



Exhaled air dispersion and use of oronasal masks with continuous positive airway pressure during COVID-19

To the Editor:

We applaud FERIOLI *et al.* [1] for their review of practical measures that can be taken to help protect healthcare workers from severe acute respiratory syndrome-coronavirus-2 infection. We urge caution in interpreting data from table 1, which lists maximum air dispersion distance with a variety of oxygen administration and ventilatory support strategies. Reporting that continuous positive airway pressure (CPAP) *via* oronasal mask at 20 cmH₂O has negligible air dispersion is potentially misleading. Much of the data from this table is derived from a series of studies by HUI and co-workers [2–5], in which a human patient simulator was used to model exhaled air dispersion with a variety of supportive devices. With this model, the group measured exhaled air dispersion using a laser to detect particles in distinct zones; the median and paramedian sagittal planes, *i.e.* directly in front of the simulator. To measure dispersion while wearing CPAP, they measured a specific oronasal mask (Quattro Air, ResMed Inc.), which contains exhaust vent holes that are evenly distributed circularly around the elbow connection point of the air tubing. Thus, exhaled air exits the mask in a continuous, circumferential flow. It is unsurprising that no distinct air jet could be measured in the median sagittal plane (*i.e.* in the midline, in front of the patient) since airflow is: 1) diverted diffusely (rather than a directed jet); and 2) circumferential (more laterally) with this mask design. The authors noted that the circumferential nature of the exhaust holes was the likely reason that they could not measure an exhaled jet.

In addition, when HUI *et al.* [5] tested exhaled air dispersion using other oronasal mask models with different, more localised, exhalation port designs they found widespread exhaled air jet dispersion, measured at 500–950 mm, especially at higher inspiratory pressures and in connection with the whisper swivel device.

Taken together, the studies cited by FERIOLI *et al.* [1] may not fully support their conclusion that “CPAP *via* an oronasal mask...[is one of the] ventilatory support methods that allow the minimum room air contamination.” We propose that the testing methodology itself may have been unable to capture exhaled airflow. Regardless, results based on a single mask design in the category of oronasal masks should not be generalised to other masks in the same category, particularly when data to the contrary exist. We recommend caution be exercised in interpreting and generalising these results.

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Caution is advised regarding the recently published conclusion that use of oronasal masks with CPAP has negligible room contamination *via* exhaled air dispersion of SARS-CoV-2 viral particles
<https://bit.ly/39cC4m8>

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Shannon S. Sullivan¹ and Indira Gurubhagavatula^{2,3}, for the Public Safety Committee of the American Academy of Sleep Medicine

¹EvalStat Research Institute (EVALRI), Palo Alto, CA, USA. ²Center for Sleep and Circadian Neurobiology, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA. ³Division of Sleep Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA.

Correspondence: Shannon S. Sullivan, EvalStat Research Institute, 3430 West Bayshore, Palo Alto, CA 94303, USA. E-mail: shannon.gaffey@gmail.com

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