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Specialty Excellence Award™ and
America's 100 Best Hospitals for Specialty Care™
2013 - 2014 Methodology

Contents

Introduction

To help consumers evaluate and compare hospital performance specific to specialty service lines and specialty focus areas, Healthgrades analyzed patient outcome data for 33 conditions or procedures (see *Table 1*). Healthgrades analyzed outcomes data for virtually every hospital in the country. Analyses included patient care records for nearly 4,500 short-term, acute care hospitals nationwide, assessing hospital performance relative to each of 33 common conditions and procedures (cohorts). The Healthgrades methodology uses multivariate logistic regression to risk adjust for patient demographic and clinical risk factors that influence patient outcomes in significant and systematic ways.

Individual risk models are constructed and tailored for each of the conditions or procedures relative to each specific outcome. Model clinical outcomes reflect clinical-based measures of patient status during and after care and include in-hospital complications, in-hospital, or 30-day post-admission mortality. In cases where Medicare data is not available for a specific condition or procedure, such as appendectomy, Healthgrades analyzed all-payer data from 18 states.

The purpose of risk adjustment is to obtain fair statistical comparisons of mortality and complication rates between hospitals while accounting for differences in underlying risk factors observed in the data among disparate populations or groups. Significant differences in demographic and clinical risk factors are found among patients treated in different hospitals; thus, it is necessary to make accurate and valid comparisons of clinical outcomes with a methodology using risk-adjustment techniques. Risk factors may include age, gender, specific procedure performed, and co-morbid conditions, such as hypertension and diabetes.

For a complete description of the Healthgrades methodology, see *Healthgrades Mortality and Complications Outcomes Methodology.*

Developing the Healthgrades hospital performance categories involved four steps:

1. The hospital predicted value (predicted number of deaths or complications at each hospital) was calculated by summing the individual patient record predicted values determined from logistic regression models discussed above.

2. The hospital predicted value was compared with the actual or observed value (e.g., actual number of deaths or complications at each hospital).

3. A test was conducted to determine whether the difference between the predicted and actual values was statistically significant. This test was performed to make sure that differences were very unlikely to be caused by chance alone. A z-score was used to establish an approximate 90% confidence interval.

4. Hospital performance categories were determined based upon the outcome of the test for statistical significance.

For each condition and procedure, hospital performance was evaluated and then stratified into three categories:

★ ★ ★ ★ ★ **Better Than Expected** – Actual performance was better than predicted and the difference was statistically significant.

★ ★ ★ **As Expected** – Actual performance was not statistically significantly different from what was predicted.

★ **Worse Than Expected** – Actual performance was worse than predicted and the difference was statistically significant.

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Table 2. Healthgrades Mortality and Complication Rate-Based Procedures (2010-2012)

Mortality Cohorts	
Bowel Obstruction	Neurosurgery
Chronic Obstructive Pulmonary Disease (COPD)	Pancreatitis
Colorectal Surgeries	Pneumonia
Coronary Artery Bypass Graft (CABG) Surgery	Pulmonary Embolism
Coronary Interventional Procedures	Respiratory Failure
Diabetic Emergencies	Sepsis
Esophageal/Stomach Surgeries	Small Intestine Surgeries
Gastrointestinal Bleed	Stroke
Heart Attack	Valve Surgery
Heart Failure	
In-Hospital Complication Cohorts	
Abdominal Aortic Aneurysm Repair	Hip Replacement
Appendectomy*	Pacemaker Procedures**
Back and Neck Surgery (Without Spinal Fusion)	Peripheral Vascular Bypass
Carotid Surgery	Prostate Removal Surgery
Defibrillator Procedures**	Spinal Fusion
Gallbladder Removal Surgery	Total Knee Replacement
Hip Fracture Treatment	Transurethral Prostate Resection Surgery

* Appendectomy is not used in awards analysis.
** Defibrillator Procedures and Pacemaker Procedures are new cohorts for 2014 and are not included in the award analysis.

Specialty Excellence Award Determination

For each hospital, Healthgrades then assigned an overall score for each specialty area based on hospital performance as determined by z-scores for one or more condition or procedure (e.g., heart attack, coronary artery bypass graft surgery).

