

*We continue with the dialogue about care delivery and staffing in the intensive care unit, which is of relevance to the ongoing global discussion of health care delivery and resource allocation. In this issue of the Journal, we present two editorials from European colleagues' perspective on these topics. We hope these opinions will contribute to the discussions on optimizing health care delivery, education, and research in the Intensive Care setting.—The Editors*

## Surviving the Night in the ICU Who Needs Senior Intensivists?

Whether intensivists should be present in ICUs around the clock is currently a matter of considerable controversy. This controversy is intertwined with a debate about the comparative performance of open versus closed ICUs. A complicating factor is the existence of considerable differences in ICU organization across countries (1). In the open format, nonintensivists continue to care for the patients they admit to the ICU, with advice from consulting intensivists. This is the most common format in the United States (1). In the closed format, all care is given by intensivists, which occurs for up to 75% of ICU patients in Western Europe (2, 3). Patients managed in closed ICUs are the sickest ICU patients (1).

Several lines of evidence suggest that around-the-clock intensivist coverage may improve patient outcomes. On-site physician staffing has been associated with a higher rate of diagnoses and procedures (1) and improved survival (4). Differences in ICU organization have been shown to affect patient outcomes (5). For instance, the absence of regular bedside rounds by intensivists was associated with higher complication rates, longer ICU stays, and a threefold increase in mortality (5). Moreover, patients managed by an on-site intensivist-supervised team had lower complication rates and shorter ICU stays than did patients not managed by intensivists (6). In a before-after study, ICU coverage by intensivists during nights and weekends significantly reduced the risk of death, by about a quarter (7). These findings suggest that around-the-clock intensivist coverage is needed in the ICU. Of course, these conclusions were not drawn from randomized controlled trials. Some of us believe that the clinical equipoise criterion would not be met in a study where some of the patients would be assigned to spending the night in an ICU where there is no intensivist. There are several indirect arguments to think that it makes sense to have such a coverage. It is well known, for instance, that medical errors are related to high intensity in the level of care: at night when fewer physicians are available the risk may become higher (8). Also, if appropriate antibiotic administration at the earliest phase of severe sepsis decreases mortality (9), and if prompt hemodynamic management of patients with septic shock saves lives (10), it may be harmful to have off hours without a senior intensivist to ensure these practices are carefully fulfilled. Furthermore, a recent metaanalysis has assessed outcomes in patients who are admitted to an ICU during off hours, with lower level of staffing and intensity of care provided (11). Although nighttime admission could not be shown to be associated with an increased mortality, weekend admissions had a significant increase in the adjusted risk of death (11).

One can argue that around-the-clock intensivist coverage significantly increases costs, but evidence coming from the

closed versus open-ICU debate suggests a cost savings. Carson and colleagues reported that, after changing from an open to a closed ICU format, clinical outcomes improved with no differences in the use of radiology, laboratory, or pharmacy resources (12). The costs of managing critically ill patients were also significantly lower with university-based than community-based physicians, suggesting that advanced training may decrease costs (13). Closed ICU compared with open ICU and/or around-the-clock intensivist coverage has been reported to decrease ICU length of stay (4, 6, 14), mechanical ventilation duration, and the number of consultations for unexpected ICU events such as arrhythmias and hypotensive episodes (6) or for acute kidney injury (15). These effects of full intensivist coverage may well counterbalance the cost of the additional intensivist work hours, compared with partial coverage (13). Furthermore, there is some evidence that the newly developed pay-for-performance model may increase costs and worsen patient outcomes (16).

In addition to the above-mentioned quantitative benefits, around-the-clock intensivist coverage may produce wide-ranging qualitative benefits. Patients may be more likely to have their preferences and values honored if a senior intensivist is present around the clock. In a study by Nelson and colleagues, important barriers to optimal end-of-life care included competing demands on physicians' time, suggesting a need for having senior intensivists in the ICU at all times (17). In the same study, ICU directors considered that strategies likely to improve end-of-life care included trainee role modeling by experienced clinicians (17). Relatives of ICU patients have been reported to want ready access to the senior intensivist in charge of their family member. More specifically, families of dying patients found comfort in identifying and speaking with the "doctor-in-charge" (18). Physician responsiveness to pain and relatives' affective distress were significantly worse when no physician was seen as clearly in charge of care (19).

In addition to patients and families, residents and nurses may benefit from full intensivist coverage. Inexperience with equipment and shortage of trained staff have been recognized for 3 decades as the factors most often felt to contribute to adverse events (20). Junior physicians caring for dying patients experience emotional distress when they feel they lack strong and continuous supervision (21). Also, residents report important misunderstandings for application of the concept of futility (22). Availability of senior intensivists at all times may prevent inappropriate decisions that may affect patient survival. Furthermore, senior intensivists are trained to facilitate communication between nurses and physicians, a strategy shown to reduce ICU conflicts, which have been associated with the development of physician and nursing "burnout" and a reduced quality of care (23, 24). For example, in a multinational study of ICU conflicts, joint assessment of symptom control by intensivists and nurses was an independent predictor of fewer conflicts (3). Pivotal

interviews with family members are best led by senior intensivists accompanied by residents and nurses involved in the patient's care. The effective implementation of these strategies requires the continuous presence of a trained intensivist.

Although we acknowledge a lack of strong scientific evidence, we believe that the currently available data support around-the-clock senior intensivist coverage in the ICU. The cost of the additional work hours compared with partial coverage may be offset by savings related to better patient care and outcomes. Furthermore, full time intensivist coverage may provide qualitative benefits to patients and the residents and nurses participating in their care.

**Author Disclosure:** E.A. has received advisory board fees from Pfizer (\$1,000–\$5,000), and Gilead (\$1,001–\$5,000); he has received lecture fees from Pfizer (\$1,001–\$5,000); he has received industry-sponsored grants from Pfizer (\$10,001–\$50,000); his research programs are sponsored by the French Ministry of Health but he does not receive a salary from these grants. J.M. has received advisory board fees from Hamilton (\$1,001–\$5,000); he has received industry-sponsored grants from Covidien (\$10,001–\$50,000). L.B. has received industry-sponsored grants from Dräger (\$5,001–\$10,000), Maquet (\$5,001–\$10,000), Respironics (\$5,001–\$10,000), and Covidien (\$5,001–\$10,000); these research grants mentioned all belong to his research laboratory and the funding was used for equipment, salaries of laboratory employees, and travel expenses.

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DOI: 10.1164/rccm.201005-0826ED

# 24-Hour Staffing of Intensive Care Units by Trained Specialists

## One Leap at a Time

Staffing intensive care units (ICUs) by specialists trained in critical care medicine reduces morbidity, mortality, and costs (1, 2). In the United States, the Leapfrog initiative has made

recommendations for an ICU physician staffing standard, thereby focusing attention on the association between patient safety, outcome, and the organizational characteristics of intensive care