Executive Summary: Society of Critical Care Medicine Guidelines on Recognizing and Responding to Clinical Deterioration Outside the ICU

RATIONALE: Clinical deterioration of patients hospitalized outside the ICU is a source of potentially reversible morbidity and mortality. To address this, some acute care facilities have implemented systems aimed at detecting and responding to such patients.

OBJECTIVES: To provide evidence-based recommendations for hospital clinicians and administrators to optimize recognition and response to clinical deterioration in non-ICU patients.

PANEL DESIGN: The 25-member panel included representatives from medicine, nursing, respiratory therapy, pharmacy, patient/family partners, and clinician-methodologists with expertise in developing evidence-based clinical practice guidelines.

METHODS: We generated actionable questions using the Population, Intervention, Control, and Outcomes format and performed a systematic review of the literature to identify and synthesize the best available evidence. We used the Grading of Recommendations Assessment, Development, and Evaluation approach to determine certainty in the evidence and to formulate recommendations and good practice statements (GPSs).

RESULTS: The panel issued 10 statements on recognizing and responding to non-ICU patients with critical illness. Healthcare personnel and institutions should ensure that all vital sign acquisition is timely and accurate (GPS). We make no recommendation on the use of continuous vital sign monitoring among "unselected" patients due to the absence of data regarding the benefit and the potential harms of false positive alarms, the risk of alarm fatigue, and cost. We suggest focused education for bedside clinicians in signs of clinical deterioration, and we also suggest that patient/family/care partners' concerns be included in decisions to obtain additional opinions and help (both conditional recommendations). We recommend hospital-wide deployment of a rapid response team or medical emergency team (RRT/MET) with explicit activation criteria (strong recommendation). We make no recommendation about RRT/MET professional composition or inclusion of palliative care members on the responding team but suggest that the skill set of responders should include eliciting patients' goals of care (conditional recommendation). Finally, quality improvement processes should be part of a rapid response system (GPS).

CONCLUSIONS: The panel provided guidance to inform clinicians and administrators on effective processes to improve the care of patients at-risk for developing critical illness outside the ICU.

KEYWORDS: clinical deterioration; Grading of Recommendations Assessment, Development, and Evaluation; guidelines; medical emergency teams; rapid response system

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SUMMARY

Early identification and prompt response to clinical deterioration confer the greatest chance of improving outcomes among patients hospitalized outside the ICU. Healthcare institutions employ various means to better detect and treat critical illness in these patients, ranging from the use of vital sign-based guidelines, electronic surveillance, and deployment of ICU-based outreach teams for obtaining help. We provide evidence-based recommendations to guide clinicians and institutional leaders in implementing systems intended to improve patient safety and reduce morbidity and mortality. This guideline is intended to be a new Society of Critical Care Medicine guideline. We provide a detailed description of the methodology in the main guideline document.

RECOMMENDATIONS

We issued 10 clinical practice guideline statements: four Grading of Recommendations Assessment, Development, and Evaluation (GRADE) recommendations, three "no recommendations," and three good practice statements (GPSs) on recognizing and responding to clinical deterioration outside the ICU. The accompanying full article (1) describes practice guideline statements with the rationale for each. Please refer to the supplemental digital content for the scope of the guideline and PICO questions (**Supplemental Digital Content 3,** http://links.lww.com/CCM/H433), outcome prioritization (**Supplemental Digital Content 4**, http://links.lww.com/CCM/H433), literature search strategy (**Supplemental Digital Content 5**, http://links.lww.com/CCM/H433), systematic review process and data synthesis (**Supplemental Digital Content 6**, http://links.lww.com/CCM/H433), GRADE methodology (**Supplemental Digital Content 7**, http://links.lww.com/CCM/H433), details on Good Practice Statements (**Supplemental Digital Content 8**, http://links.lww.com/CCM/H433), final voting process and results (**Supplemental Digital Content 9**, http://links.lww.com/CCM/H433), and evidence profiles and forest plots pertaining to each recommendation (**Supplemental Digital Content 10**, http://links.lww.com/CCM/H433). The infographic (**Fig. 1**) presents an abbreviated summary containing the seven actionable recommendations.

