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Risk Adjustment in State Medicaid Programs

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Risk adjustment is a critical tool for the development and sustainability of Medicaid Managed Care Programs. Risk adjustment, if done properly, allows Managed Care Organizations (MCOs) to compete on how efficiently they can deliver care and negotiate provider reimbursement, rather than on how well they can enroll the healthiest individuals.

This article discusses some of the most important considerations in implementing risk adjustment within a Medicaid Managed Care program. The University of Maryland, Baltimore County (UMBC) and Actuarial Research Corporation published a more detailed guide, entitled "A Guide to Implementing a Health-Based Risk-Adjusted Payment System for Medicaid Managed Care Programs." This article includes references to this guide among other sources.[1]

Risk adjustment systems that use claims data were first developed in the late 1980s. Prior to the development of risk adjustment systems, rates were primarily based on age, gender, geographic region and other demographic characteristics. However, these methods generally have much lower predictive power than methods based on diagnoses and historic healthcare utilization data, especially for the more chronically ill Medicaid disabled populations.

Risk Adjustment models measure the relative morbidity of individuals. The tools use demographic and health care claims data to develop these morbidity measures. The tools that are currently being used in Medicaid Managed Care capitation rate setting are CDPS, MedicaidRx, ACGs, CRxGs and DxCGs. These tools use various algorithms that assign each person into demographic and morbidity or disease categories. Each of these categories is assigned a risk weight based on historic relationships between members in these categories and overall healthcare expenditures for these individuals.

The following table lists some of the states using or in the process of using risk adjustment in their Medicaid programs, and several of the key characteristics of the approach used in each program (where the information was available):

State	Risk Adjustment System	Individual or Aggregate	Prospective or Concurrent
Colorado	CDPS	Aggregate	Prospective
Florida	Medicaid Rx / CDPS	Aggregate	Prospective
Maryland	ACG	Individual	Prospective
Massachusetts	DxCG		
Michigan	CDPS	Aggregate	Prospective
Minnesota	ACG	Aggregate	Concurrent
New Jersey	CDPS	Individual	Prospective
New York	CRxG		
Ohio	CDPS	Aggregate	Prospective
Oregon	CDPS	Aggregate	Concurrent
Pennsylvania	CDPS		
South Carolina [(a)]	ACG		
Tennessee	CDPS	Aggregate	Concurrent
Utah	CDPS	Aggregate	Concurrent
Washington	CDPS		

(a) South Carolina has suspended risk adjustment until 2009.

Individual versus aggregate systems and prospective versus concurrent models are described in more detail later in this paper. The risk adjustment systems themselves (CDPS, etc.) are not discussed in detail since a great deal of information exists elsewhere.

The information in the table above is a combination of several sources[2,3] and the authors'

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[1] The guide is available at: *http://www.chpdm.org/publications/Risk%20Adjustment%20Manual%20without%20appendices%20-%20March%202003.pdf.*

[2] "A Guide to Implementing a Health-Based Risk-Adjusted Payment System for Medicaid Managed Care Programs," Center for Health Program Development and Management, University of Maryland, Baltimore County, and Actuarial Research Corporation, Annandale, VA, 2003.

[3] "Health-Based Risk Assessment: Risk-Adjusted Payments and Beyond," Martin et. al., January 2004.

consulting experience. The information listed may be out of date. We encourage readers to send us updates and we will include an updated, expanded table in a future edition of *Health Watch.*

There are a number of potential pitfalls when implementing risk adjustment that may cause unintended consequences and unfairly penalize or reward health plans participating in Medicaid Managed Care Programs. This article discusses some of the most important issues associated with implementing risk adjustment. Readers are encouraged to refer to the UMBC paper for a full list of considerations. While the authors of this paper do not agree with all of the opinions presented in the UMBC paper, it is fairly comprehensive in listing the issues to consider.

