



Air Pollution and Mortality in Indian Cities

[Source: IE](#)

Why in News?

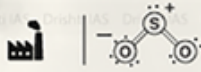
Recently, Lancet has published a **first multi-city study** examining the relationship between short-term **air pollution (PM2.5) exposure** and **mortality** in 10 major cities of India between 2008 and 2019.

What are the Key findings of the Study?

- **Air Pollution Causing Death:** The study revealed that over **33,000 deaths** (approximately **7.2%** of total mortalities) could be attributed to air pollution **annually** across the 10 investigated cities.
- **Highest Mortality Burden: Delhi,** exhibited the **most severe air pollution**, with a staggering **11.5%** (12,000 deaths) of annual deaths linked to air pollution.
- **Shimla Lowest Mortality:** Shimla emerged as the city with the **lowest mortality burden attributable to air pollution**, with only **59 deaths** (constituting 3.7% of total deaths) annually.
- **Chronic Exceedance of Safe Air Quality Standards:** There has been a persistent violation of established air quality standards. **PM2.5** concentrations consistently exceeded the [World Health Organization's \(WHO\)](#) safe limit (**15 µg/m³**) on an alarming **99.8% of the days** analyzed.
- **Deteriorating Health with Increasing Pollution Levels:** Every 10 µg/m³ increase in PM2.5 concentration demonstrably resulted in a **1.42% rise** in mortality across the ten cities.
 - Cities with comparatively **lower pollution levels**, such as Bengaluru and Shimla, exhibited a **heightened susceptibility to mortality** increases with even incremental rises in PM2.5 concentrations.

Air Pollutants

Sulphur Dioxide (SO₂)



It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

Impact: Causes respiratory problems.

Ozone (O₃)



Secondary pollutant formed from other pollutants (NO_x and VOC) under the action of the sun.

Impact: Irritation of the eye and respiratory mucous membranes, asthma attacks.

Nitrogen Dioxide (NO₂)



Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

Impact: Chronic lung disease.

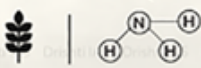
Carbon Monoxide (CO)



It is a product of the incomplete combustion of carbon-containing compounds.

Impact: Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

Ammonia (NH₃)



Produced by the metabolism of amino acids and other compounds which contain nitrogen.

Impact: Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

Lead (Pb)



Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

Impact: Anemia, weakness, and kidney and brain damage.

Particulate Matter (PM)



PM10: Inhalable particles, with diameters that are generally 10 micrometers and smaller.

PM2.5: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

Source: Emitted from construction sites, unpaved roads, fields, fires.

Impact: Irregular heartbeat, aggravated asthma, decreased lung function.

Note: These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.

Read More: [Advancing Air Pollution Control in India](#), [World Air Quality Report 2023](#)

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. In the cities of our country, which among the following atmospheric gases are normally considered in calculating the value of Air Quality Index? (2016)

1. Carbon dioxide
2. Carbon monoxide
3. Nitrogen dioxide
4. Sulfur dioxide
5. Methane

Select the correct answer using the code given below:

- (a) 1, 2 and 3 only
(b) 2, 3 and 4 only
(c) 1, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Mains

Q. Describe the key points of the revised Global Air Quality Guidelines (AQGs) recently released by the World Health Organisation (WHO). How are these different from its last update in 2005? What changes in India's National Clean Air Programme are required to achieve revised standards? (2021)

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