Risk Adjustment Methods and their Relevance to “Pay-or-Play”

Supplement E to the Report:

Challenges and Alternatives for Employer Pay-or-Play Program Design: *An Implementation and Alternative Scenario Analysis of California’s “Health Insurance Act of 2003” (SB 2)*

For the
California Health Care Foundation
and the
California Managed Risk Medical Insurance Board

Project Team Led by the
INSTITUTE FOR HEALTH POLICY SOLUTIONS

March 2005

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Acknowledgements

This supplement is part of a comprehensive report entitled *Challenges and Alternatives for Employer Pay-or-Play Program Design: An Implementation and Alternative Scenario Analysis of California's "Health Insurance Act of 2003" (SB 2).* The study that produced these reports was funded by a grant from the California HealthCare Foundation (CHCF), an independent philanthropy committed to improving California's health care delivery and financing systems.

Kanika Kapur, Ph.D., an economist with the RAND Corporation, was the principal author of this supplement on risk adjustment methods and their relevance to a pay or play mandate. The lead organizations for the overall study were the Institute for Health Policy Solutions and the RAND Corporation. Rick Curtis, of the Institute for Health Policy Solutions, served as the project director. Please see the main body of the report for a detailed discussion of the study process.

The project team is grateful to Deborah Kelch, President of Kelch Associates and our liaison with the Foundation, who provided substantial assistance with the interview process and whose project management skills helped keep us on track. Last, but not least, Jill M. Yegian, Ph.D., and Marian R. Mulkey, M.P.H, M.P.P., of the California HealthCare Foundation provided analytic insights, helpful comments, and other support throughout the project. Without the assistance of the Foundation and its staff, this project would not have been possible.

Supplement E:

Risk Adjustment Methods and their Relevance to a Pay or Play Mandate

Background

The California Health Insurance Act of 2003 (also known as SB 2) adopted a "pay-or-play" mandate aimed at reducing the size of the state's uninsured population. This law required employers over a certain size to either: (a) "pay" a fee to the state so that their workers and, for employers with 200 or more workers, dependents could be covered through a State Health Purchasing Program established under the Act, or (b) "play" by directly providing health coverage for specified workers and dependents. Although SB 2 was overturned by a narrow margin in a November 2004 referendum, the passage of legislation intended to expand employment-based coverage provides a unique opportunity to assess and to evaluate the implementation issues and challenges presented by a "pay-or-play" program.

The Act directed California's Managed Risk Medical Insurance Board (MRMIB) to design and operate the program. This paper outlines the role of risk adjustment methods in designing a pay or play system. Risk adjustment is a method that is used to predict the expected cost of health care. In the context of a pay or play health insurance mandate, risk adjustment methods can be used to set the appropriate fee that MRMIB requires for participation in the pool. Risk adjustment can also be used to determine the payments to health insurers that participate in the state pool. Risk adjustment is likely to be an important mechanism to ensure the stability of the pool and maintain incentives to provide appropriate care.

Goals Of Risk Adjustment

In essence, risk adjustment ensures that premiums are set so that all enrollees, sick or healthy, are equally profitable. A risk-adjusted payment system thus pays more for enrollees with predictably higher costs. The closer such a risk adjusted payment system comes to reflecting what individual enrollees are expected to cost, the fewer incentives providers have to discriminate among potential enrollees and/or to configure themselves to attract certain types of enrollees. If the fee for pool participation is accurately risk adjusted the pool will attract a population with diverse health risks. On the other hand, if risk adjustment is incomplete, firms with high risk individuals will gravitate towards the pool because their premiums are relatively lower in the pool than in the outside market that accurately reflects their expected health costs. Accurate risk adjustment of insurance premiums for pool participants also ensures the continued participation of insurance companies in providing coverage to pool enrollees. Risk-adjusted payments do not, however, need to reflect all of the components of actual spending, which vary in random, unpredictable ways.

