

CORRESPONDENCE

Droplets and Aerosols in the Transmission of SARS-CoV-2

TO THE EDITOR: Anfinrud et al. now illustrate in the *Journal*¹ how liquid droplets exhaled during speech can linger in the air. The large particles to which they refer remain airborne only briefly before settling because of gravity; these particles may pose a threat of infection if they are inhaled by persons close by as well as a contact hazard if they are transferred to another person's nasal or oral passages. In this way, persons infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) may contribute to the spread of the infection.

Breathing and talking also produce smaller and much more numerous particles, known as aerosol particles, than those visualized in the laser experiment of Anfinrud and colleagues.²⁻⁴ Certain persons called "super spreaders" produce many more aerosol particles than other persons. The diameters of these particles are in the micron range. These particles are too small to settle because of gravity, but they are carried by air currents and dispersed by diffusion and air turbulence.

Inhaled droplets and aerosol particles have different sites of deposition in the recipient. Inhaled droplets are deposited in the upper regions of the respiratory tract, from which they may be removed in nasal secretions or carried upward by the mucociliary escalator, to be expelled or swallowed. In contrast, inhaled aerosolized particles can penetrate to the depths of the lungs, where they may be deposited in the alveoli.

A recent study, the results of which were also published in the *Journal*, showed that experimentally produced aerosols containing SARS-CoV-2

virions remained infectious in tissue-culture assays, with only a slight reduction in infectivity during a 3-hour period of observation.⁵ Aerosols from infected persons may therefore pose an inhalation threat even at considerable distances and in enclosed spaces, particularly if there is poor ventilation. The possible contribution of infective aerosols to the current pandemic suggests the advisability of wearing a suitable mask whenever it is thought that infected persons may be nearby and of providing adequate ventilation of enclosed spaces where such persons are known to be or may recently have been.

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Disclosure forms provided by the author are available with the full text of this letter at NEJM.org.

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