Bulletin de veille émissions d'aérosols par l'appareil respiratoire humain
N° 33 – Août 2026

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.

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Darquenne C, Alsved M, Bzdek BR, Camphuijsen J, de Winter M, Golshahi L, et al.

Formation of respiratory aerosols: Modeling and experiments (FRAME).

Journal of Aerosol Science. 2026;198:106881.

https://www.sciencedirect.com/science/article/pii/S0021850226001400

It is generally established that respiratory droplets and aerosols are formed from the fluid lining the respiratory tract. However, unlike modeling of the fate of inhaled aerosols, modeling the formation of respiratory droplets and aerosols is a much less studied area. In the fall of 2024, aerosol science experts in both experimental and clinical aspects of respiratory aerosols, along with experts in mathematical and computational modelling of viscoelastic fluids, participated in a weeklong workshop to address the challenges of characterizing respiratory aerosol composition and of modeling their formation. Topics that were discussed include the mechanisms of formation, the measurement of viscoelastic and rheological properties of the lung lining fluids, the intersubject production variability, and how in-vivo/in-vitro data can be used to inform and validate modeling. This publication summarizes the current consensus on the topic as it was discussed at the workshop. It also highlights the current experimental and numerical challenges, and key gaps in the available data. The most critical needs for a more predictive understanding of respiratory aerosol generation were identified as 1) robust, high-resolution rheological and compositional measurements of lung lining fluids, 2) experimental systems that replicate dynamic airway processes under controlled conditions, 3) multiscale simulations that incorporate nonlinear constitutive behavior, complex geometries, and surface-driven instabilities with appropriate validation, and 4) integration of pathogen viability and chemical microenvironments into aerosol fate models.

Zhou CY, Hu WQ, Li JY, Lou L, Xu HL, Gu Q.

What is the source event of infectious respiratory particles release during bronchoscopy: a prospective environmental study.

Journal of Hospital Infection. 2026;174:194-202.

https://www.sciencedirect.com/science/article/pii/S0195670126001945

https://www.journalofhospitalinfection.com/article/S0195-6701(26)00194-5/abstract

Summary Background Bronchoscopy is recognized as an aerosol-generating procedure. However, it remains unclear whether standard infection control measures adequately mitigate the release of infectious respiratory particles (IRPs). Quantifying IRP release and identifying the source events are crucial for developing policies. Methods An environmental study was performed involving real-time particle monitoring during bronchoscopy in conscious patients. An optical particle sizer and a viable cascade impactor were used to monitor particle concentrations and airborne bacteria, respectively. All procedural events and patient reactions were documented to allow for temporal correlation. Results Reflexive coughing occurred in 94% of procedures and was the source of IRP release. Coughing increased the concentration of 0.5 µm particles by a median of 37,183.95 N/L, a value two orders of magnitude above the baseline level. Although mask use mitigated IRP release, it did not completely prevent it. In the absence of coughing, neither scope insertion nor bronchoalveolar lavage generated significant levels of particles. Furthermore, airborne Acinetobacter baumannii was detected during the procedures. Conclusion The current standard infection control measures during bronchoscopy are inadequate. Reflexive cough is nearly ubiquitous and the main source of significant, containment-breaching IRP release. Masks may offer partial mitigation, but the real-world effectiveness is limited. Static air cleaning alone is insufficient for real-time management of episodic particle release. Further research into source-control technologies, such as a sealed oral interface that contains cough while preserving nasal access, and into dynamic air management strategies, is warranted to minimize infection risk. Approval number IIT20240332B-R1.