Risk adjustment systems for medical expenses typically use information on the demographics and diagnoses of enrollees to model subsequent health expenditures. Such "prospective" adjusters are designed not to depend upon actions the providers might take. The information used to create the adjusters is ideally easy and inexpensive to collect (e.g. available in administrative data), verifiable by auditors, and not subject to "gaming" through changes in coding or practice patterns. The adjusters should also not encourage poor quality care – for example, generous reimbursement should not be provided for more invasive care when a safer less invasive option is available. Risk adjusted payment can increase efficiency by deterring socially wasted effort to select patients (Newhouse, Buntin, and Chapman, 1997) and by replacing competition for healthy patients with price competition. Adequate risk adjustment would allow enrollees to pay for the extent to which illness differs across those in different plans, but not pay extra for more expensive practice styles or higher prices (Robinson et al., 1991). Ideally, adjusters should adjust for identifiable factors that could plausibly be used by plans to select good risks or "dump" bad ones. Expenditures that are truly unpredictable do not need to be included in a risk adjustment system, since plans cannot predict and exclude people who will suffer from such events. Finally, the risk adjustment system should be acceptable to all those with a stake in the outcome of the risk adjustment including payers, plans, providers, and patients (Carter, 1997, 2000).

Risk adjusters that meet these criteria have been under development since the 1980s and have been implemented by Medicare+Choice program, numerous states, employer coalitions, and health plans (Keenen et al., 2001, Ellis et al., 1996; Pope et al., 2000; Kronick et al., 1996, 2000, 2002; Ash et al., 2000; Weiner et al., 1996). Such systems have been based on many factors, including diagnosis, prior utilization, demographics, persistent diseases, and self-assessments of health and/or functional status.

Is Risk Adjustment Enough?

Even a good risk adjustment system may not be fully adequate in protecting insurers from predictable risk, especially during early implementation. Blended payment systems that combine prospective risk adjustment methods with some retrospective information are gaining in popularity.[1] For instance, the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) established a system of "risk corridors" and reinsurance for prescription drug plans and Medicare Advantage drug plans in order to mitigate the risk faced by Medicare and by insurers (CMS, 2004).

Insurers may face several types of risk – two main sources of risk are "insurance risk" and "performance risk" (Health Policy Alternatives, 2003). Insurance risk refers to the risk borne by insurers due to unexpectedly high costs not incorporated into the risk adjustment methodology. Performance risk, on the other hand, refers to a plan's efficiency and the uncertainty surrounding plans' ability to administer insurance within the pool according to contractual standards. Another potentially important source of risk for both plans and MRMIB is associated with errors in premium and fee setting. In the early years of implementation, this source of risk is likely to be especially important as plans and MRMIB develop experience in risk adjustment and premium setting.

[1] A prospective system is one that only uses data from the time period prior to cost measurement to set payments. A retrospective system, on the other hand, incorporates information from the year that costs are measured into the payment system.

Despite the advantages of using a purely prospective risk adjustment system, in practice there are several advantages of incorporating retrospective data into a payment system. Risk corridors and reinsurance are both mechanisms that incorporate retrospective information into the payment system.

Reinsurance is a method of limiting the risk that a provider or managed care organization assumes by purchasing insurance that becomes effective after set amount of health care services have been provided. This insurance is intended to protect a provider from the extraordinary health care costs that just a few beneficiaries with extremely extensive health care needs may incur.

A risk corridor is a financial arrangement between a payer of health care services, such as MRMIB, and a provider, such as a managed care organization that spreads the risk for providing health care services. Risk corridors protect the provider from excessive care costs for individual beneficiaries by instituting stop-loss protections and they protect the payer by limiting the profits that the provider may earn.

In implementing a risk adjustment system, MRMIB will need to consider whether the system would be made more stable by the use of some retrospective information, possible in the form of reinsurance or risk corridors.

