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Predictive model focuses on morbidity

New program quantifies risk in terms that get attention

Although health risk assessments (HRA) are an important tool in determining the overall risk profile of individuals as well as populations, most healthcare policy experts agree that simply administering an HRA, without any follow-up interventions, will have little effect on modifying that risk. However, BioSignia, a healthcare technology company based in Research Triangle Park, NC, contends that when HRA data are translated into meaningful and actionable information for the individual, the HRA process can produce a positive effect on clinical and financial outcomes.

In fact, BioSignia has developed a risk-prediction model designed to do exactly that. The tool, called Know Your Number (KYN), uses a process that the company calls synthesis modeling to quantify an individual's risk of developing chronic, preventable, obesity-related diseases such as diabetes, chronic obstructive pulmonary disease, and heart disease. In addition, KYN calculates what modifiable factors are contributing to that risk so that individuals can take steps to improve their overall risk profile.

The approach has attracted a diverse range of customers, ranging from life insurance companies interested in obtaining more accurate risk-prediction models to health plans and employer groups focused on controlling spiraling healthcare costs by reducing risks. In addition, new applications of KYN are being offered directly to the consumer with the idea that motivated individuals will act on the data—even in the absence of provider recommendations or formal wellness interventions.

Program takes a direct approach

Since its founding in 1996, BioSignia has focused on developing predictive applications that can be applied to healthcare and health-related outcomes—especially mor-

bidity outcomes—according to **Timothy Smith, PhD**, BioSignia's CEO. The company does this by using its proprietary synthesis modeling approach, which essentially synthesizes the research from many different evidence-based studies in order to develop multivariate disease risk-prediction models. "It took us seven years to develop our technology and to get it completely validated," says Smith. "We have been marketing [our programs] for about the past two years."

The company's flagship offering, the KYN program, begins by taking the user through an evidence-based clinical assessment that is similar to what a person might go through in the doctor's office, he says, noting that the assessment includes questions related to demographic data, family history, medical history, medications, and some basic lab values. "It is a very brief but targeted assessment," says Smith. "We are interested in getting to the point of being able to predict morbidity onset—the likelihood that [the individual] will have a disease within a given period of time."

This focus on onset of disease is a key difference between the KYN program and a traditional HRA, notes Smith. "Typical HRAs are really based on technologies that are focused on mortality or the likelihood of death occurring in a group of people who have the same kind of characteristics," he says. "And while they are often used to determine the general morbidity of the population, it is a very indirect way of looking at that."

KYN reports quantify risk

The clinical assessment or questionnaire that the patient or provider fills out on the front end of the KYN process can be accomplished in a number of different

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ways, depending on the venue, says Smith. For example, in a doctor's office, the patient may begin filling out a form in the waiting room, but then a clinician may take over the process as the patient goes through a physical exam and undergoes various lab tests. In other settings, the data may be entered directly into a computer. However, in both cases, the data are ultimately sent electronically to the BioSignia server for analysis.

The result of this process is a report that quantifies a patient's risk of developing an array of chronic diseases. And this information is further broken down into components, including the percentage of risk that the KYN algorithms have determined is modifiable and how much of that risk is related to each one of the patient's risk factors.

The KYN reports can be used alone or in conjunction with targeted interventions, but in both cases, Smith notes that studies have confirmed reduced risks and lower healthcare costs. "We found that people who just [undergo] KYN with no intervention—their costs go down," he says, explaining that it is natural for people to share their KYN reports with their physician. "We think that is directly related to the fact that reports like this are very useful when put into the hands of a physician, and very communicative when given directly to the individual."

When groups of patients who underwent only the KYN assessment were compared with groups who underwent KYN and intervention, the intervention groups experienced greater reductions in risks and healthcare costs, but Smith points out that it is highly unusual for HRAs to produce any effect without follow-up intervention.

Risk estimates get attention

Employer groups with established health promotion programming are a key customer group for the KYN approach, according to Smith. For example, Springfield, OH-based International Truck and Engine Corporation first took advantage of KYN when the company launched a fitness initiative in January 2006, explains **Robin Baver**,

MD, the organization's medical director. The idea was that employees could take the KYN assessment before and after going through the fitness program so that the results of that effort could be quantified. However, Baver explains that the enthusiastic response from employees convinced the company to offer KYN to employees on an ongoing basis, with or without the fitness initiative.

"When employees see that they have a 31% risk of having an MI in the next five years, that gets their attention," says Baver. "It stresses their achievable [level of] risk, and tells them that if they change a particular risk factor, how they can affect their risk of disease."

Taking the KYN assessment is completely voluntary for employees, says Baver, but she points out that 490 individuals—representing about 40% of the work force—have completed the assessment at least once, which is a much higher participation rate than the company has achieved with previous HRA-based efforts. In addition, she has data showing percentages of change on key metrics regarding 100 employees who took the KYN assessment in 2006 and then again a year later. These employees lost an average of 5 lbs and reduced their waist circumference by an average of half an inch, says Baver. In addition, she notes that the percentage of employees at their LDL target goal increased from 68% to 89%, and employees at their HDL goal increased from 76% to 90%.

Tracking capabilities appeal to executives

Kelsey-Seabold Clinic, a large multispecialty group practice based in Houston, started using KYN in 2003 in its executive health program in response to a growing demand from customers for the kinds of tracking capabilities that the program offers. "We would have people coming in with spreadsheets, and they would ask us to update them because they were tracking their cholesterol and [other health metrics]," says **Rebecca Leal**, director of corporate, executive, and wellness programs. Leal notes that the executive health program is designed

to offer a higher level of service, including extensive diagnostic capabilities and more time with the physician.

“What we liked about this was, unlike most HRAs, it doesn’t just rely on self-reported answers. It focuses on the medical aspects of the patient,” says Leal, explaining that the questions cover family history, medical history, and specific lifestyle behaviors.

Although Leal does not have any aggregate data to share, she indicates that there have been dramatic improvements in terms of clinical metrics, as well as risk reduction in a number of patients who have taken repeated KYN assessments over time. In fact, the program has been so well received in the executive health program, that Kelsey-Seabold is now offering it to employers as part of its off-site wellness program.

Although there are no current plans to offer KYN through Kelsey-Seabold’s network of PCPs, the organization is gearing up to offer the program directly to consumers via the company’s Web site. “People will be able to log on and purchase a KYN assessment,” says Leal,

noting that people who have not had a recent physical will be able to come into the clinic to get the required measurements and lab work completed. “We will get their purchase order, put a KYN profile together, and then schedule a health coach session with them on the phone.”

Health plans are a hard sell

Currently, KYN users include health plans, DM companies, group practices, employer groups, and insurance firms, but Smith acknowledges that the program has been a harder sell to health plans than the other entities. “In general, the use of predictive modeling has not been as warmly received by health plans as it has been by DM companies or by employers. And a lot of that has to do with the fact that health plans tend to be more concerned with the people they have who are already sick rather than the ones who might soon be sick,” he says. “An employer or a physician is more motivated to head things off early and to address potential outcomes as soon as possible.” ■