



Healthgrades Specialty and Clinical Excellence Awards 2018 Methodology

Specialty Excellence Award™

America's Best Hospitals for Specialty Care™

Distinguished Hospital Award for Clinical Excellence™

America's 50 Best Hospitals™ & America's 100 Best Hospitals™

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Performance Measurement: Ratings and Awards

To help consumers evaluate and compare hospital performance specific to specialty service lines and specialty focus areas, Healthgrades communicates performance in two ways—through ratings and awards.

To measure performance, Healthgrades used Medicare inpatient data from the Medicare Provider Analysis and Review (MedPAR) file purchased from the Centers for Medicare and Medicaid Services (CMS) for years 2014 through 2016. For bariatric surgery, Healthgrades used inpatient data provided by 17 states that provide all-payer data (CA, CO, FL, IA, IL, MD, NJ, NV, NY, OR, PA, RI, TX, VA, WA, WI and WV) for years 2013 through 2015 (one year behind MedPAR data years).

Patient outcomes data for 33 conditions or procedures were analyzed (see *list below*) for virtually every hospital in the country, with the exception of bariatric surgery which analyzed hospitals in 17 all-payer states.

Mortality-Based Procedures & Conditions

Bowel Obstruction	Heart Failure
Chronic Obstructive Pulmonary Disease (COPD)	Pancreatitis
Colorectal Surgeries	Pneumonia
Coronary Artery Bypass Graft (CABG) Surgery	Pulmonary Embolism
Coronary Interventional Procedures	Respiratory Failure
Cranial Neurosurgery	Sepsis
Diabetic Emergencies	Small Intestine Surgeries
Esophageal/Stomach Surgeries	Stroke
Gastrointestinal Bleed	Valve Surgery
Heart Attack	

In-Hospital Complications-Based Procedures & Conditions

Abdominal Aortic Aneurysm Repair	Hip Replacement
Back and Neck Surgeries (Without Spinal Fusion)	Pacemaker Procedures
Bariatric Surgery	Peripheral Vascular Bypass
Carotid Surgery	Prostate Removal Surgery
Defibrillator Procedures	Spinal Fusion
Gallbladder Surgery	Total Knee Replacement
Hip Fracture Treatment	Transurethral Prostate Resection Surgery

Using Ratings to Communicate Performance

The first and most fundamental way that Healthgrades communicates performance is through star ratings. Star ratings are an evaluation of the hospital's actual performance as compared to the predicted performance for that hospital based on a specific risk-adjustment model applied to that hospital. For more details, see the *Healthgrades Mortality and Complications Outcomes 2018 Methodology*.

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 clinical and demographic risk factors are found among patients treated in different hospitals. Therefore, 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 examples of comorbid conditions are hypertension, chronic heart failure, and diabetes.

Developing the Healthgrades hospital star performance categories involves four steps:

1. The hospital predicted value (predicted number of deaths or complications at each hospital) is calculated by summing the individual patient record predicted values determined from logistic regression models discussed above.
2. The hospital predicted value is compared with the actual or observed value (e.g., actual number of deaths or complications at each hospital).
3. A test is conducted to determine whether the difference between the predicted and actual values was statistically significant. This test is performed to make sure that differences were very unlikely to be caused by chance alone. A z-score is used to establish a 90% confidence interval.
4. Hospital performance categories are determined based upon the outcome of the test for statistical significance.

For each condition or procedure, hospital performance is evaluated and stratified into three categories:

- ★★★★★ **Better Than Expected** – Actual performance was better than predicted and the difference was statistically significant at $\alpha = 0.1$.
- ★★★ **As Expected** – Actual performance was not statistically significantly different from what was predicted at $\alpha = 0.1$.
- ★ **Worse Than Expected** – Actual performance was worse than predicted and the difference was statistically significant at $\alpha = 0.1$.

