DxCG Likelihood of Hospitalization Model Generates Superior Results

Anju Joglekar, PhD
Senior Scientist
December 14, 2007

Promoting Fair and Efficient Health Care
Business Problem I
Current Case Management ID Method

Primarily, find people already in the hospital

Arrange for services to achieve earlier release and to avoid readmission

Promoting Fair and Efficient Health Care
Business Problem II

How to Prioritize Cases to Manage

- Traditional Method is to use
  - Prior costs
  - Prior admission
  - Length of stay for a prior admission
- Some DxCG clients use a prospective DCG model in combination with the above traditional approach
DxCG Developed Likelihood of Hospitalization (LOH) Model to Improve Case Management Outcomes

- Identify individuals at risk of hospitalization and optimize their health status through coordination of care
  - In an effort to prevent avoidable admissions
- Prioritize number of cases based on case management resource capacity
- Identify “actionable” cases
  - Use criteria to include or exclude cases for review and case management
Model Overview

• The model assigns each person a probability of admission in the next 6 months
  • Those with the highest risk (e.g., the top 1%) are considered first for case management
A “Real Time” Model

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/05</td>
<td>Baseline Period</td>
</tr>
<tr>
<td>6/30/06</td>
<td>Prediction Period 6 months</td>
</tr>
<tr>
<td>12/31/06</td>
<td>--- Input Data --- 12 months*</td>
</tr>
</tbody>
</table>

*As it would look on June 30, 2006 with no claims run out

Promoting Fair and Efficient Health Care
Working with Model Outputs

- The model gives a number between 0 and 1 for each person
  - This is the likelihood of admission in the next 6 months
  - Members can be “rank-ordered” from the lowest to the highest likelihood
Comparing LOH with Other Means of Identification

• Our research indicates that the LOH model has a higher rate of identifying people who are likely to be hospitalized than any one or combination of traditional methods:
  • Prospective DCG model
  • Prior year cost
  • Prior year history of admission with Length of Stay greater than 5 days

© 2007, Urix®, Inc.
Combined Three Indicators

- In the Kaiser data for CY2005, DxCG
  - Identified the top 1 percent of individuals, ranked by the prospective DCG score
  - Identified the top 1 percent of individuals, ranked by cost in the prior 12 months
  - Merged the two lists, screened on year 1 LOS, and retained individuals with a hospitalization LOS > 5 days

Promoting Fair and Efficient Health Care

© 2007, Urix®, Inc.
Top Group Created for Comparison

- Top group using traditional methods
  - Among the group in the top 1 percent, the resulting pool included 2,410 individuals
- We ran the LOH Model on the Kaiser CY 2005 population
  - Compared the top 2,410 individuals by LOH score to similar rank of the combined method
Results for the top group with 2,410 individuals
Over 12 Months, LOH Accurately Predicts 580 More Admissions in Top Group with N = 2,410

LOH has a 9% higher predictive accuracy in the 6 month prediction period and a 14% higher value in the 12 month prediction period.
LOH Model Found 1,355 Individuals Not On the List from the Combined Method

- 1,355
  - On LOH List, but not on Combined Method list

- 1,355
  - On Combined method list, but not on LOH list

- 1,055 (44%)
  - On both lists

N = 2,410

Promoting Fair and Efficient Health Care
1,355 Individuals on the LOH List That Were Not Identified in the Combined Method are More Likely to Have Future Admissions

LOH has a 17% higher predictive accuracy in the 6 month prediction period and a 25% higher value in the 12 month prediction period.
The 1,355 Non Overlapping Members Identified by the Combined Method Illustrate Regression To The Mean

Costs for the Non Overlapping 1,355 Individuals on the Combined List drop by 74% in Year 2. By contrast, the non overlapping 1,355 Individuals on the LOH List drop by 17% in Year 2

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$46,571</td>
<td>$38,465</td>
</tr>
<tr>
<td>$66,827</td>
<td>$17,218</td>
</tr>
</tbody>
</table>

N = 1,355

Promoting Fair and Efficient Health Care
The LOH Model Identifies Future High Cost Cases Better than Traditional Methods

- 1,355 non overlapping individuals on the LOH list had total Year 2 costs of more than $52 million
  - Average PMPY is $38,465 as shown on the previous chart

- 1,355 non overlapping individuals on the Combined method list had total Year 2 costs of $23 million
  - Average PMPY is $17,218 as shown on the previous chart

© 2007, Urix®, Inc.

Promoting Fair and Efficient Health Care
DxCG, Inc.

www.dxcg.com