Distinguished Hospital Award – Patient Safety™ Methodology 2008 (2004–2006 MedPAR Data)

Introduction

To help consumers evaluate and compare hospital patient safety performance, HealthGrades analyzes patient outcome data for virtually every hospital in the country. HealthGrades uses MedPAR file data from the Centers for Medicare and Medicaid Services (CMS) which contains the inpatient records for Medicare patients. The steps listed below are those taken to determine the recipients of the 2008 Distinguished Hospital Award for Patient Safety™ by creating an overall patient safety score for each hospital.

This methodology includes the following patient safety indicators:

- Death in low mortality Diagnostic Related Groupings (DRGs)
- Decubitus ulcer
- Failure to rescue
- Foreign body left in during procedure
- Iatrogenic pneumothorax
- Selected infections due to medical care
- Post-operative hip fracture
- Post-operative hemorrhage or hematoma
- Post-operative physiologic and metabolic derangements
- Post-operative respiratory failure
- Post-operative pulmonary embolism or deep vein thrombosis
- Post-operative sepsis
- Post-operative abdominal wound dehiscence

Data Acquisition

HealthGrades uses the MedPAR data file from the Centers for Medicare and Medicaid Services (CMS) for several reasons.

- First, it includes virtually every hospital in the country, with the exception of military and Veterans Administration hospitals.
- Second, hospitals are required by law to submit complete and accurate information with substantial penalties for those that report inaccurate or incomplete data.
- Third, the Medicare population represents a majority of the adult inpatient admissions.

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HealthGrades used the QI Windows Software, version 3.1a, developed by the Agency for Healthcare Research and Quality (AHRQ) and downloaded from http://www.qualityindicators.ahrq.gov/software.htm.

Following all AHRQ guidelines for using PSI software, HealthGrades applied it to all short-term acute care hospitals in the MedPAR file for three years (2004 through 2006).

Given that this data set applies mostly to patients over the age of 65, HealthGrades excluded the following PSIs from the analysis:

- Birth trauma – injury to neonate
- Obstetric trauma – cesarean delivery
- Obstetric trauma – vaginal delivery with instrument
- Obstetric trauma – vaginal delivery without instrument

Due to coding variation in the use of E codes, HealthGrades excluded three additional indicators:

- Complications of anesthesia
- Accidental puncture or laceration
- Transfusion reaction

Data Exclusions

HealthGrades modified the "Failure to rescue" patient group by excluding cancer patients–patients having any ICD-9 code between 140.0 and 208.9 or between 230.0 and 239.9.

HealthGrades also removed hospitals in the U.S. territories and Puerto Rico from the data set.

Overall Patient Safety Score

To determine the overall patient safety score by hospital, HealthGrades performed the following steps.

1. AHRQ software calculated observed and expected rates for each hospital and PSI, provided that the PSI had at least three cases. (HealthGrades used a stratification process to calculate expected rates for those PSIs where AHRQ software only provided observed rates.)

2. HealthGrades identified significant bias in the expected rates for larger hospitals (which had consistently higher observed rates than expected). Therefore, HealthGrades performed further risk adjustment using the Medicare Case Mix Index (CMI). The case mix index adjustment compensates for the fact that within a given DRG the most severely ill will probably be clustered at larger hospitals.

   To perform the case mix index adjustment and remove the bias, HealthGrades:

   a) Stratified hospitals by their CMI category. This was done separately for each of the three years (2004–2006) using the corresponding year's CMI. Therefore, it is possible that a hospital could be in different CMI strata from year to year. (See *Appendix A* for definitions.) CMI < 1.25 was the first level, and so on.

   b) Adjusted the expected (predicted) counts so that the total observed count was equal to the total expected for each PSI, and for each year-CMI level combination. For example, if CMI level 1 had 2,000

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predicted events and 1,800 observed for a given year and PSI, each of the hospitals in this group would have its predicted value reduced by 10 percent. If the CMI level 6 had 3,000 predicted and 4,000 observed, those hospitals would have the predicted values increased by 33 percent.

3. HealthGrades statistically compared the observed rate to the expected rate to produce a z-score for each PSI. To normalize the effect of the 13 indicators, these z-scores were rescaled to a mean of zero and standard deviation of one. The average of the 13 resulting scores determined a hospital's ranking.

4. HealthGrades divided the hospitals into two peer groups: teaching and non-teaching. To identify the teaching peer group, HealthGrades used data from the Medicare Cost Reports (Form CMS-2552-96). A facility was considered a teaching hospital if they answered "yes" to the question: "Is this a teaching hospital or affiliated with a teaching hospital?" Hospitals that received substantial Indirect Medical Education payments in 2006 were also classified as teaching hospitals. Independent verification by phone was used for hospitals answering "yes" with zero Indirect Medical Education payments.

5. To be considered for the Distinguished Hospital Award for Patient Safety™, hospitals had to be rated in at least 17 of 27 HealthGrades cohorts and have a current overall HealthGrades star rating of at least 2.5. The final data set included 767 teaching hospitals and 891 non-teaching hospitals.

6. From this final data set, HealthGrades identified both teaching and non-teaching hospitals in the top 15 percent as "best performing" and these hospitals are recognized as Distinguished Hospital Award for Patient Safety™ recipients. These 249 hospitals represent less than five percent of the total hospitals evaluated.

Hospital Type	Number of Best Performing Providers
Teaching Hospitals	115
Non-Teaching Hospitals	134

Limitations of the Data Models

It must be understood that while these models may be valuable in identifying hospitals that perform better than others, one should not use this information alone to determine the quality of care provided at each hospital. The models are limited by the following factors:

- Cases may have been coded incorrectly or incompletely by the hospital.
- The models can only account for risk factors that are coded into the billing data. Therefore, if a particular risk factor was not coded into the billing data (such as a patient's socioeconomic status and health behavior) then it was not accounted for with these models.
- Although HealthGrades has taken steps to carefully compile these data, no techniques are infallible; and therefore, some information may be missing, outdated or incorrect.

Please note that if more than one hospital reported to CMS under a single provider ID, HealthGrades analyzed patient safety data for those hospitals as a single unit. Throughout this document, therefore, "hospital" refers to one hospital or a group of hospitals reporting under a single provider ID.

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Appendix A: Case Mix Index Levels

Hospitals were assigned one of eight CMI levels. The Distinguished Hospital Award for Patient Safety™ recipients were categorized according to their 2006 index as follows.

CMI Index	CMI Group	# of Award Recipients
0.00 < CMI < 1.25	1	23
1.25 < CMI < 1.35	2	41
1.35 < CMI < 1.45	3	31
1.45 < CMI < 1.55	4	47
1.55 < CMI < 1.65	5	39
1.65 < CMI < 1.75	6	31
1.75 < CMI < 1.90	7	23
CMI > 1.90	8	14

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