



SIMILARITYINDEX™

HOSPITALS

September 2022

SimilarityIndex™ | Hospitals

Executive Summary

For decades, stakeholders in the health economy have relied on ordinal rank lists (e.g., *U.S. News & World Report*) to determine which hospitals are “best,” thereby creating unrealistic or irrelevant benchmarks for everyone else. To improve healthcare decision making, we are pleased to introduce SimilarityIndex™ | Hospitals, the second application of the health economy’s first machine-learning-based SimilarityEngine™. Instead of **ranking** hospitals largely based on subjective and self-reported criteria, the SimilarityEngine™ indexes facilities using machine learning models based exclusively on objective and relevant datapoints, enabling users to select certain criteria to find the hospitals that are “**true**” peers.

Methodology

Combining algorithmic intelligence with the industry’s most robust data sources, SimilarityIndex™ | Hospitals uses normalized Euclidean distance in multi-dimensional space to determine the mathematical distance between hospitals with respect to numerous measures across five measurement categories: Quality, Outpatient Service Line, Financial, Patient Mix, and Market Share, the combination of which is referred to as Aggregate. (Figure 1). While existing hospital benchmarks (e.g., CMS Care Compare, Healthgrades Top Hospitals) include certain aspects of these categories, SimilarityIndex™ | Hospitals is the first to combine all categories into a single index to allow benchmarking at a national scale.

Figure 1. SimilarityIndex™ | Hospitals Categories



Improving U.S. healthcare outcomes and affordability requires an exponentially better approach to decision making, and accurate benchmarking is essential to developing evidence-based strategies. With SimilarityIndex™ | Hospitals, learn how close a selected hospital is to – or far from – the most highly regarded U.S. hospitals, like Mayo Clinic, Cleveland Clinic, and Johns Hopkins Hospital. Even more importantly, learn which hospitals are most similar to a selected hospital based on factors including quality, operations, and financial results.

Example Findings

- **Aggregate SimilarityIndex™** reveals that Johns Hopkins Hospital’s true peers include renowned U.S. hospitals like Brigham and Women’s Hospital in Boston and Northwestern Hospital in Chicago, but also include hospitals like Mercy Medical Center in Baltimore.
- **Aggregate SimilarityIndex™** reveals that Cleveland Clinic’s true peers include renowned U.S. hospitals like Massachusetts General Hospital in Boston and Vanderbilt University Medical Center in Nashville, but also include hospitals like Strong Memorial Hospital in Rochester.

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Introduction

Trilliant Health SimilarityIndex™ | Hospitals

As a society, we have been primed to determine what is “best” using third-party rankings based on abstract and subjective measures. What are the top five restaurants in New York? What are the best colleges in the country? Healthcare is no exception. What are the best hospitals in America? Who are the best orthopedic surgeons in Tampa? In healthcare, these lists often factor in self-reported, survey-based data that are misaligned with quality outcomes, operational metrics, and financial results.

The trend: These lists are used to identify which organizations or individuals are the “best” or the “top,” becoming the *de facto* benchmark for everyone else. *U.S. News & World Report* ranks Mayo Clinic as the best health system in the U.S., but IBM Watson Health includes Allina Health, Avera Health, and Sentara Healthcare among the top performing health systems. According to *Forbes*, Aetna, Blue Cross BlueShield, and Cigna are the best health insurance companies even as UPMC, Capital District Physicians, and Kaiser Foundation Health Plan of the Mid-Atlantic States are rated highest on NCQA’s Health Plan Report Card.

The consequence: The entire health economy pursues aspirational and arbitrary benchmarks to guide critical decisions from capital investments to M&A to value-based network development.

A benchmark is “something that serves as a standard by which others may be measured or judged.” In business, to benchmark is “to study (something, such as a competitor’s product or business practices) in order to improve the performance of one’s own company.” Yet for decades, the healthcare industry has used benchmarks grounded in anecdotes and perceived similarity.

Using mathematical principles to create comparison groups (i.e., benchmarks) has always been possible. However, until 2009, creating those cohorts at scale was not affordable because of the limitations of raw computing power. Other industries now routinely apply this mathematical rigor in everyday operations, such as Amazon, Netflix, and Spotify recommending content based on features of a customer’s previous activity or similarities between customers. Today, for the first time, we apply this rigor to benchmarking for the health economy.

