








ORIGINAL ARTICLE

‘Code-95’ rapid response calls for patients under airborne precautions in the COVID-19-era: a cross-sectional survey of healthcare worker perceptions

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Key words

Code-95 call, rapid response system, medical emergency team, healthcare worker, personal protective equipment, COVID-19.

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Abstract

Background: To allow better allocation of staff and resources, rapid response teams attending to acutely deteriorating or aggressive patients with suspected or confirmed COVID-19 infection were pre-warned with the announcement of ‘Code-95’ with calls.

Aim: To assess healthcare worker (HCW) perspectives on pre-warning rapid response calls (RRC) with ‘Code-95’ in announcements when attending to deteriorating or aggressive patients with suspected/confirmed COVID-19 infection.

Methods: Design: prospective cross-sectional single-centre survey of HCW over a 3-week period. Setting: tertiary public hospital. Participants: HCW caring for deteriorating or aggressive patients. Main outcome measures: the primary outcome was to assess HCW perspectives in attending Code-95 calls. Secondary outcomes were to identify any differences related to craft group, age, experience or presence of comorbidities.

Results: A total of 297 responses was analysed; 86.7% of HCW ($n = 257$) attending Code-95 calls reported anxiety. Medical staff reported greater anxiety in comparison to nursing staff (93.8% vs 78.5%; $P = 0.002$). Efferent team reported higher anxiety in contrast to afferent team (92.6% vs 58.8%; $P = 0.021$). There was no significant difference in perceived anxiety based on age (≤ 40 vs > 40 years of age), years of experience (≤ 5 vs > 5 years), comorbidities or mental illness; 54% reported concerns about adequacy of infection-control policies and personal protective equipment; 45% were worried about inadequate training for responding to Code-95 calls.

Conclusions: Most surveyed HCW supported Code-95 announcements pre-warning them of potential COVID-19 exposure when attending a RRC. However, the majority of HCW reported anxiety when attending these calls. Medical and efferent team HCW perceived greater anxiety compared to nursing and afferent team HCW. The Code-95 system to pre-warn rapid response teams may be a useful addition to protecting HCW from infectious diseases, although broader implementation will require greater resourcing, training and support.

Introduction

Rapid response systems (RRS) have become standard of care in most healthcare organisations. These systems are designed to identify deteriorating patients and enable appropriate and timely care. Such systems involve recognition and timely activation of rapid response calls (RRC) by

the home team (defined as the ‘afferent team’) and appropriate response by adequately trained and equipped medical emergency team (MET, defined as the ‘efferent team’).¹ There is variance in rapid response team (RRT) nomenclature² and composition³ across the world; however, a ‘Code Blue’ response is generally reserved for patients in life-threatening situations who require immediate resuscitation. Many countries including Australia have

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mature RRS, which allow for early detection of clinical deterioration.⁴ In addition, many healthcare facilities have aggression management team (AMT) systems to respond to actual or perceived threat to safety of healthcare workers (HCW), patients or visitors.

The ongoing COVID-19 global pandemic and most recently, the second-wave outbreak in Victoria,⁵ has rapidly and significantly altered many aspects of clinical practice. The RRT and AMT members responding to clinically deteriorating patients with suspected or confirmed COVID-19 infection may be at greater risk for contracting severe COVID-19 infection due to their own comorbidities or age. Based on the International Society of Rapid Response Systems recommendations,⁶ our hospital, developed and implemented a 'Code-95'-labelled announcement system to alert HCW responding to deteriorating or aggressive patients with suspected or confirmed COVID-19 infection. The purpose of the Code-95 system was to allow for timely and optimal patient management when attending calls, in particular the ready access to trolleys with dedicated personal protective equipment (PPE; including N95 masks) and staff support on wards.

There is sparse scientific evidence to demonstrate the feasibility and functionality of such a system. Using a cross-sectional anonymous survey study design, we aimed to investigate local experience with regards to organisational and clinical issues and study any personal implications as a result of Code-95 calls.

Methods

Study design and setting

A prospective cross-sectional single-centre survey of all clinical staff that were involved in the care of deteriorating or aggressive patients who required the services of RRT or AMT respectively. The study hospital is a tertiary public hospital with 454 bed spaces and 15 intensive care unit (ICU) beds.

RRS in the pre-COVID-19 era

The MET in this hospital includes a critical care liaison nurse or ICU nurse, an ICU registrar and a medical registrar. An additional ICU nurse and coronary-care trained nurse attend for Code Blue. An anaesthetist is available if required for airway management. The patient services manager also attends MET or Code Blue calls.

RRS during the COVID-19 pandemic

Although the same members attend, there are clear policies on the reduced number of people inside the patient

cubicle (refer to Supporting Information Fig. S1 for COVID-19 MET and Code Blue team roles).

AMT composition

Four patient service assistants (PSA), two security personnel, ward nurse-in-charge and psychiatry liaison nurse.

