



Key Topics

- ▲ Currently, risk adjustment is used in the Medicare Advantage and Medicare prescription drug programs, many Medicaid programs, other governmental programs, and some private plans.
- ▲ The *Patient Protection and Affordable Care Act* (PPACA) establishes a risk adjustment system for plans in the individual and small group markets beginning in 2014.
- ▲ When determining how to implement a risk adjustment system under PPACA, it is important to balance the tradeoffs between using data that are available in a timely manner, maximizing the model's predictive accuracy, and minimizing the opportunity for gaming, while also ensuring the model can be implemented at a reasonable cost.

Risk Assessment and Risk Adjustment

Risk adjustment is an actuarial tool used to calibrate payments to health plans or other stakeholders based on the relative health of the at-risk populations. In particular, if insurers are limited in the extent to which premiums can vary by health status or other factors that are associated with health spending, risk adjustment can help ensure that health plans are appropriately compensated for the risks they enroll. A well-designed risk-adjustment system is one that properly aligns incentives, limits gaming, and protects risk-bearing entities (e.g., insurers, health plans). Currently, risk adjustment is used in the Medicare Advantage and Medicare prescription drug programs, many Medicaid programs, other governmental programs, and some private plans. This paper is intended to provide background on risk adjustment and considerations for implementing risk-adjustment methods. Because risk adjusting plan payments relies on risk assessment to determine the relative risk of insured populations, an overview of the risk-assessment process is also provided.

Health Risk Assessment

Health risk assessment is a means of objectively determining whether an individual or group represents a risk that is reasonably close to the population average and, if not, of quantifying the relative deviation from the average. Individuals who are expected to incur higher health spending are considered relatively worse (i.e., higher) risks than those who are expected to incur lower spending.

The American Academy of Actuaries is a professional association with over 16,000 members. The Academy's mission is to assist policymakers by providing leadership, objective expertise and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice and professionalism standards for actuaries in the United States.



In a typical health risk assessment, each individual is scored based on an algorithm that incorporates information on the individual's age, any illnesses during the previous year, and other factors. This process can operate like a multiple-choice questionnaire with many questions. The response to each question generates a numerical value, which is combined to produce a risk score for each individual, so that a *weighted average value* can be determined and used to compare the relative risk of one population to another. In other words, the relative risk of any particular risk category is the ratio of the average health spending for all individuals in the risk category to the average health spending for all individuals in all risk categories.

Claims-based risk-assessment models use data, typically from a 12-month period, to identify underlying conditions and assign a risk score. For example, a risk assessment model might use health care claims data from the 12 months ending June 2009 to predict health care spending in calendar year 2010. The gap period between June 2009 and the beginning of 2010 is necessary for most of the claims data from the 12-month period to become available, be considered complete, and be evaluated by the risk-assessment model.

Table 1 provides a hypothetical risk score development for a sample member. The example shows each of the member's conditions identified from historic claims data and the resulting risk score.

Table 1. Hypothetical Risk Score Development

Risk Marker	Risk Weight
Male Age 32	0.22
Diabetes with significant co-morbidities	1.32
Asthma / COPD	0.96
Low cost dermatology	0.30
Total	2.80

In this hypothetical example, a 32-year-old male has diabetes, asthma, and a low-cost dermatology condition. His risk score is the sum of the demographic risk weight and the risk weights for his indicated conditions (most risk-assessment models have dozens of condition categories). In this example, the population average risk score is 1.0. This particular member has a risk score of 2.80, which means that his costs are expected to be about 2.8 times that of an average member according to this risk-assessment model.

Risk assessment can be used to risk-adjust payments to health plans and to providers who accept capitated payments. It also can be used by health plans for underwriting, identifying high-cost patients for disease management programs, and measuring provider efficiency.

Currently Available Health Risk-Assessment Tools

A wide range of health risk-assessment tools are currently available, many from private vendors who charge a fee for their use. Basic risk-assessment models include demographic factors such as age, gender, and self-reported health-status information. More sophisticated models use medical condition or treatment information.

The Society of Actuaries (SOA) undertook a study that evaluated the predictive accuracy of 12 claims-based health risk-assessment models.¹ To varying degrees, the different models incorporated information on medical diagnoses, medical procedures, prescription drugs used, previous total health spending, and previous prescription drug spending. For instance, some models relied solely on either medical condition information or prescription drug utilization, while others used both.

