Session 65L, Medicaid Risk Adjustment: Physician-Based Model Correlation

Presenters:
Chris Dickerson
Barry Jordan, ASA, MAAA
Medicaid Risk Adjustment: Physician-Based Model Correlation

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BARRY JORDAN, ASA, MAAA
CHRIS DICKERSON
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Poll: Have you used the results of a claims-based risk adjustment tool in your work?
Have you used the results of a claims-based risk adjustment tool in your work?

- Yes - Medicaid Population: 55%
- Yes - Non-Medicaid Population Only: 25%
- No: 20%
Poll: What risk adjustment tools have you used in your work?
## Polling Responses

<table>
<thead>
<tr>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDPS+Rx</td>
</tr>
<tr>
<td>CDPS+Rx</td>
</tr>
<tr>
<td>Internal</td>
</tr>
<tr>
<td>Cdps</td>
</tr>
<tr>
<td>Acg</td>
</tr>
<tr>
<td>Cdps+rx</td>
</tr>
<tr>
<td>Medicare</td>
</tr>
<tr>
<td>CDPS</td>
</tr>
<tr>
<td>Cops</td>
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<tr>
<td>None</td>
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<td>Medicare</td>
</tr>
<tr>
<td>CDPS</td>
</tr>
<tr>
<td>CDPS+Rx</td>
</tr>
<tr>
<td>CDPS</td>
</tr>
<tr>
<td>Acg</td>
</tr>
<tr>
<td>Cdpsrx</td>
</tr>
<tr>
<td>Cdpsrx</td>
</tr>
</tbody>
</table>
Agenda

• Medicaid Risk Adjustment Background
• Exploration of Service-Specific Model
• Scenario Iterations
• Conclusions
• Future Applications
Medicaid Risk Adjustment Background

• Most commonly used tools in Medicaid are the University of California San Diego (UCSD)’s:
  ▪ Chronic Illness & Disability Payment System (CDPS)
  ▪ CDPS+Rx
  ▪ Medicaid Rx

• Risk Scores are Comprised of Two Components:
  ▪ Demographic Component (Age/Gender)
  ▪ Disease Component (Chronic/Acute Conditions)
Poll: Is it appropriate to apply standard risk adjustment methodologies to dual eligibles?
Is it appropriate to apply standard risk adjustment methodologies to dual eligibles?

- Yes: 85%
- No: 15%
Medicaid Risk Adjustment Background

• Example of Hypothetical Members:
  ▪ 24 Year Old Male, with Hepatitis (MRX 20)
  ▪ 58 Year Old Female, with Diabetes (MRX 10)
Medicaid Risk Adjustment Background

• Primary Purpose:
  - Budget-neutral adjustment to managed care capitation rates to account for relative risk differences between health plans:
    • E.g., Two plans cover TANF 19-44 cohort.
    • Regional TANF 19-44 capitation rate is $200:

<table>
<thead>
<tr>
<th>MCO</th>
<th>Population %</th>
<th>Relative Risk</th>
<th>Regional Rate</th>
<th>Risk Adj. Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCO 1</td>
<td>50%</td>
<td>1.05</td>
<td>$200</td>
<td>$210</td>
</tr>
<tr>
<td>MCO 2</td>
<td>50%</td>
<td>0.95</td>
<td>$200</td>
<td>$190</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>1.00</td>
<td>$200</td>
<td>$200</td>
</tr>
</tbody>
</table>

• Allows for demographic-based rating cohorts with disease-based payment adjustments.
Poll: Is it appropriate to apply standard, total cost of care-based risk adjustment tools to a limited service subcapitated arrangement? (E.g. Physician Services)
Is it appropriate to apply standard, total cost of care-based risk adjustment tools to a limited service subcapitated arrangement? (E.g. Physician Services)
Medicaid Risk Adjustment

