



# In the Literature

## THE ASSOCIATION BETWEEN HOSPITAL OVERCROWDING AND MORTALITY AMONG PATIENTS ADMITTED VIA WESTERN AUSTRALIAN EMERGENCY DEPARTMENTS

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When hospitals operate at full capacity or overcapacity, the quality of patient care is often compromised. For lack of space, patients are placed in inappropriate locations throughout the hospital. Time-sensitive care is delayed. According to a Commonwealth Fund-supported study, overcrowding is also associated with an even graver outcome—increased patient mortality.

In “[The Association Between Hospital Overcrowding and Mortality Among Patients Admitted via Western Australian Emergency Departments](#),” (*Medical Journal of Australia*, March 6, 2006) a research team led by former Harkness Fellow in Health Care Policy Peter C. Sprivulis, M.B.B.S., Ph.D., clinical associate professor of emergency medicine at the University of Western Australia in Perth, discovered a link between overcrowding of hospitals and emergency departments (EDs) and increased risk of death for admitted patients. Reducing overcrowding could be an important step, the study found, toward improving outcomes for patients requiring emergency hospital admission. The scale devised by the researchers to conduct the study could potentially be used to assess, in real time, the hazard associated with hospital and ED overcrowding.

### About this Study

The researchers studied ED admissions to three Australian city hospitals between July 2000 and June 2003 and analyzed the risk of death at days 2, 7, and 30 following an ED visit. They developed an “overcrowding hazard scale” by scoring each hospital

on three levels known to affect ED and hospital function: less than 90 percent full, 90 to 99 percent full, and 100 percent full or more. They also rated each ED on “access block”—defined as patients’ waiting eight hours or more for a hospital bed. Using these scores, the researchers analyzed death records obtained from the Western Australian Mortality Database.

The researchers controlled for two scenarios that could have affected the study’s outcome. First, they discarded hospital admissions that occurred during the four winter months—the peak season for respiratory and influenza diagnoses—from each year of records studied. Second, the researchers adjusted for admission selection factors. Hospitals that operate at high occupancy may be less likely to admit patients at lower risk of death in order to conserve beds for patients in dire need. This relationship could create a false association between overcrowding and mortality.

### Overcrowding and Mortality

The researchers’ results revealed a 30 percent relative increase in mortality by day 2 and day 7 for patients who had been admitted to an inpatient bed via the ED during overcrowded periods. The increase was the same regardless of season, patient age, diagnosis, urgency, or hospital. The researchers estimated that 120 deaths were associated with overcrowding in Perth’s hospitals in 2003. These results suggest “that overcrowding should be regarded as a patient safety issue rather than simply an issue of hospital workflow,” said the authors.

These findings are consistent with known effects of overcrowding on emergency hospital admissions. “Hospital occupancy above 90 percent has been demonstrated in our study to be closely associated with ED access block and is associated with an increased duration of ED stay,” the authors write. Emergency room stays were longer for patients who experienced overcrowded conditions and died.

Delays in the initiation of time-sensitive care, such as the administration of antibiotics in sepsis, may result from longer physician waiting times and longer durations of stay in the ED, the researchers speculated. In addition, errors may occur when systems are stressed by limited resources. Overcrowding often leads to placing patients on incorrect wards (i.e., medical patients placed in surgical wards) where staff may be less familiar with the patient’s condition or less likely to detect early warning signs of problems.

### **Solutions to Overcrowding**

The prevalence of overcrowding may rise in developed economies as age-related demand for hospital services grows over the coming 10 to 15 years. Additionally, economic incentives tend to favor higher, rather than lower, occupancy. It may be necessary, the authors note, to realign the

incentives that favor high occupancy at the expense of emergency access. Other solutions include strategies that reduce waste, misuse, and overuse of health services, as well as improved chronic disease management, which could help reduce demand for hospital beds. Also, hospitals need systems to match bed supply with predictable emergency room demand in order to optimize hospital inpatient flow. In heeding these suggestions, hospitals could succeed in reducing overcrowding and improving outcomes for patients requiring emergency hospital admissions.

### **Facts and Figures**

- Emergency department overcrowding is common in North America, the United Kingdom, and Australasia.
- A target occupancy of 85 percent has been suggested as a balance between unused bed capacity and efficient inpatient flow.
- The study identified a linear relationship between the Overcrowding Hazard Scale and seven-day mortality, indicating that a score greater than 2 is associated with increased patient mortality.