AQLI Air Quality Life Index® | Qatar Fact Sheet

Qatar is the fourth most polluted country in the world. Fine particulate air pollution ($PM_{2.5}$) shortens the average Qatar resident's life expectancy by 3.3 years, relative to what it would be if the World Health Organization (WHO) guideline of 5 µg/m³ was met.[1] In the most polluted parts of the country, such as Umm Salal and Al Daayen, Qatar residents are losing more than 3.5 years off their lives as a result of exposure to high air pollution (Figure 1).

KEY TAKE-AWAYS

- Virtually all of Qatar's 2.4 million people live in areas where the annual average particulate pollution level exceeds the WHO guideline of 5 µg/m³.
- While particulate pollution takes 3.3 years off the life of the average Qatar resident, diabetes & kidney diseases and high systolic blood pressure reduce average life expectancy by 1.5 years each and tobacco use reduces average life expectancy by 8 months (Figure 2).
- Doha, the Capital of Qatar, is in Al Dawhah, the most populous municipality in the country. An average resident there loses 3.4 years off their life expectancy compared to what it would be if the pollution level in Qatar met the WHO guideline. This amounts to a loss of 3.9 million life years in the municipality (Figure 3).
- Umm Salal, Al Daayen, and Al Rayyan are the most polluted municipalities in the country (Table 1). An average resident of these regions could live more than 3.5 years longer if pollution levels in these regions were permanently brought down to meet the WHO guideline.
- Compared to 1998, Qataris are exposed to $PM_{2.5}$ levels which are 51 percent higher. This means that an average Qatari would lose 1.4 more years off their life compared to 1998 as a result of air pollution, if this trend is sustained. (Figure 4)

Figure 1 · Potential gain in life expectancy from permanently reducing $PM_{2.5}$ from 2022 concentration to the WHO guideline

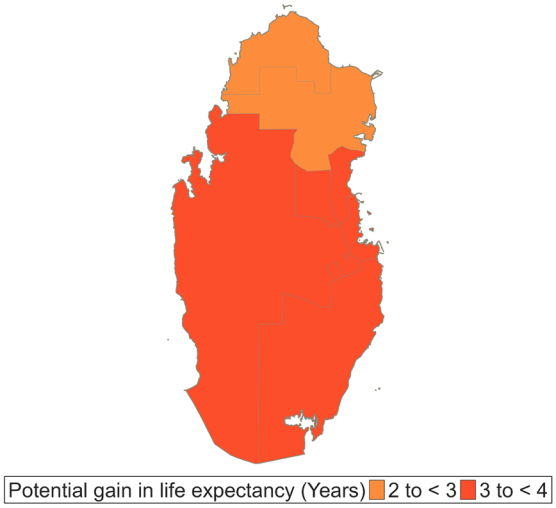
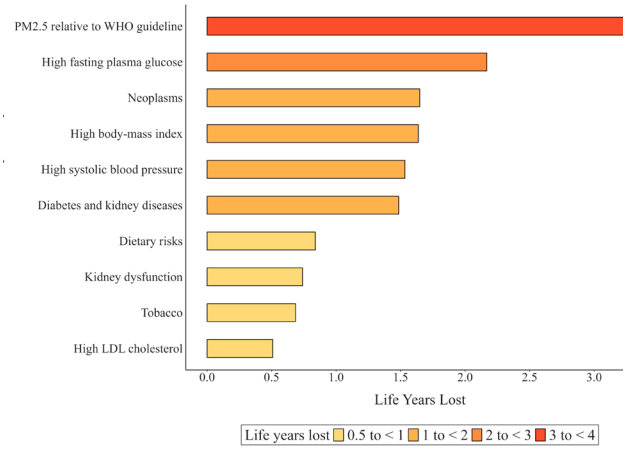


Figure 2 · Top 10 threats to life expectancy in Qatar



Sources: Global Burden of Disease (https://vizhub.healthdata.org/gbd-results/) level-2 causes and risks data and WHO Life Tables (https://apps.who.int/gho/data/node.main.LIFECOUNTRY?lang=en) were combined with the Life table method to arrive at these results. '$PM_{2.5}$ relative to WHO Guideline' bar displays the reduction in life expectancy relative to the WHO guideline as calculated by latest AQLI (2021) data.

