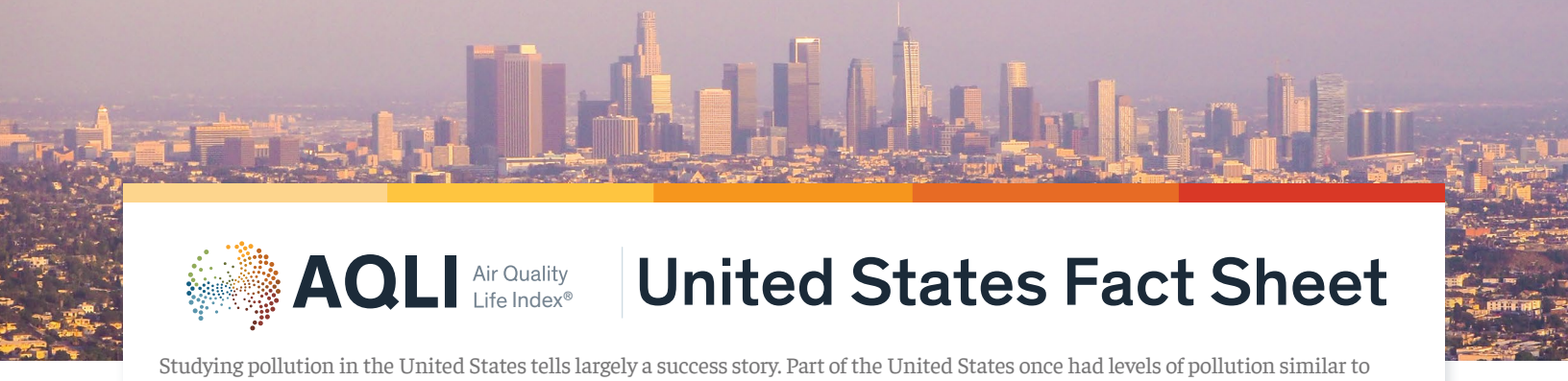


AQLI Air Quality Life Index®

United States Fact Sheet

Studying pollution in the United States tells largely a success story. Part of the United States once had levels of pollution similar to Beijing in recent years. Los Angeles had become known as the smog capital of the world. And, other large metropolitan areas weren't far behind. Pollution had become a part of everyday life for many Americans, and citizens made clear that they wouldn't tolerate it any longer. The Clean Air Act was enacted in 1970, and since that time particulate pollution has declined by 66 percent—extending the life expectancy of the average American by 1.6 years. Forty-four percent of those reductions have occurred over the last twenty years[1].

KEY TAKE-AWAYS

- For those living in the former smog capital of Los Angeles, particulate pollution has declined by almost 60 percent since 1970, extending life expectancy for the average Angeleno by 1.4 years. In Philadelphia and Washington, DC, a reduction in pollution has extended life expectancy by 2.7 years.
- Only 11 percent of the population still lives in an area where particulate pollution exceeds the World Health Organization (WHO) guideline.
- Residents of California's Central Valley have consistently been exposed to particulate pollution above both the WHO guideline and the nation's own air quality standard. Those living in this region stand to gain up to 0.4 years (8 months) of life expectancy if air quality were kept below the WHO guideline rather than at the 2018 level—a year when California saw intense wildfires that may have contributed to the pollution.
- In the industry-heavy areas around Pittsburgh, Pennsylvania and in eastern Ohio, residents stand to gain 2 months if pollution were to improve.

"The Clean Air Act has made a vast difference in the quality of the air we breathe and in the length of our lives. It has led to hundreds of millions of life-years saved from improved air quality over the last several decades. The trick moving forward will be to find economically efficient ways to sustain this clean air and to improve it in the pockets where air pollution remains higher than the United States' national ambient air quality standards."

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

Figure 1 · Potential Gains in Life Expectancy from Permanently Reducing PM Concentrations from the 2018 Levels to the WHO Guideline

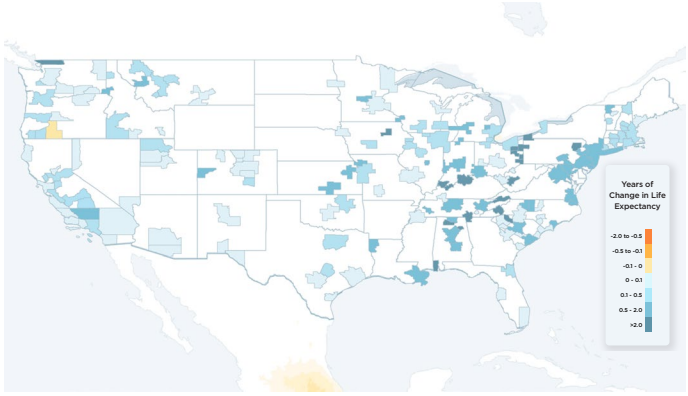
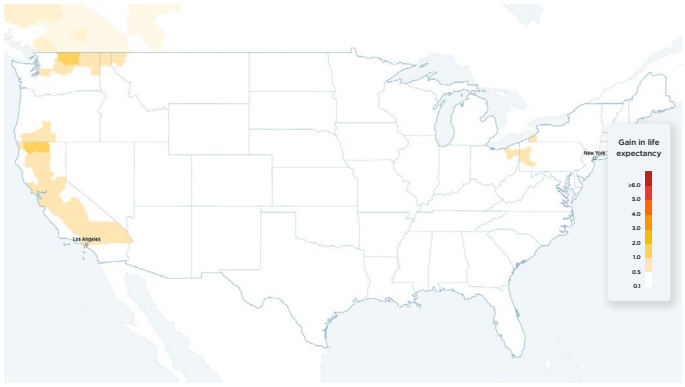


