

## A full house raises risk of hospital deaths

March 9 2010

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Admission to a hospital when most of the beds are already full can be deadly for patients, according to a new University of Michigan Health System study showing high occupancy increases the risk of dying in the hospital by 5.6 percent.

For the study, published in the March issue of [Medical Care](#), researchers evaluated a set of critical factors that can affect [hospital](#) deaths: hospital occupancy, nurse staffing levels, weekend admission and seasonal [influenza](#).

Having more nurses made patients safer, decreasing risk by 6 percent. But weekend admission raised the risk by 7.5 percent and admission during widespread seasonal flu had the greatest impact by increasing the risk of death by 11.7 percent, according to the study.

Because of the size of the study which included 166,920 adult patients admitted to 39 Michigan hospitals over three years, the findings can be generalized to hospitals nationwide, authors say.

"The study establishes that there is indeed a connection between hospital occupancy and death rates in U.S. hospitals," says Peter L. Schilling, M.D., M.Sc., a resident in orthopedic surgery at U-M Health System.

"It's important to emphasize though that this study does not identify a specific occupancy level above which patient care suffers and deaths abruptly become more common. The key occupancy level may differ for each hospital," Schilling says.

The findings are considered robust because each factor still had a significant impact even while evaluated in a model simultaneously. While this study is not the first to demonstrate that these factors are associated with in-hospital mortality, the U-M Health System is the first to compare all four at once.

"The study further establishes each factor as a major predictor of hospital deaths but the good news is that each can be modified in some way," says co-author Darrell A. Campbell Jr., M.D., chief of clinical affairs at the U-M Health System.

For instance, generally the peak flu season can be predicted and during those times, hospitals can reinforce the importance of hand washing and covering coughs and sneezes. The impact of seasonal flu may also be diminished by improving vaccination rates in the community and among health care workers. The rate of vaccination among health care workers and high-risk patients remains surprisingly low nationwide.

Researchers calculated the occupancy of the hospitals every day for the years 2003-2006. On average, patients in the study were admitted while hospital occupancy was 73 percent of full capacity. One-third of patients were admitted on high occupancy days, at average levels of 80 percent or more.

Study patients were admitted after being seen in the emergency department for a heart attack, congestive heart failure, stroke, pneumonia, hip fracture or gastrointestinal bleeding.

"Hospital occupancy changes from day to day, so patients shouldn't try to choose a hospital based on its occupancy level," says co-author Matthew M. Davis, M.D., M.A.P.P., co-director of the Robert Wood Johnson Foundation Clinical Scholars Program at the U-M. "But these kinds of study findings should prompt hospitals to look at the flow of patients and

processes of their care teams during high occupancy times. Those are more challenging moments when more things can go wrong."

What's also unique about the U-M study is it's the first U.S. study to illuminate the concept of "access block," authors say, a phenomenon that's thought to occur when a full hospital prevents emergency room patients from accessing an inpatient hospital bed, thus prolonging wait times and delaying time-critical inpatient care.

While a rush of accident victims to the ER is impossible to predict, hospital administrators can, to a large extent, control a hospital's occupancy by managing the number of elective surgical cases scheduled for admission, the authors write. Authors acknowledge that restricting these profitable procedures can cost hospitals money since they've become increasingly important to hospital finances in recent years.

"However if access block is a true phenomenon, a hospital full of elective surgical admissions may be limited in its ability to safely handle an influx of urgent admissions through the ED," Schilling says.

**More information:** Medical Care, Vol. 48, No. 3, March 2010

Provided by University of Michigan

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