Question 1: Should practitioners strive to obtain and document accurate and timely vital sign measurements in hospitalized patients?

Good Practice Statement: Ward staff caring for hospitalized patients should strive to acquire a complete and accurate set of vital signs when ordered and when there is additional cause for concern and to escalate the reporting of significant abnormalities to the appropriate clinicians in an urgent manner.

Rationale: A complete evaluation of patients' vital signs, including temperature, heart rate, respiratory rate, blood pressure, oxygen saturation, mental status and supplemental signs (e.g., pain, end-tidal CO_2, certain laboratory values) provide important information about the patient's clinical condition and often foreshadow impending clinical deterioration. Vital signs also represent the core of multiparameter early warning systems, which are seeing increased use. The entire panel felt that if vital signs were obtained timely and accurately, and transmitted with high fidelity, with prompt response to early abnormalities, frequency of failure to rescue, and associated morbidity and mortality, would decrease, meeting the criteria for a GPS.

Question 3: Should hospitals provide focused education for non-ICU staff on early recognition of clinical deterioration compared with no focused education?

Recommendation: We "suggest" focused education of direct-care non-ICU hospital clinicians on recognizing early clinical deterioration ("conditional recommendation, low certainty evidence").

Rationale: Education regarding recognition of clinical deterioration in non-ICU wards is often part of system processes for event detection. Studies evaluating this intervention varied in target audience (non-ICU nurses, physicians, medical trainees), format (in person vs. online), and structure (didactic vs. interactive) (2–22). Notwithstanding this heterogeneity, there was low certainty evidence that focused education for non-ICU bedside clinicians may be associated with reduced cardiac arrests outside the ICU (3, 16, 21, 22), ICU length of stay (10, 14, 18), and improved care processes (19, 20). There were no reported undesirable clinical effects, thus deeming this intervention to be low risk and its implementation feasible at most centers. Thus, the panel concluded that focused education for non-ICU staff should be considered by most centers but agreed that education alone is unlikely to yield meaningful clinical effects unless implemented as part of a comprehensive multifaceted rapid response system (RRS), which consists of rapid response teams/medical emergency teams (RRTs/METs), in conjunction

