Evidence-Based Medicine and the New Role of Analytics: Introducing the TAO Index from ODG

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Executive Summary

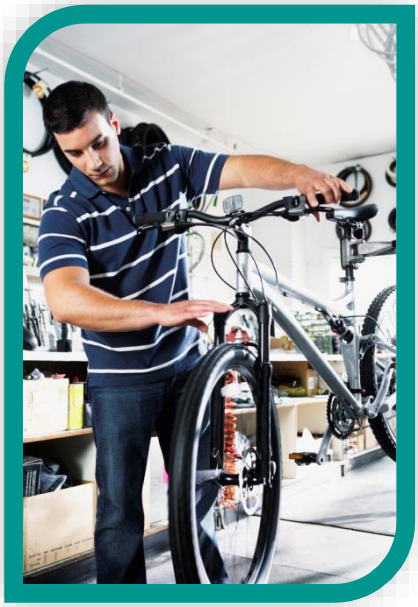
As health plans and guideline publishers know, the problem with evidence-based medicine (EBM) is that there is not enough of it. Randomized, double-blind, placebo-control clinical trials (RCTs), and meta-analyses of those trials are costly and time-consuming. They do not exist for many routine, low-cost interventions with little incentive to perform the study, or treatments like surgery where rounding out proper experimental and control groups is both difficult and an ethical concern.

A guiding principal for ODG has always been that conservative treatments should be approved even where RCTs are not available, as long as lower levels of evidence, including cohort studies, case-control series, and unstructured reviews, show support. Having collected and curated millions of medical claims with real-world outcomes data over twenty years, ODG has next proposed that *data-driven medicine* can serve to bypass manual review in the approval process by fast-tracking treatments with the best relative return-to-health performance.

This paper introduces the Treatment Analyzer on Outcomes, or TAO Index. TAO is an advanced new metric leveraging claims analytics to bolster traditional literature review. TAO is designed to facilitate early access to treatments that deliver the most sought after of outcomes, and a best post-injury measure of success – which correlates to health, quality of life and lower costs.

In an unusual position to lead, workers' comp has a unique advantage over other benefit plans given that its most important outcome measure is numeric, objective, and consistently logged.

Modeled from approximately five million medical claims, the TAO Index is the Yin to EBM's Yang, working in concert to optimize health and financial outcomes; reducing friction, treatment delay, and managed care costs. TAO puts claims payers, healthcare providers, and managed care companies in the position to expedite good patient outcomes and quality care, with minimal waste.



Welcome to the future of healthcare delivery.

Introduction

Fifteen years ago, evidence-based medicine (EBM) was in the concept phase in workers' comp systems. Whether injury occurred at the loading dock, or on a weekend biking trip, decisions at the doctor's office were generally based on the same three pillars: personal observation, experience, and tradition.

With a sample of one, little mind was paid to *evidence-based* medicine.

Doctors did not have time to stay on top of all the science all by themselves. Evidence-based guidelines have largely changed that. Insurance plans like UnitedHealth and commercial publishers like ODG, MCG Health, and UpToDate, spend millions of dollars conducting systematic literature searches, weighting medical studies on their design and quality, and developing actionable clinical guidelines. The results are impressive, with comprehensive, user-friendly decision-support products making evidence-based care recommendations to clinicians online and in electronic medical record software systems.

Healthcare providers can now outsource the research component of evidence-based medicine, spreading the costs among thousands of users. Health outcomes have improved as a result, especially in workers' comp, as regulatory agencies began adopting evidence-based guidelines at the state level. States that use ODG, like Texas, North Dakota, and Oklahoma, have seen total costs decline by about half, as return-to-work outcomes improved dramatically.

The problems with evidence-based medicine

The biggest problem with EBM is that there is not enough of it. For many treatments, academic evidence is low in quantity, quality, or both. The gold standard for publishers is the use of randomized controlled clinical trials (RCTs), and meta-analyses of those trials, but these studies do not exist for many routine, low-cost interventions, or invasive treatments where rounding out an experimental and control group for sham surgery is not easy or ethical.

Guidelines that opt to use only the RCTs simply find a dearth of qualifying evidence, and the inevitable result is that most treatment recommendations fall to a designation labeled “I,” for “Insufficient Evidence.” Once categorized as “Insufficient Evidence,” treatment recommendations become a consensus of authors, naturally recommending procedures they are most comfortable with from their personal experience and specialty training.

Called “confirmation bias,” it is the tendency to interpret, favor, and recall information in a way that confirms one's preexisting beliefs, trade, schooling or hypotheses, while giving less consideration to alternatives. It may have served our species well from an evolutionary standpoint, when we had to process information quickly or risk being eaten by predators, but is generally not synonymous with evidence-based medicine or the scientific method.

