23%,19.21%)	17.03% (10.90%,22.64%)	28.42% (21.88%,34.34%)	11.83% (7.16%,16.19%)	4.36% (-0.30%,8.73%)	28.21% (19.73%,35.72%)
Huangshan	29.92	6.71% (4.22%,9.11%)	7.44% (4.64%,10.12%)	15.95% (11.98%,19.71%)	8.04% (4.79%,11.15%)	4.44% (-0.31%,8.93%)	17.10% (11.68%,22.15%)
Hangzhou	29.90	10.82% (6.86%,14.55%)	12.15% (7.68%,16.35%)	34.77% (27.03%,41.61%)	7.47% (4.45%,10.38%)	3.99% (-0.28%,8.00%)	22.02% (15.17%,28.29%)
Shaoxing	29.72	10.82% (6.87%,14.56%)	11.65% (7.36%,15.70%)	31.11% (24.06%,37.42%)	7.90% (4.73%,10.93%)	4.32% (-0.30%,8.67%)	21.40% (14.73%,27.51%)
Ningbo	29.71	8.85% (5.60%,11.94%)	9.57% (6.01%,12.94%)	31.5% (24.4%,37.83%)	8.20% (4.90%,11.37%)	5.03% (-0.35%,10.06%)	20.40% (14.00%,26.28%)
Jinhua	29.12	8.98% (5.67%,12.13%)	9.55% (6.00%,12.92%)	31.78% (24.61%,38.17%)	9.12% (5.48%,12.58%)	3.88% (-0.27%,7.79%)	20.91% (14.38%,26.92%)
Yueyang	29.07	12.05% (7.65%,16.2%)	12.58% (7.94%,16.94%)	26.51% (20.37%,32.09%)	8.62% (5.16%,11.93%)	4.30% (-0.30%,8.62%)	26.03% (18.08%,33.18%)
Shangrao	28.78	8.70% (5.48%,11.79%)	10.17% (6.39%,13.77%)	21.71% (16.54%,26.49%)	23.45% (14.89%,30.73%)	5.33% (-0.37%,10.63%)	19.57% (13.44%,25.21%)
Taizhou	28.78	7.65% (4.81%,10.36%)	9.16% (5.75%,12.41%)	21.04% (15.99%,25.72%)	5.18% (3.07%,7.23%)	5.28% (-0.37%,10.56%)	16.83% (11.48%,21.82%)
Nanchang	28.65	9.54% (6.04%,12.87%)	11.94% (7.55%,16.07%)	28.63% (22.09%,34.51%)	9.67% (5.84%,13.27%)	4.44% (-0.31%,8.89%)	24.72% (17.15%,31.55%)
Yingtan	28.24	9.23% (5.84%,12.47%)	9.20% (5.77%,12.46%)	20.92% (15.90%,25.57%)	19.71% (12.30%,26.25%)	5.14% (-0.36%,10.25%)	16.96% (11.57%,21.98%)
Changsha	28.23	13.81% (8.85%,18.41%)	11.01% (6.94%,14.85%)	29.99% (23.18%,36.09%)	7.42% (4.44%,10.27%)	4.06% (-0.28%,8.15%)	24.28% (16.80%,31.05%)
Lishui	28.20	6.95% (4.36%,9.43%)	7.75% (4.84%,10.54%)	23.32% (17.77%,28.45%)	5.76% (3.42%,8.04%)	4.07% (-0.28%,8.18%)	20.06% (13.77%,25.87%)
Loudi	27.74	10.5% (6.66%,14.14%)	12.38% (7.84%,16.63%)	21.15% (16.09%,25.85%)	9.82% (5.92%,13.47%)	4.95% (-0.34%,9.91%)	28.97% (20.36%,36.54%)
Huaihua	27.56	9.75% (6.18%,13.14%)	11.92% (7.52%,16.05%)	17.00% (12.85%,20.89%)	9.67% (5.85%,13.24%)	4.75% (-0.33%,9.55%)	23.57% (16.29%,30.17%)
Zhuzhou	27.12	13.06% (8.36%,17.42%)	12.84% (8.15%,17.22%)	30.39% (23.49%,36.56%)	11.84% (7.18%,16.20%)	4.12% (-0.29%,8.25%)	22.21% (15.32%,28.49%)
Jian	26.98	9.39% (5.93%,12.69%)	10.58% (6.65%,14.31%)	19.14% (14.52%,23.45%)	16.73% (10.25%,22.64%)	5.11% (-0.36%,10.22%)	20.26% (13.92%,26.10%)
Shaoyang	26.92	12.54% (8.02%,16.76%)	11.97% (7.58%,16.09%)	22.09% (16.85%,26.93%)	17.07% (10.51%,22.99%)	5.10% (-0.35%,10.21%)	22.85% (15.79%,29.28%)
Guiyang	26.84	8.08% (5.09%,10.96%)	9.31% (5.84%,12.63%)	20.61% (15.63%,25.26%)	12.88% (7.85%,17.52%)	4.55% (-0.32%,9.13%)	18.44% (12.61%,23.85%)
Fuzhou	26.06	6.09% (3.82%,8.30%)	7.75% (4.83%,10.55%)	22.64% (17.24%,27.63%)	5.11% (3.02%,7.14%)	5.18% (-0.36%,10.37%)	17.55% (11.97%,22.76%)
Chenzhou	25.82	7.35% (4.63%,9.96%)	8.67% (5.44%,11.77%)	20.89% (15.88%,25.55%)	9.77% (5.88%,13.46%)	4.35% (-0.30%,8.73%)	22.80% (15.77%,29.19%)
Yongzhou	25.78	9.44% (5.98%,12.7%)	9.66% (6.08%,13.05%)	21.84% (16.64%,26.65%)	8.37% (5.03%,11.54%)	4.91% (-0.34%,9.83%)	17.36% (11.87%,22.47%)
Ganzhou	25.71	8.46% (5.34%,11.44%)	9.54% (5.99%,12.9%)	20.07% (15.26%,24.54%)	14.02% (8.57%,19.01%)	4.97% (-0.35%,9.94%)	31.41% (22.11%,39.53%)
Kunming	25.39	6.66% (4.17%,9.07%)	8.57% (5.35%,11.66%)	25.25% (19.26%,30.76%)	11.89% (7.16%,16.36%)	5.36% (-0.37%,10.72%)	21.30% (14.66%,27.39%)
Quanzhou	25.21	6.12% (3.83%,8.33%)	7.90% (4.93%,10.76%)	20.33% (15.41%,24.92%)	8.59% (5.14%,11.90%)	5.62% (-0.39%,11.23%)	15.35% (10.44%,19.98%)
Shaoguan	24.83	7.35% (4.63%,9.97%)	7.58% (4.74%,10.32%)	22.06% (16.79%,26.94%)	11.88% (7.16%,16.31%)	4.63% (-0.32%,9.27%)	24.17% (16.73%,30.90%)
Qingyuan	24.32	8.89% (5.62%,12.00%)	9.68% (6.09%,13.09%)	30.49% (23.63%,36.62%)	9.87% (5.92%,13.63%)	4.74% (-0.33%,9.47%)	23.78% (16.48%,30.37%)
Heyuan	24.05	6.47% (4.06%,8.80%)	7.24% (4.52%,9.87%)	19.19% (14.54%,23.54%)	6.98% (4.15%,9.70%)	4.92% (-0.34%,9.87%)	22.38% (15.43%,28.74%)
Zhaoqing	23.54	7.68% (4.84%,10.40%)	8.34% (5.22%,11.32%)	26.10% (20.09%,31.54%)	10.09% (6.07%,13.91%)	5.31% (-0.37%,10.6%)	21.24% (14.61%,27.32%)
Guangzhou	23.37	7.66% (4.82%,10.38%)	8.94% (5.61%,12.13%)	35.63% (27.86%,42.43%)	7.75% (4.63%,10.76%)	4.93% (-0.34%,9.84%)	22.36% (15.43%,28.69%)
Huizhou	23.25	6.27% (3.93%,8.53%)	7.74% (4.83%,10.54%)	20.58% (15.62%,25.19%)	7.28% (4.33%,10.13%)	5.21% (-0.36%,10.43%)	18.83% (12.89%,24.34%)
Nanning	23.05	8.28% (5.22%,11.21%)	9.84% (6.18%,13.33%)	27.10% (20.84%,32.79%)	9.53% (5.72%,13.16%)	4.23% (-0.29%,8.50%)	23.07% (15.93%,29.57%)
Shanwei	23.03	4.66% (2.91%,6.36%)	5.69% (3.53%,7.80%)	9.13% (6.80%,11.39%)	6.92% (4.11%,9.64%)	5.50% (-0.38%,10.99%)	17.56% (11.98%,22.77%)
Foshan	23.02	7.88% (4.97%,10.68%)	9.84% (6.18%,13.31%)	32.95% (25.66%,39.40%)	9.32% (5.59%,12.88%)	4.78% (-0.33%,9.54%)	22.34% (15.41%,28.66%)
Dongguan	22.95	8.28% (5.22%,11.21%)	8.65% (5.41%,11.75%)	30.49% (23.61%,36.63%)	9.31% (5.57%,12.87%)	5.82% (-0.41%,11.58%)	20.51% (14.09%,26.42%)
Shenzhen	22.66	5.75% (3.60%,7.84%)	6.9% (4.30%,9.41%)	22.34% (17.03%,27.24%)	5.13% (3.04%,7.17%)	5.17% (-0.36%,10.34%)	16.89% (11.51%,21.93%)
Zhongshan	22.52	7.32% (4.62%,9.91%)	7.68% (4.81%,10.45%)	27.65% (21.48%,33.13%)	7.04% (4.20%,9.77%)	4.37% (-0.30%,8.74%)	21.45% (14.80%,27.52%)
Jiangmen	22.28	6.91% (4.35%,9.38%)	8.52% (5.34%,11.56%)	26.19% (20.24%,31.55%)	7.47% (4.46%,10.36%)	4.89% (-0.34%,9.74%)	20.85% (14.37%,26.79%)
Zhuhai	22.17	5.62% (3.53%,7.65%)	6.46% (4.03%,8.8%)	23.18% (17.78%,28.10%)	5.45% (3.23%,7.60%)	5.04% (-0.35%,10.08%)	17.42% (11.90%,22.57%)
Yangjiang	22.04	7.03% (4.43%,9.53%)	7.27% (4.53%,9.9%)	15.75% (11.91%,19.35%)	6.43% (3.83%,8.93%)	5.15% (-0.36%,10.28%)	22.08% (15.21%,28.35%)

