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# We Are Not There Yet: A Qualitative System Probing Study of a Hospital Rapid Response System

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**Objectives:** The capability of a hospital's rapid response system (RRS) depends on various factors to reduce in-hospital cardiac arrests and mortality. Through system probing, this qualitative study targeted a more comprehensive understanding of how healthcare professionals manage the complexities of RRS in daily practice as well as identifying its challenges.

**Methods:** We observed RRS through in situ simulations in 2 wards and conducted the debriefings as focus group interviews. By arranging a separate focus group interview, we included the perspectives of intensive care unit personnel.

**Results:** Healthcare professionals appreciated the standardized use of the National Early Warning Score, when combined with clinical knowledge and experience, structured communication, and interprofessional collaboration. However, we identified salient challenges in RRS, for example, unwanted variation in recognition competence, and inconsistent routines in education and documentation. Furthermore, we found that a lack of interprofessional trust, different understandings of RRS protocol, and signs of low psychological safety in the wards disrupted collaboration. To help remedy identified challenges, healthcare professionals requested shared arenas for learning, such as in situ simulation training.

**Conclusions:** Through system probing, we described the inner workings of RRS and revealed the challenges that require more attention. Healthcare professionals depend on structured RRS education, training, and resources to operate such a system. In this study, they request interventions like in situ simulation training as an interprofessional educational arena to improve patient care. This is a relevant field for further research. The Consolidated Criteria for Reporting Qualitative Studies Checklist was followed to ensure rigor in the study.

**Key Words:** rapid response systems (RRS), healthcare professionals, in situ simulation, system probing, quality improvement, interprofessional collaboration, patient safety, leadership

(*J Patient Saf* 2022;18: 722–729)

Hospitals worldwide have implemented rapid response systems (RRSs) to improve care for deteriorating ward patients.<sup>1</sup> Over time, research on these has established an association with reducing cardiac arrest and hospital mortality.<sup>2–4</sup> By concept, an RRS consists of 4 interconnected limbs and works 24/7 to ensure systematic observations, early detection of deterioration, and

timely, tailored response to deteriorating patients.<sup>1,2,5</sup> Naturally, hospitals around the world have structured these systems differently,<sup>6</sup> thus necessitating multiple evaluations and improvement strategies.<sup>7,8</sup> Nevertheless, whether an individual hospital's RRS manages to improve outcomes depends on various in-hospital facilitators and barriers.<sup>5,9</sup> These warrant local recognition and a comprehensive understanding to foster continuous quality improvement.<sup>10</sup>

Simulation training presents a feasible method for system probing to gather crucial information embedded within an institution's systems and culture.<sup>11</sup> We believe this is an underexplored opportunity for quality improvement for hospitals that intend on implementing or improving their RRS. Through the scenarios and debriefings, one can identify the efficacy of the system and the reasons for it, as well as the challenges that require focused attention. Hence, we decided to perform a qualitative study that probed our hospital's RRS. We used the debriefings of the RRS from in situ simulations as focus group interviews (FGIs).

We targeted a comprehensive understanding of how healthcare professionals (HCPs) manage the complexities of RRS in daily practice as well as identifying its challenges. Thus, we developed 2 research questions: How do HCPs describe the various elements of the RRS when it works well (research question 1), and how do HCP describe the remaining challenges that need to be addressed (research question 2)?

## METHODS

### Setting

We conducted the study in a Norwegian university hospital with an established RRS, adopted from the Karolinska University Hospital model in Sweden.<sup>12</sup> The local RRS is organized as a 2-tier system (Fig. 1), implying that staff attend most patients with signs of deterioration within tier 1. However, both nurses and physicians can call tier 2 when needed. Since 2017, we have been incorporating the first version of the National Early Warning Score (NEWS)<sup>13</sup> into the electronic observation and medical chart (OM chart), with an associated response protocol (Fig. 2). The "NEWS response" is an integrated functionality in the electronic OM chart that enables clinicians to document patient assessment and plans for management and acceptable individual vital signs. If this is done, the NEWS value will be highlighted in the OM chart, making it easy to see that there is information available if you click on it. Situation-Background-Assessment-Recommendation (SBAR)<sup>14</sup> is recommended to facilitate structured nurse-physician communication.

