# Bulletin de veille émissions d'aérosols par l'appareil respiratoire humain N° 21 – Juin 2025

**Objectifs :** veille scientifique sur les émissions d'aérosols (gaz et particules) par l'appareil respiratoire humain (nez/bouche).

*La validation des informations fournies (exactitude, fiabilité, pertinence par rapport aux principes de prévention, etc.) est du ressort des auteurs des articles signalés dans la veille. Les informations ne sont pas le reflet de la position de l'INRS. Les éléments issus de cette veille sont fournis sans garantie d'exhaustivité.*

*Les liens mentionnés dans le bulletin donnent accès aux documents sous réserve d'un abonnement à la ressource.*

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Tuhkuri Matvejeff A, Silvonen V, Heikkilä P, Sanmark E, Hakala J, Kuittinen N, et al.

**Systematic review of respiratory particle measurement studies and a new method for human particle emission measurement during breathing, coughing, and voice production.**

J Aerosol Sci. 2025;189:106619.

https://www.sciencedirect.com/science/article/pii/S0021850225000965

*Spurred by the SARS-CoV-2 pandemic, there has been a considerable increase in research on human respiratory particle characterization using diverse methodologies. Our objective was to review previous methods used and to develop a highly controlled method for measuring human respiratory particle emissions during breathing, coughing, and voice production. A systematic search from three databases (Ovid Medline, Web of Science, and Scopus) was carried out in January 2024 according to the PRISMA 2020 principles. 77 original studies were included in the qualitative analysis. Considerable variation was noted in the methodology of previous particle measurement studies regarding setups, instrumentation, protocols, and reporting. We identified six key setups and discuss factors such as relative humidity, particle losses, and dilution for each. We also present our novel setup, comprising a measurement chamber with particle-free air supply, funnel-type sample inlet, and real-time particle measurement instruments to investigate the absolute and time-resolved exhaled aerosol emission rates. The drying and dilution processes of particles, as well as particle losses, are well controlled. CO2 measurements are utilized for sample dilution and exhaled flow estimation. Optional sound pressure measurement provides calibrated absolute values. Fundamental frequency and electroglottography registration are also included as optional tools for studying voice production. Our setup reports accurate data on particle number concentration, mass concentration, particle number emission, and mass emission rates during breathing, coughing, speaking, and singing in the size range 0.004–10 µm, therefore succeeding in measuring ultrafine particles. We also report a positive effect of sound pressure and CO2 on particle*

*emissions. Enhanced methods for particle emission measurements improve our understanding of airborne transmission and human physiology, providing tools to minimize the risk of airborne transmission. We propose a set of key methodological parameters for improved reporting, including the documentation of dilution, particle drying, sampling losses and sound pressure.*