Session 097 PD - Population Management for Managed Medicaid

Moderator:
Jeremy Adam Cunningham, FSA, MAAA

Presenters:
Jason Jeffrey Altieri, ASA, MAAA
Jordan Paulus, FSA, MAAA
Mary Kindel Van der Heidje, FSA, MAAA
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Session 97:
Population Management for Managed Medicaid

Mary van der Heijde, FSA, MAAA
Principal & Consulting Actuary
Milliman

Jordan Paulus, FSA, MAAA
Consulting Actuary
Milliman

Jason Altieri, ASA, MAAA
Associate Actuary
Milliman
Limitations

The views expressed in this presentation are those of the presenter, and not those of Milliman or the Society of Actuaries. Nothing in this presentation is intended to represent a professional opinion or be an interpretation of actuarial standards of practice.
What we will discuss:

- Population Health for managed Medicaid population
- Social Determinants of Health
- Case Studies
What is population health management?

- Striving to meet “Triple Aim” goals
- Utilization of predictive analytics to identify patients for interventions
Institute for Healthcare Improvement: “Triple aim”

Population Health

Experience of Care

Per Capita Cost

Experience of Provider
Medicaid and Population Management

• What is important to try to model?
• How is this population different than a commercial or Medicare population?
• How does Medicaid vary by state, and within each state?

• Unique characteristics of this population
  • Depends on eligibility requirements in each state
  • Low income, population often in transition
  • Often limited access to care or other “staples”
  • Segmentation based on eligibility category
    • Expansion population
    • Aged, blind, and disabled
    • Specific conditions that result in Medicaid eligibility
Moving beyond claims data: Other determinants of health

Figure 1

Impact of Different Factors on Risk of Premature Death

- Genetics: 30%
- Health and Well Being: 30%
- Individual Behavior: 40%
- Social and Environmental Factors: 20%
- Health Care: 10%


Social Cohort Segmentation

Pros
- Expands potential reach
- Improves patient experience

Cons
- Smaller case-by-case savings
- Requires non-traditional data analysis
Social determinants of health

Figure 2
Social Determinants of Health

<table>
<thead>
<tr>
<th>Economic Stability</th>
<th>Neighborhood and Physical Environment</th>
<th>Education</th>
<th>Food</th>
<th>Community and Social Context</th>
<th>Health Care System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Housing</td>
<td>Literacy</td>
<td>Hunger</td>
<td>Social integration</td>
<td>Health coverage</td>
</tr>
<tr>
<td>Income</td>
<td>Transportation</td>
<td>Language</td>
<td>Access to healthy options</td>
<td>Support systems</td>
<td>Provider availability</td>
</tr>
<tr>
<td>Expenses</td>
<td>Safety</td>
<td>Early childhood education</td>
<td>Social integration</td>
<td>Community engagement</td>
<td>Provider linguistic and cultural competency</td>
</tr>
<tr>
<td>Debt</td>
<td>Parks</td>
<td>Vocational training</td>
<td>Discrimination</td>
<td></td>
<td>Quality of care</td>
</tr>
<tr>
<td>Medical bills</td>
<td>Playgrounds</td>
<td>Higher education</td>
<td>Health Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>Walkability</td>
<td></td>
<td>Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Considerations in modeling social determinants

- How can you map data to each social determinant?
  - What characteristics are being tracked internally?
  - What variables can be used to flag social determinants?

- How usable is the data?
  - Does the claims data have necessary PHI to integrate non-health or “consumer” data?
  - If a particular variable has predictive value, will it be readily available to model other populations?
  - Can we model at the person level, or does the data require less granularity (ZIP code or larger)?

- What programs can be implemented to help “solve” health gaps related to social determinants?
  - Common applications: Improve transportation to improve access to care, or flag members less likely to receive follow-up care
Segmentation Approaches: Cohort segmentation methods

<table>
<thead>
<tr>
<th>Cost cohort segmentation</th>
<th>Condition cohort segmentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Heterogeneous cohort, difficult to implement processes</td>
<td>– Stratify by severity and complications</td>
</tr>
<tr>
<td>– High “bang for the buck”</td>
<td>– Predicting advances in disease state</td>
</tr>
<tr>
<td>– Example: case management</td>
<td>– Examples: Risk adjustment, behavioral health</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Utilization cohort segmentation</th>
<th>Social cohort segmentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Identify inefficient use of care or abuse</td>
<td>– High improvement in outcomes</td>
</tr>
<tr>
<td>– Examples: likelihood of ER or IP stay, back surgeries, inappropriate opioid base</td>
<td>– Often high ROI with capitation</td>
</tr>
<tr>
<td></td>
<td>– Examples: telemedicine, transportation, in-home assessments, food pantries</td>
</tr>
</tbody>
</table>
Case Study: Denver Health Hospital Authority – CMMI Grant

