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Health-Based Risk Assessment:

Risk-Adjusted Payments and Beyond

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Foreword

A number of payers across the country, including Medicaid managed care programs, the Medicare+Choice program, some state employee programs, and a few private purchasing cooperatives, have adjusted their payments based on health status. Researchers generally agree that most health-based risk-assessment tools, which are used to determine how much a payment should be adjusted, provide comparable levels of predictability, and a variety of tools are in use today. As payers have gained more experience with these tools and the concept of health-based risk assessment, both the concept and tools have become accepted more widely.

There are differences, however, among levels of implementation in various markets. One persistent question is why risk adjusted payments are more common in publicly financed programs than in the employer-based insurance markets. This question is particularly important given the ever-increasing fragmentation of the private insurance market, as employers opt for “consumer-directed” and other high-cost-sharing plans. In addition to concerns about risk pool fragmentation, there is a growing understanding, highlighted by the Institute of Medicine’s 2001 report *Crossing the Quality Chasm*, that quality of care must be improved. Risk-assessment tools originally developed to modify payment and expand access are now also being used to improve quality.

To better understand the benefits and shortcomings of risk assessment and adjustment as vehicles for maintaining viable risk pools and guiding medical management toward high-quality care and access to insurance coverage, The

Robert Wood Johnson Foundation’s Changes in Health Care Financing and Organization (HCFO) program and the Kaiser Permanente Institute for Health Policy brought together risk adjustment experts, public and private purchasers, and representatives from health plans to discuss their experiences. They addressed the roles that risk assessment and adjustment have played in keeping risk pools intact. Attendees also explored the role of risk assessment in helping health plans and providers improve quality of care through a variety of innovative uses such as predictive modeling, high-cost care identification, provider profiling, and identification of patients for disease management programs. They also considered the barriers to more widespread use of risk-assessment tools for adjusting payments and other innovative uses.

The purpose of this report is to explain the underlying concepts and tools critical to those considering a variety of risk assessment applications. It summarizes the experiences to date in three market sectors: Medicare, Medicaid, and the employer-based market. It also discusses the benefits and shortcomings of risk assessment and adjustment; highlights the differences among risk-assessment tools, their appropriateness for a particular use or population, and the data required to use them; and describes how risk-assessment tools are being used for both payment and non-payment applications. It is our hope that this report will serve as a primer for those considering adopting health-based risk assessment, as well as an update on purchasers’ experiences thus far.



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Introduction to Risk Assessment and Risk Adjustment

Health Insurance and Risk

Health insurance is designed to transfer individuals' financial risk for needed health care services to a third party, such as a health plan. In exchange for a premium, the health plan pays for or provides a defined set of necessary health care services, even if the costs of those services exceeds the premiums paid. The premium is based in part on the anticipated cost of the health care needs of those insured.

Risk selection exists whenever individuals can select among health insurance products offered by more than one health plan. Adverse selection occurs when a disproportionately high number of people at increased medical risk enroll in a particular health plan. At times, risk selection may be random or it can result from differences in benefit design or provider contracting strategies. It also can occur when health plans use strategies to attract healthier enrollees.

If plans must spend more money on an individual (because he or she requires more services or more expensive services) than the payment they receive, they will lose money. If that is true for a large proportion of enrolled individuals, the adverse selection can endanger the plan's financial viability. As a result, health plans have an incentive to enroll healthier people. Therefore, they may be in a position to compete not only on the basis of quality and efficiency,¹ but also according to whom they enroll. In theory, if payments to plans are adjusted to reflect the health of their enrollees, plans will not have a financial incentive to recruit healthier enrollees.

How Risk Adjustment Works

The goal of risk adjustment is to pay health plans according to the health risk of plans' enrollees, reducing the potential negative financial consequences of

insuring individuals at high risk for medical expenditures. The health risk of enrollees can be quantified using a variety of risk-assessment tools. (See page 3.) In a competitive private insurance market, risk-adjustment mechanisms are designed based on the assumption that the total resources spread among plans in a particular market are sufficient, but inappropriately distributed. If all payers and purchasers are willing to participate in a risk-adjusted system, premium income can be reallocated to more accurately reflect the distribution of health risk among plans. An adequate risk-adjustment mechanism provides incentives for health plans to compete solely on the basis of quality and efficiency.

Many tools for assessing risk have been developed over the last decade. They are tailored to different populations, require different data, and can be used for adjusting risk prospectively or concurrently.

Risk-adjusted payments have been implemented in varying degrees in a range of settings in both private and public health insurance markets over the last decade. For example, they have been adopted by Medicaid managed care programs, the Medicare+Choice program, some state employee programs, a small number of private purchasing cooperatives, and a few large employers. Public payers also use health-based risk-assessment tools to set initial managed care rates, as well as to move money among plans according to the risk pool they attract.

Experts continue to debate whether risk adjustment will be implemented more widely in the private insurance market. Some argue that, if an increased number of employers offer consumer-directed health plans or other plans with more cost-sharing

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(which may be more attractive to younger, healthier individuals who do not have significant—and thus expensive—health care needs), the employer risk pool will become increasingly fragmented, thus raising the need for risk adjustment. On the other hand, more employers are offering only a single health plan, which reduces the need for formal risk adjustment.

