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Staff perception and attitudes towards a medical rapid response team with a multi-tiered response

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INTRODUCTION

Rapid response teams (RRTs) are increasingly adopted and implemented in healthcare systems worldwide.⁽¹⁾ Deterioration events such as cardiac arrests are often preceded by abnormal vital signs hours before they occur, representing a window of opportunity for early intervention. RRTs therefore facilitate the delivery of early and specialised critical care services to the bedside.⁽²⁾ They typically form the efferent limb of a rapid response system (RRS), with an afferent limb responsible for early detection^(1,2) and an administrative limb to identify and address barriers to effective detection and response.⁽³⁾

Despite increasing prevalence, there is wide variation in the structure and function of RRTs.^(4,5) These include differences in activation criteria, team composition,^(6,7) and the unclear role of the ward or primary team during RRT activations.^(8,9) A concern with the increasing use of RRTs is deskilling of ward staff and adverse effects on clinical autonomy of the primary team. Significant variation in RRT setup is also evident in Singapore,⁽¹⁰⁾ and it remains unclear how differences in RRT structure and function are perceived and valued by ward staff. These are important to understand as they are inherent to the acceptance and successful utilisation of RRTs.⁽¹¹⁾

Our institution, Singapore General Hospital, is an 1,800-bed tertiary academic hospital and a 200-bed community hospital in Singapore. RRTs were implemented in February 2018 as part of a hospital-wide initiative to improve patient safety, with SMART (Singapore General Hospital Medical intensive care unit Acute Response Team) providing services to patients under medical disciplines. Apart from having specialty-based RRTs (specific RRTs for medical and surgical disciplines), our RRS has a distinct setup: a tiered response^(12,13) and a collaborative two-level approach (Fig. 1). The primary team leads the first-tier response (initial clinical deterioration triggers a clinical review by the ward team), makes the decision for RRT activation and remains involved in the second-tier response led by SMART. The third tier is a

dedicated Code Blue team activated for cardiac arrests. In this study, we conducted a survey to explore the perceived benefits and attitudes of ward staff involved in SMART activations. A secondary objective was to evaluate the RRT service with regard to staff satisfaction and perceived benefit. The survey was designed to assess user satisfaction and perceived value of SMART; attitudes regarding activation criteria and barriers; role of the primary team; and concerns with autonomy, education and deskilling.

METHODS

Our rapid response team, SMART, comprises an intensivist consultant (or registrar), critical care advanced practice nurse and a respiratory therapist. The activation criteria for SMART are based on the patient's vital signs (respiratory rate ≤ 8 or ≥ 25 breaths/min; oxygen saturation $\leq 91\%$ on supplemental oxygen; systolic blood pressure ≤ 90 or ≥ 220 mmHg; heart rate ≤ 40 or ≥ 131 beats/minute; acute drop in Glasgow Coma Scale score or unarousable patient) and the primary team's concern or requests for escalation of care. The SMART intensivist consultant and advanced practice nurse are taken off other clinical responsibilities during their shift. The 24-hour service is supported by the night team comprising a medical registrar and respiratory therapist. Upon RRT activation, resuscitation and stabilisation efforts are led by SMART, with support from the ward team. With inception of the RRT in February 2018, there have been an average of 88 medical activations per month, with a median response time of 12 (interquartile range 8–17) minutes. Weekday daytime (8 am–5 pm) activations account for approximately 30%–40% of all SMART activations. The average number of patients admitted under medical disciplines in our hospital campus averaged 47,000–48,000 per year or approximately 4,000 medical admissions per month, with a derived SMART utilisation rate (RRT dose) of approximately 22 activations per 1,000 admissions, in the first two years of implementation.

A survey on perceptions, attitudes and concerns towards SMART was conducted over an eight-month period from January 2020 to August 2020. Doctors and nurses with a patient for whom SMART was activated were invited to participate. The survey was distributed through online forms sent via secure messaging or email platforms, within one day of the activation. Only participants involved in SMART activations during daytime hours (8 am–5 pm, Monday–Friday) were invited. Survey responses (16 and 12 questions for doctors and nurses, respectively) were based on a five-point Likert scale. Participants were also invited to provide open-ended feedback at the end of the survey, with regard to the following specific domains: (a) RRT activation criteria and workflow; (b) RRT intervention; (c) patient disposition; (d) collaboration and education; and (e) communication and handover. The study protocol (with a waiver of consent from participants) was submitted to our hospital's institutional review board (IRB) (CIRB 2019/2848). The IRB committee determined that no further ethical deliberation, and therefore no formal IRB review, was required for this study.