Healthgrades uses z-scores (individual or aggregate) to determine performance. **A z-score is a standardized statistical test which calculates the difference between the actual and predicted complication and mortality rates, taking into account patient variability and volume. A higher z-score means better performance.**

A complete description of the methodology including risk factors, multivariate logistic regression model and other relevant information is available in the *Healthgrades Mortality and Complications Outcomes 2018 Methodology*. Patients were identified by their ICD-9 and ICD-10 principal procedure. A full list of ICD-9 and ICD-10 codes can be found in Healthgrades ICD-10 Mapping Tool at <https://icd10mappingtool.healthgrades.com/>.

Using Awards to Communicate Performance

The second way Healthgrades communicates information on performance is by awards. Awards determine and communicate a hospital's superior performance when compared to other eligible hospitals.

Each award has eligibility requirements specific to the nature and intent of the award. All awards require that a hospital receive a rating in the cohort(s) included in the determination of the award. Awards may reference a singular cohort or require the combination of a grouping of cohorts. Specific information on the cohorts included is outlined in the *Specialty Award Categories and Requirements* section.

Specialty Excellence Awards & America's Best for Specialty Care

Three Healthgrades awards recognized hospitals for superior performance in specialty care:

- Healthgrades Specialty Excellence Awards™
- America's 100 Best Hospitals for Specialty Care™
- America's 50 Best Hospitals for Specialty Care™

Specialty Excellence Awards™

Healthgrades Specialty Excellence Awards recognize hospitals with superior performance in specific specialty lines and specialty focus areas. Healthgrades current Specialty Excellence Awards™ include:

- Bariatric Surgery Excellence Award™
- Cardiac Care Excellence Award™
- Cardiac Surgery Excellence Award™
- Coronary Intervention Excellence Award™
- Cranial Neurosurgery Excellence Award™
- Critical Care Excellence Award™
- Gastrointestinal Care Excellence Award™
- General Surgery Excellence Award™
- Joint Replacement 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™

Specialty Excellence Award Determination

For each hospital, Healthgrades assigns an overall score for each specialty area based on hospital performance as determined by a single z-score or average of volume-weighted z-scores when more than one condition or procedure is included in the award. (See *Specialty Award Categories and Requirements* for a list for each award.)

The top 5% or 10% of hospitals within each specialty area are recognized as Healthgrades Specialty Excellence Award™ recipients, as measured by lowest risk-adjusted mortality and complication z-scores.

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 11 specialty areas based on overall z-scores. For there to be 100 Best Hospitals for specialty care, 100 hospitals or more must perform in the top 5% or 10% in the nation.

- Cardiac Care
- Coronary Intervention
- Critical Care
- Gastrointestinal Care
- General Surgery
- Joint Replacement
- Orthopedic Surgery
- Prostate Surgery
- Pulmonary Care
- Spine Surgery
- Stroke Care

America's 50 Best Hospitals for Specialty Care™

From the lists of Specialty Excellence Award recipients, Healthgrades identified the top 50 hospitals for two specialty areas based on overall z-scores. In these two specialty categories, only 50 hospitals in the nation performed among the top 5% or 10% in the nation.

- Cardiac Surgery
- Vascular Surgery

Specialty Award Categories and Requirements

The following sections provide a list of conditions, procedures and analyses that are included for each Specialty Excellence Award.

Bariatric Surgery

The Bariatric Surgery specialty award is based on all-payer data for one cohort: bariatric surgery. A hospital had to be evaluated and categorized into one of three performance categories for bariatric surgery based on in-hospital complications.

Cardiac Care

The Cardiac Care specialty award is based on:

- Coronary Artery Bypass Graft (CABG) Surgery
- Coronary Interventional Procedures (PCI)
- Heart Attack
- Heart Failure
- Valve Surgery

To be considered for an award in this specialty area, a hospital must be evaluated in four of the five procedures listed above based on MedPAR data. The four must include coronary interventional procedures, heart attack, heart failure, and either coronary artery bypass graft (CABG) surgery or valve surgery. The z-scores for in-hospital mortality and in-hospital + 30-day mortality are used in calculating the area scores. The in-hospital + 30-day mortality outcome receives 60% of the weight in the calculations and in-hospital mortality receives 40% of the weight.

