

Respirer Reports' Analysis of Air Quality in October for the past five years

Air pollution measured in PM 2.5 increased in four major cities compared to a year ago, an analysis by Respirer Reports has found. The study analysed PM 2.5 concentrations between 2019 and 2023 in eight of India's major state capitals which face air pollution challenges. These are Delhi, Mumbai, Chennai, Kolkata, Bengaluru, Lucknow and Patna.

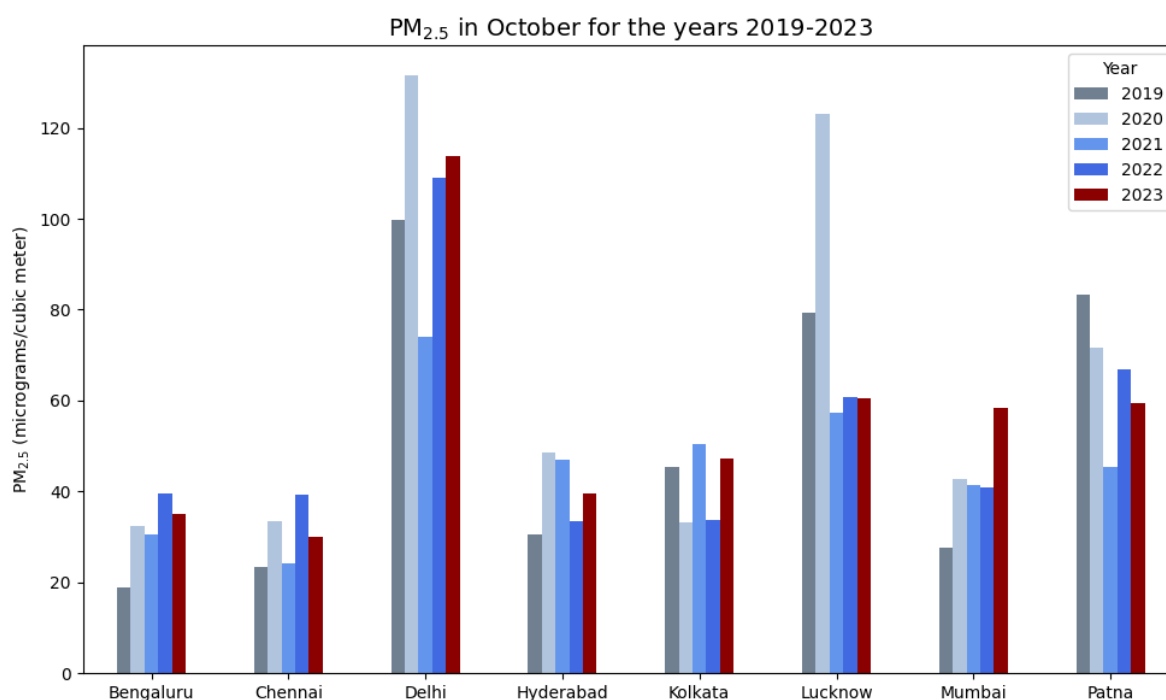
Headline takeaways

Four cities – **Delhi, Mumbai, Hyderabad and Kolkata** (see charts on pages 3 and 4) – saw PM 2.5 levels higher in October, 2023, compared to a year ago. Chennai was the least polluted, with a fall of over 23 per cent compared to a year ago.

