Evolving the Risk-Adjustment Model to Improve Payment Accuracy in the Individual & Small Group Market

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INTRODUCTION

The Affordable Care Act (ACA) created a risk-adjustment program for the individual and small group commercial markets (“commercial markets”) to promote payment accuracy for health plans by appropriately compensating plans for the financial costs of their enrollees. Through risk adjustment, plans receive a higher payment for sicker enrollees with costlier care, and a lower payment for healthier enrollees, whose care costs less.

The goal of any risk adjustment program is to encourage insurers to compete based on the efficiency and value of their plans, as opposed to attracting healthier enrollees. Adequate risk adjustment ensures plans are compensated appropriately and establishes a level playing field for plans to compete based on care management, cost, quality, and patient satisfaction. This payment accuracy is also critical for market stability; without it plans that enroll a sicker population will not receive adequate transfer payments and may lose money and exit the market. Finally, in the event risk adjustment does not adequately compensate plans for certain types of enrollees, those plans offering the most robust coverage may expose themselves to higher financial risk.

Risk adjustment has been used in public programs—notably Medicare and Medicaid—since 2004 and 1997, respectively. For the commercial markets, the Centers for Medicare and Medicaid Services (CMS) uses a model that estimates expected costs based on members’ demographic and disease profiles, similar to the approach used in Medicare Advantage. Unlike programs in both Medicare Advantage and Medicaid where risk-adjustment is used to modify capitated payments from the government to plans, the commercial risk-adjustment requires transfers of funds between plans based on the relative risk of their enrollees.

This paper examines the risk adjustment program used by CMS in the commercial market. First, the paper describes the importance of risk adjustment for this market under new rules established by the ACA. Second, the paper provides an overview of the risk adjustment model used in the commercial market and how it compares to the models used in Medicare and Medicaid. Third, the paper provides an analysis of the limitations facing the current model and fourth, the paper suggests potential modifications that could improve the model.

THE IMPORTANCE OF RISK ADJUSTMENT IN THE ACA

A viable insurance market relies on costs spread across a wide range of individuals. The ACA intended to achieve this goal through a few mechanisms. First, insurers are required to offer health insurance to all qualified applicants and

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cannot set premiums based on health status. As a result, premiums are set based on the expected average costs of the membership—the broader the risk pool, the lower the average costs. Having enough healthy enrollees to balance out the sick individuals within the risk pool is a critical part of what makes an insurance market stable. Second, the ACA includes a set of provisions designed to make insurance affordable in the exchanges by providing subsidies for lower-income individuals. Third, the ACA assesses a penalty for not enrolling in a plan.

The ACA also establishes three programs to mitigate health plan risk, known as the “Three Rs,” to make insurance affordable for enrollees while also encouraging insurers to participate in the exchanges. Two of the three Rs, reinsurance and risk corridors, sunset at the end of the 2016 plan year. The third R—risk adjustment—will continue permanently and establishes transfer payments so that plans with lower-cost enrollees essentially subsidize those plans with higher-cost enrollees. This process ensures that premiums are set at competitive rates, encouraging individuals to enroll rather than remain uninsured and pay the mandate penalty.

The ACA establishes a risk-adjustment mechanism that applies to non-grandfathered individual and small group market plans. Issuers are required to maintain a single risk pool for on- and off-exchange, ACA compliant plans in the individual market and a separate single pool for the small group market.2

OVERVIEW OF RISK ADJUSTMENT MODELS

Risk models are designed to predict healthcare costs. Developing these models requires deciding how to identify and group diseases, determining whether or not the model uses diseases from a prior year (prospective) or a current year (concurrent) to predict healthcare costs, and identifying a sample population on which to construct the model. Most risk models use regression analysis to create coefficients that estimate how an average individuals’ healthcare costs would vary as a result of having a given disease.

