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Hospital Safety Scores:

Do Grades Really Matter?

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Since the 1999 Institute of Medicine report “To Err is Human: Building a Safer Health System,” hospital safety has emerged as a central issue for patients, payers, and policy makers. Based on estimates from that report, medical errors result in 44 000 to 98 000 deaths every year in the United States, making them the third leading cause of death—ahead of breast cancer, AIDS, and motor vehicle crashes.¹ As a result of that report and growing scrutiny from the media and patient advocacy groups, hospitals nationwide have redoubled their efforts at improving patient safety.

Aiming to enhance hospital accountability and to accelerate improvements in safety, The Leapfrog Group, a national consortium of large employers and health care purchasers, launched the Hospital Safety Score in 2012.² Based on input from an expert panel, The Leapfrog Group consolidated a variety of proprietary and publicly available hospital safety data into a single composite score. In designing the composite score, 50% of the weight was applied to measures of processes of care (eg, timely administration of perioperative antibiotics) and hospital structure (eg, computerized physician order entry). The remaining 50% of the weight was applied to outcome measures (eg, rates of selected hospital acquired conditions, such as iatrogenic pneumothorax).² Hospitals were then rated and given a safety letter grade ranging from A to F, which reflects how safe hospitals are for patients.

Dissemination of the Hospital Safety Score is a key component of The Leapfrog Group’s strategy. In addition to making these ratings freely available on the Internet, The Leapfrog Group is also leveraging modern smartphone technology to help patients identify the safest hospitals and to allow hospitals to advertise their safety ratings. The latest release includes a free downloadable mobile application that allows users to view a hospital’s overall safety grade and relative performance on patient safety measures. In addition, users are provided

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with links to hospital websites, the ability to call hospitals directly from the mobile application, and integration with social media such as Twitter and Facebook.

To examine the extent to which the Hospital Safety Score directs patients to hospitals with better outcomes, we linked Leapfrog's final grade to patient outcomes using the 2009–2010 national Medicare Provider Analysis and Review files. Hospital Safety Scores were downloaded directly from the Hospital Safety Score website (www.hospitalsafetyscore.org). We extracted hospital name and zip code variables from the American Hospital Association's 2009 annual survey of hospitals to facilitate linking patient-level data with Hospital Safety Scores. This algorithm successfully matched 2483 of the 2620 (94.8%) hospitals evaluated by The Leapfrog Group.

Our study population included both medical and surgical hospital admissions. For medical admissions, we assessed 30-day mortality and 30-day readmission rates for acute myocardial infarction, congestive heart failure, and pneumonia ($n = 2\,369\,533$). For surgical admissions, we assessed the same outcomes among patients undergoing coronary artery bypass grafting, hip fracture repair, and colectomy ($n = 829\,731$). In the surgical cohort we also assessed rates of major complication and failure to rescue (patient fatality after a major complication) using methods described elsewhere.³ Outcomes were adjusted for patient age, race, socioeconomic status, and comorbidities using standard regression-based methods.³ In addition, all SEs were "clustered" to account for any intrahospital correlation of patient outcomes. This technique adjusts the 95% CIs to allow for arbitrary correction of error terms within individual hospitals. All analyses were completed using Stata 12 (StataCorp).

As seen in the Figure, patients treated at hospitals receiving safety grades of D or F ($n = 145$) had slightly higher 30-day mortality for both medical and surgical admissions. In the surgical cohort, hospitals with safety grades of D or F had significantly higher rates of failure to rescue, but similar rates of complications. Despite worse outcomes in hospitals with safety grades of D or F, the safety composite score did not discriminate outcomes in the remaining hospitals. Specifically, there was negligible difference in mortality or complication rates among hospitals receiving A, B, or C grades. There were no statistically significant differences across grades for readmission rates in either the medical cohort (21.0% to 21.3%, $P = .23$) or the surgical cohort (14.8% to 15.2%, $P = .12$).

There are several potential reasons why the Hospital Safety Score may fail to discriminate outcomes among the large majority of hospitals with nonfailing grades. First, previous studies comparing administrative data to expert medical record reviews have described only a weak association between patient safety indicators, such as iatrogenic pneumothorax, and patient outcomes.⁴ Second, two-thirds of the process and structural measures are self-reported and non-audited, raising questions concerning completeness and accuracy. Further contributing to possible measurement error, data are drawn from different sources depending on whether the hospital completed the proprietary Leapfrog Hospital Survey.

Apart from the reliability of its component measures, the value of the Hospital Safety Score may be further limited by the variable clinical relevance of those measures. For example, numerous studies have raised doubts as to the extent to which process measures tracked by

the Centers for Medicare & Medicaid Services, such as foreign objects retained after surgery, are associated with patient outcomes.⁵ These measures encompass relatively rare events more reflective of patient illness severity and hospital case mix than true signals of quality. For this reason, starting in 2013, the Centers for Medicare & Medicaid Services no longer reports many of these measures on its website (<http://medicare.gov/hospitalcompare/search.html>).

In drawing further attention to patient safety, Leapfrog's Hospital Safety Score may ultimately enhance safety by increasing accountability and accelerating safety initiatives within hospitals. From a patient perspective, the Hospital Safety Score may be useful because it distills a variety of somewhat confusing measures into a single, easily understandable letter grade. Finally, as suggested by the analysis herein, the grading system may be valuable in helping patients to identify and avoid the few hospitals with potential safety problems.

Nonetheless, our findings raise questions about the informational value of these measures for the 94.2% of hospitals with non-failing grades. Outcomes-based measures that include mortality, major complications, and failure to rescue may ultimately be more useful in guiding patients to institutions where they can expect better end results. In the meantime, our results suggest that The Leapfrog Group might consider moving to a pass/fail system rather than letter grades.

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Figure.

Risk-Adjusted Rates of Adverse Outcomes by Leapfrog Hospital Safety Score Letter Grade

^a $P < .001$.

^bMortality, $P < .001$; complication, $P < .11$; failure to rescue, $P < .001$.