Commentary: More evidence for 24-7 intensivist cardiac surgical intensive care unit coverage

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To improve is to change.

—Winston Churchill (Statement in the House of Commons, June 23, 1925)

Cardiac surgical intensive care units (CSICUs) were commonly established with *open* organizational care models (Figure 1), wherein the patient's surgeon, who had other out-of-unit obligations, provided patient care in collaboration with consultants. In 2003, the Society of Critical Care Medicine called for collaborative intensivist care of all intensive care unit patients, a call that was based on observational studies reporting that *closed* units, with unit-based intensivists, were associated with lower intensive care unit mortality and shorter length of stay.¹ Some specialized CSICUs subsequently adopted intensivist staffing models, although CSICU-specific outcomes had not yet been described in the literature. Staffing model transitions to intensivist-led CSICUs at 2 centers have subsequently served as natural experiments. In 2009, Kumar and colleagues² reported that a transition from a mixed surgical unit with overnight in-house trainee coverage to a dedicated CSICU with in-house intensivist coverage reduced ventilation time and intensive care unit length of stay. A second propensity-matched analysis by Benoit and associates³ reported that a transition from nighttime resident coverage to 24-7 in-house intensivist coverage resulted in reductions in ventilation time, postoperative complications, and CSICU readmissions.

In the largest study to date, reported in this issue of the *Journal*, Huard and colleagues' institution⁴ transitioned from CSICU staffing with a daytime intensivist (with nighttime trainee coverage with surgeon backup) to CSICU staffing with 24-7 in-house intensivist coverage. The study builds on previous work by reporting that transition to a 24-7 in-house intensivist model reduced mortality among patients with a euroSCORE-predicted mortality risk of $\geq 5\%$ and also reduced the incidence of renal replacement therapy.

	Classic Open CSICU Model	Classic Closed CSICU Model	Hybrid Model with 24-7 In-house Intensivist
In-house coverage	Cardiac Surgeon	Trainee	Intensivist
Most responsible physician	Cardiac Surgeon	Intensivist	Intensivist & Cardiac Surgeon
Location of most responsible physician	Non-CSICU	Home	CSICU
Role of trainees	On-site supervision	First-line provider	On-site supervision
Operational model	Multiple physicians with non-CSICU responsibilities	Unit-based physician	Shared care: Unit-based intensivist & surgeon with non-CSICU responsibilities

Overview of potential cardiac surgical intensive care unit staffing models.

Central Message

A transition from daytime CSICU intensivist (nighttime trainee coverage and surgeon backup) to 24-7 in-house intensivist reduced mortality in patients with euroSCORE-predicted mortality $\geq 5\%$.

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The strengths of the article of Huard and colleagues⁴ include the propensity-matched design and multiple sensitivity analyses designed to mitigate potential confounding; however, these results should be considered hypothesis generating because of the potential for unmeasured medical, surgical, and temporal confounders, and because of the uncertain generalizability to care models outside this single center.

The question these studies do not, and cannot, answer is how a change in staffing to 24-7 intensivist coverage can potentially improve outcomes. More experienced in-house providers may be more comfortable extubating patients after hours, thereby facilitating early CSICU discharge and minimizing risk of ventilator-associated complications. In addition, the reported lower rates of both acute kidney injury and use of renal replacement therapy may reflect improved perioperative fluid or hemodynamic management. It also stands to reason that the temporal increases in patient comorbidities and surgical complexity, along with the CSICU-specific growth of temporary and durable mechanical circulatory support together with ancillary multisystem management challenges, might provide the conditions for benefit from a collaborative care approach, explaining why 24-7 intensivist staffing has improved outcomes in CSICUs but not in other intensive care units.^{5,6}

The plausibility and consistency of these emerging data may one day merit the widespread implementation of 24-7 intensivist care in CSICUs; however, a traditional *closed* unit could diminish the important role of the surgeon in daily care. Perhaps the best solution is a *hybrid* model

	Classic <i>Open</i> CSICU Model		Classic <i>Closed</i> CSICU Model		Hybrid Model with 24/7 In-house Intensivist

In-house coverage	Cardiac Surgeon	Trainee	Intensivist	Trainee	Intensivist	Intensivist
Most responsible physician	Cardiac Surgeon		Intensivist		Intensivist & Cardiac Surgeon	
Location of most responsible physician	Non-CSISU responsibilities	Home	CSICU	Home	CSICU Intensivist & surgeon on-site	CSICU intensivist & surgeon at home
Role of trainees	On-site supervision	First line provider	On-site supervision	First line provider	On-site supervision	
Operational model	Multiple physicians with non-CSICU responsibilities		Unit-based physician		Shared-care: Unit-based intensivist & surgeon with non-CSICU responsibilities	

FIGURE 1. Overview of potential cardiac surgical intensive care staffing models. *CSICU*, Cardiac surgical intensive care unit.

(Figure 1), a model built on mutual trust in which a 24-7 in-house intensivist can attend to routine medical issues and emergencies but a collaborative approach to daily CSICU care is adopted.

Although randomized, controlled trial evidence is still lacking, this study represents an important addition to a nascent and growing body of literature supporting broader staffing changes toward collaborative perioperative cardiac surgical care that features CSICU staffing with 24-7 intensivist coverage.

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