Verification of Predictive Modeling in the Management of Rare, Chronic Diseases

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Outline

- Background
- Objectives
- Methodology
- Results
- Next Steps
- Q&A
Background

- Accordant Health Services is a Disease Management Organization (DMO) that specializes in managing chronic conditions for two primary categories:
  - Common (Asthma, CAD, CHF, COPD, and Diabetes)
  - Rare (ALS, CF, CIDP, Crohn’s, Gaucher, Hemophilia, Lupus, MS, Myasthenia Gravis, Myositis, Parkinson’s, RA, Scleroderma, Sickle Cell disease, and Seizure disorders)
- Independence Blue Cross (IBC) is a Managed Care Organization (MCO) headquartered in Philadelphia, PA.
  - Approximately 3.4 million insured members
  - Utilize Accordant’s services as a provider of rare disease management
Objectives

- Study Symmetry’s Episode Treatment Group (ETG) and Episode Risk Group (ERG) predictive modeling tools for analyses of IBC’s members and determination of risk relevance to rare, chronic population

- Determine statistically relevant risk category groupings

- Consider how best to incorporate results for novel approaches to clinical intervention strategies
Methodology

- Matched member approach: IBC eligible members in Accordant rare program for at least nine months of each study year.
- Model year: 10/01/05 – 09/30/06. Used to generate prospective risk scores for each member.
- Verification Year: 10/01/06 – 09/30/07. Used to determine cost and utilization totals to verify Symmetry’s risk scores.
- For all matched members:
  - Medical Claims
  - Rx Claims
  - Diagnosis (Primary Managed Condition)
Methodology (cont.)

- Originally considered five diagnosis groups:
  - Gastroenterology (n = 0): Crohn’s
  - Hematology (n = 79): Gaucher, Hemophilia, Sickle Cell disease
  - Neurology (n = 2711): ALS, CIDP, Myasthenia Gravis, MS, Parkinson’s, and Seizures
  - Pulmonary (n = 50): Cystic Fibrosis
  - Rheumatology (n = 2430): Lupus, Myositis, RA, and Scleroderma

- Crohn’s not included in later study stages due to null population (a new program for IBC)

- Hematology and pulmonary not included in later study stages due to low ‘n’ size and higher statistical variability
• N = 5,270
• Count of Members by Diagnosis
• N = 5,270
• Count of Members by Risk Category
• Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
• N = 5,270
• Average MedPaid by Risk Category
• Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Average Admits – Aggregate

- N = 5,270
- Average Admits by Risk Category
- Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Average MedPaid – 2006 Verification Year

- N = 2,711
- Average MedPaid by Risk Category
- Red lines indicate ‘Low’, ‘Moderate’, and ‘High’

Risk Category – 2005 Model Year
• N = 2,711
• Average Admits by Risk Category
• Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
- N = 2,430
- Average MedPaid by Risk Category
- Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Average Admits – 2006 Verification Year

- N = 2,430
- Average Admits by Risk Category
- Red lines indicate ‘Low’, ‘Moderate’, and ‘High’
Non-Parametric Analyses
Kruskal-Wallis Tests

- $H_0$: The mean ranks of [Medical Paid Amounts, Admits, ER Visits] are equivalent amongst the [Risk Categories].

- $H_1$: The mean ranks of [Medical Paid Amounts, Admits, ER Visits] are significantly different amongst the [Risk Categories].
Kruskal-Wallis Tests

- Defined Risk Categories (based on Symmetry’s Prospective Risk):
  - Lower (Risk < 13)
  - Moderate (13 ≥ Risk ≤ 19)
  - Higher (Risk > 19)

<table>
<thead>
<tr>
<th></th>
<th>Aggregate (n=5270)</th>
<th>Neuro (n=2711)</th>
<th>Rheuma (n=2430)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MedPaid Admits</td>
<td>p &lt; 0.05</td>
<td>p &lt; 0.05</td>
<td>p &lt; 0.05</td>
</tr>
<tr>
<td>ER Visits</td>
<td>p &gt; 0.05</td>
<td>p &lt; 0.05</td>
<td>p &gt; 0.05</td>
</tr>
</tbody>
</table>
# Neurology Population