**Medicaid Risk Adjustment Background**

- Predicting Costs:
  - **Standard weights:**
    - Developed by UCSD.
    - Based on national data.
    - Based on more global total cost of care:
      - Generally intended to be applied to global capitation rates (e.g., Inpatient, Outpatient, Professional, and Pharmacy)
  - Challenges exist when trying to apply these weights to a subset of services
    - E.g., a member diagnosed with hemophilia is expected to have significantly higher pharmacy costs than someone with asthma. This magnitude is not expected to be the same when it comes to physician services.
ASOP 45 Considerations:

- ASOP 45 – The Use of Health Status Based Risk Adjustment Methodologies.
- Some specific considerations noted in this ASOP:
  - **3.5:** “…If using a risk adjustment model on a population for which it was not originally designed, the actuary should consider appropriate adjustments, such as recalibration and condition or demographic category groupings.”
  - **3.6:** “…The actuary should consider the necessity and advantages of recalibration…” and “…The actuary should consider the credibility of data and observations for specific condition categories before changes to the model are made…”
Medicaid Risk Adjustment Background

• Questions:

What happens if risk adjustment needs to be applied to a specific set of services?

Can weights be re-calibrated to fit a specific suite of services with reasonable predictive power?

When should weights be re-calibrated to reflect specific geographies/populations?

How valid are weights over time?
Medicaid Risk Adjustment Background

• Why are we asking?

  ▪ Unique Payment Arrangements:
    • Some States are looking at options for physician-specific subcapitated arrangements.
    • Plans may seek to subcapitate specific services under a managed care arrangement.
    • *Operational ease* is a high priority in expanding value-based payments and alternative payment methodologies.

  ▪ Efficiency Review:
    • By re-tooling weights to be specific to certain services, efficiency between health plans can be analyzed at a more granular level in the Medicaid setting.
    • Plans may be able to review efficiency across market segments or geographic regions at a more granular level.
Exploration of Custom Weights

• Established precedence for custom risk adjustment weight development exists.
  ▪ Typically done to address differences in covered benefits, or other unique program aspects.
  ▪ However, guidance is not specific on the need for state-specific weights and the applicability of generalized weights.

• **GOAL:** Explore results of testing predictive power of various risk score scenarios to a specific set of Medicaid-covered professional procedure codes across three states.
  • Ideally, we will find confidence in the results so that they can be used in program implementation.
Exploration of Custom Weights

- Starting Point: Member classification consistent with condition and demographic stratification used in Medicaid Rx, through license with UCSD.
  - Disease Classification – 45 categories used in Medicaid Rx.
    - Conditions identified based on member utilization of NDCs.
  - Demographic Classification – Classification consistent with Medicaid Rx:
    - Non-Disabled Adult (AA), Non-Disabled Children (AC), and Disabled Adults/Children (DA/DC).
    - Age/Gender Component.
Exploration of Custom Weights

• Underlying Data
  - Data is from three State Medicaid programs:
    • Selected states include a mix of states with managed care and FFS-based delivery systems.
    • Mix of expansion vs. non expansion states.
  - Prescription Drug Data:
    • Determine disease categories.
  - Detailed Enrollment Data:
    • Determine member demographics.
    • Limited to 10+ months of enrollment in base period.
  - Professional Claims Data:
    • Specific set of nearly 2,000 professional procedure codes used to identify member-level expenditures for predictive purposes.
Poll: What services does your organization subcapitate, or provide via subcapitation?
<table>
<thead>
<tr>
<th>Polling Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyro</td>
</tr>
<tr>
<td>Dentalvisionlab</td>
</tr>
<tr>
<td>BH</td>
</tr>
<tr>
<td>Professional</td>
</tr>
<tr>
<td>Dental</td>
</tr>
<tr>
<td>Physician</td>
</tr>
<tr>
<td>Dental</td>
</tr>
<tr>
<td>Dental</td>
</tr>
<tr>
<td>BH</td>
</tr>
<tr>
<td>Primary care</td>
</tr>
<tr>
<td>N/A</td>
</tr>
<tr>
<td>PCP dental</td>
</tr>
</tbody>
</table>
Exploration of Custom Weights

• Observations and discussion related to results:
  
