

BEYOND RISK



SCORES

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PRIORITIZING HEALTH CARE INTERVENTIONS WITH PREDICTIVE ANALYTICS

Current health care system structures are increasingly focused on a balance of improving quality and decreasing costs. In the United States, aspects of the Patient Protection and Affordable Care Act (ACA), the Medicare Access and CHIP Reauthorization Act (MACRA), the development of accountable care organizations and electronic health record (EHR) meaningful use initiatives are all examples of programs set up to improve health care quality and cut costs. In other countries with universal health care, these same two priorities are present in the allocation of funding and resources.

Simultaneously, new provider-related teams are being formed to support these initiatives. These groups have teams of care managers who oversee patient care and determine who should receive interventions and how each intervention should be personalized for a given patient. The teams are set up in a variety of ways, ranging from doctor-led organizations, entities in which nurses oversee the care of patients and other office-run arrangements. Interventions refer to a number of different contact points with patients, including phone calls to discuss health and lifestyle, as well as more intensive in-person care and observation.

These care management teams need answers to the following questions:

- Which interventions are worth it?
- Who should receive interventions?
- Do the benefits outweigh the costs?
- How are outcomes measured?

With the increased emphasis on outcomes in health care, how these questions are addressed is more important than ever.

THE OLD WAY OF THINKING

One of the common methods of determining where to intervene to reduce costs is by examining patients' risk scores. In the health care industry, a risk score is a number that is assigned to patients based on their demographics



and diagnoses—a numerical representation of how costly they are expected to be compared to the average patient. One of the common applications of using risk scores is to adjust premium payments. A baseline (or average) risk score is assigned a value of 1.0. A patient expected to cost half as much as the average patient would have a risk score of 0.5, and a patient expected to cost twice as much would have a risk score of 2.0.

Although risk scores are a good way to gain an understanding of a patient’s anticipated health care costs relative to the rest of a population, they still have flaws that keep them from giving an accurate picture of who is “impactable.” In health care, impactable refers to the extent an intervention can affect the health and costs of a patient.

One of the flaws of risk scores is that there are many factors other than diagnosed conditions that contribute to a patient’s costliness, which are not reflected in the risk score. One example is a patient’s level of compliance with a doctor’s orders or with taking medication. A patient who is not compliant will likely cost more than a patient with the same conditions who does comply because of unmanaged complications. Another example is a patient’s level of moral hazard. Behaviors such as frequent, unnecessary trips to the emergency room, frequently receiving care from specialists, and the network status of providers seen cannot be captured in a risk score. Behavioral factors play a large role in a patient’s costs.

Another shortcoming of risk scores for determining with whom to intervene is that little to nothing can be done to lower the costs of some conditions. End-stage renal disease (ESRD) is an example of a costly condition for which little can be done to alter the costs of care.

Although a patient with this condition may have a high risk score, targeting the patient for intervention will not aid in lowering the patient’s dialysis costs.

Risk scores also fail to take into account programs already implemented for specific populations. In health insurance, the term “population” refers to a group of patients who share the same health insurance coverage or are managed by the same organization.

The types of management from population to population vary. For instance, a population that has seen effective management of diabetes will have different characteristics from one that focuses on managing patients with chronic obstructive pulmonary disease (COPD). The risk scores for a population will be the same whether diabetes or COPD is targeted, because risk scores simply flag conditions. However, how impactable a patient is will vary based on the already-existing programs. COPD patients in a population that already manages patients with COPD will be less impactable than COPD patients in a population that does not.

NEW TECHNOLOGY, NEW TECHNIQUES

Traditional methods for determining who would be most in need of intervention, such as risk scores, give some insight but fall short in many ways. However, technology allows for the ability to model other aspects of a patient’s health and costs with relative ease. Data about the patients in a population is more readily available and includes information that previously was not known. An example of this is the information contained in EHRs. Vitals, lab results and other details that are more specific than what is coded in medical claims data are now available.

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Sophisticated modeling software allows for new and complex statistical methods to be applied when analyzing a patient's information. These models allow for a patient's behaviors and conditions to be projected into the future through predictive analytics in a way that was not previously possible. For example, a patient's care patterns can be modeled. The ability to identify that a patient unnecessarily overutilizes certain services, and apply that knowledge to determine the level of effectiveness of outreach to the patient, is key for cutting costs. Similarly, medication use can be tracked and factored into a patient's overall expected costliness.

