PerceptionHealth®
Predictive Intelligence

VOCAL Algorithms Identify the Best Providers Based on User Preference

March 28, 2019

Abstract

This paper is designed to communicate the value of physician measurement based on factors important to the patient, health systems, and payers for selection of physicians by specific diagnosis and procedures.

The Federal Government is focused on taking the US Healthcare system from Volume to Value through the Triple Aim in Healthcare: Cost, Quality, and Access. The **VOCAL scoring algorithm** is a percentile-based algorithm comparing providers with similar specialties treating the same disease state. 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, congestive heart failure, and acute myocardial infarction.

Perception Health has created a physician scoring and matching algorithm that can assist in the selection of providers based on the metrics of claims **Volume**, patient **Outcome**, sum of **Charges**, time to **Access**, and **Loyalty**. The scores can be weighted differently depending on the preference of the user. VOCAL can find the optimal provider for patients, referring physicians, Accountable Care Organizations, health insurance plans, self-insured employers, physician recruitment professionals and more.

Findings

The VOCAL scoring algorithm is a percentile-based algorithm comparing providers with similar specialties treating the same disease state. If a provider has a Volume score of 72, she has a claims Volume greater than or equal to 72% of the other providers 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, congestive heart failure, and acute

myocardial infarction. This cardiologist may have high scores for congestive heart failure and acute myocardial infarction, but average scores for atrial fibrillation.

Each of the VOCAL factors varies 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 particular situation. 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.

- **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 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 any particular hospital. The more loyal the provider is, the higher the Loyalty score. This metric can be customized per hospital. For example, a Family Medicine physician sends 30% of her patients to Hospital A, 60% of patients to Hospital B, and 10% of patients to Hospital C. The physician's generalized Loyalty score is 60%, but her Loyalty score for Hospital A is 30%.

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

compared 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. 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. Another option is to scale against a smaller area; however, the results should be in the same rank order.

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 2017 is identified. Then data is pulled for all medical encounters of the patient from July 1, 2016, until June 31, 2018.

Procedure	Description
27447	Arthroplasty, knee, condyle, and plateau; medial AND lateral compartments with or without patella resurfacing (total knee arthroplasty)
27446	Arthroplasty, knee, condyle, and plateau; medial OR lateral compartment

PerceptionHealth®
Predictive Intelligence

Next, the top 10 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:

Provider Name	V	O	C	A	L	VOCAL
Kenshi Vashion	73	84	87	11	75	330
Max Tommin	13	13	8	28	65	127
Zek Mcdaniel	100	31	35	51	35	252
Sara Miller	52	31	36	99	47	265
Andrew Jones	6	4	50	65	99	224

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 an insured patient is looking for a cardiologist, he may not be too concerned about the **Charges** if he has already reached his deductible for the year. He may also be willing to sacrifice **Access** for better **Outcome**. Further, in desiring an experienced provider, he may be interested in those with a relatively high **Volume**. Lastly, he may not be concerned whether a provider is **Loyal** to a particular hospital, as long as he is receiving optimal care. Therefore, his preferred weighting might be as follows:

Volume	9
Outcome	10
Charges	2
Access	4
Loyalty	0

PerceptionHealth®
Predictive Intelligence

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

Provider Name	V	O	C	A	L	Weighted VOCAL
Peter Winbush	79	96	68	67	51	2075
Zachary Smith	94	90	54	34	18	1990
William Deresh	85	87	52	29	43	1855
Thomas Gooncki	77	90	22	46	96	1821
Iris West-Allen	98	66	63	38	37	1820

In this case, Peter Winbush is this patient's optimal provider.

Possible Improvements

The VOCAL algorithm continuously evolves. In particular, research is underway to improve how the algorithm calculates scores for **Outcome** and **Access** by combining with other Nationally accepted quality scores (MiPS, HEDIS, Physician Compare, etc.).

Some factors presumed to impact patient **Outcome** are the severity of the disease state and timeliness of care. However, these factors vary greatly among patients and are hard to standardize against large populations. Research is being conducted to refine this measure by including patient satisfaction scores in the equation.

One unaccounted 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 would be more accessible than a provider who is not.

PerceptionHealth®
Predictive Intelligence

Another factor which could be accounted for in the **Access** metric is the scheduling template of the provider, and the number and type of appointment slots the provider has available in a given day, week, or month. In theory, having more appointment slots available would lead to more provider accessibility.

Concluding Remarks

Perception Health has created a physician scoring and matching algorithm that can assist in the selection of providers based on the metrics of claims **V**olume, patient **O**utcomes, sum of **C**harges, time to **A**ccess, and **L**oyalty. The scores can be weighted differently depending on the preference of the user. **VOCAL** can find the optimal provider for patients, referring physicians, Accountable Care Organizations, health insurance plans, self-insured employers, physician recruitment professionals and more.