Although risk-assessment tools were developed to be incorporated into risk adjustment mechanisms to modify payment and expand access, some health plans are now using them to improve quality and control costs. Key players in health care markets have a growing understanding that quality of care must be improved, as highlighted by the Institute of Medicine's 2001 report, *Crossing the Quality Chasm*.²

Innovative uses of risk-assessment tools include managing patient care (e.g., high-cost case identification), adjusting payments from plans to providers, profiling physicians on the basis of quality or productivity, and paying physicians using specific quality measures. Risk-assessment tools also are being used for predictive modeling to aid health plans in some of their routine business functions, such as underwriting and renewal rating.

This report examines the tools available for assessing risk, the data needed for them, and the current use of risk-adjusted payments in three purchaser market sectors: Medicare, Medicaid, and the employer-based market.

Risk-Assessment Tools

Overview

Once purchasers decide to adjust payments based on health risk, they must make a number of decisions, including:

- ◆ Whether to use a risk-assessment tool that explains the current year’s cost or predicts next year’s costs;
- ◆ Which data to use to measure an individual’s health risk; and
- ◆ How to collect and manipulate those data to predict risk.

The mechanism by which purchasers can analyze data is called a risk-assessment “tool.” Risk-assessment tools are structured to measure risk, either by estimating it for the future or on a current-year basis. Prospective tools use data on an individual from a previous year to estimate that person’s future expenses. Often, these tools are used to set and adjust payment. Another option is to use

a concurrent tool, which draws on health status data collected in the current year to explain expenses in the same period.

Concurrent tools typically are used for profiling providers, although they also can be used for payment. Research shows that concurrent models are more accurate measures of health care expenses than are prospective models. This is primarily because concurrent tools capture more of the costs of actual utilization during a year, while prospective tools only make predictions of future utilization.

Concurrent models also call into question how to time payments and data collection. Each of these approaches creates different incentives. The decision about the type of tool to use should be based on the application.

There are many tools available that can be used for either payment or non-payment.

Table 1: Criteria for Assessing Risk-Assessment Tools

Criterion	Definition
Predictive Power	ability to accurately explain the variation in the expenses of a given population
Underlying Logic	link to daily clinical practice and whether it is clinically meaningful to providers
Incentives	the behavior encouraged among providers and health plans in the short and long term
Resistance to “Gaming”	the degree to which providers and plans cannot manipulate the tool to their benefit, including an ability to verify and/or audit the results
Data Availability	accessibility of the data upon which the tool is based, including the completeness, quality, and timeliness of the data
Transparency	ability of stakeholders to understand the basis and operation of the tool
Simplicity	how easy it is to implement and use
Reliability	how stable the risk scores are over time and with data from different health plans
Cost	monetary and non-monetary expense of the tool and of acquiring data

Most often, the quality of a risk-assessment tool is measured according to its ability to accurately explain variation in the expenditures of a given individual or population.

Therefore, purchasers must evaluate which tool is best for their purposes. Goals often differ and include controlling costs (by managing selection issues) or creating incentives for plans to accept high-risk populations in order to encourage plans to compete on the basis of quality and efficiency.

Tool selection is a complicated task. Each tool has strengths and weaknesses. In selecting a tool, a purchaser is making a tradeoff among several criteria, which are summarized in Table 1.

If used for non-payment purposes, such as medical management, underwriting, or provider profiling, a tool also may be evaluated on the basis of its ability to predict risk for particular subpopulations and its overall appropriateness for a given use.

Most often, the quality of a risk-assessment tool is measured according to its ability to accurately explain variation in the expenditures of a given individual or population. The predictive power is quantified as a statistical measure known as the R^2 , which is the proportion of total variation that can be explained by the independent variables. The closer the R^2 value is to 1, the better the predictive power of a tool. For example, a tool with an R^2 value of 0.05 explains only 5 percent of the variation in future health care costs for a given population, whereas a tool with an R^2 value of 0.25 explains 25 percent of the variation.

Although there are debates about how useful the R^2 statistic is in selecting a tool (largely because it is easily influenced by people with very low or very high health risk and there is difficulty estimating high-cost enrollees), it is the most popular and most easily understood measure that allows purchasers to compare tools' predictive power. At a minimum, R^2 is a useful starting place because it is the quickest way to compare predictive ability across tools. Other measures gauge a tool's

effectiveness at the population level—and can assess groups of different sizes and risk composition—which may be more relevant than the R^2 in some cases.

Another way to determine the adequacy of a tool is by using something called a predictive ratio. This ratio compares the total predicted costs with the actual costs among people for whom cost estimates are likely to be biased due to some shared characteristic, such as Medicaid status or the presence of diabetes. Predictive ratios range from less than 1 to greater than 1. Numbers less than 1 show that the model is under-predicting the costs of the group, while numbers greater than 1 show that the model is over-predicting costs. Models with more diagnoses tend to do better on predictive ratios, even when predicting the costs of groups defined by a disease not in the model, because many diseases may be correlated with diagnoses that are included in the model.

The risk-assessment tools available to purchasers can be divided into three categories based on the data they use: demographic information; self-reported health status; and administrative data.

A fourth category—data mining—can use any of the data in the first three categories. Because it is relatively new, data mining is discussed in more detail than other techniques. Each of the categories vary in how they rank according to the criteria described in Table 1.

