

## CLINICAL PERSPECTIVES

# The medical emergency team: does it really make a difference?

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### Abstract

Hospital systems are failing the critically ill. This has been well documented in many countries around the world, with detailed reports of suboptimal care prior to intensive care and high rates of serious adverse events, including death. These events are potentially preventable, but insufficient attention has been directed towards developing solutions to these important problems to date.

The medical emergency team (MET) is a system approach that promotes early and appropriate intervention in the care of critically ill hospital patients. The benefits of the MET in terms of absolute in-patient mortality and cardiac arrest rates are not yet well-defined, although preliminary studies are promising.

The MET does provide a potentially beneficial impact on many other aspects of patient care. These benefits

include: (i) facilitating an integrated and coordinated approach to patient care across the hospital, (ii) increasing awareness of at-risk patients, (iii) encouraging early referral of seriously ill patients to clinicians with expertise in critical care and (iv) providing a foundation for quality initiatives for hospital-wide care of the seriously ill.

The MET also empowers nursing staff and junior medical staff to call for immediate assistance in cases where they are seriously concerned about a patient, but may not have the experience, knowledge, confidence or skills necessary to manage them appropriately. (*Intern Med J* 2003; 33: 511–514)

**Key words:** medical emergency team, critical illness, hospital systems.

Australian hospitals often do not achieve the optimal health-care outcomes that most doctors set out to provide, and that patients expect to receive. There are systematic failures in the delivery of care to the seriously ill in hospital,<sup>1,2</sup> as well as high rates of serious adverse events for patients admitted to Australian hospitals.<sup>3</sup> These adverse events have been estimated to be preventable in up to 50% of cases.<sup>3</sup> Similar problems with negative hospital outcomes and preventable death have been documented in the USA and the United Kingdom.<sup>4–7</sup>

With increasing demand for hospital beds, a greater proportion of patients are being treated in clinics or as outpatients. As a result, the severity of illness of in-patients on general wards is increasing.<sup>8</sup> The age of patients is also increasing, along with their rate of chronic and complex comorbidities. In combination, these factors increase the vulnerability of patients to delayed or inappropriate responses to sudden deterioration.

The increasing severity and complexity of patient illness is also placing additional demands on the clinical staff caring for patients on the wards. As physicians themselves are spending more time dealing with patients in an ambulatory care or procedural setting, the care of the sickest patients is often relegated to the most junior members of the hospital medical team.<sup>1,7,9</sup>

In almost half the cases reported in a British study, the only doctor known to have reviewed the patient in the 24 h prior to arrest was a junior house officer.<sup>7</sup> The situation is little better in Australia.<sup>9</sup> Even if a consultant physician does provide a review, they may no longer have the skills necessary to deal with a critically ill and rapidly deteriorating patient.<sup>10</sup>

Failure to seek and provide appropriate and timely intervention to at-risk patients has led to suboptimal care of the critically ill on the wards.<sup>1</sup> Almost half of all patients who suffer an in-hospital cardiac arrest have serious and potentially reversible abnormalities in their vital signs in the 24 h before arrest.<sup>6,11–14</sup>

Once a patient has suffered an arrest, only approximately 15% survive to hospital discharge.<sup>15</sup> The survival rate is even lower for patients in areas of non-critical care.<sup>16</sup> Deterioration before the arrest is often well recognized and documented, however appropriate and timely action is often not taken because staff caring for these patients do not have the skills, experience, knowledge and confidence to do so.<sup>1,9,10,17,18</sup>

Most hospital systems are currently hierarchical and inflexible, with ultimate responsibility for all areas of patient care resting with a single specialist. This system

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has strengths and limitations. It has been recognized that, in a highly complex and interactive system such as a hospital, it is impossible for any single individual to control and guide all aspects of care, and no single clinician can claim to be able to guarantee a high quality of care.<sup>19</sup>

Patients who become critically ill urgently require assessment, with institution of appropriate therapy as soon as the deterioration and change in status is recognized. In most tertiary referral hospitals the standard pattern of referral for these patients is: nursing staff, to intern/resident, to registrar, to consultant, and then, eventually, to the intensive care unit (ICU). Smaller hospitals have fewer referral levels but a similar problem with delay between recognition of the problem and appropriate action.

Many adverse outcomes are thought to result from a delay in the effective institution of relatively simple therapies, and not from a delay in the institution of the expensive high-technology interventions associated with care in the ICU.<sup>1,2,6,7</sup>

Critical care specialists are beginning to apply the principles of acute medicine and resuscitation across the whole hospital, in order to provide rapid and specialized assistance to critically ill patients wherever and whenever it is requested.<sup>20</sup>

The medical emergency team (MET) is an example of such an initiative, providing an immediate response to all at-risk patients in an acute hospital.<sup>20</sup> This MET system has grown out of the cardiac arrest team that most hospitals currently employ. The MET was modelled on the idea of the trauma team,<sup>21</sup> which has been incorporated into Australian hospitals for over a decade. The aims of the MET are similar to those of the trauma team: effective triage and management of potentially seriously injured patients prior to the development of progressive and irreversible deterioration. In both kinds of critically ill patients, rapid assessment and early and aggressive correction of hypovolaemia and hypoxaemia have been demonstrated to decrease morbidity and mortality.<sup>22-24</sup> The MET aims to provide appropriately trained personnel who are able to perform these functions on the ward early, in order to prevent the development of severe adverse outcomes such as multi-organ failure or cardiac arrest.

