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Society of Critical Care Medicine Guidelines on Recognizing and Responding to Clinical Deterioration Outside the ICU: 2023

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RATIONALE: Clinical deterioration of patients hospitalized outside the ICU is a source of potentially reversible morbidity and mortality. To address this, some acute care hospitals 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 (PICO) 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. 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.

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

Critical illness in hospitalized patients is increasingly managed in ICUs to enable access to specific expertise, frequent clinical assessments, and technological support to manage life-threatening injuries and/or illness

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(1). When the onset of critical illness occurs outside of the ICU, early identification and prompt response to deterioration confer the greatest chance of success, yet may be hampered by an environment where the staffing ratios and resource base are configured for lower levels of acuity. Various schemes for patient screening and clinician response—typified by rapid response systems (RRSs)—have been used, yet there is uncertainty over which components of such interventions provide measurable benefits to patients. This Clinical Practice Guideline (CPG) provides evidence-based recommendations and expert guidance for practitioners and decision-makers regarding processes for: 1) early recognition of non-ICU patients at-risk for critical illness, and 2) prompt mobilization of appropriate resources to improve their care.

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METHODOLOGY

Panel Membership

Society of Critical Care Medicine (SCCM) appointed chairs (F.S., R.W.) and vice-chairs (D.P., G.L.) who convened a panel of 25 experts in acute illness and RRS including a patient/family representative (**Supplemental Digital Content 1**, http://links.lww.com/CCM/H434). The Guidelines in Intensive Care Development and Evaluation (GUIDE) group, represented by two clinician-methodologists (K.H., B.R.), provided methodological leadership based on the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) methodology (2). SCCM provided logistic and material support.

Conflicts of Interest Management

Panel members disclosed all potential financial and intellectual conflicts of interest according to the American College of Critical Care Medicine (ACCM)/SCCM Standard Operating Procedures, which were reviewed and managed by SCCM (**Supplemental Digital Content 2**, http://links.lww.com/CCM/H434).

Question Development and Outcome Prioritization

In a series of meetings, panel members established the scope of the guideline and formulated actionable population, intervention, comparator, outcomes (PICOs) questions related to the early recognition and response to clinical deterioration outside the ICU (**Supplemental Digital Content 3**, http://links.lww.com/CCM/H434). The panel also generated a list of outcomes which they then prioritized based on perceived patient-importance (**Supplemental Digital Content 4**, http://links.lww.com/CCM/H434).

Systematic Review

A professional librarian performed a systematic search of the literature to identify studies that were potentially relevant to the PICO questions (**Supplemental Digital Content 5**, http://links.lww.com/CCM/H434). A team of reviewers (V.C.D., P.K., S.W., J.D.H.) led by the clinician-methodologists (B.R., K.H.) screened and selected relevant articles, followed by data extraction and risk of bias assessment, according to standard systematic review methodology (**Supplemental Digital Content 6**, http://links.lww.com/CCM/H434). Where possible, we performed meta-analysis of data using random effects models and inverse variance weighting (dataparty.ca). Where data were insufficient for meta-analysis, we summarized evidence narratively.

GRADE Assessment

We performed assessment of the certainty in the evidence for each outcome using GRADE methodology (2) and generated evidence profiles using GRADEPro Guideline Development Tool (www.gradepro.org; **Supplemental Digital Content 7**, http://links.lww.com/CCM/H434).

Formulating Recommendations

In a series of web-based meetings, the panel used the GRADE Evidence-to-Decision framework (3) to generate recommendations. **Table 1** presents the GRADE classification of recommendation strength and their respective implications.

For questions addressing interventions in which the benefits unequivocally outweighed harms and met the appropriate criteria, the panel generated good practice statements (GPSs). According to GRADE, these statements are considered equivalent to strong recommendations but are clearly differentiated within the manuscript and intentionally worded differently from

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TABLE 1.