Demographic Information

Traditionally, payments have been risk adjusted based on demographic factors, such as age, sex, family status, and location of residence. Mechanisms that predict costs based on these demographic data are the baseline against which other mechanisms are measured. Studies have shown that risk-assessment tools using demographic information alone account for no more than 2 percent of health

care costs.^{3,4} Despite their relatively low predictive power, demographic-based adjustments are easy and relatively inexpensive to administer, and they do not produce incentives for providers to change treatment or coding to maximize risk scores.⁵ In addition, they are transparent, reliable, and simple to verify, audit, and understand.

Self-Reported Health Status

Some purchasers have considered adjusting payments based on the health status of an individual or population as measured through surveys of enrollees. This method of risk assessment has not been adopted widely. At one time, the RAND Self-Reported Health Status Survey was examined for its potential in forecasting future health care costs. The 36-item self-administered survey instrument was designed to capture the full range of health characteristics.⁶ Self-reported health status has better predictive power than demographic information alone, but only marginally. It explains between 3 and 5 percent of the variation in future costs.⁷

Other advantages of self-reported health status are that it has a solid underlying logic, it is transparent and simple to understand, and it does not create incentives for inefficiency. On the other hand, this method of assessment is associated with significant costs. Currently, most purchasers do not gather self-reported health information, so initial data collection costs would likely be considerable. Broadly surveying enrollees is also expensive, as well as time consuming.

Finally, self-reported health status is subject to “gaming,” with incentives for providers to report higher levels of health care need.

Administrative Data

A variety of administrative data sources can be used to estimate medical risk, including prior expenditures, diagnosis data (e.g., encounter data, inpatient or outpatient claims data), or prescription drug data. Research indicates that models using any of these data sources have much higher predictive power than demographic data alone.

Estimating future costs based on prior utilization and expenditures has more predictive power than many of the other available tools. Some evidence suggests that prior expenditures can account for between 25 and 45 percent of the variation in future health care costs.⁸ Adjusting payments based on prior expenditures is easy to implement and manage, and has a sound logic. Moreover, this approach is transparent and simple to comprehend and use.

Using prediction tools with prior expenditure data has some drawbacks, however. For example, it creates some undesirable incentives for providers and health plans. If plans will be paid more because their enrollees have used more services, then they have an incentive to provide more services instead of supplying efficient care. In addition, risk-adjustment systems that rely on prior expenditures can be more difficult to implement than those that use diagnosis data.

Because of the advantages of using prior expenditure data, purchasers might consider beginning their health-based payment program with prior utilization and expenditure data and eventually transition to another model to avoid the longer-term negative incentives.

Predicting future health risk and costs from diagnoses has been adopted widely because these models align payments with risk while encouraging efficient provision of care.⁹ Experts agree that diagnosis-based methods

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have better predictive power than demographic data (estimates range between 10 and 14 percent for commercial populations,¹⁰ and 19 to 22 percent for a Medicaid-specific tool¹¹). The underlying logic of these models is strong because diagnoses are highly correlated with current and future expenditures. Diagnosis-based models are not as heavily influenced by utilization levels as are models that use prior expenditure data. With diagnosis data, purchasers can make informed choices about their medical management strategies.

Although information on diagnoses are collected and reported routinely, it is often difficult to acquire complete and appropriate data. Purchasers rely on health plans and providers to submit diagnosis information on which they can base their adjustments. If the submitted data are not complete, are of questionable quality, or if physicians do not code accurately, adjusting payments based on that information could do more harm than good. In some instances, purchasers may not have been collecting diagnosis data from plans, and therefore do not have any information on which to base their adjustment. In that case, data acquisition is not only costly but time consuming.¹² The data challenges associated with diagnosis-based risk adjustment are discussed in more detail in the following section.

Compared with using an approach that draws on demographic information, diagnosis-based models are not as transparent to all stakeholders. The adjusted payments are sometimes difficult to understand for those with little or no clinical background. Moreover, the consensus-building process that is required to educate stakeholders on the complexity of these models is often long and contentious.

When these models were developed, they were expensive to purchase because of

extensive development, clinical input, and programming costs. For the most part, however, the prices of software have decreased significantly, so the acquisition cost is no longer a barrier.

Pharmacy-Based Models

Recently, questions have been raised about whether the addition of prescription drug data is preferable to diagnosis-based adjustments. Overall, prescription-drug models have about the same predictive ability as diagnosis models. In one study of the predictive power of risk adjusters, the researchers found that pharmacy-based models performed at a level similar to diagnosis-based models when the assessment was applied prospectively, but, when the models were applied concurrently, the diagnostic models outperformed the prescription drug tools.¹³

Pharmacy data also are similar to medical claims-based diagnostic data in that they can provide medical management information similar to that provided by diagnoses. In addition, prescription drugs are predictive of future expenditures without encouraging greater utilization of other services. However, with a pharmacy-based model, plans or providers may increase the number of prescriptions they dispense to raise their risk scores in order to demonstrate higher risk enrollees or patients. This does not promote the efficient provision of care.