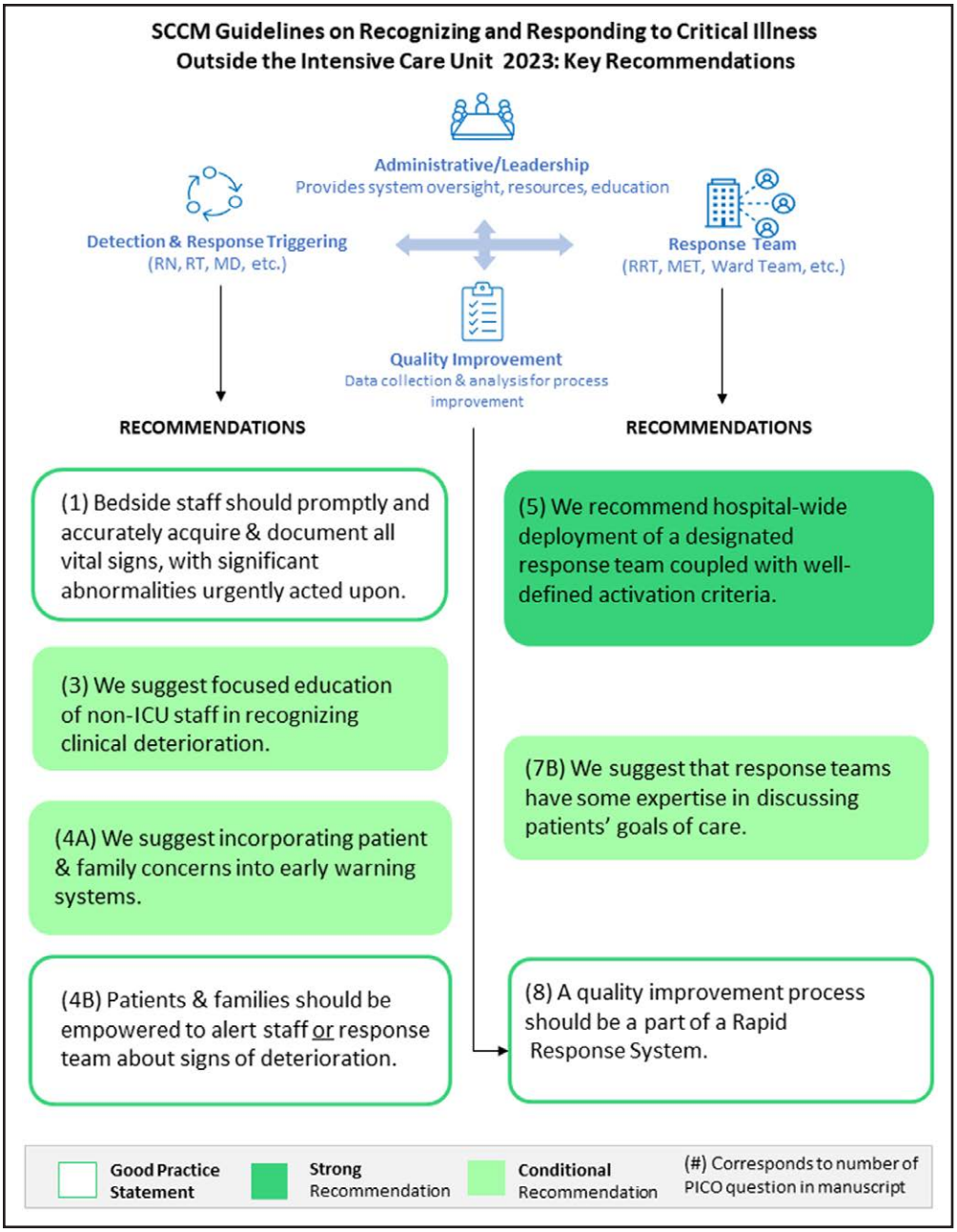

Figure 1. Society of Critical Care Medicine (SCCM) guidelines on recognizing and responding to critical illness outside the ICU 2023: Key recommendations. MD = medical doctor, MET = medical emergency team, RN = registered nurse, PICO = Population, Intervention, Control, and Outcomes, RT = respiratory therapist, RRT = rapid response team.

with explicit activation criteria and a quality assurance system ("see Infographic").

Question 4: Should patient/family member/care partner activation of a response team be included as a formal part of an early warning system as compared with no formal inclusion?

Good Practice Statement: Patients, families, and care partners of hospitalized patients are able to recognize subtle differences in clinical status that may signify deterioration and should be empowered to alert appropriate personnel, including the RRS.

Recommendation: We "suggest" that patient, family, and care partner concerns be incorporated into hospital early warning systems (conditional recommendation, low certainty evidence).

Rationale: This question addressed the deployment of a formal pathway for patients and care-partners to activate response teams directly, without the need to discuss their concerns first with their primary care team. We addressed this question using two statements: A GPS and a GRADEd recommendation statement. We found low certainty evidence from five before-after studies that this intervention may be associated with lower mortality and fewer unsuccessful resuscitation events (23–27). Although there may be concerns about a higher number of response team activations, the evidence is uncertain and patient/family activations, where implemented, are uncommon. Under-evaluated benefits of this intervention may include more timely attention to patient/family/care partner concerns regarding the patient's care. The panel unanimously agreed that patients and care partners should be empowered to escalate their patient concerns to the healthcare team and, when deemed necessary, directly to the response team, meeting the criteria for a GPS. There was low certainty in the evidence and mixed perspectives among panel members for the formal incorporation of patient/

family/care partner concerns into the hospital's early warning system, which led to a conditional recommendation pending further research.