Grading of Recommendations, Assessment, Development, and Evaluation Classification of Strengths of Recommendations and Their Implications

Implications for…	Strong Recommendation "We recommend…"	Conditional Recommendation "We suggest…"
	Desirable effects of intervention clearly outweigh undesirable effects, or clearly do not.	Trade-offs are less certain, either because of low-quality evidence or because evidence suggests desirable and undesirable effects are closely balanced.
… patients	Most individuals in this situation would want the recommended course of action and only a small proportion would not	The majority of individuals in this situation would want the suggested course of action, but many would not
… clinicians	Most individuals should receive the recommended course of action. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator. Formal decision aids are not likely to be needed to help individuals make decisions consistent with their values and preferences	Different choices are likely to be appropriate for different patients, and therapy should be tailored to the individual patient's circumstances. Those circumstances may include the patient or family's values and preferences
… policymakers	The recommendation can be adapted as policy in most situations including for use as performance indicators	Policymaking will require substantial debates and involvement of many stakeholders. Policies are also more likely to vary between regions. Performance indicators would have to focus on the fact that adequate deliberation about the management options has taken place

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GRADEd PICOs (**Supplemental Digital Content 8**, http://links.lww.com/CCM/H434) (4).

Voting Process

Panel members reviewed and approved all recommendations and rationales by a formal web-based vote. We defined consensus as 80% agreement among at least 75% of panel members (**Supplemental Digital Content 9**, http://links.lww.com/CCM/H434).

UPDATING THE RECOMMENDATIONS

As new evidence emerges in the literature, the guideline panel is committed to ensuring that the current recommendations are affirmed, updated, and expanded at regular intervals based on directives from the ACCM.

RECOMMENDATIONS

The panel generated 10 statements which are summarized in **Table 2**.

PART A. EARLY RECOGNITION OF CLINICAL DETERIORATION

This section covers recommendations related to the early recognition of clinical deterioration among patients hospitalized outside the ICU.

VITAL SIGN MEASUREMENT AND DOCUMENTATION

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. Clinical deterioration represents a loss of homeostatic functions in the face of an illness and leads to measurable changes from baseline conditions, with severity reflected by the degree of changes in vital signs. Vital signs are the simplest, cheapest, and most widely accepted signs of clinical change, and should be obtained at intervals appropriate for a patient's level

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TABLE 2.
Summary of Recommendations

Recommendation	Recommendation Strength, Quality of Evidence
Recognizing clinical deterioration	
1. 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	Good practice statement
2. We make no recommendation regarding the routine use of continuous vital sign monitoring to recognize early clinical deterioration in unselected non-ICU patients	No recommendation
3. We suggest focused education of direct-care non-ICU hospital clinicians on recognizing early clinical deterioration	Conditional recommendation, low certainty evidence
4A. 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 rapid response system	Good practice statement
4B. We suggest that patient, family, and care partner concerns be incorporated into hospital early warning systems	Conditional recommendation, low-certainty evidence
Responding to clinical deterioration	
5. We recommend hospital-wide deployment of rapid response systems (i.e., RRT/MET) for non-ICU patients that include explicit activation criteria for obtaining help from a designated response team	Strong recommendation, moderate certainty evidence
6. We make no recommendations regarding 1) whether an RRT/MET should be led by a "prescribing clinician" vs. a "non-prescribing clinician"; and 2) whether an RRT/MET should be led by a physician as compared to other healthcare providers	No recommendation
7A. We make no recommendation about involvement of palliative care-trained personnel as part of an RRT/MET	No 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
8. A process for quality improvement should be part of a Rapid Response System	Good practice statement

MET = medical emergency team, RRT = rapid response team.

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of illness and when unexpected abnormalities arise. Traditional vital signs include temperature, heart rate, respiratory rate, blood pressure, and oxygen saturation, with supplemental signs, such as pain and mental status often included. Vital signs are the most widespread triggers for summoning additional help and evaluation, and are also the core component of multiparameter early warning systems. Some advocate measuring end-tidal carbon dioxide for respiratory status (5) for patients using patient-controlled analgesia, certain laboratory values (e.g., lactate), and capillary refill time for peripheral perfusion (6).