The top 10% of hospitals (unless otherwise noted) within each specialty area were selected as Healthgrades Specialty Excellence Award™ recipients, as measured by lowest risk-adjusted mortality and complication rates. Healthgrades current Specialty Excellence Awards™ include:

- Bariatric Surgery Excellence Award™
- Cardiac Care Excellence Award™
- Cardiac Surgery Excellence Award™
- Coronary Intervention Excellence Award™
- Critical Care Excellence Award™
- Gastrointestinal Care Excellence Award™
- General Surgery Excellence Award™
- Gynecologic Surgery Excellence Awards™
- Joint Replacement Excellence Award™
- Maternity Care Excellence Award™
- Neurosciences Excellence Award™
- Neurosurgery Excellence Award™
- Orthopedic Surgery Excellence Award™
- Prostate Surgery Excellence Award™
- Pulmonary Care Excellence Award™
- Spine Surgery Excellence Award™
- Stroke Care Excellence Award™
- Vascular Surgery Excellence Award™

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America's 100 Best Hospitals for Specialty Care™

From the lists of Specialty Excellence Award recipients, Healthgrades further identified the top 100 hospitals for each of 12 specialty areas based on overall scores. The overall score for each specialty area is based on the mortality or complication hospital performance z-scores for one or more medical conditions or procedures.

- Cardiac Care
- Cardiac Surgery
- Coronary Intervention
- Critical Care
- Gastrointestinal Care
- General Surgery

- Joint Replacement
- Orthopedic Surgery
- Prostate Surgery
- Pulmonary Care
- Spine Surgery
- Stroke Care

Bariatric Surgery

The Bariatric Surgery specialty award is based on:

- Bariatric Surgery

To be considered for an award in this specialty area, a hospital must be evaluated and categorized into one of three performance categories and be located in one of the all-payer states that provide bariatric surgery data. We evaluate hospital performance in bariatric surgery based on complication rates.

Cardiac Care

The Cardiac Care specialty award is based on:

- Coronary Artery Bypass Graft (CABG) Surgery
- Coronary Interventional Procedures (PTCA/Angioplasty, Stent, Atherectomy)
- Heart Attack
- Heart Failure
- Valve Surgery

To be considered for an award in this specialty area, a hospital had to be evaluated in both coronary artery bypass graft (CABG) surgery and coronary interventional procedures as well be categorized into one of three performance categories for both heart attack and heart failure, based on MedPAR data.

The score used to determine this award is based on three components: a volume weighted average of the z-scores for cardiac surgery (CABG surgery and Valve Surgery), a volume weighted average of the z-scores for heart attack and heart failure and the average z-score for coronary interventional procedures. Only the z-scores for in-hospital mortality and in-hospital + 1 month mortality were used in these calculations. The in-hospital + 1 month mortality received 60% of the weight in the calculations and in-hospital mortality received 40% of the weight.

Cardiac Surgery

The Cardiac Surgery specialty award is based on:

- Coronary Artery Bypass Graft (CABG) Surgery
- Valve Surgery

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories in both of the above procedures based on MedPAR data. The Cardiac Surgery award is determined by the volume-weighted average of coronary artery bypass graft (CABG) surgery and valve

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surgery z-scores. Only the z-scores for in-hospital mortality and in-hospital + 1 month mortality were used in these calculations. The in-hospital + 1 month mortality received 60% of the weight in the calculations and in-hospital mortality received 40% of the weight.

Coronary Intervention

The Coronary Intervention specialty award is based on one cohort: coronary interventional procedures (angioplasty/stent).The Coronary Intervention award is based on the average of in-hospital mortality and in-hospital + 1-month mortality z-scores based on MedPAR data. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight.

Critical Care

The Critical Care specialty award is based on:

- Diabetic Emergencies
- Pulmonary Embolism
- Respiratory Failure
- Sepsis

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories in at least three out of four of the conditions listed above, based on MedPAR data. Healthgrades calculates the average z-scores for sepsis, pulmonary embolism, diabetic emergencies and respiratory failure using in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight. The Critical Care award is based on a volume weighted average of these average z-scores.

Gastrointestinal Care

The Gastrointestinal Care specialty award is based on:

- Bowel Obstruction
- Colorectal Surgeries
- Esophageal/Stomach Surgeries
- Gallbladder Removal Surgery
- Gastrointestinal Bleed
- Pancreatitis
- Small Intestine Surgeries

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories in at least five out of seven of the conditions or procedure cohorts listed above, based on MedPAR data. Healthgrades calculates the average z-scores for each cohort using in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight. The Gastrointestinal Care award is based on a volume weighted average of these average z-scores.

General Surgery

The General Surgery specialty award is based on:

- Bowel Obstruction
- Colorectal Surgeries
- Esophageal/Stomach Surgeries
- Gallbladder Removal Surgery
- Small Intestine Surgeries

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories in at least four out of five of the conditions or procedure cohorts listed above, based on MedPAR data. Healthgrades calculates the average z-scores for each cohort using in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight. The General Surgery award is based on a volume weighted average of these average z-scores.

