

Timing of surgery following SARS-CoV-2 infection: country income analysis

Our analysis of the optimal timing of surgery following SARS-CoV-2 infection was based on data for 140,231 patients from across 116 countries [1]. Postoperative mortality rates are higher in low- and middle-income countries (LMICs) than in high-income countries (HICs) [2, 3], so the relationship between SARS-CoV-2 infection status and mortality could be confounded by country income. Therefore, we included country income (high vs. low/middle) as a factor in our adjusted models.

Drs Lobo and Devys [4] suggest that a further sub-group analysis by country income would be helpful in order to ensure our findings are robust across all settings. We have produced sub-group analyses by country income replicating the methodology of the original analysis [1]. Overall mortality was lower in HICs than in LMICs; 1116/91,458 (1.22%) vs. 1035/48,679 (2.13%), respectively, $p < 0.001$. Mortality was higher in patients with pre-operative SARS-CoV-2 infection than in patients who did not have SARS-CoV-2 infection in both HICs 68/1450 (4.69%) vs. 1048/90,008 (1.16%), $p < 0.001$ and LMICs 110/1675 (6.57%) vs. 925/47,004 (1.97%), $p < 0.001$. Adjusted mortality rates in patients in HICs and LMICs with pre-operative SARS-CoV-2 infection were lowest in those patients whose diagnosis was ≥ 7 weeks before surgery (Table 1).

These country income sub-group analyses indicate that our recommendation that, whenever possible, surgery should be delayed for at least 7 weeks following SARS-CoV-2 infection is applicable to both HICs and LMICs.

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References

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Table 1 Unadjusted and adjusted 30-day postoperative mortality rates by country income sub-group. Values are proportion (fraction) or adjusted mortality rate (95%CI).

Pre-operative SARS-CoV-2 by timing of pre-operative diagnosis	Unadjusted mortality rates ^a		Adjusted mortality rates (95%CI) ^b	
	High-income countries	Low- and middle-income countries	High-income countries	Low- and middle-income countries
No diagnosis	1.16% (1048/90,008)	1.97% (925/47,004)	1.18% (1.11–1.25%)	2.01% (1.89–2.13%)
0–2 weeks	8.03% (37/461)	9.90% (67/677)	3.31% (2.29–4.34%)	5.57% (4.30–6.85%)
3–4 weeks	6.92% (11/159)	6.95% (21/302)	4.29% (1.99–6.60%)	4.60% (2.76–6.45%)
5–6 weeks	6.67% (9/135)	4.71% (9/191)	5.54% (2.38–8.71%)	3.35% (1.27–5.43%)
≥ 7 weeks	1.58% (11/695)	2.57% (13/505)	1.23% (0.53–1.93%)	2.02% (0.96–3.08%)

^aMortality data were missing in high-income countries for 76 patients with no SARS-CoV-2 diagnosis and 1 patient with SARS-CoV-2 diagnosis at ≥ 7 weeks; and in low- and middle-income countries for 16 patients with no SARS-CoV-2 diagnosis and 1 patient with SARS-CoV-2 diagnosis at ≥ 7 weeks.

^bModel adjusted for age; sex; ASA physical status; revised cardiac risk index; respiratory comorbidity; indication for surgery; grade of surgery; and urgency of surgery. Full unadjusted and adjusted models are presented in online Supporting Information Tables S1 and S2.

2. Nepogodiev D, Martin J, Biccard B, et al. Global burden of postoperative death. *Lancet* 2019; **393**: 401.
3. GlobalSurg Collaborative and National Institute for Health Research Global Health Research Unit on Global Surgery. Global variation in postoperative mortality and complications after cancer surgery: a multicentre, prospective cohort study in 82 countries. *Lancet* 2021; **397**: 387–97.
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Supporting Information

Additional supporting information may be found online via the journal website.

Table S1. Unadjusted and adjusted model for 30-day postoperative mortality in high-income countries. Values are OR (95%CI).

Table S2. Unadjusted and adjusted model for 30-day postoperative mortality in low- and middle-income countries. Values are OR (95%CI).

Appendix S1. CovidSurg Collaborative, GlobalSurg Collaborative writing group.

A 20-minute decision-delivery interval at caesarean section using general anaesthesia

We read with interest the editorial by Kinsella [1] and agree that some babies require delivery by caesarean section sooner than the 30-min decision-delivery audit standard. Kinsella has argued that in extreme cases, this interval should be reduced to 20 min using general anaesthesia. Any new initiative aimed at improving timely delivery of the at-risk fetus is to be applauded, but we have several concerns about the practical application of this standard and its implications for clinical practice.

Kinsella has pointed out that when a fetus becomes compromised, the relevant interval to delivery begins with the moment that severe and irreversible disruption of placental function or fetal circulation starts, and there is evidence that a poor outcome is probable if this interval is longer than 20 min. Unfortunately, in many cases, this event is not documented and/or may not coincide with the time that an obstetrician makes the decision to deliver, so the pathophysiological rationale for a 20-min decision-delivery interval is weakened.

Kinsella has argued that this standard should be reserved for cases of severe and irreversible compromise of placental function (e.g. placental abruption). However, many extreme cases can only be identified after the event has occurred, not before. As Kinsella has stated, obstetricians often overestimate the degree of urgency [2], and we believe this standard will inevitably come to be considered a new category of urgency and is likely to be over-used. We do not share Kinsella's confidence that this will not increase the number of general anaesthetics given.

The standard mandates the use of general anaesthesia and therefore, with time, obstetricians will come to expect (and demand) a general anaesthetic for the most urgent cases (many of which will have been overcalled), and general anaesthesia will eventually become a standard of care. It is surprising that Kinsella is arguing for this when he has previously advocated use of the "rapid sequence spinal" for category-1 caesarean sections [3]. The National Institute for Health and Care Excellence guidance states that category-1 caesarean sections should be performed as soon as possible but does not specify whether regional or general anaesthesia should be used, and notes that rapid birth can be harmful in certain circumstances [4]. In 2018, a report from the Royal College of Obstetricians and Gynaecologists suggested the mother "should not be put at risk of airway problems through inadequate preparation/positioning due to haste to achieve rapid delivery" [5]. We are concerned that introduction of this standard will hand autonomy to make decisions about the mode of anaesthesia from the anaesthetist to the obstetrician and will increase the use, and complications, of general anaesthesia.

When one of the authors started training in obstetric anaesthesia, giving a general anaesthetic to an obstetric patient resulted in an in-depth case review the next day and had to be robustly justified. Will it really increase the safety of obstetric anaesthesia if future generations are required to defend a regional anaesthetic given for an emergency caesarean section?