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# HOSPITAL OUTCOMES SCORES: PURPOSE, METHODOLOGY & DATA ANALYSIS

Working Paper  
for  
Discussion Purposes

by

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## A NOTE FROM THE AUTHOR

*“HOS”, “Hospital Outcomes Scores” and the content of this document are protected by copyright.*

This document, intended for healthcare professionals, provides a description of the Hospital Outcomes Scores (HOS) methodology, the underlying data on which it is based and some alternative methodologies that were considered before the final one was chosen. It is a compendium of author’s notes and analyses rather than a polished document and may suffer, therefore, from some disorganization and repetition.

### **Background**

Hospital Outcomes Scores (HOS) are based on avoidable deaths and complications compiled by the Centers for Medicare & Medicaid Services (CMS) for over 4,000 U.S. hospitals. HOS was developed after reviewing existing hospital safety rating systems, including Leapfrog’s Hospital Safety Grades, US News’ similarly comprehensive ratings of hospitals and various other sources, e.g. Consumer Reports and several health insurers, because of their lack of focus on outcomes. These existing measures of hospital quality and safety available to consumers yield conflicting results. AmoryAssociates, therefore, sought to develop a more consistent and objective metric for hospital safety.

### **Hospital Outcomes Scores**

HOS is built on CMS data for avoidable deaths and complications after processing the data to create a single Death Score and Complications Score for each hospital. The data exhibits several anomalies that needed to be dealt with:

- The number of hospitals reporting sufficient data for each cause of death and type of complication ranges from a low of 1,008 hospitals to almost 4,000.
- The rates are expressed as per thousand discharges using different bases.
- Some rates exhibited extremely long tails, the most extreme of which included a highest rate 23 times the average and almost 30 times the median of that population.
- Rates of deaths are generally much higher than rates of complications.

As a result, the final HOS methodology uses a double scaling technique to force each rate for all hospitals to range from 0% to 100% with a median of 50%. This facilitates average of death rates and of complications rates for each hospital.

Reviewers are encouraged to provide feedback to the author at [paw@AmoryAssociates.com](mailto:paw@AmoryAssociates.com).



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## INTRODUCTION & RATIONALE

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Hospital outcomes – deaths and complications - are (literally) vital to the patient’s future wellbeing. Hospital Outcomes Scores (HOS) were designed to make that information more accessible to consumers by enabling them to find the hospital(s) in their service area with the lowest death and complication rates, i.e. the safest by virtue of outcomes.

Hospital Outcomes Scores (HOS) consist of a Death Score and a Complications Score for each hospital that has provided sufficient data to Centers for Medicare & Medicaid Services (CMS). Scores are based on the most recent publicly available data that is collected by CMS for 4,623 U.S. hospitals.

### WHY CREATE ANOTHER MEASURE OF PATIENT SAFETY?

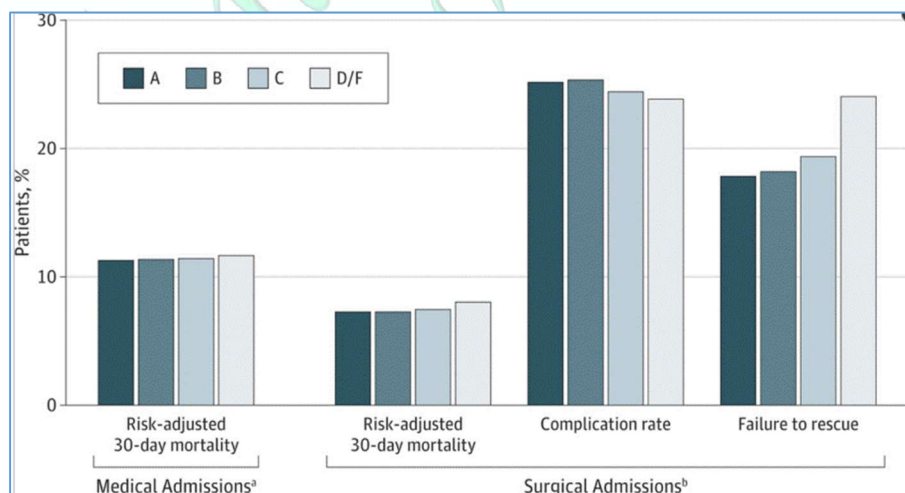
Researchers have determined that:

- Medical errors are the third leading cause of death in the United States ([NPR](#))
- “440,000 deaths annually from preventable hospital mistakes” ([LawyersandSettlements.com](#))
- Patients are 3 times as likely to die at the worst hospital than at the best ([NY Times](#))
- Hospital safety ratings are an unreliable indicator of outcomes ([JAMA Surgery](#)).

Hospital Outcomes Scores (HOS) were developed to meet a need for consumer information that was not being addressed by various existing hospital safety ratings.

### Lack of Correlation between Safety Grades and Outcomes

Numerous organizations, such as the Leapfrog Group and US News, incorporate CMS outcomes into their hospital ratings after combining it with other information. However, two University of Michigan professors found “negligible difference in mortality or complication rates among hospitals receiving A, B, or C grades” from the Leapfrog Group and “patients treated at hospitals receiving safety grades of D or F had [only] slightly higher 30-day mortality for both medical and surgical admissions.”<sup>1</sup> In other words, Hospital Safety Grades don’t help consumers find hospitals with superior outcomes.



*from “Hospital Safety Scores: Do Grades Really Matter?”*

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<sup>1</sup> “Hospital Safety Scores: Do Grades Really Matter?” by Andrew A. Gonzalez, MD, JD, MPH and Amir A. Ghaferi, MD, (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4254910/>)

The authors of this study cite several reasons “why the Hospital Safety Score may fail to discriminate outcomes among the large majority of hospitals with nonfailing grades”:

- “a weak association between patient safety indicators, such as iatrogenic pneumothorax, and patient outcomes.<sup>4</sup>
- “two-thirds of the process and structural measures are self-reported and non-audited, raising questions concerning completeness and accuracy.”
- “data are drawn from different sources depending on whether the hospital completed the proprietary Leapfrog Hospital Survey.”