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S10. City-specific attributable fractions of the air pollutants on influenza based on the multi-pollutant model, China 2015–2019**.**

City	Latitude (°N)	Attributable fractions (95% confidence interval)					
		$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Zhangjiakou	40.87	1.15% (-4.89%,6.68%)	-2.39% (-13.65%,6.89%)	19.54% (13.35%,25.18%)	-0.11% (-5.14%,4.53%)	-0.47% (-6.65%,5.29%)	4.82% (-1.15%,10.34%)
Beijing	40.19	1.79% (-8.03%,10.03%)	-2.37% (-13.09%,6.88%)	31.25% (21.98%,39.19%)	-0.04% (-1.93%,1.79%)	-0.30% (-4.28%,3.47%)	5.47% (-1.33%,11.59%)
Datong	39.90	1.44% (-6.18%,8.31%)	-2.56% (-14.14%,7.45%)	22.18% (15.21%,28.48%)	-0.24% (-11.29%,9.30%)	-0.40% (-5.65%,4.54%)	9.54% (-2.37%,19.81%)
Tianjin	39.31	2.24% (-10.11%,12.44%)	-2.72% (-15.13%,7.86%)	37.06% (26.27%,46.11%)	-0.08% (-3.81%,3.43%)	-0.26% (-3.59%,2.93%)	7.52% (-1.84%,15.81%)
Baoding	39.03	3.08% (-14.36%,16.64%)	-4.17% (-24.23%,11.60%)	36.30% (25.83%,45.05%)	-0.13% (-6.09%,5.30%)	-0.33% (-4.73%,3.79%)	8.45% (-2.12%,17.43%)
Cangzhou	38.27	2.55% (-11.51%,14.11%)	-3.53% (-19.97%,10.01%)	33.14% (23.31%,41.55%)	-0.17% (-7.88%,6.78%)	-0.42% (-5.97%,4.74%)	7.19% (-1.76%,15.10%)
Shijiazhuang	38.14	3.18% (-14.99%,17.08%)	-4.63% (-27.27%,12.73%)	37.04% (26.38%,45.91%)	-0.16% (-7.71%,6.48%)	-0.37% (-5.28%,4.18%)	8.68% (-2.18%,17.90%)
Hengshui	37.77	3.07% (-14.28%,16.68%)	-4.41% (-25.85%,12.19%)	31.50% (22.12%,39.56%)	-0.13% (-6.15%,5.35%)	-0.41% (-5.86%,4.66%)	7.92% (-1.96%,16.53%)
Dezhou	37.26	2.80% (-12.83%,15.34%)	-4.21% (-24.37%,11.77%)	29.80% (20.81%,37.60%)	-0.15% (-6.86%,5.91%)	-0.47% (-6.70%,5.28%)	8.44% (-2.10%,17.57%)
Xingtai	37.22	3.24% (-15.22%,17.45%)	-4.75% (-27.83%,13.10%)	37.83% (26.94%,46.88%)	-0.20% (-9.68%,7.99%)	-0.41% (-5.81%,4.60%)	9.99% (-2.52%,20.51%)
Handan	36.55	3.07% (-14.36%,16.62%)	-4.78% (-28.18%,13.13%)	33.56% (23.69%,41.95%)	-0.19% (-8.94%,7.43%)	-0.46% (-6.60%,5.20%)	9.32% (-2.34%,19.19%)
Liaocheng	36.47	3.13% (-14.39%,17.12%)	-4.58% (-26.43%,12.76%)	32.53% (22.85%,40.84%)	-0.12% (-5.56%,4.93%)	-0.40% (-5.63%,4.49%)	7.63% (-1.87%,16.07%)
Linfen	36.23	3.10% (-14.52%,16.70%)	-4.14% (-24.02%,11.53%)	30.45% (21.33%,38.31%)	-0.42% (-24.19%,14.72%)	-0.39% (-5.47%,4.36%)	13.44% (-3.49%,26.88%)
Anyang	35.88	3.43% (-16.28%,18.28%)	-4.55% (-26.59%,12.58%)	33.66% (23.72%,42.13%)	-0.15% (-7.14%,6.07%)	-0.41% (-5.88%,4.65%)	10.49% (-2.65%,21.48%)
Jincheng	35.62	2.54% (-11.44%,14.13%)	-3.93% (-22.28%,11.12%)	30.87% (21.60%,38.90%)	-0.25% (-12.41%,9.58%)	-0.46% (-6.50%,5.16%)	10.76% (-2.71%,22.06%)
Xinxiang	35.27	2.81% (-12.93%,15.39%)	-3.98% (-22.81%,11.17%)	34.91% (24.70%,43.52%)	-0.14% (-6.57%,5.69%)	-0.44% (-6.32%,5.00%)	8.36% (-2.07%,17.42%)
Heze	35.16	2.94% (-13.46%,16.10%)	-4.42% (-25.39%,12.36%)	28.11% (19.52%,35.65%)	-0.13% (-5.85%,5.14%)	-0.49% (-7.00%,5.54%)	8.26% (-2.03%,17.33%)
Dingxi	35.12	1.59% (-6.82%,9.17%)	-2.85% (-16.05%,8.18%)	22.72% (15.57%,29.19%)	-0.14% (-6.29%,5.47%)	-0.42% (-6.00%,4.83%)	5.17% (-1.24%,11.07%)
Tianshui	34.65	1.70% (-7.38%,9.74%)	-2.80% (-15.57%,8.06%)	28.62% (19.91%,36.26%)	-0.15% (-7.20%,6.15%)	-0.40% (-5.69%,4.58%)	6.17% (-1.49%,13.11%)
