



## Invited Commentary | Emergency Medicine

# Quality Is Not the Only Part of the Emergency Department–Based Intensive Care Unit Value Equation

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Critical illness and injury exact an enormous toll on patients, their families, and society. Initially conceived of and deployed in 1959,<sup>1</sup> the delivery of intensive care is expensive and resource intensive and currently consumes \$0.40 of each dollar spent annually on health care in the United States.<sup>2</sup> With an aging population and rapid growth in the volume and acuity of patients requiring critical care, the demand for intensive care unit (ICU) services continues to outstrip the supply of qualified intensivists.<sup>3</sup> Acknowledging the shortage of critical care services, emergency departments (EDs) are now providing 3 times as many hours of critical care as they did in 2001.<sup>4</sup> These shifts in critical care delivery, outside traditional ICU settings, have resulted in higher in-hospital mortality rates and length of stay.<sup>5</sup> In response, there is mounting interest in developing and implementing alternative solutions to providing in-patient critical care services in nontraditional health care settings.

Gunnerson and colleagues<sup>6</sup> describe a novel solution to the emerging intensive care crisis—an ED-based ICU, or ED-ICU. Their unique 14-bed unit, the Joyce and Don Massey Family Foundation Emergency Critical Care Center (EC3) at the University of Michigan, is composed of 5 trauma and medical resuscitation bays and 9 ICU patient rooms housed immediately adjacent to the ED. Patients presenting to the ED requiring intensive care are initially seen by traditional ED staff in the usual manner, and care is then transitioned to the EC3, where critical care is delivered by emergency physicians with and without critical care fellowship training. By using a standard set of evidence-based protocols, the staff of EC3 is able to accommodate patients with a wide variety of diagnoses common to the ICU, including septic shock, gastrointestinal tract bleeding, status epilepticus, and diabetic ketoacidosis, among others.

The implementation of this novel ED-ICU concept within a large academic medical center that treats 75 000 patients in the ED annually was associated with meaningful reductions in 30-day mortality among all patients in the ED and in the subset of patients admitted to the ICU.<sup>6</sup> Furthermore, these reductions were accomplished while simultaneously reducing the numbers of both overall and short-stay ICU admissions annually. Although these successes are remarkable, they are even more impressive when taken in the context of temporal increases in annual ED volume, acuity (indicated by lower mean emergency severity index scores), and length of stay during the study period and greater mean age and medical complexity (represented by increasing Charlson Comorbidity Index scores) of the comparison cohort.

Although the findings reported by Gunnerson et al<sup>6</sup> are notable and provide hope of a novel solution to the contemporary crisis of providing timely, high-quality critical care, the reproducibility of EC3 units at scale beyond a few large, specialized academic centers is uncertain without essential fiscal details. These considerations include the financing of EC3, both for initial capital (eg, physical plant creation and equipment acquisition) and ongoing personnel (eg, physicians, advanced practice providers, nursing staff, and ancillary health professionals), operational costs (eg, disposable equipment and specific training requirements for these specialized staff and physicians), and the role of foundation funding for these operations. Furthermore, the financial model of EC3, either generating its own independent stream of previously untapped revenue or as a cost-recovery mechanism for the institution, which otherwise forgoes income for boarding patients admitted to the ICU in the ED, is unspecified. Given the current regulatory environment, the mechanism for physicians and advanced practice providers in the ED-ICU to document and bill for services

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separately and distinctly from the index ED visit is also not described in detail and is absolutely essential to understanding the utility of an ED-ICU. These details serve to contextualize the viability of an ED-ICU concept within the daily operations of an ED and the larger health care institution. Without clarity around these economic realities, it is impossible to determine whether an EC3-like model is generalizable, scalable, and fiscally sustainable to address the intensive care crisis.

Although Gunnerson et al<sup>6</sup> clearly demonstrate that the quality of health care being provided by the ED-ICU and the larger ED appears to be superior to the status quo via universally agreed-on metrics, quality is only the numerator of the value equation when examining health care solutions. Without essential information that equates the quotient of quality and cost to value ( $Q/C = V$ ),<sup>7</sup> it is impossible to objectively quantify whether the benefits of an ED-ICU model are preferable to institutional policies that facilitate patient throughput in the ICU (ie, shortening admission and discharge cycles and prioritizing inpatient discharges and transfers) or simply adding more beds to the ICU. Without data to determine the value of an EC3-like ED-ICU model, the feasibility and sustainability of its widespread adoption are largely uncertain, given the current economic pressures in health care.

The contemporary crisis facing critical care has been building for decades, increasingly straining hospital personnel and resources, while relying on emergency physicians and ED staff to fill in the gap. Gunnerson et al<sup>6</sup> shed light on a unique ED-ICU model that could provide additional services to critically ill patients outside a traditional ICU environment. Unfortunately, without additional operational information, including cost-effectiveness data to inform the health care value equation, it is difficult to herald this model of an ED-ICU as anything more than novel.

#### ARTICLE INFORMATION

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