- **Delhi's** PM 2.5 level in October, 2023, was higher than a year ago, continuing a rising trend since 2021. It was the most polluted of the eight cities analysed here.
 - The national capital saw a sharp rise in PM 2.5 levels between 2019 and 2020 (by 32 per cent), a dip in 2021 (by 43.7 per cent), and a steady increase in 2022 and 2023.
 - The air quality deteriorated by 4.4 per cent in the last year (2022-23), from 109.1 micrograms/cubic metre ($\mu\text{g}/\text{m}^3$) to 113.9 $\mu\text{g}/\text{m}^3$.
 - The October 2023 level was 3.7 times the Central Pollution Control Board's 'safe' limit of 30 $\mu\text{g}/\text{m}^3$ and 7.5 times the World Health Organisation's safe limit of 15 $\mu\text{g}/\text{m}^3$.
- **Mumbai** saw a steady increase in October PM 2.5 levels from 2019 to 2023, signalling a significant deterioration in air quality.
 - Last month, pollution spiked by over 42 per cent compared to October a year ago.
 - In earlier years, PM 2.5 shot up between 2019 and 2020 (by 54.2 per cent), fell slightly in 2021 (by 3 per cent) and 2022 (by 0.9 per cent).
- In **Hyderabad and Kolkata**, October PM 2.5 levels went up in 2023 compared to 2022.
 - In **Hyderabad**, PM 2.5 increased between 2019 and 2020 (by 59 per cent), dipped slightly in 2021 (by 2.9 per cent) and considerably in 2022 (by 29.1 per cent), but went up again in 2023 (by 18.6 per cent).
 - In **Kolkata**, PM 2.5 dipped between 2019 and 2020 (by 26.8 per cent), went up in 2021 (by 51.7 per cent), decreased in 2022 (by 33.1 per cent) and rose again in 2023 (by 40.2 per cent)

Four capitals saw a fall in October PM 2.5 levels between 2022 and 2023 – Lucknow, Patna, Bengaluru and Chennai.

- In **Lucknow** and **Patna**, October PM 2.5 levels dropped between 2022 and 2023, holding on to gains from previous years.
 - In **Lucknow**, PM 2.5 spiked between 2019 and 2020 (by 55.2 per cent), dipped in 2021 (by 53.4 per cent), went up again in 2022 (by 6.2 per cent) and fell again in 2023 (by 0.9 per cent).
 - In **Patna**, PM 2.5 fell between 2019 and 2020 (by 14 per cent), dipped further in 2021 (by 36.7 per cent), spiked significantly in 2022 (by 47.7 per cent), then went down again in 2023 (by 11.1 per cent).
- In **Bengaluru** and **Chennai**, October PM 2.5 levels fell between 2022 and 2023.
 - In **Bengaluru**, PM 2.5 increased significantly between 2019 and 2020 (by 72.1 per cent), fell slightly in 2021 (by 5.8 per cent), went up again in 2022 (by 29.6 per cent) and dipped once again in 2023 (by 11.6 per cent).
 - In **Chennai**, PM 2.5 increased between 2019 and 2020 (by 43.2 per cent), fell in 2021 (by 27.8 per cent), rose again in 2022 (by 61.6 per cent) and decreased in 2023 (by 23.7 per cent).



| City | 2019 | 2020 | % Change (2019-20) | 2021 | % Change (2020-21) | 2022 | % Change (2021-22) | 2023 | % Change (2022-23) |
|------------------|------|-------|--------------------|------|--------------------|-------|--------------------|-------|--------------------|
| Bengaluru | 18.9 | 32.4 | 72.1% | 30.6 | -5.8% | 39.6 | 29.6% | 35.0 | -11.6% |
| Chennai | 23.5 | 33.6 | 43.2% | 24.3 | -27.8% | 39.2 | 61.6% | 29.9 | -23.7% |
| Delhi | 99.6 | 131.5 | 32.0% | 74.0 | -43.7% | 109.1 | 47.4% | 113.9 | 4.4% |
| Hyderabad | 30.5 | 48.5 | 59.0% | 47.1 | -2.9% | 33.4 | -29.1% | 39.6 | 18.6% |
| Kolkata | 45.4 | 33.3 | -26.8% | 50.5 | 51.7% | 33.7 | -33.1% | 47.3 | 40.2% |
| Lucknow | 79.3 | 123.0 | 55.2% | 57.4 | -53.4% | 60.9 | 6.2% | 60.4 | -0.9% |
| Mumbai | 27.7 | 42.7 | 54.2% | 41.4 | -3.0% | 41.0 | -0.9% | 58.3 | 42.1% |
| Patna | 83.3 | 71.6 | -14.1% | 45.3 | -36.7% | 66.9 | 47.7% | 59.5 | -11.1% |

