

# Did operating theatre staff understand the COVID-19 guidelines for surgery during Victoria's second wave?

## Introduction

The coronavirus disease 2019 (COVID-19) impacts surgical flow and work practices in the operating theatre (OT). These arise from the greater risk of morbidity and mortality to patients<sup>1</sup> as well as the potential for transmission to perioperative healthcare workers.<sup>2</sup>

The Victorian Department of Health and Human Services (DHHS) perioperative COVID-19 guidelines<sup>3</sup> have been developed and revised by a multidisciplinary COVID-19 personal protective equipment (PPE) taskforce since April 2020.<sup>4</sup> The taskforce has visibility of supply and demand as well as the need to generally update and align its recommendations with national guidelines.<sup>5</sup> Individual hospitals have also made modifications responding to their local circumstances, often increasing PPE requirements beyond taskforce guidance.

Since the first case of COVID-19 was reported in Australia on 25 January 2020<sup>6</sup> to 6 September, DHHS infection control guidelines were updated five times.<sup>3</sup> During this time, the University Hospital Geelong (UHG) updated their perioperative COVID-19 guidelines six times, whilst Epworth Geelong (EG) and St John of God (SJOG) private hospitals changed theirs 10 and eight times, respectively. Perioperative staff found the frequent changes confusing<sup>7</sup> and also reported difficulties in accessing a single, consistent source of information.<sup>8</sup>

This study aimed to survey OT workers' understanding of perioperative COVID-19 guidelines.

## Methods

At the time of the survey performed over a week from 31 August, there were 50 active cases (eight healthcare workers) in the Greater Geelong Region and 2620 active cases in Victoria.<sup>9</sup> UHG had seven COVID-19-positive inpatients with one in intensive care whilst the private hospitals had none, but previously treated suspected cases.

The survey (Tables 1,2) involved an opportunistic sample of 188 perioperative staff across the three hospitals: UHG (116), SJOG (41) and EG (31). Participants were asked to provide answers relevant to the site at which they were completing the questionnaire. Four COVID-19 screening questions and nine clinical scenarios were used to assess PPE understanding. The answers were anonymized and marked independently using the current guidelines at the relevant hospital where the survey was conducted.

Statistical analyses were performed with non-categorical data and compared using a Kruskal–Wallis test assuming homoscedasticity of data. Categorical data were compared using a chi-squared matrix.

Differences were deemed statistically significant at  $P < 0.05$  level. Statistical analyses were completed using MedCalc for Windows version 9.6 (MedCalc, Ostend, Belgium). Ethical approval was obtained from the Barwon Health's Human Research and Ethics Committee.

## Findings

The 188 staff members comprised 89 nurses, 24 surgeons, 26 surgical registrars, 26 anaesthetists and 13 anaesthetics registrars, with 43% having greater than 10 years' OT experience. Those surveyed had worked an average of 4.0 days per week in August with 84 participants (44.7%) working at more than one hospital.

Knowledge of the current perioperative COVID-19 guidelines was poor. All patients undergoing surgery required preoperative COVID-19 testing; however, only 67% answered all four patient scenarios correctly. Only 18% of participants correctly identified all procedures that were classified as aerosol-generating procedures at their respective hospitals. Despite there being no difference between daily PPE requirements at hospitals, knowledge for both tier 2 and 3 requirements was still poor (52% and 69%, respectively). Only EG implemented the requirement for a theatre 'resting time' between intubated patients and collective understanding of permitted activities during this time ranged from 25% to 80% (Table 1).

Answers to the nine clinical scenarios ranged from 35% to 98% correct, with poorer performance on the more discriminatory questions and only 26 (13.8%) correct for all nine (Table 2).

Participants reported the most common sources of PPE information were hospital email communication (27.7%), informal conversations with colleagues (25%) and theatre managers (20.1%). Only four (2%) participants currently accessed the DHHS website, whilst eight (4%) read their hospital intranet. A median of 1 day (range 0–30 days) had passed since last accessing their primary source of information. Nurses had accessed their primary source of information more recently than doctors ( $P < 0.05$ ) (Fig. 1).

Doctors stated that their preferred source of information was email (48.5%) and written material in theatre (15.2%). Nurses stated their preferred source of information was theatre managers (47.2%) and group mobile messages (12.4%), representing a significant difference between the groups ( $P < 0.05$ ) (Fig. 2).

When asked about the difficulty in keeping track of different perioperative guidelines, those working in multiple sites rated a median of 7 out of 10 for difficulty and all would have preferred standardized guidelines for all hospitals.

