



# Risk Adjustment: What is the current state of the art and how can it be improved?

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## SUMMARY OF KEY FINDINGS

- > **Prospective risk-adjustment models under-predict costs for high-cost patients and over-predict costs for very low-cost patients.** Using a hybrid approach of concurrent and prospective risk adjusters may help alleviate this problem.
- > **Including prior year expenditures is the best way to increase the accuracy of risk-adjustment models, but it may weaken incentives to provide cost-effective treatment to patients.**
- > **Risk adjustment has encouraged plans to provide coverage for high-cost patients, but these patients are still overrepresented among disenrollees in the Medicare Advantage program.** Risk adjustment has had mixed success in discouraging risk selection.

## Why is this important to policy-makers?

- All major public programs providing health coverage under capitation arrangements, including Medicare Advantage, Medicare Part D, and Medicaid, use risk adjustment to set payment rates that reflect expected costs.
- Without risk adjustment, health plans have an incentive to enroll healthier members and avoid sick members, especially when they cannot vary premiums by health status or other known factors likely to affect health care costs.
- The Affordable Care Act (ACA) moves risk adjustment beyond public programs to the private insurance market. The ACA requires risk adjustment for all insurers in the individual and small group market to reduce the incentive for plans to target their marketing toward healthy people, make insurance market reforms viable, and compensate insurers that enroll high-needs patients.

*Risk adjustment has a variety of uses, but this policy brief focuses on using risk adjustment for payment purposes.*

## What is risk adjustment?

Risk adjustment is the statistical process of setting capitation payments to health plans to reflect the expected costs of providing care to their members. Because of differences in health status and treatment needs, costs can vary significantly among plan members.

Risk adjustment begins with risk assessment, in which plan members are assigned risk scores. To perform a risk assessment, information about the enrollee that can be used to predict costs is collected. That information typically includes the enrollee's demographic characteristics and medical conditions. By measuring the relationship between these characteristics and costs for a large group of enrollees, a formula is developed to calculate a risk score for each individual. A risk score is their relative cost compared with the average for the population eligible for enrollment. For example, a 50 year old enrollee with a hypertension diagnosis may be expected to cost 20 percent more than average.

Risk adjustment helps ensure that payments to plans reflect the differences between their enrollees and the eligible population. Strong risk-adjustment models reduce competition among plans for favorable risks, help mitigate adverse selection, provide incentives to enroll high-cost individuals, and help ensure that plans that enroll high-cost patients have the resources needed to provide efficient and effective treatment.

Although risk adjustment is widely used in all major health programs, the majority of research comes from its use in the Medicare Advantage program.

## DATA SOURCES

Data used for most risk-adjustment models include demographic information, such as age and sex, as well as diagnosis codes obtained from the enrollee's medical claims. Other types of data differ by model and may include:

**Prescription drugs:** This source provides timely information and is often easily obtained, but may not be an accurate indicator of the severity of the patient's condition and identifies the diagnosis only indirectly. When added to data from diagnostic codes, though, it can improve the model's effectiveness.

**Self-reported health status:** Survey data or clinical assessments can capture information that does not show up in claims data. They provide important detail on the ability of patients to function on a daily basis, which is especially important for the frail and elderly, and their likelihood of using health care services. However, this data can be subjective and expensive to collect.

**Laboratory and other clinical data:** Including lab data and medical information from charts improves the predictive power of risk-adjustment models, but the data are expensive to collect. As electronic health records become more widespread and standards for interoperability are implemented, the accessibility of clinical data will increase and the cost of collecting it should decrease.

**Prior year expenditures:** Previous health care use is the strongest predictor of future use. Including prior year expenditures improves the predictability of the model substantially. One downside to including prior use is that it may weaken incentives to contain costs and penalize plans who do so.

## What types of models are used?

Risk-adjustment models fall into three categories: prospective (using prior year data to predict future costs), concurrent (using the same year data), and hybrid (using a blend of prospective and concurrent).

**Existing prospective models all perform about the same, but under-predict costs of high-cost patients and over-predict costs for low-cost patients.** Prospective models can be diagnostic-based or prescription-based (see sidebar). Prospective models under-predict for enrollees with certain disease categories such as cancer, asthma or HIV.

**Using prior expenditures to adjust payments in a prospective model would increase predictive accuracy, but it may weaken incentives to hold down costs.** If patients remain continuously enrolled in the same plan, the plan would have less incentive to hold down costs because it would be rewarded in the following year with higher payments.

