Closerr to Understanding the Value Proposition for Medical Emergency Teams

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Abbreviations
- CD—critical deterioration
- MET—medical emergency team

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Medical emergency teams (METs) are common features of adult and pediatric hospitals and have been accepted as beneficial by many in health care, including regulatory agencies.1–9 In pediatrics, the value (quality outcome / cost) derived from operating METs is not known. Bonafide et al10 report the first significant effort to address MET value by detailing costs, in their large children’s hospital, associated with patient critical deteriorations (CDs) and MET operations. To account for differing structures, Bonafide et al10 calculate MET operating costs by modeling various commonly deployed MET staffing compositions and whether the team is freestanding or comprises individuals with concurrent responsibilities. After adjusting for multiple confounders, the authors report that total hospital costs after unplanned admissions to the ICU for patients suffering CD are $99,773 greater than for unplanned ICU admissions without CD. Annualizing MET operating costs and utilizing the aforementioned CD costs, the authors estimate that if an MET, as commonly deployed in many hospitals, prevented 3.5 CDs, then the savings associated with the need to provide less emergency critical care services would offset total MET operating costs. This analysis, in combination with previous work linking reductions in non-ICU cardiopulmonary arrests and MET implementation, makes a persuasive case that METs achieve meaningful end points in a value-added way.2,6–8,11

Bonafide’s work is important and encouraging, but it provokes issues that merit additional discussion. The use of CD as the outcome metric to assess MET value is a new construct. Optimal metrics to assess value are challenging to identify in pediatrics because traditional “big dot” outcome metrics (eg, mortality) are relatively uncommon.12 Consequently, the authors used their previously published CD concept to define hospital costs associated with serious patient deterioration.13 CD is defined as the use of invasive or noninvasive mechanical ventilation and/or vasoactive drugs within 12 hours of transfer to the ICU. This definition suggests that patients requiring aggressive resuscitation within a few hours of ICU admission may have had unrecognized deterioration on the general care unit before ICU transfer. Importantly, this definition includes patients with a wide spectrum of illness severity. For example, patients with respiratory distress transferred nonemergently to the ICU for stabilization with noninvasive ventilation are not equivalent to children with unrecognized septic shock requiring aggressive resuscitation, vasoactive infusions, and organ support for days or weeks. A narrower assessment of CD might include invasive mechanical ventilation, central venous access, and fluid resuscitation in the first hour or 2 after unplanned transfer to distinguish patients in extremis from patients with an “unplanned” but not necessarily unexpected escalation in care. It is possible that many less ill patients included in an unplanned ICU admission CD cohort would not require MET intervention. Therefore, an analysis of MET value that includes such patients could spuriously increase MET value.
Another issue that the authors acknowledge as a study limitation is whether all unplanned ICU admissions associated with CD can be prevented by an appropriately activated MET. In our practice, we observe a significant number of patients with sudden deterioration wherein MET activation does not occur in time to prevent the deterioration or subsequent ICU admission. Brilli and Tibballs previously described deterioration events, such as unexpected seizures with associated respiratory decompensation, which are not associated with antecedent clinical or laboratory signs and would rarely be prevented by an intrahospital MET.2,7,8

Up to 40% of deteriorations in our hospital are of this nature (unpublished data). Understanding the proportion of abrupt deterioration in patients in Bonafide’s CD cohort is necessary to appropriately judge true MET value. If all patients in the CD cohort exhibited progressive recognizable distress before transfer, then an MET activated earlier in the patient’s course could reduce the rate of ICU transfer and subsequent ICU/hospital costs. If, however, the CD cohort is overrepresented by patients who experience unpredictable, sudden deterioration not amenable to early identification and intervention by an MET, then the number of opportunities for an MET to reduce CD/unplanned ICU admission is diminished, thus limiting potential for MET costs to fully counterbalance CD costs. The distribution of CD not amenable to MET intervention is not provided in the report by Bonafide.

We commend Bonafide and colleagues for their meticulous review of CD associated costs in a large freestanding children’s referral center. Recently, value based health care discussions have increased, and the analysis by Bonafide adds important data to that conversation. METs were widely adopted because they made intuitive sense; however, their clinical benefit remains a matter of debate and attempts to describe their value are limited.14,15 The era of “what does it cost” is upon us. Bonafide describes a paradigm for analyzing the value of what we do in pediatric care and brings us a few steps closer to defining the value proposition for METs.

REFERENCES
1. Berwick DM, Calkins DR, McCannon CJ, Hackbart AD. The 100,000 lives campaign: setting a goal and a deadline for improving health care quality. JAMA 2006;295(3):324–327
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