RESULTS

Invitations to participate in the survey were sent out to 233 doctors and 197 nurses. A total of 227 responses were received from 125 (55.1%) doctors and 102 (44.9%) nurses. The response rates of doctors and nurses were 53.6% and 51.8% respectively. A description of the participants' years of work experience (as a doctor or nurse) and prior experience with SMART is summarised in Table I.

Table I. Profile of doctors and nurses who participated in the survey.

Characteristic	No. (%)	
	Doctors (n = 125)	Nurses (n = 102)
Working experience (yr)		
≤ 3	43 (34.4)	25 (24.5)
4–6	40 (32.0)	22 (21.6)
7–10	33 (26.4)	24 (23.5)
> 10	9 (7.2)	31 (30.4)

Prior experience with SMART activations		
≥ 5 times	54 (43.2)	25 (24.5)
1–4 times	57 (45.6)	43 (42.2)
No prior experience	14 (11.3)	34 (33.3)
Seniority of doctors		
Junior resident	76 (60.8)	–
Senior resident	32 (25.6)	–
Consultant	17 (13.6)	–

Working experience is based on no. of years working in healthcare as a doctor or nurse. SMART: Singapore General Hospital Medical intensive care unit Acute Response Team

Questions evaluating the perceived value of SMART, user attitudes and concerns are summarised in Table II. Almost all doctors and nurses (> 95%) agreed or strongly agreed that SMART attended to patients in a timely manner, was competent in managing critically ill patients and communicated effectively with ward staff. The large majority of doctors (93.6%) and nurses (95.1%) agreed or strongly agreed that SMART improves patient outcomes, and 87.2% of doctors and 93.1% of nurses agreed or strongly agreed that continuity of care was maintained for acutely ill patients who remained in the general ward after patient assessment and stabilisation.

Most doctors (80%) agreed or strongly agreed that they felt comfortable activating SMART without fear of criticism or being reprimanded, and almost all (99.2%) felt that SMART was readily accessible and responsive when called. When asked whether all healthcare workers should be empowered to activate SMART, most doctors (70.4%) and nurses (68.7%) agreed or strongly agreed.

Primary team's role and concerns with autonomy and deskilling of ward staff Almost all doctors (97.6%) and nurses (99.0%) agreed or strongly agreed that both the primary medical team and SMART should be significantly involved in the resuscitation of an acutely deteriorating patient (Table II). Almost all (99.0%) nurses agreed or strongly agreed that the primary team's presence and involvement in shared decision-making is important for patient care. When asked whether the primary team should take the lead in the discussion of goals or

limitations of care, most doctors (77.6%) agreed or strongly agreed. A minority (14.4%) of doctors expressed concern (agree or strongly agree) that the primary team's autonomy in patient management may be adversely affected. Most doctors (91.2%) and nurses (90.2%) felt (agree or strongly agree) that SMART creates a valuable learning and educational experience in the management of critically ill patients. When asked whether they were concerned that SMART adversely affects their skills in managing critically ill patients, 8.0% and 2.4% of doctors agreed and strongly agreed respectively, while the majority (70.4%) of doctors disagreed or strongly disagreed.

Table II. Results of survey questions with five-point Likert scale response (125 doctors, 102 nurses).

Survey question	No. (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
User satisfaction and perceived value of the rapid response team					
1. SMART attends to my patient in a timely manner.					
Doctors	0 (0)	0 (0)	0 (0)	32 (25.6)	93 (74.4)
Nurses	0 (0)	0 (0)	2 (2.0)	44 (43.1)	56 (54.9)
2. SMART is competent in assessing, stabilising and managing my critically ill or deteriorating patient.					
Doctors	1 (0.8)	0 (0)	0 (0)	27 (21.6)	97 (77.6)
Nurses	0 (0)	0 (0)	3 (2.9)	41 (40.2)	58 (56.9)
3. SMART communicates effectively with the primary team and ward nurses about the issues and plan of management.					
Doctors	0 (0)	1 (0.8)	0 (0)	41 (32.8)	83 (66.4)
Nurses	0 (0)	0 (0)	5 (4.9)	51 (50.0)	46 (45.1)
4. With SMART, there is continuity of care for acutely ill patients who remain in the general ward.					
Doctors	0 (0)	1 (0.8)	15 (12.0)	73 (58.4)	36 (28.8)
Nurses	0 (0)	0 (0)	7 (6.9)	53 (52.0)	42 (41.2)
5. SMART improves patient outcomes.					
Doctors	0 (0)	0 (0)	8 (6.4)	48 (38.4)	69 (55.2)
Nurses	0 (0)	0 (0)	5 (4.9)	47 (46.1)	50 (49.0)
6. Overall, I am satisfied with SMART's services.					
Doctors	0 (0)	0 (0)	1 (0.8)	36 (28.8)	88 (70.4)
Nurses	0 (0)	1 (1.0)	3 (2.9)	39 (38.2)	59 (57.8)
Activation criteria and barriers					
7. I am confident that I can recognise early signs of an acutely deteriorating patient.					
Doctors	0 (0)	0 (0)	6 (4.8)	82 (65.6)	37 (29.6)