The panel agreed that if full advantage is to be gained from obtaining vital signs, they need to be acquired in the most accurate manner possible, and with significant abnormalities reported to the appropriate personnel in a timely manner. However, numerous studies demonstrate incomplete and/or incorrect vital sign measurement is common in hospitalized patients (7, 8) leading to failure to detect or recognize key signs of deterioration. We also noted the importance of education (9), audits (7), and feedback to encourage improvement (10, 11) and compliance (9) with proper measurement techniques, accurate documentation, and prompt response to significant physiologic abnormalities.

Routine Continuous Vital Sign Monitoring in Unselected Non-ICU Patients

Recommendation. We make no recommendation regarding the routine use of continuous vital sign

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monitoring to recognize early clinical deterioration in unselected non-ICU patients.

Rationale.

Evidence Summary. Fourteen studies (3 randomized controlled trials [RCTs] [12–14], 11 observational [15–25]) reported inhospital clinical outcomes associated with continuous vital sign monitoring compared with intermittent monitoring (**Supplemental Digital Content 10*A***, http://links.lww.com/CCM/H434).

The intervention may be associated with decreased ICU length of stay (two observational studies [21, 24], low certainty). Evidence suggests uncertain effects of this intervention on mortality (two RCTs [12, 14], seven observational studies [15, 17, 18, 20, 23–25]; very low certainty), cardiac arrests (two RCTs [12, 13] and six observational studies [17, 19–22, 24]; very low and low certainty, respectively), unplanned transfers to ICU (three RCTs [12-14] and eight observational studies [17–21, 23–25]; very low and low certainty, respectively), time to recognition of clinical deterioration (two observational studies [16, 19]; very low certainty), implementation of appropriate treatment (i.e., time to antibiotics in sepsis; one RCT [14]; very low certainty) and changes in goals of care/ resuscitation status (two observational studies [17, 20]; very low certainty).

Evidence to Recommendation. There was low certainty in the evidence for the desirable effects of the intervention. Although we found no evidence of undesirable effects, the panel acknowledged possible disrupted patient sleep and increased staff workload with frequent false alarms are of concern, but inadequately evaluated. The panel speculated that continuous vital sign monitoring may create a false sense of security that may substitute for other forms of meaningful patient contact including bedside assessments.

No studies reported the resource requirements associated with the intervention in unselected patients, although monitoring technology and personnel are required with varying costs. As such, cost-effectiveness is unknown. Concerns were discussed about the potential impact of the intervention on health inequity regarding racial or ethnicity-related differences in the accuracy of some monitoring devices (26, 27). The panel agreed that the intervention is probably feasible in some jurisdictions, but not in low-resource settings. The panel agreed that continuous vital sign monitoring provides benefit in some patients and settings (i.e., patient-controlled analgesia infusions, active cardiac disease), but judged the evidence for default use in all (unselected) hospitalized patients to be insufficient.

Focused Education on Recognition of Early Clinical Deterioration

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

Rationale.

Evidence Summary. Twenty-one studies (1 cluster RCT [28], 20 before-after studies [29–48]) reported outcomes following the implementation of focused education programs; most were bundled with other interventions when implementing an RRT/MET. Education varied in format (i.e., in-person vs. online), structure (i.e., didactic vs. interactive sessions), and target audience (i.e., general ward nurses vs. physicians). See **Supplemental Digital Content 10*B*** (http://links.lww.com/CCM/H434) for the GRADE evidence profile.

The effect of focused education independent of other interventions on mortality, non-ICU cardiac arrests, hospital length of stay, and transfers to higher levels of care was uncertain (very low certainty for all outcomes). There was a possible reduction in ICU length of stay (low certainty) (36, 40, 44), increased compliance with early warning systems (low certainty), and possibly decreased time from RRT/MET activation to physician review (very low certainty).

Evidence to Recommendation. The desirable effects of focused education may include improved pairing between patients needing RRT/MET services and receipt of such services, with possible reductions of morbidity, mortality, resource use, and costs. Despite the low to very low-certainty evidence for benefit, the panel acknowledged that in GPSs, education was often part of an implementation or quality improvement (QI) package, of which the value of individual components is difficult to assess on their own. Thus, the clinical benefit of focused education may be underestimated in this analysis.

