AQLI Air Quality Life Index® | Nigeria Fact Sheet

Air pollution is among the top 5 threats to life expectancy in Nigeria. Fine particulate air pollution ($PM_{2.5}$) shortens the average Nigerian resident's life expectancy by 2 years relative to what it would be if the World Health Organization (WHO) guideline of 5 µg/m³ was met.[1] Some areas of Nigeria fare much worse than average, with air pollution shortening lives by more than 3.5 years in parts of the Cross River and Taraba states in Nigeria (Figure 1).[2]

KEY TAKE-AWAYS

- All of Nigeria's 224.2 million people live in areas where the annual average particulate pollution level exceeds the WHO guideline.
- More than 80 percent of the country's population lives in regions that don't meet the country's national standard of 20 µg/m³. If these regions were to meet the national standard, an average resident of Nigeria would live 9 months - collectively adding 126.2 million years to Nigeria's total life expectancy.
- In the most polluted local government area of the country—Bakassi (in the Cross River state)—residents are on track to lose 3.9 years of life expectancy relative to what it would be if the particulate level met the WHO guideline. In the Niger River Delta, where oil refineries are linked to the grim daily reality of air pollution, 46.6 million residents are on track to lose 2.6 years of life expectancy [3]. In the states of Akwa Ibom, Rivers and Taraba, residents would lose between 2.7 to 3.2 years of life expectancy. (See Appendix Table)
- If Nigeria were to reduce particulate pollution to meet the WHO guideline, residents in Lagos—Nigeria's most populous province—would gain 1.7 years of life expectancy (Figure 2). In Abuja—Nigeria's capital city—residents would gain 2.6 years of life expectancy.
- While particulate pollution takes 2 years off the life of the average Nigerian resident, HIV/AIDS and sexually transmitted infections takes off 1 year (Figure 3).
- Particulate pollution has increased over time in Nigeria. Average annual particulate pollution levels in 2022 were 18 percent higher relative to levels in 1998, further reducing life expectancy by more than 5 months (Figure 4).

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

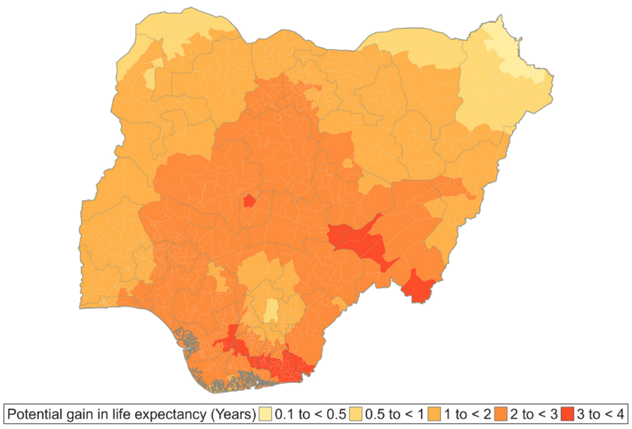
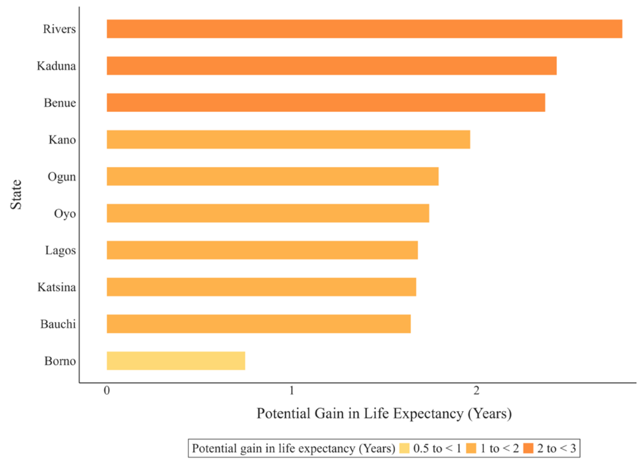


Figure 2 · Potential gain in life expectancy from reducing $PM_{2.5}$ from 2022 levels to WHO guideline in 10 most populous states of Nigeria