8. When I am caring for critically ill and deteriorating patients in the ward, there are occasions when I am worried for my patient but do not know what to do.					
Doctors	3 (2.4)	18 (14.4)	18 (14.4)	70 (56.0)	16 (12.8)
Nurses	2 (2.0)	15 (14.7)	21 (20.6)	54 (52.9)	10 (9.8)
9. All healthcare providers (junior doctors, nurses, allied health professionals) should be empowered to activate SMART.					
Doctors	0 (0)	14 (11.2)	23 (18.4)	51 (40.8)	37 (29.6)
Nurses	0 (0)	6 (5.9)	26 (25.5)	48 (47.1)	22 (21.6)
10. I am always aware when the ward doctors have activated SMART for a patient under my care.					
Nurses	1 (1.0)	4 (3.9)	23 (22.5)	52 (51.0)	22 (21.6)
11. I feel comfortable activating SMART without fear of being criticised or being reprimanded.					
Doctors	2 (1.6)	5 (4.0)	18 (14.4)	57 (45.6)	43 (34.4)
12. SMART is readily accessible and responsive when called.					
Doctors	0 (0)	0 (0)	1 (0.8)	31 (24.8)	93 (74.4)
Role of the primary team and concerns with autonomy and deskilling					
13. Both the primary team and SMART should be significantly involved in the resuscitation of an acutely deteriorating patient.					
Doctors	0 (0)	2 (1.6)	1 (0.8)	36 (28.8)	86 (68.8)
Nurses	0 (0)	0 (0)	1 (1.0)	36 (35.3)	65 (63.7)
14. The primary team (instead of SMART) should take the lead in the discussion of goals or limitations of care with the patient and/or their family.					
Doctors	3 (2.4)	2 (1.6)	23 (18.4)	57 (45.6)	40 (32.0)
15. The primary team's presence and involvement with shared decision making (together with SMART) is important for patient care.					
Nurses	0 (0)	0 (0)	1 (1.0)	32 (31.4)	69 (67.6)
16. I am concerned that with SMART, the residents' or the primary team's autonomy in patient management is reduced.					
Doctors	22 (17.6)	69 (55.2)	16 (12.8)	12 (9.6)	6 (4.8)
17. I am concerned that SMART reduces my skills in managing critically ill patients and I will become less prepared to care for such patients in future.					
Doctors	21 (16.8)	67 (53.6)	24 (19.2)	10 (8.0)	3 (2.4)
18. SMART creates a valuable learning and educational experience for me in managing critically ill patients.					
Doctors	0 (0)	2 (1.6)	9 (7.2)	65 (52.0)	49 (39.2)
Nurses	0 (0)	0 (0)	10 (9.8)	50 (49.0)	42 (41.2)

SMART: Singapore General Hospital Medical intensive care unit Acute Response Team

Feedback and comments based on specific RRT themes (activation criteria and workflow, intervention, patient disposition, collaboration and education, and communication/handover) were collected from participants (Appendix). Table III summarises some of the feedback and comments. An appreciation of the ease in initiating RRT activations and perceived benefits of SMART was noted. Extending ‘activation rights’ to more healthcare workers was evident in the comments, in order to “*empower more healthcare workers to activate SMART*”. Conversely, there were also concerns with overactivation and of overwhelming the RRT service, evident from the following comments: “*If SMART is too accessible, then it may be abused*”, “*SMART frequently gets swamped with concurrent activations*” and “*primary team... outsourced the job of seeing patients to SMART*”. There was a signal that ward team doctors and nurses were open to more collaboration, education, and open communication, based on the following comments: “*to involve junior doctors in the primary team actively*”, “*educate ward nurses on the management of critically ill patients*” and “*there should be a platform for feedback*”.

Table III. Selected feedback and comments provided by participants.