The RRS is an integrated part of the hospital's structure. Nevertheless, adverse events with evident RRS protocol breaches still occur, often describing challenges with interprofessional collaboration. Subsequent research has found that simulation training positively correlated with improved usage of the RRS.<sup>15,16</sup> Thus, in 2019, the hospital RRS committee initiated weekly interprofessional in situ simulation to improve the use of RRS. Initially, the focus centered on the "afferent limbs" approach to a deteriorating patient. The initiative started in 2 wards, 1 surgical (24 beds) and 1 medical (21 beds), with a plan to gradually have regular RRS-focused

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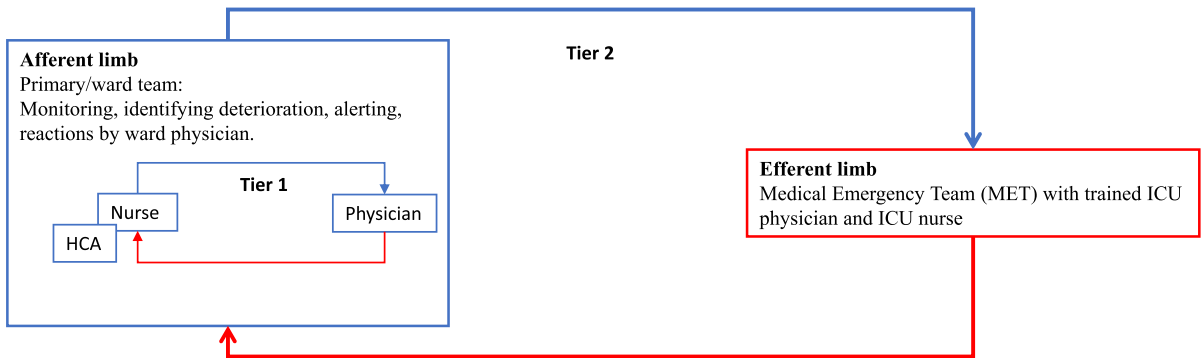
This study was funded by the University of Stavanger Research Fund: Safer Healthcare Grant.

The authors disclose no conflict of interest.

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### The operative limbs of the local rapid response system



**FIGURE 1.** Illustrating the hospital arrangement of the operative limbs of the RRS. Afferent limb: the process of monitoring the patient and detection of deterioration by predefined criteria, including response by tier 1: responsible physician at the ward. SBAR is the recommended tool for communication. The responsibility for the patient lies within the afferent limb until a decision is made to move the patient to the ICU. Efferent limb: the MET from the ICU (physician and nurse), alerted by the afferent limb if the patient triggers the response criteria, and tier 1 response is not enough or not available.

simulations in all adult wards. Over time, we could include the “efferent limb” in 1 simulation session every month.

### Participant Inclusion

The study followed the Helsinki Declaration. Because of Norwegian law, this study was not regulated by the Health Research Act (Regional Committee for Research Ethics in Norway). The Hospital Data Protection Officer at the Research Department of the University Hospital granted permission to perform the study (ID: 17/2019). The senior staff in the wards identified possible participants among the ward’s nurses, physicians (medical physicians and surgeons), and healthcare assistants (HCAs) during the weeks before the study. We verbally informed all eligible participants at meetings in the wards about the study purposes, that participation was voluntary, and that they were free to withdraw at any time. The participants signed a written informed consent form. (For participant information, see Table 1.)

### Data Collection

The Train the Trainer-EuSim level 1 facilitators<sup>17</sup> planned and facilitated the in situ simulations. (For scenario information, see Table 2.) First (emergency physician) and third (intensive care nurse [ICN]) authors observed 6 in situ simulation sessions of the RRS together and conducted the debriefings as FGI for

2 months. We arranged the debriefing/FGI immediately after the simulation scenarios in a quiet meeting room, lasting 45 to 50 minutes. We took field notes during the observations of the simulations and made audio recordings of all FGIs in their entirety. Facilitators started the dialogue in the FGI, letting the participants reflect on the scenario itself, which elicited further reflections and lively discussions among all participants regarding operating the RRS daily. The moderators then continued the FGI, following the semistructured interview guide (Box 1) with questions sourced from our past systematic review.<sup>5</sup> Hence, the RRS model (Fig. 1) was the framework for the scenarios and interview guide. To include some perspectives from tier 2 (Fig. 1), we arranged an additional FGI in the intensive care unit (ICU) with physicians and nurses experienced with the medical emergency team (MET; Table 1). We accomplished this with a customized interview guide (Box 1).

We transcribed the rich data material from the interviews verbatim and coded them into NVivo 12 pro software (<https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/support-services/nvivo-downloads>), and hence performed a thematic analysis.<sup>18</sup> To ensure trustworthiness, the research group continuously discussed and reflected on the identified patterns of meaning and issues of interest in the data. We generated codes and categories, searched for themes, and finally defined and named 3 themes that captured essential issues regarding the study

National Early Warning Score (NEWS)							
PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≤8		9 - 11	12 - 20		21 - 24	≥25
Oxygen Saturations	≤91	92 - 93	94 - 95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35.0		35.1 - 36.0	36.1 - 38.0	38.1 - 39.0		≥39.1
Systolic BP	≤90	91 - 100	101 - 110	111 - 219			≥220
Heart Rate	≤40		41 - 50	51 - 90	91 - 110	111 - 130	≥131
Consciousness Level				A			V, P or U