At a high level, the steps for implementing risk adjustment into a Medicaid Managed Care Program are as follows:

1. Decide which risk adjustment system will be used (CDPS, ACG, etc.).
2. Decide what type(s) of data should be used in the risk adjustment system (the plan may be to change this over time).
3. Decide which Medicaid eligibility groups will be risk-adjusted. In addition, some subpopulations may be excluded (i.e., AIDS and HIV).
4. Decide whether to employ a prospective or concurrent risk adjustment system.
5. Decide whether to base the risk adjustment factors on the individuals enrolled during the rating period or during the experience period ("individual" vs. "aggregate" approach).
6. Decide whether or not to customize the risk weights inherent in the risk adjustment model.
7. Decide on criteria for including individuals in the risk adjustment calculations (minimum eligibility during experience or rating period, etc.).
8. Develop criteria for claims records to be included in the risk adjustment model. This step is designed to ensure that the data being used in the risk adjustment calculations is consistent with the rating algorithms and that it is consistent across all comparative organizations.
9. Determine the phase-in schedule and whether or not risk corridors will be used. Typically, adjustments to managed care capitation rates are phased in over time as the risk adjustment process, data and calculations are refined.

The steps above are roughly in sequential order, with some interdependencies.

The UMBC guide also describes many of the eligibility and data criteria in detail, and other administrative and budgetary considerations that are outside the scope of this paper.

Two Important Definitions

Two definitions are used throughout this article, describing the two most important time periods for risk adjustment:

Experience Period – The experience period represents the data collection period. The experience period is usually 12 months in duration, and usually precedes the period which rates are being paid (in the case of retrospective risk settlements, the experience period would be the same as the period rates are being paid).

Rate Period – The rate period is the time period that rates are being paid. The rate period usually follows the experience period. The rate period is usually 12 months in duration. Also, there are usually three to nine months in between the end of the experience period and the beginning of the rate period to allow paid claims data for the experience period to complete.

Choosing a Risk Adjustment System

There may be too much focus on the predictive power of the different risk adjustment models, and not enough on their transparency and usability. The recently released Society of Actuaries (SOA) sponsored research report on the commercially

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available risk adjustment models[4] (lead by Winkelman who co-authored this paper), studied the predictive power of the different risk adjustment tools on commercial populations. On an individual member basis, there were important differences in the predictive power of the various tools which depended on the testing conditions.

The following table, taken from the SOA sponsored research project shows differences in the R-squared and Mean Absolute Prediction Error (MAPE) statistics across the different prospective and concurrent models:

Table IV.8 – R-squared Offered Nonlagged (Without Prior Cost & 250K truncation) – Prospective versus Concurrent

		R-Squared			MAPE%		
Risk Adjuster Tool	Inputs	Prospective	Concurrent	Change	Prospective	Concurrent	Change
ACG	Diag	19.2%	29.7%	10.5%	89.9%	75.0%	-14.9%
CDPS	Diag	14.9%	32.9%	18.0%	95.3%	80.6%	-14.7%
Clinical Risk Groups	Diag	17.5%	43.3%	25.8%	90.9%	70.5%	-20.4%
DxCG DCG	Diag	20.6%	51.8%	31.2%	87.5%	65.0%	-22.5%
DxCG RxGroups	Rx	20.4%	N/A	N/A	85.3%	N/A	N/A
Ingenix PRG	Rx	20.5%	N/A	N/A	85.8%	N/A	N/A
MedicaidRx	Rx	15.8%	28.1%	12.3%	89.6%	79.1%	-10.5%
Impact Pro	Med+Rx+Use	24.4%	N/A	N/A	81.8%	N/A	N/A
Ingenix ERG	Med+Rx	19.7%	42.4%	22.7%	86.4%	67.7%	-18.7%
ACG - w/ Prior Cost	Diag+$Rx	N/A	N/A	N/A	N/A	N/A	N/A
DxCG UW Model	Diag+$Total	N/A	N/A	N/A	N/A	N/A	N/A
Service Vendor	Inputs	Prospective	Concurrent	Change	Prospective	Concurrent	Change
MEDai	All	N/A	N/A	N/A	N/A	N/A	N/A

The goal of a risk adjustment system in Medicaid managed care is to accurately capture the overall relative risk at the MCO level, not at the individual level. It may be argued that the differences noted in the SOA study would not be meaningful at the MCO level. Among the top systems, it is therefore more important to choose a system based on the data used and the ability to customize the risk adjustment system, than the published accuracy of that system in individual member level predictions.