Ethical approval

This study was approved by local hospital research ethics committee (HREC Reference number: 66401).

Survey development and distribution

A provisional questionnaire was prepared after review of the literature. This questionnaire was then revised following input by clinical experts. A pilot study helped further refine the questions. Finally, a web-based anonymous survey was developed using the SurveyMonkey™ platform and published online (Appendix S1). This survey targeted staff who were involved in both the afferent and efferent teams of the RRS implemented in the study hospital. The survey weblink was distributed in the hospital e-Bulletin for 3 weeks between 17 August 2020 and 6 September 2020, initially once a week and then daily in the last week to improve the response rate. An intranet hyperlinked desktop banner was created for all hospital computers in the last week prompting staff to complete the survey. Participation was voluntary and anonymous, with no reimbursement offered to participants.

Data collection

The 48-question survey collected basic information including age group, gender, type of employee, work experience, comorbidities and mental illness.

Study outcomes

The primary outcome of the study included identification of potential organisational, clinical and personal implications of HCW attending Code-95 calls for patients with suspected or confirmed COVID-19. Secondary outcomes included HCW perceptions with comparisons between different groups based on the reported anxiety level and reasons to be more anxious: (i) clinical experience (≤ 5 years vs > 5 years); (ii) age (≤ 40 vs > 40 years); (iii) presence of chronic conditions; (iv) history of mental illness; (v) afferent vs efferent teams; and (vi) medical vs nursing staff. The perceived anxiety was presented as proportion of responses 'feeling anxious sometimes' and 'feeling significantly anxious'.

Data analysis

Survey responses were exported from the online survey platform, converted to Microsoft Excel format and analysed using SPSS Statistics Version 26 (IBM Corp., Armonk, N.Y., USA).⁷ The data analysis was primarily descriptive and reported as percentages of valid responses. The responses were compared using Chi-squared and Fisher's exact tests with a two-tailed alpha-level of 5% considered significant ($P < 0.05$). As 50.4% of HCW had not attended a Code-95 MET call, we analysed for any differences in perceptions between those who attended such calls to those who did not.

Results

Of 334 responses, 297 were included in the final analysis (Fig. 1). Approximately 40% of the overall efferent team (excluding PSA) responded, compared to 15% in the afferent team (Fig. 1). More than 50% of staff were over

40 years of age; 65% of respondents were female and 59% ($n = 174$) belonged to the afferent team; 57% of respondents had >5 years' experience in their current clinical role. Only 16% of respondents reported medical comorbidities with most (41 out of 47) having one chronic condition. Approximately 5% of clinical staff were current smokers. Approximately 10% of the respondents reported some form of mental illness. Half of all respondents had not attended a Code-95 MET call, most of whom were over 40 years of age and senior clinicians. The demographic characteristics of respondents are summarised in Table 1.

Primary outcome

Organisational issues of Code-95 calls for patients under COVID-19 precautions

A total of 82% believed that Code-95-labelled announcements should be used for all patients in

