VOCAL Algorithm Delivers Data Driven Unique Insights for Providers

The digital front door strategy in healthcare is experiencing an exciting time, starting to gain traction to empower newly engaged healthcare providers and consumers. Both patients and providers are now seeking new ways to evaluate and compare services and care givers in increasingly unbiased and insightful ways. As an industry, we must move beyond the "internet patient review paradigm." At Perception Health we understand the nuances of provider comparisons and want to share our insights from one of the most comprehensive data sets in the US to further advance data driven discussions that influence continual caregiver and healthcare consumer improvements.

The inherent flaws within current provider comparisons often stem from a lack of objectivity, contextualization, or a breadth of comparable dimensions and the oversight of applying weighting options to account for unique circumstances.

Through the use of percentiles and comparisons within the confines of consistent but specific specialties and disease states, Perception Health can provide data-informed views across five important dimensions to expand a customer's view of current provider comparisons. These dimensions include Volume, Outcomes, Charges, Access, and Loyalty otherwise referred to as Perception Health's Physician VOCAL scores.

VOCAL Defined

The VOCAL score is a percentile-based algorithm comparing providers with similar specialties treating the same disease state. Perception health defines a disease state based on a collection of data elements such as diagnosis codes, services rendered including therapeutic treatments, diagnostic studies, laboratory, or pathology events that when combined reflect the clinical presentation or pathway of specific diseases or medical outcomes.

If a provider has a Volume score of 72, she has a claims Volume greater than or equal to 72% of the other providers in the US like her (similar specialty treating the same disease). A single provider can have multiple VOCAL scores, each related to a different disease state or surgical procedure. A cardiologist could have different VOCAL scores for different disease states such as atrial fibrillation, heart failure, and acute myocardial infarction. This cardiologist may have high scores for heart failure and acute myocardial infarction, but average scores for atrial fibrillation.

- **V:** The **Volume** metric is a measure of the number of visits to a particular provider. The more patients a provider sees, the higher they score on the Volume metric.
- **O:** The **Outcome** metric is a measure of how long the patients of a provider are in a particular disease state. The shorter the time the patient is in a particular disease state, the higher the Outcome score.
- **C:** The **Charges** metric measures the amount of charges per patient related to the disease state. Lower sums of charges lead to a higher Charges score.
- **A:** The **Access** metric is based on primary care physicians referring to specialists and measures the time between a referral from a Primary Care Provider (Family Medicine, Internal Medicine non-specialist, and General Practice) to the first visit to the given specialist. The shorter the time between the primary care and specialist visits, the higher the Access score.
- **L:** The **Loyalty** metric is a measure of the percentage of patients the physician sends to one particular hospital based on taxonomy definitions for NPIs. The more loyal the provider is, the higher the Loyalty score.

The Outcome, Charges, and Access scores for a provider are patient-based: calculated at the patient level, then averaged together for the provider's score. The raw scores are scaled to the percentile-based score at the patient level first. This is to see how a particular patient's care compares to other patients with the same disease. It is also scaled at this point to normalize any outliers.

The provider Outcome, Charges, and Access scores are then calculated by averaging the scores of every patient the physician touched for the specified disease state. This includes all patients, regardless of what the patient/provider relationship was. For example, if one orthopedic surgeon saw a patient for an orthopedic consult and another orthopedic surgeon ended up performing the surgery, both orthopedic surgeons are counted as having seen the patient.

Once the raw scores are determined for each field, the scores are scaled using a percentile algorithm, calculating how the physicians compare to one another when ranked by the raw scores. The patient-based scores are first scaled against all other patients in the set to help with normalization and to see how a particular patient's experience compares with those of other patients with the same disease state dealing with the same types of providers.

The default algorithm scales against all similar providers/patients in the entire United States.

Contextualization and Weightings

In order to gain additional insight into physician comparisons it is important to consider multiple dimensions as opposed to a single dimension. Restricting the view to any single dimension limits the insights to be gained and used in making decisions about physician selection or encouraging enriched conversations amongst providers. For example, many internet-based provider comparisons today are based on curated responses and pay for promotion rankings or patient satisfaction ratings. Patient satisfaction, while important, is certainly not the only factor that should be shared and considered when comparing physicians.

Each of the VOCAL factors may vary in terms of importance to patients, clinical leadership, and health system administration; therefore, Perception Health's VOCAL physician matching algorithm allows a user to weigh each factor individually to identify an ideal match for a range of business or clinical needs.

For example, adjusting the weights of the algorithm can allow a user to find a specialist for a patient that best suits the patient's individual preference, identify a new physician to recruit to a hospital or physician group, or even determine the best strategy for managing physician networks and insurance costs.