Data to be Used

In general, all risk adjustment tools use eligibility data because it is high quality, does not cause health plans to upcode or game the risk adjustment system and it increases predictive power. Therefore, risk adjustment models should include demographic information (age, gender and eligibility category).

There are three broad categories of additional data that risk adjustment models may use (including various combinations of the three):

1. **Diagnosis data from inpatient admissions –** Generally less susceptible to gaming, but health information for those without inpatient admissions is not available.
2. **Diagnosis data from outpatient services –** More susceptible to gaming than inpatient diagnosis data, but outpatient data provides a more complete picture of relative morbidity for those both with and without inpatient admissions. Outpatient diagnosis data may be incomplete for MCOs where capitation or other risk sharing arrangements exist (i.e. encounter data is often incomplete because it does not drive payment).
3. **Pharmacy data –** Pharmacy data has been shown to be very powerful for prediction, at least in part because it is plentiful and specific, but also because it completes very quickly compared to medical data. However, pharmacy data has the potential for gaming because prescribing patterns may be influenced. Off-label prescribing and the rapid adoption of new drugs are also concerns with pharmacy data.

As an example of a state using methods which change over time, Florida has decided to use a pharmacy data based risk adjuster (MedicaidRx) initially, and then transition to a diagnosis based model (CDPS) as MCO encounter data improves.

Which Eligibility Groups to Risk Adjust

There are two major considerations in deciding which rate categories to create and whether or not to apply risk adjustment within that rate category: 1) to what degree does health status vary among beneficiaries in the rate category, and 2) will the risk adjustment system appropriately capture health status variations for that category.

[4] Winkelman et. al, "A Comparative Analysis of Claims-Based Tools for Health Risk Assessment," Society of Actuaries, April 2007.

Significant variation has been observed among the Supplemental Security Income (SSI) population. As a result of this variation [and the fact that risk adjustment systems have been shown to accurately capture variations in health status], most states making risk-adjusted payments have chosen to use health status to risk adjust their SSI population.[5]

The Temporary Assistance to Needy Families (TANF) population exhibits less variation, but may still have enough meaningful variation to justify applying a risk adjustment system. In particular, the prevalence of adult diseases such as hypertension and heart disease and childhood diseases such as asthma and diabetes may vary from one population to another. A major challenge when risk adjusting a TANF population is the high level of turnover in this population. These members move in and out of the Medicaid system very frequently. Additionally, a significant portion of the population will not have medical claims with a chronic condition in a fiscal year.

The Sixth Omnibus Budget Reconciliation Act [1986] (SOBRA) population consists of women who are pregnant, but who fail to meet the TANF eligibility standards. By definition, all SOBRA women must be pregnant in order to meet the program's eligibility requirements. The medical costs for this population are often paid through a maternity "kick" payment.

Prospective or Concurrent/ Retrospective

Prospective risk adjustment uses experience period data to estimate morbidity for a future period. Because of issues with data and administrative requirements, the rating period may begin nine or more months beyond the end of the experience period.

Concurrent risk adjustment uses experience period data to estimate morbidity during that same time period. Concurrent risk adjustment is (understandably) more accurate than prospective risk adjustment.

Stated another way, concurrent risk adjustment models estimate or recognize costs during the experience period, while prospective risk adjustment models estimate costs during the rating period. For example, prospective risk adjustment models would not assign weight to conditions or injuries that would not continue to produce costs (i.e., a broken arm), while concurrent risk adjustment models would generally recognize the relative morbidity associated with these conditions or injuries.

Using a concurrent risk adjustment model in its purest form would require states to distribute payment retrospectively since data requires some time to be adjudicated and then be available to the risk adjustment system.

Assuming that MCOs systematically attract certain types of risk, a concurrent model would do the best job of estimating exactly how much variation in risk exists from one MCO to another. However, since retroactive adjustments to rates are generally not favored by states or MCOs, most states have chosen to utilize a prospective model.