To account for evidence limitations, the leading commercial guidelines take a pragmatic, multidisciplinary approach, allocating the most weight to RCTs and meta-analyses. In the absence of RCTs and meta-analyses, the guidelines use progressively lower levels of evidence, including cohort studies, case-control series, and unstructured reviews. In a world of imperfect knowledge, this type of evidence hierarchy allows the best *available* evidence to trump lower levels and drive guideline recommendations. It has worked well in ODG state adoptions and national implementations.

Treatments *should* be approved on a trial basis with lower levels of evidence if they are conservative (non-invasive, low risk, and low cost). They facilitate recovery, allowing the human body to do what it does: heal with time. A good medical system is not one where providers must fight for the first dollar spent on physical therapy (PT), chiropractic care, or alternative medicine.

The secondary problem with EBM is that too much time and money are spent on enforcement, with labor-intensive managed care initiatives taxing each case at every conceivable level. Much of that is frictional waste and can adversely impact outcomes when it delays care in situations where prior approval is required, often while indemnity payments are made in the interim.

A disconnect quickly develops between patient and workplace, a precursor to the "disability mindset" that follows. Importantly, one of the best ways to ensure good outcomes for claimants is not only that they get the right care *eventually*, but that they get it *quickly*.

The perfect metric

In the age of big data, healthcare is where the potential is highest.

That bike accident is not the first of its kind. There are millions of like-incidents by like-people that received like-diagnoses and like-treatments logged in electronic data warehouses. Thanks to more than a decade of improved data capture by payers, a tour de force lies in those warehouses. Workers' comp is unusually poised to lead, capturing a unique outcome measure.

The key: Return-to-Work (RTW).

In every claim file lies a numerical assessment of the success of the medical regimen. When patients return to work, they have demonstrably returned to health. It is a simple, meaningful, objective outcome-measurement. Return-to-work means getting your life back. Nothing correlates better with positive health outcomes, quality of life, and low costs. Leveraging this tremendous advantage, ODG has begun the process of revolutionizing the way we think about choosing and assessing treatments-

a) The workers' comp industry tracks time away from work closely, creating an incredible metric for post-injury success. It is objective, numeric, and logged on virtually every file.
b) We can compare this metric on like-files, with different treatments.
c) We can score treatments based on their relative performance.
d) We can design a system to fast-track approval for those treatments with the best relative performance using our near-perfect metric, even where high-quality studies do not exist, and we can do so objectively, systematically, and scientifically.
e) Patients will then receive quality care quickly, less time and money are lost in friction, and doctors are not frustrated in fighting for every treatment option.
f) We can use machine-learning and analytics to automatically and systematically update this system as new claims data is logged, thereby making it even "smarter."
g) This analytics component can fill the many holes left by evidence-based medicine.

As the French say, "Voila."

Treatment Analyzer on Outcomes (TAO) Index

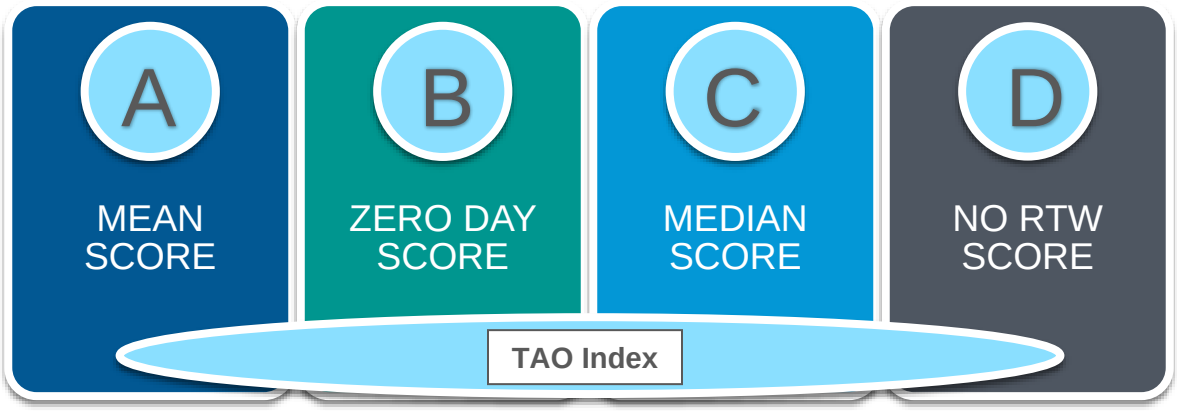
The release and rapid adoption of the ODG Risk Assessment Score (RAS) in 2015 and 2016 inspired the ODG analytics team to begin looking at return-to-work metrics at the treatment level, rather than claim level as with RAS. The premise: Nothing is a bigger trigger for both financial and medical problems than delayed recovery. Excessive utilization, inadequate reserves, opioid overuse, abuse, and dependence, poor health outcomes, litigation, failed back syndrome, ruined lives all usually have one thing in common: missing a return-to-work benchmark.