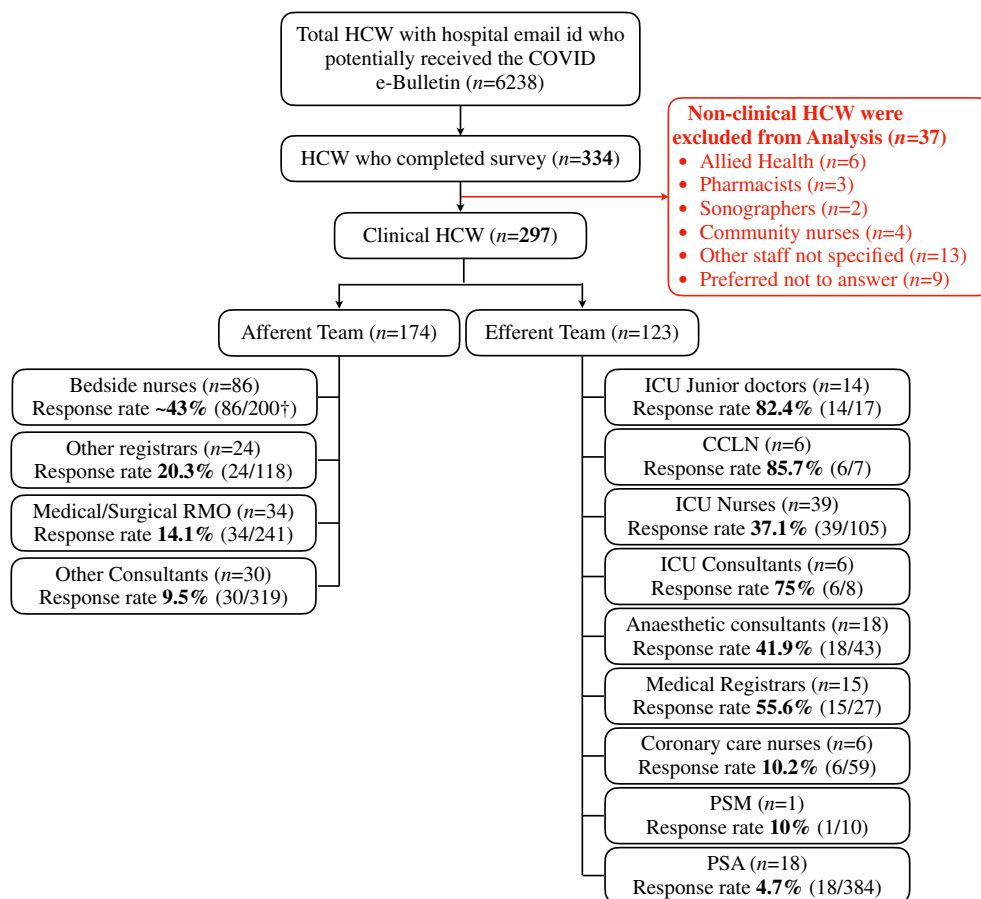


Figure 1 Illustration of respondent inclusion and exclusion process for this survey. †These are nurses from the three wards that looked after COVID-19/sCOVID-19 patients in the study hospital at the time of this survey. One for COVID-19, one for sCOVID-19 and another was overflow. CCLN, critical care liaison nurses; COVID-19, coronavirus disease; HCW, healthcare worker; ICU, intensive care unit; PSA, patient services assistant; PSM, patient services manager; RMO, resident medical officer; sCOVID-19, patient with suspected COVID-19.

isolation for respiratory infectious illness requiring airborne/droplet precautions in the future. Nine percent were unaware of the meaning of the Code 95 announcement by the time of the survey; 54% of respondents

Table 1 Demographics of the survey respondents

Questions	n (%)
Clinical role: efferent team	
ICU junior medical staff	14 (4.2)
Critical care liaison nurses	6 (1.8)
ICU nurses	39 (11.7)
ICU consultants	6 (1.8)
Coronary care	6 (1.8)
Medical registrars	15 (4.5)
Anaesthetic consultants	18 (5.4)
Patient service assistants	18 (5.4)
Hospital coordinators/PSM	1 (0.3)
Clinical role: afferent team	
Ward nurses, ward ANUM	81 (25.5)
Other registrars	24 (7.2)
Medical/surgical RMO	34 (10.2)
CLIPS clinicians	2 (0.6)
Other consultants	28 (8.4)
Others†	37 (11.4)
Experience in current clinical role (years)	
<1	28 (9.5)
1–5	98 (33.2)
5–10	49 (16.6)
>10	120 (40.7)
Age category (years)	
<30	69 (23.6)
30–40	73 (24.9)
41–50	69 (23.6)
51–60	66 (22.5)
>61	16 (5.5)
Female gender	189 (64.7)
Chronic health conditions for staff	
No chronic conditions	245 (83.9)
1 chronic condition	41 (14)
2 or more chronic conditions	6 (2.1)
Severe and/or multiple chronic conditions	0
Staff with some form of mental illness	27 (9.5)
Current smoker	15 (5.1)
Number of MET calls attended by staff with sCOVID-19/COVID-19 with airborne precautions	
No experience	144 (51.3)
1–10	112 (39.9)
11–50	23 (8.2)
>50	2 (0.7)
Number of Code Blue calls attended by staff with sCOVID-19/COVID-19 with airborne precautions	
No experience	220 (77.4)
1–5	59 (20.9)
6–10	2 (0.7)
>10	2 (0.7)
Number of Code Grey/Code Black calls attended by staff with sCOVID-19/COVID-19 with airborne precautions	
<5	27 (65.9)

Table 1 Continued

Questions	n (%)
6–10	11 (26.8)
>11	3 (7.3)

†Allied health (6), pharmacists (3), Finance (2), sonographers (2), clinical coordinator, psychologist, social worker, medical administration, ward clerk (1 each), not specified (10), preferred not to answer ($n = 9$). ANUM, associate nurse unit manager; CLIPS, consultation liaison inpatient psychiatry service; COVID-19, coronavirus disease 2019; ICU, intensive care unit; MET, medical emergency team; PSM, patient services manager; RMO, resident medical officer; sCOVID-19, suspected patient with COVID-19.

were concerned that hospital policies were inadequate and there was insufficient PPE; 64% of the respondents believed that existing COVID-19 training programmes were adequate; however, some aspects could be improved; 71% of them believed there were adequate signage and instructions for COVID-19 precautions. A ‘buddy’ supervising PPE donning/doffing processes was usually/always present 25% of the time. Most (77%) believed that communication methods (e.g. wall-phone, walkie talkie) between teams inside and outside negative pressure room during such calls was more difficult than usual and 25% reported there were no communication devices present in negative pressure rooms. Moreover, approximately half of the respondents expressed concerns about interdisciplinary communication. The findings are summarised in Table 2.

