Commentary

# Introduction of a rapid response system: why we are glad we MET

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Published: 15 February 2006
This article is online at http://ccforum.com/content/10/1/121


*Critical Care* 2006, **10:**121 (doi:10.1186/cc4841)

## Abstract

Hospital patients can experience serious adverse events during their stay. To identify, review and treat these patients and to prevent serious adverse events, we introduced a medical emergency team (MET) service into our hospital in September 2000 following a 1-year period of preparation and education. The introduction of the MET into our institution has been associated with profound changes to cultural and medical practice that have affected the way in which the intensive care unit and the hospital view the roles of junior doctors, nurses, intensive care physicians, and senior doctors. These changes have also been associated with a progressive reduction in the incidence of cardiac arrests of close to 70%. Furthermore, they have allowed improved analysis and characterization of 'at-risk' patients and their needs. Four years later, we remain glad we MET.

## Introduction

Studies conducted in multiple countries have revealed that 15–20% of hospitalized patients develop serious adverse events [1-3]. Up to 80% of adverse events are preceded by physiological and biochemical derangements that occur over hours and sometimes days [4-6]. Despite these observations, not all hospitals have a systematic approach to the identification, review and rapid treatment of such patients. These patients suffer mortality rates that are greater than those in patients with myocardial infarction. However, the latter are identified within minutes of presentation, are managed using evidence-based algorithms and have dedicated units, nurses and doctors. The former typically receive unpredictable and unstructured care. We argued in our hospital that as an issue of clinical governance it was necessary to develop a method of identifying and treating patients at risk – the medical emergency team (MET) service.

## The concept of the MET

As described previously [7], the MET system can be activated by any member of ward staff when patients develop predefined alterations in heart rate, blood pressure or respiratory rate, or when – for whatever reason – a member of staff feels worried about the patient. Immediate patient review in our hospital is then performed by a team led by an intensive care fellow with an intensive care nurse. The theory behind the MET is that early intervention during clinical deterioration is associated with improved outcome. This observation has been made for the management of trauma [8], acute myocardial infarction [9] and septic shock [10] presenting to the emergency department.

## Sustaining the success of the MET service at the Austin Hospital

The MET service was introduced into the Austin Hospital in September 2000 and was shown to be associated with a 56% relative risk reduction for cardiac arrests [11] and a 36% relative risk reduction for surgical deaths [12].

In the 4 years following the introduction of the MET, there has been a progressive reduction in cardiac arrests [13]. This reduction has been associated with a progressive increase in the number of MET calls/1000 patients admitted to the hospital. Our findings also suggested a 'dose effect'. We believe that the sustained success of the MET at our hospital is due to a number of important factors (Table 1).

## How the MET changed hospital culture

### Setting the scene for the introduction of the MET service

Before the MET service was introduced into the Austin Hospital, a 1-year campaign of preparation and education was undertaken. During this period, 'political' support was obtained for its introduction. In addition, detailed and repeated education was delivered to all nursing and medical staff to advise them of the pending introduction, clinical rationale and method of activation. It was emphasized that the MET service was hospital policy and that no member of staff could be criticized for calling the MET. It was also emphasized that the MET system would not and could not represent an attempt by intensive care unit (ICU) doctors to take over patient management. Instead, the MET service

ICU = intensive care unit; MERIT = Medical Emergency Response Improvement Team; MET = medical emergency team.

**Table 1**

**Important components of the success of the MET service at The Austin Hospital**

| |
|---|
| Collection of baseline data for before-and-after studies |
| Obtaining support from administrators and heads of departments |
| Detailed education and preparation for 1 year before introducing the MET service |
| Repeated education of new and existing hospital staff |
| Administering questionnaires to assess staff attitudes and obstacles to MET use |
| Assessing the circadian pattern of MET activations and cardiac arrests |
| Ongoing audit of effectiveness of the MET |
| Feeding back effectiveness to hospital staff at regular meetings |
| Assessment of the common causes of MET syndromes |
| Educating ICU fellows about an approach to managing a MET call |

ICU, intensive care unit; MET, medical emergency team.

aimed to provide an acute second opinion within minutes and to offer resuscitation expertise that would form part of patient co-management during a crisis.

### How the MET has changed the culture of managing acutely unwell hospital patients

Uptake of the MET service in the Austin Hospital has been progressive from 25 calls/month in 2000 to over 100/month in December 2005. The current call rate (>40 calls/1000 admissions per month) is five times that seen in the Medical Emergency Response Improvement Team (MERIT) study [14]. These observations suggest that sustained uptake of the MET system is possible but that increased utilization may take several years to develop.

We recently surveyed 350 ward nurses to assess their understanding and attitudes toward the MET service (unpublished data). We found that the nurses understood the concepts of the MET and appreciated its presence. The vast majority felt that the MET increased their ability to manage acutely unwell patients.

Analysis of the circadian variation of activation of the MET service revealed that the majority of calls occurred during nursing handover, with a peak at 8:00–8:30 hours [15]. These observations reinforce previously reported opinion [7] that adequately trained doctors must be available 24 hours per day.

Recently, we completed an audit of 400 MET calls to identify the most common clinical triggers [16]. In keeping with previously reported opinion [17], these data have allowed us to identify some 'MET syndromes'.

### How the MET has changed our intensive care unit

The introduction of the MET service has changed the profile of the ICU within the hospital. ICU doctors and nurses are no longer viewed as simply managing critically ill patients within the confines of the ICU ('the ivory tower'). Instead, they are seen in the hospital wards assessing and treating patients in the early phases of clinical deterioration. This paradigm shift has been associated with an improvement in the interaction between the ICU and all other departments of the hospital.

The MET service has allowed the ICU to work closely with the Clinical Governance Department to identify system problems in the management of unwell ward patients, assess these problems by root cause analysis, and develop strategies to prevent them.

## Future direction for the MET service

Considerable interest in 'rapid response systems' such as the MET service has developed in both the USA [18] and the UK [19]. At our institution, future development of the MET service will probably concentrate on further developing and characterizing MET syndromes and validating education methods for ICU fellows. Finally, in characterizing the epidemiology and outcome of nearly 2500 MET calls and 300 cardiac arrests, we hope to increase our ability to introduce further preventative strategies to protect at-risk patients.

## Conclusion

The introduction of a MET service into our hospital has changed the culture of the hospital itself and the ICU. The latter has come to recognize that the task of intensive care medicine is to prevent critical illness within the hospital just as much as treating it effectively when such illness presents to its door. Through the MET service, collaboration between the ICU and other units has increased. Many physicians and ward charge nurses frequently remark that it seems inconceivable that not so long ago our hospital existed without a MET and wonder why the MET system had not been introduced 30 years ago.

## Competing interests

The author(s) declare that they have no competing interests.

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