Undesirable patient effects of focused education were not identified. The panel considered factors, such as information/cognitive overload among healthcare providers and cost of the intervention. Depending on its effectiveness, costs may or may not be offset. The

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panel agreed the intervention would be acceptable to healthcare providers although feasibility will vary depending on the complexity.

Special considerations. The panel agreed that education that is directed toward a specific behavior, such as calling for help in specific situations, instituting protocols when needed, and performing key actions in specific situations is unlikely to lead to meaningful clinical benefit without incorporation into a structured RRS (see infographic) with some form of audits and feedback (see Recommendation 5).

The panel identified areas of future research, including identifying:

- Course content: types of knowledge required based on the type of institution/clinical setting;
- Course duration, frequency, and format;
- Evaluation of cost-effectiveness;
- Duration of the learning effects and need for reinforcement over time.

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Patient, Family, and Care Partner RRT/MET Activation as a Formal Part of an Early Warning System

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 GPS.

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

Rationale.

Evidence Summary. A recent SCCM CPG provides recommendations regarding family-centered care in the ICU (49). Here, we considered patient/family/care partner activation of RRT/MET to include a hospital-led, formalized pathway for patients, family members, and care partners to trigger and communicate with the RRT/MET directly, without requiring involvement by their primary medical team.

We identified five before-after studies that reported clinical outcomes after the implementation of patient/family/care partner RRT/MET activations among hospitalized adults (two studies) and children (three studies) (50–54) (**Supplemental Digital Content 10*C***, http://links.lww.com/CCM/H434). This intervention may be associated with decreased rates of mortality (one study [53]) and unsuccessful resuscitations (one study [53]), but no change in the rate of non-ICU cardiac arrests (three studies [51–53]; low certainty for all outcomes). Effects on unplanned transfers to ICU (two studies [51, 53]) and number of RRT/MET activations (four studies [50, 51, 53, 54]) were unclear (very low certainty for both).

The proportion of RRT/MET calls resulting in transfer to a higher level of care was increased in staff activations compared with family activations in three studies (50–52), while the fourth study reported that all family activations led to transfer to a higher level of care (55).

Evidence to Recommendation. The panel judged the overall certainty in the evidence to be low but agreed that there are other potential benefits for patient/family/care partner activation that are challenging to evaluate in quantitative studies (i.e., timely attention to patient/family/care partner concerns and opportunities for improved communication and care).

Despite concerns about increased RRT/MET personnel workload, patient/family/care partner RRT/MET activations, where they exist, are uncommon and mostly occur when there is a communication breakdown between the primary team and these stakeholders. The panel agreed that such activations are justified by more timely interventions or resolution of these stakeholders' concerns. As such, it was judged the balance of effects probably favors the intervention.

No studies were found reporting resource requirements associated with this intervention. The panel speculated that additional costs may come from establishing dedicated contact mechanisms and educational initiatives for patient/family/care partner RRT/MET activation Availability and presence of family members and care partners at the bedside provide greater opportunities for patient advocacy. The panel had concerns about the impact of this intervention on health inequity affecting non-dominant cultures, ethnic origins, or primary languages who may have variable access to this intervention. Remedies such as provision of translation tools in other languages may somewhat alleviate these concerns.

The panel judged that the intervention would be highly acceptable to patients, family members, and care partners. Some clinicians may have concerns

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about the potential risk to relationships between ward clinicians and patients, family members, and care partners. Training patients, family members, and care partners about the purpose of the RRT/MET and training clinicians around timely communication with these stakeholders may improve acceptability of this intervention.

The panel unanimously agreed that patients, families, and care partners should be empowered to communicate any concerns with the healthcare team and that it is important that clinicians should take measures to ensure that such concerns are heard and addressed in a timely manner. The panel agreed that hospitals should create means for these stakeholders to escalate their concerns over patient deterioration and that this met the criteria for a GPS.