Clinical issues during MET/Code Blue calls for patients under COVID-19 precautions

A total of 69% of respondents believed that there were no differences in escalating to MET or Code Grey/Black calls in patients in COVID-19 precautions when compared to non-COVID-19 patients. Most respondents (89%) believed that respiratory precautions often delayed treatment to patients during Code-95 RRC and 39% felt that these patients were less likely to be reviewed by the MET team leader when compared to non-COVID-19 patients. Eighty percent of respondents were satisfied with outcomes at the conclusion of Code-95 calls. Only 17% of respondents reported that patients post Code-95 calls were likely to be transferred to ICU. Almost all (95%) consultants believed that complex clinical decisions (e.g. instituting new or modifying existing goals of care) were possible during Code-95 calls. Fifty-eight percent of the AMT members believed that patients under COVID-19 precautions were more confused and aggressive than non-COVID-19 patients and 78% believed that managing such patients was more complex.

Table 2 Organisational and clinical impact of Code-95 calls for patients under COVID-19 precautions

Question	%
Organisational	
Do you usually observe adequate signage/instructions for COVID-19 precautions when you arrive at a MET/Code?	
Never observe	4.9
Usually not	8.3
Sometimes observe	15.9
Usually observe	30.6
Always observe	40.3
Essential PPE always present when you arrive at Code-95 calls for COVID-19/sCOVID-19?	
Important parts of PPE usually missing	6
Some parts of PPE occasionally missing	50
All necessary parts of PPE usually present	44
Donning/doffing process is usually well organised during Code-95 calls for sCOVID-19/COVID-19 patients	
Usually poorly organised	19.4
Sometimes poorly organised	32.8
Usually well organised, but can be improved	39.6
Always well organised	8.2
Presence of a well trained person ('buddy') supervising the donning/doffing process	
Never present	17.8
Sometimes present	58
Usually present	17.2
Always present	7
Staff awareness of any existing local COVID-19 policies for MET/'Code' calls?	
Not aware	16.8
Aware but not very familiar	28.4
Aware and somewhat familiar	33.7
Aware and very familiar	21.1
Staff awareness of any existing training programmes specific to COVID-19 infection prevention (i.e. required PPE, donning/doffing, transporting patients)	
Unaware of any specific training programmes	6.9
Aware of but not participated in any training programmes	8.3
Existing training programmes are inadequate/poorly designed/do not cover significant aspects	19.9
The existing training programmes are adequate; however, some aspects can be improved	44.4
The existing training programmes are appropriate and well designed	19.9
The existing training programmes are excessive to the extent of the problem in our hospital	0.5
Communication between staff members during the MET/Code-95 calls for COVID-19/sCOVID-19 patients compared to non-COVID-19 patients	
Communication is better during MET/'Code' calls	7.3
No significant difference in communication issues during MET/Code Blue calls	15.9
Communication between staff members is somewhat more difficult	59.4
Significant issues with communication between staff members	17.4
Communication system (e.g. wall-phone, walkie talkie) between teams inside and outside negative pressure room during a Code-95 calls	
Communication device always present inside the negative pressure room	38.2
Communication device sometimes presents inside the negative pressure room	37.3
Communication device usually not present inside the negative pressure room	24.5
Do you think we should use the 'Code-95' calls for all patients in isolation for respiratory infectious illness airborne/droplet precautions in the future?	
Disagree	4.6
Neither agree nor disagree	13.6
Agree	81.8
For the MET team members: are you usually aware that the MET/Code Blue call you are going to attend is for a patient with suspected/confirmed COVID-19 beforehand?	
Usually unaware and do not know much about Code-95 calls	0
Sometimes aware and do not know much about Code-95 calls	8.8
Usually aware since introduction of the Code-95 calls	91.2
If you hear Code-95 call, how likely is that you are going to ask your colleagues to attend it instead of you?	
Likely. Due to higher risk of infection	9.5
Neutral. Not more likely than with other calls	39.2
Unlikely. Prefer to attend protected calls myself	13.5