  DISCLAIMER: Discussion surrounding results that appears on subsequent slides of this presentation reflect observations and considerations for informational purposes only. This is not intended to be relied upon as an actuarial opinion or for decision-making purposes as it pertains to any use of risk adjustment or other actuarial work.
Exploration of Custom Weights

• Regression Background
  ▪ The primary statistic used in this presentation is the coefficient of determination, or $R^2$.
  ▪ $R^2$ represents the percentage of variation in the dependent variable that is explained by the model.
  ▪ $R^2$ is commonly used to measure the fit of regression models.
  ▪ It is expressed as a decimal value between 0 and 1.
  ▪ Standard applications of Medicaid RX to the full suite of services produces an $R^2$ of 0.18\(^1\), meaning that the disease and demographic variables and associated weights explain 18% of the variation in expense.
Exploration of Custom Weights

- Regression Background cont.
  - Another key concept discussed is statistical significance.
  - In our context we mean whether or not the parameter estimate can be distinguished from 0 with a probability of 99.9%.
  - Statistical significance incorporates, the volume of observations, the variance between observations, as well as the magnitude of the parameter estimate.
  - For example, assuming a comparable variance, a variable with 10,000 observations and a parameter estimate of 0.05 could be statistically significant, as could a variable with 100 observations and a parameter estimate of 3.00.
Exploration of Custom Weights

• Attempting to run Medicaid Rx on single state data led to sample size issues.
  ▪ Some of the original 45 Medicaid Rx Conditions were statistically insignificant, primarily due to small observation counts.
  ▪ Conditions were condensed into 25 groups based on clinical similarities e.g., condensed Infections High and Medium into one group.
  • Groupings were based on the professional suite of services relevant to this analysis as an attempt to develop a reasonable approach to aggregating certain conditions; this grouping may change in actual application to Medicaid programs and should be reconsidered for any other suites of services.
Poll: What range of $R^2$ do you think the results of this study will produce?
What range of $R^2$ do you think the results of this study will produce?

- **Significantly Lower** ($R^2 < 0.12$) - 5%
- **Moderately Lower** ($0.12 \leq R^2 < 0.15$) - 15%
- **Generally Consistent within $\pm 0.03$** ($0.15 \leq R^2 \leq 0.21$) - 20%
- **Moderately Higher** ($0.21 < R^2 \leq 0.24$) - 20%
- **Significantly Higher** ($R^2 > 0.24$) - 40%
**Exploration of Custom Weights**

- R² results of original Condition categories and condensed Condition categories for the AA population are below:

<table>
<thead>
<tr>
<th>Sample</th>
<th>Original R²</th>
<th>Condensed R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>.3631</td>
<td>.3516</td>
</tr>
</tbody>
</table>

- Even though R² is slightly lower, the iteration using condensed categories is arguably preferable since it relies on statistically significant variables. These condensed categories form the basis for the results shown on subsequent slides.
Exploration of Custom Weights

- Conducted Multiple Scenario Tests:
  - Weight Development (Re-Weight), and
  - Statistical Correlation (Application)

<table>
<thead>
<tr>
<th>Name</th>
<th>Re-Weight</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>Single State</td>
<td>Same Single State</td>
</tr>
<tr>
<td>Other State</td>
<td>Single State</td>
<td>Different Single State</td>
</tr>
<tr>
<td>Combo – In</td>
<td>Two States</td>
<td>Single State in Sample</td>
</tr>
<tr>
<td>Combo – Out</td>
<td>Two States</td>
<td>Single State out of Sample</td>
</tr>
<tr>
<td>All</td>
<td>Three States</td>
<td>Single State in Sample</td>
</tr>
</tbody>
</table>

- Results reflect the average $R^2$ of the relevant scenarios.
- Scenarios tested under “Same Year” and “Subsequent Year” scenarios.
Exploration of Custom Weights

• Same Year
  ▪ Weights are developed using 2015 data and the correlation with 2015 experience is tested.

