

Early Response Teams

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OBJECTIVES

- Provide an overview of an Early Response Team system.
- Components of ERT.
- Indications for ERT activation.
- Role of ERT.
- Essential infrastructure for success of ERT.
- Data behind implementation and use of ERT.
- Concerns related to use of ERT.

BACKGROUND

- Studies suggest that adverse events occur in 10% of hospitalized patients with a mortality rate of 5–8%.
- Almost all critical inpatient events are preceded by warning signs for an average of 6–8 hours.
- Such warning signs include: change in vital signs, acute dyspnea, and change in level of consciousness.

BACKGROUND

- ERTs provide at-risk patients early intervention, in the form of better assessment and aggressive resuscitation.
- ERTs are independent of the primary physicians who care for the patient.
- Institute for Healthcare Improvement's 100 000 Lives Campaign has recommended that hospitals implement RRTs as 1 of 6 strategies to reduce preventable in-hospital deaths.

COMPONENTS of ERTs

- An ERT is typically a multidisciplinary team of medical, nursing, and respiratory therapy staff.
- May be a physician- OR an RN- led team and may include the following:
 - Critical care physician
 - Non-ICU physician
 - Critical care RN
 - Respiratory Therapist
 - Pharmacist
 - Charge RN

Table 1. Comparison between a Traditional Code Team and a Rapid-Response Team.⁹

Feature	Traditional Code Team	Rapid-Response Team
Typical criteria for calling the team	No recordable pulse, no recordable blood pressure, absence of respiratory effort, unresponsive	Low blood pressure, rapid heart rate, respiratory distress, altered consciousness
Typical conditions that the team assesses and treats	Cardiac arrest, respiratory arrest, airway obstruction	Sepsis, pulmonary edema, arrhythmias, respiratory failure
Typical team composition	Anesthesia fellow, ICU fellow, internal medicine house staff, ICU nurse	ICU fellow, ICU nurse, respiratory therapist, internal-medicine house staff
Typical call rate (no./1000 admissions)	0.5-5	20-40
Typical in-hospital mortality (%)	70-90	0-20

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ESSENTIALS of an ERT

Regardless of the team composition, it should be able to perform the following:

- Ability to diagnose and intervene.
- Advanced airway management skills
- Advanced cardiac life support certification.
- Capability to establish central venous access.
- Ability to provide an ICU level of care at the bedside.

Common INDICATIONS for ERT

• Acute change in heart rate	<40 or >130 beats per minute
• Acute change in systolic blood pressure	<90 mmHg or >200 mm Hg
• Acute change in respiratory rate	<8 or >30 per minute
• Acute change in saturation	<90% despite O ₂
• Acute change in conscious state	e.g., sudden fall in Glasgow coma scale of >2 points
• Acute change in urinary output	<50 ml in 4 hours
• Repeated or prolonged seizures	
• MEWS	>5
• Clinical intuition	

The RN's Role in the Early Response Team



Efferent Limb

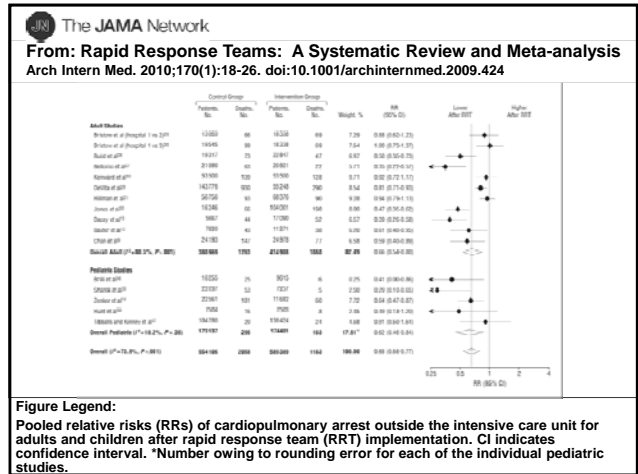
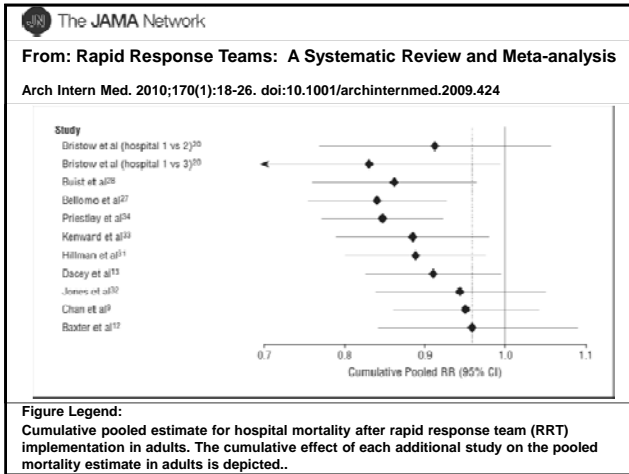
- Form of activation: overhead page or designated pagers.
- Average time for response 10-15 minutes.
- Carry the required equipment.
- Contact the appropriate providers.
- Documentation forms.

Equipment Recommended

- Airway management
- IV access
- Glucometer
- iSTAT
- IVF
- Basic medications (glucagon, lorazepam)
- Access to crash cart

DATA for ERTs

- The only multicenter, cluster-randomized, controlled trial of medical emergency teams is the MERIT study.
- Underpowered study for an intention to treat model.
- A post hoc analysis of the MERIT study showed a significant improvement in outcomes (fewer deaths and cardiac arrests) when the data were analyzed in an as-treated model.
- A few nonrandomized, single-center, before-and-after trials have shown improved outcomes with rapid-response teams.