Table 2 Continued

Question	%
Usually this is not an option	37.8
Clinical impact	
MET/Code Blue calls	
Do you think that patients under COVID-19 precautions are less likely to be reviewed by the MET team leader during MET/Code Blue call?	
Disagree	20
Neither agree, nor disagree	43.3
Agree	36.7
Do you believe that the treatment of the patients with sCOVID-19/COVID-19 is often delayed during MET/Code Blue calls due to infectious precautions?	
Disagree	11.3
Neither agree, nor disagree	0
Agree	88.7
Do you think that patients with suspected/confirmed COVID-19 often receive inadequate treatment due to infectious precautions comparing to non-COVID-19 patients?	
Disagree	21
Neither agree, nor disagree	40.3
Agree	38.7
Do you think that patients under COVID-19 precautions are more likely to be transferred to ICU after MET/Code Blue calls comparing to non-COVID-19 patients?	
Disagree	21.9
Neither agree, nor disagree	61.3
Agree	16.8
Do you think that patients under COVID-19 precautions are more likely to trigger MET Calls/Code calls for similar problems comparing to non-COVID-19 patients?	
Disagree	10.6
Neither agree, nor disagree	68.4
Agree	21.0
Staff satisfaction with the outcomes of MET/Code calls for patients under COVID-19 precautions comparing to non-COVID-19 patients	
Significantly less likely to be solved during Code-95 calls	0
Somewhat less likely to be solved during Code-95 calls	20
Same rate of satisfaction regardless of COVID-19 precautions	65.7
More likely to resolve the issue	8.6
Significantly more likely to resolve the issue	5.7
Code Grey and Black calls	
Do you think that patients under COVID-19 precautions are more often become confused and aggressive comparing to non-COVID-19 patients?	
Strongly disagree	0
Disagree	0
Neither agree nor disagree	41.9
Agree	32.6
Strongly agree	25.5
Do you think that response to Code Grey/Black for patients under COVID-19 precautions is usually delayed comparing to non-COVID-19 patients?	
Disagree	13.9
Neither agree nor disagree	44.2
Agree	41.9
Do you think that management of an aggressive patient on airborne precautions in the COVID-19 era is more complicated comparing to non-COVID-19 patients?	
Strongly disagree	4.7
Disagree	2.3
Neither agree nor disagree	4.7
Agree	30.2
Strongly agree	58.1
Senior clinicians and hospital administrators (PSM)	
Do you think that you are more likely to be involved in a MET call if it is for a patient on airborne precautions comparing to non-COVID-19 patients?	
Agree	18.2
Neither agree, nor disagree	51.5
Disagree	30.3

Table 2 *Continued*

Question	%
How often complex clinical decisions (e.g. Goals of Care change) have to be made during Code-95 rapid response calls for patients on airborne precautions?	
Often	26.9
Sometimes	69.2
Rarely	0
Never happened	3.9

COVID-19, coronavirus disease 2019; ICU- intensive care unit; MET, medical emergency team; PSM, patient services manager; sCOVID-19, suspected patient with COVID-19.

Personal implications due to Code-95 calls

A total of 86.7% of HCW ($n = 257$) attending Code-95 calls reported anxiety (Fig. 2). More than half of all respondents expressed concerns related to PPE, such as discomfort and potential heat stress. Although the majority was not concerned about their health issues increasing risks for COVID-19, 76% were concerned about spreading the virus to either family members, colleagues or other patients. Overall, most respondents were not concerned about making difficult decisions, such as changing patients' goals of care and redirection of care.

Secondary outcomes

Staff perception of anxiety based on subgroups is summarised in Table 3. Medical staff were more anxious when compared to nursing staff (93.8% vs 78.5%; $P = 0.002$) when Code-95 calls were activated. Similarly, efferent team members reported being more anxious when compared with afferent team members (92.6% vs 58.8%; $P = 0.021$), with 41% of afferent team members not feeling anxious at all. About 38% of all respondents felt they had no choice in attending Code-95 calls. There was no difference in staff perception of anxiety based on their years of experience, age, comorbidities or mental illness.

HCW with ≤ 5 years' experience (56.9% vs 37%; $P = 0.003$) and those ≤ 40 years of age (60% vs 32.6%; $P < 0.001$) believed they were more likely to be exposed to COVID-19 when compared to respective more experienced or older counterparts. Younger HCW (≤ 40 years) also believed there were inadequate infection control policies and/or lack of appropriate PPE, compared to older counterparts (64.8% vs 44%; $P = 0.006$). A higher proportion of HCW with one or more comorbidities expressed concerns that their health placed them at higher risk of contracting COVID-19 when compared to HCW without comorbidities (48.6% vs 8.8%; $P = 0.0001$). Similarly, HCW with mental illness had reservations about attending Code-95 calls in comparison to those without mental illness (31.6% vs 16.8%; $P = 0.047$). Furthermore,

approximately 10% of efferent team members with chronic disease or mental illness said they would likely ask their colleagues to attend Code-95 calls due to concerns about their health. A higher proportion of efferent team members believed there were deficiencies in infection-control policies and PPE when compared to the afferent team (57.4% vs 29.4%; $P = 0.017$). Significantly more nursing HCW expressed concerns about their health issues increasing risks for contracting COVID-19 (23.9% vs 12.5%; $P = 0.02$). A higher proportion of medical staff believed they lacked essential elements of PPE (70.1% vs 37.3%; $P = 0.001$) and PPE was poorly organised (61.5% vs 48.2%; $P = 0.04$) when compared to nursing counterparts. Although more nurses experienced discomfort and potential heat stress due to donning PPE for a long duration than medical staff, it was not statistically significant (57.3% vs 42.7%; $P = 0.15$).

