negative pressure within proximity of a patient’s airway is expected to reduce the amount of bioaerosols particularly for anesthesia staff who are frequently near the patient’s airway.

Methods In the experiment, aerosols were produced using a polydisperse aerosol generator with nebulized saline. A portable negative pressure unit was set up at set distances of 10 and 30 cm with the aim of reducing aerosol particle counts detected by a laser-based particle counter.

Results Without the portable negative pressure unit, the median concentration of 0.5 μm aerosols detected was 3128 (1533, 22832) particles/ft³/min. With the portable negative pressure unit 10 cm and 30 cm from the site of aerosol emission, the median concentration compared to background concentration was -0.5 (-8.8) particles/ft³/min and 398 (89, 1749) particles/ft³/min, respectively. For particle concentrations of 0.5 μm, 0.7 μm, and 1.0 μm a significant amount of aerosol reduction was observed (p<0.001).

Conclusions PNP units have the potential to mitigate risks for all operating room staff as spontaneously ventilating patients with infectious diseases of the airway can contaminate the environment. As expected the effectiveness of the aerosol particle reduction is dependent on the distance between the PNP unit and the aerosol generating site. Further experiments are warranted to assess the safety of staff when encountering a potentially infectious patient in the operating room.