<table>
<thead>
<tr>
<th>Dx Related</th>
<th>ETG / Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor inflammation of skin &amp; subcutaneous tissue</td>
<td><del>678</del> / n = 404</td>
</tr>
<tr>
<td>Neurological diseases signs &amp; symptoms</td>
<td><del>185</del> / n = 381</td>
</tr>
<tr>
<td>Infections of lower genitourinary system, not sexually transmitted</td>
<td><del>574</del> / n = 173</td>
</tr>
<tr>
<td>Inflammatory diseases of eye, w/o surgery</td>
<td><del>206</del> / n = 120</td>
</tr>
<tr>
<td>Otitis media, w/o surgery</td>
<td><del>329</del> / n = 107</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Dx Related</th>
<th>ETG / Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine exam</td>
<td><del>794</del> / n = 442</td>
</tr>
<tr>
<td>Benign neoplasm of skin</td>
<td><del>682</del> / n = 212</td>
</tr>
<tr>
<td>Isolated signs, symptoms &amp; non-specific diagnoses or conditions</td>
<td><del>900</del> / n = 201</td>
</tr>
<tr>
<td>Fungal skin infections, w/o surgery</td>
<td><del>675</del> / n = 173</td>
</tr>
<tr>
<td>Tonsillitis, adenoiditis or pharyngitis, w/o surgery</td>
<td><del>331</del> / n = 155</td>
</tr>
</tbody>
</table>
# Rheumatology Population

## Dx Related

<table>
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<tbody>
<tr>
<td>Minor inflammation of skin &amp; subcutaneous tissue</td>
<td><del>678</del> / n = 441</td>
</tr>
<tr>
<td>Benign neoplasm of skin</td>
<td><del>682</del> / n = 203</td>
</tr>
<tr>
<td>Fungal skin infections, w/o surgery</td>
<td><del>675</del> / n = 180</td>
</tr>
<tr>
<td>Gastroenterology diseases signs &amp; symptoms</td>
<td><del>486</del> / n = 133</td>
</tr>
<tr>
<td>Infections of lower genitourinary system, not sexually transmitted</td>
<td><del>574</del> / n = 127</td>
</tr>
</tbody>
</table>

## Non-Dx Related

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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Routine exam</td>
<td><del>794</del> / n = 350</td>
</tr>
<tr>
<td>Isolated signs, symptoms &amp; non-specific diagnoses or conditions</td>
<td><del>900</del> / n = 165</td>
</tr>
<tr>
<td>Acute bronchitis, w/o comorbidity, age 5 &amp; older</td>
<td><del>384</del> / n = 117</td>
</tr>
<tr>
<td>Acute sinusitis</td>
<td><del>333</del> / n = 104</td>
</tr>
<tr>
<td>Otolaryngology diseases signs &amp; symptoms</td>
<td><del>354</del> / n = 103</td>
</tr>
</tbody>
</table>
Conclusions

- Symmetry’s risk categories were verified against IBC’s rare, chronic study population
- Prospective risk appears to identify those members with a higher likelihood of increased medical spend and/or utilization
- Determined significant difference in groups of risk (Low, Moderate, High)
- Established that Symmetry captures both rare condition diagnoses and non-diagnoses related episodes of care
Next Steps

- Additional analyses to consider correlations between member’s participation status and risk, as well as a member’s level of acuity and risk
- Determine relevant segmentation for impacting clinical intervention strategies:
  - Common traits of risk inclined members
  - Exclusionary parameter considerations
  - Collaborate with Clinical Operations to develop a segmentation strategy
  - Pilot a prospective study to measure segmentation strategy impact
Questions?

Thank You...

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