My head grew heavy and my sight grew dim—I had to stop for the night.

Don Felder, Don Henley, and Glenn Frey, “Hotel California”

MILESTONES, NUMBERED MARKERS along a road, date back to at least the Roman Empire and were important reference points for travelers. Knowing where and when to stop for the night could be a matter of life and death in the era before artificial light. Even if today’s milestones are typically metal signs rather than granite, they still assist drivers, highway engineers, and first responders to react promptly and accurately to developing situations.

Milestones in project management parlance refer to events requiring special attention and frequently are incorporated into goal-directed protocols for medical care. In highly routinized care, such as cardiac surgery, logical reference points include hemodynamic stabilization, awakening, achieving hemostasis, endotracheal extubation, and patient mobilization. In this issue, Miller and colleagues from Vanderbilt University Medical Center have defined specific milestones for adult cardiac surgical patients. Simplified, these milestones are endotracheal extubation, titration off vasoactive infusions, mobilization, and removal of all extraneous catheters. Within each phase bookended by milestones, certain evidence-based tasks must be accomplished: Pain control, prophylaxis against complications, and transitioning of medications. The hypothesis was that rounding informed by milestone completion could reduce both CVICU and overall hospital lengths of stay, and a correlation was demonstrated. The concept that patients who hit their milestones on schedule then would be discharged expeditiously is not surprising, but the more important concept is adaptive leadership facilitating a team response to any delays. One strength of this study was that milestones were not defined by task completion (process measures) but rather by clinical outcomes. Discontinuing sedation, for example, is a variable process that necessarily precedes the milestone of extubation within 6 hours of stabilization. The concept of adaptive responses to deviations from the normal clinical pathway could have application beyond just cardiac surgery.

Typical medical management initiatives consider observed outcomes, such as geometric mean ICU or hospital lengths of stay, in relation to established benchmarks. Such data often are analyzed retrospectively weeks or months following clinical events. While the processes that allow or inhibit outcomes generally are well known, the linkage may not be clear to frontline workers unless immediate feedback is provided. The first in Miller et al’s article suggests that real-time trajectories provide important information allowing catch-up or service recovery after a delay. Their patient populations fell into 3 groups, the first achieving milestones in times better than expected and who progressed to a rapid, uncomplicated recovery. The upper grey band in the first figure in Miller’s article describes patients who fell off track with limited opportunity for remediation. The most important group, however, was those patients who fell into the white band between the grey zones. Here is where an experienced clinician can implement recovery protocols, much as an experienced airline pilot can adjust a flight path to mitigate take-off delays. In fact, a generalized model (Figure 1) could be adapted to the care of medical patients and noncardiac surgical patients by substituting stabilization, recovery, rehabilitation, and readiness for next stage (discharge or transfer) for milestones specific to the cardiac surgical population. Importantly, initiatives to reduce overall length of stay could fail if considering only average ICU or hospital length of stay if large numbers obscure important detail. Tracking specific phases of postoperative care offers a granularity that facilitates process improvement. Further research may better define how to best track and concentrate on the middle at-risk population; resources for length-of-stay recovery can be better expended on these.

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patients rather than patients on track to do well or those who have irretrievably fallen off track. It might be envisioned to measure clinical expertise as the ability to rescue patients in the middle, at-risk group, even if the proportion of these patients varies by institution. Separating populations by risk also allows physicians and advanced practitioners to concentrate on the needs of the high-risk patients while delegating routine care under protocol to others. This is likely to become a staffing and financial imperative given the impending shortage of licensed independent providers.

Clinicians may think they are accomplishing patient progress goals, but perception is not necessarily truth. They must measure and feed results back to themselves and their colleagues to reliably assess performance, and adapt interventions to real-time data. Checklists are not rocket science, but they demonstrably improve communication among ICU providers and can reduce morbidity and mortality. Miller and colleagues have added to the process management literature by demonstrating the possibilities for adaptive responses to the timing of independent tasks within a coordinated workflow for postcardiac surgical recovery. Adaptive leadership likely will have a role in many care pathways.

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REFERENCES