Category	Response
Activation and intervention	
Doctors	It has given us an easy platform to activate the ICU team; previously it was more difficult to find out who to contact
	If SMART is too accessible then it may be abused, e.g. too liberally activated or some primary teams may activate SMART because they do not know or want to manage a deteriorating patient
	Immensely helpful in acceleration of critical care, which is not possible otherwise in an outpatient setup like the Haematology centre
	The response is quick and timely, very helpful and approachable
	SMART frequently gets swamped with concurrent activations, so manpower and logistics frequently get stretched to the maximum.
	Primary consultant did not review the patient, and outsourced the job of seeing patient to SMART
Nurses	Empower more healthcare workers to activate SMART team
	Nurses should have the right to activate SMART team
	The activation criteria should be made known to new staff
	To have more specific criteria for escalation; does ‘being worried’ allow nurses to initiate SMART team?
	They are knowledgeable and I felt assured once SMART arrived when managing critically ill patients, especially when I do not have much experience despite several years in nursing

	SMART is critical in determining patients' survival
Collaboration, communication and education	
Doctors	Primary team doctors should help with the management and ideally, the senior resident or consultant should be around as well
	Excellent communication, good continuity. Also enabled guidance of junior doctors in the process
	I hope after assessing the patient, SMART can communicate verbally with the primary team about recommendations so that actions can be taken in a timely manner
	To involve junior doctors in the primary team actively, to learn about the handover process and communication with family
	I think most of the time, there is no room for education
	There should be a platform for feedback between SMART and primary team about any concerns or areas of improvement
Nurses	SMART allays the ward nurse's anxiety by working together and helping when the patient is deteriorating
	Continued to collaborate with the ward nurses in a cool and calm manner but still with a sense of urgency
	It will be beneficial for SMART to conduct a debriefing session, so that individuals can improve and gain experience
	It will be good if SMART can provide feedback on the performances of ward nurses, and how we can cooperate better
	If time and opportunity permits, to educate ward nurses more on the management of critically ill patients

SMART: Singapore General Hospital Medical intensive care unit Acute Response Team

DISCUSSION

Evidence from systematic reviews suggests that RRS may be associated with reduced cardiac arrest rates and mortality.⁽¹⁴⁻¹⁶⁾ However, the medical community continues to debate about the effectiveness of RRT/RRS' and how their performance should be evaluated.⁽¹⁷⁻¹⁹⁾ Establishing evidence of clinical benefit and cost effectiveness is challenging owing to the significant heterogeneity in RRT implementation strategies and complex interactions within each healthcare ecosystem.⁽²⁰⁾ At present, healthy utilisation rates and minimisation of delayed activations act as surrogate markers of a mature and effective RRS.^(21,22) These are, in turn, influenced by user perceptions regarding the value of the RRT, sociocultural barriers, and concerns with primary physician autonomy and continuity of care.^(3,6) Understanding and addressing these beliefs and concerns are important and are the main motivation behind our study. We also aimed to evaluate our RRT service two years after its inception, in terms of staff satisfaction and perceived value.

The results of this survey suggest that nearly all RRT users perceive SMART to be timely, effective, competent, and importantly, to improve patient outcomes. A notable feature of our RRT setup is dedicated (without competing clinical responsibilities) team members. Dedicated RRT members are likely to enhance the effectiveness of the rapid response⁽²³⁾ and are a recognised feature of efficient RRTs.^(24,25) Barriers to activation of RRTs are acknowledged in various healthcare systems,⁽²⁶⁻²⁸⁾ with their absence (e.g. activation of RRT without fear of reprisal) being an indicator of better-performing RRTs.⁽²⁴⁾ The large majority of participants reported that they felt comfortable activating SMART and agreed that it is a readily accessible and responsive service. This provides validation of the value and benefit that RRT users place on SMART,⁽¹¹⁾ and is likely to contribute to increased utilisation of the RRT. Increasing RRT utilisation rate (or RRT dose) is associated with improved patient outcomes, and a ‘healthy’ dose reflective of mature RRS’ has been reported to be between 26 and 56 activations per 1,000 admissions.⁽²¹⁾