The panel judged that data supporting the incorporation of patient/family/care partner concerns as a formal component of a hospital's early warning system was less concrete, with panel members holding different perspectives on the topic, leading to a conditional recommendation pending further research.

PART B. RESPONDING TO CLINICAL DETERIORATION

This section covers recommendations related to the response to clinical deterioration among patients hospitalized outside the ICU.

Explicit Activation Criteria and Rapid Response Team (RRT)/Medical Emergency Team (MET)

Recommendation. We recommend hospital-wide deployment of GPSs (i.e., RRT/MET) for non-ICU patients that include explicit activation criteria for obtaining help from a designated response team (strong recommendation, moderate certainty evidence).

Rationale.

Evidence Summary. This recommendation addresses the 1) identification of acute patient deterioration requiring additional help, and 2) the deployment of a designated rapid response team/medical emergency team (RRT/MET) with expertise in addressing clinical deterioration. We identified 6 relevant RCTs (28, 56–60) and 112 before-after studies (9, 17–20, 31, 33, 34, 36, 37, 39, 42, 44, 48, 61–158) that evaluated the impact of activation criteria and/or RRT/MET interventions on clinical outcomes (for details, see **Supplemental Digital Content 10*D***, http://links.lww.com/CCM/H434). Important heterogeneity existed across study designs and interventions, with many implementing activation criteria and RRT/MET simultaneously; thus, evaluating the impact of each in isolation was not possible.

Among RCTs, pooled results demonstrated a reduction in mortality (three RCTs; respiratory rate 0.74; 95% CI, 0.66–0.83; moderate certainty) and non-ICU cardiac arrests (two RCTs; mean difference –0.43; 95% CI, –0.88 to 0.02; moderate certainty). Both findings were supported by most observational studies. There was no effect on health-related quality of life or discharge to assisted living facilities (low certainty). Effects on transfers to a higher level of care and changes in goals of care were unclear (very low certainty).

Evidence to Recommendation. Desirable effects of activation criteria and a designated RRT/MET include a possible reduction in mortality among hospitalized patients (moderate certainty from RCTs and supported by most observational studies). More recent interventional trials have confirmed that deployment of an early warning risk score leads to decreased mortality (159). The literature did not identify any undesirable effects of this intervention. The panel considered possible overutilization and reliance on the RRT/MET and deskilling among non-ICU staff. However, these effects are speculative and not reported in the literature. Overall, the panel deemed the balance of effects to favor activation criteria with RRT/MET interventions.

Resource requirements will vary based on jurisdictional differences in activation criteria and RRT/MET composition. The panel deemed that cost-effectiveness probably favors the intervention. The panel judged that the intervention would be highly acceptable to patients. Although the primary care team should be part of RRT/MET activation, there may be a perceived infringement on their autonomy although potential patient benefit likely supersedes such concerns. The panel judged the intervention is probably feasible in most settings, including in smaller healthcare settings.

Special Considerations. The panel acknowledged the difficulty of evaluating the impact of separate, yet interdependent, components within this complex system. This analysis was not possible given the heterogeneity in study designs, the types of explicit activation criteria

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that were implemented, composition and structure of the RRT/MET, and reported outcomes. The panel strongly supported future research evaluating the impact of various types of activation criteria, such as those that are simple bedside parameters that are understood and acted upon by the patient's nurse or other clinicians vs. algorithmic electronic medical record analysis that predicts acute decline and summons help.

Most evidence supporting RRTs comes from their operation in non-ICU inpatient wards. Response to emergency departments (EDs) and other specialty areas within a hospital will depend on local needs and arrangements including consideration of support for admitted patients boarded in the ED.

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Rapid Response Team Leadership/ Composition

Recommendation. We make no recommendations regarding 1) whether an RRT/MET should be led by a "prescribing clinician" versus a "non-prescribing clinician," and 2) whether an RRT/MET should be led by a physician as compared to other healthcare providers.

Rationale.