Individual Versus Aggregate Risk Factor Calculation

While all risk adjustment systems calculate risk scores for each individual, the application of the risk adjustment factor in the rate process varies. Some programs calculate a composite health plan risk score across all eligible members. Then, for a subsequent period of time, the health plan capitation rate is paid at that composite health plan score. However, some state Medicaid programs transfer an individual member's risk score to a health plan when they move. Therefore, the capitation rate paid to the health plan will vary based on the actual risk factors of the members enrolled on a periodic (usually monthly) basis.

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[5] "A Guide to Implementing a Health-Based Risk-Adjusted Payment System for Medicaid Managed Care Programs," Center for Health Program Development and Management, University of Maryland, Baltimore County, and Actuarial Research Corporation, Annandale, VA, 2003.

For purposes of discussing the pros and cons of each general approach, we use the following naming convention:

Individual – risk adjustment system where risk scores for individuals are calculated during the experience period. These risk scores follow beneficiaries through the system. The risk adjustment factor for a given MCO is the weighted average of the risk scores for the beneficiaries enrolled during the rating period.

Aggregate – risk adjustment system where the average risk score for enrollees during the experience period is assumed to represent the average risk of enrollees during the rating period.

The UMBC paper discusses the individual and aggregate approaches and generally favors the aggregate approach. The key advantage of the aggregate approach discussed in the paper is that the aggregate approach assigns a claims based risk score to new enrollees (although this risk score assignment is at the average risk score of other members).

It is important to lay out the approach each method typically uses for new and existing enrollees.

Type of enrollee	Individual	Aggregate
New	Demographic enrollee	Experience period average
Existing enrollee	Individual Prospective	Experience period average

Therefore, the pure individual approach typically uses a demographic factor for new enrollees, while the aggregate approach assigns a factor equal to the average risk factor for all existing enrollees.

Rather than discarding the individual approach altogether because of this issue with new enrollees, it is important to consider a potential fix and then make a choice as to which approach to use. For new enrollees, a risk factor either equal to the average of the existing enrollees, equal to a demographic factor, or something in between could be used. With this modified approach, the assumption as to the portion of the variation in risk due to systematic issues could be separately identified. The individual approach has the major advantage of recognizing shifts in enrollment, which is an especially important issue during the initial roll-out of a managed care program.

The UMBC paper also identifies the improved accuracy of concurrent models compared to prospective models and definitively links concurrent models with the aggregate approach and prospective models to the individual approach. The reason prospective risk adjustment models are linked to the individual approach is that the rating period represents a future period compared to the experience period. However, in the aggregate approach, the rating period still represents a future period. The individual approach is not inherently inconsistent with the assumption that MCOs systematically attract certain types of risk. The problem may lie in how states have historically implemented the individual approach. Modifications along the lines of the adjustment for new enrollees might address the concurrent versus prospective issue.

Customization of Risk Weights

Customization of risk weights is often necessary for a state Medicaid risk adjustment system based on differences in the state program as compared to the population underlying the development of the risk adjustment system:

1. Benefit carve-outs
2. Data coding differences
3. Regional practice and patient utilization patterns
4. Regional differences in costs among specialties and care settings
5. Differences in the number of eligibility categories and sub-categories and the criteria for assigning individuals into those categories.
6. The need or desire to include individuals with limited exposure (demographic risk

weights would increase if risk models are customized to appropriately reflect the risk for these individuals).

Birth and delivery "kick" payments are examples of benefit package carve-outs that many states employ and which fundamentally affect the risk adjustment system. It is not appropriate to capture risk differences due to pregnancy or newborn status and then make a separate payment on that basis. Mental health benefit and pharmacy benefit carve-outs also require customization of the risk weights. The calibration step should exclude direct mental health or pharmacy benefit costs. However, because the presence of mental health conditions has been shown to exacerbate some medical conditions, mental health services should be left in the data for purposes of assigning members into their condition categories.

