SOCIETY OF ACTUARIES

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Population Risk Management..
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1. Find the members that represent the target population for risk management. This population could range from "all diabetics" to "members who have disease markers but who were low-cost in the prior twelve months". These members are found from the traditional sources of medical claims and pharmacy data, together (sometimes) with self-reported data (Health Risk Assessments). The key to the data is operationalizing it, because the database needs to be updated regularly. Disease definitions are widespread in the industry, or can be obtained from vendors.

2. Identify risk factors. Some risk factors are well-known to actuaries (age, gender, geographic region, plan of benefits, etc.). Other risk factors are behavioral—is the member who has a heart condition on the appropriate treatment regimen. For example, and does the member comply with the treatment regimen (as evidenced by prescription fills and regular physician visits)? What makes this area of analysis so exciting is the volume of transactional data collected about members (and providers) by the average health plan. To date, this data has tended to be used for risk management in aggregate, rather than granular form. Nevertheless, there is considerable scope, limited only by the creativity of the user, to link different data and variables to create a profile of the member.

3. Relate the dependent (predicted) variable to the independent variables. At its most simple, this could be an application of a technique that every actuary is familiar with—multiple regression. In a simple model, the member's propensity to consume resources in the following period, (paid claims) is related to independent variables age, gender, number of co-morbidities and number of therapeutic classes (of prescription drugs). Standard multiple regression techniques will assign significance values, as well as coefficients, to the independent variables.

4. Apply the model to an independent data set. Based on the values of the independent variables, each member is "scored" or assigned a relative risk rank for the predicted variable (in this case, total cost in the following period). If test data sets are available, then different models can be tested against actual data and models can be optimized.

Typical Results

Consider a recent case study. For this study, we evaluated members of a 270,000-member regional HMO over a two-year period, to identify those who are currently low-cost consumers but who were at risk of becoming high cost in the future. For this HMO, we identified approximately 60% of the members who met two criteria: (1) members were continuously enrolled over the two-year period, and (2) Members were "low cost" (less than $2,000 of expense in the base period). The result of the analytical process (similar to that above) was a ranking of members according to their probability of experiencing high costs in the projection year. When tested against actual plan data for the target year, approximately 40% of the highest-ranked members (0.5% of the database) experienced the predicted event. The incidence of high-cost events in the entire low-cost population, by comparison, was 8%.

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The low cost/high risk members identified in the database had a total of 160 bed days per thousand members per year in 1999—their "low cost" year. In the year 2000, the year that they were predicted to be at high risk for becoming high cost, that same patient population had a total of 1,400 bed days per thousand members, an increase of over 700%.

Of course, identification is only the first step in an effective population risk management program. One objective of risk management is reducing costs, so identification must be followed by an effective intervention. Knowing that John Doe is at high risk for a diabetes crisis in 2002 is useless, unless we can take action to prevent that crisis from occurring. The critical first step, however, is to identify those members who are at-risk for incurring high health costs. The second step in population risk management is determining effective and efficient intervention strategies to prevent the crisis and the costs—both financial and human—that such a crisis entails. We will follow up this article with a second on intervention results in a future issue.

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Footnotes

1) Example data are from a typical healthplan; all commercial members; high-cost is defined as claims incurred in excess of $5,000 annually—approximately four times the plan average. Approximately 1% - 2% of members fit the definition.