With similarity analysis so ingrained in modern decision making, why does the health economy still benchmark against the “best” rather than relevant peers? Why strive to achieve unattainable metrics when you can identify the top performer in your industry that is *most similar* to you?

In the increasingly complex health economy, an exponentially better approach to decision making and accurate benchmarking is essential for all stakeholders to develop evidence-based strategies. To equip decisionmakers with the tools to identify their **most relevant peers**, the second application of the SimilarityEngine™ is focused on Hospitals. Because hospitals represent the single largest part of the health economy, almost every stakeholder is impacted by what does and does not happen in acute care hospitals.

The Current State of Hospital Benchmarking

SimilarityIndex™ | Hospitals offers insights that no other existing resource does. Instead of **ranking** hospitals based on a mix of objective and subjective criteria, the SimilarityEngine™ **compares** them based **solely using objective datapoints**, enabling users to select certain criteria to find the hospitals that are true peers. By learning what makes similar hospitals successful, healthcare executives can make better-informed decisions in their policies, selections, and services.

Several hospital **rankings** and **ratings** exist in the market today that provide ordinal scores or ordered lists (i.e., best to worst). The current hospital benchmarking landscape ranks and rates hospitals on a variety of measures, including HCAHPS, 30-day risk-adjusted mortality rate, and readmission rates. *U.S. News & World Report* “Hospital Honor Roll”, Merative, and Leapfrog Top Hospitals utilize a ranking system, while CMS Care Compare, Healthgrades’ 250 Best Hospitals Award, the Lown Institute Most Socially Responsible Hospitals, and Leapfrog Top Hospitals offer ratings.

Most “best” or “top” hospital lists are targeted to consumers. The *U.S. News & World Report* rankings aim to help consumers understand the “best” place to receive certain types of healthcare services.¹ Similarly, Leapfrog Group scores hospitals on patient safety.² Healthgrades provides an objective review of clinical outcomes across multiple conditions to identify the hospitals with the “best” outcomes.³ While CMS Care Compare is intended to educate patients and provide consumer-curated scores, it also is used to incentivize performance, with Federal reimbursement levels (i.e., Medicare, Medicaid) subject to change based on a hospital’s rating score.⁴ Merative, comparatively, is intended to educate healthcare executives on organizational improvement initiatives.⁵

The existing hospital “benchmarks” and “raters” use similar data sources in developing their methodologies (e.g., HCAHPS, publicly available indicators such as CMS Care Compare, Medicare Beneficiary Summary Files, and the Medicare Provider Analysis and Review dataset). For example, *U.S. News & World Report* utilizes the American Hospital Association Annual Survey and a reputation survey.^{6,7} Leapfrog Group and Merative use their own internally conducted survey.^{8,9} The Lown Institute analyzes Census data from the Bureau of Labor Statistics, SEC filings, and state employee salary databases.¹⁰

The current ratings and rankings lack comparative elements, which leads hospitals, health systems, and other stakeholders in the health economy to make arbitrary and incomplete parallels between a particular hospital and some of the nation’s “top” hospitals. Some comparisons focus on singular aspects of hospital performance and effectiveness, such as outcomes (e.g., Healthgrades) or patient safety (e.g., Leapfrog Group), which is sufficient for a ranked list or assigning a grade, but not to compare hospitals. Hospitals don’t know how **dissimilar** they are to some of the nation’s top hospitals on different metrics, nor do they know which hospitals are most similar to them.

In fact, no health economy stakeholder can accurately identify relevant hospital peers with traditional hospital benchmarking resources. While many well-known hospitals such as Mayo Clinic, Cleveland Clinic, and Cedars Sinai may be reputational peers, they are not relevant peers for thousands of other acute care hospitals. For a typical acute care hospital to develop strategies based on unattainable benchmarks to irrelevant peers is ineffective at best. Rather, these hospitals would benefit from knowing which hospitals are most similar with respect to quality, operational, and financial metrics. In turn, other stakeholders in the health economy are ill-equipped to develop evidence-based strategies to sell their products and services to hospitals and health systems, resulting in the often-cited but rarely documented “waste” in the U.S. healthcare system.