A unique feature of our RRT setup is a tiered response where SMART is predominantly activated through the primary team. The primary team also serves as the first responder for clinical deterioration, in contrast with hospitals, where RRT activation is made available to all ward staff. Some hospitals even implement patient- and/or family-activated RRTs.^(29,30) While potentially providing a larger safety net and reducing response time, such a setup may also increase the strain on limited critical care resources and potentially overwhelm RRTs with alarm fatigue or multiple activations. This may ultimately dilute the effectiveness of the RRT. Feedback provided by participants such as, “*If SMART is too accessible then it may be too liberally activated*”, suggests the same concerns from RRT users. The premise of a tiered response is, therefore, as follows: first-tier responses by the ward team may be effective for identifying and correcting early states of deterioration or establishing goals of care, reducing unnecessary escalation of care to the RRT. Hospitals with a tiered RRS have reported more

efficient use of critical care resources, with no evidence of adverse outcomes.⁽¹³⁾ A tiered response is also increasingly used in trauma centres.⁽³¹⁻³³⁾ Conflicts between nurses and ward physicians may also be aggravated when the RRT is expected to be alerted directly by ward staff, which often bypasses the ward physician.⁽³⁴⁻³⁶⁾ Conversely, a counter argument is that liberal activation of RRTs may potentially reduce resource utilisation downstream, even if there are unwarranted activations. Limiting 'activation rights' to the primary teams may also lead to delayed activations, which are associated with worse clinical outcomes.^(22,25) Notably, a preference for empowerment of all healthcare workers to activate the RRT is also evident from the qualitative feedback provided by some participants. It will, therefore, be important to continue to monitor clinical outcomes and utilisation rates of SMART, and review cases of delayed activation.

Another key consideration in any RRS setup is the role of the primary team in the management of critically ill patients. An unclear role can lead to confusion among ward staff and concerns with autonomy, deskilling and continuity of care. The results of our survey suggest that most RRT users disagree that SMART adversely affects their autonomy, with many perceiving educational benefits instead. In addition, most appear keen to remain significantly involved in the management of critically ill patients. Calls to actively involve primary team doctors during activations are also evident on the qualitative feedback, with proposals for the initiation of post-activation debrief and educational outreach by SMART. These suggest that RRT users continue to acknowledge the important role that the ward team can play in the RRS.⁽³⁷⁾ Involvement of the primary team is also associated with more transfers to higher care levels and changes in code status,^(9,38) and improved mortality.⁽⁸⁾ While objective benefit in patient outcomes or resource utilisation remains unproven, the above factors appear to support the tiered response and partnership approach of our RRS. Indeed, there is potential for increased collaboration in the form of feedback and educational outreach. RRTs introduce

a promising opportunity to develop novel interprofessional curricula in not only clinical skills but also teamwork, communication and leadership skills.^(12,39)

A hospital-wide early warning system (EWS) was lacking in our hospital at the time of writing this report. A survey of 103 hospitals in the United States revealed that the RRS afferent limb is supported by an early warning aggregate score in up to 54% of hospitals.⁽⁵⁾ Careful planning, however, is critical before implementation of a standardised EWS, with a ‘track and trigger’ activation criteria. This is to ensure that ward staff as well as RRTs are not overwhelmed by alarm fatigue and multiple activations, which may dilute the dedicated and specialised care that we are currently able to provide. Strong leadership, protected funding, clearly defined protocols, and continuous evaluation and quality improvement are also essential for planning and initiation of an EWS.^(12,20)

This study has some limitations. All respondents participated in RRT activations that were limited to medical disciplines, and activations during daytime hours. The survey response rate of 53%, while acceptable, may potentially introduce response bias, with responses leaning towards more extreme values. Self-assessment bias⁽⁴⁰⁾ and recall bias are also likely to exist, which will affect the results of the questions related to SMART’s timeliness of response, competency, continuity of care and outcomes. However, care was taken to administer surveys within the same day of the SMART activation, which serves to minimise recall bias. The majority of respondents were junior residents, and it is unclear whether these perceptions and attitudes are representative of doctors and nurses of varying seniority. Moreover, this was a single-centre study, and no data on actual patient outcomes are available to correlate perceived value to actual clinical benefits of SMART.

In conclusion, there is a clear perceived value placed on the RRT and the willingness of the primary team to remain significantly engaged in the management of critically ill patients in the general ward. This provides validation of a tiered medical emergency response and a

partnership approach with our RRTs. There remains a potential for increased engagement of ward staff, including feedback and education.