Background. RRT/METs vary in their composition and approach to activations: 1) an RRT uses a "ramp-up" approach in which the initial response is most often led by a critical care-trained nurses (i.e., "non-prescribing clinicians"), who may then summon other clinicians as needed, and 2) a MET uses a "ramp-down" approach characterized by an initial presence of a prescribing clinician (i.e., physicians, nurse practitioners, or advanced care practitioners), which can be de-escalated as clinically indicated (160).

Evidence Summary. The panel considered two different comparisons:

1. RRT/MET led by a "prescribing" versus "non-prescribing" clinician. Due to high risk of bias, inconsistency, and imprecision across two included observational studies (**Supplemental Digital Content 10*E***, http://links.lww.com/CCM/H434), there were uncertain effects on mortality (one study) (161), hospital length of stay (one study) (161), unplanned ICU transfers (two studies) (93, 161), and RRT/MET activations (one study) (93) (very low certainty for all outcomes).
2. The presence of a physician versus critical care nurse during the initial team-response. Due to inconsistency and high risk of bias across three included observation studies (Supplemental Digital Content 10*E*, http://links.lww.com/CCM/H434), there were uncertain effects on mortality (two studies) (137, 162), cardiac arrests (three studies) (145, 149, 150), hospital and ICU lengths of stay (one study) (149), unplanned ICU transfers (three studies) (137, 162, 163), changes in patients' resuscitation status (one study) (162), and RRT/MET activations (one study) (163) (very low certainty for all outcomes).

Evidence to Recommendation. The panel considered possible unevaluated effects of RRT/MET compositions, including that prescribing clinicians may be more likely to initiate goals of care conversations where appropriate (see Recommendation 7B) and implement orders/interventions earlier. The panel speculated that ward clinician thresholds for requesting help may be higher when calling a physician-led RRT/MET.

No studies reported resource requirements, but the panel judged that physician-led teams may be moderately more resource-intensive and that hospitals in some areas (e.g., rural and low-income settings), may have limited physician support to implement this intervention. Emergency physician and staff support in the response to deteriorating patients outside the ED, for example, may create conflicts with areas of primary responsibility and highlight the need to carefully consider issues such as staffing policies when personnel are limited (164).

The panel judged acceptability and feasibility will vary by setting. For patients, the panel agreed that timeliness of the initial response to RRT/MET activations would be more valuable than the professional composition of the team.

Special considerations. The panel identified two areas for future research:

- The utility of protocolized care to guide RRT/MET interventions;
- Virtual consultations (e.g., telehealth) to offset the need for on-site physicians, particularly at smaller centers.

Palliative Care Personnel as Part of the RRT/MET and Education/Guidance for Clinicians in Eliciting Patients' Goals of Care

Recommendations.

Recommendation 7A. We make no recommendation about involvement of palliative care-trained personnel as part of an RRT/MET.

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).

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Rationale.

Evidence Summary. This question was addressed in two parts:

1. Palliative care personnel as part of the RRT/MET: no relevant studies.
2. Education/guidance for clinicians regarding discussions about patients' goals of care. We identified three relevant studies (**Supplemental Digital Content 10*F***, http://links.lww.com/CCM/H434):
   - One RCT in which the intervention consisted of an RRT/MET physician communicating scripted guidance regarding goals of care discussions to patients' ward physician (165).
   - A before-after study implemented a two-pronged educational program for non-ICU staff (166).
   - Another before-after study implemented a hospital-wide preprinted order set to facilitate discussion about goals of care by clinical staff (167).

The heterogenous interventions were associated with increased reevaluation and documentation of patients' goals of care preferences and change in resuscitation status (one RCT [165], two before-after studies [166, 167]; moderate certainty). There were no effects on palliative care consultations (one RCT [167] and one before-after study [153]; low certainty) or functional status at discharge (one before-after study [166]; low certainty), and uncertain effects on discharge to residential setting (one before-after study [166]; very low certainty) and lengths of stay (one RCT [165], two before-after studies [166, 167], very low certainty).

