

Innovation does not wait for evaluation. Since September 2006, after the latest SOA study was launched, the Johns Hopkins ACG Team introduced both an NDC-based pharmacy only predictive model (Rx-PM) and one that includes both pharmacy and diagnostic information (DxRx-PM). With any model variant, prior cost information may be included. Performance of these models is comparable to similar models in this latest SOA study which shows, fundamentally, that statistical performance as measured by model fit ( $R^2$ ) is largely determined by the number of different input data sources and calibration to the specific databases of interest.

The credibility of models does not solely rest on regression fit. It is possible to precisely fit models to any dataset by adding more variables and manipulating these variables mathematically to assume a “perfect” form which could be logarithmic, exponential, quadratic, or some other transformation. The problem with such approaches is two fold. First, the more convoluted the model, the less sense it will convey to clinicians and other decision makers who are supposed to take action. Second, highly fitted models will change with the dataset, often from year to year, which can introduce considerable instability. Instability in terms of payment can adversely impact health plans and care providers.

The ACG System stresses clinical “sense” and simplicity, offering both actuarial cells and several regression-based predictive models. The ACG approach for assessing concurrent risk includes about 100 commonly used ACG actuarial cells that can be easily manipulated in a spreadsheet. We are gratified by the latest SOA study results that show, although ACG actuarial cells are simple and easy to use, they are still strong performers when compared with much more complex regression-based approaches. In real world applications, ACGs have been used to distribute millions of dollars over many years to the satisfaction of payers and those responsible for care. Additionally, the ACG predictive models have been used for the pre-emptive identification of high risk cases for disease management interventions. For modeling in these instances, where the outcome of interest is more like a diagnostic test (high risk or not), there is a different class of evaluation statistics that includes sensitivity, positive predictive value, and the receiver operating characteristics curve (ROC).

Unless augmented by data from other important sources such as health risk appraisals or electronic health records, most models will perform similarly. However, as noted in the introduction to the current SOA report, there are other important considerations that warrant attention in selecting a predictive model. Some areas of special importance include:

### **Transparency and Credibility**

Models are fully transparent when the component variables and their associated coefficients are listed and fully explained. Models are credible when they have been independently validated and subject to scientific peer review. There is an extensive literature on ACGs and transparency is our hallmark.

### **Clinical Utility**

Co-morbidity is the key to understanding health risk and the ACG System contains multiple clinically-derived markers that are descriptive of the clinical conditions and morbidity profile of the member. The SOA report lists the ACG System as a top performer when evaluated by disease category.

### **Flexibility and Ease of Use**

ACGs support the full spectrum of concurrent and prospective risk applications with minimal data requirements. Whether the application is financial or clinical, ACGs can be applied “out of the box” using the offered weights or can be adapted for specific purposes. ACGs maximize available data by offering models based on diagnosis data only, pharmacy data only or both diagnosis and pharmacy data sources.

### **Support and Documentation**

The ACG System is grounded on over a decade of successful applications and continuing research and innovation. ACGs are the subject of numerous research articles and extensive user documentation that can serve as a fundamental text on the science of risk adjustment. The ACG System has always supported individual users in successful applications and engages the overall user community for both education and continuing improvement and innovation.