Methodology

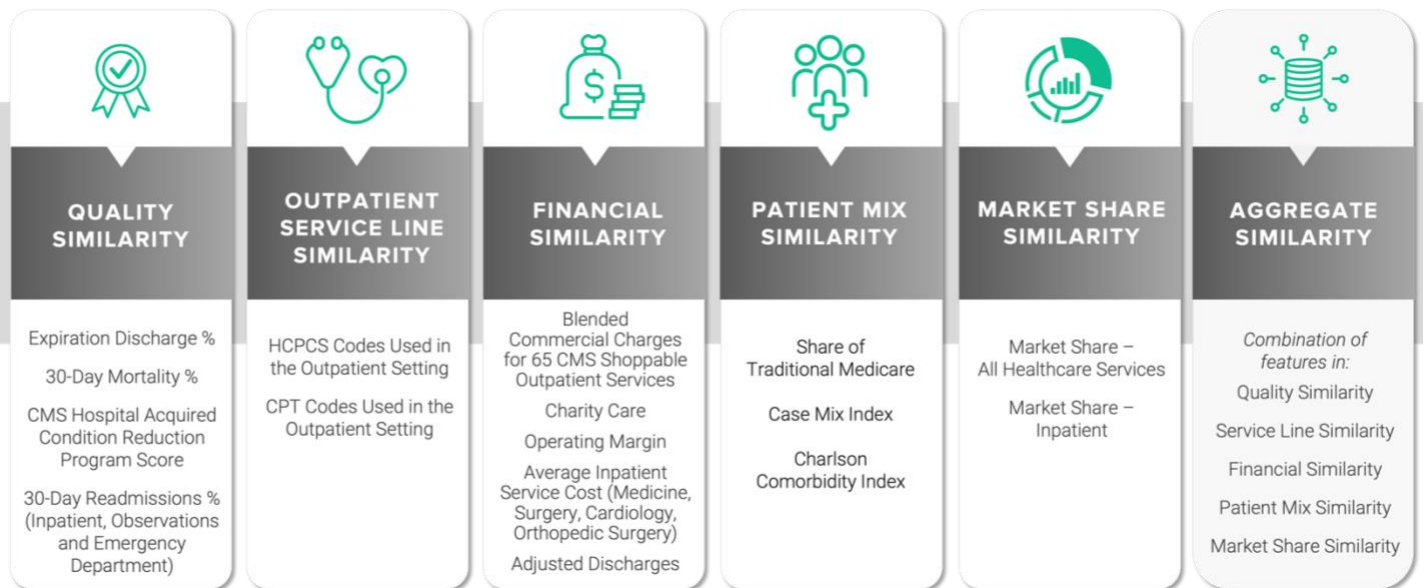
Developing SimilarityIndex™ | Hospitals

The SimilarityEngine™ uses normalized Euclidean distance in multi-dimensional space to reveal the mathematical difference between a selected category – markets, hospitals, physicians, or patients – across a variety of datapoints to create the relevant index. SimilarityIndex™ | Hospitals compares hospitals based upon quality, operational, and financial measures (Figure 2).

As a result, users can make relative – and relevant – comparisons to user-selected hospitals to reflect the “true peers” based on those metrics of the selected benchmark hospital, as well as distance from the “top” hospitals in the country.

SimilarityIndex™ | Hospitals allows any health economy stakeholder to compare a selected hospital’s quality metrics to both the most well-known health systems and also their closest peers. By changing the benchmark metric, a user can see how a hospital compares nationally to other hospitals. What you will see may surprise you, as the “best” hospitals are quite different from one another, and a hospital’s true peers often vary greatly depending on the chosen metric.