A volume-weighted average z-score is calculated for the combination of cardiac surgery (CABG surgery and Valve Surgery). A volume-weighted average z-score is also calculated for heart attack and heart failure. A z-score is also calculated for coronary interventional procedures. The Cardiac Care award is based evenly on average of the combined cardiac surgery (CABG surgery and Valve Surgery) z-score, the combined heart attack and heart failure z-score, and the score for coronary interventional procedures.

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 must be evaluated 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 surgery z-scores. The z-scores for in-hospital mortality and in-hospital + 30-day mortality are used in these calculations. The in-hospital + 30-day mortality outcome receives 60% of the weight in the calculations and in-hospital mortality receives 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 + 30-day mortality z-scores based on MedPAR data. The in-hospital + 30-day mortality outcome receives 60% of the weight in this calculation and in-hospital mortality receives 40% of the weight.

Cranial Neurosurgery

The Cranial Neurosurgery specialty award—*formerly Neurosurgery*—is based on one group of procedures: cranial neurosurgery. The cranial neurosurgery score is calculated using the average of in-hospital mortality and in-hospital + 30-day mortality z-scores based on MedPAR data. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 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 must be evaluated 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 + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 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 must be evaluated 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 + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 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 must be evaluated 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 + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 40% of the weight. The General Surgery award is based on a volume-weighted average of these average z-scores.

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 must 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.

Neurosciences

The Neurosciences specialty award is based on:

- Neurosurgery
- Stroke

To be considered for an award in this specialty area, a hospital must be evaluated 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 + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 40% of the weight. The Neurosciences award is the volume-weighted average of these two z-scores.

Orthopedic Surgery

The Orthopedic Surgery specialty award is based on:

- Back and Neck Surgeries (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 must be evaluated in 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 and/or back and neck surgeries. 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 surgeries (only one is required). A z-score is also calculated for hip fracture treatment. The Orthopedic Surgery award is based on the evenly weighted average 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 Prostate Resection Surgery

To be considered for an award in this specialty area, a hospital must be evaluated 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 or the direct z-score if only one type of procedure is performed.

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 must be evaluated in both conditions based on MedPAR data. We first calculate the average z-scores for these conditions using in-hospital mortality and in-hospital + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 40% of the weight. The Pulmonary Care award 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 Surgeries (Without Spinal Fusion)
- Spinal Fusion

To be considered for an award in this specialty area, a hospital must be evaluated in both procedures based on MedPAR data. We evaluate both procedures based on in-hospital complications. The Spine Surgery award 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 evaluated, a hospital must have a transfer-out rate of less than 10% for the three years of data used. The Stroke Care award is based on the average z-scores for in-hospital mortality and in-hospital + 30-day mortality. The in-hospital + 30-day mortality receives 60% of the weight in this calculation and in-hospital mortality receives 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 must be evaluated for all three procedures based on MedPAR data. We evaluate all three procedures based on in-hospital complications. The Vascular Surgery award is based on the volume-weighted average of the z-scores for these three procedures.

Distinguished Hospital Award for Clinical Excellence™ Methodology

The Distinguished Hospital Award for Clinical Excellence recognizes hospitals for superior performance in providing care for conditions and procedures across multiple specialty lines and areas. The Distinguished Hospital Award for Clinical Excellence recognizes the top 5% of hospitals in the country for clinical excellence. While many hospitals have specific areas of expertise and high-quality outcomes in certain areas, these hospitals exhibit comprehensive high-quality care across clinical areas.

To help consumers evaluate and compare hospital performance relative to this award, Healthgrades uses a two-step methodology:

1. Evaluate hospital performance for 32 procedures and conditions using Healthgrades Mortality and Complication Outcomes Methodology (see list below).
2. Identify the hospitals with superior performance overall for up to 32 of these conditions and procedures using this Distinguished Hospital Award for Clinical Excellence™ Methodology.

Procedures and Conditions Evaluated for DHA-CE Calculation

The following 32 procedures and conditions are used in this methodology.

