

precluded airway management but performed remarkably well in reducing aerosol egress.

To find solutions that truly improve safety, we need sound engineering solutions that are acceptable to users and patients and validated through rigorous testing protocols rooted in scientific principles. These solutions take time, expertise and multidisciplinary collaboration, the Simpson et al. article being an excellent example. Our front-line healthcare workers and patients deserve nothing less.

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No competing interests declared.

## References

1. Simpson JP, Wong DN, Verco L, Carter R, Dzidowski M, Chan PY. Measurement of airborne particle exposure during simulated tracheal intubation using various proposed aerosol containment devices during the COVID-19 pandemic. *Anaesthesia* 2020; **75**: 1587–95.
2. Rafat A. Effect of ventilation strategies on infection control inside operating theatres. *Engineering Applications of Computational Fluid Mechanics* 2010; **4**: 1–6.

doi:10.1111/anae.15227

## A survey on burnout and depression risk among anaesthetists during COVID-19: the tip of an iceberg?

The recent article by Heath et al. [1] is a timely one, which addresses the need for solutions to minimise the adverse psychological impact of the COVID-19 pandemic. In the midst of this public health crisis, anaesthetists are at the frontline of the 'war' against the virus, and hence at great risk of suffering from mental and emotional harm, akin to a 'parallel pandemic' [2]. Due to the nature of the work of anaesthetists in managing patients in acute and critical care, with special emphasis on airway management and ventilatory support, their work-load worldwide has increased during the pandemic, predisposing to burnout. Also, as the clinicians responsible for airway management, anaesthetists are among those at greatest risk of contracting COVID-19 [3], and with this risk comes worry and anxiety, contributing to further psychological distress. In view of the multiple psychological challenges faced by anaesthetists worldwide, we sought to define the problem by investigating the prevalence of burnout and depression risk among anaesthetists in a nationally designated exclusive COVID-19 hospital.

In May 2020, we performed a cross-sectional survey of all clinicians in the anaesthesia department of the national infectious disease centre of Malaysia. This centre had been officially redeployed to receive only COVID-19 patients from March 2020 [4]. Ethical approval was obtained from the Medical Research Ethics Committee of the Ministry of Health, Malaysia. Written informed consent was obtained from all participants. Validated questionnaires were then

used to assess burnout (Maslach Burnout Inventory) and depression risk (2-item PRIME-MD). We also evaluated subjects' worry of COVID-19, using a numerical rating scale (NRS), where 0 was 'not worried at all' and 10 was 'the worst worry possible'.

Out of 88 anaesthetists working in the anaesthesia and intensive care departments, 85 (96.6%) agreed to participate and returned a completed form (Table 1). During the COVID-19 pandemic, 44 (51.8%) participants were working more than 50 h per week, and 59 (69.4%) were on call at least twice a week. Up to 80 (94.1%) subjects handled COVID-19 patients daily. Twenty-seven (31.8%) participants reported high emotional exhaustion, 40 (47.1%) had high depersonalisation and 54 (63.5%) had low personal accomplishment. Overall, 47 (55.3%) anaesthetists were classified as having burnout based on high scores in the emotional exhaustion and/or depersonalisation indices, while 57 (67.1%) demonstrated a depression risk. Up to 34 (40%) subjects reported having major worry (score 8–10) regarding COVID-19, with all subjects having a median (IQR [range]) score of 7 (5–8 [1–10]). Unsurprisingly, burnout and depression risk were significantly associated with each other ( $p < 0.0001$ ). Both burnout and depression risk were associated with number of calls per week ( $p = 0.038$  and  $p = 0.026$ , respectively) and worry regarding COVID-19 ( $p = 0.014$  and  $p = 0.044$ , respectively).

Burnout and depression are prevalent among anaesthetists, possibly associated with increased work-load

and the worry of COVID-19. This is just the tip of an iceberg, one that represents a terrifying picture in terms of the adverse consequences of long-term psychological harm. Potential interventions can be classified into four main categories: physician level; organisation level; national level; and international level. As a first step, efforts should be made to educate the anaesthetic community on burnout and depression. Recognition of the problem is the first step, and as more and more anaesthetists recognise the high

**Table 1** Characteristics of the 85 respondents who completed the questionnaire, and the results. Values are median (IQR [range]), number (proportion) or mean (SD)

Age; y	31 (28–36 [27–58])
Sex; female	54 (63.5%)
Anaesthetic experience; y	3 (1–8 [1–30])
Anaesthesia training level	
Medical officer	62 (72.9%)
Consultant	23 (27.1%)
Hours of work per week	
< 50	41 (48.2%)
50–59	22 (25.9%)
60–69	22 (25.9%)
No of 'on calls' per week	
0–1	26 (30.6%)
≥ 2	59 (69.4%)
Frequency of handling COVID-19 patients	
Daily	80 (94.1%)
Weekly or monthly	5 (5.9%)
Burnout indices	
Emotional exhaustion <sup>a</sup>	
Mean (SD)	21.35 (9.9)
Low	29 (34.1%)
Intermediate	29 (34.1%)
High	27 (31.8%)
Depersonalisation <sup>b</sup>	
Mean (SD)	8.74 (4.9)
Low	18 (21.2%)
Intermediate	27 (31.8%)
High	40 (47.1%)
Personal accomplishment <sup>c</sup>	
Mean (SD)	29.2 (7.4)
Low	54 (63.5%)
Intermediate	23 (27.1%)
High	8 (9.4%)
Burnout	
Yes	47 (55.3%)
No	38 (44.7%)

(continued)

Depression risk	
Yes	57 (67.1%)
No	28 (32.9%)

Worry about COVID-19 <sup>d</sup>	
Median (IQR [range])	7 (5–8 [1–10])
Mild	11 (12.9%)
Moderate	40 (47.1%)
Major	34 (40.0%)

<sup>a</sup>Emotional exhaustion scoring: low < 18, intermediate 18–26, high ≥ 27. Higher score denotes higher degree of burnout.