Use Case Example: Knee Joint Replacement VOCAL Scores for Orthopedic Surgeons

The first step for calculating VOCAL scores is to define a disease state and the types of providers desired. As an example, the process for looking at knee joint replacement VOCAL scores for orthopedic surgeons is below. First, every person who had an HCPCS procedure code of knee joint replacement (in the table below) in 2020 is identified. Then data is pulled for all medical encounters of the patient from July 1, 2016, until December 31, 2020.

CPT Code	Description
27447	Arthroplasty, knee, condyle, and plateau; medial AND lateral compartments with or without patella resurfacing (total knee arthroplasty)
27445	Arthroplasty, knee, hinge prosthesis
27486	Revision of total knee arthroplasty, with or without allograft; 1 component
27487	Revision of total knee arthroplasty, with or without allograft; femoral and entire tibial component

HCPCS procedure code of knee joint replacement in 2020.

Next, the top specialty types treating these patients are identified as those on which to focus. One such specialty is Medicare Specialty 20 - Physician/Orthopedic Surgery. Below is a sample of the results of running the VOCAL algorithm with Medicare Specialty 20:

Name	V	O	C	A	L	VOCAL
Jefferson Morrison	72	71	50	94	94	381
William Shell	92	86	77	44	70	369
Matthew Beal	70	89	32	81	94	366
Ginger Holt	7	94	81	76	100	358
Robert Otto	62	80	46	97	64	349

Sample of the results of running the VOCAL algorithm with Medicare Specialty 20.

Each provider receives a score for each metric. Those scores are then combined for a total VOCAL score for the provider. Each metric can be weighted differently based on the situation to help the user identify the ideal physician.

For example, if a care coordinator is looking for an orthopedic specialist to meet their patients' needs and an insured patient is looking for an orthopedist, they may not be too concerned about the Charges if they have already reached their deductible for the year. They may also be willing to sacrifice Access for better Outcome. Further, in desiring an experienced provider, they may be interested in those with a relatively high Volume. Lastly, they may not be concerned whether a provider is Loyal to a particular hospital, as long as they are receiving optimal care.

Therefore, his preferred weighting might be as follows:

Volumes	4
Outcomes	5
Charges	2
Access	2
Loyalty	1

VOCAL Physician Scoring Algorithm

Weighting these scores will allow the user to find the optimal provider to fit their patient's needs. Results can also be limited to the geography which the patient is willing to travel for care. Within the patient's Core Based Statistical Area, the following are the best matches:

Name	V	O	C	A	L	Weighted VOCAL
Jefferson Morrison	72	71	50	94	94	1,025
William Shell	92	86	77	44	70	1,110
Matthew Beal	70	89	32	81	94	1,045
Ginger Holt	7	94	81	76	100	912
Robert Otto	62	80	46	97	64	998

In this case, Dr. Shell is this patient's optimal provider.

Considerations for Improvement

Perception Health continues to conduct research to determine if the current algorithm can be improved along each dimension.

Research is ongoing to discern if additional factors can be included for influence into a provider's Outcomes including specifics such as complication rates which can include the advancement or avoidance of patient disease to an acute exacerbation, and/or unexpected medical events related to the disease state. It may also need to include gaps in care or incorporation of broader accepted national quality scores.

Additional factors presumed to impact patient Outcome include the severity of the disease state, the timeliness or chronology of care, and even some aspects of patient satisfaction. The place of service can also be utilized to account for appropriate weighting of acute events that occur only in inpatient settings.

A factor that could impact a patient's time to Access is the provider's percentage of new patient visits. For providers that bill office visits, the percentage of office visits that are with new patients versus established patients can be calculated. If a provider is seeing new patients, it would be expected that he/she would be more accessible than a provider who is not.

Perception Health is also exploring improvements to the Loyalty score including how loyal the physician is to a network/community of NPIs rather than loyalty to the NPIs top hospital relationship.

Currently Perception Health displays quality metrics from CMS Hospital Compare and MIPS programs which are well known. While the values and scoring are not determined by Perception Health, it may be useful to consider including these as inputs into the outcomes methodology as we seek to continually improve the view of data-backed provider comparisons.

Concluding Remarks

Perception Health has created a unique algorithm that assists in the selection and comparison of physicians. A multidimensional view across Volumes, patient Outcomes, sum of Charges, time to Access, and Loyalty helps to go beyond the oversimplified view of just patient satisfaction while also accounting for unique circumstances associated with importance. VOCAL can find the optimal provider for patients, referring physicians, Accountable Care Organizations, health insurance plans, self-insured employers, physician recruitment professionals and more.

Note: Special credit goes to Katie Kruzan, Perception Health's mathematician for some of the early work associated with VOCAL comparisons.

For more information please visit: perceptionhealth.com