\*The NEWS initiative flowed from the Royal College of Physicians' NEWS Development and Implementation Group (NEWSDIG) report and was jointly developed and funded in collaboration with the Royal College of Physicians, Royal College of Nursing, National Outreach Forum and NHS Training for Innovation. © Royal College of Physicians 2012

Escalation protocol		
Limitations of medical treatment should be evaluated within the first 24 hours		
NEWS-score	Vital sign frequency	Response/ Escalation
0	Minimum of 2 x /24 hours	
1-4	Minimum of 3 x /24 hours (1 per shift)	Nurses can evaluate the need for more frequent vital sign measurements
5-6 or score of 3 or more in a single parameter	Hourly, or as instructed by physician. Document assessment and measures in 'NEWS response' in the OM-chart	Alert the responsible physician. Consider calling the MET
≥7	Continuous monitoring until physician assessment. Document assessment and measures in 'NEWS response' in the OM-chart	Immediately alert responsible physician. Call MET if patient is not stabilised and the condition under control within 20 minutes
When seriously concerned about the patient, alert the responsible physician and/or MET, regardless of NEWS- score.		

**FIGURE 2.** The established scoring system, NEWS, and the local escalation protocol (translated from Norwegian).

Box 1.

**Interview guide: (a) Focus group interview in in situ simulation groups**

**\*First debrief of the scenario: What happened, what worked well, what could have been done differently.**

What works well, challenges, and ideas for improvement are discussed through the following subjects:

- Do you have examples of managing deteriorating patients in the ward? Tell.
  - How do HCA, nurse, and physician cooperate in these situations?
- How and when is the scoring system NEWS used?
- Tell about how you were educated/informed about NEWS and MET.
- How and where do you document evaluations and measures taken regarding deterioration?
- How and when is SBAR communication used?
- How is MET used?
- Regarding all elements of the RRS, how can we further improve the system?

**Interview guide: (b) Focus group interview with ICU personnel (experienced in MET calls)**

What works well, challenges, and ideas for improvement are discussed through the following subjects:

- Tell about your experiences with handling deterioration patients in the ward.
- Regarding the scoring system NEWS:
  - What do you know about the use of NEWS in the wards?
  - What value does it have for the MET?
- How do you experience the communication when MET is called?
- How is MET utilized, by your experience?
- Tell about how you were educated/informed about NEWS and MET.
- How do you experience the cooperation between the ward personnel and MET?
- Do you have any thoughts about documentation?
- Regarding all elements of the RRS, how should we work to further improve the system?

**Recognizing Deterioration (Theme 1)**

**Being Able to Combine Knowledge, Experience, and Objective Measures (Category 1)**

Participants described how they recognized a deteriorating patient. They gave an overall clinical impression, calculated the NEWS value, and combined this information with their knowledge and experience regarding the patient’s current diagnosis. Inexperienced HCPs elaborated on how they were more dependent on NEWS in their evaluation, valuing the support of the system. Moreover, participants reported a fear of relying solely on NEWS to recognize deterioration, highlighting the need for HCP with clinical knowledge and evaluation skills. Physicians saw increasing NEWS as an alarm; however, they highlighted the need to know the vital parameters behind the score for decision support.

**Unwanted Variation in the Ability to Recognize Deterioration (Category 2)**

Intensive care unit personnel, having experience on how the RRS functioned in different departments, expressed their worry about the unwanted variations among wards, concerning their ability to recognize deterioration. As suggestions for improvement, the ICU nurses discussed how they could be more proactive, thereby increasing ward personnel competence.

**Using the Elements of the RRS (Theme 2)**

**Being Able to Use Scoring Systems and Protocol for Escalation (Category 1)**

Overall, the HCPs expressed appreciation for the scoring system and escalation protocol, as they provided structure, overview, and a sense of security. The HCPs described how NEWS lowered their threshold for escalation, whereas physicians confirmed how worsening NEWS caught their attention.

By protocol, the NEWS response should include the acceptable physiological parameters of the individual patient and the strategies for management. This was not familiar for all participants, but HCPs, being aware of the functionality, valued how it simplified their work by highlighting essential information.

Furthermore, ward personnel reported how structured communication through SBAR facilitated the escalation process and simplified decision making for physicians, who were often in the middle of other tasks when receiving a call about a deteriorating patient.

objectives (COnsolidated criteria for REporting Qualitative research Checklist).

**RESULTS**

We identified 3 major themes, each of which had 2 underlying categories answering the 2 research questions (Fig. 3). For illustrating quotes, see Table 3.