In general, the SOA study found that when used prospectively, the models were able to explain between 15 percent and 28 percent of the variation in medical claim costs across individuals (i.e., the R-squared ranged from 15 percent to 28 percent). Although that leaves a

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significant portion of variation unexplained, this is an improvement over using age and gender information only, as together they explain less than 5 percent of the variation in medical claims. In addition, risk assessment does a much better job of explaining variations in costs among larger groups than among individuals. For instance, explained variation for groups greater than 500 can exceed 90 percent. This is an important distinction because risk adjustment typically is applied to large groups of individuals.

Aside from predictive accuracy, other criteria are important when evaluating and selecting a risk-assessment model, including cost, ease of use, access to quality data, underlying logic of the model, transparency, and resistance to gaming. Many of these will be explored in more detail below.

Health Risk Adjustment

Health risk adjustment is the process of adjusting payments to organizations (usually health insurance plans) based on differences in the risk characteristics of people enrolled in each plan. Risk adjustment relies on risk assessment to determine the relative risks among individuals and groups.

Risk-adjustment methods can be designed to accomplish several goals, including:

- Compensating insurers fairly and equitably for the risks they assume;
- Reducing the effects of either inadvertent or intentional risk selection so that insurers in a competitive market can compete on the basis of medical and administrative efficiency and quality of service and care, rather than on the ability to select risk;
- Maintaining consumer choice from among multiple health plans based on premiums that reflect plan design differences and relative medical and administrative efficiencies, rather than selection;
- Protecting the financial soundness of the system.

Risk adjustment may be necessary when rating restrictions prohibit health plans from recognizing health status or other risk factors in premium rates. For instance, in a pure community-rating environment, premiums are not allowed to vary by health status or other factors that are associated with health spending, such as age and gender. Even when rating rules allow the use of such factors, the degree to which premiums are allowed to vary by insured characteristics is often limited. When premiums for individuals at risk for high health spending don't reflect fully those higher costs, health plans could develop strategies for avoiding high-risk individuals. Risk adjustment can be used to reallocate premium income among plans to take into account the health status of plan participants. Risk adjustment helps to make payments to competing plans more equitable, thereby protecting plan solvency and reducing the incentives for competing plans to avoid high-risk individuals with higher-than-average costs.

Risk adjustment would also be appropriate when multiple health plan options are available to members. When plans with high cost-sharing requirements are offered alongside plans with low cost-sharing requirements, people who expect to be high users of medical care tend to enroll in the plans with lower cost sharing, even after the plan design differences are reflected in the premium. Reflecting this selection in the premiums would result in even larger premium differences between the plan offerings. Risk adjustment can be used by a plan to internally reallocate funds to adjust for selection, when actual premiums are set to reflect plan-design differences, but not the full effect of selection.

How Health Risk Adjustment Is Used Today

MEDICARE—Risk adjustment is used to adjust plan payments in the Medicare Advantage (MA) program, as well as in the Part D prescription drug program. Payments to MA plans currently are adjusted to reflect enrollee

¹ Ross Winkelman and Syed Mehmud. 2007. *A Comparative Analysis of Claims-Based Tools for Health Risk Assessment*. Schaumburg, Ill.: Society of Actuaries.

demographics and diagnoses based on historical medical claims data, as well as Medicaid, disability, and institutional status. Payments to prescription drug plans are adjusted using similar methods, including demographics and diagnoses based on historical medical claims data, as well as low-income subsidy eligibility and institutional status. Data on drug claims are scheduled to be incorporated into the risk-adjustment process in 2011. For both MA plans and drug plans, plan payments for new enrollees are adjusted for demographics and non-diagnosis-based factors only.

MEDICAID—Many state Medicaid programs include managed care programs, in which Medicaid enrollees can or must enroll with a private health insurance company. Many of these state Medicaid programs employ claims-based risk adjustment to mitigate selection issues, using various approaches and methodologies.

MASSACHUSETTS—The Commonwealth Care program offers subsidized health insurance coverage to income-eligible individuals and is set up structurally like a Medicaid managed care program in which private health insurance companies bid for the ability to enroll eligible members. Risk adjustment has been implemented to mitigate selection issues among the health plans, with risk-adjustment factors based on demographics and diagnoses. Risk-adjustment mechanisms are not currently being used in the state's Commonwealth Choice program, which offers unsubsidized coverage.