Advantages Of Using Retrospective Information

Risk corridors and reinsurance introduce retrospective information in the prospective risk adjustment system. While implementing risk corridors and reinsurance weakens the incentive for efficiency and cost control, these mechanisms have several important advantages. In particular, they increase incentives to provide needed care and increase the accuracy of payment to the plan. Chronic diseases that are diagnosed for the first time during the year and technological changes that affect drug prices or types of drugs available may potentially have a large impact on plan costs – incorporating risk corridors and reinsurance more closely tailors payment to actual costs. This greater accuracy should reduce incentives to select healthier patients into a plan. Risk corridors also protect plans against errors in the premium setting process. Both risk corridors and reinsurance are also likely to ease providers' financial risk, and therefore, should increase incentives for providers to remain in the state pool. As a result, reinsurance and risk corridors are likely to increase the continuity of care for state pool enrollees.

Risk sharing between plans and the government is also likely to be viewed as "fair" by the plans in light of the uncertainty surrounding the implementation of risk adjusted rates. If people stay with the same plans for a moderate length of time, adjusting payments based on prior utilization would provide plans with incentives to provide generous coverage. This is actually an advantage because, in terms of ensuring quality, it may be desirable to have providers and payers share the risks of care for expensive patients (Keeler, Carter and Newhouse, 1998). Blended payment systems have been favorable viewed in the research and policy arena since they protect plans from some of the problems with purely prospective risk adjustment system, but yet, do not fully blunt the incentives associated with capitation.

Disadvantages Of Using Retrospective Information

Including retrospective information in the payment rate increases incentives to provide unnecessary services (e.g. Ellis et al, 1996) and transfers part of the risk back to the payer. This is particularly true for risk corridors that limit plans' losses. Conversely, corridors that require plans to pay MRMIB back if their costs are too low, may make plans particularly eager to keep cost above their risk adjusted premium. Over time, risk corridors can be widened. The presumption behind this stipulation is that plans will gain experience and make more accurate bids, and that risk adjustment methods and data will improve over time reducing the need for risk corridors.

If reinsurance thresholds are high enough, incentives are unlikely to be largely affected; however, payment schemes based on reinsurance and risk corridors may also increase the data and implementation burden.

A Review Of Selected Risk Adjustment Systems

Recently much effort has gone into developing risk-adjustment systems to modify capitation payments for expected use (Ellis et al., 1996; Pope et al., 2000; Kronick et al., 2000; Kronick et al., 1996; Ash et al., 2000; Weiner et al., 1996). In this section, we provide a brief review of several prominent risk adjustment systems. In particular, we review Adjusted Clinical Groups (ACGs), previously known as the Ambulatory Care Groups, Diagnostic Cost Groups (DCGs), Chronic Illness and Disability Payment System (CDPS), previously known as the Disability Payment System, Global Risk Assessment Model (GRAM), Clinical Risk Groups (CRGs), and the Clinically Detailed Risk Adjustment System for Cost (CD-RISC). These systems are based on diagnostic measures that are typically found in claims data bases. Each of these systems groups diagnoses together in relatively homogenous cells that predict the expected health care cost of a population group. Diagnostic based risk adjustment systems have a much higher predictive power than systems based solely on demographic information (Pope et al., 2004). We consider the conceptual and analytic framework for each of these systems, and assess the data needs and other practical considerations for implementation for each system. Table 1 contains a concise comparison of these models across key dimensions.[2]

ACG

This system was originally developed as a case-mix adjustment measure for ambulatory populations (Weiner et al., 1996). Later, it was extended to incorporate inpatient diagnoses as well. The system categorizes diagnoses based on duration, severity, etiology, diagnostic certainty and the likelihood that specialty services will be needed. ICD-9-CM codes are assigned to 32 ADGs (Adjusted Diagnostic Groups). Each individual may potentially be assigned to multiple ADGs. Based on ADG categories, each individual is assigned to mutually exclusive morbidity groupings, known as ACGs. Depending on the specific type of system, there are between 80 and 100 ACGs. The system is data-driven and clinically oriented.

