High-flow nasal cannula for COVID-19 patients: risk of bio-aerosol dispersion

Jie Li [1], James B. Fink [1] and Stephan Ehrmann [2,3]

Affiliations: [1]Dept of Cardiopulmonary Sciences, Division of Respiratory Care, Rush University Medical Center, Chicago, IL, USA. [2]CHRU Tours, Médecine Intensive Réanimation, CIC INSERM 1415, CRICS-TriggerSep network, Tours, France. [3]INSERM, Centre d'étude des pathologies respiratoires, U1100, Université de Tours, Tours, France.

Correspondence: Jie Li, 1620 W Harrison St, Tower LL1202, Chicago, IL 60612, USA. E-mail: Jie_Li@rush.edu

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High-flow nasal cannula does not generate higher risk of bio-aerosol dispersion than conventional oxygen masks https://bit.ly/2Yn0RQn

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From the authors:

We appreciate the comments of J. Elshof and co-workers on our article "High-flow nasal cannula for COVID-19 patients: low risk of bio-aerosol dispersion" [1] and agree that further research is warranted to reduce the risk of virus transmission from infected patients. The presented *in vitro* data of J. Elshof and co-workers from a model using light detection of smoke dispersion distance and velocity, suggesting that high-flow nasal cannula (HFNC) generates a larger dispersion distance than non-rebreather masks and Venturi masks, is in contrast to reports from Hui *et al.* [2] using a similar model. Presumably, because the smoke used by J. Elshof and co-workers was larger (0.3–2.5 μm) than that used by Hui *et al.* [2] (⩽1 μm), the larger particles dispersed differently. It should be noted that smoke in both models represents only a small fraction of the range of bio-aerosols generated by patients during breathing, speaking, coughing or sneezing [3]. Using the same size airway model, J. Elshof and co-workers observed that the dispersion distance decreased from 71 cm to 25 cm by changing the nasal cannula size from small to large when HFNC flow was set at 30 $L \cdot min^{-1}$; however, when HFNC flow was set at 60 $L \cdot min^{-1}$, the medium-size nasal cannula generated a shorter distance than both small and large nasal cannulas. This raises the role of proper fit of prongs to nares and highlights the limitations of modelling. Regardless of the sizes of nasal cannula, the dispersion distance was farther with 60 $L \cdot min^{-1}$ than 30 $L \cdot min^{-1}$, which is in line with the results of Hui *et al.* [2] and may be expected, as higher velocity of the gas will carry exhaled smoke to a further distance. However, this effect of total flow did not occur when testing the Venturi mask. Surprisingly, the Venturi mask with large open holes and a total gas flow of 40 $L \cdot min^{-1}$ generated a shorter dispersion distance than normal breathing. These inconsistencies are difficult to interpret without comprehensive peer review of extensive methods and results. Whether smoke imaging models truly reflect the natural features of the transportation and dispersion of bio-aerosols generated by patients has not been established and results from these studies should be interpreted cautiously.