Figure 2. SimilarityIndex™ | Hospitals Categories and Features



Hospital Inclusion Criteria

SimilarityIndex™ | Hospitals indexes 2,159 U.S. short-term acute care hospitals located in one of the 927 metropolitan and micropolitan CBSAs in the U.S. Hospitals in the following categories were omitted from the index to ensure comparisons between hospitals with similar operational structures:

- Veterans Affairs hospitals
- Critical access hospitals
- Kaiser Permanente hospitals
- Government-operated hospitals
- Safety net hospitals
- Surgical hospitals
- Children's hospitals
- Hospitals without emergency departments
- Hospitals with fewer than 2,000 annual discharges
- Hospitals that have closed as of July 2022

The list of short-term acute care hospitals was originally sourced based upon institutional NPIs using Trilliant Health's national all-payer claims database. We applied the filters above and also compared against the CMS Care Compare 2022 database, as well as the rural hospital closures list maintained by the Cecil G. Sheps Center for Health Services Research at the University of North Carolina.

Reporting for certain short-term acute care hospitals were consolidated into reporting for a primary facility in the same geographic area.

SimilarityEngine™ → SimilarityIndex™

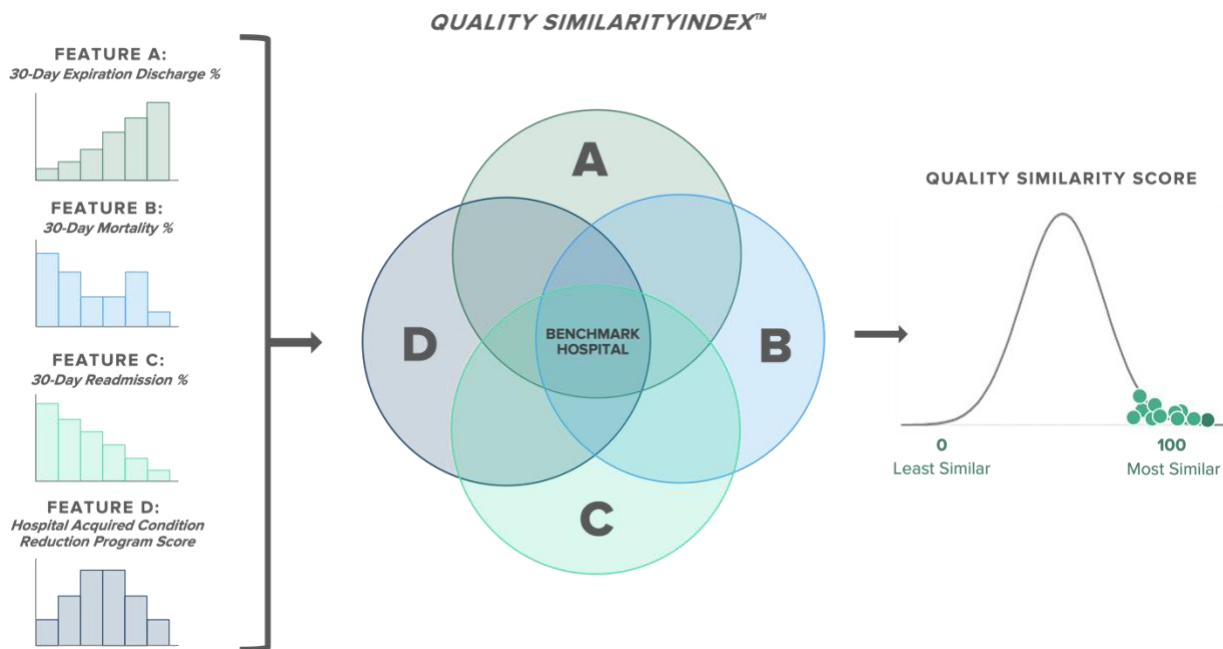
The **SimilarityEngine™** was developed using a machine-learning-based model that uses normalized Euclidean distance in multi-dimensional space. **SimilarityIndex™ | Hospitals** measures distance between hospitals with respect to numerous measures across five measurement categories: Quality, Outpatient Service Line, Financial, Patient Mix, and Market Share, the combination of which is referred to as Aggregate. (Figure 3).