EMPLOYER-BASED PLANS—In the private-plan setting, risk adjustment is used to modify plan payments, particularly when employers offer multiple plan options to their employees. Some employers who offer multiple plan options pay risk-adjusted premiums to the plans, depending on the average risk profile of employees enrolled in each plan. The employee share of the premiums can be set to include only the impact of plan-design differences or also to include, at least in part, the impact of selection.

Considerations When Determining How to Implement Risk Adjustment Under the Patient Protection and Affordable Care Act

The *Patient Protection and Affordable Care Act* (PPACA), enacted in March 2010, includes provisions related to risk adjustment. In particular, non-grandfathered plans in the individual and small group markets will be subject to risk adjustment beginning in 2014. States will assess charges to plans with enrollment of less-than-average risk and will provide payments to plans with enrollment of higher-than-average risk. The Secretary of Health and Human Services, in consultation with states, the National Association of Insurance Commissioners (NAIC), and other interested parties, will establish the criteria and methods to be used in the risk-adjustment process. The discussion below provides some initial guidance on the various issues that will need to be addressed in the regulatory process.

Health-based data options

In addition to incorporating demographic information and other appropriate non-health based characteristics (e.g., low-income eligibility status), medical condition indicators are a key component of risk-adjustment models. Determining which specific health-based indicators to use will depend on the availability of timely data and the susceptibility of the indicators to gaming. When possible, it is preferable to base risk-adjustment systems on diagnosis-related health data, rather than on treatment data, because diagnosis data is more resistant to gaming. (More detail on the need for risk-adjustment systems to be resistant to gaming is provided below.)

In general, claims information can be used to develop risk-adjustment systems based on three types of data either alone or in combination—diagnosis data from inpatient claims, diagnosis data from outpatient claims, and pharmacy claims data. Each data source comes with advantages and disadvantages for use in risk-adjustment models.

- **DIAGNOSIS DATA FROM INPATIENT CLAIMS**—Diagnosis data from inpatient claims are very resistant to gaming. However, diagnosis

information can be incomplete, especially when providers are paid on a capitated basis rather than on a fee-for-service basis, and there can be a long lag in the data-collection process. In addition, inpatient diagnosis data will not capture diagnosis information for plan enrollees who only use outpatient services.

■ **DIAGNOSIS DATA FROM OUTPATIENT**

CLAIMS—Diagnosis data from outpatient claims are more susceptible to gaming than inpatient diagnosis data, in part because outpatient services can be more discretionary. They are therefore potentially more reflective of differences in treatment patterns than underlying diagnoses. However, including diagnoses from both inpatient and outpatient claims data provide a more complete assessment of an individual's relative risk and has become the norm in risk-adjustment methodologies.

- **PHARMACY CLAIMS DATA**—Pharmacy data are fairly uniform across health plans, complete very quickly, and do not have many of the issues associated with diagnosis data. But because pharmacy prescriptions are more treatment-based than diagnosis-based, and more discretionary in nature than some medical procedures, pharmacy data are even more susceptible to gaming than outpatient diagnosis data. Also, pharmacy-only risk-assessment models typically cannot distinguish between different levels of severity among enrollees who are prescribed drugs in the same therapy class. However, risk-adjustment models that use only pharmacy claims data have proven to be surprisingly powerful predictors of future medical costs—the SOA risk-assessment study found that, in terms of predictive power, pharmacy-only models rival models that use both diagnosis data and pharmacy data. Nevertheless, the gaming concerns with pharmacy data are significant and should be addressed carefully if a pharmacy risk-assessment model is used.

Resistance to Gaming

Risk-adjustment systems should be designed

to minimize the extent to which they can be manipulated to their benefit by health plans or providers. Health care provider coding practices vary considerably across organizations and individuals. Risk adjustment provides incentives for organizations to completely report encounters with patients and prescribe necessary medications so that the organization gets full credit for the conditions of its individuals. However, incentives can be so strong that they could cause providers to upcode diagnoses, an activity usually referred to as “gaming.” Pharmacy-based risk-adjustment models are particularly susceptible to gaming concerns—there is often a choice of appropriate medications, giving providers the opportunity to prescribe the medication that will maximize risk-adjustment payments. Carefully selecting a risk-adjustment model and methodology is important to prevent gaming. The administering agency or organization should put controls in place to detect and resolve inappropriate coding or prescribing.