Pharmacy-based models have the following advantages over diagnosis-based tools:

- ◆ Purchasers often have more complete prescription drug data available in an electronic format, making it significantly easier to access;
- ◆ Prescription drug data do not need to be obtained from physicians, thus eliminating a difficult data-collection step;

- ◆ People with chronic conditions may not have encounters with the health care system during the data-collection window that would generate diagnoses, but they generally refill prescriptions regularly;
- ◆ Prescription drug data are recorded more similarly across plans than is information about diagnosis, leading to less variation in reporting; and
- ◆ Pharmacy data are available more quickly than diagnosis data and generally are less expensive to collect and validate.¹⁴

Although pharmacy data are available more quickly than diagnosis data, the rapidly changing pharmaceutical industry requires that pharmacy-based models be updated more often than diagnosis-based models.¹⁵

The primary weakness of pharmacy-based models is that they are slightly less precise than diagnosis-based models, in part due to the vague relationship between conditions and pharmaceuticals.

Prescribing a drug to someone is a step removed from diagnosing him or her with a specific condition. For example, some conditions do not have a single recommended pharmacological treatment. Thus, pharmacy data may not be helpful. Alternatively, providers can treat the same condition with different medications, and some drugs are used to treat multiple conditions. Models may not link the pharmacy data back to the appropriate condition or may assume an inaccurate underlying health status.

Data Mining

Data mining is the science of finding interesting and novel patterns in large blocks of data. Data-mining techniques use sophisticated computer programs to sift through health plans' data to identify patterns that can predict the future health care expenditures and use of a given population. Data-mining mechanisms predict future costs based on patterns of

information, whether complete or incomplete. They may be better able than traditional regression methods to model non-linear dynamics that occur within a population. Health plans can use these tools to better understand the effects of subtle changes in health status that may have an impact on future costs. The core goal of any of these is to model the relationship between data measuring a certain health indicator in a population and the group's usage of services and costs.

Currently, some are experimenting with neural networks, one type of pattern-recognition tool for assessing health risk. Unlike traditional regression models, neural networks and other pattern-recognition tools search through data in a non-linear way to recognize linkages among different combinations of data.

Data-mining methodologies do not have a medical or causal theory supporting their use. In other words, they are not designed to look for specific diagnoses, conditions, prescriptions, or other indicators of future high risk. Rather, they seek out patterns, which may not be predictable and could be temporary or unique to a specific context. One of data-mining tools' greatest contributions is the possibility of improved predictive accuracy through "feature extraction." These methodologies have the ability to convert raw data into a set of attributes or features that can describe the previous year's trends and occurrences.

Data-mining techniques are applied widely in other industries. For example, advertisers may use past purchasing behavior to determine which mail-order catalogs an individual should receive. However, these methodologies have not been adopted as broadly in health care. Experts believe it is difficult to apply data-mining results in health care because the tools do not necessarily have a theoretical basis specific to health claims.

The use of data-mining mechanisms to assess risk raises policy questions about

what health plans and purchasers should do with the results that these tools provide. It seems unlikely that purchasers would want to adjust payments based on these models. Without an adequate causal explanation for the findings generated through data mining, purchasers cannot fully understand the medical or policy implications that would be associated with adjusting risk according to their results.

As decision makers become more familiar with the capabilities of data-mining methodologies, they may become more comfortable using information generated in this way. For example, data mining could be helpful for purposes other than payment, such as identifying high-cost cases within a health plan.

Each type of risk assessment tool has advantages and drawbacks. In general, diagnosis-based, traditional-regression models have been adopted more widely than the other categories of tools for adjusting payments. Their ability to provide balance among predictive accuracy, desired incentives, and administrative burden with which purchasers can be satisfied contribute to their popularity.

Applying Tools Beyond Payment

Once plans and purchasers collect information for risk-assessment, they can use it for purposes other than adjusting payments. Risk-assessment tools may be useful in improving health care efficiency, for example. They can also help health plans to underwrite more effectively, identify candidates for disease management, adjust payments from plans to providers, profile physicians on the basis of quality or

productivity, and pay providers using specific efficiency measures. Most often, risk-assessment tools serve as a first level of information on which health plans can act, rather than as a final decision tool.

Randall K. Spoeri, Ph.D., vice president of medical and quality informatics at HIP Health Plan of New York, says that he and his colleagues use their physician profiling program to “engage providers in a substantive and useful dialogue, which we hope ultimately will improve the quality of care we provide.” Although an increasing number of plans are using risk assessment in creative ways, little research has been done to evaluate the impact of these innovations, although there has been some assessment of the provider profiling methodologies using a variety of risk-assessment tools.

J. William Thomas, Ph.D., and colleagues at the University of Michigan evaluated the accuracy of seven primary care provider profiling methodologies, including the implications of the differences in accuracy for assessment of physician performance. They found that on average, profiling systems agree on 54 percent to 58 percent of physicians identified as least efficient and 42 percent to 53 percent of those identified as most efficient. They also found that the profiling systems vary significantly in terms of the information they gather, and how they classify patients.¹⁶ Thomas is now examining whether risk-adjustment methodologies used to generate reliable profiles in a primary care setting can be extended to specialists, given the unique factors that arise in profiling specialty physicians.

Data for Risk Assessment

One of the most significant barriers to implementing a diagnosis-based traditional regression health-based risk-assessment tool is the collection of data. This is in part because of the effort required to submit large amounts of data and in part due to the sensitivity of diagnostic models to the quality of data used. Health plans often fear that their data are wrong or incomplete, either because they capitate their providers and do not require them to submit information, or because they truncate the data from their providers. Thus, the data may indicate that they have healthier enrollees and cause their revenues to decline. Unless health plans have had reason to edit their data, they have no assurance that the information is accurate.