Other outreach responses based on the MET concept have been developed elsewhere. For example, the patient at-risk team (PART), and medical early-warning systems (MEWS) are being implemented in various hospitals in the United Kingdom.<sup>25</sup> In the USA, a new 'Hospitalist' system has been developed. The Hospitalist system aims to deal with these same problems by ensuring that a specialist specifically trained in resuscitation is available and is responsible for the welfare of all patients in the hospital at all times.<sup>26</sup> It may be that the MET system provides an interim solution to the problem of suboptimal care in hospitals, until such time as the Hospitalist concept has been sufficiently tested, validated and accepted. Should the Hospitalist system become widely implemented in Australian hospitals, the need for the MET (and similar outreach systems) may be substantially reduced.

The MET in the tertiary hospital setting usually consists of: (i) an ICU or emergency department (ED) registrar, (ii) an ICU or ED nurse and (iii) the medical registrar. In smaller hospitals the MET may consist of as few as two nurses trained in advanced resuscitation. All members of the nursing and medical staff are encouraged to call the MET whenever they are seriously concerned about a patient's condition, or if a patient's observations meet at least one of the well-defined physiological calling criteria (Table 1).

The response team will assess the patient, and institute any therapy that is immediately necessary. The patient may then be given an active medical management plan and left on the ward, with or without a not-for-resuscitation (NFR) order in place, after appropriate discussion. Alternatively, if the patient is not responding to initial therapy or is judged to be too sick for the wards and appropriate for more intensive therapy, they may be transferred to an area capable of a higher level of care. Where the patient is judged safe to remain on the wards, the ongoing care and management responsibility are transferred back to the consultant in charge of the patient's hospital admission.

The stated aims of the MET are to reduce unexpected death (i.e. death without an NFR order), rates of cardiac arrest and unanticipated admission to ICU. The MET has been shown to reduce the rates of cardiac arrest<sup>27</sup> and unanticipated ICU admission.<sup>28</sup> The aims of the

**Table 1** Medical emergency team calling criteria

Area	Symptom
Airway	Threatened
Breathing	All respiratory arrests Respiratory rate <5 Respiratory rate >36
Circulation	All cardiac arrests Pulse rate <40 Pulse rate >140 Systolic blood pressure <90
Neurology	Sudden fall in the level of consciousness (fall in the Glasgow coma stage of >2 points) Repeated or prolonged seizures
Other	Any patient you are seriously worried about who does not fit the above criteria

MET are currently being tested in 23 hospitals across Australia, in a cluster randomized controlled trial. The results of this trial, known as MERIT (medical early response, intervention and therapy) will be available in approximately 18 months.

The potential benefit of the MET system is not limited to a reduction in the adverse outcomes discussed above. The MET is also capable of facilitating change in attitude and systematic thinking across the hospital. First, the system results in a less rigid, more patient-centred approach generally within the hospital, by empowering all staff to call for appropriate help when required. The MET system provides room for staff to display initiative and become pro-active when confronted by seriously ill patients. The MET also provides a sense of support and security for the junior medical and nursing staff: an environment that is supportive and less stressful facilitates more effective learning.<sup>29</sup>

The MET system also acts as a driver to increase the appropriate documentation of NFR at an earlier stage, and in a more considered and controlled fashion. This may lead to a reduction in the rate of futile and inappropriate cardiac arrest calls. The MET system may also encourage a better quality of end-of-life care for patients and their families, by de-emphasizing acute medical management in favour of active and holistic care of the dying.<sup>30</sup>

In addition, the MET system provides a basis for clinical governance by providing information on patients suffering serious adverse events heralded by MET criteria that were not acted on appropriately.<sup>31</sup>

The MET system reinforces who and what physiologically constitutes a critically ill patient, and therefore helps to direct attention to those at risk. This, together with the ongoing overall hospital education and awareness processes that a MET system entails, means that staff become more skilled and confident in their initial response to critically ill patients. They also no longer have to deal with these extremely stressful situations, along with their potentially negative outcomes, alone. It may be these less tangible benefits that explain the nursing staff's positive attitude toward the MET concept.<sup>32</sup>

The problems of suboptimal care and preventable death in hospitals have been identified in many countries around the world; they are real, and they must be constructively addressed.

Even if the early trials of the effectiveness of outreach teams such as the MET are not able to demonstrate improved outcomes, it remains true that resuscitating patients at the earliest possible time is beneficial, regardless of where a patient is located within the hospital. We need to direct our attention to devising ways of providing effective and timely care to all critically ill and at-risk patients in the hospital, rather than only to those located within the designated critical care areas.

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