Luoyang	34.30	2.95% (-13.53%,16.17%)	-4.23% (-24.13%,11.92%)	32.57% (22.82%,40.99%)	-0.07% (-3.39%,3.09%)	-0.38% (-5.37%,4.30%)	5.94% (-1.43%,12.64%)
Shangqiu	34.29	2.56% (-11.49%,14.22%)	-3.62% (-20.40%,10.31%)	25.05% (17.30%,31.93%)	-0.09% (-4.12%,3.69%)	-0.50% (-7.20%,5.69%)	5.28% (-1.26%,11.33%)
Xian	34.12	3.39% (-15.77%,18.34%)	-4.45% (-25.50%,12.46%)	41.11% (29.40%,50.73%)	-0.08% (-3.78%,3.45%)	-0.25% (-3.48%,2.84%)	7.44% (-1.81%,15.69%)
Pingdingshan	33.80	2.90% (-13.15%,16.00%)	-3.70% (-20.90%,10.53%)	29.60% (20.60%,37.48%)	-0.12% (-5.44%,4.79%)	-0.42% (-6.00%,4.77%)	6.96% (-1.68%,14.80%)
Zhoukou	33.73	2.52% (-11.41%,13.98%)	-3.55% (-20.10%,10.11%)	21.84% (14.95%,28.08%)	-0.09% (-4.08%,3.70%)	-0.51% (-7.21%,5.70%)	7.86% (-1.93%,16.50%)
Hanzhong	33.10	2.98% (-13.43%,16.50%)	-3.32% (-18.44%,9.58%)	26.63% (18.39%,33.95%)	-0.08% (-3.58%,3.27%)	-0.24% (-3.34%,2.72%)	9.69% (-2.39%,20.19%)
Nanyang	33.05	2.42% (-10.88%,13.50%)	-3.51% (-19.80%,9.99%)	23.74% (16.34%,30.37%)	-0.08% (-3.57%,3.24%)	-0.50% (-7.15%,5.65%)	7.12% (-1.73%,15.10%)
Zhumadian	32.93	2.40% (-10.75%,13.41%)	-3.43% (-19.31%,9.80%)	25.57% (17.68%,32.58%)	-0.11% (-5.00%,4.35%)	-0.51% (-7.29%,5.75%)	5.38% (-1.29%,11.53%)
Fuyang	32.92	2.44% (-10.89%,13.68%)	-3.06% (-17.00%,8.84%)	25.32% (17.46%,32.33%)	-0.07% (-3.37%,3.05%)	-0.42% (-5.96%,4.76%)	5.25% (-1.26%,11.27%)
Chuzhou	32.55	2.29% (-10.14%,12.94%)	-2.75% (-15.13%,8.01%)	28.71% (20.04%,36.25%)	-0.07% (-2.94%,2.72%)	-0.44% (-6.28%,5.01%)	5.34% (-1.28%,11.47%)
Xinyang	32.09	2.18% (-9.70%,12.27%)	-2.95% (-16.39%,8.50%)	21.19% (14.52%,27.22%)	-0.06% (-2.53%,2.34%)	-0.52% (-7.35%,5.80%)	4.83% (-1.15%,10.38%)
Nanjing	31.94	1.88% (-8.23%,10.72%)	-2.54% (-13.95%,7.43%)	32.90% (23.12%,41.29%)	-0.07% (-3.02%,2.78%)	-0.42% (-5.91%,4.72%)	5.85% (-1.40%,12.53%)
Hefei	31.77	2.18% (-9.58%,12.34%)	-2.46% (-13.42%,7.23%)	32.86% (23.10%,41.22%)	-0.05% (-2.14%,1.99%)	-0.38% (-5.36%,4.29%)	5.54% (-1.33%,11.90%)
Luan	31.76	1.82% (-7.92%,10.42%)	-2.46% (-13.42%,7.22%)	25.59% (17.70%,32.60%)	-0.05% (-2.11%,1.96%)	-0.44% (-6.24%,4.98%)	4.67% (-1.11%,10.09%)
Maanshan	31.64	2.18% (-9.66%,12.30%)	-2.58% (-14.16%,7.55%)	29.92% (20.90%,37.76%)	-0.10% (-4.39%,3.97%)	-0.41% (-5.82%,4.65%)	7.10% (-1.72%,15.08%)
Wuxi	31.53	2.10% (-9.24%,11.93%)	-2.81% (-15.47%,8.15%)	33.48% (23.58%,41.92%)	-0.06% (-2.84%,2.61%)	-0.35% (-4.91%,3.96%)	6.68% (-1.61%,14.25%)
Shanghai	31.18	1.66% (-7.20%,9.50%)	-1.77% (-9.49%,5.26%)	33.58% (23.69%,41.99%)	-0.06% (-2.61%,2.41%)	-0.44% (-6.27%,5.01%)	4.84% (-1.15%,10.43%)
Huanggang	30.73	1.96% (-8.58%,11.20%)	-2.64% (-14.42%,7.72%)	23.57% (16.25%,30.11%)	-0.05% (-2.34%,2.17%)	-0.37% (-5.3%,4.25%)	6.01% (-1.44%,12.88%)
Chengdu	30.70	2.04% (-8.93%,11.64%)	-2.57% (-14.01%,7.52%)	33.00% (23.09%,41.55%)	-0.04% (-1.77%,1.66%)	-0.28% (-3.94%,3.21%)	5.34% (-1.27%,11.49%)
Wuhan	30.63	2.30% (-10.15%,13.02%)	-2.72% (-14.9%,7.94%)	35.83% (25.40%,44.60%)	-0.06% (-2.51%,2.33%)	-0.31% (-4.39%,3.54%)	6.72% (-1.62%,14.33%)
Chizhou	30.30	1.88% (-8.24%,10.68%)	-2.23% (-12.17%,6.55%)	28.00% (19.47%,35.48%)	-0.08% (-3.47%,3.16%)	-0.37% (-5.30%,4.25%)	5.20% (-1.24%,11.19%)
Enshi	30.20	1.68% (-7.32%,9.63%)	-2.14% (-11.62%,6.32%)	20.05% (13.63%,25.93%)	-0.03% (-1.33%,1.25%)	-0.27% (-3.81%,3.11%)	5.87% (-1.41%,12.57%)

Table S10. (continued).

