



Risks to healthcare workers following tracheal intubation of patients with known or suspected COVID-19 in Canada: data from the intubateCOVID registry

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To the Editor,

Airway management may expose healthcare workers (HCWs) to the risk of contracting coronavirus disease (COVID-19).¹ This exposure may occur in a broad range of clinical scenarios, from intubation of asymptomatic individuals undergoing elective surgery to emergent airway management for COVID-19-related respiratory failure. While efforts have been made to assess the magnitude of this risk, definitive data are lacking, and variability may exist across different settings and countries.

A prospective, international, quality improvement project (intubateCOVID; <https://www.intubatecovid.org/info>) was launched to collect information on HCWs involved in tracheal intubation of patients with suspected or confirmed COVID-19.² A waiver of formal research ethics approval was obtained from the Ottawa Health Science Network Research Ethics Board on 31 March

2020. Participants reported details of airway management, personal health outcomes, personal protective equipment used, and personnel involved. Intubation reports predating enrolment were permitted. We present the Canadian data from this international registry and discuss their implications.

From 3 March to 7 August 2020, 54 HCWs (37 males and 17 females; median [interquartile range (IQR)] age 41 [37–48] years; majority anesthesiologists) from 37 Canadian hospitals registered at least one tracheal intubation in a COVID-19 patient and subsequently recorded their own COVID-19 infection status. Overall, 136 tracheal intubations in COVID-19 patients (44 confirmed and 92 suspected) were reported (median [IQR] intubations per participant, 2 [1–2]). The Table summarizes the details. Participants were the primary intubator in most procedures. Respiratory failure was the main indication for intubation and 75% were performed in the intensive care unit or emergency department. Rapid sequence induction was most commonly employed, a videolaryngoscope was the first-

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Table 1 Details of tracheal intubations in COVID-19 patients for Canadian participants in the intubateCOVID registry from 3 March to 7 August 2020

Number of intubations	136
Patient COVID-19 status	
Confirmed	44 (32.4%)
Suspected	92 (67.6%)
Airway manager involvement	
Intubator/laryngoscopist	125 (91.9%)
Assistant	11 (8.1%)
Intubator/laryngoscopist	
Anesthesiologist	127 (93.4%)
Intensive care physician	6 (4.4%)
Others	3 (2.2%)
Airway assistant	
Anesthetic nurse	37 (27.2%)
Other nurse	22 (16.2%)
Anesthesiologist	15 (11.0%)
Other doctor	9 (6.6%)
Intensive care doctor	5 (3.7%)
Other healthcare provider	48 (35.3%)
Indication	
Deteriorating respiratory failure	80 (58.8%)
General anesthetic for surgery	24 (17.7%)
Cardiac arrest	16 (11.8%)
Airway protection for low Glasgow Coma Scale	10 (7.4%)
Endotracheal tube exchange	3 (2.2%)
Elective tracheostomy	1 (0.7%)
Other ICU airway manipulation	1 (0.7%)
Other indication	1 (0.7%)
Location	
ICU	61 (44.9%)
Emergency department	41 (30.1%)
Operating room	24 (17.6%)
General ward	5 (3.7%)
Other	5 (3.7%)
Rapid sequence induction	107 (78.8%)
First attempt laryngoscopy device	
Videolaryngoscope	124 (91.2%)
Direct laryngoscope	8 (5.8%)
Flexible bronchoscope	2 (1.5%)
Tracheostomy/front-of-neck access	2 (1.5%)
Use of bag-mask ventilation	19 (14.0%)
Use of supraglottic airway	4 (2.9%)
Final airway management device	
Endotracheal tube (oral)	132 (97.1%)
Emergency front-of-neck access	2 (1.5%)

Table 1 continued

Elective tracheostomy	1 (0.7%)
Supraglottic airway	1 (0.7%)
Number of attempts	
1	128 (94.1%)
2	6 (4.4%)
3	2 (1.5%)
Personal protective equipment	
Gloves	135 (99.3%)
Eyewear/faceshield	133 (97.8%)
Gown	132 (97.1%)
Apron	12 (8.8%)
Hat	129 (94.9%)
FFP2/N95 (or equivalent)	109 (80.1%)
FFP3/N99 (or equivalent)	19 (14.0%)
Surgical mask	17 (12.5%)
Plastic drape/plastic intubation box	10 (7.4%)
PAPR	5 (3.7%)
Procedures where WHO personal protective equipment standards were not met*	5 (3.7%)
Staff in the intubation room	
Median [IQR]	3 [3,4]
Min-max	2–12

*One participant did not use eyewear and a gown/apron; one participant did not use any mask/respirator; two participants did not use gown/apron; one participant did not use gloves.

COVID 19 = coronavirus disease; ICU = intensive care unit; IQR = interquartile range; FFP = filtering facepiece; PAPR = powered air-purifying respirator; WHO = World Health Organization.

line device, and there was a high first-attempt success rate. Two emergency front-of-neck airways (eFONA) were reported (one in the resuscitation of a cardiac arrest, where eFONA was performed after two failed videolaryngoscopy attempts, and another where FONA was the first airway attempt in a patient with laryngeal trauma from a stab injury).

Laboratory-confirmed COVID-19 was reported in one HCW five days after the intubation (1/54 HCWs, 1.9%; one HCW/136 intubations, 0.7%). Two HCWs self-isolated because of symptoms (but subsequently tested negative for COVID-19) six and 23 days after the intubation, respectively (2/54 HCWs, 3.7%; 2 HCWs/136 intubations, 1.5%). Personal protective equipment (PPE) was widely used, but World Health Organization

recommended standards³ were not met in five procedures (all occurring in March and April; reasons for these safety breaches could not be ascertained). The recommendation of minimizing the number of HCWs in the room to mitigate risk exposure^{4,5} was broadly followed (median [IQR] 3 [3–4]), but up to 10–12 individuals were present in two intubations (details of these events were not available).

Minimizing unnecessary HCW exposure remains an important focus and establishing dedicated airway response teams may help in this regard. Our findings should be interpreted within the limitations of a voluntary self-reported registry. The data undoubtedly represent only a small sample of COVID-19-related intubations performed in Canada, and a causal link between participation in airway management and subsequent COVID-19 infection cannot be ascertained. At the time of writing, Canada is into its second wave of COVID-19 infections, and data from continued participation in registries such as intubateCOVID will be valuable in guiding healthcare management policies.

Disclosures None.

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References

1. Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J. Aerosol generating procedures and risk of transmission of acute respiratory infections to healthcare workers: a systematic review. *PLoS One* 2012. <https://doi.org/10.1371/journal.pone.0035797>.
2. El-Boghdady K, Wong DJ, 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: 1437-47.
3. World Health Organization. Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages: interim guidance, 6 April 2020. Available from URL: <https://apps.who.int/iris/handle/10665/331695> (accessed December 2020).
4. Resuscitation Council UK. Resuscitation Council UK statement on COVID-19 in relation to CPR and resuscitation in healthcare settings. Available from URL: <https://www.resus.org.uk/covid-19-resources/statements-covid-19-hospital-settings/resuscitation-council-uk-statement-covid>. Published March 2020 (accessed December 2020).
5. Thiruvengattarajan V, Wong DT, Kothandan H, et al. Airway management in the operating room and interventional suites in known or suspected COVID-19 adult patients: a practical review. *Anesth Analg* 2020; 131: 677-89.

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