

# The rapid response team in outpatient settings identifies patients who need immediate intensive care unit admission: A call for policy maker

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## ABSTRACT

**Background:** Caregivers in the ambulatory care setting with differing clinical background could encounter a patient at high risk of deterioration. In the absence of a dedicated acute care team, the response to an unanticipated medical emergencies in these settings is likely to have a poor outcome. **Objective:** To describe our experience in implementing an intensivist-led rapid response team (RRT) in the outpatient settings that identified patients who needed immediate Intensive Care Unit (ICU) admission. The effect on in hospital arrests, mortality, and ICU outcome is not the scope of this study. **Materials and Methods:** This retrospective descriptive study was performed from January 1, 2009 to December 31, 2011 in a tertiary hospital. Data from hospital records were used (none from patients' records). Consent was not needed. **Measurements:** Direct ICU admissions from the outpatient areas. **Results:** There were 90 patients cared for by RRT in the outpatient's settings, 76 adult, and 14 pediatric patients. A total of 12 adult patients were transferred directly to ICU. Among the patient who were transferred to the emergency department, additional four patients required to be transferred to ICU (total 16 patients [17.7%], 15 adult, and one pediatric patient). Follow-up at 24 h in the ICU showed death of one adult oncology patient (6.25%), and discharge of two patients (12.5%). Nine patients (81%) were still sick to require longer ICU stay. **Conclusion:** Intensivist-led RRT in outpatient settings identifies patients who are critically ill and in need of immediate ICU admission. Thus, an intensivist-led RRT policy in the outpatient settings needs to be implemented hospital wide.

**Key words:** *Intensive care admission, outpatient, safety rapid response system*

## INTRODUCTION

Little research has focused on patient safety in the ambulatory setting.<sup>[1]</sup> Yet most care is delivered in these settings. In the absence of a dedicated acute care team, the response to an unanticipated medical emergencies in these settings is likely to be disorganized with poor outcome.<sup>[2]</sup> Despite having highly qualified and dedicated staff in the outpatient setting, early recognition and appropriate timely response to patients who are clinically deteriorating may not always occur and could result in the

missed opportunity to prevent serious morbidity or death in these setting.<sup>[3]</sup>

Rapid response teams (RRT) were introduced more than a decade ago in Australia and the United Kingdom to rapidly identify and manage seriously ill patients at risk of further deterioration. Its use is perhaps the most dramatic strategies implemented to save patients' lives.<sup>[4,5]</sup> While much that has been written about RRT is about managing general inpatient clinical emergencies, many of the concepts are appropriate for a clinical emergency in outpatient settings. The value of RRT activations in these settings is not well defined. To the best of our knowledge, only three studies have so far evaluated RRT in response to crises in outpatient setting. These studies have shown differing levels of intervention. In Dechert *et al.* paper, only 13% of total RRT activations were for nonhospitalized patients. In this study, RRT-led intensivist interventions were small. Authors thus conclude that RRT led by nonphysician providers (like nurses) is equally effective as RRT-led intensive approach in the

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ambulatory care area.<sup>16]</sup> On the other hand, King *et al.* found that as many as half of the RRT activations events occurred in the outpatient settings, 2.6% of which required Intensive Care Unit (ICU) admissions.<sup>17]</sup> In another paper, 13 patients were admitted directly to ICUs (8%).<sup>18]</sup> With this conflicting evidences and mixed findings, researches may not be used optimally, which could represent missed opportunities for improved patient care in these areas. Obviously, more evidence is needed to support patient safety if we are to provide high-quality health care in the outpatient setting. In this article, we describe our experience in implementing Intensivist-led RRT in outpatient settings and evaluate its ability to detect patients who need immediate ICU admission. The effect on in hospital arrests, hospital mortality and the long-term outcome of patients admitted to the ICU are not the objectives of this study.

## MATERIALS AND METHODS

This retrospective descriptive study was performed from January 1, 2009 to December 31, 2011 in a tertiary hospital. It is a 985-bed referral hospital for oncology, organ transplantations, cardiac surgery and genetic disease patients. The hospital is accredited by Joint Commission International Accreditation and is recognized to be as an international center for cancer research, prevention and treatment. This study relates to a quality improvement project of the service provided for the nonhospitalized patients attending outpatient settings (medical and surgical clinics, day care units, oncology clinics, radiology department, endoscopy units, echo rooms and IVF clinics). The hospital has approved in advance any study related to quality improvement project, so approval from the Ethics Committee was not needed to use data from hospital record. As this study is an observational retrospective study with no use of information from the patients' records, consent was not obtained.

