

Associated risks posed to healthcare workers when intubating the trachea of patients with COVID-19: a reply

We thank Drs Begley and Brazil [1] for their interest in our study in which we report the risks of nosocomial infection to healthcare workers following their involvement in tracheal intubation of patients with COVID-19 [2]. They correctly point out that our findings reflect the potential impact to the hospital workforce and that we do not claim that the tracheal intubation episodes reported cause approximately 10% nosocomial infection to clinicians. We do, however, state that approximately 1 out of 10 healthcare workers involved in tracheal intubations went on to report a COVID-19 outcome (the primary endpoint of the study). In our study, we have reported an association, not causality, and we thank Drs Begley and Brazil for reinforcing this important difference.

We wish to respond to some important points raised by Drs Begley and Brazil. Firstly, they state that if the virus was contracted during tracheal intubation, then a peak onset at around day 5 after exposure would have been seen in the cumulative plot. This was not evident on that graph due to the time variable intervals. However, in the daily risks data from our study, there is a visible upward deflection of the

curve with time (Fig. 1), reflecting a non-linear increase over time, which could demonstrate a potentially increased risk associated with the procedure. Secondly, they state that there was no increased risk associated with the absence of personal protective equipment (PPE). While it is concerning that approximately 12% of tracheal intubations were performed with insufficient PPE utilisation and that our data analysis did not find any association between appropriate PPE utilisation and the primary endpoint, this does not definitively mean that there is no increased risk associated with inadequate PPE usage. Our study may have been underpowered to detect this association, and thus further work is required. As the adage goes, absence of evidence is not evidence of absence. Finally, Drs Begley and Brazil state that one would expect the number of tracheal intubations performed to be associated with the primary outcome if the risk of contracting the virus was associated with tracheal intubation procedures. This lack of association could be attributed to the increased experience, understanding and skills developed by the intubation teams with each subsequent tracheal intubation episode, improvement in

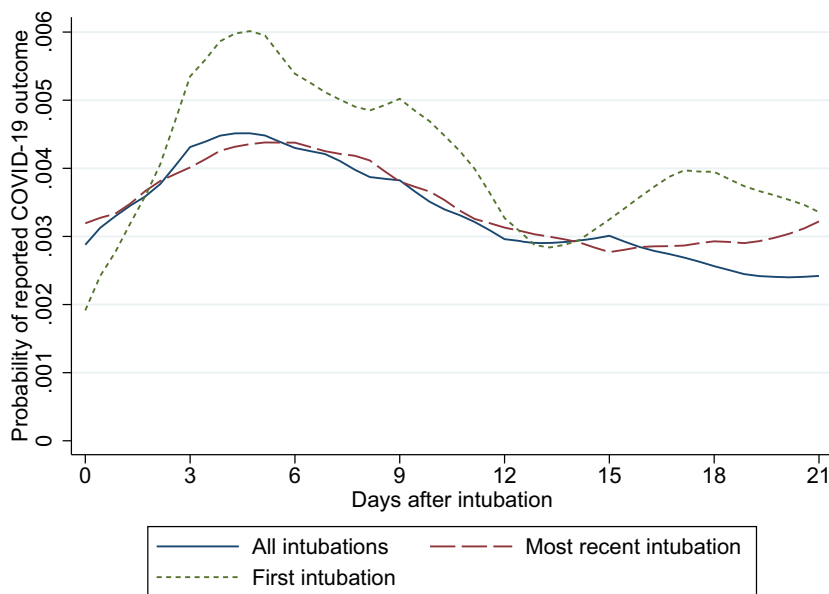


Figure 1 Risk of COVID-19 after any tracheal intubation (blue solid line), most recent tracheal intubation (red dashed line), and first tracheal intubation (green dashed line). ‘All intubations’ includes every tracheal intubation performed, ignoring dependence within-participant; ‘most recent intubation’ is number of the days from most recent tracheal intubation and resets when a new tracheal intubation is performed; and ‘first intubation’ is number of days from when the first tracheal intubation was performed.

the appropriate use and availability of suitable PPE, as well as the increasing availability of tracheal intubation guidelines during the pandemic [3].

To determine the extent to which performing tracheal intubation directly exposes healthcare workers to the risk of contracting COVID-19, staff isolation, serial testing and immunophenotyping of staff and their respective patients would be required which will ensure both validity and accuracy of any association. This challenging study could be considered for future research to provide us with a definitive answer, but in the absence of such data, large-scale studies such as the intubateCOVID project represent the highest level of evidence in the COVID-19 pandemic to date.

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References

1. Begley J, Brazil V. Assessing the risk of nosocomial infection posed by COVID-19 tracheal intubation: the first intubateCOVID results. *Anaesthesia* 2020; **75**: 1544.
2. El-Boghdadly K, Wong D, Owen R, et al. Risks to healthcare workers following tracheal intubation of patients with COVID-19: a prospective international multicentre cohort study. *Anaesthesia* 2020; **75**: 1537–47.
3. Cook TM, El-Boghdadly K, McGuire B, et al. Consensus guidelines for managing the airway in patients with COVID-19. *Anaesthesia* 2020; **75**: 785–99.

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One-lung ventilation during the COVID-19 pandemic

We read with interest the recommendations provided by Thornton et al. [1] and thank the authors for their excellent and timely work. We would like to add some comments, having adapted our technique over the course of treating > 100 patients during the COVID-19 pandemic.

We assemble the double-lumen tube with two paediatric ClearTherm 3 heat and moisture exchange (HME) filters (Intersurgical Ltd., Wokingham, UK) attached to the catheter mounts before anaesthesia in addition to a standard HME filter at the distal end of the catheter mount (Fig. 1). There is no increased resistance within the circuit when these extra HME filters are added and they serve two purposes. First, they make the circuit symmetrical, with less likelihood of kinking. Second, because they are sited proximal to the patient's airway, accidental disconnection of any parts of the circuit should not result in aerosol generation within the operating room. Using two clamps eliminates potential contamination from the patient's lungs and we can isolate parts of the circuit in order to insert and remove in line suction as needed, rather than using standard suction catheters, with their inherent risk of aerosol generation.

Thornton et al. state that a flexible bronchoscope should be used to check double-lumen tube positioning

following tracheal intubation and after positioning the patient laterally. They write that clinical confirmation of double-lumen tubes is associated with a malposition rate of up to 35% and quote two references, one of which was a study involving a single anaesthetist whose thoracic experience was unknown [2] and the other a review that quoted the study [3]. Use of a bronchoscope risks generation of aerosols because the port through which the bronchoscope is introduced is not airtight. We, therefore, check the position of the double-lumen tube clinically utilising intermittent clamping and a stethoscope, and have only had to use a bronchoscope in 20% of cases, where tube positioning was considered incorrect. However, if tracheal intubation is likely to be difficult, we use the Vivasight DL (ETView Ltd., Amsterdam, The Netherlands) with an inbuilt camera Ambu® aView™ (Ambu Ltd., St. Ives, UK). This is integral and, unlike a standard bronchoscope, does not result in aerosol generation. We have used this technique successfully in four patients.

Not mentioned in the guidelines is the importance of using a pressure manometer to check both tracheal and bronchial cuff pressures immediately after insertion of the double-lumen tube and cuff inflation. Finally, Thornton