**Table 1** Participant responses compared to perioperative COVID-19 guidelines as of 31 August 2020

Perioperative situation	Number of participants who answered correctly	Correct answer as per perioperative guideline			
		DHHS	UHG	SJOG	EG
<b>Preoperative COVID-19 screening</b>					
Elective surgery patient: asymptomatic for COVID-19	178 (94.7%)	All patients (asymptomatic and symptomatic for COVID-19) required preoperative COVID-19 swab (all elective and emergency procedures)			
Elective surgery patient: symptomatic for COVID-19	183 (97.3%)				
Emergency surgery patient: asymptomatic for COVID-19	132 (70.2%)				
Emergency surgery patient: symptomatic for COVID-19	162 (86.2%)				
All answers correct	126 (67%)				
<b>Procedures classified as AGPs</b>					
Laparoscopic cholecystectomy	111 (59.0%)	N	N	N	N
Open appendicectomy	123 (65.4%)	N	N	N	N
Endotracheal intubation	184 (97.9%)	Y	Y	Y	Y
Endotracheal extubation	182 (96.8%)	Y	Y	Y	Y
Laryngeal mask airway	173 (92.0%)	Y	Y	Y	Y
Colonoscopy	139 (73.9%)	N	N	N	N
Gastroscopy	76 (40.4%)	N	N	Y	Y
Excision of a left cheek BCC under local anaesthetic	156 (83.0%)	N	N	N	N
All answers correct	34 (18.0%)				
<b>PPE requirements for tier 2 precautions</b>	98 (52.1%)	Hand hygiene, disposable gloves, disposable gown, eye protection and surgical mask			
<b>PPE requirements for tier 3 precautions</b>	130 (69.1%)	Hand hygiene, disposable gloves, disposable gown, eye protection and P2/N95 respirator			
<b>Requirement for theatre 'resting time' required between intubated patients</b>	161 (85.6%)	30 min	None	None	14 min
<b>If applicable: during theatre 'resting time'<sup>†</sup></b>					
Permitted to move a patient to recovery	25 (80.6%)	Y	N/A	N/A	Y
Permitted to begin case within the 'resting' period with tier 3 precautions	8 (25.8%)	N			N

<sup>†</sup>Participants were asked to answer the question only if it is applicable to their institution.

AGP, aerosol-generating procedure; BCC, Basal cell carcinoma; COVID-19, coronavirus disease 2019; DHHS, Department of Health and Human Services; EG, Epworth Geelong; PPE, personal protective equipment; SJOG, St John of God; UHG, University Hospital Geelong.

**Table 2** Participant responses to clinical scenarios compared to perioperative COVID-19 guidelines as of 31 August 2020

Clinical scenario	COVID-19 screen <sup>†</sup>	COVID-19 swab result	Number of participants who answered correctly	Tier of PPE required as per guidelines			
				DHHS	UHG	SJOG	EG
Confirmed COVID-19 positive	N/A	Positive	184 (97.9%)	3	3	3	3
Gastroscopy	Negative	Negative	111 (59.0%)	2	2	3	3
Colonoscopy	Negative	Negative	160 (85.1%)	2	2	2	2
Elective open anterior resection	Negative	Negative	155 (82.4%)	2	2	2	2
Emergency laparoscopic appendicectomy	Negative	Negative	152 (80.9%)	2	2	2	2
Emergency laparoscopic appendicectomy	Negative	Pending	122 (64.9%)	2	2	3	3
Emergency laparoscopic appendicectomy (fever only)	Positive	Negative	116 (61.7%)	2	2	2	2
Emergency laparoscopic appendicectomy (cough only)	Positive	Negative	66 (35.1%)	2	2	2	2
Emergency laparoscopic appendicectomy (cough only)	Positive	Pending	169 (89.9%)	3	3	3	3
<b>All answers correct</b>	26 (13.8%)						

<sup>†</sup>COVID-19 screening questionnaire as per DHHS guidelines.<sup>3</sup>

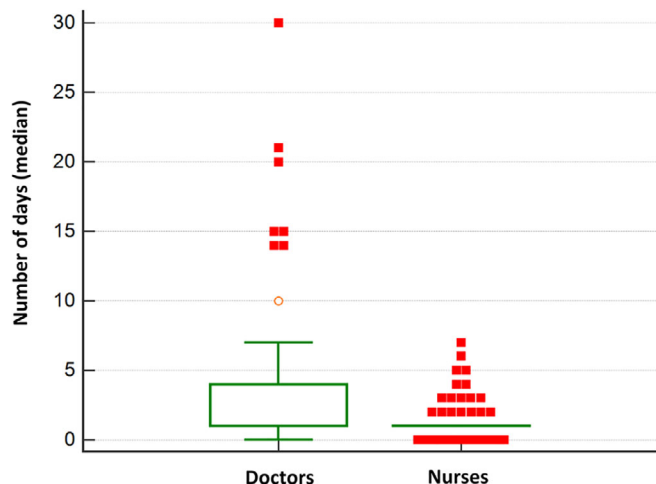
COVID-19, coronavirus disease 2019; DHHS, Department of Health and Human Services; EG, Epworth Geelong; PPE, personal protective equipment; SJOG, St John of God; UHG, University Hospital Geelong.

## Conclusion and recommendations

The responses indicate that the current perioperative guidelines were not effectively conveyed to, nor understood by OT staff, despite how recently staff had accessed their primary information source.

