Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

2. Pascall E, Trehane SJ, Georgiou A, et al. Litigation associated with intensive care unit treatment in England: an analysis of NHSLA data 1995–2012. *Br J Anaesth* 2015; **115**: 601–7
3. United Nations General Assembly, "64/292. The human right to water and sanitation," Resolution adopted by the General Assembly on 28 July 2010. UN.org (accessed 25 May 2022).
4. Association of Anaesthetists of Great Britain and Ireland, Pre-operative assessment and patient preparation, practice guideline, London, 2010. Anaesthetists.org (accessed 25 May 2022).
5. National Institute for Health and Care Excellence. *NICE Guideline NG 180; Perioperative care in adults*. National Guideline Centre; 2020. NICE.org.uk. [Accessed 25 May 2022]. accessed
6. McCracken GC, Montgomery J. Postoperative nausea and vomiting after unrestricted clear fluids before day surgery: a retrospective analysis. *Eur J Anaesthesiol* 2018; **35**: 337–42
7. Reader J, Kranke P, Smith I. Free pre-operative clear fluids before day-surgery?: challenging the dogma. *Eur J Anaesthesiol* 2018; **35**: 334–6
8. Rudge Wilson G, Dorrington KL. Starvation before surgery: is our practice based on evidence. *BJA Educ* 2017; **17**: 275–82
9. Morrison E, Ritchie-McLean S, Jha A, et al. Two hours too long: time to review fasting guidelines for clear fluids. *Br J Anaesth* 2020; **124**: 366–70
10. Ohashi Y, Walker JC, Zhang F, et al. Preoperative gastric residual volumes in fasted patients measured by bedside ultrasound: a prospective observational study. *Anaesth Intensive Care* 2018; **46**: 608–13
11. Frykholm P, Disma N, Andersson H, et al. Pre-operative fasting in children. A guideline from the European society of anaesthesiology and intensive care. *Eur J Anaesthesiol* 2022; **39**: 4–25

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Impact of enhanced personal protective equipment on safety and logistics of pre-hospital emergency anaesthesia during the COVID-19 pandemic: a retrospective crossover study

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Keywords: COVID-19; personal protective equipment; pre-hospital emergency anaesthesia

Editor—Essex & Herts Air Ambulance Trust (EHAAT) operates a paramedic–physician helicopter emergency medicine service (HEMS) that responds to critically ill and injured patients in the UK. Their critical care team provide a spectrum of advanced interventions including pre-hospital emergency anaesthesia. Quality assurance for such core interventions is maintained through a standardised approach guided by detailed standard operating procedures (Supplementary material), intensive training with ongoing currency requirements, and comprehensive clinical governance. Severe acute respiratory distress syndrome coronavirus 2 (SARS-CoV-2) is a highly infectious novel beta-coronavirus that poses a significant risk to healthcare professionals.[1–3] To protect clinicians undertaking aerosol-generating procedures, such as tracheal intubation, enhanced airborne personal protective equipment (PPE) is advocated.[4] This study aimed to better understand the impact of enhanced PPE on the safety and logistics of pre-hospital emergency anaesthesia in a UK air ambulance service.

This was a retrospective review of all pre-hospital emergency anaesthesia care that occurred in the EHAAT from December 25, 2019 to June 8, 2020. During the COVID-19 pandemic, an enhanced PPE policy was introduced on March 18, 2020 that mandated enhanced PPE and discontinuation of routine nasal apnoeic oxygenation for all pre-hospital emergency anaesthesia given the undifferentiated nature of the cases attended. The policy change was accompanied by a significant training burden including simulation to ensure team familiarity and limit impact on operations. Data were extracted from our prospectively completed database HEMSbase (Medic One Systems, Tadworth, UK). Demographic and baseline characteristics were analysed using χ^2 test (categorical) or unpaired *t*-test (continuous) with binary outcome measures subject to logistic regression and continuous outcome measures analysed using linear regression. Local ethics approval was obtained from the EHAAT clinical cabinet and research committee.