**Modeling using current year data on diagnoses predicts expenses more accurately than models using prior year data.** Much of the improvement comes from accounting for the cost of newly acquired conditions and exacerbations of previous conditions that could not be predicted at the individual level. Concurrent models could weaken incentives to provide care efficiently by penalizing plans that help patients avoid new or worsening conditions.

**A hybrid model may be a good alternative to a solely prospective or solely concurrent approach.** One study used a prospective model for most enrollees and a concurrent model for a small percentage of enrollees with selected chronic conditions (Reference 1). The authors found the blended model was nearly as accurate as a purely concurrent model while only requiring updated data on a fraction of the enrollees.

## How well does risk adjustment work?

The effectiveness of risk adjustment in the real world can be measured by whether it increases plans' willingness to provide coverage to high-needs patients, decreases the disenrollment of high-risk enrollees, and reduces risk selection.

**Risk adjustment has encouraged plans to provide coverage to high-cost patients.** Evidence from Medicare Advantage (Reference 3) and Europe (Reference 4) shows that risk adjustment has diversified the population that can be profitably insured. Using data from the Medicare Current Beneficiary Survey to compare beneficiaries before and after refined risk adjustment was implemented, Brown et al. (2011) found the range of expected costs among enrollees increased. This finding suggests plans have chosen to market more broadly or at least made less effort to avoid those with high needs (Reference 5).

# Upcoding significantly undermines risk adjustment.

**High-cost cases are overrepresented among disenrolled patients in the Medicare Advantage program.** Studies found that although enrollment rates increased and disenrollment rates decreased with refined risk adjustment, the costs of disenrollees were higher compared with the costs of those who remained continuously enrolled (Reference 7). In other words, the patients who disenrolled were sicker and costlier than those who remained in the plan.

**The degree of favorable selection into Medicare Advantage plans appears to have lessened as risk adjustment has improved, but plans still experience favorable selection relative to fee-for-service.** Even after the adoption of more sophisticated risk-adjustment processes in Medicare Advantage, plans still offer benefits more likely to attract beneficiaries with low expected costs (Reference 8). However, one study using multiple years of data found that risk-adjusted profits among Medicare Advantage plans subject to improved risk adjustment were less than unadjusted profits from the years before the improvement (Reference 9).

## How can risk adjustment be improved?

Regardless of the model used, there is a concern that risk adjustment does not do an adequate job of offsetting favorable selection, compensating for high-cost enrollees, or providing strong incentives to improve patients' health.

**“Upcoding” —that is, recording more diagnoses or more severe diagnoses than may be warranted—undermines risk adjustment.**

Electronic health records can exacerbate upcoding by making it easier to identify and record credible diagnostic codes (Reference 6). In Medicare Advantage, payments to all plans are scaled back based on an average estimated upcoding rate. However, this creates the incentive for every plan to practice upcoding in order to offset the automatic payment reduction. The adjustment for upcoding needs to be plan-specific. For example, a plan's average risk score could be adjusted downward if its own increase from the prior year exceeded the average increase among all plans or among those in fee-for-service.

**Truncating costs above a threshold amount improves the overall fit of the model.** Research shows that risk adjustment results in an underpayment for the highest-cost patients. Not only are costs easier to predict when the impact of the highest-cost cases is reduced—such as by scaling down those above \$100,000 or \$250,000 to that threshold level—but highly skewed cost data can distort risk-adjustment models. Truncation should be combined with reinsurance to reimburse plans for costs above the threshold for high-cost patients.

## RISK-ADJUSTMENT SYSTEMS

Four prominent risk-adjustment systems are Ambulatory Care Groups (ACGs), Diagnostic Cost Groups (DxCGs), Hierarchical Condition Categories (HCCs), and the Chronic Illness and Disability Payment System (CDPS).

**ACGs** are assigned based on diagnoses from patient encounters with providers, classified according to the pattern of spending they are likely to produce. Combinations of these diagnosis groups are then used to define mutually exclusive groups, each with a unique cost weight.

**DxCGs** are assigned to clinically-based diagnostic groups based on diagnosis codes from encounters. Patients with encounters for multiple related groups are assigned to the category with the most important resource implication. Beneficiaries' costs are predicted based on the combination of categories into which they fall.

**HCCs** are diagnostic categories based on the DxCG system, but optimized for the needs of the Medicare program. Categories focus on chronic conditions likely to affect Medicare beneficiaries (e.g., congestive heart failure, diabetes, Alzheimer's) rather than conditions such as pregnancy or childhood diseases.