We make four recommendations:

- (1) Guidelines should be consistent between hospitals within geographical regions or cluster, especially for mobile staff.
- (2) Guidelines should be conveyed through a weekly, succinct email.



**Fig 1.** Participants time since last accessing primary source of perioperative coronavirus disease 2019 guidelines. circle: mild outliers (observations between the inner and outer fence). square: extreme outliers (beyond the outer fence).

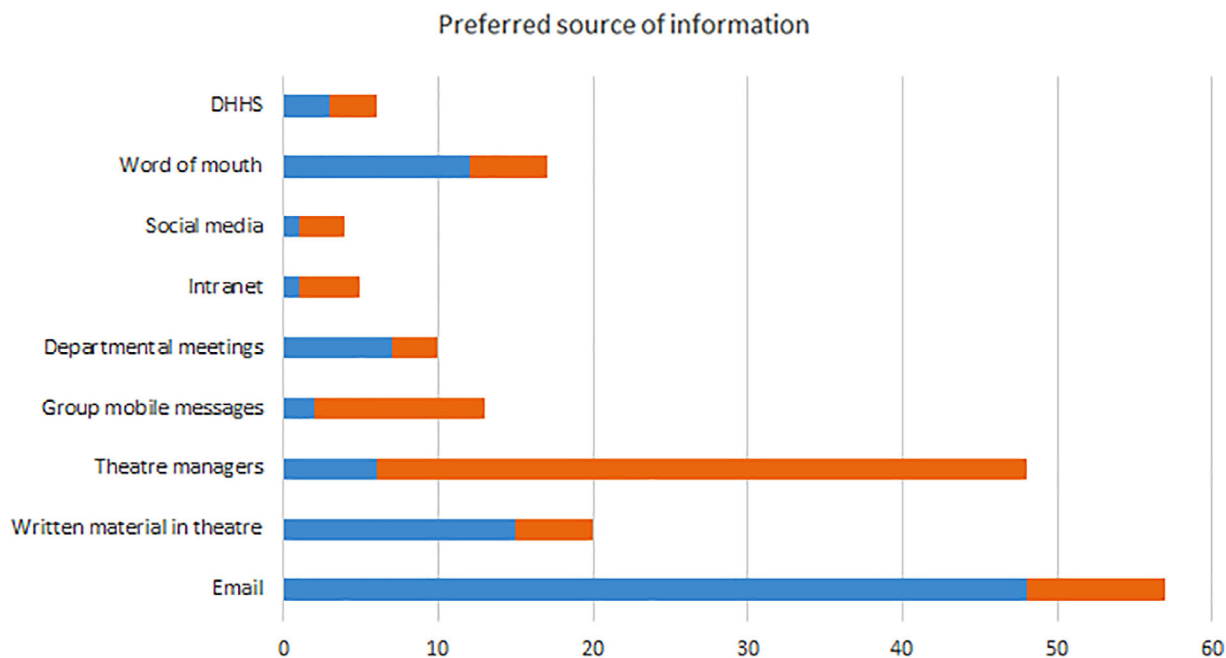
- (3) Current guidelines should be clearly displayed in the form of an up-to-date poster within each theatre.
- (4) The perioperative team should include the current PPE requirements at the start of each operating list during the team brief.

## Acknowledgements

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## Author Contributions

**Emma Downie:** Conceptualization; data curation; formal analysis; methodology; writing-original draft. **Steve Lau:** Formal analysis; writing-original draft; writing-review and editing. **Geelong Surgical COVID-19 Response Team:** Conceptualization; data curation; investigation; validation. **Douglas Stupart:** Formal analysis; methodology; supervision; writing-review and editing. **Richard Page:** Project administration; supervision; writing-original draft; writing-review and editing. **Sonal Nagra:** Data curation; methodology; project administration; supervision; writing-original draft; writing-review and editing. **David Watters:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; supervision; validation; writing-original draft; writing-review and editing. **Glenn Guest:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; supervision; writing-original draft; writing-review and editing. **Henry Drysdale:** Conceptualization; data curation; formal analysis; investigation; methodology;



**Fig 2.** Doctors (■) and nurses' (■) preferred source of perioperative coronavirus disease 2019 guidelines.

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## Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Appendix S1.** Questionnaire.

**Appendix S2.** Members of the Geelong Surgical COVID-19 Response Team include: Dr Will Anderson, Dr Tess Asgill, Dr Pia Bernadi, Dr Elliot Bowden, Ms Brydie Clark, Dr Jessie Cole, Mr Simon Crowley, Dr Jordy Dangen, Dr Emma Downie, Dr Henry Drysdale, Ms Joanne Eaton, Professor Glenn Guest, Ms Sneha Kommidi, Dr Steve Lau, Dr Yit Leang, Dr Ellen McMahon, Dr Eileen Mary Moore, Mr Sonal Nagra, Ms Phoebe Niven, Dr Sally Ooi, Dr Bushra Othman, Professor Richard Page, Mr Vishwakar Panuganti and Dr Sam Pellegrino.

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