Table 1 Patient characteristics, safety outcome measures, and key timings before and after enhanced PPE introduction for pre-hospital emergency anaesthesia. BVM, bag valve mask; LMA, laryngeal mask airway; PPE, personal protective equipment.

Patient characteristics	Pre-PPE	Post-PPE	P-value
Age, yr (mean, SD)	56.3 (18.8)	48.6 (19.2)	0.04
Sex:			
Male, *n* (%)	43 (78)	44 (80)	0.82
Female, *n* (%)	12 (22)	11 (20)	
Patient type:			
Medical, *n* (%)	35 (65)	30 (55)	0.33
Trauma, *n* (%)	20 (35)	25 (45)	
Pre-hospital emergency anaesthesia indication:			
• Airway compromise, *n* (%)	14 (25)	11 (20)	0.38
• Ventilatory failure, *n* (%)	7 (13)	7 (13)	
• Unconscious, *n* (%)	23 (42)	31 (56)	
• Agitated/unmanageable, *n* (%)	6 (11)	5 (9)	
• Other, *n* (%)	5 (9)	1 (2)	

Outcome measures	Pre-PPE, *n* (%)	Post-PPE, *n* (%)	Odds ratio (95% CI)	P-value
First pass intubation success	50/55 (91)	48/55 (87)	0.63 (0.18–2.19)	0.47
≥2 Intubation attempts	5/55 (9)	6/55 (11)	1.51 (0.41–5.54)	0.53
Rescue technique (LMA, BVM)	2/55 (4)	4/55 (7)	1.95 (0.33–11.4)	0.46
Complications (hypotension, hypoxaemia, or both)	24/55 (44)	20/55 (36)	0.76 (0.35–1.66)	0.50
Job timings (min)	**Pre-PPE, mean (SD)**	**Post-PPE, mean (SD)**	**Mean difference (95% CI)**	**P-value**
Calling 999 to pre-hospital emergency anaesthesia	68.0 (21.8)	75.2 (22.1)	7.2 (−1.1 to 15.4)	0.09
Patient's side to pre-hospital emergency anaesthesia	27.2 (9.5)	30.8 (11.6)	3.4 (−0.7 to 7.5)	0.11
Pre-hospital emergency anaesthesia to hospital arrival	44.0 (17.3)	40.4 (14.8)	−3.5 (−9.8 to 2.8)	0.27
Hospital arrival to available	15.5 (9.0)	25.8 (14.1)	10.4 (5.8–15.0)	< 0.001
Total job cycle	112.3 (20.8)	124.9 (22.6)	12.8 (4.4–21.2)	0.003

Anonymised data from 110 consecutive pre-hospital emergency anaesthesia cases (55 pre-PPE and 55 post-PPE introduction) were available for analysis during the study period. Complete datasets were collected for:

- Baseline patient characteristics: age, sex, trauma/medical case, indication.
- Patient safety outcome measures: first pass intubation success, airway rescue techniques, and complications (namely hypoxaemia [SpO_2 <90%] and hypotension [SBP <90 mm Hg]).[5]
- Key timings (999 call to patient side, 999 call to pre-hospital emergency anaesthesia, pre-hospital emergency anaesthesia to hospital, hospital arrival to available, and total job cycle duration).

Baseline patient characteristics were statistically similar between groups except patient age (Table 1). Outcome variables were analysed with adjustment for the mean age difference. All patients were successfully intubated during the study period without the need for front-of-neck-access. Table 1 shows the patient-related outcome measures and job timings for the two groups. There was no statistical difference in patient safety outcome measures or key patient-centred time points during the study period after PPE introduction. Times from arrival at hospital to being available and total job cycle duration were significantly longer after enhanced PPE introduction.

The introduction of enhanced PPE and temporary removal of apnoeic oxygenation in response to the COVID-19 pandemic did not appear to significantly impact on the safety of pre-hospital emergency anaesthesia or key patient-centred time points. Despite the challenges of a changeable pre-hospital environment and undifferentiated high acuity case mix, the first pass success and rate of complications reported during pre-hospital emergency anaesthesia at EHAAT compared favourably with previous in-hospital data predating the need for enhanced PPE.[6] From an organisational perspective, there were significant time delays related to the required decontamination and doffing routines. Limitations of this study include its retrospective nature that could introduce data extraction biases, convenience sample size, and single-centre design, all of which could limit the generalisability of these findings. This study provides some reassurance that enhanced PPE does not appear to impact on the quality of care delivered by an air ambulance service with rigorous training and governance.

