Air Quality-Life Index (AQLI)

There are currently an estimated 4.5 billion people around the world exposed to particulate pollution levels that are at least twice what the World Health Organization (WHO) considers safe. Yet, the consequence of sustained exposure to pollution on a person’s life expectancy has largely remained a vexingly unanswered question—until now.

The Air Quality-Life Index (AQLI) translates particulate pollution concentrations into the impact on lifespans. Specifically, it provides a reliable measure of the potential gain in life expectancy if pollution concentrations are brought into compliance with WHO, national standards, or some other norm. It serves as an important complement to the frequently used Air Quality Index (AQI), which is a complicated function of air pollution concentrations and does not map directly to health. They indicate that particulates are the greatest current environmental risk to human health and rank up there with cigarette smoking and a few other culprits in the who's who of the greatest behaviorally related killers.

"The AQLI is the first tool of its kind to allow people to learn how much longer they could live in the areas where they live if air pollution is reduced to meet global or national standards. It suggests that particulates are the greatest current environmental risk to human health, with the impact on life expectancy in many parts of the world similar to the effects of every man, woman and child smoking cigarettes for several decades."

MICHAEL GREENSTONE
DIRECTOR, ENERGY POLICY INSTITUTE AT THE UNIVERSITY OF CHICAGO

WHY IT'S UNIQUE

Scores of studies have demonstrated that air pollution negatively impacts our health. But, these studies tend to rely on data tracking people’s exposure over a short time period, while the most important question is about lifetime exposure. Here, there is almost no evidence, particularly at the high concentrations that prevail currently in many parts of the world. Further, the conventional wisdom is that it is very difficult to find settings where it is possible to isolate the effect of air pollution from other factors that impact health.

The AQLI is based on data from a pair of studies (Chen et al. 2013; Ebenstein et al. 2017) published in the Proceedings of the National Academy of Sciences (PNAS) that provide credible solutions to these challenges. The studies exploit a natural experiment where one segment of the population was inadvertently exposed to high particulate pollution concentrations during a period when migration was restricted, meaning their lifetime exposure was altered arbitrarily. Thus, this natural experiment provides an opportunity to measure the consequences of sustained exposure to high levels of air pollution while plausibly isolating its impact from other factors that affect health.