

Bulletin de veille émissions d'aérosols par l'appareil respiratoire humain N° 29 – Avril 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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Liu Y, Huang ZJ, Luo XM, Ma HQ, Li ZP.

Insights of airborne transmission within urban rail transit carriage environments after the COVID-19 pandemic.

Indoor Built Environ. 2026:30.

<https://doi.org/10.1177/1420326X261439110>

During the COVID-19 pandemic, the high-density and enclosed environments of rail transit systems have increased respiratory transmission risk, emphasizing the need to investigate droplet dispersion mechanisms and influencing factors in rail carriages. This article reviews the numerical simulation and experimental studies on respiratory droplet transmission in rail vehicles since 2020, focusing on droplet characteristics, infection risk assessment and influencing factors in dense and narrow environments. The review encompassed high-speed trains, conventional trains and subways, analysing the effects of ventilation, passenger behaviour and environmental conditions on spread of droplet. Through systematic literature search and keyword co-occurrence analysis, 27 core studies were identified. The results indicated that numerical modelling mostly employed Eulerian and Lagrangian frameworks with various turbulence models, simplifying 3D carriage geometries with seats and occupants. Key boundary conditions included mixed and new type ventilation systems and idealized human exhalation. These models simulated spherical droplets from coughing and breathing under velocities of 0.1-20 m/s. Experiments are more complex and time-consuming but can provide realistic insights. For infection risk assessment, optimizing models for special environments is essential. Advanced ventilation modes and higher ventilation rates are effective for controlling droplet transmission, while passenger behaviours could significantly affect dispersion and would require further research.

Qiao LK, Wei T, Qiu W, Han J.

Sneeze droplet dispersion in radiant floor heated rooms: A numerical simulation.

Indoor Built Environ. 2026:12.

<https://doi.org/10.1177/1420326X261436724>

Winter is a peak season for respiratory disease outbreaks, with indoor environments being major sites of airborne transmission. Radiant floor heating, widely applied in cold regions for its energy efficiency and thermal comfort, can strongly affect indoor aerosol transport. Therefore, a numerical simulation was conducted to investigate the effects of radiant floor heating and body thermal plumes on sneeze droplet dispersion in a typical indoor environment. The results showed that body thermal plumes delayed aerosol deposition and increased concentrations in the breathing zone. When radiant floor heating was operating, aerosols travelled farther and reached substantially higher concentrations. As the floor temperature (T_f) rose to 30-32 degrees C, radiant floor heating became the dominant factor governing aerosol dispersion, weakening the influence of body plumes. In the breathing zone, the average aerosol concentrations were 7.26 $\mu\text{g}/\text{m}^3$ and 8.50 $\mu\text{g}/\text{m}^3$ at $T_f = 26$ degrees C and 28 degrees C, increasing to 17.25 $\mu\text{g}/\text{m}^3$ and 42.36 $\mu\text{g}/\text{m}^3$ at $T_f = 30$ degrees C and 32 degrees C, respectively, compared with 13.70 $\mu\text{g}/\text{m}^3$ under the sole effect of body thermal plumes. The results suggest that maintaining a mild floor temperature of 26 degrees C could reduce aerosol concentrations in the breathing zone while ensuring thermal comfort and conserving energy.