



healthgrades™

Specialty Excellence Awards &
America's Best Hospitals
for Specialty Care Awards
2022 Methodology

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Performance Measurement: Ratings & Awards

To help consumers evaluate and compare hospital performance specific to specialty 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 2018 through 2020. For appendectomy and bariatric surgery, Healthgrades used inpatient data provided by 16 states that provide all-payer data for years 2017 through 2019 (one year behind MedPAR data years). The 16 states evaluated were:

- Colorado
- Florida
- Illinois*
- Iowa
- Maryland
- Nevada*
- New Jersey
- New York*
- Oregon
- Pennsylvania
- Rhode Island*
- Texas
- Virginia*
- Washington*
- West Virginia
- Wisconsin

*See Appendix A. All-Payer States Citations and Disclaimers

Patient outcomes data for 33 conditions or procedures were analyzed (see list below) for virtually every hospital in the country, with the exception of appendectomy and bariatric surgery for which hospitals in 16 all-payer states were assessed.

Mortality-Based Procedures & Conditions

- Bowel Obstruction
- Chronic Obstructive Pulmonary Disease (COPD)
- Colorectal Surgeries
- Coronary Artery Bypass Graft (CABG) Surgery
- Coronary Interventional Procedures
- Cranial Neurosurgery
- Gastrointestinal Bleed
- Heart Attack
- Heart Failure
- Pancreatitis
- Pneumonia
- Pulmonary Embolism
- Respiratory Failure
- Sepsis
- Stroke
- Upper Gastrointestinal Surgery
- Valve Surgery

In-Hospital Complications-Based Procedures & Conditions

- Abdominal Aortic Aneurysm Repair
- Appendectomy
- Back and Neck Surgeries (Without Spinal Fusion)
- Bariatric Surgery
- Carotid Procedures
- Defibrillator Procedures
- Diabetic Emergencies
- Gallbladder Removal Surgery
- Hip Fracture Treatment
- Hip Replacement
- Pacemaker Procedures
- Peripheral Vascular Bypass
- Prostate Removal Surgery
- Spinal Fusion
- Total Knee Replacement
- 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 2022 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, sex, specific procedure performed, and comorbid conditions (e.g., 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 patient deaths or patients with 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 that 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 2022 Methodology*. A full list of ICD-10 codes used to define each model 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 17 specialty areas. Healthgrades current Specialty Excellence Awards™ include:

- | | |
|--|--------------------------------------|
| Bariatric Surgery Excellence Award™ | Neurosciences Excellence Award™ |
| Cardiac Care Excellence Award™ | Orthopedic Surgery Excellence Award™ |
| Cardiac Surgery Excellence Award™ | Prostate Surgery Excellence Award™ |
| Coronary Intervention Excellence Award™ | Pulmonary Care Excellence Award™ |
| Cranial Neurosurgery Excellence Award™ | Spine Surgery Excellence Award™ |
| Critical Care Excellence Award™ | Stroke Care Excellence Award™ |
| Gastrointestinal Care Excellence Award™ | Surgical Care Excellence Award™ |
| Gastrointestinal Surgery Excellence Award™ | Vascular Surgery Excellence Award™ |
| Joint Replacement 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 11 specialty care areas:

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

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

For two specialty areas—Prostate Surgery and Spine Surgery—the 100 Best Hospitals for specialty care is awarded independently of the corresponding Specialty Excellence Award and may represent more than the top 10% of hospitals in the nation. The 100 Best Hospitals in Prostate Surgery and 100 Best Hospitals in Spine Surgery are identified as the top 100 hospitals rank ordered by volume-weighted z-score.

America's 50 Best Hospitals for Specialty Care™

From the lists of Specialty Excellence Award recipients, Healthgrades identified the top 50 hospitals for three specialty care areas based on overall z-scores.

- Cardiac Surgery
- Surgical Care
- 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 recognizes hospitals with superior clinical outcomes in bariatric (weight loss) 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 recognizes hospitals with superior clinical outcomes in heart bypass surgery, coronary interventional procedures, heart valve surgery, and the treatment of heart attack and heart failure.

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 recognizes hospitals with superior clinical outcomes in heart bypass surgery and heart valve 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 recognizes hospitals with superior clinical outcomes in coronary intervention procedures including angioplasty with stent.

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 recognizes hospitals with superior clinical outcomes in 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 recognizes hospitals with superior clinical outcomes in treating pulmonary embolism, respiratory system failure, sepsis, and diabetic emergencies.

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, 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. Healthgrades also calculates the average z-scores for diabetic emergencies using in-hospital complications. The Critical Care award is based on a volume-weighted average of these average z-scores.

Gastrointestinal Care

The Gastrointestinal Care specialty award recognizes hospitals with superior clinical outcomes in colorectal surgeries, gallbladder removal, upper gastrointestinal surgery, and treating bowel obstruction, gastrointestinal bleeds, and pancreatitis.

The Gastrointestinal Care specialty award is based on:

- Bowel Obstruction
- Colorectal Surgeries
- Gallbladder Removal Surgery
- Gastrointestinal Bleed
- Pancreatitis
- Upper gastrointestinal surgery

To be considered for an award in this specialty area, a hospital must be evaluated in at least four out of six 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.