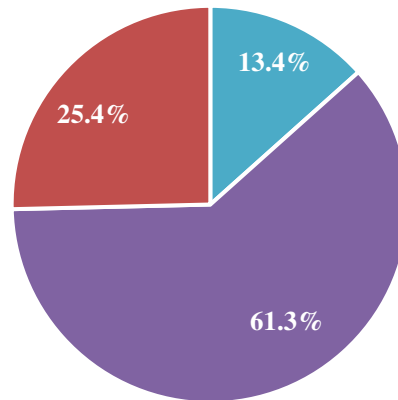
Post-hoc analysis comparing HCW with and without Code-95 MET experience

A total of 137 HCW reported having attended Code-95 MET calls. They were more likely to be ≤ 40 years of age (60.6% vs 36.7%; $P < 0.001$), with ≤ 5 years' experience (54% vs 33.1%; $P = 0.002$) and report anxiety (77.4% vs 50.4%; $P < 0.001$) (Table 4).

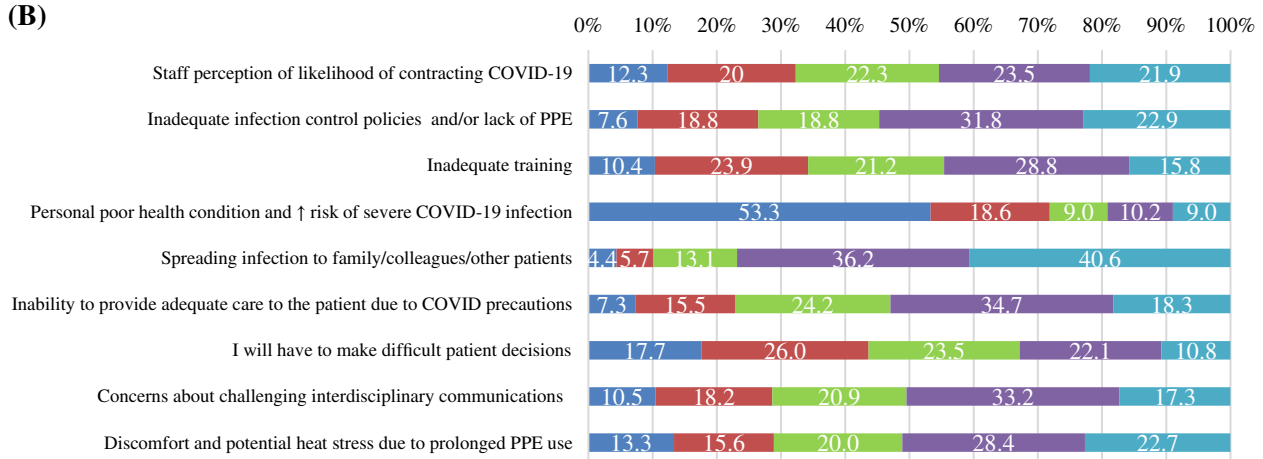
Discussion

We believe this to be the first study that explores HCW impacts and perceptions of Code-95 RRC when attending to deteriorating patients with suspected or confirmed COVID-19. Overall, at an organisational level, Code-95-labelled calls are highly valued by HCW in aiding their personal and mental preparedness. From a personal perspective, a significantly high proportion of HCW, in particular medical staff and efferent team members, reported anxiety when Code-95 calls were activated. Despite this, respondents believed that these calls improve HCW safety when attending to deteriorating or aggressive patients under airborne precautions. Concerningly, many respondents

(A)



(B)



(C)

