

Air quality indicators: when data disappear

Ankita S Achanta^a & Ther W Aung^a

We recently assessed the health impact of improved ambient air quality in five Indian megacities following the movement restrictions during the coronavirus disease 2019 pandemic. We used (at the time) publicly available particulate matter data collected by embassies and consulates of the United States of America. Our paper was accepted for publication in the *Bulletin of the World Health Organization*; however, before the article's publication, in March 2025, public access to this data set was suspended.¹ Because the raw data were no longer publicly accessible, the *Bulletin* withdrew its acceptance of the paper. The removal of publicly available air quality data will have negative consequences for global research and for the health of billions of people in low- and middle-income countries.

Since 2008, the United States Department of State has collected air pollution data at its embassies and consulates and made them publicly available, providing a reliable source of real-time air quality information in many countries. Such access has had many positive spillover effects, including advances in scientific research, environmental health awareness and changes in policies and practices in low- and middle-income countries. For example, air quality data from the State Department have been used to conduct comparative studies in India,^{2,3} China^{4,5} and across continents.⁶ Researchers have also used the data to identify potential sources of particulate matter,⁶ a key component of air pollution that is hazardous to health. Knowledge of these sources is critical for developing air quality management plans and therefore reducing its health impacts.

Furthermore, many governments in low- and middle-income countries may not have the financial and technical

resources to install and maintain high-quality air monitors. Such monitors can carry an annual operational cost of over 130 000 United States dollars per monitor.⁷ The State Department air monitoring has partially filled this critical information gap by collecting air quality data in over 40 cities⁶ globally and by making the data freely and publicly available. For example, in India, each of the five megacities included in our assessment – home to over 10 million people per city – have high-quality air monitors that have provided data since 2017. Although one monitor in a city cannot provide representative exposure data, particularly in densely populated cities, it can shed light on spatial differences between cities and temporal trends, such as hourly, daily or annual changes in air pollution levels. While other sources of publicly available air quality data exist, such as satellite remote sensing and a growing number of low-cost sensors, ground-based high-quality monitors are a critical part of an air quality data ecosystem, because researchers need a combination of data sources to build, validate and refine exposure models.⁷

Exposure to high levels of fine particulate matter is associated with a range of adverse health outcomes including premature death, cancer, respiratory and cardiovascular diseases, and increased child mortality.⁸ While the evidence of the health impacts is robust, much of this evidence is from studies of populations in high-income countries. The State Department's air quality data have enabled researchers to build predictive models^{9,10} and to analyse the connection between air pollution and health¹⁰ in countries where such research would be impossible on individual research project budgets.

The State Department's air quality data has also been instrumental in

changing policy and practice. A widely known example is in China, where social media tweets on air quality from the United States Embassy in 2010 led to the Chinese government proposing new air quality standards.¹¹ Additionally, in countries with United States embassy monitors, particulate matter has declined, resulting in decreased risk of premature mortality.¹¹

The removal of public access to air quality data from the State Department will undermine research in countries where data are scarce and a large proportion of the population is exposed to hazardous levels of air pollution. Governments that lack the means to generate their own air quality data will be excluded from an important resource, and without that knowledge, citizens will be unable to participate in environmental health actions. Until all governments invest in their own air quality monitoring solutions, the air monitoring infrastructure already in place at United States embassies remains a valuable resource. Given the substantial investment made and the minimal resources required to continue data sharing, restoring public access to this information would be an effective step towards strengthening health-protective policies and practices against air pollution. ■

References

Available at: <https://www.who.int/publications/journals/bulletin>

© 2025 The authors; licensee World Health Organization.

This is an open access article distributed under the terms of the Creative Commons Attribution IGO License (<http://creativecommons.org/licenses/by/3.0/igo/legalcode>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. In any reproduction of this article there should not be any suggestion that WHO or this article endorse any specific organization or products. The use of the WHO logo is not permitted. This notice should be preserved along with the article's original URL.

^a School of Medicine, Case Western Reserve University, 10900 Euclid Ave, Cleveland, Ohio, 44106, United States of America. Correspondence to Ankita S Achanta (email: asa242@case.edu).

References

1. Wholf TJ. State Department suspends reporting air quality levels staff and families relied on overseas. CBS news. 2025. Available from: <https://www.cbsnews.com/news/state-department-stops-reporting-air-quality-levels/> [cited 2025 Mar 7].
2. Singh V, Singh S, Biswal A. Exceedances and trends of particulate matter (PM_{2.5}) in five Indian megacities. *Sci Total Environ*. 2021 Jan 1;750:141461. doi: <http://dx.doi.org/10.1016/j.scitotenv.2020.141461> PMID: 32882489
3. Zhou M, Xie Y, Wang C, Shen L, Mauzerall DL. Impacts of current and climate induced changes in atmospheric stagnation on Indian surface PM_{2.5} pollution. *Nat Commun*. 2024 Aug 28;15(1):7448. doi: <http://dx.doi.org/10.1038/s41467-024-51462-y> PMID: 39198469
4. San Martini FM, Hasenkopf CA, Roberts DC. Statistical analysis of PM_{2.5} observations from diplomatic facilities in China. *Atmos Environ*. 2015 Jun 1;110:174–85. doi: <http://dx.doi.org/10.1016/j.atmosenv.2015.03.060>
5. Turiel JS, Kaufmann RK. Evidence of air quality data misreporting in China: an impulse indicator saturation model comparison of local government-reported and U.S. embassy-reported PM_{2.5} concentrations (2015–2017). *PLoS One*. 2021 Apr 21;16(4):e0249063. doi: <http://dx.doi.org/10.1371/journal.pone.0249063> PMID: 33882055
6. Dhammapala R. Analysis of fine particle pollution data measured at 29 US diplomatic posts worldwide. *Atmos Environ*. 2019 Sep 15;213:367–76. doi: <http://dx.doi.org/10.1016/j.atmosenv.2019.05.070>
7. Brauer M, Guttikunda SK, Nishad KA, Dey S, Tripathi SN, Weagle C, et al. Examination of monitoring approaches for ambient air pollution: a case study for India. *Atmos Environ*. 2019;216:116940. doi: <http://dx.doi.org/10.1016/j.atmosenv.2019.116940>
8. State of global air 2024. Special report. Boston: Health Effects Institute; 2024. Available from: <https://www.stateofglobalair.org/resources/report/state-global-air-report-2024> [cited 2025 Apr 22].
9. Chetna SK, Dhaka SK, Walker S-E, Rawat V, Singh N. Long-term meteorology-adjusted and unadjusted trends of PM_{2.5} using the AirGAM model over Delhi, 2007–2022. *Atmos Environ X*. 2024 Apr 1;22:100255. doi: <http://dx.doi.org/10.1016/j.aeaoa.2024.100255>
10. Oguge O, Nyamondo J, Adera N, Okolla L, Okoth B, Anyango S, et al. Fine particulate matter air pollution and health implications for Nairobi, Kenya. *Environ Epidemiol*. 2024 Apr 16;8(3):e307–7. doi: <http://dx.doi.org/10.1097/EE9.0000000000000307> PMID: 38799266
11. Jha A, Nauze A. US Embassy air-quality tweets led to global health benefits. *Proc Natl Acad Sci USA*. 2022 Nov;119(44):e2201092119. doi: <http://dx.doi.org/10.1073/pnas.2201092119> PMID: 36279451