City	Latitude (°N)	Attributable fractions (95% confidence interval)					
		$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Chongqing	30.07	1.91% (-8.34%,10.94%)	-2.33% (-12.70%,6.87%)	31.98% (22.32%,40.36%)	-0.05% (-2.20%,2.05%)	-0.22% (-3.03%,2.46%)	6.01% (-1.44%,12.89%)
Jingzhou	30.01	2.44% (-10.86%,13.73%)	-3.47% (-19.44%,9.92%)	27.61% (19.15%,35.06%)	-0.08% (-3.46%,3.16%)	-0.35% (-4.93%,3.97%)	7.41% (-1.80%,15.72%)
Huangshan	29.92	1.09% (-4.65%,6.38%)	-1.40% (-7.46%,4.21%)	15.44% (10.39%,20.19%)	-0.05% (-2.24%,2.09%)	-0.35% (-4.99%,4.04%)	4.25% (-1.01%,9.21%)
Hangzhou	29.9	1.8% (-7.80%,10.29%)	-2.38% (-12.95%,6.97%)	33.82% (23.76%,42.43%)	-0.05% (-2.07%,1.94%)	-0.32% (-4.51%,3.64%)	5.58% (-1.33%,12.00%)
Shaoxing	29.72	1.8% (-7.80%,10.30%)	-2.27% (-12.36%,6.68%)	30.25% (21.11%,38.18%)	-0.05% (-2.24%,2.07%)	-0.35% (-4.89%,3.94%)	5.42% (-1.29%,11.65%)
Ningbo	29.71	1.46% (-6.29%,8.42%)	-1.84% (-9.91%,5.46%)	30.62% (21.42%,38.59%)	-0.05% (-2.30%,2.14%)	-0.40% (-5.71%,4.58%)	5.13% (-1.22%,11.06%)
Jinhua	29.12	1.48% (-6.35%,8.54%)	-1.84% (-9.88%,5.45%)	30.90% (21.60%,38.94%)	-0.06% (-2.60%,2.40%)	-0.31% (-4.38%,3.54%)	5.28% (-1.26%,11.36%)
Yueyang	29.07	2.00% (-8.71%,11.47%)	-2.45% (-13.35%,7.22%)	25.75% (17.82%,32.77%)	-0.05% (-2.43%,2.26%)	-0.34% (-4.85%,3.91%)	6.72% (-1.62%,14.35%)
Shangrao	28.78	1.42% (-6.07%,8.27%)	-1.95% (-10.53%,5.80%)	21.06% (14.42%,27.08%)	-0.17% (-8.07%,6.86%)	-0.43% (-6.08%,4.86%)	4.93% (-1.17%,10.62%)
Taizhou	28.78	1.25% (-5.32%,7.27%)	-1.75% (-9.40%,5.22%)	20.40% (13.93%,26.30%)	-0.03% (-1.42%,1.33%)	-0.42% (-6.00%,4.81%)	4.17% (-0.99%,9.04%)
Nanchang	28.65	1.57% (-6.80%,9.08%)	-2.34% (-12.75%,6.86%)	27.82% (19.37%,35.23%)	-0.06% (-2.81%,2.57%)	-0.36% (-5.02%,4.04%)	6.37% (-1.53%,13.61%)
Yingtan	28.24	1.52% (-6.55%,8.78%)	-1.76% (-9.45%,5.24%)	20.29% (13.85%,26.15%)	-0.14% (-6.38%,5.57%)	-0.41% (-5.86%,4.68%)	4.21% (-1.00%,9.12%)
Changsha	28.23	2.34% (-10.40%,13.16%)	-2.14% (-11.61%,6.31%)	29.15% (20.33%,36.84%)	-0.05% (-2.09%,1.94%)	-0.32% (-4.59%,3.70%)	6.22% (-1.49%,13.32%)
Lishui	28.2	1.13% (-4.79%,6.60%)	-1.46% (-7.78%,4.39%)	22.63% (15.49%,29.08%)	-0.04% (-1.58%,1.49%)	-0.33% (-4.58%,3.71%)	5.04% (-1.20%,10.87%)
Loudi	27.74	1.74% (-7.55%,9.99%)	-2.44% (-13.34%,7.12%)	20.52% (14.02%,26.43%)	-0.06% (-2.85%,2.61%)	-0.40% (-5.60%,4.51%)	7.69% (-1.87%,16.25%)
Huaihua	27.56	1.61% (-6.99%,9.28%)	-2.33% (-12.65%,6.84%)	16.47% (11.17%,21.38%)	-0.06% (-2.82%,2.58%)	-0.38% (-5.36%,4.33%)	6.02% (-1.44%,12.91%)
Zhuzhou	27.12	2.21% (-9.80%,12.44%)	-2.55% (-14.01%,7.41%)	29.54% (20.61%,37.31%)	-0.08% (-3.48%,3.17%)	-0.33% (-4.66%,3.75%)	5.65% (-1.35%,12.13%)
Jian	26.98	1.54% (-6.62%,8.93%)	-2.03% (-10.97%,6.04%)	18.56% (12.64%,23.98%)	-0.11% (-5.09%,4.57%)	-0.41% (-5.82%,4.66%)	5.11% (-1.22%,11.00%)
Shaoyang	26.92	2.12% (-9.34%,11.95%)	-2.35% (-12.87%,6.89%)	21.43% (14.70%,27.53%)	-0.11% (-5.28%,4.71%)	-0.41% (-5.79%,4.65%)	5.83% (-1.40%,12.5%)
Guiyang	26.84	1.32% (-5.61%,7.68%)	-1.78% (-9.51%,5.30%)	19.99% (13.61%,25.83%)	-0.08% (-3.85%,3.48%)	-0.36% (-5.13%,4.14%)	4.59% (-1.09%,9.94%)
Fuzhou	26.06	0.98% (-4.14%,5.79%)	-1.46% (-7.74%,4.38%)	21.97% (15.03%,28.25%)	-0.03% (-1.39%,1.31%)	-0.42% (-5.88%,4.72%)	4.35% (-1.03%,9.43%)
Chenzhou	25.82	1.20% (-5.14%,6.99%)	-1.65% (-8.87%,4.93%)	20.26% (13.83%,26.13%)	-0.06% (-2.80%,2.58%)	-0.35% (-4.92%,3.96%)	5.83% (-1.40%,12.49%)
Yongzhou	25.78	1.56% (-6.79%,8.98%)	-1.87% (-10.10%,5.52%)	21.19% (14.51%,27.24%)	-0.05% (-2.39%,2.21%)	-0.39% (-5.55%,4.47%)	4.32% (-1.03%,9.36%)
Ganzhou	25.71	1.39% (-5.94%,8.04%)	-1.84% (-9.90%,5.44%)	19.47% (13.30%,25.09%)	-0.09% (-4.23%,3.81%)	-0.40% (-5.65%,4.53%)	8.37% (-2.04%,17.66%)
Kunming	25.39	1.07% (-4.53%,6.32%)	-1.62% (-8.59%,4.85%)	24.50% (16.80%,31.44%)	-0.08% (-3.41%,3.14%)	-0.43% (-6.08%,4.88%)	5.39% (-1.29%,11.59%)
Quanzhou	25.21	0.99% (-4.16%,5.81%)	-1.49% (-7.91%,4.47%)	19.71% (13.41%,25.49%)	-0.05% (-2.42%,2.24%)	-0.45% (-6.40%,5.12%)	3.77% (-0.89%,8.21%)
Shaoguan	24.83	1.20% (-5.11%,6.99%)	-1.43% (-7.62%,4.30%)	21.40% (14.63%,27.54%)	-0.08% (-3.43%,3.15%)	-0.37% (-5.26%,4.22%)	6.19% (-1.49%,13.26%)
Qingyuan	24.32	1.46% (-6.32%,8.46%)	-1.87% (-10.07%,5.53%)	29.65% (20.74%,37.37%)	-0.06% (-2.80%,2.59%)	-0.38% (-5.39%,4.32%)	6.11% (-1.47%,13.07%)
Heyuan	24.05	1.05% (-4.43%,6.15%)	-1.36% (-7.22%,4.10%)	18.60% (12.65%,24.08%)	-0.04% (-1.93%,1.81%)	-0.39% (-5.57%,4.48%)	5.68% (-1.36%,12.21%)
Zhaoqing	23.54	1.26% (-5.37%,7.30%)	-1.58% (-8.45%,4.73%)	25.36% (17.59%,32.21%)	-0.06% (-2.88%,2.66%)	-0.43% (-6.07%,4.84%)	5.37% (-1.28%,11.55%)
Guangzhou	23.37	1.25% (-5.34%,7.28%)	-1.71% (-9.15%,5.09%)	34.68% (24.55%,43.24%)	-0.05% (-2.17%,2.02%)	-0.40% (-5.63%,4.50%)	5.69% (-1.36%,12.21%)
Huizhou	23.25	1.01% (-4.27%,5.95%)	-1.46% (-7.74%,4.38%)	19.95% (13.60%,25.76%)	-0.04% (-2.02%,1.88%)	-0.42% (-5.92%,4.75%)	4.7% (-1.12%,10.16%)
Nanning	23.05	1.35% (-5.79%,7.87%)	-1.89% (-10.15%,5.61%)	26.33% (18.24%,33.49%)	-0.06% (-2.71%,2.50%)	-0.34% (-4.77%,3.86%)	5.88% (-1.41%,12.61%)
Shanwei	23.03	0.74% (-3.12%,4.42%)	-1.05% (-5.54%,3.20%)	8.83% (5.88%,11.67%)	-0.04% (-1.91%,1.79%)	-0.44% (-6.26%,5.01%)	4.35% (-1.03%,9.43%)
Foshan	23.02	1.29% (-5.49%,7.50%)	-1.89% (-10.19%,5.61%)	32.06% (22.58%,40.17%)	-0.06% (-2.64%,2.44%)	-0.39% (-5.47%,4.36%)	5.68% (-1.36%,12.19%)
Dongguan	22.95	1.35% (-5.78%,7.87%)	-1.64% (-8.77%,4.91%)	29.64% (20.73%,37.37%)	-0.06% (-2.62%,2.43%)	-0.47% (-6.70%,5.31%)	5.16% (-1.23%,11.13%)
Shenzhen	22.66	0.93% (-3.91%,5.46%)	-1.30% (-6.87%,3.90%)	21.67% (14.85%,27.85%)	-0.03% (-1.40%,1.32%)	-0.41% (-5.87%,4.71%)	4.18% (-0.99%,9.06%)
Zhongshan	22.52	1.20% (-5.12%,6.96%)	-1.46% (-7.76%,4.36%)	26.89% (18.88%,33.79%)	-0.04% (-1.96%,1.83%)	-0.35% (-4.96%,3.98%)	5.46% (-1.31%,11.71%)
Jiangmen	22.28	1.13% (-4.80%,6.57%)	-1.62% (-8.69%,4.84%)	25.46% (17.75%,32.20%)	-0.05% (-2.09%,1.95%)	-0.39% (-5.61%,4.46%)	5.29% (-1.27%,11.37%)
Zhuhai	22.17	0.91% (-3.85%,5.34%)	-1.21% (-6.44%,3.65%)	22.51% (15.55%,28.70%)	-0.03% (-1.50%,1.40%)	-0.40% (-5.73%,4.59%)	4.33% (-1.03%,9.38%)
Yangjiang	22.04	1.15% (-4.90%,6.68%)	-1.37% (-7.26%,4.11%)	15.26% (10.36%,19.80%)	-0.04% (-1.79%,1.67%)	-0.41% (-5.86%,4.69%)	5.60% (-1.34%,12.04%)

