
Traditional Measures of Hospital Utilization May Not Accurately Reflect Dynamic Patient Demand: Findings From a Children's Hospital

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OBJECTIVES: Hospital crowding adversely affects access to emergent and elective care, quality and safety, patient and staff satisfaction, and trainee education. Reliable and valid measurements are crucial to operational planning and improvement, but traditional measures of hospital utilization may not accurately describe dynamic demand at hospitals. The goal of this study was to determine how effectively traditional measures express demand for hospital services and to describe the dynamic nature of patient flow in children's hospitals compared with alternative measures.

METHODS: This was a retrospective administrative data review conducted at an urban, tertiary care children's hospital. A total of 28 045 inpatients (22 310 from fiscal year 2008 and 5735 from 2 months in the fall of 2009 during the H1N1 influenza surge [October 16, 2009 November 18, 2009]) were reviewed. Admission-discharge-transfer data were abstracted from a total of 14 months (1 fiscal year and a separate 2 months including an influenza surge). Hourly hospital census and occupancy were determined. Measures of mean and median length of stay (LOS) were compared. Turnover was calculated by summing admissions, discharges, and interunit transfers. Coefficient of variation (SD/mean) was used to describe variation.

RESULTS: Midnight occupancy was generally closer to minimum occupancy than peak. Peak was usually between 10 AM and 12 PM and was a mean of 4% points higher than midnight (but as large as 13% points). Median LOS was 58% shorter than average LOS. There was a high level of turnover, and patient days did not express the wide variation in how demand was generated by day of week.

CONCLUSIONS: Traditional metrics for hospital utilization do not accurately express the true extent and dynamic nature of patient flow and inpatient demand at a children's hospital. Hospitals and government regulatory agencies should consider additional means of measuring utilization to accurately determine demand, including its variation, and thus assist in budgeting, staffing, and capacity planning.

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