Figure 3. Formula for Measuring Euclidean Distance

$$d(p, q) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2}$$

To generate each **SimilarityIndex™** (e.g., Quality, Financial), the features (e.g., 30-day mortality, 30-day readmissions) were normalized and equally weighted. The more features that are included in the **SimilarityEngine™**, the more challenging it becomes to identify similar hospitals, as the mathematical distance from the benchmark is likely to widen. In order to generate comparable results across disparate feature sets, the Index is normalized and bounded to a range between 0 and 100, with a Similarity Score closer to 1 being more similar to the selected hospital (Figure 4).

Figure 4. Development and Interpretation of a Similarity Score



SimilarityIndex™ | Hospitals Categories

Quality SimilarityIndex™

The **Quality SimilarityIndex™** incorporates expiration discharge volume percentages, 30-day mortality volume percentages, and 30-day inpatient, observations, and emergency department readmission volume percentages of all inpatient admissions sourced from the CMS Standard Analytic File, and the Hospital-Acquired Condition Reduction Program scores are sourced from the CMS Care Compare hospital data. The Care Compare data factor in a single claims-based composite measure of patient safety (CMS PSI 90) together with five chart-abstracted measures of healthcare-associated infections submitted to the CDC's National Healthcare Safety Network. The SimilarityEngine™ compares acute care hospitals with the selected Quality SimilarityIndex™ features.

Outpatient Service Line SimilarityIndex™

The **Outpatient Service Line SimilarityIndex™** incorporates outpatient healthcare claims distribution at the hospital level, inclusive of HCPCS and CPT codes sourced from Trilliant Health's national all-payer claims database. The SimilarityEngine™ compares acute care hospitals with the selected Outpatient Service Line SimilarityIndex™ features.

Financial SimilarityIndex™

The **Financial SimilarityIndex™** incorporates charity care, operating margin, adjusted discharges, and average inpatient service costs sourced from HCRIS for the most recent fiscal year, and blended commercial charges for the 65 outpatient shoppable services (i.e., CPT and HCPCS codes) identified by CMS as mandatory in hospital price transparency reporting, sourced from Trilliant Health's national all-payer claims database. Charity care was calculated as a percent of net patient revenue. Hospitals whose HCRIS filing reported operating margins below -90% and above 100% were considered outliers and therefore excluded from the index. Adjusted discharges is an aggregate measure of workload reflecting the sum of discharges and equivalent discharges attributed to outpatient services. The number of equivalent discharges attributed to outpatient services is derived by multiplying (x) admissions by (y) the ratio of outpatient revenue to inpatient revenue. Reported average inpatient service costs for the following service lines were included: Medicine, Surgery, Cardiology, and Orthopedic Surgery. The SimilarityEngine™ compares acute care hospitals with the selected Financial SimilarityIndex™ features.

Patient Mix SimilarityIndex™

The **Patient Mix SimilarityIndex™** incorporates the Charlson Comorbidity Index (CCI) of patients associated with each hospital, sourced from Trilliant Health's national all-payer claims database, and share of Traditional Medicare for each hospital and case mix index sourced from the HCRIS for the most recent fiscal year. The CCI consists of 19 conditions with an assigned weight between one and six to predict risk of death within one year of hospitalization for patients with specific comorbid conditions. The weights are summed to comprise the index. To determine an individual hospital's CCI, patients that were seen by that hospital were included in the calculation, including those without one of the 19 chronic conditions (thus factoring a score of zero). Because patients could have been treated at multiple facilities, an individual patient could be included in multiple hospitals' CCI scores. CCI was calculated using Trilliant Health's national all-payer claims database, and therefore reflects a mix of Medicare Advantage, Traditional Medicare, commercial, and Medicaid patients. Share of Traditional Medicare reflects a proportion of all fee-for-service Medicare discharges as a proportion of all discharges. A hospital's case mix index represents the average diagnosis-related group (DRG) relative weight for that hospital. It is calculated by summing the

MS-DRG weights for all Medicare discharges and dividing by the number of discharges. The SimilarityEngine™ compares acute care hospitals with the selected Patient Mix SimilarityIndex™ features.