In order to make health-based payments, plans must be willing to make an ongoing commitment to submitting data about their enrollees' diagnoses. For some plans and purchasers, submission of diagnoses will require little additional effort. Others will have to make a significant investment to develop the necessary infrastructure to meet data requirements.¹⁷ Purchasers can work with plans to increase their comfort with the selected tool and the data used in adjustments in a number of ways— by creating risk corridors, adjusting only a portion of the payment until plans gain confidence in the quality of their data, or by offering trial runs on data where there are no payment implications. These intermediate steps can go a long way toward increasing a plan's commitment to submitting complete, high-quality data and to health-based payments overall.

As they work toward successful data submission, purchasers and health plans should realize that there is no such thing as perfect data for health-based risk adjustment. All stakeholders need to work with each other to produce an acceptable data set.

Purchasers often push plans to submit a multitude of data elements, but plans may only be able to supply limited information. One way that plans and purchasers can compromise is to reduce the number of required fields to only those that are absolutely necessary in order to conduct the assessment and adjustment.¹⁸ According to a study evaluating the implementation of

HIPAA and Data Collection for Risk Assessment

In an era in which the privacy rule within the Health Insurance Portability and Accountability Act (HIPAA) has raised consciousness about data confidentiality, any data collection effort needs to comply with the standards laid out in that legislation. Although many assume that HIPAA hinders or prohibits data collection for risk adjustment purposes, the “business-associate” provisions of the rule may still permit it. By establishing business associate contracts between the health plan and the purchaser and the health plan and any consultants involved in the process, the health plan can share protected health information with the other parties.¹

The privacy rule allows providers and health plans covered by HIPAA to disclose protected health information to people and businesses that help them carry out their health care activities and functions. Under HIPAA, business associates are those entities that undertake specific functions, activities, and services.

Permissible functions and activities include:

- ◆ Claims processing or administration;
- ◆ Data analysis, processing, or administration;
- ◆ Utilization review;
- ◆ Quality assurance;
- ◆ Billing;
- ◆ Benefit management;
- ◆ Practice management; and,
- ◆ Repricing.

Allowable services include:

- ◆ Legal;
- ◆ Actuarial;
- ◆ Accounting;
- ◆ Consulting;
- ◆ Data aggregation;
- ◆ Management;
- ◆ Administrative;
- ◆ Accreditation;
- ◆ Financial;
- ◆ Actuarial services;
- ◆ Accounting services; and,
- ◆ Consulting.²

Although risk assessment and adjustment appear to fall into these categories, some health plans still may be concerned about submitting their data to an external entity for these purposes. To ameliorate these concerns, benefit consultants that specialize in health-based risk assessment have used minimum data sets that encrypt member identifiers, limited geographic information, created age bands (instead of including an individual's actual age), and eliminated social security numbers from records.

¹ U.S. Department of Health and Human Services Office of Civil Rights Guidance Explaining Significant Aspects of the Privacy Rule, December 4, 2002, Business Associates section. See www.hhs.gov/ocr/hipaa/guidelines/businessassociates.pdf.

² *ibid.*

Some have argued that standards should be established about how to collect information and what to do with data of poor quality.

health-based risk adjustment conducted at the Park Nicollet Institute, data collection and processing obstacles can be overcome with commitment and resources from purchasers and participating health plans.¹⁹

Fortunately, the experiences of purchasers who have adopted health-based risk adjustment suggest that collecting the necessary encounter data is feasible.²⁰ For example, Medicaid programs have been able to acquire robust data through a commitment to health-based risk adjustment and an investment in a data-collection infrastructure. The implementation of health-based payment in Medicare+Choice also has helped move public programs a long way in terms of data collection.

The request for data issued by the Centers for Medicare and Medicaid Services (CMS) in March 2002 caused plans to refine their data-collection infrastructure to comply with the new system. To gain the support of health plans, CMS reduced the number of ICD-9 codes used for risk adjustment. Although some plans had to make a significant financial investment to get to that point, they now are well-positioned to use that information in other ways and, potentially, for other purchasers.

David Knutson, director of health systems studies at the Park Nicollet Institute, and his colleagues found that

plans may take up to three years to develop and implement a data-collection system that provides complete information. In addition, in the rare cases when purchasers have invested in providing technical assistance to plans to improve their data-collection efforts, purchasers have been successful in acquiring complete encounter data.²¹ The health-based risk assessments that have been implemented thus far were made possible through data sets that are not perfect, but good enough. As health-based risk adjustment becomes more common and data requirements are made clear, it will become easier to identify good data.

Another goal of data collection for health-based payments is for health plans to generate similar enough data to compare and measure health status across plans.²² Increased uniformity would improve the precision of risk adjusters. With more consistent data, purchasers can be more confident that they are adjusting for legitimate health status differences, rather than for differences in the quality of the data that plans can provide. Some have argued that standards should be established about how to collect information and what to do with data of poor quality. It would be much easier for purchasers to adopt health-based risk adjustment with standardization because it would be easier for plans to provide the necessary data.