DETAILS OF THE COMMERCIAL RISK ADJUSTMENT MODEL

Section 1343 of the ACA requires a risk adjustment program for each state insurance market in which health plans are either assessed a charge or provided a payment based on the plan’s actuarial risk compared to the average actuarial risk in the state. In every state, except Massachusetts, the federal government operates the risk adjustment program for the state. To determine actuarial risk for the individual and small group commercial markets population, CMS developed a risk model (i.e., the Department of Health and Human Services-Hierarchical

2 Effective October 2015, the PACE Act defines a small group employer as an employer who employed an average of 1-50 employees on business days during the preceding calendar year, but states have the option to extend the definition of small employer to include employers with up to 100 employees. Pub. Law. 114-60, “Protecting Affordable Coverage for Employees Act,” October 19, 2015. A few states have exercised ACA authority to merge their individual and small group risk pools.
Condition Categories (HHS-HCC) model) that predicts costs based on health plan enrollee diagnoses and demographics. CMS uses 15 risk adjustment models. Within each of the five metal levels (platinum, gold, silver, bronze, catastrophic), CMS created three models for each age group (infants, children, and adults) to account for cost differences in each of these age groups.

The HHS-HCC risk models calculate risk scores for each enrollee in each plan and averaging those scores across each plan and issuer. The average risk score represents the expected plan liability (i.e., the amount of healthcare costs the plan is at risk to cover) for a single plan relative to the average plan liability across all plans within the individual and small group commercial markets. If a plan’s aggregate risk score is greater than the average risk score across all issuers within the state, the plan receives a “transfer payment”; and if it is less, the plan pays a fee (Figure 1).

The formula used to determine the transfer payment or fee also includes other adjustments that take into account differences in actuarial value between the plan products (e.g., bronze vs. silver), cost sharing plan variations, as well as geographic cost adjustments. Further, the transfer payment is a percent of the average premium in the market. Because the average premium incorporates administrative costs, more efficient plans may be subsidizing less efficient plans.

In order to determine the risk score for a given enrollee, the HHS-HCC risk-adjustment model relies on diagnosis codes (ICD-9) to predict expected healthcare costs. The model is a concurrent model, meaning that it uses diagnoses from a time period to predict cost in that same period, rather than a prospective model that projects future costs based on past diagnoses. In order to obtain a clinically meaningful and statistically stable system, all ICD-9 codes used to capture diagnoses are grouped into a smaller number of categories that produce a diagnostic profile of each individual. Each of these groups is called a Hierarchical Condition Category, or HCC. CMS consults with an outside clinical panel to determine how best to group the diseases into HCCs. There are 264 HHS-HCCs in the full diagnostic classification; however, only 127 are included in the HHS risk adjustment model, since some are dropped if they are vague, discretionary in coding, or not medically significant.

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6 Note that some HCCs are grouped together for a final count of 100. Ibid.
Finally, because the ACA dramatically expanded access to coverage in the individual and small group markets, there was no real-world claims data for the market (including the previously uninsured population) that could be used to estimate the new risk adjustment model. As such, CMS needed to create a sample claims database to construct the risk model (including the model coefficients). CMS used 2010 claims and demographic data from the Truven Health Analytics MarketScan® Commercial Claims and Encounters database (MarketScan). This database includes claims for individuals in the self-insured, large employer market. An enrollee was included in the concurrent modeling sample if the enrollee had at least one month of 2010 enrollment, was enrolled in a preferred provider organization (PPO) or other fee-for-service (FFS) health plan, had no payments made on a capitated basis, had prescription drug coverage, and had integrated mental health/substance abuse coverage.

**COMPARING THE COMMERCIAL RISK ADJUSTMENT MODEL TO THOSE USED FOR MEDICARE ADVANTAGE AND MEDICAID**

The different risk adjustment models used in the commercial, Medicare Advantage, and Medicaid markets differ in a variety of ways, as shown in Table 1. One key
difference relates to their predictive accuracy, as measured by the $R^2$ statistic. The $R^2$ measures the amount of variation that is explained by the model—the higher the $R^2$, the more accurate the model.

As noted previously, the HHS-HCC model (for the individual and small group commercial market) is based on the design of the CMS-HCC model used for Medicare Advantage. Both models group all diagnosis codes into HCCs. However, unlike the commercial model, the Medicare Advantage risk adjustment model only predicts medical costs, since pharmacy costs are included in the Part D model.