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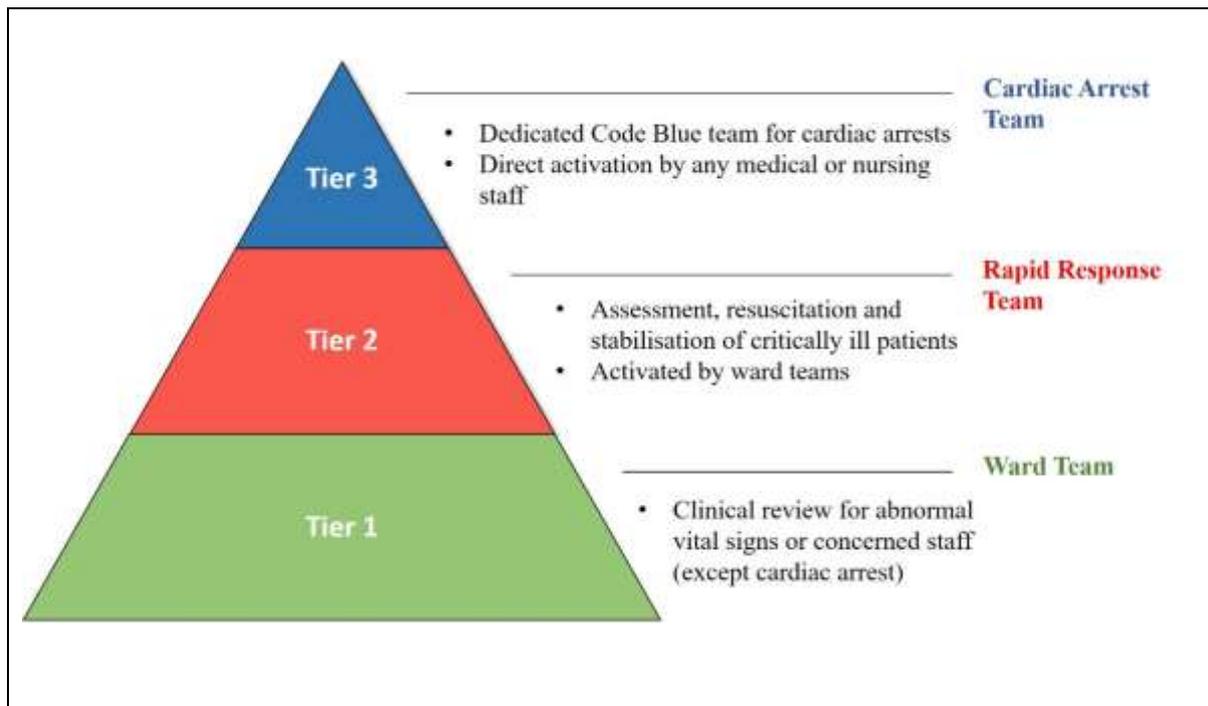
FIGURE

Fig. 1 Diagram shows the structure and escalation process of the three-tiered rapid response system.

APPENDIX**Doctors' feedback and comments**1. Activation criteria and workflow

- Promptly attended to
- It has given us an easier platform to get assessment of patients needing to go to ICA. Previously it was harder to find out who to contact when we already know someone requires higher level monitoring/intervention and had to contact ICU/ICA to find out who is covering etc before finally getting to the right person.
- I think if SMART is too accessible then it may be abused e.g. too liberally activated or some primary teams may activate SMART because they do not know want to manage a deteriorating patient
- Criteria could be better made known
- Fast and effective
- Prompt and easy to do
- The team responded very fast and was extremely helpful. It is a huge support for Haem centre in view of our fragile patients who suddenly take a turn for the worse during chemo/ blood transfusion etc, given the limited support and manpower at the centre itself.
- Smart team frequently gets swamped with concurrent activations so manpower and logistics, equipment frequently get stretched to the maximum. May need a look at how this can be addressed. Otherwise, publicity with regards to criteria and number to call has been clear. Perhaps for better communication and to avoid rambling over the phone, a template for the rest of the hospital can be provided so that targeted info can be obtained with minimal time loss
- Please get more APNs... they are overworked!
- Swift and timely
- Smart nurse was friendly, efficient, and arrived in a timely manner
- The response is quick and timely
- Activation is fast and person receiving call is friendly
- Attend immediately to discuss issues with physical presence
- Primary consultant did not review patient. Outsourced job of seeing patient to SMART
- Usually arrive in timely manner to assist us with patient's resuscitations

2. SMART intervention

- Helpful
- I think they can help to guide us to initiate inotropes early in the general ward which I think is useful for stabilising patients.
- Useful
- Helped the team manage the acutely unwell patient in a timely and calm manner
- Immensely helpful in acceleration of critical care, which is not possible otherwise in an outpatient setup like Haematology centre.
- Due to prompt response, I think clinical outcome is better for patients
- Better communication with primary team regarding goals of treatment, i.e. SMART team and primary team should talk to each other, especially if goals of care are different before communicating to family
- To discuss with primary team as sometimes no communication takes place

