Matava C, Collard V, Siegel J, Denning S, Li T, Du B, Fiadjoe J, Fiset P, Engelhardt T. 2020. Use of a high-flow extractor to reduce aerosol exposure in tracheal intubation. *British Journal of Anaesthesia*, **125**, E363-366. DOI: 10.1016/j.bja.2020.07.014

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission is thought to be through fomites, droplets, and droplet nuclei (aerosols). Aerosol-generating medical procedures are commonly performed and are associated with increased risk of infection of healthcare workers. Some clinicians are using barriers such as transparent plastics and Plexiglas boxes to reduce aerosol spread. However, these barriers may limit access to the patient and mobility of the clinician. An alternative to barriers that may reduce aerosol spread is directed *high flow air extraction*. A high flow air extractor combines high flow suction and a high-efficiency particulate (HEPA) filter. We conducted a study to determine if high flow air extraction reduces aerosol exposure of clinicians. We designed an experimental model that determined the efficacy of removal of particles similar in size to human aerosols. We used two particles to simulate aerosols, essential oil particles ranging in size from 1 nm to 1 µm, and ISO 12103-1 A1 Ultrafine test dust (Powder Technologies Inc., Arden Hills, MN, USA) ranging in size from 1 to 20 µm. We simulated human breathing using an essential oil diffuser as a continuous aerosol source.

Main findings

- High-flow extractor device was **99%** effective at removing aerosols near the source.
- During an uncovered cough, it had a effectiveness of **97%** in reducing the aerosols near the clinician's head.
- For covered cough, high-flow extractor only provides a **52%** reduction in aerosols because aerosols were **diverted away** from the device's intake.
- The high-flow air extractor is more effective for **larger particles** (>1 µm) emitted from the simulated cough, and generally low for **small particles** (<1 µm).

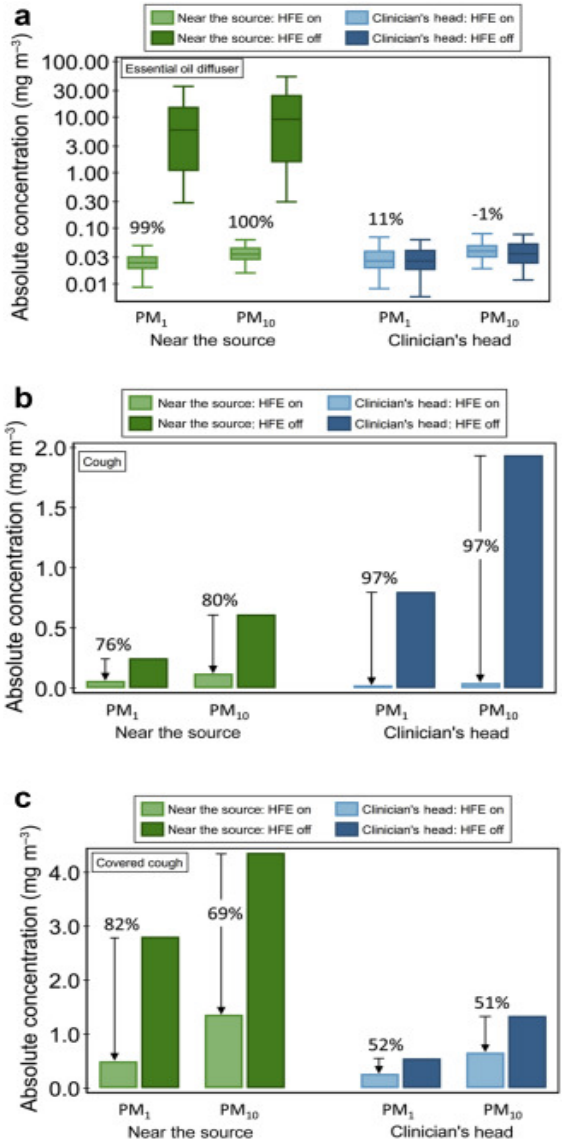

Figure 1. Particle concentration measurements from the two DustTrak DRX units near the source and clinician's head with the high flow extractor (HFE) turned on and off. Calculated HFE effectiveness is labelled on top of each pair of boxes/bars during (a) essential oil diffuser test; (b) simulated cough test; (c) simulated covered cough test.

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