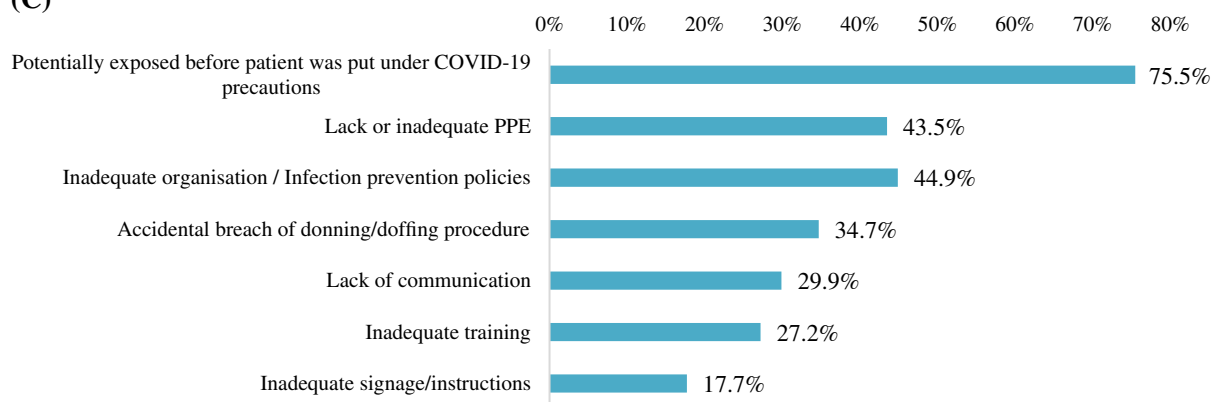


Figure 2 Personal implications due to Code-95 calls. (A) Staff mindset when a Code-95 is activated; (■), not anxious; (■), anxious sometimes; (■), significantly anxious. (B) Personal implications Due to Code-95 calls; (■), strongly disagree; (■), disagree; (■), neutral; (■), agree; (■), strongly agree. (C) Staff perception of potential reasons for being exposed to COVID-19 during MET/Code Blue calls (multiple responses). COVID-19, coronavirus disease 2019; HCW, Healthcare worker; PPE, personal protective equipment.

believed that infection precautions compromised timely care delivery.

HCW caring for COVID-19 patients experience significant psychological stress.⁸ A survey, early in the

pandemic showed 71% of HCW were anxious of becoming exposed to the SARS-CoV-2 virus.⁸ COVID-19 has been reported to be associated with psychological stress amongst HCW⁸ and burnout.⁹ Our survey found that

Table 3 Staff perception of anxiety when they need to attend Code-95 calls

Q10. What statement best describes your feeling when you realise that you need to attend MET/Code call for patients under COVID-19 precautions?																		
Staff perception of anxiety	Experience		Age		Comorbidities			Mental illness		Medical versus nursing			Afferent versus efferent limb					
	≤5 years, n (%)	>5 years, n (%)	P- value	≤40 years, n (%)	>40 years, n (%)	P- value	Nil, n (%)	≥1, n (%)	P- value	No, n (%)	Yes, n (%)	P- value	Medical, n (%)	Nursing, n (%)	P- value	Afferent limb, n (%)	Efferent limb, n (%)	P- value
Not at all Anxious sometimes significantly anxious	10 (10.0)	19 (16.2)	0.10	12 (10.8)	17 (16.5)	0.21	25 (14.0)	4 (11.8)	0.56	24 (12.6)	3 (14.3)	0.31	7 (6.2)	20 (21.5)	0.002	7 (41.2)	4 (7.4)	0.021
	69 (69.0)	64 (54.7)		74 (66.7)	57 (55.3)		112 (62.6)	19 (55.9)		120 (63.2)	10 (47.6)		79 (69.9)	48 (51.6)		6 (35.3)	37 (68.5)	
	21 (21.0)	34 (29.1)		25 (22.5)	29 (28.2)		42 (23.5)	11 (32.4)		46 (24.2)	8 (38.1)		27 (23.9)	25 (26.9)		4 (23.5)	13 (24.1)	

more than 85% HCW attending Code-95 calls reported anxiety, with medical staff reporting higher levels of stress compared to other HCW. Rapidly evolving and unfamiliar practice environments with high workload, ethical dilemmas, uncertainty, and stigmatisation are likely to contribute to psychological stress.^{10,11} Anxiety surrounding attending Code-95 calls was more pronounced in HCW who had medical comorbidities or mental illness. We also observed positive correlations between respondents' comorbidities and reported anxiety when attending Code-95 calls. This is not surprising as older age and comorbidities are risk factors for more severe clinical course of COVID-19.¹²

Respondents' reported fear of contracting COVID-19 infection during work and spreading to family members was no different to previously published data.^{13,14} HCW concerns are justified as more than 70% of the total COVID-19 cases in HCW (3408) in Victoria were acquired in a healthcare setting.¹⁵ It is however difficult to differentiate reported anxiety related to the pre-warning Code-95 calls or to attending patients in the current COVID-19 climate.

Our survey was related to all Code-95 calls. We have used MET calls as an example. For instance, it is possible that anaesthetists may have participated in Code Blue Code-95 calls; and PSA, and floor nurses in AMT Code-95 calls. Our survey found that HCW who attended MET Code-95 calls were more likely to report being anxious. A possible explanation for this could be that this is related to recollection of their previous Code-95 RRC experience.

Efferent team members who attended deteriorating patients more frequently reported anxiety. Bedside afferent team members less frequently reported anxiety when escalating Code-95 calls. This is probably because the afferent teams have habituated to a patient over time,¹⁶ whereas the efferent teams are likely to be encountering the patient for the first time at the call.² There were notable differences in perceived adequacy of infection control policies and procedures between efferent and afferent teams. Although afferent teams believed that infection-control policies and procedures were adequate, efferent teams reported gaps that needed to be addressed. This may be related to afferent teams working in known and familiar environments when compared to the efferent teams.

