China Fact Sheet

Over the past two decades, air pollution has emerged as a serious challenge in China. Between 1998 and 2013, a time of historic economic expansion, concentrations of particulate pollution increased by nearly 75 percent on average across the country, rising to more than four times the World Health Organization's (WHO) safe level. In many areas, particularly in China's densely populated east region, the increases were much larger. China declared a war again pollution since 2013. The data from 2013-2016 shows that China is winning the war. If China can meet the WHO guideline from its 2016 levels, the average person in China would live 2.9 years longer.

In 2013, China declared a "war against pollution," initiating an ambitious program of pollution reduction that laid out specific targets to improve air quality by the end of 2017. To achieve these goals, the government built pollution reduction into local officials' incentives, so promotions depended on both environmental audits and economic performance; prohibited new coal-fired plants in some regions and required existing coal plants to reduce emissions or be replaced with natural gas; increased renewable energy generation; reduced iron and steel making capacity in industry; restricted the number of cars on the road in large cities; and increased transparency and enforcement of emissions standards.

These steps have begun to produce important results. Particulate pollution concentrations in 2016 were more than 10 percent lower than in 2013, and there is evidence that levels fell farther in 2017. Reduction in key regions were even larger than the national average. Nonetheless, significant progress remains to be made - compared to 2016 levels, the average person in China would live 2.9 years longer if particulate pollution throughout the country met the WHO guideline.

KEY TAKEAWAYS[1]

- As of 2016, the average person in China would live 2.9 years longer if particulate air pollution met the WHO standard. Thanks to a 12 percent reduction in particulate pollution, this is down from 3.4 years in 2013.
- Tianjin, one of China's three most-polluted cities in 2013, saw 14 percent less particulate pollution in 2016. If their pollution reduction is sustained, the city's 13 million residents can expect to live 1.2 years longer on average than if concentrations had remained at 2013 levels.
- In Henan, the province that saw the largest pollution reduction, residents are exposed to 20 percent less particulate pollution than in 2013, equating to a 1.3 year gain in life expectancy.
- In 2016, residents of Beijing were exposed to 6 percent less particulate pollution than in 2013.

Figure 1 · Change in Pollution, 2013-2016

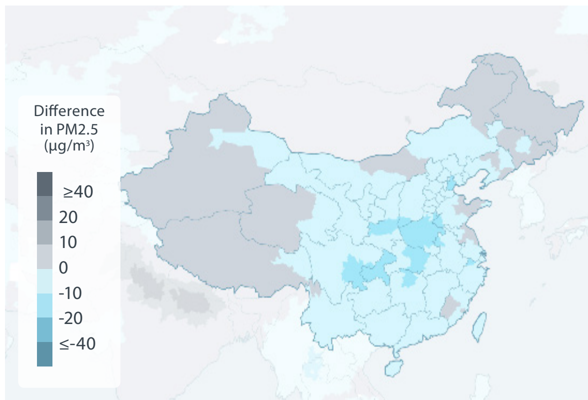
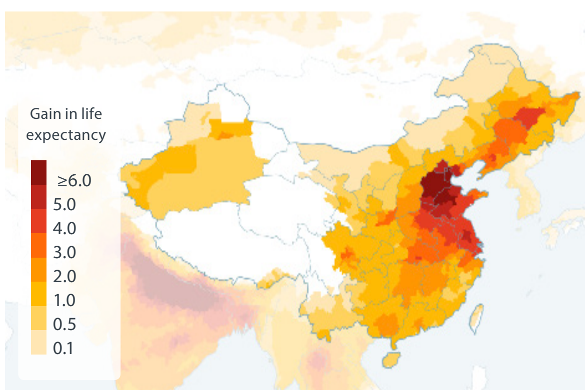


Figure 2 · Gain in Life Expectancy from Achieving WHO Standard, 2016



"The data is in—China is winning its war against pollution. By winning this war, China is due to see dramatic improvements in the overall health of its people, including longer lifespans, if these improvements are sustained."

Michael Greenstone, Milton Friedman Distinguished Service Professor in Economics, the College, and the Harris School; Director, EPIC

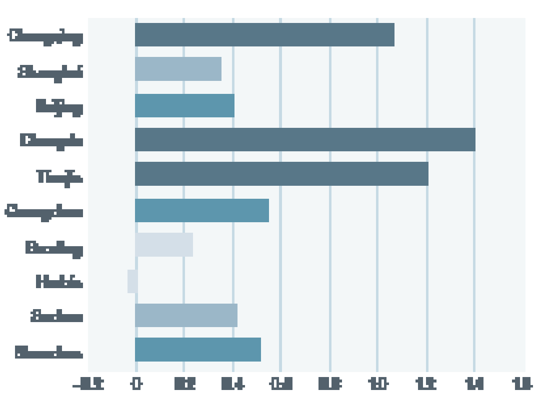
[1] This Fact Sheet reports pollution data and associated life expectancy results from the AQLI's own satellite-derived pollution dataset. Thus, they are generally lower than the pollution and life expectancy results in the "Is China Winning its War on Pollution?" report, which are based on ground-level pollution monitors. Since China's War on Pollution is a recent policy initiative, the report uses monitor data to (1) cover an additional year, 2017, when much pollution reduction progress was made, and (2) avoids satellite data's potential error in measuring pollution trends over a short timespan. An additional cause of discrepancies between the data sources is that the AQLI's pollution data is net of dust, which is a substantial part of what monitors observe – e.g. about 8 percent in Beijing.

