

## COMMENTARY

## Evidence-based Medicine and Rapid Response Team Implementation

Jeffrey Bruckel\*

---

**ABSTRACT:** The implementation of Rapid Response Teams is becoming commonplace in U.S. hospitals, following the model developed in Australia. The Rapid Response Team is a method of bringing ICU-level patient care to the bedside of critically ill patients using a multidisciplinary team. Acute care unit staff are trained to recognize clinical deterioration using a set of vital sign calling criteria (systolic blood pressure below 90 mmHg, pulse below 60 or above 100, etc.). Many hospitals have been facing problems gaining needed support to make the organizational changes needed for the team to function properly. Some faculty physicians have expressed apprehension about losing control over their patients, and they have also highlighted the lack of rigorous experimental evidence that the teams work. Since there are so many confounding factors at work when trying to design an experimental study of this type of change, the study may not accurately portray the situation. Other evaluation methods should therefore be considered.

---

### INTRODUCTION

The implementation of Rapid Response Teams (RRTs), also known as Medical Emergency Teams (METs), in hospitals has been a topic of interest recently. The RRT is a method of bringing ICU-level care to the bedside of clinically deteriorating and critical Acute Care Unit patients in the form of a multidisciplinary team. Acute care unit staff are trained to recognize clinical deterioration using a set of vital sign calling criteria (systolic blood pressure below 90 mmHg, pulse below 60 or above 100, etc.). When a patient meets one of the criteria, or the nurse or family member feels concerned about the patient's worsening condition, a team consisting of ICU physician(s), nurse(s), and/or respiratory therapist(s) responds to the patient at the bedside. The team is responsible for stabilizing the patient's condition and integrating his/her care with the primary team.

The body of literature surrounding the implementation and operation of Rapid Response

Teams is growing rapidly. It is this body of research that hospitals consult when deciding whether to implement a team and what design that team should take. Although the body of evidence that exists is overwhelmingly positive toward Rapid Response Teams, many hospitals have refrained from implementing a team due to the lack of rigorous evidence in the form of a randomized controlled trial. This type of study has been touted as the "gold standard" in research under the guise of the Evidence-Based Medicine (EBM) model that has become the primary methodology for making clinical decisions. Due to this demand for scientific rigor in the implementation of a Rapid Response Team, a cluster-randomized controlled trial of Medical Emergency Teams was recently published. This trial, the MERIT study, failed to show any association between the introduction of a Medical Emergency Team and their outcome variables (rates of cardiac arrest, mortality, and ICU admissions) (2). This study may unwittingly become the basis for the refusal of institutions to implement a Rapid Response Team.

---

\* To whom correspondence should be addressed: Jeffrey Bruckel  
E-mail: bruckel@email.unc.edu

## EVIDENCE-BASED MEDICINE

The situation at hand, however, is an inappropriate application of some of the principles of Evidence-Based Medicine. EBM was developed as an "approach to caring for patients" for use by individual physicians in clinical practice (3). It is a tool for clinical decision-making and tailoring clinical practice to individual problems based on the literature. The implementation of a RRT is not a clinical decision; rather it is an alteration of organizational design of a hospital that requires a system-wide change in culture. This is an area to which EBM was never intended to apply, and viewing organizational situations through the EBM lens may produce results that misrepresent the situation. It is this misrepresentation that has resulted in physicians in hospitals becoming reluctant to accept evidence for a RRT in their hospital due to lack of evidence that meets typical EBM criteria.

EBM is a practice that has been adapted to the spectrum of medical practice, including Critical Care Medicine (the closest relevant discipline to the RRT issue). Dr. Peter Pronovost, in the introduction to an EBM syllabus, states that, "randomized clinical trials are sometimes difficult in critically ill patients, and the results of randomized clinical trials may not be generalizable. Therefore, we may need observational studies to supplement clinical trials to inform clinical practice" (3). This statement is one that applies directly to the case of RRT development, in that it is very difficult to generalize the results found at one hospital to those experienced by other hospitals. The confounding factors at work are so numerous that trying to control for them would result in simply controlling away all of the effect of the "experiment." This is likely one of the reasons why the MERIT study found no association; by choosing hospitals with greatly varying operational profiles (and baseline outcome variables), and by allowing multiple different team design models, any potential effect that could be reported in an individual hospital was lost when the results were averaged over the whole. The same article by Pronovost describes the evidence needed to make such operational decisions, and states that observational studies may provide the best evidence (3). Observational studies in this case have been criticized due to the possible presence of Hawthorne effect. In fact, this effect is desirable in system changes designed for process improvement. Educating acute care unit nurses to recognize imminent deterioration should not be viewed as a detriment to this process.

## A BETTER METHOD

Since the question being studied (whether or not Rapid Response Teams improve patient outcomes) does

not relate to the outcome of a single patient but rather to general patient outcome measures in the aggregate, a different set of evaluation criteria should be used when making the decision to implement a team. The first step in evaluating whether or not a facility could benefit from a RRT is to determine whether or not the facility is experiencing the type of problem that the RRT is designed to correct. Namely, patients in the facility are experiencing delays in getting the most highly trained practitioners available to their bedside in the event that their condition deteriorates to a critical level.