[2] See Shenkman and Breiner (2001) for a comprehensive review of several of these systems.

The ACG system was developed on a pediatric population in one HMO. Since then, the model has been extended to several HMOs and the Medicaid population. The system requires data that has information on demographic characteristics (age and sex), enrollment length, and diagnoses, and costs. The ACG system explains about 40-60 percent of the variation in concurrent health costs, and less for prospective health costs.

The ACG system has been implemented by the Minneapolis Buyers Health Care Action Group. They reported a relatively smooth experience with the ACG system (Dunn, 1998).

DCG

This system was developed as a health adjuster for HMOs that enroll Medicare populations (Pope et al., 2000, Ash et al., 2000). Initially, the system focused on only inpatient diagnoses (PIP-DCG); however the sole use of inpatient information provides incentives to hospitalize patients rather than treat them in ambulatory settings, and hence may encourage inefficient provision of care. The system was broadened to incorporate diagnoses from ambulatory settings and developed into the DCG/HCC (Hierarchical Coexisting Conditions) model.

DCGs are clinically oriented and resource-based, and use demographic and diagnostic information. Initially, the model was calibrated on the Medicare population. It was later extended to commercial and Medicaid populations. The model classifies ICD-9-CM codes into over 800 distinct diagnostic groups (DxGroups) on the basis of clinical similarity and resource use. The DxGroups are grouped into 184 Condition Categories (CCs). The Condition Categories are then ordered into about 100 Hierarchical Coexisting Conditions (HCC). Individuals can be assigned to multiple conditions across the HCCs, but only one condition within an HCC group. The model requires data on demographics (age and sex), diagnoses, and health care costs. The DCG-HCC can predict up to 40 percent of the potentially explainable variance in prospective health costs.

In 2000 CMS, which administers the Medicare Program, implemented the PIP-DCG model as a health-based payment adjuster (Pope et al., 2000). This model estimates beneficiary health status (expected cost next year) from demographics and the worst principal inpatient diagnosis (principal reason for inpatient stay) associated with any hospital admission. PIP-DCG-based payments were introduced gradually, with only 10 percent of total Medicare capitation payments adjusted by PIP-DCG factors in 2000. The other 90 percent of payments were still adjusted using a purely demographic model. The Washington State Health Care Authority also incorporated a DCG model. The model had mixed success and required adjustments of over 5 percent to premium payments (Dunn, 1998).

CMS-HCC

CMS (Centers for Medicare and Medicaid Services) was required by Congress's BIPA (2000) to use ambulatory diagnoses in Medicare risk-adjustment, to be phased in from 2004 to 2007. To this end, CMS evaluated several risk-adjustment models that use both ambulatory and inpatient diagnoses, including ACGs (Weiner et al., 1996), the chronic disease and disability payment system (CDPS) (Kronick et al., 2000), clinical risk groups (CRGs) (Hughes et al., 2004), the clinically detailed risk information system for cost (CD-RISC) (Kapur et al., 2003), and

DCG/HCCs (Pope et al, 2000b). CMS chose the DCG/HCC model for Medicare risk-adjustment, largely on the basis of transparency, ease of modification, and good clinical coherence.

CMS began collecting encounter data from MCOs for the physician office and hospital outpatient settings; however, following complaints from MCOs about the burden of reporting encounter data, CMS suspended data collection and opted for a streamlined data reporting strategy. The resulting model, which is a simplified version of the DCG model is called the CMS-HCC (Pope et al., 2004).

This model relies on only 70 HCCs pruned from the original DCG/HCC model's 101 HCCs. Low cost condition codes were systematically pruned from the model. Since insurers need only report the condition code at the top of hierarchy, the administrative burden is considerably reduced. Even though this pruning does not diminish predictive power substantially, there are likely to be repurcussions for individuals with low-frequency and high cost conditions that are no longer factored into the model.