In keeping with published literature,^{11,17} our survey demonstrated that a high proportion of nurses who spend long hours donned in full PPE reported experiencing physical and psychological distress. The potential for impaired cognitive and executive functioning by members of the RRT and/or AMT while undertaking critical care procedures in full PPE, while feeling highly anxious about cross-infection risk cannot be ignored.¹⁸

Table 4 Post-hoc analysis comparing HCW with and without Code-95 MET experience

	HCW with no RRC experience, <i>n</i> (%)	HCW with RRC experience, <i>n</i> (%)	<i>P</i> -value
<i>n</i> = 276	139 (50.4)	137 (49.6)	—
Experience in current role (years)			
<1	13 (9.4)	15 (10.9)	0.002
1–5	33 (23.7)	59 (43.1)	
5–10	23 (16.5)	22 (16.1)	
>10	70 (50.4)	41 (29.9)	
Age group (years)			
<30	28 (20.1)	39 (28.5)	<0.001†
31–40	23 (16.6)	44 (32.1)	
41–50	46 (33.1)	20 (14.6)	
51–60	32 (23.0)	26 (18.9)	
>60	7 (5.0)	8 (5.8)	
Preferred not to answer	3 (2.2)	0 (0)	
Gender			
Female	93 (66.9)	83 (60.6)	0.48†
No. comorbidities			
0	114 (82.0)	114 (83.2)	>0.99†
1	20 (14.4)	19 (13.9)	
≥2	3 (2.2)	3 (2.2)	
Preferred not to answer	2 (1.4)	1 (0.7)	
Mental illness			
No	121 (87.0)	119 (86.9)	0.96†
Yes	13 (9.4)	14 (10.2)	
Preferred not to answer	5 (3.6)	4 (2.9)	
Current smoker			
No	131 (94.3)	130 (94.9)	0.83†
Yes	7 (5.0)	5 (3.7)	
Preferred not to answer	1 (0.7)	2 (1.4)	
What statement best describes your feeling when you realise that you need to attend MET/Code call for patients under COVID-19 precautions?			
Not at all	9 (6.5)	25 (18.2)	<0.001†
Anxious sometimes	45 (28.8)	83 (60.6)	
Significantly anxious	30 (21.6)	23 (16.8)	
Preferred not to answer	18 (12.9)	6 (4.4)	
Not applicable	37 (26.6)	0 (0)	
HCW reasons for being anxious, median Likert score (IQR)			
About inadequate infection control, lack of PPE, inadequate policies	4 (2)	4 (1)	0.85
About inadequate training	3 (2)	3 (2)	0.92
About personal poor health condition increasing risk of severe COVID-19 infection	1.5 (2)	1 (2)	0.35
About spreading infection to family, colleagues, other patients	4 (1)	4 (1)	0.10
About inability to provide adequate care to patients due to COVID-19 precautions	3 (1)	4 (1)	0.52
About making difficult patient decisions	3 (2)	3 (2)	0.83
About interdisciplinary communication issues	3 (2)	4 (4)	0.22
About discomfort and potential heat stress caused by wearing PPE for a long time	4 (2)	3 (3)	0.22

†Fisher's test. COVID-19, coronavirus disease 2019; HCW, healthcare worker; PPE, personal protective equipment; RRC, rapid response calls.

Our survey identified concerns related to gaps in processes, training, education and infection-control policies^{17,19} with Code-95 calls. It will be important to develop quality metrics to assess whether addressing these results in reduced HCW anxiety and infections.

There were several limitations that need to be acknowledged. First, the online survey was conducted over a short timeframe and longitudinal alterations in perception are unknown.²⁰ Second, the survey was conducted at a single institution without a clearly defined probabilistic population sample along with a low response rate may limit

generalisability of our results. However, psychosocial stress contributing to staff absenteeism²¹ and hospital outbreak associated furlough of over 700 HCW may have underestimated the respective response rates of 40% (efferent) and 15% (afferent). Third and inherent to any survey, there may be selection bias in respondent sampling. Perceived negativity over the outbreak management could have potentially influenced the responses and reactive comments. Cognitive biases such as overconfidence in the older and more experienced group of clinicians also cannot be excluded. The timing of the survey coincided with a major SARS-CoV-2 virus outbreak in the hospital that resulted in many HCW being infected or furloughed^{22,23} and this could have influenced responses. Finally, the survey was not balanced between different subgroups as half of all respondents reported never attending a Code-95 RRC and three-quarters had not attended Code Blue calls for patients on airborne precautions.

Conclusions

Most surveyed HCW supported Code-95-labelled announcements pre-warning them of required airborne precautions when attending a RRC. Such calls may be an additional useful safety function for organisations to pre-warn HCW attending to patients that pose high infectious risk. However, the majority of HCW reported anxiety when attending these calls. Medical and efferent team HCW perceived greater anxiety compared to nursing and afferent team HCW. Results of this survey should be of interest to hospital administrators and policymakers to help refine existing RRC practices. We believe Code-95 calls should be considered for utilisation by healthcare organisations to support and protect HCW responding to deteriorating patients with COVID-19 and other respiratory infections who are under airborne precautions.

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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. The survey.

Figure S1 COVID-19 MET and Code Blue team roles.