1 This data is based on the AQLI 2022 dataset. All annual average $PM_{2.5}$ values (measured in micrograms per cubic meter: µg/m³) are population weighted.

Potential life expectancy impacts of particulate pollution reduction in the municipalities of Qatar

Municipality	Population (thousands)	Annual Average 2022 PM2.5 Concentration (µg/m³)	Life Expectancy Gains from reducing PM2.5 from 2022 concentration to WHO PM2.5 guideline of 5 µg/m	Life Expectancy Gains from reducing PM2.5 from 2022 concentration by 30 percent
Ad Dawhah	1151.4	39.7	3.4	1.2
Ar Rayyan	673.9	41	3.5	1.2
Al Khor	303.2	32	2.6	0.9
Al Wakrah	212.7	39.6	3.4	1.2
Umm Salal	76.7	42.3	3.7	1.2
Al Daayen	44.3	41.4	3.6	1.2
Madinat ash Shamal	10.7	28.6	2.3	0.8

Figure 3 · Potential gain in life expectancy from reducing PM2.5 from 2022 levels to the WHO guideline in provinces of Qatar

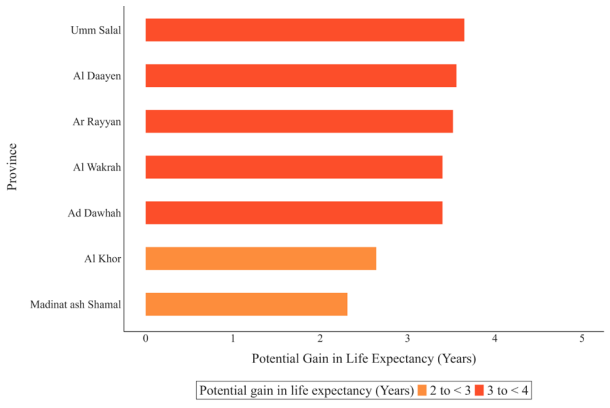
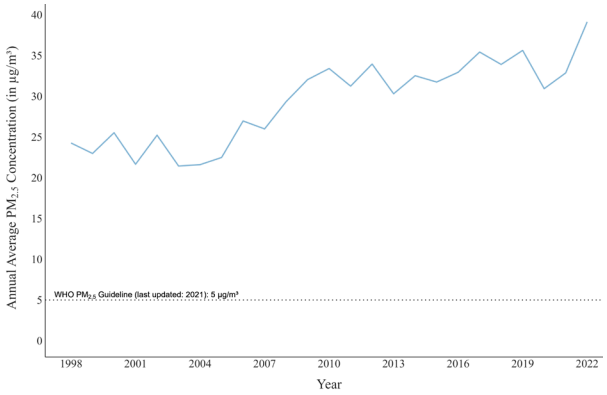


Figure 4 · Annual average PM2.5 concentrations in Qatar, 1998-2022



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 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 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, satellite measurements of global particulate matter ($PM_{2.5}$), yielding unprecedented insight into the true cost of 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 particulate air pollution from other factors that affect health. Ebenstein et al. (2017) found that sustained exposure to an additional 10 µg/m³ of PM10 reduces life expectancy by 0.64 years. In terms of $PM_{2.5}$, this translates to the relationship that an additional 10 µg/m³ of $PM_{2.5}$ reduces life expectancy by 0.98 years. This metric is then combined with sea-salt and mineral dust removed satellite-derived $PM_{2.5}$ data. All 2022 annual average $PM_{2.5}$ values are population-weighted and AQLI's source of population data is https://landscan.ornl.gov/. We are grateful to the Atmospheric Composition Analysis Group, based at the Washington University in St. Louis for providing us with the satellite data. The original dataset can be found here: https://sites.wustl.edu/acag/datasets/surface-pm2-5/. To learn more deeply about the methodology used by the AQLI, visit: aqli.epic.uchicago.edu/about/methodology.