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S11. Heterogeneity of the air pollutant effects on influenza incidence across the 82 Chinese cities and how much heterogeneity remains after city-specific characteristics are accounted for, based on the second-stage random effect meta-regression following the first-stage single-pollutant models.

	I^2	Q test*	Wald test†	I^2	Q test*	Wald test†
	$PM_{2.5}$			**NO_2**		
Intercept-only	83.549	<.001		88.604	<0.001	
PWD-G	83.676	<.001	0.945	88.194	<0.001	0.039
Median level of air pollution	80.340	<0.001	0.067	85.697	<0.001	<0.001
Children proportion	82.004	<0.001	0.021	88.706	<0.001	0.892
Longitude	83.294	<0.001	0.859	88.366	<0.001	0.288
Latitude	80.239	<0.001	0.015	88.126	<0.001	<0.001
	PM_{10}			**O_3**		
Intercept-only	83.841	<0.001		63.931	<0.001	
PWD-G	83.709	<0.001	0.948	63.057	<0.001	0.180
Median level of air pollution	80.177	<0.001	0.002	61.562	<0.001	0.002
Children proportion	82.119	<0.001	0.020	64.197	<0.001	0.865
Longitude	83.932	<0.001	0.954	55.266	<0.001	0.002
Latitude	78.134	<0.001	<0.001	63.243	<0.001	0.668
	SO_2			**CO**		
Intercept-only	72.942	<0.001		86.088	<0.001	
PWD-G	72.123	<0.001	0.691	86.147	<0.001	0.636
Median level of air pollution	69.891	<0.001	0.003	85.220	<0.001	0.041
Children proportion	71.276	<0.001	0.033	84.844	<0.001	0.366
Longitude	73.276	<0.001	0.034	85.979	<0.001	0.836
Latitude	67.962	<0.001	<0.001	80.721	<0.001	<0.001

*p-value derived from the Cochran's Q test.

†p-value derived from the Wald test.

Table S12. Median (IQR) of Bayesian information criterion (BIC) values for the linear and nonlinear air pollutant effect models across the 82 Chinese cities.

	Linear	**Nonlinear**	**p-value***
$PM_{2.5}$	13789.1 (11123.1–39144.4)	13929 (11168.6–28629.5)	0.778
PM_{10}	13761.3 (11121.6–41237.2)	13852.7 (11177.5–29794)	0.387
SO_2	13813.6 (11073.7–33865.8)	13750.1 (11160–31507.9)	0.871
NO_2	13859 (11123.5–40859.4)	13973.1 (11175.9–30136.9)	0.647
O_3	14531 (11172.6–42803.7)	14013.5 (11274.9–37752.3)	0.523
CO	13794.2 (11125.5–42931.8)	13914.3 (11153.3–30560.7)	0.810

*p-values were derived from the paired Wilcoxon rank-sum test.

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Table S13. Pooled estimates (95% CI) of cumulative risk ratios (CRR) per 10μg/m^3 increase in daily concentrations of the six air pollutants over the lags of 1–7 days in the sensitivity analyses.

Conditions	$PM_{2.5}$	PM_{10}	NO_2	SO_2	O_3	CO
Single-pollutant model						
Origin model (>500 cases per year; 82 cities)	1.024 (1.014–1.033)	1.017 (1.010–1.023)	1.093 (1.067–1.119)	1.094 (1.054–1.136)	1.007 (0.9996–1.014)	1.003 (1.002–1.004)
Cities with >400 cases per year (103 cities)	1.021 (1.012–1.029)	1.013 (1.008–1.019)	1.091 (1.067–1.115)	1.081 (1.046–1.117)	1.006 (0.999–1.012)	1.003 (1.002–1.003)
Cities with >300 cases per year (130 cities)	1.020 (1.012–1.029)	1.014 (1.008–1.019)	1.091 (1.070–1.112)	1.097 (1.058–1.137)	1.004 (0.998–1.010)	1.003 (1.002–1.004)
Change temperature and humidity df to 4	1.020 (1.012–1.028)	1.013 (1.008–1.019)	1.088 (1.065–1.111)	1.081 (1.046–1.118)	1.007 (0.99995–1.014)	1.003 (1.002–1.003)
Change temperature and humidity df to 5	1.020 (1.012–1.028)	1.013 (1.007–1.019)	1.088 (1.066–1.111)	1.080 (1.046–1.114)	1.008 (1.001–1.015)	1.003 (1.002–1.003)
Change the moving-averaged lag days of tem and rhu to 10	1.028 (1.019–1.037)	1.019 (1.013–1.026)	1.096 (1.071–1.121)	1.111 (1.065–1.159)	1.006 (1.00001–1.013)	1.003 (1.002–1.004)
Change the moving-averaged lag days of tem and rhu to 14	1.029 (1.020–1.038)	1.019 (1.013–1.026)	1.094 (1.070–1.118)	1.104 (1.061–1.149)	1.006 (1.001–1.012)	1.003 (1.002–1.004)
Use serial intervals(3–5days) instead of incubation period	1.025 (1.016–1.034)	1.018 (1.012–1.025)	1.098 (1.073–1.124)	1.117 (1.073–1.163)	1.005 (0.997–1.012)	1.003 (1.002–1.004)
Multi-pollutant model						
Origin model (>500 cases per year; 82 cities)	1.004 (0.985–1.022)	0.997 (0.985–1.009)	1.089 (1.057–1.122)	1.000 (0.977–1.023)	1.000 (0.993–1.006)	1.001 (0.9999–1.001)
Cities with >400 cases per year (103 cities)	1.009 (0.992–1.028)	0.989 (0.977–1.001)	1.097 (1.066–1.130)	1.000 (0.980–1.021)	1.001 (0.995–1.008)	1.000 (0.9998–1.001)
Cities with >300 cases per year (130 cities)	1.009 (0.992–1.027)	0.987 (0.976–0.997)	1.091 (1.065–1.118)	1.003 (0.977–1.029)	1.000 (0.993–1.006)	1.001 (1.001–1.002)
Change temperature and humidity df to 4	1.007 (0.990–1.024)	0.992 (0.981–1.003)	1.091 (1.061–1.122)	1.004 (0.984–1.023)	1.002 (0.996–1.008)	1.000 (0.9998–1.001)
Change temperature and humidity df to 5	1.006 (0.990–1.022)	0.992 (0.981–1.002)	1.094 (1.064–1.125)	1.003 (0.983–1.023)	1.003 (0.997–1.009)	1.000 (0.9998–1.001)
Change the moving-averaged lag days of tem and rhu to 10	1.008 (0.992–1.025)	0.995 (0.984–1.007)	1.091 (1.061–1.122)	1.000 (0.978–1.023)	0.998 (0.993–1.004)	1.001 (0.9999–1.001)
Change the moving-averaged lag days of tem and rhu to 14	1.006 (0.992–1.020)	0.998 (0.989–1.008)	1.091 (1.061–1.122)	0.996 (0.975–1.018)	0.997 (0.992–1.001)	1.001 (1.0001–1.002)
Use serial intervals(3–5days) instead of incubation period	0.999 (0.979–1.018)	1.000 (0.987–1.013)	1.091 (1.059–1.123)	1.006 (0.980–1.032)	0.997 (0.989–1.012)	1.001 (0.9998–1.002)

Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.