Market Share SimilarityIndex™

The **Market Share SimilarityIndex™** incorporated market share for two separate categories: market share of all healthcare services delivered in the CBSA in which a hospital is located, and market share of all inpatient services delivered in the CBSA in which a hospital is located, sourced from Trilliant Health's national all-payer claims database and HCRIS for the most recent fiscal year. The SimilarityEngine™ compares acute care hospitals with the selected Market Share SimilarityIndex™ features.

Aggregate SimilarityIndex™

The **Aggregate SimilarityIndex™** reflects an equally weighted combination of features reflected in: Quality SimilarityIndex™, Outpatient Service Line SimilarityIndex™, Financial SimilarityIndex™, Patient Mix SimilarityIndex™, and Market Share SimilarityIndex™.

Table 1. Primary and Secondary Sources Associated with SimilarityIndex™ | Hospitals Features

SIMILARITY CATEGORY	FEATURE	DESCRIPTION	YEAR	SOURCE
QUALITY SIMILARITY	Expiration Discharge %	Admitted patients that died during an inpatient stay, prior to discharge, as a percentage of all inpatient visits	2021	CMS Standard Analytic File
	30-Day Mortality %	Admitted patients that died within 30 days following discharge from an inpatient visit, as a percentage of all inpatient visits	2021	CMS Standard Analytic File
	30-Day Readmission % (Inpatient, Observations, and Emergency Department)	Readmission of a patient within 30 days following initial discharge, segmented for inpatient, observation, and emergency department encounters, as a percentage of all inpatient visits	2021	CMS Standard Analytic File
	Hospital Acquired Condition Reduction Program Score	On an annual basis, CMS evaluates overall hospital performance by calculating Total Hospital Acquired Condition scores as the equally weighted average of scores on measures included in the program: One claims-based composite measure (CMS PSI 90) and five chart-abstracted measures of healthcare-associated infections, submitted to the CDC (Central Line-Associated Bloodstream Infection, Catheter-Associated Urinary Tract Infection, Surgical Site Infection for abdominal hysterectomy and colon procedures, Methicillin-resistant <i>Staphylococcus aureus</i> bacteremia, and <i>Clostridium difficile</i> Infection	FY 2022 ¹¹	CMS Care Compare, CMS Recalibrated Patient Safety Indicators, CDC National Healthcare Safety Network

SIMILARITY CATEGORY	FEATURE	DESCRIPTION	YEAR	SOURCE
OUTPATIENT SERVICE LINE SIMILARITY	HCPSC Codes used in the outpatient setting	Healthcare Common Procedure Coding System; codes based on the CPT to provide standardized coding when healthcare is delivered used to facilitate the processing of health insurance claims by Medicare and other insurers	2021	Trilliant Health national all-payer claims database
	CPT Codes used in the outpatient setting	Current Procedural Terminology codes; offer healthcare professionals a uniform language for coding medical services and procedures to streamline reporting, increase accuracy and efficiency	2021	Trilliant Health national all-payer claims database

SIMILARITY CATEGORY	FEATURE	DESCRIPTION	YEAR	SOURCE
FINANCIAL SIMILARITY	Blended Commercial Outpatient Charge Amounts for 65 Shoppable Services	The outpatient services for which CMS mandates hospitals report pricing information	2021	Trilliant Health national all-payer claims database, CMS Hospital Price Transparency program
	Charity Care	Free or discounted medically necessary health care that many hospitals offer to people who cannot afford to pay for treatment otherwise, calculated as a percentage of net patient revenue	Most recently filed	HCRIS
	Operating Margin	The difference between total net revenue and total expenses divided by total net revenue	Most recently filed	HCRIS
	Average Inpatient Service Cost (Surgery, Medicine, Cardiology, Orthopedic Surgery)	Average cost of inpatient services for surgery, medicine, orthopedic surgery, and cardiology	Most recently filed	HCRIS
	Adjusted Discharges	Aggregate measure of workload reflecting the sum of discharges and equivalent discharges attributed to outpatient services. The number of equivalent discharges attributed to outpatient services is calculated by multiplying admissions by the ratio of outpatient revenue to inpatient revenue.	Most recently filed	HCRIS