Declaration of interest

The authors declare that they have no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.bja.2022.07.006.

References

1. Sherren PB, Ostermann M, Agarwal S, Meadows CIS, Ioannou N, Camporota L. COVID-19-related organ

dysfunction and management strategies on the intensive care unit: a narrative review. *Br J Anaesth* 2020; **125**: 912–5
2. El-Boghdadly K, Wong DJN, 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. Odor PM, Neun M, Bampoe S, et al. Anaesthesia and COVID-19: infection control. *Br J Anaesth* 2020; **125**: 16–24
4. Poller B, Tunbridge A, Hall S, et al. High Consequence Infectious Diseases Project Working Group. A unified personal protective equipment ensemble for clinical response to possible high consequence infectious diseases: a consensus document on behalf of the HCID programme. *J Infect* 2018; **77**: 496–502
5. King C, Lewinsohn A, Keeliher C, et al. Cardiovascular complications of prehospital emergency anaesthesia in patients with return of spontaneous circulation following medical cardiac arrest: a retrospective comparison of ketamine-based and midazolam-based induction protocols. *Emerg Med J* 29 September 2021. https://doi.org/10.1136/emermed-2020-210531
6. Simpson GD, Ross MJ, McKeown DW, Ray DC. Tracheal intubation in the critically ill: a multi-centre national study of practice and complications. *Br J Anaesth* 2012; **108**: 792–9

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Association between long-term opioid use and cancer risk in patients with chronic pain. Comment on *Br J Anaesth* 2022; 129: 84–91

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Keywords: analgesics; cancer risk; chronic pain; defined daily dose; opioids

Editor—We read with great interest the article by Sun and colleagues[1] reporting that patients with chronic pain and long-term opioid use had an increased risk for development of cancer. We would like to highlight some key points regarding their study.

Firstly, chronic pain was defined from diagnosis of osteoarthritis, spinal disorders, peripheral vascular disease, osteoporosis, gout, headache, diabetic neuropathy, rheumatoid arthritis, pressure ulcer, or herpes zoster. We have questions about the validity of this chronic pain definition, because chronic pain was usually diagnosed by self-reported symptoms or questionnaires, along with numerical rating scale (NRS) or visual analogue scale (VAS) to assess the pain amplitude.[2] There are more conditions accompanied by chronic pain, such as depression,[3] osteoarthritis,[4] or fibromyalgia,[5] which were not included in the analysis. This could lead to possible selection bias.

Secondly, the pain scale was not analysed. On average, patients should have oral tramadol 150 mg, codeine 120 mg, oxycodone 37.5 mg, hydromorphone 10 mg or morphine 50 mg daily to achieve 180 defined daily doses (DDDs) in 1 yr to be enrolled in the case group.[6] If the case group had a fentanyl patch, the dose should be 25 μg h^{-1} daily. Compared with non-cancer pain, the case group might have complicated pain and mood issues. Because pain itself is associated with cancer incidence and lower cancer survival,[7] we suggest that the pain scale should be analysed as a confounding factor in multivariate analysis or as a subgroup in stratified analysis.

Thirdly, previous studies have identified multiple determinants affecting the incidence of cancer, such as depression,[8] anxiety,[8] insomnia, exercise,[9] and certain medications. For instance, NSAIDs have anticancer effects and thus might affect the outcome.[10] Although residual confounders exist, evaluating confounding factors is difficult in the current research design as: (1) the study was not fully reported with respect to Strengthening The Reporting of OBservational Studies in Epidemiology (STROBE) guidelines; (2) propensity score-matched design was used; and (3) there were relatively few cancer events. We suggest that the authors should consider these important risk factors to minimise residual confounders.

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