The Medicare Advantage risk adjustment model is prospective, using diagnoses from a prior year to predict medical costs in the following year. The HHS-HCC model, however, is a concurrent model, using diseases from the current year to predict costs in that same year. For example, the Medicare Advantage risk adjustment model uses diagnoses from 2016 to predict 2017 costs. The HHS-HCC model uses diagnoses from 2017 to predict 2017 costs. As a result, the $R^2$ is higher for the HHS-HCC model than the Medicare Advantage model.

Importantly, in Medicare Advantage, the government uses risk adjustment to increase or decrease the per member payments to each plan. Payments are not reduced or increased compared to other plans’ risk scores. In addition, the payments are calculated for each person in the plan, and the comparison implicitly is to the average Medicare beneficiary across the entire Medicare population. By contrast, risk adjustment in the commercial market involves an assessment of each plan’s average relative cost to other plans and the amount of money either paid or received by each plan depends on its average risk score compared to the other plans. As a result, plans may have difficulty predicting whether they will need to make transfer payments in a given year. Furthermore, the payments within each state individual and small group market are zero sum, meaning that the risk models adjust within a fixed pool of funding, but no additional funding is provided if enrollees’ actual costs are higher than their predicted costs.

This difference emphasizes the importance of accurate risk adjustment for the commercial market, since an improperly set risk adjustment system in the individual and small group market can mean that the system will inappropriately transfer money between plans. Assuming that the plan has set the premium accurately based on expected medical costs, if a plan’s risk score is lower than would be expected by its medical costs, then that plan may not be made whole by the risk adjustment transfer payment. Similarly, a plan with a high risk score but relatively low medical costs would be inappropriately receiving transfer payments.

States use a number of different risk adjustment models in their Medicaid programs. As noted in Table 1, the most common risk adjustment models used in Medicaid are the Chronic Disability Payment System (CDPS) and the CDPS+Rx models. These models are used in nearly half of all states. The CDPS model is similar to the HCC models in that it also groups diseases, but it groups the diseases differently than the HCC models. CDPS uses diagnosis codes from administrative claims data to classify Medicaid beneficiaries (including the disabled and
Temporary Aid to Needy Families (TANF) populations). The model then combines these diagnosis codes with age and gender categories to predict total medical cost. CDPS uses a different set of weights for the disabled and TANF populations as well as for adults and children.

### Table 1. Comparison of Risk Adjustment Models

<table>
<thead>
<tr>
<th></th>
<th>Commercial (Individual and Small Group On- and Off-Exchange)</th>
<th>Medicare Advantage</th>
<th>Medicaid Managed Care</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Source</strong></td>
<td>MarketScan® Commercial Claims and Encounters database (MarketScan)</td>
<td>Medicare FFS claims</td>
<td>Varies, generally claims data</td>
</tr>
<tr>
<td><strong>Risk Model</strong></td>
<td>HHS-HCC Model</td>
<td>CMS-HCC Model</td>
<td>Varies by state, most common ones are Chronic Illness and Disability Payment System (CDPS) (4 States) and CDPS Rx (16 states)</td>
</tr>
<tr>
<td><strong>Timing</strong></td>
<td>Concurrent</td>
<td>Prospective</td>
<td>Prospective and Concurrent (CDPS)</td>
</tr>
<tr>
<td><strong>Score Calculation</strong></td>
<td>Additive</td>
<td>Additive</td>
<td>Additive (CDPS)</td>
</tr>
<tr>
<td><strong>Costs Predicted</strong></td>
<td>Total Costs (Medical+Pharmacy)</td>
<td>Medical Costs Only*</td>
<td>CDPS: Medical Costs CDPS+Rx: Medical Costs and Drug Costs</td>
</tr>
<tr>
<td><strong>Number of Disease Groups</strong></td>
<td>127</td>
<td>79</td>
<td>CDPS Rx: 55</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>$R^2$: 30-35%</td>
<td>$R^2$: 12%</td>
<td>CDPS RX: $R^2$: 22%**</td>
</tr>
<tr>
<td><strong>Payment Adjustment Methodology and Financing</strong></td>
<td>Payments/transfers made between non-group and small group plans; transfers within a state net to zero</td>
<td>Individual plan capitation payments from CMS adjusted to reflect enrollee risk as compared to FFS</td>
<td>Per member per month capitation payments to Medicaid managed care plans</td>
</tr>
</tbody>
</table>

*CMS has a separate model for predicting prescription drug costs for Part D plans, called the CMS-RxHCC model. It uses similar groupings as the CMS HCC model.