SIMILARITY CATEGORY	FEATURE	DESCRIPTION	YEAR	SOURCE
PATIENT MIX SIMILARITY	Share of Traditional Medicare	Fee-for-service Medicare discharges as a proportion of all discharges	Most recently filed	HCRIS
	Charlson Comorbidity Indicator	Consists of 19 conditions with an assigned weight between one and six to predict risk of death within one year of hospitalization for patients with specific comorbid conditions. The weights are summed to comprise the index	2021	Trilliant Health national all-payer claims database
	Case Mix Index	Calculated by summing the relative MS-DRG weight for each discharge, and dividing that by the total number of Medicare and Medicaid discharges in a given month and year	Most recently filed	HCRIS

SIMILARITY CATEGORY	FEATURE	DESCRIPTION	YEAR	SOURCE
MARKET SHARE SIMILARITY	Market Share – All Healthcare Services	Reflects the hospitals share of all claims-based healthcare encounters in the CBSA in which the hospital is located, capped at 90%	2021	Trilliant Health national all-payer claims database
	Market Share – Inpatient	Reflects the hospitals share of all inpatient encounters in the CBSA in which the hospital is located	Most recently filed	HCRIS

The Aggregate Similarity Category equally weights all the features that make up Quality Similarity, Outpatient Service Line Similarity, Financial Similarity, Patient Mix Similarity, and Market Share Similarity

Commonly Used Acronyms

- **CBSA:** Core Based Statistical Area
- **CCI:** Charlson Comorbidity Index
- **CDC:** Centers for Disease Control and Prevention
- **CMS:** Centers for Medicare and Medicaid Services
- **CPT:** Current Procedural Terminology
- **HAC:** Hospital-Acquired Condition
- **HACRP:** Hospital-Acquired Condition Reduction Program
- **HCAHPS:** Hospital Consumer Assessment of Healthcare Providers and Systems
- **HCPCS:** Healthcare Common Procedure Coding System
- **HCRIS:** Healthcare Cost Report Information System
- **M&A:** Mergers and Acquisitions
- **MS-DRG:** Medicare Severity Diagnosis Related Groups
- **PSI-90:** Patient Safety Indicators #90
- **SAF:** CMS Standard Analytic File

ILLUSTRATIVE EXAMPLE: Cleveland Clinic

Unlike traditional ranking or rating methods, SimilarityIndex™ | Hospitals allows users to benchmark a single hospital based on the similarity categories: Quality, Outpatient Service Line, Financial, Patient Mix, and Market Share, and Aggregate (i.e., an equally weighted index that factors in each category). SimilarityIndex™ | Hospitals indexes 2,159 U.S. short-term acute care hospitals.

While Cleveland Clinic is ranked fourth by *U.S. News & World Report*, receives five stars from CMS, and rates among top 50 U.S. hospitals according to Healthgrades, it has a “B” Hospital Safety Grade from the Leapfrog Group, ranks 562 of the nation's most socially responsible hospitals by the Lown Institute, and is not included in Merative’s Top 100 Hospitals list.^{12,13,14,15,16,17} The variation across existing hospital “benchmarks” and “raters” reinforces the need to redefine benchmarking based upon objective data and mathematical principles rather than national benchmarking based on subjective data and interpretation (i.e., “perceived prestige”). While Cleveland Clinic is undoubtedly one of the nation’s top healthcare facilities, its “peers” vary across SimilarityIndex™ measurement categories.

Quality SimilarityIndex™ reveals that **Cleveland Clinic’s** most relevant peers (in terms of quality only and as determined using CMS data) are University of Michigan Health System, Christ Hospital, UCSF Medical Center, UC Davis Medical Center, and Tampa General Hospital (Figure 5). When additional measures beyond quality are factored in (e.g., case mix, operating margin, inpatient market share), the list of most similar hospitals changes.