Our RRT was led by assistant consultant intensivist with an immediately available in house consultant intensivist if needed at any point in time. In addition, the team included an ICU nurse, respiratory therapist, and patient transporter, who were activated to report immediately to the bedside of the unstable patient. Prespecified criteria in addition to clinical judgment "gut feeling" were used for RRT activation. ICU was then informed by the RRT nurse of the case to be admitted directly to the ICU from the outpatient areas. RRT record of the hospital was reviewed, and cases from outpatient setting were identified. Data were obtained from copy of RRT form that was kept as a record in quality management department and were prospectively recorded. Patients who had comfort measures as the goal of therapy were excluded.

## RESULTS

Over the study period, there were 90 patients cared for by RRT in the outpatients setting. There were no visitors for which RRT had to be activated. Criteria for calling the RRT are shown in Table 1 for both adult and pediatric patients. The leading reasons for RRT activation were respiratory and cardiovascular problems (33.3% and 22.2% respectively).

The most common documented therapeutic interventions performed during RRTs were airway, respiratory, and cardiovascular support, with some having more than one intervention [Table 2]. Patients from oncology clinics led the list of patients for which RRT was activated [Table 3]. A total of 16 patients required ICU transfer (17.7%, 15 adult and one pediatric patient). Totally, 12 of these patients were transferred directly to an ICU and 4 were transferred to the emergency department who were then transferred to the ICU. 24 h follow-ups in the ICU showed death of one oncology patient who was directly transferred to the ICU (6.25%), 2 were discharged (12.5%) and 13 were still in need to remain in the ICU (81%). Table 4 shows the distribution of patient location for which RRT was activated who then required transfer to the ICU. 68.75% were from the oncology clinic.

## DISCUSSION

Our study is one of the few studies to evaluate the implementation of RRT in the outpatient settings.

We proved that RRT in the outpatient setting identifies patients who are sick enough to need immediate ICU admission (17.7%). About 81% of them continue to be sick to require ICU stay longer than 24 h. Emergencies in outpatient's settings can and do occur, and being prepared for them requires an investment of time, effort, and resources. Existing evidence shows that patients who are acutely unwell receive suboptimal care.<sup>9,10]</sup> The prime cause of the substandard care of the acutely unwell in hospital was found to be delayed recognition contributing to about a third of the deaths.<sup>9]</sup> The positive impact of ICU admission on patient survival is more evident during the first 72 h of critical illness.<sup>11]</sup> Timely access to ICU beds is therefore increasingly important. Implementing an intensivist-led RRT in the outpatients setting is a solution to inappropriate delays and/or inadequate treatment in dealing with deteriorations in nonhospitalized patients.

With the availability of intensivist-led RRT in our study and early institution of appropriate therapy by direct ICU admission from the outpatient setting, the death rate was only 6.25%. In contradiction to the study by Dechert *et al.*

**Table 1: Criteria for calling the RRT**

Criteria to call RRT		
Pediatric	Adult	Total (%)
HR <80 or >200 (infant up to 12 months)	HR <50 or >120	30 (33.3)
HR <70 or >180 (1-year to 14 years)		
SBP <70 (infant up to 12 months)	SBP <90 mmHg	20 (22.2)
SBP <90 (1-year to 14 years)		
Capillary refill >4 s		
RR <20 or >80 (infant up to 12 months)	RR <8 or >24	10 (11.2)
RR <15 or >60 (1-year to 14 years)		
O <sub>2</sub> saturation <90 (on O <sub>2</sub> >8 L/min)	O <sub>2</sub> saturation <90 (on O <sub>2</sub> >8 L/min)	6 (6.66)
GCS <10	GCS <10	6 (6.66)
Acute mental status changed	Acute mental status changed	6 (6.66)
Seizures	New onset/increasing seizures activity	4 (4.44)
Acute significant bleeding	Acute significant bleeding	4 (4.44)
Staff concerned/worried	Staff concerned/worried	4 (4.44)

RRT: Rapid response team; SBP: Systolic blood pressure; HR: Heart rate; GCS: Glasgow coma scale; O<sub>2</sub>: Oxygen; RR: Respiratory rate

**Table 2: Interventions performed by the rapid response team\***

Interventions	Number of times intervention needed
Respiratory	
Airway maintained	30
O <sub>2</sub> mask	30
Chest X-ray	14
Arterial blood gases	14
Nebulizer treatment	7
Suctioned	7
No intervention	1
Noninvasive positive pressure ventilation	1
Call code team	1
Circulation	
Intravenous access insertion	30
Intravenous fluid bolus	30
Electrocardiogram	14
Call code team	1
No intervention	1

