



WEEKEND ADMISSIONS TO CRITICAL CARE WHY DO MORE OF THESE PATIENTS DIE?

A recent issue of *Chest* included a report by Cavallazzi et al¹ that systematically examined the literature for evidence of an association between off-hours (night or weekend) admission to an intensive care unit (ICU) and the patient's risk of death. Based on previous research that suggested a link between these factors, the authors anticipated that their literature analysis of studies conducted in North America, Europe, and Asia would reveal that patients who are admitted to an ICU during night or weekend hours would have a higher risk of death compared to patients admitted during daytime hours on weekdays. Of the 10 studies that met the inclusion criteria, 8 studies examined admissions at night and 6 considered weekend admissions. Analysis of the pooled study data revealed 2 striking and contrasting findings:

1. Nighttime admission to an ICU was not associated with increased mortality (odds ratio [OR], 1.0 [95% confidence interval [CI], 0.87-1.17]; $P = .956$).

2. Weekend admission to an ICU was associated with a significant increase in the risk of death (OR, 1.08 [95% CI, 1.04-1.13]; $P < .001$).

The sizes of the samples represented by these findings are notable. The 8 studies that compared daytime versus nighttime admissions included a total of 135 220 patients. Of these, the 73 676 patients admitted during daytime hours had a death rate of 21.4%, whereas the 61 544 patients admitted during nighttime hours

demonstrated a comparable death rate of 20.8%. Likewise, the 6 studies that evaluated weekday versus weekend admissions tabulated results from 180 600 patients and found the mortality rate among the 133 150 weekday admissions was 11.1%, whereas the mortality rate for the 47 450 patients admitted on weekends was significantly higher at 15.6% ($P < .001$). Even when the severity of a patient's illness/injury was accounted for (and found to raise mortality as high as 13% for the most severely ill or to lower it to 4% among the least severely ill), patients admitted to the ICU during a weekend still had 8% higher mortality rates than those admitted during the week.

To ensure that the findings from these studies were not floating on some preternatural island, I ran a PubMed literature search and readily located numerous recent research reports of significantly higher mortality rates among patients with various medical diagnoses admitted over the weekend to a variety of patient care areas.²⁻¹⁰ The relationship between a weekend hospital admission and higher hospital mortality is supported by a growing body of literature that has another feature in common: lack of clarity regarding the reason(s) for this unseemly coexistence. What is it about being admitted to the ICU (or to a hospital) during a weekend that establishes the link between the end of a week and the end of a life?

Possible Explanations/Influences

Cavallazzi et al¹ did not examine the reason(s) why ICU admission over a weekend is associated with increased hospital mortality, but generally ascribed this finding to a lower level of staffing

Go to the
CCN Web
site at www.ccnonline.org and tell us which factors you think are responsible for higher mortality rates in patients admitted over the weekend.

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and intensity of care that hospitals may afford throughout the weekend. More specifically, the authors attributed differences in mortality related to weekend admissions to a combination of the following off-hour factors¹:

1. Lack of intensivists on-site
2. Higher patient-to-physician ratio
3. Staff fatigue
4. Delays in getting complex diagnostic tests and treatments completed

While according to these authors due credit for their etiologic insights and focus on physician-related causes, it seems a wider net might be cast to consider other possible factors that may influence this association between timing of admission and discharge from life. If those 4 aspects were the central influences in this relationship, why is there no clear zenith of greatest mortality related to the wee hours of the day, around 3:45 or 4:45 AM, when even the most highly trained physicians as well as allied health staff from diagnostic support services are most likely to be scarce, exhausted, and barely functional? If we can be fairly confident that weekend admission is more detrimental to patient survival than nighttime admission, other influences must be operating in this scenario. Contributing factors may include the following:

Patient-Related Factors

- Patients may wait longer before entering the hospital or seeking medical care on weekends, making them sicker or their cases more complex upon arrival
- Patients may have fewer family or friends available to support them on weekends, causing them to be more desperate before seeking medical assistance

Organizational-Related Factors

- Reduced levels of staffing throughout all hospital services over the weekend
- Less experience and, possibly, less expertise among staff on duty
- Delays in reporting diagnostic or therapeutic test results

Physician-Related Factors

- Less experienced physicians on duty
- Fewer physician assistants on duty
- Physician reluctance to interrupt colleagues throughout weekend hours to confer or consult on cases

Nurse-Related Factors

- Fewer registered nurses on duty
- Less experienced registered nurses on duty
- Fewer support nursing staff on duty

Physician- or Nurse-Related Factors (Secondary to the Above)

- Incomplete or suboptimal patient assessments at time of weekend admission
- Omissions and/or errors in admission patient assessment data or diagnoses
- Incomplete or inappropriate plan for patient management
- Lack of all requisite ongoing patient monitoring
- Failure to recognize and/or manage complications in a timely manner
- Failure to communicate with other members of the health care team regarding patient status

Implications

It is not clear what factors are responsible for the observed differences in ICU mortality based on the weekday versus weekend timing of a patient's admission. Simply multiplying or matching staff to customary weekday hours is neither financially nor operationally feasible in many cases or lacks evidence-based justification. In the study reported here, nighttime admission to ICU was not associated with higher mortality rates than daytime admission, so numbers of staff alone do not seem to represent a solution. When obvious clinical influences such as the severity of a patient's injury or illness can only account for some of the variation in mortality rates, other influences must cause weekend admission to be an independent influence on patient survival. If we cannot isolate the specific causes of these findings, we are likewise constrained in being able to distinguish the organizational or operational changes that need to be implemented to offset the potentially detrimental effects associated with weekend admission to a critical care unit.

What Do You Say ?

While we await further research to explore and confirm these findings and to more fully elucidate the factors responsible for these outcomes, *Critical Care Nurse* would like to hear your thoughts, observations, and possible explanations for this situation. What is it about being admitted to an ICU during a weekend that increases the

mortality rate among these patients? More specifically, we invite you to visit the *CCN* Web site at www.ccnonline.org to

- Confirm workplace conditions that might contribute to higher patient mortality rates at your facility when patients are admitted during the weekend
- Specify other workplace conditions not already mentioned that you believe contribute to higher patient mortality rates for patients admitted on weekends
- Identify which workplace factor you think is the single largest contributor to higher patient mortality rates among patients admitted during a weekend

Take a few minutes to provide us with your input.

Your professional and personal experiences are important ingredients for improving patient outcomes for critically ill patients, so let us hear from you today! The survey will be available online until November 30. *CCN*



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