Figures

Figure S1. Time series of daily influenza incidence and air pollutant level averaged over 2015–2019. The red lines represented the median of daily influenza incidence and concentrations of air pollutants and the black lines (top and bottom) represented the IQR (25%, 75%) across the 82 selected cities. Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide. Numeric data can be found in Excel Table S1.

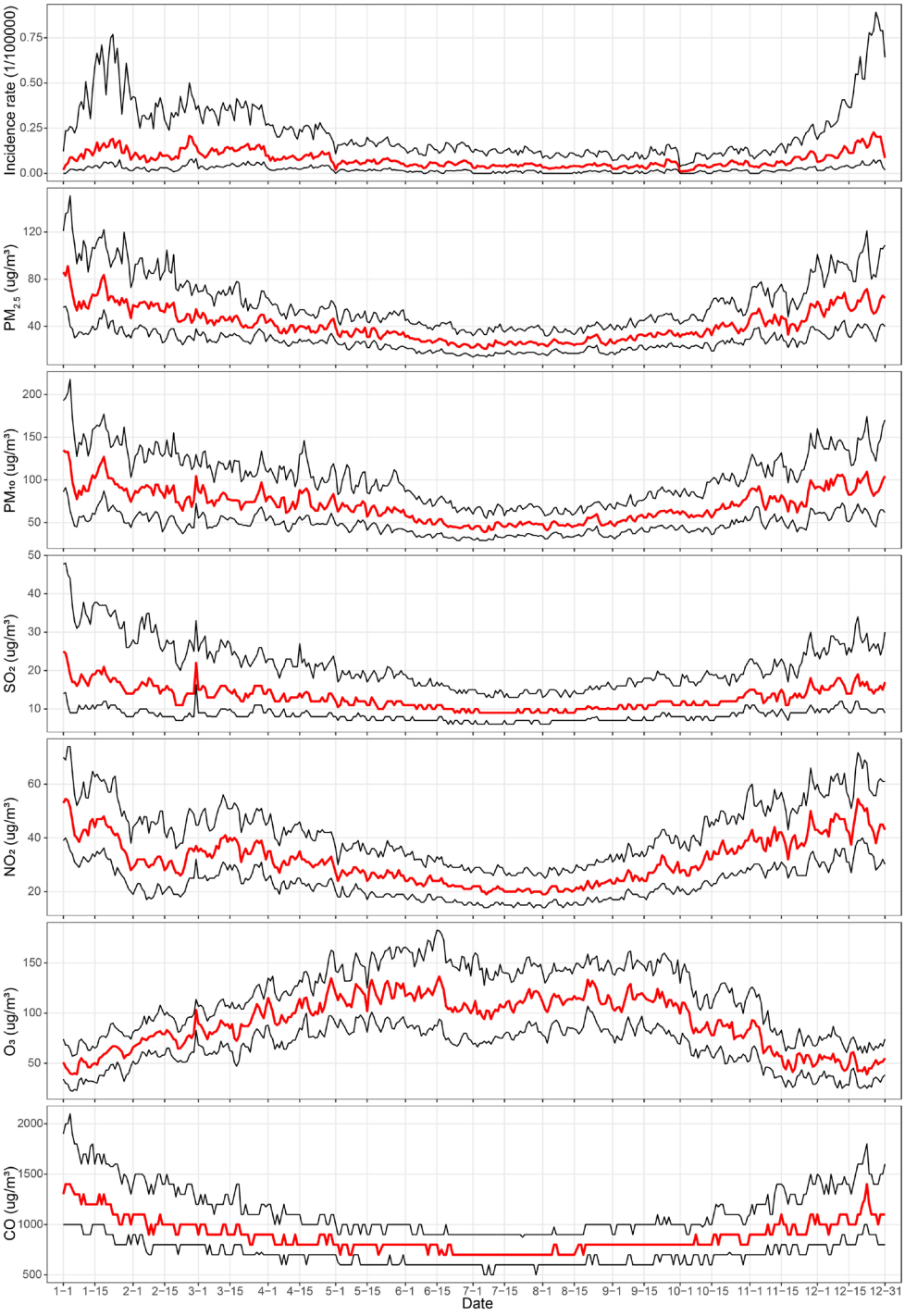

Figure S2. Distribution of daily incidence (A) and distribution of variance/mean ratio for daily counts of influenza cases (B) in the 82 Chinese cities.

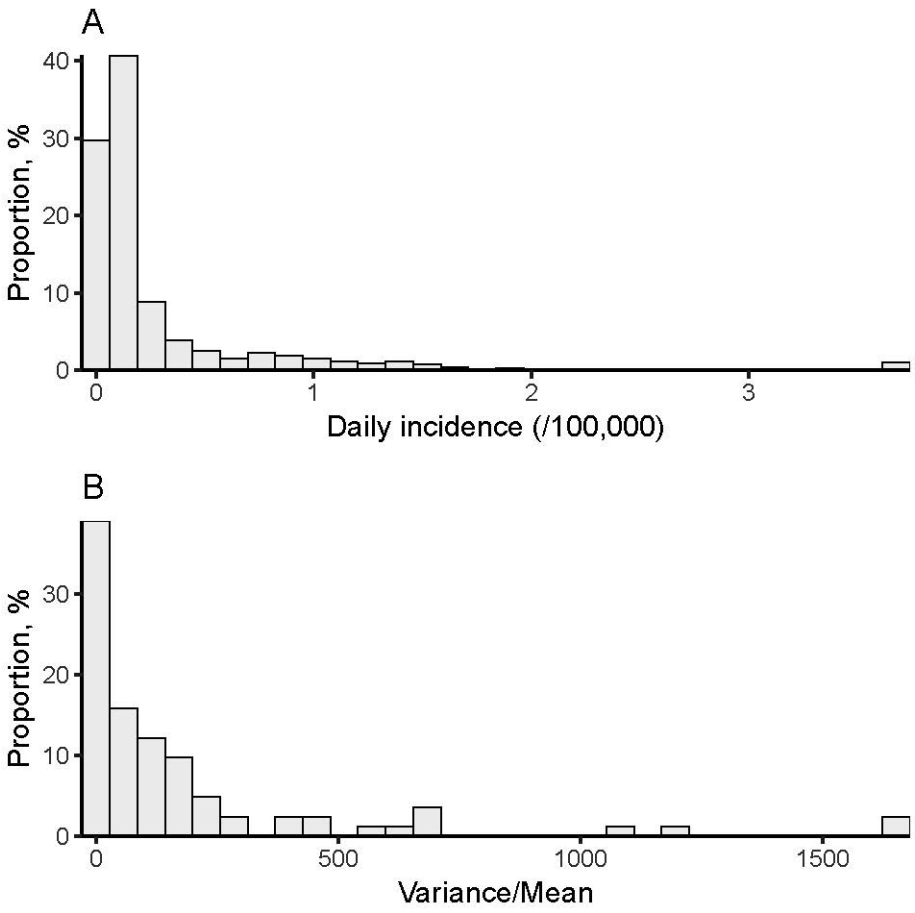

Figure S3. Spatial distribution of city-level annual influenza incidence among (A) children (0–14 years old) and (B) adults (≥15 years old) in the mainland of China from 2015 to 2019.