Risk Adjustment in Medicaid

State Medicaid programs have been the lead purchasers to implement health-based risk adjustment, preceding efforts by both employers and Medicare. This largely is because health plans serving Medicaid enrollees are more likely to enroll higher risk enrollees. Without health-based payments, the financial viability of the health plans that serve the chronically ill and disabled could be in jeopardy.²³ By paying plans according to the health risk of their enrollees, states can allocate expenditures, without increasing them, in a way that reflects the plans' costs of providing care to beneficiaries. This, in turn, can increase

plans' willingness to serve the Medicaid population.^{24,25} More than in other markets, there is a large health-based risk-assessment infrastructure in place among Medicaid programs.

Medicaid programs, including those in Colorado, Maryland, and Oregon, began implementing health-based risk adjustment in the late 1990s. Delaware, Michigan, New Jersey, Minnesota, Tennessee, and Utah also have incorporated health-based risk assessment into their Medicaid programs in some way, and more than 20 other states have considered using

Table 2: Health-Based Risk Adjustment as of 2002 – 2003.

Medicaid Program	Implementation Year	Tool	Prospective/ Concurrent	Populations Covered	Participating Plans	Covered Lives	% of payment based on HBRA	Individual/ Plan*
Utah	2002	CDPS	Concurrent	SSI/Disabled, TANF	4	100,000	100	Plan
Tennessee	2002	CDPS	Concurrent	SSI/Disabled, TANF, and Medicaid/ expansion populations except dual eligibles	8	1.3 million ^a	100	Plan
New Jersey	1999	CDPS	Prospective	Aged, blind, disabled without Medicare, including SSI	5	42,600	100	Individual
Minnesota	2000	ACGs	Concurrent	TANF and medically needy	7	173,000 ^b	30% (2002), 50% (2003)	Plan
Oregon	1998	CDPS	Concurrent	Non-Medicare disabled, general assistance, Oregon Health Plan for Adults and Couples	15	100,000	15	Plan
Maryland	1997	ACGs	Prospective	SSI/Disabled, TANF, state expansion program	6	410,000	100	Individual
Colorado	1998	CDPS	Prospective	SSI/Disabled, TANF, and a few other specialized populations	5	111,000	100	Plan

* "Individual" indicates that the payment adjustment was based on risk assessment of individuals within a plan. "Plan" indicates that the payment was adjusted based on the health risk of a health plan as a whole.

^a This number was projected to decrease in 2003 because of stricter eligibility criteria, which would lead to lower enrollment.

^b This number was expected to increase in 2003.

risk adjustment or are interested in learning more.²⁶ In addition, some larger states, including Texas, Pennsylvania, California, and New York, are considering using risk adjustment or are close to implementing it. Table 2 illustrates how some states have implemented health based risk adjustment as of 2002 – 2003. According to Knutson, “There is evidence that health-based risk adjustment will continue to expand for health plan payment in state Medicaid managed care programs and probably for provider payments in primary care case management programs.”

Medicaid-Specific Tools

Because the Medicaid population is different from commercial populations in terms of their health status (people in Medicaid generally are sicker and have more chronic conditions), researchers have developed tools specifically for assessing the health risk of Medicaid enrollees. All state Medicaid programs that have adopted health-based risk adjustment have used some version of these tools.

Richard Kronick, Ph.D., and colleagues at the University of California, San Diego, have developed the Chronic Illness and Disability Payment System, which builds on the Disability Payment System. These tools group diagnoses according to chronic and disabling diseases. The same researchers also have been developing a pharmacy-based tool called Medicaid Rx, which may be more appropriate for the Medicaid population than other pharmacy-based tools.

At Johns Hopkins University, Jonathan Weiner, Dr.P.H., and colleagues have released a new version of their Ambulatory Care Group (ACG) tool that is targeted to Medicaid programs. ACG-Medicaid is a streamlined version of earlier ACG models; It is designed specifically for rate setting and capitation in Medicaid.²⁷ ACGs use ambulatory and inpatient claims to predict expenditures.²⁸ Both of these tools are available publicly at no cost to state Medicaid agencies.

Lessons States Have Learned

According to a survey conducted by the University of Maryland, Baltimore County’s (UMBC) Center for Health Program Development and Management, states that have implemented health-based payments believe that doing so created incentives for plans to focus on providing high-quality care rather than on selection strategies. At a forum sponsored by UMBC, states noted that this has improved the overall efficiency of the programs.²⁹

Separately, an evaluation of Maryland’s Medicaid Managed Care program completed in 2002 showed that, overall, health-based risk adjustments have become part of the fabric of the state’s Medicaid program. Risk adjustment helped to ensure that the dollars follow patients, and discussions between plans and the state about payment issues focus heavily on the level of payment, not how those funds are allocated.³⁰

Some states found it useful to begin adjusting payments by using prior expenditures, especially in the first year or two, before undertaking the longer-term approach of adjusting payment by diagnoses. Adjusting by diagnoses has the advantage of encouraging plans to undertake activities that will attract people with varying levels of chronic illness and disability.³¹

Another crucial component of successful implementation of health-based risk adjustment in Medicaid is consensus building among stakeholders about both the goals of health-based payments and the mechanics of achieving the new system. Stakeholders who should be involved include health plans, beneficiaries and their advocates, providers, state legislators, and other state officials.³² States have found it useful to focus on well-defined diagnoses to avoid conflicts between payers and plans about reporting requirements.³³

