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Five Essentials for Evaluating Predictive Modeling Solutions

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Distinguishing Differences of Predictive Modeling Solutions

Predictive modeling solutions draw on payers' vast stores of information to identify and characterize health risk and forecast future needs for medical resources. In many settings these solutions have been able to demonstrate a measurable return-on-investment (ROI) for three key areas of a health care payer's operation: care management, underwriting, and benefit design.

For care management—especially disease management, which is taking up more and more of payers' resources—the best predictive modeling solutions facilitate improvements and generate ROI by more effectively identifying those members who will benefit most, as well as the most effective strategies for working with them.

For underwriting and benefit design, predictive modeling provides more accurate and timely insights into prospective risk for both current and potential members. The result is premium rates that better balance pricing pressures with bottom line concerns, as well as benefit designs geared more closely to the risk of a particular population.

Given these advantages, there's been an explosion of predictive modeling solutions on the market, each featuring different methodologies and technology designs. The following information helps payers differentiate among those solutions by detailing the five highest priority concerns and suggesting ways to probe those concerns in a Request for Proposal (RFP).

How Predictive Modeling Works: A Brief Primer

Ideally, a predictive modeling platform begins by identifying key markers of risk—clinical conditions and prior events that distinguish one patient from another. It then translates the series of markers into a risk score, which is a prediction of a patient's future medical costs and utilization. Actuaries and underwriters use the risk scores of individual members to make assumptions about the overall risk of a particular population in order to design benefits appropriate to that population or to set appropriate premium rates. Clinicians and other care management staff use the risk scores to target members and study the data driving the risk scores to develop appropriate interventions.

The process usually involves four steps:

1 Data Preparation: The predictive modeling solution collects, evaluates, and integrates member enrollment and claims data.

2 Identification of Risk Markers: The model then applies grouping and risk marker identification algorithms; ideally, grouping occurs by episodes of care and the algorithms include categories of pharmaceutical treatments.

3 Creation of a Risk Profile: The modeling solution summarizes the presence of clinical risk markers to create a risk profile.

4 Calculation of Future Health Risk: Finally, the model assesses overall risk by adding assigned risk weights for all the identified markers. For example, congestive heart failure might receive a base score for an episode of care, but added weighting could come from a variety of high acuity events, medical or surgical contacts, and/or use of certain drugs, all of which modify the risk score.

Predictive modeling works best when payers use both extremely accurate risk scores and the ability to dig beneath the scores to gain in-depth insight into their population. It is that insight—and the ability to use it effectively—that delivers the ROI.

With this understanding of the process in mind, any RFP for a predictive modeling solution must, at a minimum, check for five essential qualities:

1. Accuracy
2. Transparency
3. Interoperability
4. Support for diverse and changing operational needs
5. Industry credibility

Requirement One: Accuracy

Every year health plans work hard to understand what health resources their membership will need and to find ways to either help members stay healthier and so demand fewer or less expensive resources—or to adjust premiums and benefit designs appropriately. An accurate predictive modeling solution removes much of the uncertainty from the analysis. For this reason, payers need to have a good sense of the accuracy of each of the platforms under consideration before purchasing.

How do they get that sense?

To begin with, payers should ask for the model's R-squared measurement, which is the commonly accepted measurement of a predictive modeling solution's accuracy. Any reliable vendor will know their product's R-squared measurement.

In addition, vendors should be able to demonstrate both the sensitivity and specificity of their solution, especially as regards case management programs. High sensitivity indicates *positive predictive value*: an ability to identify most of the people who would benefit from a care management intervention. Specificity or *negative predictive value* is the ability to limit the number of false positives or people who would not benefit from a care management program.

The sensitivity and specificity questions are especially important if one considers payers' need to assign resources where they're needed most and to avoid wasteful efforts.

Consider two members, both with Type I insulin-dependent diabetes. One is religious about getting an annual exam, had no acute episodes in the prior year, and has a BMI that indicates an effectively managed diet. The other patient misses exams, is clearly overweight, and had a number of acute episodes and emergency room visits in the past year. The solution has to identify both of these members because of their underlying condition, but also be able to differentiate among the other data points so the health plan can decide how or if to intervene differently with the two members. In other words, the solution should be able to differentiate actionable medical risk from medical risk that is high, but is either stable or not actionable.

Requirement Two: Transparency

Understanding if the solution can differentiate among the data points is intimately linked to the second key requirement in choosing a predictive modeling solution: transparency.

