

Rapid Response Systems

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Background

Rapid response teams represent an intuitively simple concept: When a patient demonstrates signs of imminent clinical deterioration, a team of providers is summoned to the bedside to immediately assess and treat the patient with the goal of [preventing](#) intensive care unit transfer, cardiac arrest, or death. Such teams have become a widely used patient safety intervention due in large part to their inclusion in the Institute for Healthcare Improvement's "[100,000 Lives Campaign](#)" in 2005. However, the rapid response team concept has come to exemplify the tension between those arguing for swift implementation of conceptually attractive patient safety interventions supported by anecdotal evidence of benefit and those advocating a more rigorous, evidence-based—and inevitably slower—approach.

Patients whose condition deteriorates acutely while hospitalized often exhibit warning signs (such as abnormal vital signs) in the hours before experiencing adverse clinical outcomes. In contrast to standard cardiac arrest or "code blue" teams, which are summoned only after cardiopulmonary arrest occurs, rapid response teams are designed to intervene during this critical period, usually on patients on general medical or surgical wards.

Several different models of rapid response teams exist (see Table 1), and a 2006 [consensus conference](#) advocated use of the term "rapid response system" (RRS) as a unifying term. [Hospitalists](#) are increasingly assuming RRS duties, either as the primary responder or to assist nurse-led teams.

Table 1. Rapid Response System Models

Model	Personnel	Duties
Medical Emergency Team	Physicians (critical care or hospitalist) and nurses	• Respond to emergencies

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Model	Personnel	Duties
Critical Care Outreach	Critical care physicians and nurses	<ul style="list-style-type: none"> • Respond to emergencies • Follow up on patients discharged from ICU • Proactively evaluate high-risk ward patients • Educate ward staff
Rapid Response Team	Critical care nurse, respiratory therapist, and physician (critical care or hospitalist) backup	<ul style="list-style-type: none"> • Respond to emergencies • Follow up on patients discharged from ICU • Proactively evaluate high-risk ward patients • Educate and act as liaison to ward staff

A useful construct is to consider RRSs as having "afferent" (the criteria for calling) and "efferent" (responsive) arms. Despite differences in team structure, the criteria used to summon the teams are generally similar. Bedside staff are encouraged to call the team when any of a number of prespecified criteria (Table 2) are met. At certain hospitals, [patients and family members](#) are also permitted to call the team. Recent research has focused on development of more sophisticated "[track-and-trigger](#)" bedside monitoring systems that could be used to automatically trigger intervention when certain physiologic abnormalities are detected.

Typical Rapid Response System Calling Criteria

Any staff member may call the team if one of the following criteria is met:

- Heart rate over 140/min or less than 40/min
- Respiratory rate over 28/min or less than 8/min
- Systolic blood pressure greater than 180 mmHg or less than 90 mmHg
- Oxygen saturation less than 90% despite supplementation
- Acute change in mental status
- Urine output less than 50 cc over 4 hours
- Staff member has significant concern about the patient's condition

Typical Rapid Response System Calling Criteria

Additional criteria used at some institutions:

- Chest pain unrelieved by nitroglycerin
- Threatened airway
- Seizure
- Uncontrolled pain

Evidence of Effectiveness

Early publications on RRSs reported significant improvements in clinical outcomes, but multiple subsequent [systematic reviews](#) have tempered the initial enthusiasm. The best available evidence indicates that RRSs [slightly reduce](#) unexpected cardiac arrests in ward patients, but they do not affect overall in-hospital mortality. The reasons for the inconsistent effects of RRSs are complex, and in some cases, may be related to local practice and cultural reasons that result in the team being underutilized. RRSs are very popular among [nursing staff](#) and can contribute to detection of underlying patient safety issues in hospitals.

Current Context

Some form of rapid response team is present in most hospitals in the United States, spurred by the 2008 [Joint Commission National Patient Safety Goal](#), which required hospitals to implement systems to enable "healthcare staff members to directly request additional assistance from a specially trained individual(s) when the patient's condition appears to be worsening."