**TABLE 1.** Participants in the In Situ Simulations and FGIs

Interview No.	Ward	Situation	Participants	Interview Group Size	Years in the Profession
1–3	Medicine	Simulation scenario/debriefing	8 nurses (N <sub>1–8</sub> Med), 2 HCA (HCA <sub>1–2</sub> Med), 3 physicians: 1 intern, 1 resident, 1 attending (P <sub>1–3</sub> Med)	4–5	4 mo–39 y (median, 4 y)
4–6	Surgery	Simulation scenario/debriefing	9 nurses (N <sub>1–9</sub> Surg), 1 HCA (HCA <sub>1</sub> Surg), 3 physicians: all residents in surgery (P <sub>1–3</sub> Surg)	4–5	0.5 mo–38 y (median, 7 y)
7	ICU	FGI	3 ICNs (N <sub>1–3</sub> ICU), 2 physicians: 1 intensivist and 1 resident in anesthesiology (P <sub>1–2</sub> ICU)	5	4–31 y (median, 9.5 y)
Authors			Author 1: MD, emergency physician, PhD candidate, Train the Trainer-EuSim level 1 facilitator. RRS committee member Author 2: anesthesiologist, professor. Author 3: ICN, professor. RRS committee member		

**TABLE 2.** Design and Conduction of the RRS In Situ Simulations

- We created patient cases based on real events. We used 3 different cases: a patient developing severe pancreatitis, a patient with bleeding after kidney biopsy, and a patient with chronic obstructive pulmonary disease exacerbation developing respiratory failure.
- HCP-simulated patients. We instructed them thoroughly on how to behave in the patient role.
- The scenarios took place in the wards, with all required equipment in its familiar places.
- Participants were told to use all equipment they naturally needed to examine the patient and plan further patient treatment.
- Because of the high patient bed occupancy rate, it was sometimes difficult to find an available patient room. This resulted in the scenarios taking place in the corridor behind screens or in exam rooms at times. Nevertheless, this did not change the scenarios or performance significantly.
- We created a test patient in the electronic OM chart, with vital parameters, EHR documents, and laboratory and radiology results to enhance the authenticity of the scenario.
- Every scenario involved a minimum of 1 nurse and 1 physician (Table 1). The session started with a brief, informing participants of the purpose of the simulation training, and the learning goals: evaluating and examining the patient using NEWS and clinical assessment, applying SBAR for communication, using the EHR and OM chart for documentation, and coming up with a plan for the patient.
- The cases started with the nurse and an HCA when present, getting a report of the case patient, and then going to see the patient, doing an initial evaluation. The physician was alarmed by a nurse in all scenarios, and the interprofessional team came up with a joint plan.
- The scenarios lasted 15–20 min, focusing mainly on the RRS elements within tier 1 (Fig. 1).
- The facilitator ended the scenario after an exam, the performance of initial stabilizing measurers, and development of a joint plan for further observations and actions, one of which included alarming the MET.

**Unwanted Variation in RRS Knowledge and the Use of Documentation Systems (Category 2)**

Knowledge regarding the RRS elements varied among participants, most likely reflecting their highly variable educational experiences regarding the system. Healthcare professionals who worked in the hospital during the initial phase of the RRS implementation had attended the relevant educational activities. However, HCPs employed more recently had rarely attended structured education and had to grasp the workings of the system individually. As a result, they requested collective interprofessional education to improve and align their RRS knowledge, highlighting in situ simulation as a desired educational arena.

The HCPs also described how the use of different documentation strategies within the electronic health record (EHR) created challenges. For instance, EHR notes often had no information about NEWS values and the related management plans, whereas the documentation of NEWS response varied among HCPs. This inconsistency in documentation routines led to challenges in finding important information for decision making, resulting in HCPs spending inordinate amounts of time searching through the EHR.

Nurses described different strategies for patients who exhibited repeatedly high NEWS values without a defined response strategy. Some argued for following the protocol and notifying tier 1

immediately, whereas others argued for trusting their own assessment, not alarming anyone if they deemed the patient stable. To improve patient care, nurses requested a common strategy for documenting structured plans for the patient. Both nurses and physicians then suggested consistency in the use of NEWS response, believing that it made plans readily available and could save time.