One of the most important aspects of a patient that can be modeled through predictive analytics is the level at which an intervention can cut costs. Not all high-cost conditions have the same level of costs that can be cut through intervention. Predictive modeling allows for the examination of costs that can be cut based on a patient's behaviors, pattern of care and conditions. Other patients with similar health care characteristics can be observed in order to help make informed predictions on how impactable a given patient might be in the future. The analysis of costs over time for an entire population increases the amount of information available about the likely future cost profile of a patient. In turn, patients who have a cost profile that is predicted to have potential savings as a result of an intervention can be targeted. The ability to know with greater certainty whether intervening with a given patient will affect end costs—and having an estimate of what the maximum impact could be—is a tremendous step forward when managing patients. The cost savings value of an interven-

tion can be known and considered before it takes place, leading to improved decision-making abilities and better allocation of time and resources for patient interventions.

A CASE STUDY

This case study looks at a health care management organization focused on managing emergency room visits and inpatient admissions. The organization enters into arrangements with an insurer to manage an entire population, but it is only liable for certain categories of service. The arrangements it enters into stipulate that it receives a fixed per-member payment for all emergency room and some inpatient services used by the population. This organization uses sophisticated predictive models to optimize its interventions by targeting the most impactable patients.

Almost all insurers with which this organization contracts want to know about return on investment (ROI), but not all of them are willing to do a properly-designed study to measure ROI. One insurer was willing to create a study, however, and came up with an experiment design to measure the impact the organization has on a population. For this contract, the insurer ranked what it considers to be the 50,000 most impactable patients from a large population, with the intention of giving half of the top-ranked patients to the organization to manage and keeping the other half to manage and intervene. Sometime into the contract, there will be a comparison of which group is less costly to determine if the organization's strategies and ability to manage patients is actually superior to the insurer's management.

The insurance company used two main patient characteristics when determining who it considers to be most

impactable: the risk score and the presence of a chronic condition. As previously discussed, the application of a risk score, although helpful, does not give the full picture of a patient's health. There are other condition-specific and behavioral aspects that need to be taken into account when determining how impactable a patient is. The presence of a chronic condition also does not encompass enough information about a patient to determine the level of possible cost impact. The 50,000 patients were split evenly between the insurer and the organization for risk score, presence of a chronic condition, age, gender, race and geographic location. Many cost impact questions were left unanswered, such as the ability to affect the patients' behavior and health care costs.

Because of its prior work with predictive models for targeting intervention in its other populations, the organization knows there are more items that need to be taken into account when determining how impactable a patient is. The data for the new population was run through custom predictive modeling algorithms to determine the predicted possible level of impactability for each patient. Then the model results were employed to determine whether the population the insurance company assigned the organization is at least as impactable overall as the population the insurance company is managing and using as a control group.

Through the use of predictive modeling, a comparative value between the two populations was estimated. Because the contract between the organization and the insurer is set up in such a way that the organization needs to cut more costs than the insurance company while still managing patients, it is crucial to have a population that is impactable. Although the management of the populations is still ongoing and the outcomes will not be compared for quite some time, the use of custom predictive analytics in addition to the original risk score and condition comparison methodology has helped ensure that the final outcome comparison is fairer.

CONCLUSION

Care management and the reduction of health care costs are extremely important. Companies and providers are scored on health outcomes and decreases in cost trends. The levels of reimbursement and profitability are affected by these outcomes. Because of the cost of intervention and limited resources, focusing management efforts on patients who will benefit most from the intervention is critical.

The use of predictive analytics allows for an informed decision when determining with which patients to inter-

vene. Unlike more traditional methods, custom predictive modeling allows for information about a patient's behavior and care patterns to be taken into account when determining the future impactable level. Where patients go to receive care, their levels of drug compliance, the frequency with which they receive care from specialists and the network status of their providers all affect the costs that can be reduced for a patient—and all can be modeled through predictive analytics.

Additionally, predictive analytics helps with assessing more specific cost categories, such as the costs that can be reduced through intervention. Because not all patient costs associated with a condition are impactable, it is important to examine the impactable costs when deciding whether to conduct an intervention. Predictive modeling can base results on these potentially impactable costs, leading to a much more accurate sense of who can benefit from intervention and by how much.

Another way the use of custom predictive analytics may lead to better outcomes than the use of more traditional methods is by incorporating the information of the whole population when determining future costs. When modeling a population, patients naturally will have things in common (existing care management programs, where they receive coverage, geographic location, and age or financial status). Capitalizing on these similarities can better predict the future costs of a patient. Deeper similarities, such as the combination of conditions or care patterns, can be found in other patients within the population. In turn, their historical impactable spends can be used to help inform the model of what an original patient's cost will be. The ability to apply detailed information from similar patients leads to significantly more accurate predictions.

Despite tools like risk scores being able to provide high-level insight into a patient's expected future costs, modern technologies and methodologies lend themselves to even greater insight. With a growing number of provider-related teams trying to cut the costs of populations below certain thresholds, the ability to identify the most impactable patients is more crucial than before. Through custom predictive analytics, the level of impact on a patient can be more accurately and robustly estimated, and more educated intervention decisions can be made, allowing for groups to meet their financial goals. ■

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