Establishing a Rapid Response Team (RRT) in an Academic Hospital: One Year's Experience

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BACKGROUND: Rapid response teams and medical emergency teams have been utilized to rapidly manage seriously ill patients at risk of cardiopulmonary arrest and other high risk conditions but have not been extensively described in the American medical literature.

OBJECTIVES: To describe a full year's experience of implementing a rapid response team (RRT) in an academic medical center.

DESIGN: Retrospective analysis of our hospital's RRT database and description of the implementation process from July 2004 to July 2005.

SETTING: Urban, academic medical center.

RESULTS: The RRT system was activated for 107 potentially reversible patients. The most common reasons for an RRT activation were cardiac, respiratory, and neurological conditions. At least 37% of RRT calls were for off-unit inpatients and to outpatient/common areas frequented by outpatients and visitors, whereas at least 42% occurred in inpatient units. Most RRT calls, 82.9%, occurred during daytime hours. In the opinion of RRT leaders 96% of the evaluated calls were appropriate and 85% of the RRT responses resulted in the prevention of further clinical deterioration.

J Hosp Med. 2006 Sep;1(5):296-305.

Criteria for calling early response team

Pulmonary
Respiratory Rate <8 or >30
New onset of dyspnea
New, prolonged (>5min) SaO2 <90%
New requirement for >50% oxygen to keep SaO2 <85%

Cardiovascular
Chest pain unresponsive to nitroglycerin or physician unavailable
Symptomatic systolic blood pressure <80 or >200; diastolic blood pressure >110 (neurological change, chest pain, dyspnea)
Sudden color change of patient or extremity (pale, dusky, gray, blue, cyanotic)

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Criteria for calling early response team

Neurological/Psychiatric

Acute loss of consciousness or sudden collapse
 Naloxone (Narcan) administration for suspected overdose without immediate response
 New onset lethargy, difficulty walking
 Seizure (outside) of seizure monitoring unit
 Sudden loss of movement (or weakness) in face , arm or leg
 Unexplained agitation >10 minutes
 Suicide attempt

In-house Trauma, Chest pain, or Stroke

Outside of Emergency Department, Operating Room, or Intensive Care Unit

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Criteria for calling early response team

Hematological

Large acute blood loss
 Uncontrolled bleeding
 Bleeding into airway
Other
 Inability to reach the patient's primary team of treating physician for any of the above
 Any potentially serious medical errors or adverse events

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TABLE 1
Diagnoses in Rapid Response Team (RRT) Activation

<i>Pulmonary</i>	30%
Hypoxia/Respiratory Distress (32%)	
<i>Neurological</i>	11%
Change of mental status (7%)	
Syncope (7%)	
<i>Cardiac</i>	11%
Hypotension (8%)	
Arrhythmia (2%)	
Hypertension (1%)	
<i>Hematologic</i>	2%
Bleeding (2%)	
<i>Endocrine</i>	1%
Hypoglycemia (1%)	
<i>Other reason not listed</i>	32%
<i>No reason given</i>	9%

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Results

- 12-month period, the RRT was activated 307 times.
- Most RRT activations occurred between 8 am and 4 pm.
- In the judgment of evaluators, the system was utilized appropriately in 98% of the evaluated events.
- It was believed that 88% of the patients were stabilized after ERT.

Concerns

- Successful rapid-response systems consistently deliver a high response “dose” (>25 calls per 1000 admissions).
- Evidence supporting the effectiveness of rapid-response systems comes from unblinded, nonrandomized, short-term studies at single centers.
- Implementation of a rapid-response system may theoretically “de-skill” hospital-ward staff.
- Conflict with the primary team may occur.

Concerns

- The optimal composition of the team remains unknown, although before-and-after studies that showed a benefit involved teams led by a physician.
- Implementation of a rapid-response system could divert critical care staff from other duties and jeopardize the safety of their ICU patients, although no data exist to support this concern.
- Implementation of a rapid-response system is potentially expensive if ad-hoc teams are required.

Summary

- Role of the rapid-response team is to provide a quick second opinion, and to stabilize a patient prior to clinical deterioration.
- A rapid-response system requires support from hospital leaders to succeed.
- Adequate resources, in terms of both personnel and equipment, to manage any critical care event are required.
- System's afferent limb requires sustained education of hospital-ward staff. Without this effort, the system is likely to fail.

Summary

- Regular audits are needed to assess factors that contribute to activations and failures of the rapid-response system and to guide quality-improvement activities.
- Although rapid-response systems are assumed to be models for advancing patient safety, they should always be part of a much wider strategy aimed at making modern hospitals safer.

MEWS webcast

<https://ccme.osu.edu/EnduringMaterialDetail.aspx?ID=201>

MEWS

- Simple physiological scoring system.
- Validated in the surgical and medical units as a tool for identifying patients at risk of deterioration.
- Based on 5 bedside parameters: SBP, HR, RR, temperature, and level of consciousness (assessed by the AVPU or RASS score).

MEWS

	3	2	1	0	1	2	3
Systolic BP (mmHg)	<70	71-80	81-100	101-199		>200	
Heart rate (bpm)		<40	41-50	51-100	101-110	111-129	>130
Respiratory rate		<9		9-14	15-20	21-29	>30
Temperature (°C)		<35		35-38.4		>38.5	
AVPU score/ RASS score				Alert +3 to 0	Reacting to Voice -1 to -3	Reacting to Pain -4	Unresponsive -5

MEWS Implementation

- The score is not meant to replace Nursing judgment, but if there is clinical concern we recommend:
 - MEWS= 4, call covering clinician, consider increase clinical monitoring (VS)
 - MEWS >4, call covering clinician, consider increase clinical monitoring (VS), consider ERT as needed.