CMS's experience with the CMS-HCC model will provide an important information on the viability of a relatively parsimonious model in predicting costs.

CDPS

The Chronic Illness and Disability Payment System was developed specifically to compensate more fairly for individuals with disabilities. It is a primarily resource-based system that is based on detailed clinical information for the disabled. The system has been developed for Medicaid and Medicare populations (Kronick et al., 2000, 2004). The system uses demographics and diagnostic information, and also used the length of enrollment, dates of services, type of provider, procedural inforation, and category of service.

The model has over 700 diagnostic groups that are combined into over 50 diagnostic subcategories. The system predicts between 30 and 50 percent of the variance in a population with disability. However, it is important to note that this population is likely to have costs that easier to predict than the general population.

The CDPS was implemented for the Medicaid population in Colorado. Plans did suffer from some selection, and required rates to be adjusted over time (Dunn, 1998).

GRAM

The Global Risk Assessment Model is a clinically based, hierarchical model of health care use (Hornbrook et al., 1996). The model was developed on 100,000 individuals who were randomly selected from several HMOs. The model uses data on demographics, eligibility, diagnoses, and costs. The system uses Kaiser Permanente Clinical Behavioural Disease Classification System, which groups diseases by their clinical attributes and the expected responses to the disease. There are 350 diagnostic categories that are further grouped into 19 categories. The model explains 17 percent of the variance, or 70 percent of the explainable variance in prospective costs. This model has not been implemented to date.

CRG

This system was developed to predict costs for individuals with congenital and chronic health conditions (Hughes, 2004). CRG is a categorical clincal system that classifies individuals into mutually exclusive categories and assigns each person to a severity level if he or she has a chronic health condition. The system uses demographic, diagnostic, and procedural information. The CRG grouper assigns each individual to a hierarchically defined health status group, and then to a specific CRG category and severity level if they are chronically ill. There are nine health status groups, and over 250 CRG categories. Unlike most other risk adjustment systems, the CRG is a categorical clinical model and not a regression model.

The testing and refinement of CRGs included three large data sets representing different populations – Medicare, Medicaid, and an employer based population. Prediction performance varied depending on the population tested. For a Medicaid population, the CRG yielded a predictive power of 30 percent.

CRG was implemented for several pediatric populations in Ohio and Maryland

CD-RISC

This system was developed to predict costs for a Medicaid population and private sector managed care enrollees (Carter et al., 1997, Kapur et al., 2003), and was later calibrated for a Medicare population. CD-RISC contains definitions for several hundred severity-adjusted conditions that can be used to predict future health care costs. The CD-RISC model has a hierarchical structure that implies that only the most expensive condition within a body system affects payments. The system describes the resources needed to care for the Medicare population based on their burden of disease. It contains prospective models that predict annual costs based only on information known at the start of the year. It also contains several retrospective models that predict costs based on current year diagnoses. The diagnoses are grouped into conditions with an attached severity level. The condition-severity groups are then organized into body systems with only the most expensive group in each body system affecting prediction. However, other conditions in both the same and other body systems may affect severity level and thus differences in the effects of severity levels of the same condition often measure the interaction of the condition with other conditions. The structure of the CD-RISC model is designed to minimize incentives to game the system. The predictive power for the CD-RISC model is 11 percent.

The CD-RISC model has not been implemented in practice.

Implications for MRMIB

As described above, there are a number of candidate risk adjustment models that use diagnostic information to predict costs. Each of these systems can be judged using the following criteria (Newhouse, 1986):

- ***Strength of prediction***: The incentive for insurance companies to participate in covering state pool members and the stability of the pool will hinge on whether the fee and the payments to health insurers accurately reflect expected costs. All the models discussed above do reasonably well in predicting costs, since they all use detailed clinical information. However, models that rest solely on demographic information are likely to be inadequate in most cases.