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Risk Adjustment in Medicare

In the 1990s, there was some evidence that Medicare+Choice (M+C) health plans, which were paid an average payment rate, were enrolling a healthier mix of enrollees than was fee-for-service Medicare. To address this, CMS (which was called the Health Care Financing Administration at that time) began to explore options for a system that would provide more accurate payments.³⁴

The Balanced Budget Act of 1997 (BBA) expanded managed care options for Medicare beneficiaries under the M+C program. It mandated the implementation of health-based risk adjustment by January 2000. In addition to creating an expanded set of options for beneficiaries, there was the possibility that the BBA legislation could introduce biased selection by type of plan (e.g., a higher proportion of sick individuals could have chosen the PPO option). Risk adjustment ensured more accurate payments for all types of plans.

In selecting the risk adjustment methodology, CMS was primarily concerned with ensuring reliability and finding a tool that would be reasonably inexpensive to implement—both for CMS and plans. The agency also sought to find an approach that had simplicity in its underlying logic, was resistant to gaming, and had good predictive power.

CMS chose to implement a prospective, health-based risk adjuster in two phases. In the first phase, which began in January 2000, diagnoses from inpatient stays were used to adjust payments using the Principle Inpatient Diagnostic Cost-Group (PIP-DCG) Risk Adjustment model, developed by Ash and colleagues.³⁵ More recently, diagnoses from ambulatory settings have been incorporated into the payment model using a version of the Hierarchical Condition Category (HCC) risk adjustment model.³⁶ Implementation of a risk-adjusted payment using health data from ambulatory settings is scheduled to begin in January 2004. It is

being phased in over a four-year period: 30 percent in 2004; 50 percent in 2005; 75 percent in 2006; and 100 percent in 2007.

CMS uses risk adjusters that incorporate demographic status and diagnostic information into a risk-adjustment factor, which is then multiplied by a base payment amount. A risk-adjustment factor is calculated on a preliminary basis for each beneficiary at the beginning of the year based on data from the prior year; the factor is updated after the year is over to incorporate any additional diagnoses from the prior year that have been received. The factors are based on diagnoses identified in the prior year only, and are not updated during the payment year for diagnoses that are identified during the payment year.

In theory, the models are additive. In other words, additional payment is associated with each added diagnosis. However, some diagnoses are combined in a hierarchy, and some diagnoses within a hierarchy may not change payment.

Challenges to Implementing Risk-Adjusted Payment

Among the biggest challenges to implementing health-based risk adjustment in Medicare have been the cost and administrative difficulties associated with data collection. Prior to the implementation of risk-adjusted payments, health plans were not required to report diagnostic information to CMS. Many plans did not require such information from their providers, and providers had difficulty recording, collecting, and submitting such data. Plans had to modify contracts with providers and develop the capacity to collect this data and pass it along to CMS on a timely basis. For a more detailed discussion about data challenges, see page 9.

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Some stakeholders have raised concerns that the diagnostic data collected by plans would not be entirely accurate and, to the extent that important diagnoses are missing, would result in reduced payments to plans.

Early instructions from CMS called for the collection of all encounter-level data by plans from inpatient and ambulatory settings. After health plans expressed concern about the volume of encounters and the level of burden being imposed on them, CMS revised its requirements. Plans now are required to provide a simplified format, which includes the date, type of provider, beneficiary identifier, and diagnosis code (only for diagnoses included in the payment model) for each enrolled beneficiary. Diagnoses must be documented in a medical record.

Some stakeholders have raised concerns that the diagnostic data collected by plans would not be entirely accurate and, to the extent that important diagnoses are missing, would result in reduced payments to plans. Although Medicare physician payment policies under fee-for-service required that diagnostic information be included on the claim, such data often were not used in payment and so may not have been accurate. To address this issue, CMS has developed educational materials that plans may give to their provider networks to increase the accuracy of diagnostic coding.

Currently, CMS uses diagnostic data collected from health plans for payment purposes only. With the planned collection of encounter data, CMS had considered using the data for recalibrating the risk-adjustment model and for quality-assessment purposes. The current data, however, do not support those efforts.

Lessons Learned

An important lesson from the Medicare experience is that it is possible to initiate large-scale data collection and use it to adjust payment, although it may be difficult for smaller players with less market share to achieve this. By phasing in the types of data collected and the impact of the payment change, Medicare decision makers helped overcome plans' fears that inadequate payments would be made on the basis of incomplete data. In addition,

the extensive education and technical assistance provided by CMS helped all plans, especially smaller ones, to meet the requirements.

In establishing the data-submission requirements, CMS had to carefully weigh its need for data and the potential burden that collecting such information would impose on plans. Complicating the process was the extensive variation both by plan and within some plans in how they contracted with their providers and what data they were collecting. Changing systems to comply with new data requirements was costly for many plans and took time to implement.

CMS needed to minimize the potential for adjustments based on the data collection methodology, rather than on the underlying health status of beneficiaries. In the end, CMS chose to allow flexibility in data collection. Plans can submit encounter data if they were already collecting it, but can also choose to submit a minimum set of diagnostic data instead.