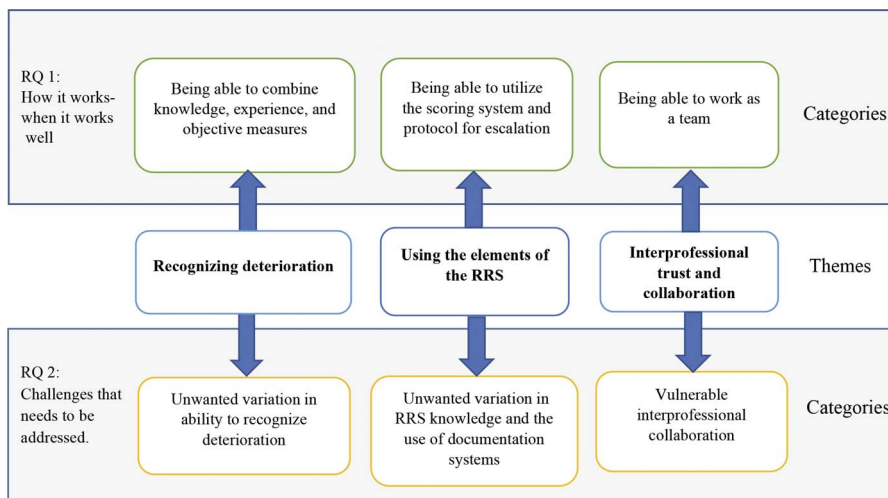
**Interprofessional Trust and Collaboration (Theme 3)**

**Being Able to Work as a Team (Category 1)**

The ward nurses highlighted the value of intraprofessional collaboration when having a deteriorating patient. Working together with another nurse ensured that they could perform tasks on time. The HCPs in the wards and the ICU could describe positive experiences with the MET, highlighting the importance of how this collaboration helped patients.

**Vulnerable Collaboration (Category 2)**

However, the FGIs uncovered collaboration challenges between the wards and the ICU. Saturated units and simultaneous vital tasks competed for HCPs’ attention. Thus, despite the existing protocol clearly describing how staff should respond when a patient



**FIGURE 3.** Themes and categories from thematic analysis.



**TABLE 3.** Illustrating Quotes

## Recognizing deterioration

Being able to combine knowledge, experience, and objective measures “She didn’t do very well. I checked the vitals; they were quite skewed. NEWS was red.” (N<sub>4</sub>-Med)  
 “The vitals were not that skewed, but the diuresis reduced...They can deteriorate quite fast, these patients.” (P<sub>2</sub>-Surg)  
 “For us newly educated nurses, I think it is nice to have such a tool (NEWS) with standardized measures, as it gives us a template for how to act. Our experience is limited, and we encounter new cases consistently.” (N<sub>4</sub>-Surg)  
 “A weakness with scoring systems is that you can lean on them without re-evaluating the patient.” (P<sub>2</sub>-ICU)  
 “I fear that NEWS can become a crutch, such that you stop doing good clinical evaluations and get tunnel vision. However, NEWS is great if you don’t forget a comprehensive assessment.” (N<sub>4</sub>-Surg)  
 “NEWS is good as a warning flag, (...) but I need more information. What has changed (...) I need to go through the numbers (of vital signs).” (P<sub>2</sub>-Surg)

Unwanted variation in ability to recognize deteriorating “There is a big gap between the wards, let’s say...in some wards they lack competence on vital parameters. This can be quite frightening.” (P<sub>1</sub>-ICU)  
 “I worry about the ward nurses. Too many nurses are inexperienced...some have only a few months of ward experience. We see the difference.” (N<sub>2</sub>-ICU)  
 “We could have been used more actively in all departments, such as in basic nursing, teaching, and guidance.” (N<sub>2</sub>-ICU)  
 “We (ICU nurses) should reach out to the ward nurses teaching tips and tricks.” (N<sub>3</sub>-ICU)

## Using the elements of the RRS

Being able to use the scoring system and protocol for escalation “The system of doing observations has become very clear after the implementation of NEWS and MET.” (N<sub>7</sub>-Surg)  
 “I think it (NEWS) provides a sense of security.” (HCA<sub>2</sub>-Med)  
 “We are often the ones doing the vitals. We look at the last vitals and report the difference.” (HCA<sub>1</sub>-Med)  
 “You can observe a trend, and then see how they are getting worse...before they really do, that is very...that is the real early recognition.” (P<sub>2</sub>-Med)  
 “It’s great (NEWS response). If it’s used, you see it, and you can easily find the plan.” (P<sub>2</sub>-Med)  
 “I have experienced its value. I had a patient with low saturation levels and was able to find out the measures that helped the patient last time, in the NEWS response. Then, I knew what could work, and it did.” (N<sub>4</sub>-Surg)  
 “It’s something to lean on when you talk to the physician. You have something specific; for instance, if NEWS has increased from orange 6 to red 8, you do not have to be afraid to call the physician.” (N<sub>5</sub>-Med)  
 “I believe it helps. If a nurse comes and says, ‘The patient is suddenly orange,’ it is easy. Something has happened.” (P<sub>1</sub>-Med)  
 “In general, the nurses have become great at using the SBAR, giving a clear picture about why they call.” (P<sub>2</sub>-Med)  
 “Since you are on the other side of the call and do not know the patient, it is extremely valuable when you get an SBAR report like that. It is much better than simply stating, ‘I have a deteriorating patient.’” (P<sub>3</sub>-Med)