For care management programs, transparency means clinicians can look underneath the risk scores all the way to the level of individual claims so they can devise a proper intervention or have an appropriate conversation with a member. A risk score of 52 is not particularly helpful for care management nurses; they need a way to understand what's driving the risk. For example, why do the two diabetics above, with the same underlying diagnosis, have very different risk scores? To this end, member profiles should include a listing of all episodes of care and the key services involved in their treatment.

For underwriting and benefit design, underwriters and actuaries relish transparent solutions, because they allow the experts to validate their modeling. This is not just important

as a way to ensure improved rates and designs, but it's also a negotiating tool in that it can help payers convince employer clients that proposed premiums are rooted in valid numbers and clinical rules. Similarly, being able to clearly demonstrate why 20 of 2,000 employees are driving a majority of costs can help convince employers that they would benefit from a disease management program.

This need for transparency means RFPs should ask whether the model is a rules-based or neural net solution. In general, payers should look for rules-based models, because they match data patterns to clear clinical rules that identify such things as the disease, type of episode, co-morbid conditions, medical events, and drug treatments. In a good rules-based model, payers should be able to easily identify all of these risk markers—not just the risk score.

In contrast, so-called black box algorithms are not clinically based and are technically complicated so you have to possess real data mining expertise to understand how a specific risk score has been compiled. This robs clinicians of many of the advantages that predictive modeling should deliver for care management programs. Black box algorithms also make it difficult for payers to properly check—for themselves or for their employer clients—the validity of their models.

Requirement Three: Interoperability

Because there are a number of applications and data sources that support medical management and underwriting programs, any predictive modeling solution should easily operate with these programs and sources.

More specifically, the RFP should probe whether the predictive modeling solution supports all relevant database technologies, so it can load the appropriate data quickly and reliably into the model's data mart. The RFP should also check if the solution can create supporting databases and export them to the appropriate care management, underwriting, and actuarial applications.

Vendors should also explain how the solution brings together data points from various sources to decide on an intervention point for care management programs—or how it works with business and financial data, as well as risk analysis tools to help hone underwriting practices and benefit design.

Finally, one of the key underlying questions in the area of interoperability is how a solution defines and groups care—by procedure, diagnosis, or by fully fleshed out episodes of care. Episodes of care are a much more effective way to group care for predictive modeling because they group claims into clinically homogenous groups which take into account all of an individual's underlying clinical factors, not simply a diagnosis or severity indicator.



For Information: 800.765.6696 | insight@ingenix.com
Ingenix, Inc. | 12125 Technology Dr. | Eden Prairie, MN 55344
www.ingenix.com

Requirement Four: Support for diverse and changing operational needs

The fourth requirement is the ability to support and adapt to diverse and changing operational needs. This requirement contains a number of key components.

First, the solution must be adaptable enough to work with typical operational issues that payers face and generate predictions as often as business needs dictate. For example, many employers require that renewal rates and designs be submitted 90-120 days in advance, and so rather than look at the risk in the next 12 months (as is common with many models), the model should be able to look at the risk 6-18 months out. These longer prediction horizons also can help underwriters better match premiums appropriately for the time they are actually underwriting. From another perspective, a three-month model is valuable for intensive care management strategies that target complex, higher-risk patients.

Second, the data used in the solution must be fresh, reliable, and accessible. In particular, it should be refreshed on at least a monthly basis so it gets into the stream as soon as possible for renewal periods, which can vary from client to client.

Finally, the solution must be flexible enough to accommodate different data availabilities (e.g., medical only, pharmacy only, medical and pharmacy combined). It should also be able to incorporate emerging data sources that can help payers hone their risk predictions, such as lab results.

Requirement Five: Industry credibility

The fifth and final requirement is industry credibility in terms of the power of the solution and the follow-up support offered.

One of the most obvious markers of industry credibility is market penetration. The RFP should probe whether others use the solution and if they will speak to its value.

In addition, credibility is not just rooted in the solution itself, but in the support the vendor offers, because predictive modeling is changing and improving at a rapid rate; upgrades and support require a team that fully understands

not just the technology, but how health care works. The RFP, therefore, should check whether the support offered includes an integrated team that brings together IT, clinical, actuarial, and underwriting experts.

Conclusion

Despite its emerging reputation as a valuable and must-have tool for health care payers, predictive modeling is like any advance: payers must choose wisely and use the modeling appropriately. Ineffective predictive modeling—either through poor models or data—wastes valuable health plan resources and has a negative impact on members in an increasingly consumer-focused industry.

However, if payers become sophisticated and knowledgeable purchasers of predictive modeling solutions by understanding how to assess the offerings and apply the technology once they've purchased it, predictive modeling can realize the promise of using information to genuinely and significantly improve value in health care.

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