One question for decision makers to consider is the extent to which other payers could capitalize on the data-collection infrastructure created for Medicare. If other payers choose a risk-adjustment model using inpatient and ambulatory diagnoses, providers and payers may be able to take advantage of significant economies of scale by providing the same types of data as are currently required for Medicare.

The choices made during the development of a risk-adjustment model for Medicare were constrained, however, by the structure of the Medicare benefit. For example, it was not possible to design a risk adjuster that draws on drug data because Medicare to date has not covered outpatient pharmaceuticals. Other payers, especially those that have a comprehensive drug benefit, may make different choices about a risk-adjustment model and the data required to support it.

Risk Adjustment in the Employer Market

Employers³⁷ face many of the same issues of adverse selection as Medicaid and Medicare programs when they offer products from multiple health plans. They have been far slower to adopt formal risk adjustment, however. By 1998, only 774,919 (approximately 1.3 percent) of the 60,599,934 enrollees with employer-based health insurance coverage were in plans that use formal demographic or health-based risk adjustment.³⁸ Recent figures indicate that between 100 and 150 employers use risk assessment as a tool for better purchasing, particularly for premium negotiation. About 350 employers use some form of demographic risk assessment, and 50 use prescription drug data to assess risk. Fewer than five large employers are using risk assessment to drive efficiency through payment.³⁹

Some posit that, as state Medicaid programs and Medicare adopt health-based payment methodologies, the employer-based insurance market will follow.⁴⁰ Economists also observe that the different constraints and markets that private and public payers face, and the different goals they set, might lead to variation in adoption and tool selection. For most employers, the primary goal of formal risk adjustment is to maintain freedom of choice of health plans for their employees.⁴¹ In some cases, if health plans perceive that they will attract the higher-risk employees, they have not offered coverage to employers offering multiple plans.

Glazer and McGuire,^{42,43} Frank and Rosenthal,⁴⁴ and Ellis⁴⁵ suggest that employers have mechanisms other than formal risk adjustment to address adverse selection, which is why it has not been adopted as widely in this market. Typically, these other mechanisms are not available to Medicare or Medicaid programs, resulting in their increased reliance on formal risk adjustment. Specifically, Glazer and McGuire note that open enrollment provisions, premium negotiations, and restrictions on employees' choices of health plans are mechanisms "superior to formal risk adjustment for dealing with problems caused by adverse selection."

Frank and Rosenthal note that three factors reduce the value of risk adjustment in the employer market from the perspective of the plan:

- ◆ Only a small segment of privately insured individuals are offered a choice of competing health plans;
- ◆ Health plans share risk with payers, providers, and reinsurers; and
- ◆ De facto experience rating occurs during the premium negotiation process and management of coverage seems to substitute for formal risk adjustment.

Those who work closely with employers have seen a recent surge in interest in formal risk adjustment, supporting Ellis' hypothesis⁴⁶ that changes in the health care market may change demand and accelerate future adoption.

Hewitt Associates notes that the current dilemma for employers is how to control costs while offering employees more choices in health care. In advising employers, they posit that risk adjustment may offer the "right combination of employee-driven choice and fully insured cost control."⁴⁷ Over the next three years, they hope to have risk adjustment implemented for 100 percent of the lives covered by their clients' plans.

Overall, they have found that employers are willing to invest in more complex data sets, as long as the benefits of collecting and using the data outweigh the costs. Further education of employers can help them understand:

- ◆ what risk adjustment tools are available and the feasibility of implementing them;
- ◆ how payments will be affected; and
- ◆ how formal risk adjustment might stabilize their risk pools, which benefits the market in the long-term, even if individual employers are "winners" and "losers" over time.⁴⁸

Some posit that, as state Medicaid programs and Medicare adopt health-based payment methodologies, the employer-based insurance market will follow.

The results from recent surveys conducted by researchers at the Park Nicollet Institute indicate that risk adjustment is a feasible tool and an important component of the solution to risk segmentation in the employer market. A survey of purchasers who had implemented health-based risk adjustment for payment found that

most purchasers agree that it has contributed to fairer payment, and that it has been worth the effort. Health plans were also surveyed, and the majority agreed that risk-adjusted payments did not require the collection of unnecessary and costly data and reduced concerns about the negative financial impact of adverse selection.⁴⁹

Conclusion

Efforts to implement risk-adjusted payments in public programs have been successful, in part because of substantial work by all stakeholders to come to agreement on the goals of risk adjustment and the mechanics of the systems. Many risk-adjustment systems have been implemented gradually, starting with adjustment based on prior expenditures or with a limited set of data. This has helped by reducing the financial impact of risk adjustment in the early stages and allowing all parties to get used to new data-collection systems over time.

There are many different risk-assessment tools and risk-adjustment mechanisms currently in use. Prior to choosing an approach to assessing risk or adjusting payments, participants need to take into account the factors specific to their

environment, including the benefit package, data capabilities of providers, and characteristics of the population. It is unlikely that one common methodology will emerge in light of the various health care environments and infrastructures in place, and the high costs that would be associated with making such a transition.

Further, it is not clear that one methodology would be appropriate for all settings and all uses, particularly for non-payment uses. Given the many parties that are using diagnosis-based risk-assessment models, however, in the future decision makers may be able to take advantage of economies of scale by using data already being collected for other programs, such as Medicaid and Medicare.

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