- Denver Health’s 21st Century Care Program: Population health-informed primary care
  - $19.8 million Innovation Award from the Center for Medicare and Medicaid Innovation (CMMI)
  - Goals were to improve access and achieve the Triple Aim: better care, smarter spending, healthier people
  - Covered all the populations (Medicaid, Medicare, commercial)
  - $15.8 million in cost avoidances achieved for adult Medicare and Medicaid beneficiaries alone in 2013 and 2014

Enhanced clinical services
- Clinical pharmacists
- Behavioral health consultants
- RN care coordinators
- Patient navigators
- Social workers
- Specialized high intensity teams

Enhanced health information technology
- Population segmentation
- Patient risk stratification
- 3M™ Clinical Risk Groups (CRGs)
- eTouch Services

Administration and evaluation
- Rapid cycle evaluation
- Quality improvement

Example: Enhanced care management “tiered” delivery

Example: Program development as an iterative process

Example: Iterative tiering process
Improving models over time

Algorithm 1.0
– Instable assignments, complicated interventions
– Lab values good within tiers, but not defining tiers

Algorithm 2.0
– Transparency important for acceptance
– Can meet clinical and financial goals
– Interventions require stability

Algorithm 3.0
– Clinical feedback improves acceptance
– Social determinants of health are important

Clinical acceptance ("buy-in") weighed against financial differentiation

Example: Custom Predictive Modelling for Distributing Limited Care Management Resources

Managed Care Organization $1,000

Regions
- $950
- $50

Patients
- $800
- $150
- $50
Goal and Challenges

- **Goal:**
  - Identify members who would benefit the most from care management intervention

- **Challenges:**
  - Filtering out high cost but unavoidable issues (i.e. cancer) while not ignoring patients with those conditions
  - Identifying patients who are not yet expensive, but have the potential to be
  - Accounting for organization specific strengths/weaknesses, including
Approach

- Used AHRQ research and clinical input to identify costs as “Potentially Avoidable”

- Focused on predicting the potentially avoidable costs in the right tail of the distribution (90th percentile)
Tailoring the Model

Prediction Features → Prediction Response

Learn / Train → Predict

Training Features → Training Response

Time
## Output

- Rank-ordered list of high risk patients
- Total cost rank and potentially avoidable ranks differ – as expected

<table>
<thead>
<tr>
<th>Adverse Scenario Total Costs</th>
<th>Adverse Scenario Potentially Avoidable Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dollars</strong></td>
<td><strong>Rank</strong></td>
</tr>
<tr>
<td>$88,800</td>
<td>100</td>
</tr>
<tr>
<td>$86,100</td>
<td>100</td>
</tr>
<tr>
<td>$104,600</td>
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<td>$86,100</td>
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<td>$64,200</td>
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<tr>
<td>$106,300</td>
<td>100</td>
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</tbody>
</table>
Example: Developing Cohorts to Support CPC+ Program

- **Goal:**
  - Come up with cohorts of high-risk patients with similar clinical and demographic profiles

- **Challenges:**
  - Developing cohorts without long manual process of hand selecting
  - Leveraging potentially avoidable costs for patient stratification in the cohort building
  - Ensuring the cohorts are similar enough to offer coherent management opportunities
Cluster Analysis – the *K*-means Algorithm

1. Select *K* points as initial centroids.

REPEAT:
2. Form *K* clusters by assigning each point to its closest centroid.
3. Re-calculate the centroid of each cluster.

UNTIL:
4. The centroids do not change.
Results

- Some meaningful clusters emerged, others were noise.
- Roughly 80% of patients were in three clusters.
- Cluster 1: Seizures, asthma, other metabolic disorders, cerebral palsy (average age 18).
- Cluster 2: Seizures, artificial openings for feeding, cardio respiratory issues, spina bifida, down syndrome, autism (average age 8).
- Cluster 3: Diabetes, seizures, congestive heart failure, asthma, major depressive and bipolar disorders, specified heart arrhythmias (average age 55).
Questions?

Mary van der Heijde, FSA, MAAA
Email: mary.vanderheijde@milliman.com
Phone: (303) 672-9081

Jordan Paulus, FSA, MAAA
Email: jordan.paulus@milliman.com
Phone: (303) 672-9064

Jason Altieri, ASA, MAAA
Email: jason.altieri@milliman.com
Phone: (317) 639-1000 x4528