Gastrointestinal Surgery

The Gastrointestinal Surgery specialty award recognizes hospitals with superior clinical outcomes in bowel obstruction treatment, colorectal surgeries, gallbladder removal, and upper gastrointestinal surgery.

The Gastrointestinal Surgery (formerly General Surgery) specialty award is based on:

- Bowel Obstruction
- Colorectal Surgeries
- Gallbladder Removal Surgery
- Upper Gastrointestinal Surgery

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 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 Surgery award is based on a volume-weighted average of these average z-scores.

Joint Replacement

The Joint Replacement specialty award recognizes hospitals with superior clinical outcomes in knee and hip 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 recognizes hospitals with superior clinical outcomes in stroke care and cranial neurosurgery.

The Neurosciences specialty award is based on:

- Cranial 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 recognizes hospitals with superior clinical outcomes in back and neck surgery, spinal fusion, hip fracture treatment, and knee and hip replacement.

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 recognizes hospitals with superior clinical outcomes in prostate removal surgery and transurethral resection of the prostate (TURP).

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 recognizes hospitals with superior clinical outcomes in treating chronic obstructive pulmonary disease (COPD) and pneumonia.

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 recognizes hospitals with superior clinical outcomes in back and neck surgeries and spinal fusion.

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 recognizes hospitals with superior clinical outcomes in the care and treatment of stroke.

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.

Surgical Care

The Surgical Care specialty award recognizes hospitals with superior clinical outcomes in overall surgical care across 15 of the most common in-hospital surgical procedures including cardiac, vascular, joint replacement, prostate, spine, and gastrointestinal surgeries.

The Surgical Care specialty award is based on:

- Back and Neck Surgery (except Spinal Fusion)
- Back and Neck Surgery (Spinal Fusion)
- Bowel Obstruction
- Carotid Procedures
- Cholecystectomy
- Colorectal Surgeries
- Coronary Bypass Surgery
- Hip Fracture Repair
- Peripheral Vascular Bypass
- Prostate Removal Surgery
- Resection/Replacement of Abdominal Aorta
- Total Hip Replacement
- Total Knee Replacement
- Upper Gastrointestinal Surgery
- Valve Replacement Surgery

To be considered for an award in this specialty area, a hospital must be evaluated in 8 of 15 procedures and conditions based on MedPAR data. The Surgical Care award is based on a volume-weighted average of these average z-scores for mortality- and complication-based procedures.

Specifically, Healthgrades calculates the average z-scores for bowel obstruction, colorectal surgery, coronary bypass surgery, upper gastrointestinal surgery, and valve replacement surgery using in-hospital mortality and in-hospital + 30-day mortality. The in-hospital + 30-day mortality outcome receives 60% of the weight in the calculations and in-hospital mortality receives 40% of the weight.

Healthgrades also evaluates the following procedures based on in-hospital complications: back and neck surgery (except spinal fusion), back and neck surgery (spinal fusion), carotid procedures, cholecystectomy, hip fracture repair, peripheral vascular bypass, prostate removal surgery, resection/replacement of abdominal aorta, total hip replacement, and total knee replacement.

Vascular Surgery

The Vascular Surgery specialty award recognizes hospitals with superior clinical outcomes in abdominal aortic aneurysm repair, carotid surgery, and peripheral vascular bypass surgery.

The Vascular Surgery specialty award is based on:

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

To be considered for an award in this specialty area, a hospital's performance must be evaluated for at least two of any three procedures based on MedPAR data. We evaluate each procedure based on in-hospital complications. The Vascular Surgery award is based on the volume-weighted average of the z-scores for at least two of three procedures. If a hospital meets eligibility requirements for ratings in all three procedures, the Vascular Surgery award will be based on the volume-weighted average z-score of all three procedures.

Appendix A. All-Payer States Citations and Disclaimers

We respectfully list the following citations and disclaimers as requested from the following states that provide inpatient data.

Illinois: This data product, analysis or report was produced using discharge data supplied by the Illinois Department of Public Health (IDPH) under Illinois Public Acts 94-027 and 93-0144. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of IDPH."

Nevada: This information is from the records of the Nevada Division of Health Care Financing and Policy (DHCFP) and was released through the Center of Health Information Analysis (CHIA) of the University of Nevada, Las Vegas. Authorization to release this information does not imply endorsement of this study or its findings by either DHCFP or CHIA.

New York: This publication was produced from raw data purchased from or provided by the New York State Department of Health (NYSDOH). However, the conclusions derived, and views expressed herein are those of the author(s) and do not reflect the conclusions or views of NYSDOH. NYSDOH, its employees, officers, and agents make no representation, warranty or guarantee as to the accuracy, completeness, currency, or suitability of the information provided here.

Rhode Island: Rhode Island Hospital Discharge Data, Center for Health Data & Analysis, Rhode Island Department of Health

Virginia: Virginia Health Information (VHI) has provided non-confidential patient level information used in this file, report, publication, or database which it has compiled in accordance with Virginia law but which it has no authority to independently verify. By using this file, report, publication, or database, the user agrees to assume all risks that may be associated with or arise from the use of inaccurate data. VHI cannot and does not represent that the use of VHI's data was appropriate for this file, report, publication, or database or endorse or support any conclusions or inferences that may be drawn from the use of VHI's data.

Washington: Washington State Data is being made available from: Washington State Department of Health