



PRESS RELEASE
15 September 2026 11:00:00 CEST

CAMBRIDGE STUDY USES SLEEP CYCLE'S TECHNOLOGY TO LINK AIR POLLUTION AND NIGHTTIME COUGHING WORLDWIDE

Peer-reviewed research led by the University of Cambridge uses Sleep Cycle's on-device cough detection to link air pollution with nighttime coughing across 32 cities.

Sleep Cycle's cough-detection technology has been used in a peer-reviewed study led by the University of Cambridge to measure how air pollution affects nighttime coughing across 32 cities in 12 countries. The study, published in *Communications Health*, links daily air pollution to nocturnal cough at a scale not previously possible, and points to Sleep Cycle's passive sound analysis as a credible complement to traditional public health surveillance.

Researchers at Cambridge and Tsinghua University worked with cough data recorded through Sleep Cycle over roughly 500 nights. Each rise of 10 micrograms of PM2.5 per cubic metre of air was associated with a 2.4% increase in nighttime coughing. The association held even in cities where pollution stayed below the World Health Organization's recommended daily limit, and after the researchers adjusted for weather and seasonal flu activity. The study is observational, so it shows an association rather than proof that pollution causes the coughing.

"Everyone coughs from time to time, but coughing, whether it's a one-off or more persistent, is a sign of irritation or inflammation in the lungs," said lead author Dr Tong Xia from Tsinghua University. "A cough could be a sign of something that hasn't become chronic yet, but might in future."

Coughs were detected and counted on each user's own device, so no audio recordings left the phone. Only anonymised, city-level cough counts were used in the analysis. The dataset drew on tens of thousands of users over 18 months, in the countries where the technology is most widely used: Australia, Brazil, Chile, China, France, Germany, Italy, Japan, South Africa, Sweden, the United Kingdom and the United States.

During the January 2025 Los Angeles wildfires, nighttime coughing in the city rose alongside the sharp increase in pollution. This real-world event served as a natural experiment and supported the wider finding.

"The dataset from Sleep Cycle is really valuable, because the app is widely used worldwide," said Professor Cecilia Mascolo from Cambridge's Department of Computer Science and Technology, who led the research. "Most public health studies only have data from one country, so having a dataset of this size gives it much more power."



Sleep Cycle's technology uses sound, such as breathing, snoring and coughing, to analyse sleep quality. The sounds are recorded locally and processed by an AI algorithm on the device. The technology has now analysed more than four billion sleep sessions, which makes it a useful complement to traditional public health surveillance and epidemiological research.

"Every night, Sleep Cycle's technology turns millions of smartphones into precise sound-analysis instruments," said Dr Mikael Kågebäck, CTO and acting CEO of Sleep Cycle. "Coughs are detected and counted directly on each user's device, so no audio ever leaves the phone. That combination of scale and privacy lets researchers see the health effects of air pollution city by city, night by night, at a scale no sleep lab could match."

"A collaboration like this, with Cambridge and Tsinghua, is independent confirmation of something we have long believed: a passively recorded cough can carry a real public health signal," Kågebäck added. "It shows our technology can support the people whose job is to protect population health, without compromising the privacy of the people who use our app."

The authors suggest the approach could track early respiratory responses to air pollution in near real time, across many cities at once, as a complement to existing public health monitoring.

The full study is available at <https://www.nature.com/articles/s44528-026-00030-5>.

Reference

Tong Xia et al. "Short-term associations between air pollution and nocturnal cough frequency." *Communications Health* (2026). DOI: 10.1038/s44528-026-00030-5

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About Sleep Cycle

Sleep Cycle is dedicated to making healthy sleep accessible to everyone. Our app helps users to build hero habits, identify potential sleep issues, and gain valuable insights into their sleep patterns. Leveraging patented sound technology and over 4 billion analyzed sleep sessions, Sleep Cycle provides great accuracy and personalized guidance. As part of its broader partnership program, Sleep Cycle offers company partnerships including in-app promotions, tailored SDK solutions, and an extensive data library, enabling businesses to expand their offerings with sleep solutions and insights. Sleep Cycle is listed on Nasdaq Stockholm under the ticker SLEEP, with its headquarters in Gothenburg, Sweden.