Meet or beat the benchmark, and these problems rarely arise.

The TAO Index synthesizes four component RTW metrics into a single actionable, consumable score at the medical code level (CPT-ICD), and for treatment

categories, comparing relative performance for each with all other treatments historically performed on every diagnosis.

TAO component scores include the following metrics-



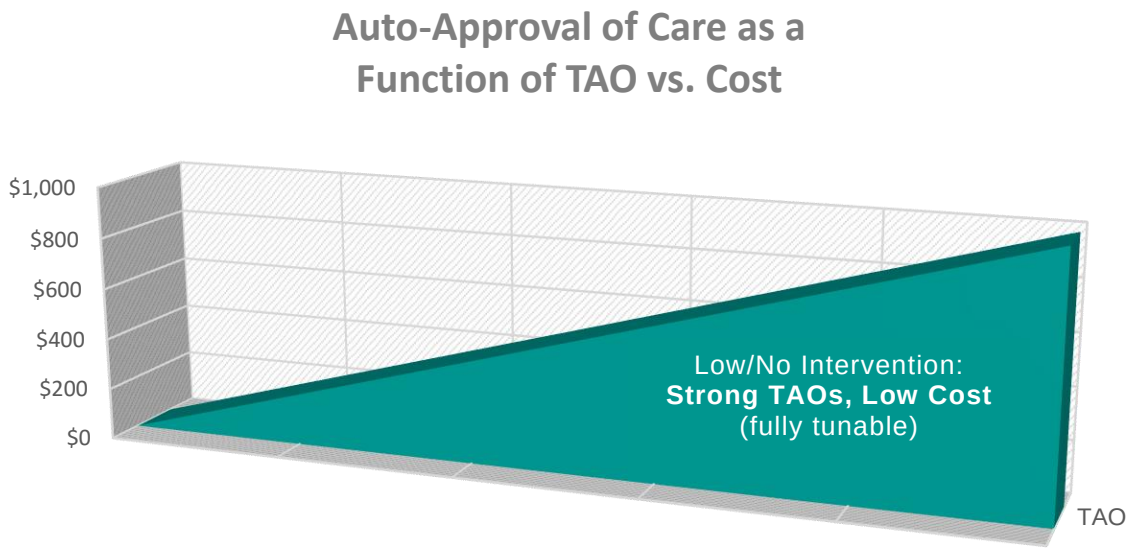
Relativity is critical, as any one metric for any one treatment in a vacuum is impossible to scale. Instead, it is the performance of each treatment across thousands of occurrences, risk-adjusted and inside a growing database of millions of claims, that reveals the significance.

A) MEAN SCORE is a proprietary measure using case-adjusted mean RTW performance for each treatment when compared with all other treatments.
B) ZERO DAY SCORE measures the percentage of cases receiving each treatment that do not miss any work at all (a positive), relative to all other treatments.
C) MEDIAN SCORE is a measure using case-adjusted median RTW Performance for each treatment when compared with all other treatments.
D) NO RTW SCORE measures the percentage of cases receiving each treatment that are never able to return to work (a negative), relative to all other treatments.

When combined into TAO, the baseline score is set to zero. Thus, treatments receiving a negative TAO signal worse than average RTW performance, while a positive TAO is better.

Although the component scores are not published, the absolute values of each *are published*, giving millions of new data points to users and integrators. As the database gets larger, smoothing out statistical noise, each metric shows good correlation to the others, meaning they resonate. Treatments that perform best in multiple categories are *amplified*. They stand out.

The science of medicine has never been more precise. Combined with ODG measures for incidence, frequency, and cost, TAO is designed to auto-approve care, reducing friction and fast-tracking treatments with the best relative return-to-work performance. The TAO logic uses a relational dynamic recommending approval of increasing costs as the TAO increases. The better the relative RTW performance, the more treatment can be auto-approved.



For better relative RTW Performance (via increasing TAO Index), claims payers can auto-approve treatment without excessive managed care and/or manual clinical reviews.