**Disabled population.

### LIMITATIONS OF THE COMMERCIAL HHS-HCC MODEL

There are several potential limitations of the HHS-HCC Model that increase the likelihood of calculating risk scores, and therefore transfer payments, inaccurately, including:
The data sample used to estimate the model,
The selection of the specific diseases in the model,
The omission of prescription drug data that could be used both to identify diseases and also to adjust for the severity of diseases.

The commercial population is different than the large employer group population used to estimate the model

The HHS-HCC risk adjustment model is developed from data on large employer self-funded commercial claims. This database represents primarily large group market claims and encounter data, and does not reflect the demographic characteristics of the individual and small group commercial market. As is true with any risk adjustment model, the intent is for the model estimation to be based on a sample that has similar demographic and disease profiles as the population to be risk adjusted (i.e., the commercial individual and small group market population).

The specific sample for the HHS-risk adjustment model consists of 2010 MarketScan® Commercial Claims and Encounter Data. The MarketScan® data is a large, proprietary database generated from large employers and health plans. In order to provide risk adjustment factors that best reflect more recent treatment patterns and costs, CMS recalibrates the risk adjustment models each year by using more recent MarketScan® claims data to develop updated risk factors for each disease and demographic group in the model. Although CMS estimated the HHS-HCC model on a database of large group enrollees, the new commercial market—particularly exchange enrollees—have different demographic profiles, as shown in Table 2.

Table 2. Distribution of Enrollees in MarketScan Database vs. Exchange Enrollees and all Individual Market Enrollees

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>MARKETSCAN®</th>
<th>EXCHANGE POPULATION</th>
<th>ALL INDIVIDUAL MARKET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>49%</td>
<td>46%</td>
<td>49%</td>
</tr>
<tr>
<td>Female</td>
<td>51%</td>
<td>54%</td>
<td>51%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-17</td>
<td>26%</td>
<td>8%</td>
<td>19%</td>
</tr>
<tr>
<td>18-34</td>
<td>24%</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td>35-44</td>
<td>17%</td>
<td>17%</td>
<td>14%</td>
</tr>
<tr>
<td>45-54</td>
<td>18%</td>
<td>22%</td>
<td>18%</td>
</tr>
</tbody>
</table>

7 Employees, spouses, and dependents covered by employer-sponsored private health insurance coverage are included. The MarketScan® sample includes enrollees from all 50 states and D.C. Ibid.

Exchange enrollees comprised roughly one-third of the individual market in 2014.\(^{11}\) As shown in Table 2, both the Exchange population and the individual market population are significantly older than the MarketScan® employer population. The HHS-HCC risk adjustment model creates different predictive models for infants, children and adults, so the differences in the age distribution for children vs adults is not significant to the accuracy of the model. However, the difference in the age distribution for the adult population could impact the accuracy of the risk adjustment model. As shown above, the individual market adult population is also older than the MarketScan® employer population. Presumably, younger enrollees are healthier and even with diagnoses, they are less likely to have comorbidities or experience complications when compared to an older population. As a result, the potential for lower spending by this model population may result in corresponding payments to individual and small group commercial plans that are based on inaccurate estimates.

Enrollees in the individual market have lower incomes than individuals who are insured through their employers. Exchange enrollees are particularly low income, as most quality for financial assistance.\(^{12}\) Research has shown that disease profiles and utilization patterns are different for lower versus higher-income individuals.\(^ {13}\) Given that a substantial share of the individual market includes lower income Exchange enrollees that qualify for premium subsidies, differences in income between the individual and large employer markets could mean that the HHS-HCC model is not accurately estimating the relative cost of disease and utilization for the individual market population under the current model.