<sup>b</sup>Depersonalisation scoring: low ≤ 4, intermediate 5–9, high ≥ 10. Higher score denotes higher degree of burnout.

<sup>c</sup>Personal accomplishment scoring: low ≤ 32, intermediate 33–39, high ≥ 40. Lower score denotes higher degree of burnout.

<sup>d</sup>Worry about COVID-19 stratified based on: Mild (scores 0–4), Moderate (scores 5–7), Major (scores 8–10).

prevalence of burnout and depression, and understand the impact on their work and personal life, they will be willing to seek help voluntarily. At an organisation level, leaders and employers should take steps to perform regular assessments once or twice a month to detect burnout and depression among their staff. A chief wellness officer at executive level could be appointed, with the task of overseeing the detection and management of those with burnout and depression, in addition to taking preventative steps in the department. A good work-life balance should also be encouraged by those with the authority to make decisions. The role of peer support groups should also be emphasised, allowing those with prior experience to help their colleagues. On a national level, policymakers should focus on appropriate funding for mental health programmes. In addition, appropriate financial remuneration should be considered for those putting their lives at risk to save patients with COVID-19. An international collaboration should also be initiated by the world health bodies to share information and practices that can improve clinicians' well-being during the pandemic.

The results of our survey demonstrate the unique and challenging circumstances anaesthetists worldwide find themselves in during the COVID-19 pandemic. There is still much to be done to improve the resilience of anaesthetists to counter this 'parallel pandemic', and contributions from all stakeholders are urgently needed before the situation worsens.

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The study was prospectively registered on the ClinicalTrials.gov registry (NCT04362319). We thank the Director General of Health, Malaysia, for his permission to publish this article. No competing interests declared.

**References**

1. Heath C, Sommerfield A, von Ungern-Sternberg BS. Resilience strategies to manage psychological distress amongst healthcare workers during the COVID-19 pandemic: a narrative review. *Anaesthesia* 2020; **75**: 1364–71.
2. Dzau VJ, Kirch D, Nasca T. Preventing a parallel pandemic—a national strategy to protect clinicians’ well-being. *New England Journal of Medicine* 2020; **383**: 513–5.
3. Meng L, Qiu H, Wan L, et al. Intubation and ventilation amid the COVID-19 outbreak: Wuhan’s experience. *Anesthesiology* 2020; **132**: 1317–32.
4. Ram BS. Health Ministry ready to face surge in Covid-19 cases. *New Straits Times* 9 March 2020. <https://www.nst.com.my/news/nation/2020/03/573205/health-ministry-ready-face-surge-covid-19-cases> (assessed 19/04/20).

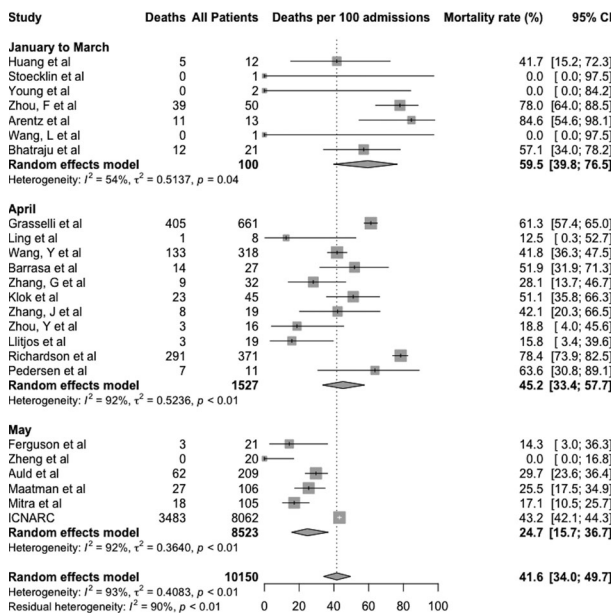
doi:10.1111/anae.15231

# Decreasing mortality rates in ICU during the COVID-19 pandemic

We would like to thank the readers of *Anaesthesia* for their interest in our recent systematic review and meta-analysis of intensive care unit (ICU) mortality in patients with COVID-19, in which we found that reported mortality rates have fallen as the pandemic has progressed [1]. The process of post-publication peer review has highlighted that we could have

presented the changes in mortality rate over time more clearly.

Combined ICU mortality (95%CI) was 59.5% (39.8–76.5%) in studies published before the end of March 2020 and 41.6% (34.0–49.7%) for all included studies to the end of June 2020. Figure 1 was not included in the original published manuscript or supplementary material, but we include it here to provide a clear illustration of the reported mortality rate for completed intensive care admissions over the course of the pandemic.



**Figure 1** Forest plot of ICU COVID-19 deaths per 100 completed intensive care admissions, grouped by month of publication (January to March, April, May), and combined. Values are proportions (95%CI).

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**Reference**

1. Armstrong RA, Kane AD, Cook TM. Outcomes from intensive care in patients with COVID-19: a systematic review and meta-analysis of observational studies. *Anaesthesia* 2020; **75**: 1340–9.

doi:10.1111/anae.15230