Mortality-Based Procedures & Conditions

Bowel Obstruction	Heart Failure
Chronic Obstructive Pulmonary Disease (COPD)	Pancreatitis
Colorectal Surgeries	Pneumonia
Coronary Artery Bypass Graft (CABG) Surgery	Pulmonary Embolism
Coronary Interventional Procedures	Respiratory Failure
Cranial Neurosurgery	Sepsis
Diabetic Emergencies	Small Intestine Surgeries
Esophageal/Stomach Surgeries	Stroke
Gastrointestinal Bleed	Valve Surgery
Heart Attack	

In-Hospital Complication-Based Procedures & Conditions

Abdominal Aortic Aneurysm Repair	Pacemaker Procedures
Back and Neck Surgeries (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
Hip Replacement	

Eligibility

To be considered for the Healthgrades Distinguished Hospital Award for Clinical Excellence, a hospital must have evaluations in at least 21 of the 32 Healthgrades procedures and conditions using Medicare inpatient data from the Medicare Provider Analysis and Review (MedPAR) file purchased from the Centers for Medicare and Medicaid Services (CMS).

Clinical Excellence Award Determination

After creating a list of hospitals that meet the above eligibility criteria, Healthgrades uses the following steps to determine recipients of the Distinguished Hospital Award for Clinical Excellence™.

1. Determine an overall performance score: The overall performance score for each hospital is calculated using volume-weighted z-scores averaged across all complication and mortality based cohorts. Volume weights represent the proportion of patients within a given cohort and outcome measure. The proportion is calculated as the ratio of patients in a cohort and outcome measure over total patients across all cohorts and outcome measures. Performance is assessed at two time points for mortality cohorts: in-hospital and at 30-days post admission. The patients used for in-hospital mortality and 30-day mortality are treated as independent for the volume weighting calculation.

As each mortality cohort is composed of two outcomes measures (in-hospital mortality and 30-day mortality), and complication cohorts have only one outcome measure, the individual influence of mortality and complication outcomes on the overall performance score is 2 to 1.

Within the mortality cohorts, a higher emphasis is placed on 30-day mortality (0.6) compared to in-hospital mortality (0.4). The 30-day mortality outcome measure is considered a more statistically significant quality indicator, and this quality measure impacts hospital reimbursements through the Center for Medicare and Medicaid Service's (CMS) Value-Based Purchasing initiative.

The final contribution of each cohort to the overall score will vary based on the mix of cohorts at any given hospital.

2. Determine performance in sequential order: Hospitals are listed in descending order by their overall performance score.
3. Identify top 5% of all facilities: The top performers are selected from the above listing and receive the Distinguished Hospital Award for Clinical Excellence™ for 2018.

America's Best Hospitals™ Methodology

Healthgrades identifies America's Best Hospitals™ and stratifies performance into two categories: America's 50 Best Hospitals™ and America's 100 Best Hospitals™.

Identifying America's 50 Best Hospitals™

Healthgrades America's 50 Best Hospitals Award™ recognizes 50 hospitals as the top 1% in the nation for consistent clinical excellence based on an analysis of risk-adjusted mortality and complication rates for common procedures and conditions. Specifically, these hospitals have received a Healthgrades Distinguished Hospital Award for Clinical Excellence™ in consecutive years over an extended period of time.

To identify America's 50 Best Hospitals, Healthgrades used a two-step process.

1. Identified those hospitals that received the Distinguished Hospital Award for Clinical Excellence for at least seven consecutive years.
2. If the number of hospitals identified above was less than 50, then the recipients for the last six consecutive years were identified and sorted by volume-weighted average z-score from the most recent Distinguished Hospital Award for Clinical Excellence analysis. (The volume-weighted average z-score is a statistical measure of hospital quality outcomes.) The top hospitals from this list were then added to the list from Step 1 above to create a list of America's 50 Best Hospitals™ for 2018.

Identifying America's 100 Best Hospitals™

Healthgrades America's 100 Best Hospitals Award™ recognizes the top 100 hospitals that received the Distinguished Hospital Award for Clinical Excellence each year for at least the last three years. The list is made up of those hospitals that were identified as America's 50 Best Hospitals as described above with the addition of the next 50 top hospitals, identified by consecutive years of achieving the Distinguished Hospital Award for Clinical Excellence and volume-weighted average z-score.

These hospitals are recognized as the top 2% in the nation for consistent clinical quality.