Evidence to Recommendation. The literature shows that patients who receive emergency team calls have a higher mortality than other ward patients (168, 169) such that the time of a call represents a critical juncture in care where it is important to understand a patient's values as well the disease at hand in formulating an appropriate care plan. We, therefore, consider it important that an emergency response team contain some members who are comfortable with discussing disease severity and goals of care and establishing treatment plans that best reflect a patient's wishes and prognoses. Where needed, additional training in this skill was considered by the panel to be important (170). The panel judged that the intervention improves communication and documentation around goals of care and may reduce administration of therapies inconsistent with patients' preferences and prognoses. Undesirable effects may include disagreement between ward clinicians and RRT/MET staff regarding timing and content of goals of care discussions. Although such conflicts may be infrequent, their impact on subsequent patient care is unknown. On balance, the panel judged that the improved patient communication and choice outweighed potential undesirable effects and clear documentation of goals of care discussions in the medical record is an essential element in this process.

The costs of this intervention are unknown but providing treatments that are not consistent with patients' wishes likely increases costs. We identified no evidence of the impact of this intervention on health equity, although studies have found that recent immigrants (171) and some ethnic minorities (172) are more likely to receive aggressive interventions and die in an ICU than other groups. To enhance health equity, clinicians should 1) not approach goals of care discussions with a prespecified outcome in mind, 2) provide all patients with the opportunity to discuss their values and goals, regardless of race, ethnicity, and cultural background, and 3) adapt discussions to diverse languages and cultures. The panel judged that the intervention would be acceptable and feasible.

RRS Quality Improvement

Good Practice Statement. A process for QI should be part of a GPS.

Rationale. The most comprehensive programs that evaluated and treated deteriorating patients outside the ICU were GPSs. We identified 23 observational studies evaluating the effect of various QI initiatives on patient outcomes (9, 38, 40, 41, 44, 61, 64, 99, 142, 173–185). The studies employed heterogenous interventions, including RRS implementation education (40, 44, 61, 64, 99, 142, 176, 178, 180–184), clinician oversight with audit and feedback (40, 61, 177, 179, 184), and teamwork/communication strategies (38, 44, 87, 176, 184).

The panel agreed that QI is an integral part of an effective RRS, but that high variability exists in the types of QI strategies implemented and reported in the literature. The panel emphasized that each center should establish QI that is tailored to local context, including patient volumes, and resources. The structure of QI strategies may vary across centers in format and approach. For example, case-based reviews (e.g., review of RRT/MET activations, RRT/MET activation delays, morbidity and mortality rounds with case reviews) may be preferred in smaller institutions, whereas the addition trend analysis of volume-adjusted rates (e.g., RRT/MET activation delays,

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non-ICU cardiac arrests) may be more salient in larger centers. Refinement of RRS processes should be informed by periodic audits to address barriers to early recognition and prompt response to clinical deterioration and team communication processes. The panel also determined that the ideal QI program be guided by the goal of capturing all events that qualified for and those that received an RRT/MET response into a database to monitor circumstances and outcomes surrounding these events. Such databases may include patient identifiers, dates, times, locations, reasons for RRT/MET calls, interventions, and outcomes among those with RRT/MET activations as well as adverse events among patients who would have qualified for an activation but did not receive one. (i.e., missed events resulting in clinical deterioration). Whenever possible, patient and family perspectives should be incorporated into the QI process to further ensure patient and family-centered care.

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RESEARCH AGENDA

Important questions remain across multiple domains relevant to recognizing critical illness outside of the ICU, including, but not limited to:

- What physiologic parameters could improve the recognition of at-risk patients and be included in the bedside examination, RRT/MET activation criteria, and Early Warning Scores?
- Is electronic health record-enabled RRT/MET activation superior to clinician-initiated RRT/MET activation?
- Does the professional composition of an RRT/MET team affect patient outcomes?
- Does the use of specific treatment protocols for specific conditions (shock, respiratory failure, etc.) improve patient outcomes?
- How can patient- and family-important outcome measures be incorporated in studies evaluating RRS effectiveness?
- Are there key interventions/ resuscitation goals to be met that need to take place within a specific time period to improve outcomes?

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