Individual or Aggregate Adjustment

Risk-adjustment systems always calculate risk scores for each individual, but there are two basic approaches for using individual scores to adjust plan payments. For the purposes of illustrating these approaches, assume that a risk-adjustment program uses claims data from July 2008 to June 2009 to calculate individual member-level risk scores, with a premium payment period of calendar year 2010.

Under an ‘individual’ approach, risk scores follow members during the rating period. In the example, the risk-adjustment factor for each health plan will be based on who is enrolled with that health plan during 2010.

Under an ‘aggregate’ approach, risk-adjustment factors for each health plan are based on the enrollment in that health plan during the data collection period (July 2008 to June 2009). The aggregate approach assumes risk differences across health plans do not change rapidly and are stationary across time.

The aggregate approach is simpler—plan risk scores can be calculated in a more timely fashion and claims-based risk scores (rather than risk scores based only on demographics)

can be assigned to a higher share of individuals since new enrollees are not explicitly scored. However, the aggregate approach does not measure any shifts in risk caused by changes in enrollment, product offerings, or other program changes. This is especially problematic for new programs and health plans that are new to a market.

The Medicare Advantage program, some state Medicaid programs, and the Massachusetts Commonwealth Care program currently use the individual-based risk-adjustment approach. Other state Medicaid programs use the aggregate-based approach and a few use hybrid approaches.

Prospective or Concurrent Models

To predict health spending in any given period, prospective risk-assessment models use information on health spending indicators from a previous period. Concurrent risk-assessment models use information on health spending indicators during the current period. Some health status indicators, such as the diagnosis of a chronic condition, are accurate predictors of health spending not only in the current year, but also in future years. Other health status indicators, such as a broken arm or leg due to an accident, can help predict costs in the current year, but do not necessarily translate to spending in future years. Because concurrent models will reflect new diagnoses that arise during the year, retrospective payment adjustments are typically required.

Whether an individual-based or aggregate-based risk-adjustment approach is used will help determine whether a prospective or concurrent model is used. Individual-based approaches generally use prospective models and aggregate-based approaches generally use concurrent models.

Concurrent models typically differentiate more between health plans' risks than prospective models. But, they also can be less resistant to gaming. Because current diagnoses and/or treatments can affect the risk-adjusted payments to plans, there may be more opportunity and incentive to code diagnoses or prescribe treatments to maximize the payments to the plan.

Administrative Costs

The administrator or payer charged with coordinating the risk-adjustment process will incur various administrative costs, including the following:

- If a licensed risk-assessment model is selected, the vendor will typically charge a periodic flat fee as well as a per-enrollee fee. If, instead, a publicly available free risk-assessment model is used, such fees would be avoided.
- There are also costs associated with collecting the demographic and claims-based data that will be used as inputs to the risk-assessment model, checking and correcting the data for any inaccuracies, standardizing the data for consistency, storing the data, and processing the data through the risk-assessment model. To some extent, these costs already might be incurred if data are being collected and used for other purposes, such as clinical outcomes analyses or provider efficiency measurement.
- There will be costs associated with reporting requirements.
- If retrospective payment reconciliations are performed, costs will be incurred for any associated data analysis and reporting activities.

Administrative costs during the first year of implementation can be especially high, as they will include any start-up costs associated with setting up the data collection and reporting systems. Also, many private vendors of risk-assessment models have standard models that can be used to adjust payments to public or private plans. However, these models typically need to be calibrated or customized to reflect the specific program and characteristics of the covered population. It is important to consider the extent of the differences between how the model was developed and how it will be used when deciding whether to customize (recalibrate) it. If it is decided to customize the model, the associated costs also will be incurred as part of start-up costs. After the start-up period, the annual implementation costs can be more moderate. The start-up and annual costs could

be passed along to the plans or be financed through alternative means.

In addition to any administrative costs incurred by the administrator or payer, the participating plans may incur costs associated with data and reporting activities. They will also incur model vendor fees if they wish to replicate in-house the risk assessment results that the payer presents to them.