\*Some patients had more than one interventions performed. O<sub>2</sub>: Oxygen

**Table 3: Distribution of outpatient location for which RRT was called**

Location	Number (%)
Oncology clinics	50 (55.5)
Radiology department	10 (11.1)
Medical day care unit	10 (11.1)
Endoscopy unit	7 (7.77)
Dialysis unit	7 (7.77)
Others*	6 (6.66)

\*One from hyperbaric oxygen room, Medical clinic, Speech therapy, *in vitro* fertilization clinic, Surgical Day case, Echo room. RRT: Rapid response team

who questioned the value of an intensivist-led RRT in the outpatient setting, our study supports intensivist-led RRT.<sup>[6]</sup> We think this provides the most experienced team of

decision makers to provide emergency consultation for the entire spectrum of physiological changes in the outpatient settings where many patients could be significantly ill to need immediate ICU admission. Based on available evidence, this is expected to reduce patient mortality, morbidity and length of stay in ICU. Studies have shown a significant association between time to ICU admission and survival rates.<sup>[12]</sup> Others studies reported a 2 times longer stay among patients not immediately admitted to the ICU.<sup>[13]</sup> In this study, having easily accessed acute care providers in the outpatients settings through the intensivist-led RRT, 12.5% of cases stabilized in <24 h and were able to be transferred from the ICU to general medical floor. In addition, early ICU admission could also have substantial health economic implications through reductions in ICU length of stay, which could cost approximately £1716/day.<sup>[14]</sup> However, in our small study, the effect of our intervention on length of stay and ICU outcome was not looked at. Further studies are needed to look at cost benefits of RRT implementation in the outpatient settings.

Because a significant proportion of outpatients come from vulnerable patient populations, it is essential that hospitals offer care under conditions that minimize the risks. This study showed that the RRT has been activated for variety of nonhospitalized patients. However, majority were for events among oncology patients. The evolution of ambulatory care with a major shift from inpatient to outpatient has been well documented for adult hematology/oncology patients.<sup>[15]</sup> Reports consistently show that oncology patient acuity has risen in ambulatory care service.<sup>[16,17]</sup> More recently, Canadian Institute for Health Information report indicated that cancer condition was among the top five case mix groups with the highest readmission volume presenting to acute care hospitals as an emergency admission.<sup>[18]</sup> Such patients have poor 1-year survival.<sup>[19-21]</sup> Early involvement

**Table 4: Distribution of RRT patients who required ICU admissions**

Location	Number (%)
Oncology clinics	11 (68.75)
Radiology department	2 (12.5)
Medical day care unit	1 (6.25)
Endoscopy unit	1 (6.25)
Echo room	1 (6.25)

RRT: Rapid response team; ICU: Intensive care unit

and easy accessibilities of acute care services will ensure the patient receive appropriate and timely intervention. The national confidential enquiry into cancer patient outcomes and death identified a number of factors contributing to the death of cancer patients presenting first in the outpatient setting. Most important factor was lack of senior medical staff assessment and delay in patient admission.<sup>[22]</sup> These worrying findings led to the National Chemotherapy Advisory Group to make a number of recommendations centered on careful provision of acute care service in the outpatient setting by senior specialists as acute care providers.<sup>[23]</sup> Finding in our study supports this recommendation. Transitions between inpatient and ambulatory care as well as between different points in ambulatory care increase the risk of adverse events and shortfalls in quality of care. It has become increasingly clear that attention to safety and quality is required across the whole spectrum of care. Patient safety has thus become an integral topic within the broad scope of different healthcare delivery system. Prior to the introduction of RRT in the outpatient settings in our hospital, no system existed for expedited treatment of sick patients in the outpatients settings and patients had to be shifted to the emergency department for further evaluation and management. Our newly implemented policy seems to have fill in a gap in patient safety, improvements in patient safety in the clinic setting require physicians, nurses, and administrators to commit to identifying structural and process changes that make it easier to provide consistently safer care. Some of the improvements require system wide efforts. The development and implementation of patient safety policies within a medical organization inevitably involve change.

This change may be met by resistance or noncompliance by certain clinical or administrative staff.

One tool an administrator may use to address these arguments is to refer to clinical evidence as the basis for the patient safety policies, like our study. Achieving consensus as to what standard care to be used for patient safety in the ambulatory setting is an important organizational decision, the responsibility of which falls to the leadership and management in any organization.

## CONCLUSION

With the current availability of few safety tools specifically designed for the ambulatory care setting, there is an opportunity for the decisions maker to utilize tools like an intensivist-led RRT. In our study, 17.7% of patients attending the ambulatory care service were sick to require immediate ICU admission, majority of which remained sick and required ICU care longer than 24 h. We, therefore, recommend the implementation of intensivist-led RRT policy in all outpatient settings in order to expedite the admission to the ICU.

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