The most efficient way to evaluate whether or not this problem exists is to conduct retrospective chart reviews of critical patients, evaluating them for the time it takes between when the deterioration is first noted to when the patient receives appropriate care. These chart reviews can be quite startling, and illustrate the problem in the clearest possible light: that critically ill patients may not be receiving advanced care as quickly as they should. Though this evidence is not nearly as rigorous as the principles of EBM demand, the problem exists regardless of whether it can be proven to statistical significance and this truth should be obvious to anyone using reasonable judgment and given the proper information (To further illustrate my point, I refer you to an article in the British Medical Journal which concludes that parachutes don't save lives) (4).

The next step in evaluating the problem is to determine its cause. Obviously there is no one specific cause to this problem, but understanding the process of summoning help might provide some insight as to why the process has failed and may illuminate some appropriate solutions. This analysis quite often shows (at least in academic institutions) that the greatest barrier to patients receiving appropriate and timely care is the hierarchical nature of how care is provided. The nurse reports the signs or symptoms to an intern, who reports it to a senior house officer, who then reports it to a fellow or attending physician only after they have first attempted to investigate and treat the symptoms on their own. Often, a significant amount of time has passed when the attending physician reaches the bedside. In the vast majority of cases this process is entirely appropriate and leads to timely care for the patient and improved educational opportunities for the junior team members in that they must make decisions on their own. However, when a patient is deteriorating rapidly, he/she may have already arrested by the time the attending physician can be called.

Caring for critically ill patients is complex and requires experience; additionally, assessments and decisions must be made much more efficiently than when caring for any other patient. Asking junior team members to be responsible for evaluating and treating a

critically ill patient on their own is akin to asking a first-year surgical resident to perform a liver transplant without supervision. Closing the wound after surgery unsupervised may be the proper place for the same resident; however appropriate supervision is necessary for proper education. It is therefore necessary for junior physicians learning to care for critically ill patients to have an experienced opinion readily available.

Attending physicians are quite busy, and there is a reason they cannot be immediately available for consultation on every patient. The decisions therefore fall to the junior team members who may or may not have the experience necessary to care for a critically ill patient. Since asking the attending to abandon another patient or procedure immediately to come to the Acute Care Unit is often impossible and quite unfair to both patients, another solution must be devised. The most obvious conclusion is that a Rapid Response Team that would bring ICU-trained physicians to the bedside within minutes would help to alleviate this problem. When confronted with this information, though, many attending physicians immediately become defensive, feeling as though they are losing control over their patient. Although it may be true that the physician loses some direct control over their patient's care, the physician must evaluate what is likely to produce a better outcome for their patient. The physician must also evaluate which is a better scenario: one where they will be called to come immediately in the event of their patient's cardiac arrest, or one where an experienced ICU physician is working with the primary team to produce a better outcome. According to the guidelines of "Good Medical Practice" supported by the General Medical Council of the UK, responsible for enforcing standards of medical practice, a physician must both "Make sure that [their] personal beliefs do not prejudice [their] patients' care" and "Work with colleagues in ways that best serve patients' interests" (1). Many physicians are falling victim to the first point, by vehemently opposing Rapid Response Teams on the principle that their control of their patient is being usurped, and to the second point as well, in that they refuse to allow a colleague of appropriate skill and

training to assist them in caring for a critically ill patient.

Evaluating potential process changes for a facility is a difficult task, made easier with the help of an evaluation tool. Evidence Based Medicine is the tool most often cited when attempting to evaluate data for project implementation; however, it is an ill-fitting model for Rapid Response Teams and will produce results that do not accurately portray the facility's and the patients' needs. Therefore, when evaluating evidence for process changes such as the RRT program, other analytical techniques can produce better outcomes for both the hospital and the patient. A process of identifying a problem (such as delayed care for critically ill patients), investigating the cause of that problem (here, through directed chart reviews of cardiac arrest patients), proposing a solution (the Rapid Response Team), and measuring success through careful data collection, will produce the most desirable effect.

## REFERENCES

1. General Medical Council [homepage on the Internet]. London: General Medical Council; c2005 [cited 2005 Sep 03]. Review of Good Medical Practice - Initial Consultation; [about 13 screens]. Available from: [http://www.gmc-uk.org/guidance/good\\_medical\\_practice/index.asp](http://www.gmc-uk.org/guidance/good_medical_practice/index.asp)
2. Hillman K, Chen J, Cretikos M, Bellomo R, Brown D, Doig G, et al. Introduction of the medical emergency team (MET) system: a cluster-randomized controlled trial. *Lancet*. 2005 Jun 18-24; 365(9477): 2091-7.
3. Pronovost P, Angus D. Evidence-Based Critical Care Medicine [monograph on the Internet]. Toronto: Centre for Evidence-Based Medicine; 2004 [cited 2005 Sep 3]. Available from: <http://www.cebm.utoronto.ca/syllabi/crit/print/whole.htm>.
4. Smith GC, Pell JP. Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomized controlled trials. *BMJ*. 2003 Dec 20; 327(7429): 1459-61.

**Jeffrey Bruckel** is currently conducting the Rapid Response Team project at University of North Carolina Hospitals in the department of Continuous Quality Improvement. His research interests include the study of organizational barriers to implementation of performance improvement projects and the effect of organizational design on the efficiency of obtaining timely, appropriate care. Jeffrey wishes to pursue medical studies in the future, with specialization in neurology and cognitive neuroscience.