Unwanted variation in RRS knowledge and the use of documentation systems “When we implemented NEWS, we were trained to do it.” (N<sub>7</sub>-Surg)  
 “In the beginning, physicians received education during lunch meetings.” (P<sub>3</sub>-Med)  
 “For my part, there hasn’t been (education).” (P<sub>2</sub>-ICU)  
 “I wondered what it was: MET? I was just told that I can call the MET, but I did not know when to call, whom to call, and where to call.” (N<sub>4</sub>-Med)  
 “The most important aspect relating to NEWS is the education about it.” (N<sub>4</sub>-Surg)  
 “Everybody should be present and have the same education.” (P<sub>3</sub>-Surg)  
 “I have actually asked for it (simulation training). I have worked here for several years, but I need it because you need to freshen up your knowledge...and you need reminders.” (N<sub>7</sub>-Surg)  
 “Every time I attend any in situ simulation, I go home and think that now I have learned something.” (P<sub>3</sub>-Surg)  
 “You learn so much more doing this (in situ simulation) than by reading on a paper what to do.” (N<sub>6</sub>-Med)  
 “Some (physicians) think it is annoying that we call just because the score is red...but if there are no target measures and no plan...then we must call them.” (N<sub>5</sub>-Med)  
 “The patient has a high NEWS over time, and if the NEWS is the same, you cannot call every time you get a high score...that is not possible.” (N<sub>1</sub>-Surg)  
 “I do appreciate when there is a clear plan, including acceptable target measures for the vital signs of the patient, and information on how and when to act.” (N<sub>5</sub>-Med)  
 “It’s very convenient if you have a patient with COPD (chronic obstructive pulmonary disease);—this patient’s O<sub>2</sub> saturation goals are..., and if they fall below this level, do this and this.” (N<sub>7</sub>-Surg)  
 “We spend so much time searching through documents to check if anybody has made any decisions.” (N<sub>7</sub>-Med)  
 “Often, I get a call from the ward, and the patient plan is hidden in the EHR somewhere; nobody has read it.” (P<sub>2</sub>-Med)  
 “I feel in a way, if it is (NEWS response) going to work, then it’s all or none.” (N<sub>7</sub>-Med)  
 “If we could implement it (NEWS response) in daily work, it is a great tool, an aid to ensure effective clarifications. I believe that it can streamline communication.” (N<sub>6</sub>-Med)

## Interprofessional trust and collaboration

Being able to work as a team “I have called the MET several times; it is excellent, you have someone to lean on. We can be a team, working together and planning together. We can improve the patient’s situation together.” (N<sub>6</sub>-Surg)  
 “I experience that we are saving angels when we arrive. The nurses lower their shoulders, as they feel that finally somebody has come to offer support and suggestions, and that they are not alone anymore.” (N<sub>2</sub>-ICU)  
 “I believe having an MET is reasonable. I have never attended an MET where I did not find our presence useful, whether or not the patient needed transfer to a higher level of care.” (P<sub>2</sub>-ICU)

(Continued next page)