- ***Ease of collection***: A system that rests on easily collected information will be less burdensome for providers and employers. Diagnoses can usually be easily collected from claims and encounter data; however, a modified and simplified risk adjustment system may need to be used during the first year of implementation. All the diagnoses based systems discussed above require ICD-9-CM codes; however, the CMS-HCC has eased the burden by requiring providers to record only one diagnosis within a hierarchy. Some systems also require information on length of enrollment and procedural detail that will provide extra burden. Like CMS, MRMIB may want to consider incorporating a streamlined version of an existing risk adjuster. The experience of CMS with the CMS-HCC model will be useful in making this decision.

- ***Ease of audit and difficulty of gaming***: Employers and insurers may be inclined to game the risk adjustment system. Employers may attempt to game by underreporting diagnoses among their workers in order to minimize their fee. Insurers have an incentive to do just the opposite to obtain a higher premium. Most of the risk adjustment systems exclude diagnoses that are vague in order to minimize gameability. Several systems, such as the HCC and the CD-RISC, have a hierarchical structure so that only one condition within a hierarchy counts for payment. This minimized incentives to enter multiple codes for related conditions.

- ***Size of incentives for inefficient care***: Virtually all the models described above aim to promote efficiency by using both inpatient and outpatient information. The PIP-DCG that uses only inpatient information may encourage inpatient use and therefore is unlikely to be an appropriate choice. While models that incorporate procedural data succeed in reimbursing providers who need to undertake expensive procedures, they may also encourage the provision of potentially unnecessary services.

- ***Previous implementation experience***: Risk adjustment models that have been successfully implemented for similar populations are likely to be more easily adapted to the employer-based population in a pay or play system. Several of the risk adjustment models described above, such as the CDPS and the CRG, were designed specifically for disabled populations and may be less relevant for a working age population. The CMS-HCC is currently being tested on a large population; however, this is a Medicare population, not a working age population.

MRMIB or any other government agency that administers a pay or play system will have to carefully weigh these considerations in choosing and adapting existing risk adjustment systems for an employer population. In addition, incorporating blended payment mechanisms in the form of risk corridors or reinsurance, may be particularly useful during the early years of implementation.

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TABLE E-1: A COMPARISON OF SELECTED RISK ADJUSTMENT SYSTEMS

	ACG	**DCG**	**CDPS**	**GRAM**	**CRG**	**CD-RISC**
Authors	Weiner et. al	Pope et. al	Kronick et al	Hornbrook et al	Hughes et al	Carter et al
Calibration Population	Pediatric, HMO, and Medicaid	Medicare, Medicaid and commercial	Medicaid and Medicare – emphasizes disabled populations	HMO population	Medicaid, Medicare and working age – emphasizes chronically ill	Medicare, Medicaid and private insured
Data Requirements	Demographics, diagnoses, duration, severity, etiology, and use of specialty services, costs	Demographics, diagnoses, costs	Demographics, diagnoses, length of enrollment, dates of services, type of provider, procedural inforation, category of service, costs.	Demographics, eligibility, diagnoses, costs	Demographic, diagnostic, procedural information, costs	Demographics, diagnoses, costs.
Model Structure	32 ADGs aggregated into 80-100 mutually exclusive ACGs	800 DxGroups, aggregated into CCs. Hierarchcial grouping of CCs.	700 diagnostic groups combined into 50 diagnostic subcategories	350 diagnostic categories combined into 19 categories	9 health status groups and 250 CRG categories – not regression based	473 condition-severity groups assigned to 19 body systems. Hierarchical structure.
Implementation Examples	Successful implementation by Minneapolis Buyers Health Care Action Group	Moderately successful implementation by Washington State Health Care Authority	Implemented with some problems by Colorado Medicaid program	Never implemented	Implemented for pediatric populations in Washington and Ohio	Never Implemented