Criteria for Including Individuals

A decision on which specific individuals to include in the risk adjustment system needs to be made in addition to which eligibility categories to include. The criteria should include duration criteria and be consistent with the rate development and MCO contracts. Many states require at least six months of eligibility exposure in the experience period to be included in the risk adjustment calculations. Pharmacy based models require fewer months of eligibility to provide meaningful predictions (because of the frequency of pharmacy utilization and the faster completion).

All else being equal and without customization of risk weights, risk scores will decrease as the number of months of data decreases from the 12 month standard. Ideally, different risk weights should be developed which reflect the amount of experience each individual has in the system. The demographic risk weights will increase as the number of experience period months decrease, and the condition risk weights may increase or decrease. Alternatively, it is important to analyze the average number of months of experience across sub-populations to ensure that one MCO does not have a higher or lower average number of months of experience per enrollee than other MCOs and/or the state.

Phase-in and Risk Corridors

The purpose of phase-in and risk corridor provisions is to moderate the impact of the implementation of risk adjustment, both as MCOs refine data and understand the impact, but also as the state and their technical support staff are able to refine the risk adjustment process.

Phase-in refers to the portion of differences in risk adjustment which are applied to the MCO's capitation rate. For example, if the phase-in for a particular year were 80 percent and the relative risk adjustment factor for a particular MCO was 0.95, then the phase-in risk adjustment factor for that MCO would be 0.96 [0.95 x 0.80 + 1.00 x 0.20].

Risk corridors are often used in the initial roll-out of a Medicaid risk adjustment system to ensure that a particular MCO does not experience too large of an upward or downward adjustment to revenue. For example, a risk corridor of +/- 5 percent would mean that a risk adjustment factor of 0.92 would be increased to 0.95, and a risk adjustment factor of 1.10 would be reduced to 1.05.

It is important to recognize that risk corridors could cause payments to be asymmetric, and therefore could cause the overall risk adjustment system to not be budget neutral.

Other Considerations

There are a number of other considerations that need to be made during implementation of a risk adjustment system, including the following:

1. **Budget neutrality** – It is important that the state does not create an adjustment that changes the overall payment, since risk adjustment is intended to re-distribute funds according to the relative risk being covered

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by the MCOs and state. Phase-in and risk corridors that vary according to how long an MCO has been active have the potential to adversely affect this neutrality.

2. **Timing of updates** – A survey conducted as part of the UMBC survey determined that 70 percent of states updated risk scores annually, 20 percent updated semi-annually, and 10 percent updated quarterly. The characteristics of the population and risk adjustment system should be reviewed to determine the frequency of risk score updates.
3. **Data testing and validation** – Data quality drives the risk adjustment models, and resulting adjustments. Therefore, it is important to have robust data testing and validation process. The UMBC paper outlines a number of methods to test and validate the data going into the risk adjustment system. However, probably no issue is more important than the comparability and quality of encounter data, especially where capitated provider contracts exist. If the state does not intend to penalize MCOs for incomplete encounter data, then adjustments to the standard risk adjustment calculations need to be made and sufficient time and education needs to be provided so that MCOs can improve their data quality.
4. **HIPAA considerations and controls** – Risk adjustment factors inherently contain information on the health of each individual and should be considered Personal Health Information and should be protected as such.
5. **Newborns** – Several states have begun to introduce risk adjustment systems for the TANF populations. However, due to the unique nature of their expenditures and limited months of eligibility in a fiscal year, modifications to the risk adjustment systems may need to be implemented. For example, the six month minimum enrollment requirement should be removed for newborns. Additionally, a prospective payment system would not capture newborn costs. The newborn costs would need to be paid through a concurrent system or through a newborn "kick" payment.

Conclusion

Risk adjustment is an important tool to align incentives between health plans and state Medicaid managed care programs, as well as reward stakeholders who perform well. It is important to recognize and address differences in how the models were built and how each model may be implemented. Some of these differences have important implications. Due to the financial implications associated with the risk adjustment system implementation methodologies, all stakeholders need to work collaboratively to openly share and discuss data and implementation decisions.