



## KEY POINT SUMMARY

### OBJECTIVES

To assess health outcomes, particularly mortality, in ICU trauma patients based on the location of their admission into the ICU.

## Intensive care unit design and mortality in trauma patients

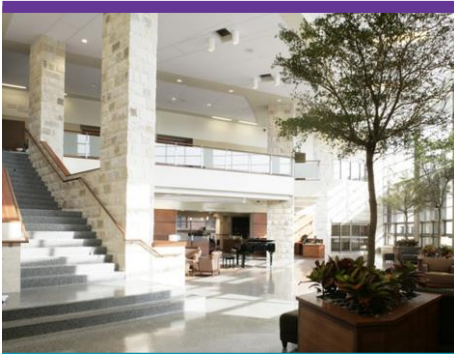
Pettit, N. R., Wood, T., Lieber, M., & O'mara, M. S. 2014 | *Journal of Surgical Research* Volume 190, Issue 2, Pages 640-646

### Key Concepts/Context

A primary concern for many patient care units is the question of where to place more seriously ill patients within the space that is available. Questions regarding the impact of architectural features, such as the availability of natural lighting, or adjacency to nurse stations on patient health outcomes should be further explored so that increasingly effective healthcare environments can be established. Currently, no data exist demonstrating whether trauma patients receiving treatment in intensive care unit (ICU) beds with poor visibility from a central nursing station experience health outcomes different from those in rooms that may be more visible from the nursing station.

### Methods

- A total of 773 charts of trauma patients admitted to an ICU over a one-year period were retrospectively reviewed. All patients who were aged 16 years and above and who were admitted to and discharged from the ICU (including deaths) were included in the study. The data from these patients were divided into two groups based on the visibility of their rooms from the central nursing station: high-visibility rooms (HVRs) and low-visibility rooms (LVRs).
- According to the hospital's protocol, patient placement within HVRs was done whenever possible. If a patient was moved during their time in the ICU, the first room they were assigned to was the only room accounted for for the study.
- Data from a computer registry maintained by the ICU were incorporated into statistical analysis to account for patient age, Charlson Comorbidity Index (CCI) Head Abbreviated Injury Score (Head AIS), and Injury Severity Score (ISS). A random 10% error check was run to evaluate the validity of CCI values. Other variables included in analysis were the need for tracheostomy and resuscitation status.



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- The primary outcome used was hospital mortality, which is defined as death occurring before discharge from the hospital. Secondary outcomes were complication incidences and ICU length of stay (LOS).

## Findings

The percentage of trauma patients who died within 24 hours of admission to the ICU did not differ between HVRs and LVRs (7.2% and 5.1%, respectively). Fifty-two of 320 patients died in HVRs and 49 of 448 patients died in LVRs. ISS and Head AIS proved to be the most significant predictors of hospital mortality, along with age and CCI. Overall, the room a patient is placed in within the ICU is related to overall mortality rates, but is not significant when adjusted for patient acuity. Sicker patients in more visible rooms died as often as expected, and fewer patients in less visible rooms also died as often as expected.

## Design Implications

Although the authors discovered the opposite of what they expected (that patients in HVRs had higher mortality rates than those in LVRs), the health outcomes that derive from high-visibility rooms are still well documented. The highest degree of visibility possible should be available so that visual contact can be established between patients, nurses, and physicians. However, as this study shows, the converse to this is that LVRs can still function as equally effective treatment spaces, so long as they are carefully monitored. The existence of a centralized nursing station around which patient rooms were situated was pivotal to this study; centralized nursing stations could provide a high degree of visibility and mobility for nurses.

## Limitations

The authors noted several limitations within the study. A relatively small sample size was used within a one-year timeframe. The study was retrospective and patients were not randomized to specific rooms. Consideration was not given to room changes and readmissions to the ICU. Inclusion of severe injury and illness data did not include patients' physiological measures and the treatments used, which may have factored into triaging decisions.

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