Question 5A: Should hospitals implement hospital-wide explicit activation criteria to help recognize deteriorating non-ICU patients as compared with no such criteria?

Question 5B: Should hospitals deploy a designated RRT/MET as compared with the absence of a designated RRT/MET?

Recommendation: We "recommend" hospital-wide deployment of designated RRSs (i.e., RRT/MET) for non-ICU patients that includes explicit activation criteria for obtaining help ("strong recommendation, moderate certainty evidence").

Rationale: This recommendation addresses two important components in recognizing and responding to non-ICU patient deterioration: 1) the identification of acute patient deterioration requiring additional help (bedside clinicians trained in acquiring, understanding, and utilizing criteria for obtaining help) and 2) the deployment of a designated RRT/MET with expertise in addressing clinical deterioration. Due to a high overlap between these two interventions in most studies, the panel was unable to isolate the impact of each and thus addressed them in a single recommendation. There is moderate certainty evidence from four randomized controlled trials that the application of explicit activation criteria and deployment of a designated hospital-wide RRT/MET leads to a reduction in mortality and cardiac arrest (28–32). In implementing this intervention, hospitals should consider and address the risk of de-skilling of non-ICU staff by overreliance on RRT/MET for patient care. The role/impact of emergency departments and physicians regarding this intervention is discussed in Population, Intervention, Control, and Outcomes 5 and 6 in the main article.

Question 7: Should an RRT/MET include palliative care trained personnel (7A) and/or focused education/guidance regarding goals of care discussions for clinicians (7B)?

Recommendation 7B: We "suggest" ensuring that responding clinicians have expertise on eliciting patients' goals of care and establishing treatment plans that best reflect their wishes and prognoses ("conditional recommendation, low certainty evidence").

Rationale: Response team activation represents an opportunity to ensure that ongoing therapies are administered in a manner that is consistent with patients' wishes and values. Studies suggest that education/guidance for clinicians to address goals of care may improve documentation of patients' preferences and, in some cases, changes in resuscitation status to reflect patients' wishes (33–35). Although the panel acknowledged the potential for disagreement between response team personnel and ward clinicians regarding the timing and content of goals of care discussions, this is outweighed by the benefits of improving communication with patients and their families and ensuring that treatment is consistent with patients' wishes, values, and prognosis.

Question 8: Should there be a quality improvement component, such as debriefing and measuring, recording/reporting of performance metrics as part of an RRS?

Good Practice Statement: A process for quality improvement should be part of an RRS.

Rationale: Numerous centers have implemented a variety of quality improvement initiatives that vary in timing, approach, and complexity. Centers with successful RRSs have found that documentation and review of events and metrics help to identify opportunities to improve care. Patient/family engagement in quality improvement initiatives is important to ensure patient- and family-centered care. The panel agreed that the optimal approach to quality improvement will vary across centers depending on the local context (e.g., patient volumes, acuity, and available resources) but that a process for quality improvement is an important component of caring for deteriorating patients and this met the criteria for a GPS.

CONCLUSIONS

The Task Force considered care processes in a number of areas related to the detection and care of patients outside of the ICU who experience a deterioration in clinical status. This summary presents immediately actionable practices that, if implemented, will recognize earlier and respond promptly to clinical deterioration in noncritical care areas of the hospital, frequently leading to improved outcomes and less suffering. These recommendations include: 1) healthcare personnel and institutions should ensure that all vital sign acquisition is timely and accurate (GPS) and 2) focused education should be provided for bedside clinicians in signs of clinical deterioration and response

team activation and that patient/family/care partners' concerns be included in decisions to obtain additional help (both conditional recommendations). We strongly recommend hospital-wide deployment of an RRT/MET coupled with explicit activation criteria. We suggest that lead members of the response team be oriented or trained in eliciting and documenting patients' goals of care (conditional recommendation). Finally, quality improvement processes are an important part of an effective RRS (GPS).