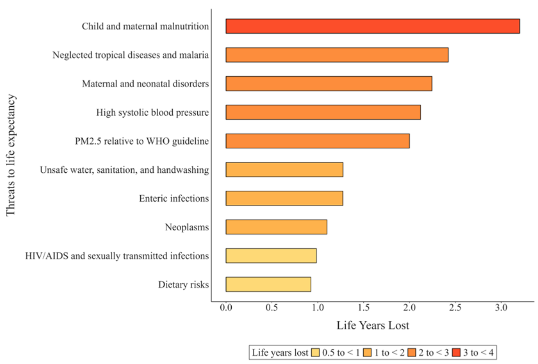
1 This data is based on the AQLI 2022 dataset. All annual average $PM_{2.5}$ values (measured in micrograms per cubic meter: µg/m³) are population weighted.
2 Four out of ten most polluted Local Government Areas (LGAs) of Nigeria lie in the Cross river state as follows: Bakassi, Akpabuyo, Calabar and Calabar South
3 Niger river delta is defined as the following nine states: Rivers, Delta, Akwa Ibom, Imo, Edo, Ondo, Cross River, Abia, Bayelsa.

Potential life expectancy impacts of particulate pollution reductions in the 25 most populous local government areas (LGAs) of Nigeria

Local Government Area	Population (Millions)	Annual Average 2022 $PM_{2.5}$ Concentration (µg/m³)	Life Expectancy Gains from reducing $PM_{2.5}$ from 2022 concentration to WHO $PM_{2.5}$ guideline of 5 µg/m	Life Expectancy Gains from reducing $PM_{2.5}$ from 2022 concentration by 30 percent
Alimosho	2.7	21.7	1.6	0.6
Abuja	2.3	32	2.6	0.9
Ikorodu	1.9	23.9	1.9	0.7
Ado Odo/Ota	1.7	22.4	1.7	0.7
Amuwo Odofin	1.6	22	1.7	0.6
Surulere	1.6	21.8	1.6	0.6
Eti-Osa	1.5	23.2	1.8	0.7
Apapa	1.5	22.1	1.7	0.6
Ungogo	1.4	25.4	2	0.7
Ikeja	1.4	21.3	1.6	0.6
Ojo	1.4	22.7	1.7	0.7
Obio/Akpor	1.2	34.1	2.9	1
Mainland	1.1	21.5	1.6	0.6

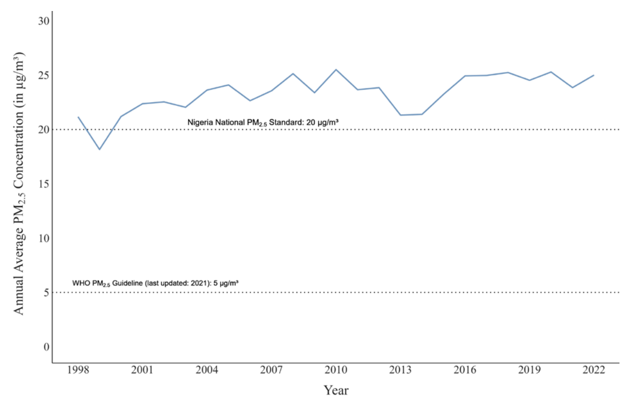
Local Government Area	Population (Millions)	Annual Average 2022 $PMPM_{2.5}$ Concentration (µg/m³)	Life Expectancy Gains from reducing $PM_{2.5}$ from 2022 concentration to WHO $PM_{2.5}$ guideline of 5 µg/m	Life Expectancy Gains from reducing $PM_{2.5}$ from 2022 concentration by 30 percent
Lagos Island	1	22.1	1.7	0.6
Kosofe	1	21.6	1.6	0.6
Akko	1	20.2	1.5	0.6
Bwari	1	33.1	2.8	1
Konduga	0.9	11.9	0.7	0.3
Gezawa	0.9	25.3	2	0.7
Oshodi/Isolo	0.9	21.6	1.6	0.6
Bauchi	0.9	23	1.8	0.7
Igabi	0.9	29.9	2.4	0.9
Shomolu	0.8	21.1	1.6	0.6
Port Harcourt	0.8	32	2.6	0.9
Ifo	0.8	22.6	1.7	0.7

Figure 3 · Top 10 threats to life expectancy in Nigeria



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.

Figure 4 ·Annual average $PM_{2.5}$ concentration in Nigeria, 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 PM2.5 , this translates to the relationship that an additional 10 µg/m³ of PM2.5 reduces life expectancy by 0.98 years. This metric is then combined with sea-salt and mineral dust removed satellite-derived PM2.5 data. All 2022 annual average PM2.5 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.

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