- Sometimes you need an external party to ‘maxward’ the patient because the primary physician is not capable of making an objective recommendation on resuscitation status. Well done to SMART!
- Advice on additional boluses, stabilising blood pressure with inotropes
- Clearly communicated to primary team and also documented

3. Patient disposition

- Appropriate
- I think that having someone more senior to assess the situation helps.
- Well-communicated
- Very helpful and approachable. I thank all the members profusely for helping me yesterday in the management of the patient.
- No question. Where the cases are a little grey and for those who may potentially deteriorate, it was a good practice to have afternoon reviews by SMART
- Helpful in arranging disposition of the patient
- In certain clear-cut cases when patient is in extremis and the primary team is happy to resuscitate, may not be necessary for SMART to physically see patient. Just phone consult and approve ICU bed will do. Otherwise, the step to physically review can cause delays.
- Discussed with primary team and clearly documented

4. Collaboration and education

- Primary team doctors should help with the management and ideally, the senior resident or consultant should be around as well, because the patient is still theirs and not SMART’s
- More of acute management than educational
- Can be improved
- Excellent communication, good continuity. Also enabled guidance of junior doctors in the process
- Would be useful
- Think most of the time there is no room for education
- To be improved. Primary team need to continue to provide support and follow up on SMART’s team plan
- Great
- Learned a lot from management of my ill patient
- Will be very beneficial to have teaching material for junior doctors on the criteria, process of SMART activation
- To involve primary team juniors/seniors actively in when SMART team takes over care – to learn about handover process, communication with family
- System of feedback between SMART and primary team mutually about any concerns or points of improvement for patient care
- Can let the team medical officer or house officer perform the procedure sometimes (e.g., intubation), if there is no ICU medical officer who wants to do
- Working together to stabilise patient
- Educated discussion on overall plans for patient moving forward between SMART and primary team before making a joint decision for patient management

5. Communication and handover

- Well done
- Excellent
- I think having the SMART team during the general ward resuscitation process makes it easier for eventual care of the patient in ICA by the ICA/ICU team.
- It would be good to sometimes communicate why decisions are made as such, especially for grey cases for better communication. We can always agree to disagree, but that is better than just assuming. Verbal communication with the primary team is a must, and not just documenting and scooting off.
- Was not present unfortunately
- I hope after the assessment, SMART can communicate verbally with the primary team about recommendations so that actions can be made in a timely manner.
- Very clear
- Very good!
- Clear and concise

Nurses' feedback and comments

1. Activation criteria and workflow

- Attend to patient very fast
- To have better specificity criteria for escalation; does 'being worried' allow nurses to initiate SMART team?
- Easy to get through and just one call away
- Easily contactable
- Excellent in work
- Great experience
- To have seminar to all staff how and when to activate SMART
- Empower more HCW to activate SMART
- Quite fast when being activated
- Should be made known to the new staff regarding the SMART activation and what is the criteria to activate it
- Nurses should have the right to activate SMART team as most of the time, when patient's condition suddenly turn unwell, it is very hard for nurses to contact the primary team, especially the DIM and renal doctor. They usually will not come to see patient immediately and patient's condition will become worse.
- They will come as soon the doctor activate them to provide care for the ill patient
- It is fast responsive team once activated.
- Important
- Very fast and efficient
- It was done by primary team. SMART team came fast as well.
- Quite easy to activate SMART team.
- Very prompt!
- At times, team doctors did not inform nurses that they activated the SMART Team
- It will be good to share with the ground nurse on the criteria for activation – especially those who just joined or came back from studies. Personally, I am not aware of the criteria.
- Need more alarming system, e.g. code blue call, which is a very distinguished sound to be ignored.
- Timely approach and helps ground nurses to better manage critically ill patients

- Very prompt reply and fast to analyse situation
- Good job on your quick responses with activation
- Immediate response
- Unsure how to activate SMART team. Only know the next moment SMART team is here.
- SMART activation response is very fast. I suggest members must identify themselves or at least wear any identifiers for less confusion.
- Smooth and fast