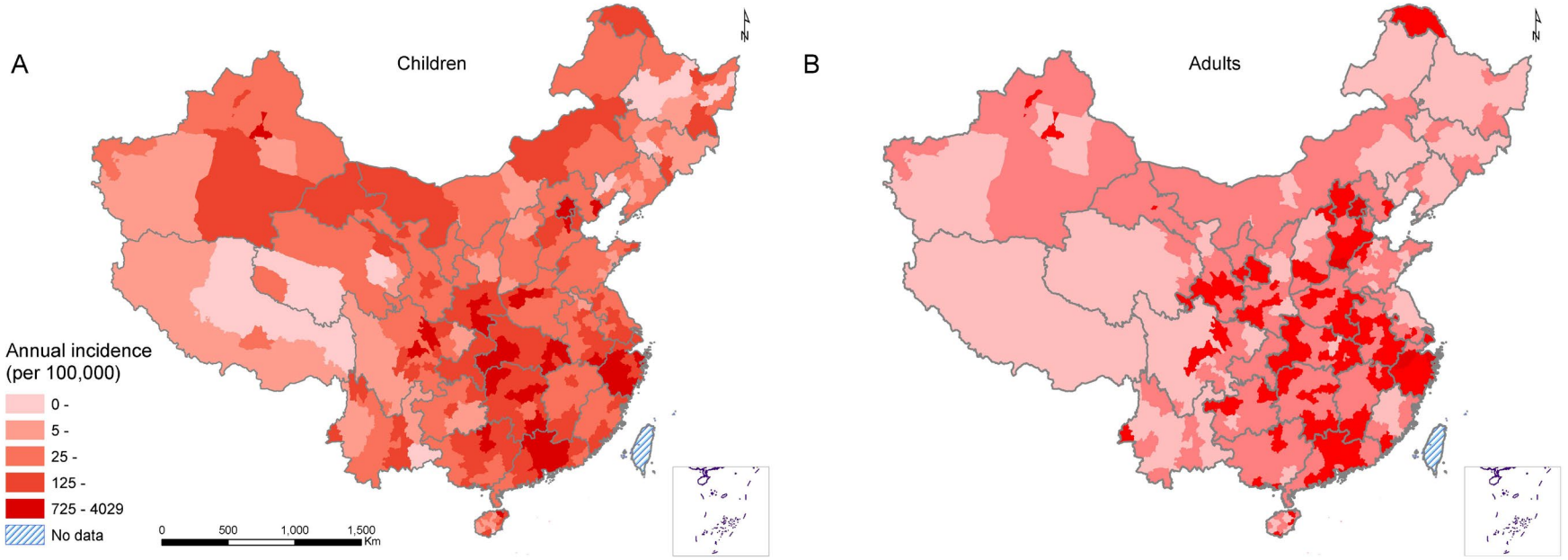

Figure S4. Annual median concentrations of air pollutants in the 82 Chinese cities selected for the primary analysis. Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide. Numeric data can be found in Tables S2–S4.

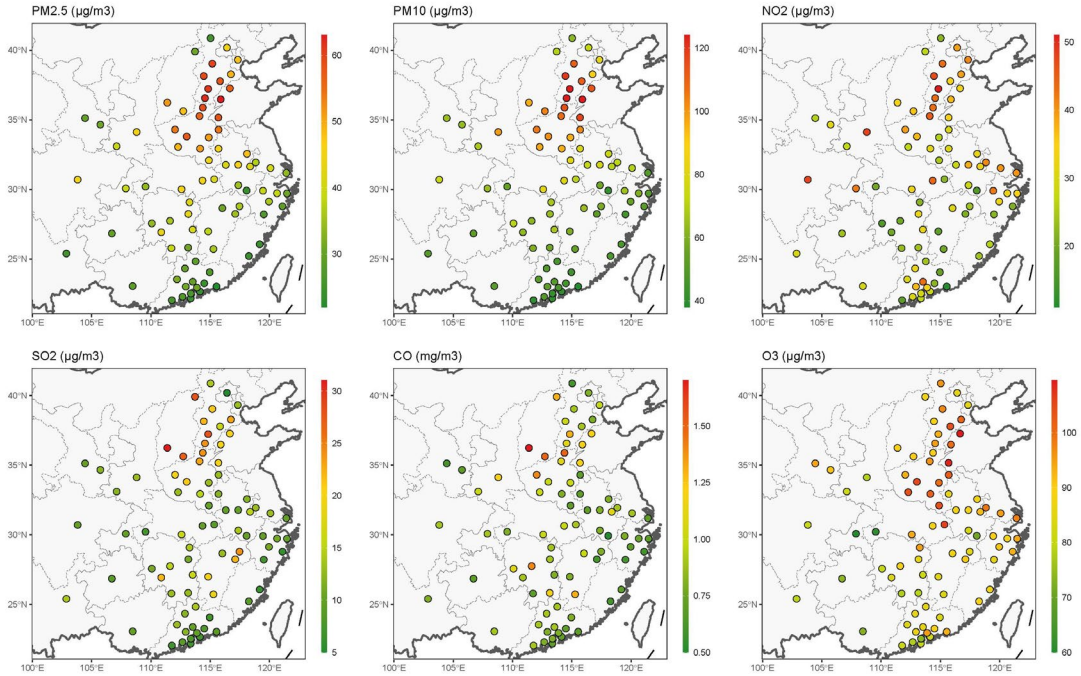

Figure S5. Pooled estimates of lag-specific risk ratios and 95% confidence intervals per 10μg/m^3 increase in the concentration of each air pollutant based on the single-pollutant models. Natural cubic spline with 3 degrees of freedom was used to model the variation of the linear effect over the lags. Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide. Numeric data can be found in Table S8.

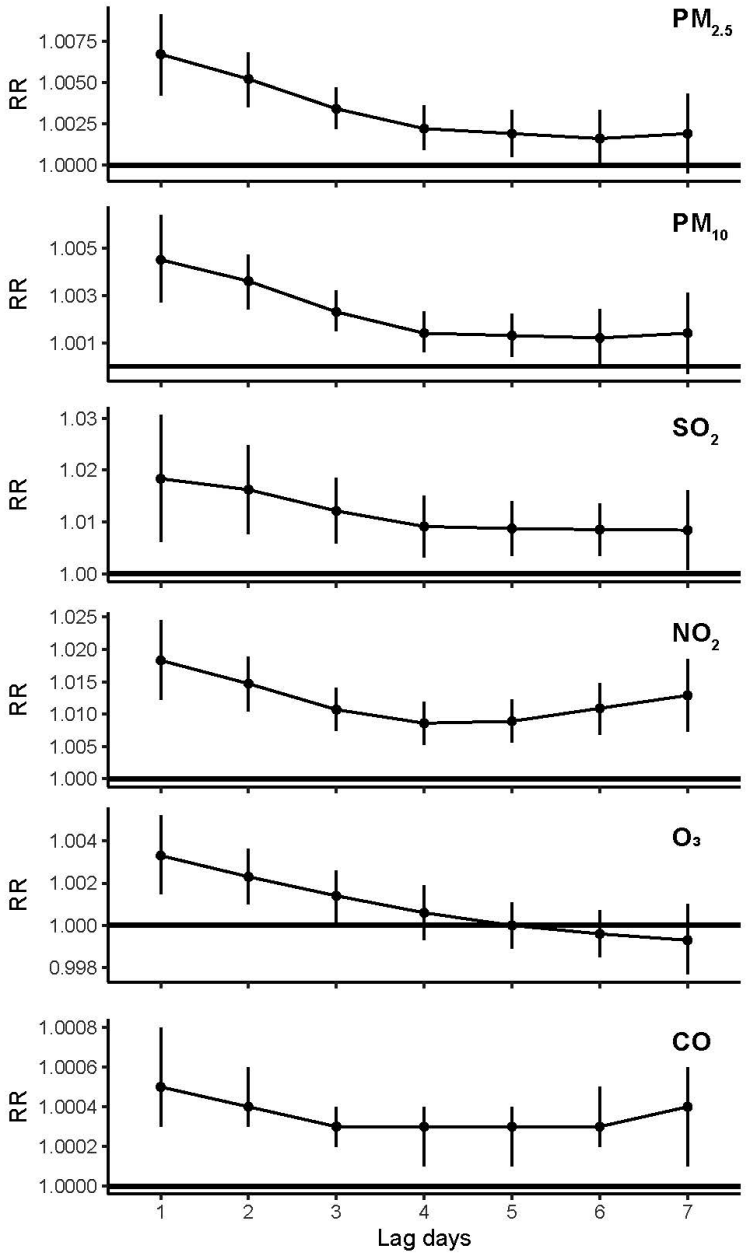

Figure S6. Forest plots for the attributable fractions (and 95% confidence intervals) of influenza incidence associated with air pollutant concentrations, using single-pollutant models. The cities were ordered by latitude from high to low (from northern to southern Chinese cities). Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide. Numeric data can be found in Table S9.