• Subsequent Year
  ▪ Weights are developed using 2015 data and the correlation with 2016 experience is tested. Weights are still developed on a concurrent basis, but are applied to the following year.
  ▪ Goal is to determine the loss in predictive power over time and quantify the value of re-weighting due to changing data.
Poll: Which population do you think will result in the highest $R^2$?
Which population do you think will result in the highest $R^2$?

- AA (Non Disabled Adults): 30%
- AC (Non Disabled Children): 20%
- DADC (Disabled Adults and Children): 50%
AA Population Scenarios

- Various scenarios indicate that the AA population is very stable and has a high level of predictability.
  - Not much value is gained by using a larger sample size, as small populations are just as good as larger populations at predicting this stable group.
  - Results argue that state-specific weights may not be necessary, and simpler development or application of risk scores can be used to obtain similar accuracy.

<table>
<thead>
<tr>
<th>AA R² Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Change from State-Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.3516</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.3417</td>
<td>-2.8%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.3503</td>
<td>-0.4%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.3484</td>
<td>-0.9%</td>
</tr>
<tr>
<td>All</td>
<td>0.3518</td>
<td>0.1%</td>
</tr>
</tbody>
</table>
AC Population Scenarios

- The AC Population appears to be more state-specific.
  - $R^2$ is considerably lower than AA population, which may be due in part to using Rx utilization as the method for identifying conditions.
  - Different Rx utilization practices can be present between adults and children.

<table>
<thead>
<tr>
<th>AC R² Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Change from State-Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.2452</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.2213</td>
<td>-9.7%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.2477</td>
<td>1.0%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.2380</td>
<td>-2.9%</td>
</tr>
<tr>
<td>All</td>
<td>0.2483</td>
<td>1.3%</td>
</tr>
</tbody>
</table>
The AC Population appears to be more state-specific.  

- There is a meaningful difference between weights that include the test state and weights that do not.  
  - May be due in part to higher use of E&M procedure codes related to EPSDT.  
  - This may also be impacted by 1202-related reimbursement policy differences between states.  
- As long as test state is included in development of weights, risk score predictability is fairly consistent.

<table>
<thead>
<tr>
<th>AC R² Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Change from including test State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample includes test State</td>
<td>0.2358</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sample excludes test State</td>
<td>0.2169</td>
<td>-8.0%</td>
</tr>
</tbody>
</table>
Poll: Which scenario will produce the highest $R^2$ for the DADC population?
Which scenario will produce the highest $R^2$ for the DADC population?
DADC Population Scenarios

- The DADC Population appears to be more state-specific.
  - Weights built on a larger sample size perform better than smaller sample size scenarios.

<table>
<thead>
<tr>
<th>DADC $R^2$ Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Change from State-Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.2357</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.2280</td>
<td>-3.2%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.2373</td>
<td>0.7%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.2363</td>
<td>0.2%</td>
</tr>
<tr>
<td>All</td>
<td>0.2405</td>
<td>2.0%</td>
</tr>
</tbody>
</table>
AA Population Scenarios

- Weights appear valid for multiple years.
  - AA weights retain predictive power for multiple years.
  - The advantages of larger sample sizes are evident in the smaller decreases in $R^2$.
  - Results suggest that a single set of weights can be defensibly used for multiple years for the AA Population.

<table>
<thead>
<tr>
<th>AA R² Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Concurrent Weights, Subsequent Year</th>
<th>Change from Same Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.3516</td>
<td>0.3469</td>
<td>-1.3%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.3417</td>
<td>0.3399</td>
<td>-0.5%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.3503</td>
<td>0.3475</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.3484</td>
<td>0.3466</td>
<td>-0.5%</td>
</tr>
<tr>
<td>All</td>
<td>0.3518</td>
<td>0.3494</td>
<td>-0.7%</td>
</tr>
</tbody>
</table>
AC Population Scenarios

- Weights lose predictive ability, but customized weights retain value.
  - The AC population loses predictive ability from one year to the next.
  - $R^2$ drops are much larger than the AA population.
  - Weights that include the test state still outperform other scenarios, but the gap has shrunk.