Another factor that may result in inappropriate risk adjustment is the high rate of churn within the individual market. Enrollees in the individual market may shift in and out of coverage within the year as a result of changes in employment, income, and availability of other sources of coverage (e.g., Medicaid or employer coverage) and this may impact utilization and costs differently than in the more stable large group market. Thus, the calculation of risk scores may be inaccurately accounting for the true cost of care for individuals who are not enrolled in coverage for the full year.

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\(^{13}\) Avalere Analysis based on claims data from Inovalon’s Medical Outcomes Research for Effectiveness and Economics Registry® (MORE\(^2\)) for individual market enrollees from 2014 and 2015.
year or enroll under a special enrollment period. Not only could this churn limit the predictive accuracy of the model, but it may also exacerbate imbalances between plans if some plans are enrolling a higher portion of short-term or special enrollment period enrollees (those enrolled for less than a full year).

Initial Avalere analysis of MORE² claims data¹⁴ finds that over 30% of enrollees in the individual market are enrolled for less than one year. On average, part year enrollees have costs that are 18% higher per assigned risk score than full year enrollees. These initial findings suggest that the model may not be fully capturing or predicting cost differences for these populations.

As a result of these differences in the populations, using the MarketScan population to estimate the model could lead to inaccurate risk score calculations, which in turn creates inaccurate transfer payments.

Diseases included in the model are not accurately capturing the health needs of the population

As noted earlier, HHS estimated the HHS-HCC model using a similar methodology to that used for the Medicare Advantage model. The model developers, working with a clinical panel, grouped diagnosis codes together and then selected a subset of disease groups for inclusion in the model. Through this process, however, the model ended up having a very small proportion of individuals—only 19.2 percent—who had at least one HCC.

Using a grouping methodology and approach based on Medicare eliminates a substantial number of diagnoses from the model. This exclusion also makes the model less accurate at predicting costs for individual and small group enrollees. While only 19.2 percent of individuals have at least one HCC in the HHS-HCC model, nearly 70 percent of the Medicare Advantage model sample enrollees have at least one HCC.¹⁵ As noted earlier, CMS selected 127 of 264 HCCs for inclusion. Presumably using the full subset of HCCs would lead to a higher percentage of individuals with diseases. However, including only the 127 HCCs means the model may underpay plans without HCCs because their risk scores are artificially low due to these high concentration of expenditures in such a small number of enrollees.¹⁶ Moreover, if the risk adjustment methodology fails to account for the actual conditions of the population, the model is not compensating plans based on the actual risk of the individuals enrolled.

¹⁴ Avalere Analysis based on claims data from Inovalon’s Medical Outcomes Research for Effectiveness and Economics Registry® (MORE²) for individual market enrollees from 2014 and 2015.
By excluding prescription drug information to identify an enrollee's HCC, the model does not take a holistic view of healthcare costs.

The premium charged by plans in the exchanges is designed to cover all expenditures, and the model itself predicts total healthcare costs (medical and prescription drug costs). The HHS-HCC model, however, does not include prescription drug information to identify health conditions. In contrast, the CMS-HCC model for Medicare Advantage only predicts medical costs, and CMS uses a separate model (the CMS-RxHCC model) to predict prescription drug costs.

Prescription drug information can be a useful and reliable source of information to identify health conditions and to also classify the severity of the diseases. As an example, individuals could be stratified based on their use of medications that correspond to different levels of disease progression. Under the current model, plans may be systematically undercompensated for enrollees who use high-cost medications, because they are not used to inform disease identification and severity. Specific medication use may provide greater insight into a person’s health status (i.e., whether they are healthier or sicker). Adding prescription drug information to the model could potentially improve the accuracy of the model. Such an approach could lead to more accurate transfer payments and better prescription drug coverage for enrollees.

