

Overview of Air Quality

Air Quality

Air pollution is one of the world's largest health and environmental challenges. Air pollution expands in two contexts: indoor (household) air pollution and outdoor air pollution. Air pollution is often defined as the combination of outdoor and indoor particulate matter and ozone. It is a risk factor for many of the leading causes of death, including heart disease, stroke, lower respiratory infections, lung cancer, diabetes, and chronic obstructive pulmonary disease (COPD) (Ritchie and Roser 2019).

Unfortunately, over half of the world's population lives without the protection of adequate air quality standards. Here at home, the air quality outdoors has gotten better since the 1990s, but there are still numerous challenges in safeguarding Americans from air quality issues. The U.S. Environmental Protection Agency (EPA) regulates six pollutants as “criteria” air pollutants using human health-based and environmentally-based criteria.

- ground-level ozone (OZ)
- particle pollution (PM2.5 and PM10)
- carbon monoxide (CM)
- lead total suspended particulate (TSP)
- nitrogen oxides (NO2)
- sulfur dioxide (SD)

PM2.5 the invisible killer

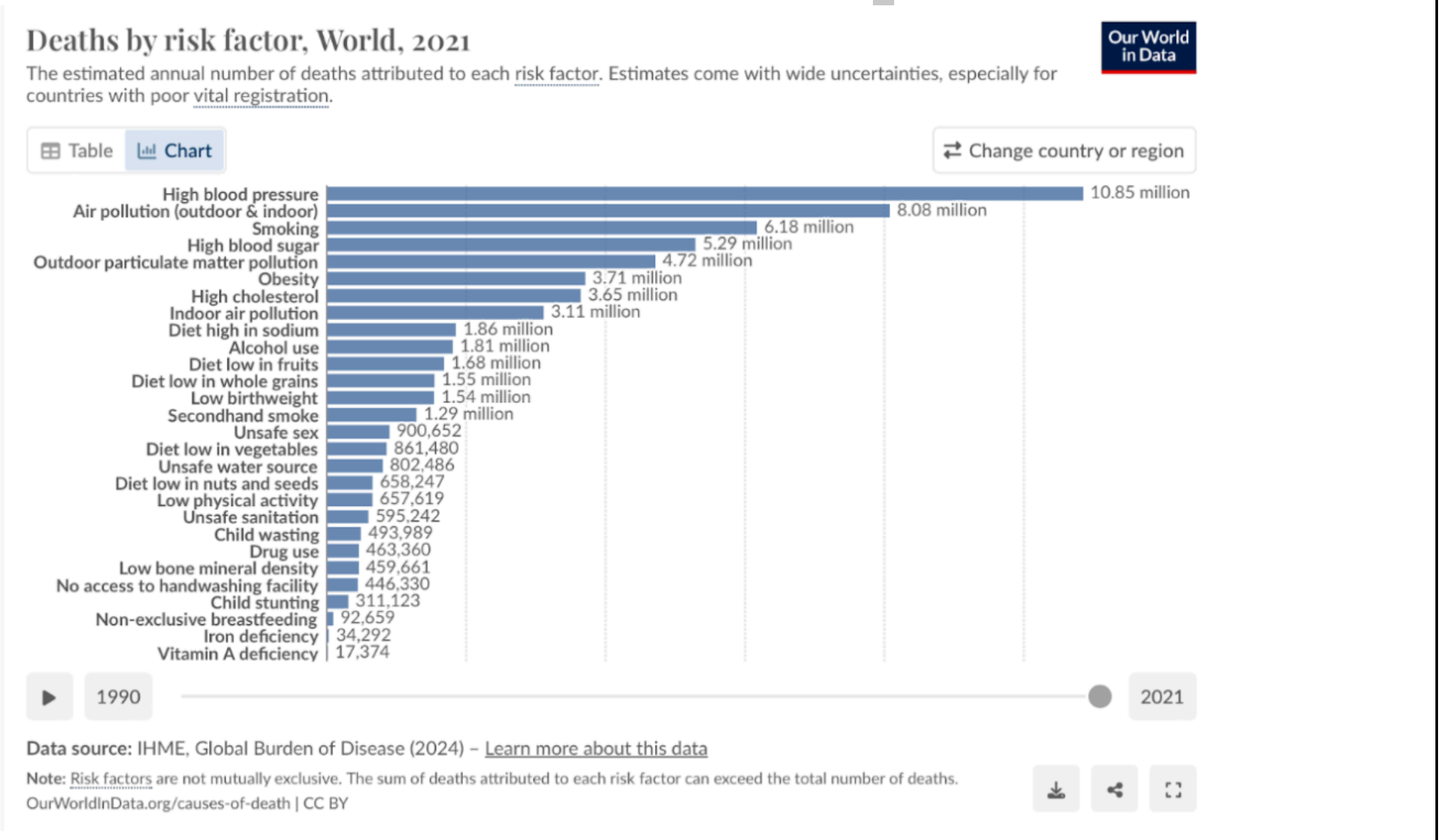
Among all air pollutants, PM2.5 kills the most people worldwide. It consists of particles smaller than 2.5 microns — small enough that billions of PM2.5 can fit inside a single red blood cell. PM2.5 is responsible for an estimated 4.2 million premature deaths every year globally. This includes over a million deaths in China, over half a million in India, almost 200,000 in Europe, and over 50,000 in the United States (McGill University 2021).

Analytics to the rescue

Like any other data-driven decision making problem, we can tackle the challenges of air quality using advanced analytics. Business analytics can provide practical insights and aid in the decision-making of strategic decisions concerning air quality and its corresponding health-related issues.

Terms and Definition:

- PM2.5** - Tiny particles in the air (smaller than 2.5 micrometers) that can be inhaled into the lungs, potentially causing health issues.
- PM10** - Small particles (smaller than 10 micrometers) that can also be inhaled, but are larger than PM2.5.
- NO2** - Nitrogen Dioxide: A gas from vehicle emissions and industrial activities that can harm the lungs and contribute to smog.
- OZ** - Ozone: A gas that forms smog at ground level and can cause breathing problems.
- CO** - Carbon Monoxide: A gas from burning fuel (like in cars) that can prevent oxygen from getting to your body’s cells.
- SD** - Sulfur Dioxide: A gas from burning fossil fuels that can irritate the lungs and lead to acid rain.
- TSP** - Total Suspended Particles: All particles floating in the air, including PM2.5 and PM10.



Sources:

<https://ourworldindata.org/air-pollution>
Ritchie, H., & Roser, M. (2019). Outdoor air pollution. *Our world in data*., <<https://ourworldindata.org/air-pollution>>

McGill University (2021) Air pollution: The silent killer called PM2.5. *Phys dot Org*, <<https://phys.org/news/2021-03-air-pollution-silent-killer-pm25.html>>

[From <<https://ourworldindata.org/air-pollution>>]
(images/ourworldindata_air_pollution_overview.png)

U.S. Environmental Protection Agency. (n.d.). *Glossary of Air Pollution Terms: Particle Pollution and Your Patients' Health*. Retrieved from <https://www.epa.gov/pmcourse/glossary-air-pollution-terms-particle-pollution-and-your-patients-health>

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