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Predictive modeling identifies patients most in need of care

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Third-generation model/ s artificial intelligence considers uniqueness of each chronic disease population.

Predictive modeling offers a tremendous opportunity for healthcare. With healthcare expenditures exceeding 15% of the gross domestic product (GDP), and the aging baby-boom generation entering their "high-utilization years," strategies for targeting healthcare resources toward those who could benefit most have become a strong necessity for a health plan's economic survival.

Although numerous disease management guidelines exist to adequately treat patients, the real challenge of disease management is to identify and stratify those patients who could most benefit from interventions. As resources are in short supply, effectively using those limited resources delivers the best clinical and economic value to both the member and the payer.

The first generation of predictive models used basic patient demographic and clinical data (e.g., age, gender, diagnosis). These models provided a simple form of risk adjustment, but were limited by the simplicity of their design as well as the limitation of variables that could be obtained and utilized. Now, we take for granted our access to fast personal computers, broadband Internet, and wireless connections, but for much of the last 20 years, problems in data access, format and timeliness presented significant obstacles for predictive models to identify and stratify plan members.

The second generation of predictive models utilized a much broader set of member data, including both demographic and clinical data. This helped to paint a more accurate picture of a member's condition. Some researchers took advantage of the increasing data access and developed risk adjustment techniques that could be applied to healthcare issues. These risk adjustment methodologies were able to classify or group patients into risk categories (e.g., Ambulatory Care Groups-ACGs), allowing for easier analysis and management of these patients. Although groupers offered a measurable advantage over the first generation of modeling, they still suffered from problems of specificity and sensitivity that often led to unnecessary, ineffective or missed interventions for patients.

The third generation of predictive models, developed in very recent years, builds upon the previous two iterations, while expanding their sophistication. The advantage of this new generation of modeling is based on three key characteristics: 1) It can incorporate any type of variable in its analysis, 2) It includes multiple models and is able to utilize them as if they were variables, and 3) It actually learns from the data as it is analyzed and adjusts the overall model accordingly. Some researchers call this type of software model behavior, "artificial intelligence."

Using these third-generation predictive models provides great benefit to organizations trying to manage their members who have chronic diseases. Not only are they able to more accurately identify members,

but the models adapt to the information sources available to each payer. In addition, they are able to identify and express the uniqueness of the population under study and adjust the model accordingly. In fact, these third-generation models identify the best model(s) to apply, and in what combinations, to best predict which members require closer monitoring. All of this leads to higher levels of predictive modeling, improved care for members and return on investment for health plans.

Use of third-generation predictive modeling at one institution resulted in the following:

Diabetics-15% reduction in blood sugar values, 40% reduction in admissions, 26% reduction in ER visits, and a 50% reduction in costs.

Asthmatics-67% reduction in admissions, 75% reduction in ER visits, and an average of $800 per member in savings.

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