nonprotocolized strategy was implemented arbitrarily. Our participation in the Pediatric Heart Network collaborative learning project, in which patients with coarctation and tetralogy of Fallot underwent early extubation following surgery, taught us several important lessons. First, we realized that with widespread cultural acceptance of such a practice shift, dramatic results can be achieved. Second, we learned that it is easy to equate early extubation with stability, and not infrequently we would prematurely withdraw other support along with the endotracheal tube. Just because patients do not have an endotracheal tube does not mean they are not critically ill. However, the fact that so many infants weighing <7 kg could successfully undergo early extubation with such fantastic results is truly an inspirational motivation to move intentionally toward such a goal.

The authors also share an unexpected consequence of their work—that the German DRG-based reimbursement system could create a conflict in which higher performance (early extubation) is disregarded as long as standard therapy is more highly reimbursed. Unexpectedly, the authors found that when extubation times were dramatically reduced, they

received 27% less reimbursement for caring for patients of the same acuity. Although the main point of the paper was not advocacy or policy, their findings set the stage for a potential conflict. Resource-constrained units might not have the appetite to take on implementation of new practice patterns, especially if there are negative financial implications; and even worse, providers could choose to simply keep the standard of care to maintain reimbursement, even if it is not in the patient's best interest.

Regardless of these theoretical concerns, the authors deserve tremendous credit for their efforts to improve the quality and efficiency of care they deliver to their patients. This should serve as a reminder to us all of the untapped potential in each of our units and the opportunities that we all have to improve.

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See Article page 435.

Check for updates

Commentary: A coalition of the willing: Untangling efficiency-penalized reimbursement

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I read with interest the article by Murin and colleagues¹ in this issue of the *Journal*, which seeks to investigate how a

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CENTRAL MESSAGE

Care processes that increase efficiency may paradoxically lead to declining reimbursement and dangerous personnel reductions.

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fast-track (FT) extubation strategy impacts the in-hospital clinical outcomes of patients <7 kg undergoing cardiac surgery, as well as the programmatic “impact” of this strategy

from a reimbursement and personnel allocation standpoint. I understand that some readers may conclude that the discussion and particulars may be restricted in their perceived applicability to just the German health care system. However, in truth, the messages are relevant to global congenital heart surgery care and have likely been lingering under the surface of many hallway discussions and intimated in related cardiac literature.

It is not surprising, given current health care expenditures, that cardiac surgeons are increasingly focused on cost-related metrics and the complexities (honestly a euphemism for inadequacies, but I was making a stab at nicety) of the All Patients Refined Diagnosis-Related Group payment system, which has been impugned for an insensitivity to case complexity.² In fact, PubMed reveals 419 citations since January 2019³ containing the key words “resource utilization and pediatric cardiac surgery”—most of which report on streamlined components of care as isolated elements (ie, extubation or reduction in narcotic utilization) or more recently,⁴ describing the application of comprehensive initiatives that include complete care pathways (Enhanced Recovery After Cardiac Surgery [ERAS] initiative) to pediatric cardiac surgery patients.

The current study provides additional evidence that FT extubation strategies in selected cardiac surgery patients is safe and may reduce postoperative length of stay—which is nothing new. The more interesting component of the author’s study is the analyses and perspectives regarding reimbursement, personnel use, and performance—particularly the notion that maintenance of performance through improved care processes (such as FT extubation) may paradoxically decrease reimbursement and reduce personnel allocation. While the idea the “doing more with less” may not have been foremost in the authors’ mind at the outset, it is perhaps one of the most critical pitfalls to avoid when studying the potential or realized cost reductions of more efficient care. It is true that some organizations may be able to do “less with less.” However, the notion that high-complexity pediatric cardiac surgery ecosystems will be able to sustain quality under a “doing more with less” paradox is frankly dangerous. In the article by Murin and colleagues,¹ personnel capacity decreased by 20% over the 4-year study period, mainly reflecting a decrease in intensive care unit nurses from 36 to 29 full-time positions. These reductions occurred despite stable case mix, volume, and luckily, performance. Inflection points whereupon such staffing deficits will translate into measureable value-based care deficits are not known, but the inevitability of faculty and personnel “burn-out,” fatigue, apathy, and attrition is undeniable.

Reimbursement decreased by a similar 27% over the study period owing to the decreased cost-weight value of the FT-extubation patients that was in turn due to shorter

mechanical ventilation times in this group. In essence, the cardiac unit was “penalized” by the decreased cost-weight value allotted to the FT-extubation population because the current German Diagnosis-Related Group system considers mechanical ventilation time as a surrogate for case complexity, on which the cost-weight value is based. Ironically, evolution of the German unit toward wider adoption of FT extubation would further exacerbate these errors in the reimbursement equation.

Overall, the paper is well-written and the propensity-matching is a well-conceived analytic nuance to dissuade the skeptics who would otherwise argue that the patients who underwent FT-extubation were either not representative or not comparable. The authors, in their abstract, state that they wished to study “safety and resource efficacy” of their FT-strategy, which they define as extubation within 8 hours of surgery. The use of the word, “efficacy” is an unfortunate imprecision (the definition of efficacy is “the ability to produce a desired or intended result”). The authors have not addressed efficacy but did show a reduction in resource use (or perhaps increased efficiency) such that postoperative length of intensive care unit stay decreased from 4.2 days to 1.8 and postoperative total length of stay decreased from 10 days to 7 days. It was unclear from the initial manuscript what characteristics would qualify a patient for FT extubation, and given the dramatic increase in the number of FT-extubation patients over time, from 3.8% in 2014 to 43% in 2018, it is likely that these criteria changed significantly as the unit became more accustomed to the FT strategy. Indeed, the paper from the Pediatric Heart Network-Pediatric Cardiac Critical Care Collaborative (PC4) collaborative demonstrated that a concerted effort to increase early extubation resulted in similar incremental increases in the proportion of patients who were extubated early.⁵ I would suggest that the authors prescriptively delineate the criteria that they used and the cadence of evolution in these criteria to add relevance to non-German centers who may consider adopting FT strategies.

Finally, although initially skeptical about the early ERAS data in pediatric patients, mainly because of its prematurity, I fully recognize the wisdom in the ERAS premise. In my opinion, the salutary effects of the ERAS approach lie in the comprehensive packaging. By including all elements of care within the perioperative period (preoperative optimization and nutrition, intraoperative blood conservation and fluid management, early extubation, and narcotic reduction, etc) rather than a siloed approach where only one component is addressed while others are ignored, multidisciplinary engagement and resource investment are implicit. After all, a coalition of the willing, even if opposed by its majority-constituents, as pointed out by Michael Moore⁶ in his indictment of the 2003 Iraq War, will prevail.

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