Figure 5. Five Most Similar Hospitals to Cleveland Clinic, by Quality SimilarityIndex™

QUALITY SIMILARITY	SIMILARITY SCORE
University of Michigan Health System	93.0
Christ Hospital	92.5
UCSF Medical Center	90.0
UC Davis Medical Center	89.9
Tampa General Hospital	89.3

When additional measures beyond Quality are factored in, the list of most similar hospitals inevitably changes. **Quality SimilarityIndex™**, **Outpatient Service Line SimilarityIndex™**, and **Financial SimilarityIndex™** reveal that **Cleveland Clinic’s** true peers are Vanderbilt University Medical Center, University of Michigan Health System, AdventHealth Orlando, Evanston Hospital, and Norton Hospitals (Figure 6). The more features that are included (i.e., Quality, Outpatient Service Line, and Financial), the more challenging it becomes to identify similar hospitals, as the mathematical distance from the benchmark is likely to widen, evidenced by the decreased similarity scores compared to Quality alone. Notably, the University of Michigan Health System is the only hospital that appears on both outputs of top five hospitals.

Figure 6. Five Most Similar Hospitals to Cleveland Clinic, by Quality SimilarityIndex™, Outpatient Service Line SimilarityIndex™, and Financial SimilarityIndex™

QUALITY + OUTPATIENT SERVICE LINE + FINANCIAL SIMILARITY	SIMILARITY SCORE
Vanderbilt University Medical Center	79.9
University of Michigan Health System	76.9
AdventHealth Orlando	75.4
NorthShore University HealthSystem - Evanston Hospital	74.4
Norton Hospitals, Inc	72.4

Aggregate SimilarityIndex™ reveals that **Cleveland Clinic's** true peers are Vanderbilt University Medical Center, Duke University Hospital, Strong Memorial Hospital, The University of Kansas Hospital, and the University of Utah Hospital (Figure 7). Notably, there is not a single hospital that appears consistently when the included measures are changed. Whereas Similarity Scores closer to 100 reflect a hospital that is more similar to the selected benchmark (i.e., Cleveland Clinic) hospital, the more measures that are included for comparison, the more challenging it becomes to identify similar hospitals, as the normalized Euclidean distance from the benchmark is likely to widen. Said differently, since comparing hospitals in Aggregate includes a greater number of measures than comparing Quality alone, we see that the distance (or the degree of similarity) between the benchmark and its most similar peer decreases from 93.0 in Quality to 66.9 in Aggregate.

Figure 7. Five Most Similar Hospitals to Cleveland Clinic, by Aggregate SimilarityIndex™

AGGREGATE SIMILARITY	SIMILARITY SCORE
Vanderbilt University Medical Center	66.9
Duke University Hospital	64.9
Strong Memorial Hospital	63.2
The University of Kansas Hospital	62.5
University of Utah Hospital	61.4

Our DataLab's SimilarityIndex™ | Hospitals visualizer allows health economy stakeholders to compare a user-selected benchmark hospital to the 10 most similar hospitals according to the Quality SimilarityIndex™ and Aggregate SimilarityIndex™. By changing the composition of the Quality SimilarityIndex™, a user can see how a benchmark hospital's "true peers" often vary greatly depending on the chosen metric.

Use [SimilarityIndex™ | Hospitals visualizer](#) to select a benchmark hospital of your choice to index.

Acknowledgements

From whiteboarding the initial concepts and programming the similarity model to selecting the features relevant to comparing hospitals, the development of the SimilarityEngine™ and SimilarityIndex™ | Hospitals is the product of significant interdisciplinary collaboration and efforts of many of our colleagues behind the scenes.

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The health economy's first machine-learning-based SimilarityIndex™ and its various applications, from markets to hospitals, would not have been possible without the leadership and vision of Hal Andrews.

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¹⁰ 2022 Methodology Lown Institute Hospitals Index for Social Responsibility. (2022). Lown Hospitals Index. Retrieved from <https://health.usnews.com/best-hospitals>

¹¹ The HAC scores are associated with FY 2022 and reflects a payment adjustment applies to all Medicare FFS discharges from October 1, 2021, to September 30, 2022, when CMS pays hospital claims.

The CMS PSI 90 measure's performance period is July 1, 2018, to December 31, 2019. The CDC NHSN HAI measures' performance period is January 1, 2019, to December 31, 2019. These performance periods are shorter than the previously finalized 2-year performance periods for the measures. In response to the 2019 Novel Coronavirus (COVID-19) public health emergency, CMS is excluding all calendar year (CY) 2020 data from future HAC Reduction Program calculations.

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