Gynecologic Surgery

The Gynecologic Surgery specialty award is based on:

- Gynecologic Surgery

To be considered for an award, a hospital must be evaluated and categorized into one of three performance categories in gynecologic surgery and be located in one of the all-payer states that provide gynecologic surgery data. We evaluate gynecologic surgery based on complication rates. Procedures include fistula repair surgery, hysterectomy, surgery for fallen bladders or prolapsed, surgery for incontinence, surgery on ovaries and fallopian tubes, and surgery for vulvar cancer.

Joint Replacement

The Joint Replacement specialty award is based on:

- Hip Replacement
- Total Knee Replacement

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories for both total knee replacement and hip replacement. We evaluate both procedures based on in-hospital complications. The Joint Replacement award is based on a volume-weighted average of the z-scores for these procedures.

Maternity Care

The Maternity Care specialty award is based on the analysis of four factors:

- Maternal complication rate among women undergoing single live vaginal deliveries
- Maternal complication rate among women undergoing single live C-section deliveries
- Newborn volume adjusted for low birth weight
- Risk-adjusted neonatal mortality

For each of the four factors above, a percentile score is calculated. Lower maternal complication rates correspond to lower percentiles. For newborn volume, hospitals are assigned a percentile based on their overall volume of single-live born neonates combined with the percentage of neonates falling into the 1,000 to 1,749 gram birth weight categories compared to the national average. Hospitals with higher volumes and higher percentages of these low birth weight infants receive lower percentiles. Finally, a percentile is assigned based on

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the z-score for risk-adjusted newborn. To be considered for an award, a hospital must be located in one of the all-payer states that provide maternity care data.

Neurosciences

The Neurosciences specialty award is based on:

- Neurosurgery
- Stroke

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories for both of these conditions and procedures based on MedPAR data. We first calculate the average z-scores for each condition or procedure using in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight. The Neurosciences score is the volume weighted average of these two z-scores.

Neurosurgery

The Neurosurgery specialty award is based on one group of procedures: neurosurgery. The neurosurgery score is calculated using the average of in-hospital mortality and in-hospital + 1-month mortality z-scores based on MedPAR data. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight.

Orthopedic Surgery

The Orthopedic Surgery specialty award is based on:

- Back and Neck Surgery (Without Spinal Fusion)
- Hip Fracture Treatment
- Hip Replacement
- Spinal Fusion
- Total Knee Replacement

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories for four of the five procedures listed above based on MedPAR data. Those four must include total knee replacement, hip replacement, hip fracture treatment, and either spinal fusion or back and neck surgery. These procedures are evaluated based on complication rates. A volume-weighted average z-score is calculated for the combination of the joint replacement procedures (both are required) and for the combination of spinal fusion and back and neck surgery (only one is required). The Orthopedic Surgery score is based on the evenly weighted average of the of the joint replacement z-score, the combined back and neck z-score and the hip fracture z-score.

Prostate Surgery

The Prostate Surgery specialty award is based on:

- Prostate Removal Surgery
- Transurethral Resection of Prostate Surgery

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three categories for hospital performance for either one or both conditions based on MedPAR data. We evaluate both procedures based on in-hospital complications. The Prostate Surgery award is based on the volume-weighted average of the z-scores for these procedures.

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Pulmonary Care

The Pulmonary Care specialty award is based on:

- Chronic Obstructive Pulmonary Disease (COPD)
- Pneumonia

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three categories for hospital performance for both conditions based on MedPAR data. We first calculate the average z-scores for these medical issues using in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight. The Pulmonary Care score is based on a volume weighted average of these average z-scores.

Spine Surgery

The Spine Surgery specialty award is based on:

- Back and Neck Surgery (Without Spinal Fusion)
- Spinal Fusion

To be considered for an award in this specialty area, a hospital had to be evaluated and categorized into one of three performance categories for both procedures based on MedPAR data. We evaluate both procedures based on in-hospital complications. The Spine Surgery score is the volume-weighted average of these z-scores for these procedures.

Stroke Care

The Stroke Care specialty award is based on one condition: stroke. To be categorized into one three performance categories in this condition, a hospital had to have a transfer-out rate of less than 10 percent for the three years of data used. The score used for the Stroke Care award is based on the average z-scores for in-hospital mortality and in-hospital + 1-month mortality. The in-hospital + 1 month mortality received 60% of the weight in this calculation and in-hospital mortality received 40% of the weight.

Vascular Surgery

The Vascular Surgery specialty award is based on:

- Abdominal Aortic Aneurysm Repair
- Carotid Surgery
- Peripheral Vascular Bypass

To be considered for an award in this specialty area, a hospital's performance had to be categorized into one of three performance categories for all three procedures based on MedPAR data. We evaluate all three procedures based on in-hospital complications. The score used for the Vascular Surgery award is based on the volume-weighted average of the z-scores for these three procedures.

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