**HOW CAN THE ACCURACY OF THE RISK MODEL BE IMPROVED?**

As noted in this paper, the current model for calculating risk adjustment in the exchanges has a number of limitations. Improving the accuracy of the risk adjustment program can preserve the viability of the exchange, individual, and small group markets, ensure broad participation by plans, and provide access to plans and coverage that meet the needs of all enrollees. Potential solutions include the following policy changes:

**Estimating the model on individual and small group commercial enrollees rather than the MarketScan database**

The population used to estimate the model does not closely mirror the currently-enrolled individual and small group commercial population. Using a database with individuals with higher incomes and lower utilization than current enrollees may lead to inaccuracies in the model, because the incremental costs for each disease are not properly estimated.

Additionally, given the high rates of enrollee churn in this market, further examination of how partial-year enrollments may be impacting plans’ risk profiles and whether their enrollees risk scores accurately reflect their costs under the model is critical.
Exploring ways to estimate the model based on the individual and small group commercial population could improve the accuracy of predictions. And, allowing for an open and transparent process would enable stakeholders to provide feedback on results of model changes to influence rulemaking.

Reevaluating the coverage criteria for diseases included in the model
As currently constructed, the model has a small proportion of enrollees with HCCs, suggesting that the approach for disease inclusion could be reconsidered. Using essentially the same conditions used for the Medicare model development may not be appropriate for the individual and small group commercial population. Also, to date, no results of the clinical panels' research or its deliberations are available. Yet the panels play a key role in determining which HCCs are included or excluded from the model.

Allowing more transparency on this process may provide an opportunity for stakeholders to provide feedback on these inclusion or exclusion decisions, particularly as so many stakeholders have on-the-ground experience covering or treating the wide variety of conditions enrollees in these plans face. This process could include public meetings in which the clinical panel would receive feedback from stakeholders. Additional details could include: 1) the reasons for the small percentage of individuals with HCCs, 2) the prevalence of conditions for the full 264 HCCs and 3) the implications on the model, in terms of model accuracy, of having a small percentage of individuals with HCCs.

Including prescription drug information to determine diseases and assign severity
In the proposed 2017 Notice of Benefit and Payment Parameters (NBPP), CMS suggested that prescription drug data could be used in the risk adjustment methodology to supplement diagnostic data by using the prescription drug data as a severity indicator, or as a proxy for diagnosis in cases where diagnosis data are likely to be incomplete. CMS did not finalize any approach to incorporate prescription drugs to avoid creating adverse incentives that might affect prescribing behaviors. There is a perceived risk that incorporating prescription drugs into the model would encourage increased use of high-cost prescription drugs in order to achieve higher risk scores and, thus, receive higher payments. CMS has signaled it will continue to explore ways to incorporate prescription drugs into the methodology.

A risk adjustment model that uses prescription drug information to identify conditions beyond those captured by diagnoses alone could be more accurate than the current model. The inclusion of prescription drug information to identify conditions also could allow the model to adjust for the severity of certain diseases,

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since drugs can be indicative of the level of care each patient requires. Moreover, given the possibilities of personalized medicine, adding prescription drug use may provide more nuanced information on patients than was possible previously.

**CONCLUSION**

The ACA created risk adjustment for the commercial population in order to transfer funds appropriately between plans based on their relative healthcare costs. To accomplish this goal, CMS built a model using a similar framework to the model used for the Medicare Advantage population. However, although the commercial model is more accurate in predicting the costs of a sample population, it is unclear how well the model predicts actual costs. Further analysis is needed to assess, based on actual experience, the model’s predictive accuracy.

Several issues exist that could warrant additional research. First, the population used to estimate the model should mirror the commercial population in order to ensure accuracy of risk scores and related payments. Second, increasing transparency into the decision-making that informs the diseases included in the model would leverage the experiences of stakeholders who have substantial expertise in caring for this population. And, finally, including prescription drug information to determine illness prevalence would help identify patients with HCC diagnoses as well as allow more nuanced risk scoring to reflect disease severity. Improving accuracy of the commercial risk adjustment model allows plans to receive payments that better reflect the needs of their enrollees, ensures patients have access to appropriate care, and fosters a more stable and competitive individual and small group market.
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