2. SMART intervention

- Fast and effective
- Efficient and timely
- Very fast and efficient
- Prompt
- To have seminar to all staff regarding SMART intervention for additional learning
- Able to assess and provide intervention efficiently and effectively
- Very well executed
- Quite fast and accurate in giving instructions
- Good teamwork among team
- Once they see the patient, they will advise whether the patient care go higher to MICU and do blood investigation and intervention before sending patient to the higher care.
- Steady, accurate and fast.
- Accurate
- Decisive
- Assessing patient at bedside prior to transfer. Both doctors and nurses communicate well.
- Good, even if radiologist says otherwise, SMART team voice out their concerns and need for intervention.
- Will appreciate if SMART team will update ward nurse regarding latest intervention. It will aid a lot while handing over to ICU staff
- It will be beneficial for the SMART team to conduct a debriefing post activation with the ppl involved, this will allow improvements for individuals and gain more experiences
- Understandable and systematic approach in interventions
- Very critical in determining patients' survival
- Able to send patient in time before further deterioration happened in ward level
- They are very knowledgeable and felt assured once SMART team is here when dealing with critically ill patients, especially when I do not have much experience in this despite the number of years in nursing.
- Effective and supportive

3. Patient disposition

- Good
- Very professional
- To have seminar to all staff for additional learning
- Very systematic

- Helped in ‘resuscitation’ of patient, advised on further management, arranged ICU bed
- All the team able to advise the following steps of care for patient.
- Professional, calm
- Calm, systematic
- Organised
- Accurate
- Efficient in allocation and disposition of care
- Fast. As they know the ICU bed availability

4. Collaboration and education

- Very good
- Get the ‘new’ nurses to listen to discussion on caring of deteriorating/ill patients.
- Need to create awareness for nurses on SMART team, e.g. quarterly roadshow, orientation programme for new nurses
- Able to clearly instruct nurses about process of resuscitation and arrange for further management in higher level of care
- Excellent teamwork and great learning experience.
- Seminar for all staff for additional learning
- Teach nurses more about SMART team activation and capability
- Able to provide education on patient’s condition
- Good collaboration
- If the situation permits, a bit of involvement of the staff nurse in charge so can familiarised some of the drugs used and when the patient be transferred.
- Continue to collaborate with the nurse in-charge/nurse assisting in the care of the critically ill patient in a cool and calm manner but still with a sense of urgency. This really helps in preventing us from having sudden ‘brain block’ from panic attacks while attending to the patient.
- Good communication
- Great team
- The APN in the SMART team able to collaborate with the nurses on the care of patient
- Able to collaborate with ward nurses.
- Instructions given were direct and clear. Easy to follow and understand.
- SMART team allay ward nurse’s anxiety by working together and helping when patient is deteriorating
- Very thankful to SMART nurses for updating us regarding patient after care.
- Well collaborated
- If the time & opportunity permits, could also educate more on management of critical ill patient to ward nurses.
- SMART team and ground nurses have open communication and willing to help ground nurses if they are unsure. Their knowledge is willingly shared.
- Good to have some sharing session on the nursing roles for nurses involved in SMART activation biannually or yearly. Perhaps can also tie on to LSCN trained nurses on their roles to facilitate on prompt management of care.
- Good collaboration
- Thanks for all the information provided yesterday.
- Was useful

- Fast
- Very clear and precise
- They are very fast and knowledgeable
- Effective
- Delegate and tell the nurses the next step on what to do.
- Supportive and educated on inotrope administration
- It will be good that the team give us feedback on how we nurse in ward do well or need to improve. How we can cooperate with them well after the resuscitation.

5. Communication and handover

- Very good and clear
- Straightforward, and highlights on management for patient.
- Escalation of SMART team policy or algorithm for nurses in case the primary team is not able to attend to patient timely or when during night shift when the on-call doctors are busy attending to other sick patients; reinforce for nurses to use ISBAR should nurses activate or initiate SMART team and/or using a template sheet for SMART team activation.
- Excellent communication and handover
- Always admired especially APN with their assessment and communicating with patients and team physicians
- Seminar for all staff for additional learning
- Communicate with nurses promptly and managing condition of patient together
- Very clear and precise
- Great
- The SMART team able to handover effectively to the nurses by informing them what are the investigation and care for the patient.
- Very efficient
- Instructions given were direct and clear. Easy to follow and understand.
- SMART team communicate effectively among one another
- Sometimes SMART doctors come and review patient but no involvement with the ward nurses. Nurses usually need to wait for update in the system before knowing next intervention.
- Done well
- It will be good to let the ward nurses be aware of SMART activation and updating on the management of patient instead of just communicating with the team doctor
- Effective handover between primary nurses and doctors
- Perfect
- Clear and rationale
- They ensure clear and precise instructions for ward nurses to follow SMART review.
- Detailed
- Effective