<table>
<thead>
<tr>
<th>AC $R^2$ Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Concurrent Weights, Subsequent Year</th>
<th>Change from Same Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.2452</td>
<td>0.2300</td>
<td>-6.2%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.2213</td>
<td>0.2107</td>
<td>-4.8%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.2477</td>
<td>0.2373</td>
<td>-4.2%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.2380</td>
<td>0.2295</td>
<td>-3.6%</td>
</tr>
<tr>
<td>All</td>
<td>0.2483</td>
<td>0.2386</td>
<td>-3.9%</td>
</tr>
</tbody>
</table>
DADC Population Scenarios

• Weights should be re-developed annually.
  - DADC shows a substantial drop in predictive ability.
  - Previous high-performing scenarios are now comparable to scenarios that have no connection to the test state.
  - Results argue for annual re-basing of weights for a disabled population.

<table>
<thead>
<tr>
<th>DADC R² Summaries</th>
<th>Concurrent Weights, Same Year</th>
<th>Concurrent Weights, Subsequent Year</th>
<th>Change from Same Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>State-Specific</td>
<td>0.2357</td>
<td>0.2153</td>
<td>-8.6%</td>
</tr>
<tr>
<td>Other State</td>
<td>0.2280</td>
<td>0.2109</td>
<td>-7.5%</td>
</tr>
<tr>
<td>Combo – in sample</td>
<td>0.2373</td>
<td>0.2173</td>
<td>-8.4%</td>
</tr>
<tr>
<td>Combo – out</td>
<td>0.2363</td>
<td>0.2183</td>
<td>-7.6%</td>
</tr>
<tr>
<td>All</td>
<td>0.2405</td>
<td>0.2205</td>
<td>-8.3%</td>
</tr>
</tbody>
</table>
Conclusions

• Recap:
  ▪ Moving from 45 to 25 disease groups:
    • Slightly lower $R^2$.
    • Statistical significance.
  ▪ As long as a state is included in weight development, $R^2$ generally remains consistent across scenarios.
  ▪ AA resulted in highest $R^2$ of the three populations.
  ▪ Factors such as Rx patterns and EPSDT emphasis may be contributors to lower $R^2$ for children.
Conclusions

• Recap:
  ▪ Weights retained steady $R^2$ values when applied to a future year for AA/AC populations, but less steady for DADC population.
  ▪ Additional validation techniques can be considered even with lower $R^2$, which may support the use of the same weights for multiple years.
Conclusions

• Other Considerations
  ▪ Practicality of Rx-based weights vs. diagnosis-based weights.
  ▪ 45 disease groups make sense for total cost of care.
  ▪ Smaller suite of services could lead to sample size issues.
Future Applications

- Risk scores can simplify APM arrangements:
  - Risk scores for professional services have general and lasting predictive power.
  - Professional subcapitation arrangements can be structured around fewer rate cells, easing operational difficulties.
  - Risk score weights may not need to be customized for a specific state, lowering the expense of implementing new contracting arrangements.
  - A similar approach can be considered for other suites of services, although results of other suites of services are outside the scope of this specific study.
Future Applications

- Risk score updates should depend on covered populations:
  - Risk scores for “standard” populations (e.g. TANF, non-disabled adults, etc.) appear to have lasting predictive power.
  - More unique populations appear to benefit from annually updated risk scores.
  - State agencies, health plans, and provider groups can evaluate their enrollment and program design to determine the necessity of risk score updates.
Future Applications

• Risk Scores can be applied to various program designs:
  ▪ Standard, well-established risk indicators and disease categories appear to have valid predictive ability for subsets of medical benefits.
  ▪ Customized risk scores for specific service packages have been used previously, but our results show the limited benefit package still has strong predictive ability, often exceeding the $R^2$ of the full benefit package.
  ▪ This allows for the application of an industry-standard tool in a manner that is specific to the covered benefit package.
Questions?
References

1. Accuracy of Claims-Based Risk Scoring Models, Geof Hileman, FSA, MAAA, and Spenser Steele. Published October 2016