This summary document does not address questions where evidence did not support a specific practice or intervention, such as the leadership of outreach teams, the need for palliative care personnel on teams, or the need for continuous monitoring, although the importance of these questions may be equally relevant to Critical Care practitioners. We point the reader to the main document (1) for a complete discussion of all questions considered by the our task force regarding the "Earlier Recognition and Intervention on Patients At-risk for Critical Illness Outside the ICU" Task Force.

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REFERENCES

1. Honarmand K, Wax RS, Penoyer D, et al: Society of Critical Care Medicine Guidelines on Recognizing and Responding to Clinical Deterioration Outside the ICU: 2023. *Crit Care Med* 2024; 52:314–330
2. Hillman K, Chen J, Cretikos M, et al; MERIT study investigators: Introduction of the medical emergency team (MET) system: A cluster-randomised controlled trial. *Lancet* 2005; 365:2091–2097
3. Davis DP, Aguilar SA, Graham PG, et al: A novel configuration of a traditional rapid response team decreases non-intensive care unit arrests and overall hospital mortality. *J Hosp Med* 2015; 10:352–357
4. Chatwood AK, Osborne M: The impact of an integrated resuscitation and critical care training programme on cardiac arrest rates and survival after cardiac arrest. *Resuscitation* 2010; 81(2 Suppl 1):S96
5. Buist MD, Moore GE, Bernard SA, et al: Effects of a medical emergency team on reduction of incidence of and mortality from unexpected cardiac arrests in hospital: Preliminary study. *BMJ* 2002; 324:387–390
6. Bradley P, DePolo M, Tipton J, et al: Improving sepsis survival using MEWS for early recognition and immediate response to patient decline. *Crit Care Med* 2019; 47(1 Suppl 1):788
7. Bunkenborg G, Samuelson K, Poulsen I, et al: Lower incidence of unexpected in-hospital death after interprofessional implementation of a bedside track-and-trigger system. *Resuscitation* 2014; 85:424–430
8. Campello G, Granja C, Carvalho F, et al: Immediate and long-term impact of medical emergency teams on cardiac arrest prevalence and mortality: A plea for periodic basic life-support training programs. *Crit Care Med* 2009; 37:3054–3061
9. Fuhrmann L, Perner A, Klausen TW, et al: The effect of multiprofessional education on the recognition and outcome of patients at risk on general wards. *Resuscitation* 2009; 80:1357–1360
10. Guirgis FW, Jones L, Esma R, et al: Managing sepsis: Electronic recognition, rapid response teams, and standardized care save lives. *J Crit Care* 2017; 40:296–302
11. Heal M, Silvest-Guerrero S, Kohtz C: Design and development of a proactive rapid response team. *Comput Inform Nurs* 2017; 35:77–83
12. Jones D, Bates S, Warrillow S, et al: Effect of an education programme on the utilization of a medical emergency team in a teaching hospital. *Intern Med J* 2006; 36:231–236
13. Jones D, Opdam H, Egi M, et al: Long-term effect of a medical emergency team on mortality in a teaching hospital. *Resuscitation* 2007; 74:235–241
14. Joshi KS, Campbell VK, Gooch RJ, et al: Adult deterioration detection system (Q-ADDS) based rapid response system (RRS) reduces severity of illness and length of stay of ICU admissions from the ward in a regional hospital. *Intensive Care Med Exp* 2015; 3(Suppl 1):A141
15. Leech C, Cosgrove J, Laws P: MEWS (Modified Early Warning Score) chart completion as a marker for quality in the early recognition of acutely ill patients. The experience of a UK University Teaching Hospital NHS Trust. *J Intensive Care Soc* 2014; 15(1 Suppl 1):S32
16. Lighthall GK, Parast LM, Rapoport L, et al: Introduction of a rapid response system at a United States Veterans Affairs hospital reduced cardiac arrests. *Anesth Analg* 2010; 111:679–686
17. Merriel A, van der Nelson H, Merriel S, et al: Identifying deteriorating patients through multidisciplinary team training. *Am J Med Qual* 2016; 31:589–595
18. Mullany DV, Ziegenfuss M, Goleby MA, et al: Improved hospital mortality with a low MET dose: The importance of a modified early warning score and communication tool. *Anaesth Intensive Care* 2016; 44:734–741
19. Peebles RC, Nicholson IK, Schlieff J, et al: Nurses' just-in-time training for clinical deterioration: Development, implementation and evaluation. *Nurse Educ Today* 2020; 84:104265
20. Raines K, Sevilla Berrios RA, Guttendorf J: Sepsis education initiative targeting qSOFA screening for non-ICU patients to improve sepsis recognition and time to treatment. *J Nurs Care Qual* 2019; 34:318–324
21. Sebat F, Vandegrift M, Amato V, et al: Effect on patient outcomes of rapid response system focused on the afferent arm. *Am J Respir Crit Care Med* 2014; 189:A4463
22. Mitchell IA, McKay H, Van Leuvan C, et al: A prospective controlled trial of the effect of a multi-faceted intervention on early recognition and intervention in deteriorating hospital patients. *Resuscitation* 2010; 81:658–666
23. Zix J, Giaccone M, Wheeler D, et al: Family activated rapid response team: What we know five years later. *Crit Care Med* 2012; 40(12 Suppl 1):1–328
24. McCawley BA, Gannotta RJ, Champagne MT, et al: Calling a "condition H." *Nurs Manage* 2013; 44:30–35
25. Brady PW, Zix J, Brilli R, et al: Developing and evaluating the success of a family activated medical emergency team: A quality improvement report. *BMJ Qual Saf* 2015; 24:203–211
26. Gerdik C, Vallish RO, Miles K, et al: Successful implementation of a family and patient activated rapid response team in an adult level 1 trauma center. *Resuscitation* 2010; 81:1676–1681
27. Hueckel RM, Mericle JM, Frush K, et al: Implementation of condition help: Family teaching and evaluation of family understanding. *J Nurs Care Qual* 2012; 27:176–181
28. Ludikhuize J, Borgert M, Binnekade J, et al: Standardized measurement of the modified early warning score results in enhanced implementation of a rapid response system: A quasi-experimental study. *Resuscitation* 2014; 85:676–682