Figure 2 · Change in Life Expectancy due to Change in PM2.5 Concentration, 1998-2018

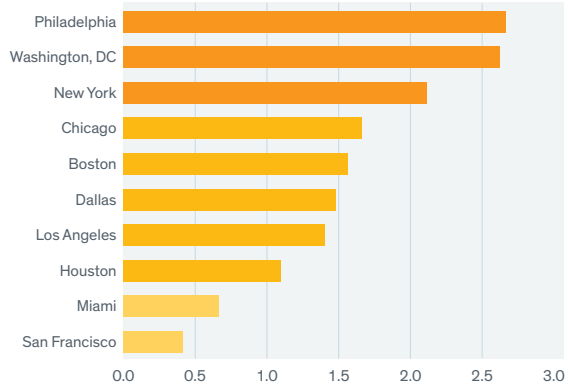


1 Details on how 1970 particulate pollution concentrations and life expectancy changes since 1970 were estimated are available at aqli.epic.uchicago.edu/policy-impacts.

$PM_{2.5}$ Concentrations and Potential Life Expectancy Gains in 25 Most Populous Counties.

State	County	Population (Millions)	PM2.5 Concentration, 1970 (µg/m3)	PM2.5 Concentration, 2018 (µg/m3)	Years of Life Expectancy Gained Due to Decrease in PM2.5, 1970-2018	Years of Life Expectancy Gained By Reducing PM2.5 from 2018 Concentration to WHO Guideline
California	Los Angeles	10.1	25	10	1.4	0.1
Illinois	Cook	5.4	24	10	1.4	0.0
Texas	Harris	4.9	18	7	1.1	0.0
Arizona	Maricopa	4.4	15	4	1.1	0.0
California	San Diego	3.4	12	6	0.5	0.0
California	Orange	3.3	23	9	1.3	0.0
Texas	Dallas	2.9	25	7	1.7	0.0
Florida	Miami-Dade	2.7	9	5	0.3	0.0
New York	New York	2.5	22	8	1.3	0.0
New York	Kings	2.4	36	9	2.7	0.0
Washington	King	2.4	15	11	0.4	0.1
California	Riverside	2.3	20	8	1.1	0.0
Nevada	Clark	2.2	11	4	0.7	0.0
New York	Queens	2.2		9		0.0
California	San Bernardino	2.1	17	10	0.7	0.1
Texas	Tarrant	2.1	19	7	1.2	0.0
California	Santa Clara	2.0	20	13	0.7	0.3
Texas	Bexar	2.0	10	5	0.5	0.0
Florida	Broward	1.9	17	5	1.2	0.0
Michigan	Wayne	1.8	31	10	2.1	0.0
California	Alameda	1.7	22	13	0.9	0.3
Massachusetts	Middlesex	1.7	22	7	1.5	0.0
Pennsylvania	Philadelphia	1.6	36	9	2.6	0.0
California	Sacramento	1.5	23	14	0.9	0.4
Maryland	Baltimore	1.5	33	8	2.4	0.0

Figure 3 · Estimated Gain in Life Expectancy due to Decrease in $PM_{2.5}$ in 10 Most Populous Metro Areas , 1970-2018[2]



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 University of Chicago's Milton Friedman Dinstinguished 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.

Methodology: The life expectancy calculations made by the AQLI are based on a pair of peer-reviewed studies, Chen et al. (2013) and Ebenstein et al. (2017), co-authored by Michael Greenstone, that exploit a unique natural experiment in China. By comparing two subgroups of the population that experienced prolonged exposure to different levels of particulate air pollution, the studies were able to plausibly isolate the effect of particulates air pollution from other factors that affect health. The more recent of the two studies found that sustained exposure to an additional 10 µg/m3 of PM10 reduces life expectancy by 0.64 years. In terms of PM2.5, this translates to the relationship that an additional 10 µg/m3 of PM2.5 reduces life expectancy by 0.98 years. To learn more about the methodology used by the AQLI, visit: aqli.epic.uchicago.edu/about/methodology

2 For which 1970 PM2.5 concentrations could be estimated