**TABLE 3.** (Continued)

Vulnerable interprofessional collaboration	<p>“I had a very ill patient in the ward...I had been working all night, trying to push for help, but none of the measures worked. The physician reply was: ‘just wait and see.’” (N<sub>7</sub>-Surg)</p> <p>“What is the result at 6 in the morning? Full speed to the ICU! That too, after we have argued all night!” (N<sub>2</sub>-Surg)</p> <p>“It feels like the threshold to call (MET) is high. Like you are doing something that is not quite okay.” (N<sub>7</sub>-Med)</p> <p>“I have experienced three times; as a nurse, it is not for us to make the call. They (MET) tell you to go through the ward physician...and they hang up. Moreover, if the surgeon is operating, then...” (N<sub>1</sub>-Surg)</p> <p>“I remember a very busy night shift, where the ICU physician told me off, saying that I should have been there by the patient bed while calling him. But how can I be everywhere at once?” (P<sub>1</sub>-Surg)</p> <p>“My impression is that we often get called to help in a difficult situation, where the patient is not that critically ill, but the ward struggles with staffing, and we somehow should...” (N<sub>2</sub>-ICU)</p> <p>“When we attend an MET call, and the ward physician is not present...we are not very happy.” (P<sub>1</sub>-ICU)</p> <p>“I worry about the increasing use of resources (for the ICU). Therefore, when the MET call comes, it is not always welcomed, because whatever plan you had for the day is shifted.” (P<sub>1</sub>-ICU)</p> <p>“When ward nurses call, we should be heard and respected for the knowledge we have.” (N<sub>2</sub>-Surg)</p> <p>“In my mind, the ICU physicians need to understand that we are alone at night.” (P<sub>1</sub>-Surg)</p> <p>“It is scary at night. Only two nurses (are present), and if you have two severely ill patients...” (N<sub>6</sub>-Med)</p> <p>“Success factor: Staffing. There should be enough staffing in the ICU for both physicians and nurses to attend the MET call; this is a prerequisite for high quality.” (P<sub>1</sub>-ICU)</p> <p>“We should have the resources to attend when they call, and not be prevented by a filled-up ICU.” (N<sub>2</sub>-ICU)</p> <p>“It’s not ideal, in any way... but we must stay positive and not let the fact that the ward physician cannot attend stop an MET call. Since then (at night) staffing levels are ‘cut to the bone,’ actually understaffed, we must limit the damage by compensating with those who are available, and actually can attend.” (P<sub>1</sub>-ICU)</p> <p>“Everybody needs this type of training (in situ simulation). We work in teams in our daily practice. Thus, it is important to train as teams.” (N<sub>6</sub>-Surg)</p> <p>“Yes, we should be involved (in the in-situ simulations) because I feel like a stranger when I come to the ward.” (N<sub>3</sub>-ICU)</p> <p>“The positive aspect of in situ simulations is how you start thinking differently, because you come together, reflect, and discuss.” (N<sub>7</sub>-Med)</p> <p>“It is quite rare that nurses and physicians get to give each other feedback...that is very useful with these simulations.” (N<sub>5</sub>-Med)</p> <p>“What is great about simulation training is the fact that you get to hear the opinions and experiences that other professions have...it is very useful to hear how they reason, because otherwise, you are not very conscious about it, being in your own bubble.” (P<sub>2</sub>-Surg)</p> <p>Dialogue: “What I find very important is your gut feeling.” (P<sub>3</sub>-Med)—“That is good to hear! It is greatly appreciated.” (N<sub>6</sub>-Med)</p> <p>Dialogue: “If a nurse treated the patient yesterday, and now today says, ‘You know, he was not like this yesterday’... then we must come to evaluate.” (P<sub>1</sub>-Surg).—“That is so nice to hear you say! Not all physicians listen to that.” (N<sub>1</sub>-Surg)</p>
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deteriorated, nurses repeatedly struggled to get appropriate help for their patients. The HCPs from the wards discussed how they dreaded calling the MET, expecting a negative tone and resistance. Nurses reported that MET physicians instructed them not to contact the MET directly but rather to request the ward physician to make the call. This statement highlighted a significant concern at nightshifts in the surgical ward because the surgeon could have prior engagements at the operating theater. As a result, surgeons described feeling inadequate, having to be in several places at once. Nurses also reported how they wished ICU personnel were more respectful toward them while understanding their work situation. The ICU personnel, in turn, expressed how frustrating MET calls could be. They felt a need to accommodate for the lack of personnel and competence in the wards and reported discouragement when responding to a MET call when the ward physician was absent. They further elaborated on their struggles related to excusing the ICU nurse from other tasks and expressed concern about the ICU physicians’ workload. Furthermore, The ICU personnel described how having all the members present in the MET call as essential for effective patient management. To accomplish this, they requested more resources and admitted a need for an attitude that supported collaboration.

To improve collaboration, both ward and ICU HCPs requested the opportunity to train together. They believed that in situ simulations would facilitate teamwork and increase shared situational awareness regarding the care for deteriorating patients. These statements

corresponded with our observations during the simulation sessions. Through these interactions, HCPs from different professions often cleared up misunderstandings and uncertainties, showed each other support, and gave each other positive feedback.

## DISCUSSION

Through system probing, this study aimed to provide insight into how HCPs managed the operational limbs of the RRS in daily practice, while revealing remaining challenges. The in situ simulations elicited open and lively discussions between professions regarding the system and prompted HCPs’ requests for improvement. We believe that both the approach and results are relevant for all hospitals working to implement and improve their RRS.

The HCPs experienced that the NEWS worked well when combined with clinical knowledge and experience. Previous studies have reported this appreciation of Early Warning Scores<sup>19,20</sup> and the need to combine these scores with clinical judgment.<sup>21</sup> However, the appropriate use of NEWS and corresponding escalation protocol necessitate HCPs’ sufficient education about the system. As revealed in this study, this was not the case for all HCPs, some of whom had to discover the system individually. According to our systematic review, uniform education of HCPs in a hospital regarding RRS remains a challenge all over the world.<sup>5</sup> The ICU personnel with extensive MET experience expressed concern about the unwanted variation among wards concerning the staff’s

understanding of clinical deterioration. This underlines the importance of systematic interprofessional education.

