



Rapid response teams improve outcomes: yes

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What are a rapid response team and a rapid response system?

A rapid response team (RRT) is a group of clinicians who provide a rapid response to hospital patients showing objective or subjective signs of clinical deterioration. Calling criteria are based on abnormal vital signs and other significant clinical changes such as increased work of breathing, bleeding, or uncontrolled seizures [1]. A rapid response system (RRS) describes a whole hospital approach to improving the recognition and management of all at-risk and deteriorating patients. It consists of an afferent limb (the calling criteria and mechanism of activation), an efferent limb (the team itself), an administrative limb (which coordinates the day to day work of the team), and a quality improvement or governance limb.

Why are RRTs needed?

Studies from the 1990s to the present day show that adverse events including cardiac arrest, unplanned admission to intensive care, and unexpected death in hospitals around the world are usually preceded by objective signs of deterioration, often for several hours [2]. Investigations indicate that standard hospital systems frequently fail patients in these cases [2]; however, certain high-risk groups (e.g. with myocardial infarction or stroke) benefit from timely treatment by dedicated services. These observations provide the background and biological plausibility for the deployment of RRTs, acting as a safety-net for all at-risk and deteriorating patients on

general wards, and as the key component of a whole-hospital patient safety system—the RRS (Table 1).

RRTs reduce the incidence of in-hospital cardiac arrests

The most consistent finding of studies of RRT effectiveness in systematic reviews is reduction of in-hospital cardiac arrests achieved by early identification and treatment of at-risk patients [3–5]. There are typically fewer than 10 cardiac arrests per 1000 patient admissions [3–5]; however, mature RRTs review at least 20 patients per 1000 admissions [6] and a dose–response relationship between increasing RRT review rates and reducing cardiac arrests has been demonstrated [7]. RRTs also play a leading part in developing a safety-focused culture and patient-safety systems across hospitals, although it takes time for systems to mature, for barriers to be overcome, and for escalation of at-risk patients and learning from adverse events to become routine practice.

RRTs can also enable more appropriate treatment planning so that patients are not “over-treated” with therapies unlikely to provide benefit. In some cases this will include ‘do not attempt resuscitation’ decisions; such patients will not then be recorded in a cardiac arrest registry. Finally, education of all staff about using vital signs and other indicators of clinical deterioration may alert the ward team to intervene without the need to activate the RRT.

RRTs may decrease hospital mortality

Decreased all-cause hospital mortality is less consistently demonstrated following introduction of RRSs. This is probably because a large proportion of hospital admissions are often patients in their last year of life [8]. Thus, many deaths can be anticipated and occur in the context of planned treatment limitation or active palliation. Despite this, a recent systematic review found that RRS implementation was associated with a 17 % mortality reduction [3]. Similarly, in an 8-year before-and-after multicentre study, introduction of RRTs was associated with a 23 % reduction in mortality [9]. Follow-up of ICU

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Contrasting viewpoints can be found at: doi:10.1007/s00134-016-4246-2 and doi:10.1007/s00134-016-4253-3.

Table 1 Summary of rationale and benefits of the rapid response team and rapid response system

RRTs are the first clinician-led, patient-centred, organisation-wide initiatives aimed at making hospitals safer
Ward teams do not reliably recognise instability or always escalate patient care appropriately
Serious adverse events are usually preceded by objective signs of deterioration, often for several hours. These signs can be used as calling criteria for the RRT
In-hospital cardiac arrests are relatively infrequent, and the rate of RRT review in mature RRSs exceeds in-hospital cardiac arrest rates several-fold
Systematic review and meta-analysis indicated that RRTs reduce in-hospital cardiac arrests and possibly hospital mortality
RRTs participate in end-of-life care in about a third of cases; therefore, introduction of RRTs may improve end-of-life care
RRTs may indirectly improve patient care by (a) supporting and educating ward staff, (b) triaging deteriorating patients who are appropriate for ICU, (c) enabling audit and learning about at-risk and deteriorating patients, thereby improving care processes
RRTs facilitate communication across departments and pathways and encourage the development of new technology for patient-centred care and detection and monitoring of at-risk and deteriorating patients

discharges by RRTs has also been shown to reduce readmission rates [10], hospital stay, and mortality [11].

RRTs can improve end-of-life care

RRTs were initially introduced to reduce avoidable mortality. However, they are now increasingly involved in ensuring that patient treatment plans include agreed limits of care so that only interventions likely to be of benefit are given [12]. It is now apparent that many deteriorating patients are actually in need of end-of-life care [12]. Dying patients will trigger RRT activation criteria, and ward staff may also call RRTs because of uncertainty about the goals of care. RRTs can then provide an expert second opinion, and assist ward teams with decisions about which patients will benefit from intensive care and when more conservative care is appropriate.

The RRT can then improve end-of-life care by preventing patients from invasive, burdensome, or painful treatments unlikely to improve end-outcomes [12]. These sorts of interventions might include organ support in ICU, or futile resuscitation efforts in the event of cardiac arrest. RRTs can also help facilitate family meetings to agree appropriate goals of care, and can improve the provision of terminal care [12].

Other potential benefits of RRTs

Other benefits of RRTs have been reported. A single-centre study found that there were fewer adverse events after major surgery following introduction of an RRT [13]. Ward nurses suggest that the RRT teaches them how to better manage deterioration, and reduces the workload associated with care of acutely ill patients [14]—which may also benefit other patients on the ward. RRT involvement in end-of-life care provides opportunities for ward staff to gain confidence and skills in these difficult matters [12]. Furthermore, RRTs may expedite ICU transfers, allowing ward staff to allocate more time to their other patients. Increasingly, it may be possible to predict which

patients require admission to the ICU following activation of the RRT [15].

The RRS focus on the predictive value of vital signs has helped drive development of warning systems, computerised analytics and alerts, and advances in continuous monitoring devices. Most importantly, audit, investigation, and learning about the antecedents, triggers, and consequences of RRT calls have brought about significant improvements in care processes for both at-risk and less acute ward patients [14, 16]. Finally, it is hypothesised that the support of an RRS improves ward staff satisfaction and retention—as well as patient satisfaction—but this requires further investigation [17].

What are the research priorities in the area of RRSs?

With increasing publications showing effectiveness of the RRT model, there has been a shift in the focus of the research priorities in this area [1]. Current unanswered questions include the following: (1) what are the factors that lead to a patient needing an RRT call, and can they be predicted or even prevented? (2) what is the ideal composition of the RRT? (3) which patients benefit most from RRT review? (4) what are the optimal calling criteria? (5) how can seriously ill patients that will benefit from aggressive treatments be differentiated from those that will not? (6) how can the RRS approach be used to further improve the quality of care for all at-risk patients?

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