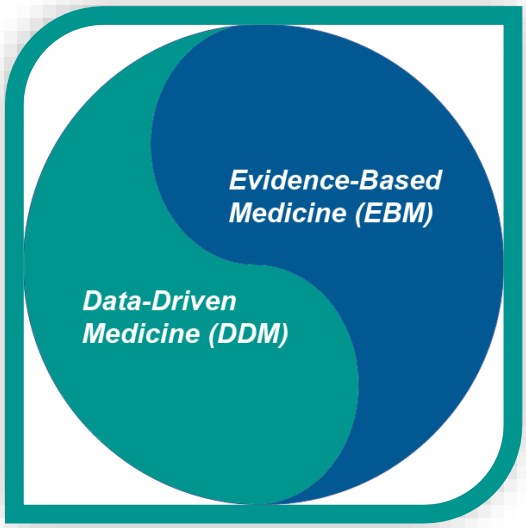
TAO can also alert clinicians, adjusters or managed care staff to which treatments perform better on a relative basis, automatically, and in real-time, in systems they are already using. For example, every treatment plan, bill or preauthorization request can be annotated by line item.

Request Line	RELATIVE PERFORMANCE and TAO Index
1	93.09%
2	91.09%
3	82.58%
4	72.84%
5	72.43%
6	64.18%
7	55.02%
8	54.21%
9	51.75%
10	46.42%
11	39.64%
12	38.60%
13	36.36%
14	35.93%
15	22.38%
16	9.89%
17	2.11%
18	-0.18%
19	-4.56%
20	-16.09%
21	-16.85%
22	-45.59%
23	-47.57%
24	-65.07%
25	-66.57%
26	-78.74%
27	-85.08%
28	-96.24%
29	-96.58%
30	-99.28%

Outcomes-based decision making in the clinician's office is increasingly important as the healthcare system begins a massive transition towards value-based care. Health systems are being rewarded not by how much treatment they provide, but how well it works. There is no better actionable, consumable measure for return-to-health than that afforded by a workers' comp dataset, synthesized into a single consumable score now known as TAO.

In “The coming age of data-driven medicine” (© BMJ Publishing Group), authors Nigam Shah and Jessica Tenenbaum emphasize the significance of these concepts in medicine today-

> *The time is ripe for medicine to embrace Big Data, to usher in the age of data-driven medicine—and to truly enable proactive, predictive, preventive, participatory, and patient-centered health. Data-driven medicine will enable the discovery of new treatment options based on learning from the trends hidden among the diagnoses, prescriptions, and discharge summaries of millions of patient encounters logged by clinical practitioners…This is an exciting time when medicine begins utilizing massive amounts of data to discover patterns and trends, and to make predictions in a manner that is a mainstay of web-scale computing.*



Bringing it all together

Evidence-based guidelines must serve a dual mandate: (a) safeguarding access to quality care, while (b) limiting excessive/inappropriate utilization, protecting patients from harm.

In a perfect world, RCTs would abound on every intervention, and each would be incorporated into decisions at the point of care. In the real world, that is far from the case. RCTs are often inconclusive or absent, and a back-end utilization management process is required to ensure evidence-based medicine is applied for reimbursement. While not perfect, it has resulted in tremendous benefits, including reductions in the misuse or overuse of opioids, benzodiazepines, spinal fusions, and disc replacements.

The missing component has been analytics. The first role of data-driven medicine is to fill the gaps. The other, more transformative role may be to challenge existing journal literature with millions of actual case-data, the real story of the success or failure of treatments "in the wild."

From a process standpoint, approving care is easier than denying it. Administrators just need a reliable tool to do it quickly and safely, without jeopardizing outcomes. The TAO Index promises to expedite approval for quality care and reduce waste from unnecessary prior, concurrent or retrospective medical reviews. Patients get treated quickly with the very interventions proven to correlate with the most important of outcome measures, return-to-work.

TAO can also help in limiting inappropriate utilization, flagging those treatments best suited for manual review, employing clinical resources to leverage both the traditional approach, using evidence-based guidelines and RCTs that focus on successful treatments in isolation, and TAO data that expose ineffective therapies and treatment patterns in real-world scenarios.

The word Tao in Chinese signifies “the way,” “path,” or more loosely, a “doctrine” or “principle.” It is the intuitive knowing of life, and the natural order and its universal awakening. A symbol of Taoism is the familiar Yin and Yang, which are complementary forces that interact to form a dynamic system in which the whole is much greater than the sum of the assembled parts. This is the future of medical management and healthcare delivery, with analytics as a complement to traditional evidence-based literature review by a multidisciplinary medical board.

Evidence-based or data-driven medicine? The path forward is not one or the other, but both, like the Yin and Yang, complementary and supporting each other dynamically to deliver optimal patient outcomes, quality care quickly, and minimal waste in a near frictionless system.

For a consultation regarding TAO solutions, contact the ODG Helpdesk at odghelp@mcg.com.