**CDPS** was originally developed for states to use in adjusting capitated payments for health plans serving Medicaid beneficiaries, but has since been adapted and recalibrated to risk adjust costs so that it might be used for Medicare and other populations. The CDPS subdivides diagnoses by body function (e.g., endocrine system problems, cardiovascular system diseases) and codes most diagnoses by level of severity.

# Risk adjustment for newly insured enrollees can be done.

## RISK ADJUSTMENT FOR NEW ENROLLEES

It can be difficult to estimate costs of people newly eligible for health coverage, such as individuals who become eligible for Medicare when they turn 65 or individuals who were previously uninsured, because there may not be sufficient data. Evidence shows there is a large variation in costs among new enrollees in Medicare, highlighting the need for accurate risk adjustment (Reference 2).

**Concurrent risk adjusters or a mixed concurrent-prospective hybrid could be used for new enrollees.** Chronic conditions are well suited for concurrent risk adjustment because they can capture newly emerging conditions, such as cancer or a stroke, that are not gameable and are unlikely to have arisen due to poor care by the plan.

**Group risk adjustment is another solution for new beneficiaries.** Premiums can be risk adjusted based on post-enrollment diagnoses of previous cohorts of new enrollees. This approach assumes that the group of new enrollees in a health plan would have a similar mix of conditions to new enrollees from previous years. The estimated fee could be updated annually.

**Reducing underpayment and overpayment for those in the top and bottom percentiles of costs will improve the fit of risk-adjustment models and pay plans more equitably.** Regression models will always, by nature, under-predict costs for those who actually incur high costs, and over-predict costs for those who actually incur very low costs. There are ways to reduce the effects of this problem. One option is to use a hybrid approach of a concurrent adjuster for a small subset of previously high-cost enrollees and a prospective adjuster for all other enrollees.

**Extended history—that is, using two or more years of data—can improve risk-adjustment models (Reference 10).** One study found that using two years of retrospective data increased the number of beneficiaries identified with chronic conditions (Reference 11). This would result in smaller risk-adjustment payments for chronic conditions but would include more beneficiaries. Plans could be paid more for enrollees with specific diagnoses in both years to capture more severe cases and encourage continuity of care. In some cases, however, extended history is not available.

**Including prior use or expenditures is the most powerful way to capture predictable future costs.** The concern is that including prior expenditures weakens incentives to provide care efficiently. Including prior expenditures in a prospective model may be better described as a form of partial capitation, however. Because prior cost is only one factor in the model, the adjustment does not fully reimburse costs. Instead, the payment is a blend of fixed payments based on the enrollee's risk factors and reimbursement of part of the previous year's costs. However, costs are difficult to measure consistently across plans.

**Improve incentives to preserve health.** Risk adjustment is intended to counteract the incentive for plans to make their plan more attractive to patients who are low-risk and less attractive to patients with greater health care needs, among both potential enrollees and current members. Thus plans are paid more for caring for sicker patients. However, this type of payment also reduces the plan's incentive to preserve patients' health because plans are paid more as enrollees' health deteriorates. One technique for counteracting that incentive is to reward plans for good outcomes, or for care conforming to high standards. These payments could be based on quality profiling methods, which may or may not include risk-adjusted outcomes.

# Policy Implications

**Risk adjustment plays a critical role in many aspects of health care financing today. Despite the advances in the ability of models to predict costs, risk adjusters continue to have some serious weaknesses. In addition to the improvements to the risk-adjustment models described above, policy-makers could consider the following approaches:**

- **Incentivize plans to retain high-risk patients.** The effect of selective disenrollment can be mitigated by penalizing it. Policy-makers could impose a penalty on plans for which the ratio of costs between enrollees and disenrollees is above the market average.
- **Reduce the financial risk from extreme outliers that may be beyond the control of plans.** Since predictive models are not suitable for identifying the most extreme cases, reinsurance may be needed. Costs in developing risk adjusters could be truncated at a specific high threshold amount, with reinsurance provided to plans for some or all costs above the threshold.
- **Regulation and market design:** Risk adjustment cannot be relied on to solve all adverse selection problems. The interaction of regulations concerning variations in premiums and benefit offerings needs to be considered in addition to risk-adjustment techniques. Regulation that limits the scope of variation in coverage also limits the return to selection, and therefore prevents selection from unraveling markets even if risk adjusters are not especially powerful. The goal of preventing selection must be balanced, however, against the goal of permitting plans the flexibility to innovate and to serve diverse beneficiaries.

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