Other considerations

- **PHASED-IN IMPLEMENTATION**—When a risk-adjustment system is first put into place, complete data on health-based information may not be available for many plan enrollees, and health plan diagnosis data may not be fully coded. Therefore, it may be appropriate to phase in implementation of a risk-adjustment payment system over a period of time. During the initial years, demographic and other non-health based information can be used, with claims-based risk-adjustment models phasing in over time. The Medicare Advantage program has taken this approach. Risk-sharing provisions, such as risk corridors or reinsurance, can be used during the first years of a new health program to help protect health plans against adverse selection while the risk adjustment model is being phased in. Because it may take health plans time to improve their diagnosis data reporting and pharmacy data, it may be appropriate to phase from a demographic-based risk-adjustment system to a pharmacy-based system to a diagnosis-based system using inpatient and/or outpatient claims. The Florida Medicaid program, for instance, has taken this approach.
- **REINSURANCE**—Risk-assessment tools perform very well for projecting relative costs of large groups composed of a broad cross section of health risks. Future health costs can be fairly predictable for individuals identified as having chronic conditions since extensive data are available to estimate future spending based on prior experience. However, some enrollees will likely need extremely expensive treatment for unusual conditions. This spending will be less well-predicted by the risk-assessment model; the low frequency of the condition means that there will be little, if any, experience data available upon which to base spending estimates. In addition, some individuals will experience health spending associated with accidents or other acute episodes that won't be predicted at all by a risk-assessment model that relies on prior claims or diagnoses. Reinsurance, either through the private market or sponsored by the government, can help protect health plans from unpredictable swings in costs that can occur despite the existence of a risk-adjustment system.
- **BUDGET NEUTRALITY**—Risk adjusting plan payments is typically done on a budget-neutral basis. Plans with a disproportionate share of higher-risk enrollees receive relatively higher payments, and plans with a disproportionate share of lower-risk enrollees receive relatively lower payments. Therefore, the net effect of risk adjustment is a movement of money among participating organizations, rather than a net increase or decrease in total payments within the system.
- **ALIGNING RISK-ADJUSTMENT METHODOLOGY AND PREMIUM RATE DEVELOPMENT**—Risk adjustment is used to ensure that plans receive adequate payments when rating restrictions limit the extent to which premiums are allowed to vary by known risk factors. Therefore, it is important to align the risk-adjustment methodology with the underlying premium-rate development. To the extent that certain factors are incorporated in premiums, these factors may not be appropriate to include in the risk-adjustment methodology. Otherwise, these factors may be double-counted and reflected in both the premiums and the risk-adjustment payments.
- **WHICH PLANS TO RISK ADJUST**—When individuals obtain their coverage through a particular mechanism, such as through a state Medicaid program or through their employer, it can be feasible to risk-adjust the plans competing for those individuals.

For instance, risk-adjusted payments can be made on a budget-neutral basis to Medicaid plans based on the relative risk of their enrollees. Similarly, an employer offering multiple plan options to its employees can risk-adjust the plan payments to account for selection effects between the plans. However, it can be more complicated to implement a risk-adjustment mechanism in a broader market context unless there is a centralized administrative authority. For instance, it may be feasible to risk-adjust plan payments if there is a market exchange or connector system, with payment adjustments flowing between plans in the exchange. However, if insurance plans also are offered to the same population outside of the exchange, the risk-adjustment system ideally would include these plans (including self-insured plans) within the risk-adjustment system as well. Otherwise, there could be incentives to game the risk-adjustment system by enrolling certain individuals or groups inside or outside of the exchange, depending on which method is more advantageous to the plan. It may be administratively difficult, however, to include plans outside of the exchange in the risk-adjustment system due to increased data collection difficulties.

Conclusion

Risk-adjustment mechanisms can help mitigate incentives for plans to develop strategies to avoid high-cost enrollees, leading to plan competition that is based on risk selection rather than on medical and administrative efficiencies and quality. Risk adjustment helps to ensure that plans receive adequate payments when rating restrictions limit the extent to which premiums are allowed to vary by known risk factors. It is most needed when there is wide variability in claims among enrollees in the same premium category. That said, the administrative costs of a risk-adjustment system can be substantial, especially during the start-up period. These costs need to be reasonable compared to the amount of money that is shifted between plans through the risk-adjustment process.

A well-designed risk-adjustment system is one that properly aligns incentives and protects risk-bearing organizations. To do so, it must be designed to balance the tradeoffs between using data that are available in a timely manner, maximizing the model's predictive accuracy, and minimizing the opportunity for gaming, while also ensuring the method can be implemented at a reasonable cost.