The SBAR is known to improve nurse-physician communication<sup>14,22</sup> and was highly appreciated by all professions in the current study, as it facilitated timely decision making and teamwork. Meanwhile, HCPs experienced a time-consuming struggle due to inconsistency in the extent and location of the documented information. They requested consistency in documentation practice, as they needed readily available plans regarding the management of deterioration. They believed that it would buy time and reduce alarm fatigue. Locally, the NEWS response in the OM chart could satisfy this need, as it is easily available and visible. This challenge regarding documentation systems and routines is also consistent with the findings of previous studies.<sup>5,23,24</sup>

Central for an RRS is the connection between the 2 operational (afferent and efferent) limbs (Fig. 1), and this link's disconnection was a core barrier for succeeding with such a system.<sup>5</sup> Unfortunately, the current study is yet another example of how lack of interprofessional trust and fear of being criticized hinder the response to deteriorating patients.<sup>24,25</sup> It is worrisome that HCPs describe how they dread calling the MET, reporting stories of being dismissed or criticized. This is a sign of a system with low psychological safety, which counteracts the improvement of patient care.<sup>26,27</sup> Understanding the underlying causes for this patient safety breach is imperative. Through system probing, we revealed how conflicting interests between the ward and the ICU disrupted collaboration. These conflicting interests were normally due to high patient occupancy and high workload, with simultaneous tasks competing for the HCPs' attention. This fact should worry leaders in health care and health policymakers. The lack of staff, especially at night, requires urgent attention. Studies on RRS frequently report lack of personnel,<sup>5</sup> which is associated with increased in-hospital mortality.<sup>28</sup>

Interprofessional education that provides a shared understanding of why, when, and how to connect the operative limbs might improve the RRS. The HCP cannot address this issue on their own. As reported by HCPs in other studies,<sup>25,29</sup> the HCPs in our study requested more interprofessional arenas for evaluation, learning, and training. In situ simulation may meet this request because it has proven to increase nurses' knowledge and confidence regarding the management of deteriorating patients.<sup>16,30</sup> It also enhances cooperation and communication,<sup>31,32</sup> and improves situational awareness.<sup>33</sup> The structured debrief is of utmost importance, giving the HCP the opportunity to reflect, get feedback, discuss, and learn.<sup>34</sup> This use of facilitator-guided post event debrief has the ability to improve both individual and team performances.<sup>35</sup> In addition, we believe that in situ simulation can serve as an arena for building relationships within and between afferent and efferent limbs while highlighting the importance of all team members. Thus, it might increase psychological safety,<sup>27</sup> a factor essential for an RRS.

We believe that continuously working to overcome challenges within the RRS is essential to the improvement of the care of deteriorating patients in the wards. The opportunity and responsibility for providing time and resources for improvement of RRS lie within leadership at all hospital levels. The HCPs in all units must have the skills to detect deterioration and use the elements of the RRS, ensure consistency in documentation processes, and provide a foundation for interprofessional collaboration. In this regard, future research should further explore in situ simulation as an arena for system probing and interprofessional learning.

## Strengths and Limitations

A strength of this study is that it presents the perspectives of HCPs from all professions involved in operating an RRS. Moreover,

the detailed description of the study design, setting, and analysis, supported by quotations, has enhanced its transferability. However, not having the efferent limb as part of in situ simulation was a limitation. Thus, to obtain the perspectives of ICU personnel with MET experience, we conducted a separate FGI. However, having the ward and ICU personnel in separate FGIs might have encouraged the participants to talk more freely about negative issues. As with all single-center studies, the results could be different in other hospitals. Nevertheless, the findings are consistent with previously published studies, underlining how many strengths and challenges that hospitals worldwide need to recognize and address, concerning their respective RRS. In addition, this study illustrates the importance of local system probing to find what works locally and identify challenges and ideas for local improvement. Finally, the female researchers (MD and ICN) performing the FGIs were familiar with some of the participants, which may be both a strength and limitation of the study.

## CONCLUSIONS

When it comes to succeeding with RRS, we are not there yet. Through system probing, we identified the merits of our RRS and revealed its current challenges. We must improve our instances of unwanted variations in HCPs' understanding of clinical deterioration, RRS education, and documentation routines, and address worrisome challenges regarding interprofessional collaboration. The participants in this study suggest that patient care improves when in situ simulations become a regular interprofessional educational arena. This is a relevant field for further research.

## ACKNOWLEDGMENTS

*We are grateful to the facilitators and participants for allowing us to use the in situ simulations as an arena for research. We are also thankful to the intensive care unit personnel for presenting their perspectives. To secure English language spelling and grammar, we used Editage (www.editage.com) for manuscript editing. The Safer Healthcare Grant covered the relevant expenses.*

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