

# New aerosol research indicates significantly less risk of COVID-19 transmission from

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Since the outset of the COVID-19 pandemic, there has been much debate about the danger to hospital staff from anesthetic procedures. Concerns include that placing a tube in the patient's airway (intubation) before surgery or removing it at the end (extubation) may produce a fine mist of small particles (called aerosols) and spread the COVID-19 virus to nearby staff.

This risk was judged so high that the procedures are classified 'aerosol generating procedures' (AGPs) for which respirators and high level [personal protective equipment](#) (PPE) are worn routinely, and after which surgery stops while the [operating room](#) is cleared of aerosols and special cleaning is undertaken. These requirements have dramatically slowed surgery and contributed to enormous waiting lists for surgery in the UK National Health Service (NHS), as well as similar problems in hospitals worldwide. Despite the presumed risk, no direct measurements of aerosols have ever been made during anesthetic care in a hospital.

New research published in *Anaesthesia* (a journal

of the Association of Anaesthetists) shows that these procedures may only produce a fraction of the aerosols previously thought, much less than would be produced during a single regular cough. This brings into question whether the procedures should be designated AGPs and provides an opportunity to dramatically speed up surgery.

The study is by Dr. Jules Brown (North Bristol NHS Trust, Bristol, UK) working with Professor Jonathan Reid (Bristol Aerosol Research Centre, School of Chemistry, University of Bristol), Professor Tim Cook (Royal United Hospitals Bath NHS Foundation Trust, Bath, UK, and School of Medicine, University of Bristol, UK) and Professor Tony Pickering, (School of Physiology, Pharmacology & Neuroscience, University of Bristol, Bristol, UK), and colleagues.

To address this lack of evidence, the authors conducted [real-time](#), high-resolution environmental monitoring in ultraclean ventilation operating theaters during anesthesia procedures for insertion and removal of the tube from the patient's airway. The authors also studied procedures such as suction of the airway and 'mask ventilation' when the anesthetist takes over the patients breathing before tube insertion. Put simply, they were able to quantify the aerosols generated during all these procedures, in a real clinical setting, and compare this to the aerosols produced by a single cough. Recordings were made of 19 tube insertions and 14 tube removals.

Against expectations, the authors found that tube insertion generated approximately one thousandth of the aerosol generated by a single cough. Tube removal produced more aerosol, especially when accompanied by a weak cough, but still less than 25% of that produced by a voluntary cough.

"These findings should trigger a re-evaluation of when it is necessary to use specific measures to protect against viral transmission by aerosol in

operating rooms. De-escalation of these high-level protective measures would have a substantial impact on our ability to deliver healthcare to patients within the NHS and internationally," explain the authors.

"If we can agree these procedures do not generate aerosols we can reduce the PPE we wear and we can eliminate the major delays that currently exist between one patient leaving the operating room and starting the next case," they add.

"The results suggest that during anesthesia tube insertion should not be considered a high-risk procedure," say the authors. "We detected no increases in aerosolised particles during face-mask ventilation, airway suction or repeated attempts at intubation. This reflects typical clinical practice by anesthetists with a range of experience, providing further reassurance regarding the low level of aerosol generation."

The authors explain that with tube removal, a cough can occur as the patient's natural breathing reflexes return, and this does produce aerosols that are detectable for around five seconds. They say: "The risk of aerosol exposure for staff can be further reduced by using techniques that reduce coughing or by the anesthetist simply stepping away, as our study showed much reduced particle numbers behind the patient's head compared to above their face."

The authors note some limitations to their study. "It should be acknowledged that while we have provided reassuring evidence around aerosol generation during these procedures, we have not directly studied the risk of SARS-CoV-2 transmission and our interpretation rests on the widely accepted link between aerosol generation and infection risk," they explain. For [safety reasons](#), this study was not performed on patients with COVID-19, but on other patients to demonstrate the aerosols actually produced during these procedures which are common during anesthesia and in intensive care.

They conclude: "The precautions many hospitals worldwide have introduced to mitigate the risks posed by viral aerosols have reduced operating

theater turnover, decreased hospital productivity and increased waiting times for elective and cancer surgery. A further important consideration relates to the cost and limited supply of PPE which has to be targeted to appropriate healthcare settings on the basis of risk. Our results raise important questions about the need for these precautions at the start and end of anesthesia. These results should help inform future PPE guidelines by providing evidence on the relative risk of [aerosol](#) generation associated with tracheal intubation and extubation."

Provided by AAGBI

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