29. Haegdorens F, Van Bogaert P, Roelant E, et al: The introduction of a rapid response system in acute hospitals: A pragmatic stepped wedge cluster randomised controlled trial. *Resuscitation* 2018; 129:127–134
30. YekeFallah L, Eskandari Z, Shahrokhi A, et al: Effect of rapid response nursing team on outcome of patient care. *Trauma Monthly* 2018; 23:e14488
31. Priestley G, Watson W, Rashidian A, et al: Introducing critical care outreach: A ward-randomised trial of phased introduction in a general hospital. *Intensive Care Med* 2004; 30:1398–1404
32. Jeddian A, Hemming K, Lindenmeyer A, et al: Evaluation of a critical care outreach service in a middle-income country: A stepped wedge cluster randomized trial and nested qualitative study. *J Crit Care* 2016; 36:212–217
33. Picker D, Dans M, Heard K, et al: A randomized trial of palliative care discussions linked to an automated early warning system alert. *Crit Care Med* 2017; 45:234–240
34. Johnson CE, Chong JC, Wilkinson A, et al: Goals of patient care system change with video-based education increases rates of advance cardiopulmonary resuscitation decision-making and discussions in hospitalised rehabilitation patients. *Intern Med J* 2017; 47:798–806
35. Tam B, Salib M, Fox-Robichaud A: The effect of rapid response teams on end-of-life care: A retrospective chart review. *Can Respir J* 2014; 21:302–306