50 Most Populous Prefectures

Prefecture	Population (Millions)	$PM_{2.5}$ Concentration, 2016 (μg/m³)	$PM_{2.5}$ Concentration, 1998 (μg/m3)	Increase in Average Life Expectancy if Prefecture Meets National Standard (35 μg/m³)	Increase in Average Life Expectancy if District Meets WHO Guideline (10 μg/m³)	Change in Life Expectancy Due to Change in $PM_{2.5}$, 1998-2013 (Years)	Change in Life Expectancy Due to Change in $PM_{2.5}$, 2013-2016 (Years)
Chongqing	29.6	27	25	0.0	1.6	-1.3	1.1
Shanghai	23.7	52	25	1.6	4.1	-3	0.4
Beijing	20.1	68	43	3.3	5.7	-2.9	0.4
Chengdu, Sichuan	13.7	42	43	0.7	3.2	-1.3	1.4
Tianjin	13.3	73	43	3.7	6.1	-4.1	1.2
Guangzhou, Guangdong	13	34	23	0.0	2.4	-1.6	0.5
Baoding, Hebei	11.5	75	42	4.0	6.4	-3.4	0.2
Harbin, Heilongjiang	10.9	52	30	1.7	4.1	-2.2	0
Suzhou, Jiangsu	10.7	58	28	2.3	4.7	-3.3	0.4
Shenzhen, Guangdong	10.6	26	18	0.0	1.6	-1.3	0.5
Nanyang, Henan	10.6	39	26	0.5	2.8	-2.7	1.4
Shijiazhuang, Hebei	10.4	76	38	4.0	6.4	-4.3	0.6
Linyi, Shandong	10.3	60	26	2.4	4.9	-3.6	0.3
Wuhan, Hubei	10	49	44	1.4	3.8	-1.4	0.9
Handan, Hebei	9.4	71	25	3.5	5.9	-4.9	0.4
Wenzhou, Zhejiang	9.4	25	22	0.0	1.5	-0.6	0.3
Weifang, Shandong	9.3	61	27	2.5	5.0	-3	-0.3
Zhoukou, Henan	9.2	54	32	1.9	4.4	-3.5	1.3
Qingdao, Shandong	8.9	51	29	1.6	4.0	-1.9	-0.3
Hangzhou, Zhejiang	8.9	42	28	0.9	3.1	-2.2	0.9
Zhengzhou, Henan	8.9	57	33	2.2	4.6	-3.9	1.5
Xuzhou, Jiangsu	8.8	61	36	2.5	5.0	-2.9	0.4
Xi'an, Shaanxi	8.7	46	35	1.1	3.5	-2.1	1
Ganzhou, Jiangxi	8.6	26	13	0.0	1.6	-1.4	0.1
Heze, Shandong	8.5	65	33	2.9	5.4	-4.1	1
Dongguan, Guangdong	8.4	31	20	0.0	2.0	-1.5	0.5
Quanzhou, Fujian	8.3	27	18	0.0	1.7	-0.9	0.1
Shenyang, Liaoning	8.3	50	31	1.5	3.9	-1.9	0
Nanjing, Jiangsu	8.2	58	37	2.2	4.7	-2.3	0.2
Changchun, Jilin	7.9	51	26	1.5	4.0	-2.3	-0.1
Shaoyang, Hunan	7.8	33	21	0.1	2.3	-1.7	0.6
Fuyang, Anhui	7.8	50	33	1.5	4.0	-2.7	1.1
Ningbo, Zhejiang	7.8	34	26	0.2	2.3	-1.5	0.7
Tangshan, Hebei	7.8	61	36	2.6	5.0	-2.7	0.2
Shangqiu, Henan	7.6	59	34	2.3	4.8	-3.5	1.1
Nantong, Jiangsu	7.5	57	27	2.2	4.6	-3.1	0.2
Yancheng, Jiangsu	7.4	60	28	2.4	4.9	-2.9	-0.3
Zhumadian, Henan	7.4	46	29	1.1	3.6	-3	1.3
Foshan, Guangdong	7.4	34	23	0.0	2.4	-1.6	0.5
Hengyang, Hunan	7.3	35	27	0.1	2.5	-1.3	0.4
Cangzhou, Hebei	7.3	79	47	4.3	6.7	-3.8	0.6
Fuzhou, Fujian	7.3	23	14	0.0	1.3	-1	0.1
Xingtai, Hebei	7.3	74	28	3.8	6.3	-5.1	0.6
Changsha, Hunan	7.2	40	28	0.5	2.9	-1.9	0.7
Zhanjiang, Guangdong	7.2	24	19	0.0	1.4	-1	0.4
Jining, Shandong	7.2	71	36	3.5	5.9	-4	0.6
Yantai, Shandong	7.1	43	28	0.8	3.2	-1.3	-0.2
Jinan, Shandong	7	81	43	4.5	6.9	-3.8	0.1
Hong Kong	6.9	23	18	0.0	1.2	-0.9	0.4
Dalian, Liaoning	6.9	35	27	0.1	2.5	-0.9	0.1

Figure 3

10 Most Populous Prefectures: Gains in Life Expectancy due to Pollution Reduction, 2013-2016



ABOUT THE AIR QUALITY LIFE INDEX (AQLI)

The AQLI is a pollution index that translates particulate air pollution into perhaps the most important metric that exists: its impact on life expectancy. Developed by the Milton Friedman Distinguished Service Professor in Economics Michael Greenstone and his team at the Energy Policy Institute at the University of Chicago (EPIC), the AQLI is rooted in recent research that quantifies the causal relationship between long-term human exposure to air pollution and life expectancy. The Index then combines this research with hyper-localized, global particulate measurements, yielding unprecedented insight into the true cost of particulate pollution in communities around the world. The Index also illustrates how air pollution policies can increase life expectancy when they meet the World Health Organization's guideline for what is considered a safe level of exposure, existing national air quality standards, or user-defined air quality levels. This information can help to inform local communities and policymakers about the importance of air pollution policies in concrete terms.

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