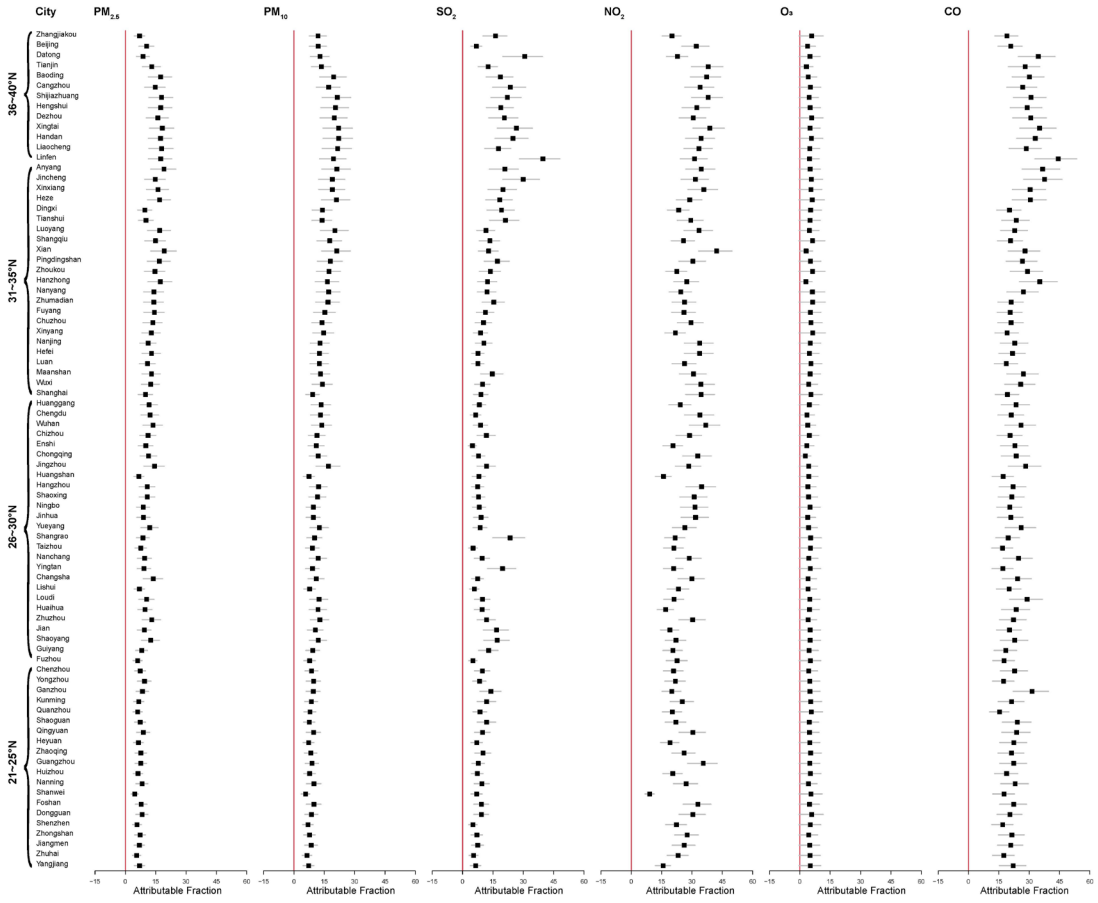

Figure S7. Forest plots for the attributable fractions (and 95% confidence intervals) of influenza incidence associated with air pollutant concentrations, using the multi-pollutant model. The cities were ordered by latitude from high to low (from northern to southern Chinese cities). Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide. Numeric data can be found in Table S10.

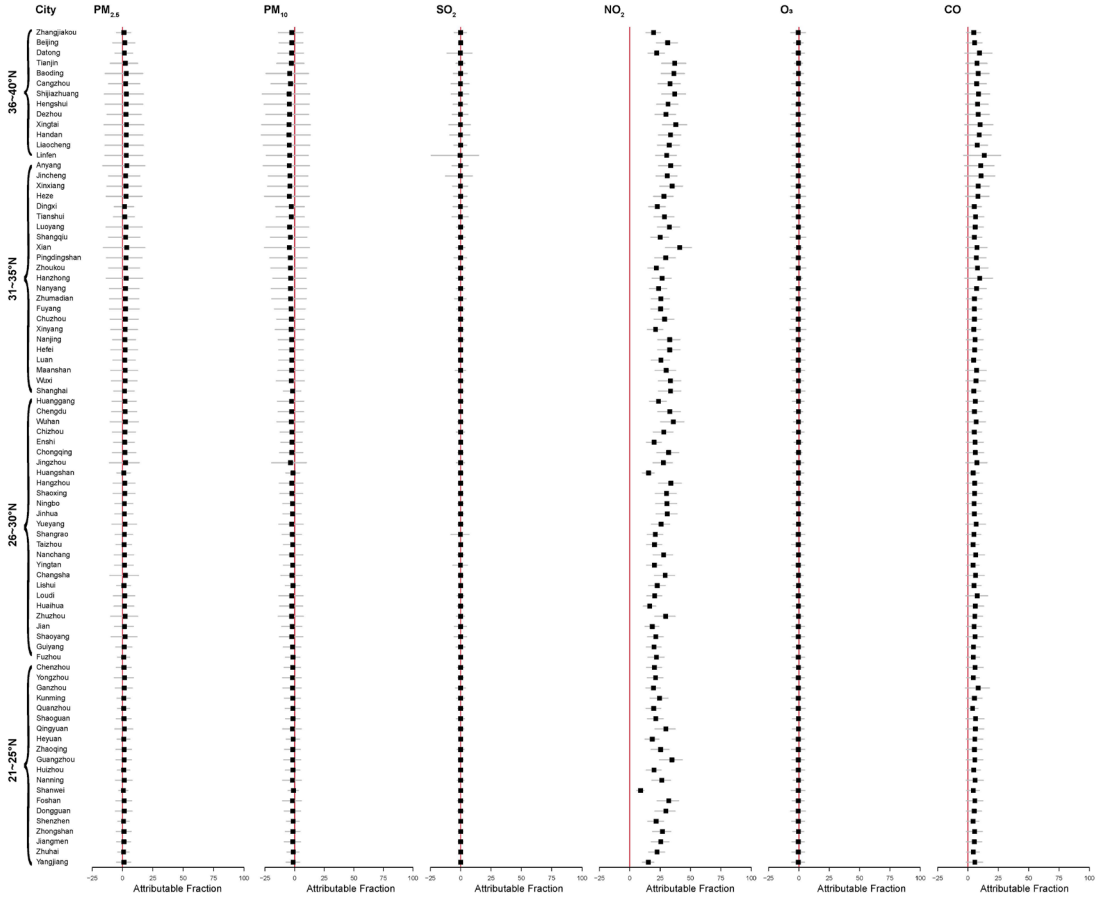

Figure S8. Correlation between daily concentrations of the six air pollutants during 2015–2019 in the 82 Chinese cities. Note: PM, particulate matter; SO_2, sulfur dioxide; NO_2, nitrogen dioxide; O_3, ozone; CO, carbon monoxide.