Medicare Risk-Adjusted Capitation Payments: From Research to Implementation

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INTRODUCTION

In this issue of the *Health Care Financing Review*, we focus on risk adjustment. A now-popular part of current health care jargon, risk adjustment can actually refer to a number of interrelated concepts. For example, risk adjustment sometimes describes a way of accounting for differences in health status among various study populations; this is also referred to as case-mix adjustment. Risk adjustment can also be used for the purpose of measuring and/or predicting the health care expenditures of individuals or groups, and applied specifically as part of a payment system. It is this latter application of the term that is the focus of this issue.

In part, this issue updates some of the research that was previously published in the 1996 issue of the *Review* Volume 17, Number 3 on risk adjustment. While much has changed regarding the policy applications of risk adjustment—risk-adjusted capitated payments are now a reality in the Medicare program, as well as in many State Medicaid programs—recent research on risk adjustment continues to focus on model development and improvement. However, because the real world of risk-adjusted payment systems are far more common than in 1996, some of the newest work in risk adjustment is related to policy appli-

cations. This issue presents articles that touch both on recent model development work and on policy applications.

RECENT RISK-ADJUSTMENT MODEL DEVELOPMENT

Risk-adjustment models developed for the purpose of explaining/predicting resource use have a number of common elements. They are generally ordinary least square regression models designed to predict total expenditures for an individual (most commonly in the following year, though same year, or concurrent models are also available). Models of this type also generally incorporate some demographic information, such as age and sex. Where models differ is in the factors (or independent variables) used to explain differences in individuals' health expenditures, and how this information is organized in the classification system.

For example, most current risk-adjustment models use clinical diagnoses (in the form of the *International Classification of Diseases, 9th Revision, Clinical Modification* codes) as the basis for a clinical classification system. Such models depend upon the relationship between more severe and in some cases more numerous clinical diagnoses, and higher health care expenditures. Given that there are more than 10,000 such codes, developers of risk-adjustment models must define some way of grouping these codes in a way that makes sense to the users of the model, while maximizing

predictive power and minimizing sensitivity to coding anomalies. Some developers base their classification systems on clinical or disease-specific groupings, combining codes, for example, that pertain to various heart disorders or diabetes. Often, even these basic groups must be combined further in order to improve model performance; a common approach is to combine multiple clinical groups that have similar costs. Others base their groupings on major body systems, persistence of illness, or likelihood of recurrence.

But while clinical disease codes are a common basis for risk-adjustment classification systems, they are not the only possibility. Currently, there are a number of risk-adjustment models that explain/predict individuals' health expenditures using measures of functional status. The theory behind this approach is that individuals with increasing numbers of limitations in activities of daily living (ADL) are also higher users of health care services. Instead of using diagnosis codes as the basis for classifying, ADL limitation information (gathered from all individuals or a sample population) is used. In some cases, specific ADL limitations are used as independent variables, while in other models of this type counts or hierarchies of ADL limitations are developed.

In understanding risk-adjustment models developed for payment applications, the information not used in the models is almost as significant as what is. In most risk-adjustment models, the development process includes decisions about the exclusion of some information. Sometimes those decisions are driven by the desire to improve model performance or robustness. For example, if the goal of the risk-adjustment model is to predict next year expenditures using current year diagnoses, some diagnostic information

has no predictive power or is too vague and non-specific clinically to add much to the overall models' performance. On the other hand, information which may be highly predictive of future resource use may be considered inappropriate because of incentives created, or problematic for payment purposes (for example, prior expenditures or the use of an individual's race). Therefore, as risk- adjustment models continue to be developed, part of the refinement process may include changes in the weight given to some information.

Three articles presented in this issue focus primarily on recent development/refinement of risk-adjustment models using diagnosis information. The first of these by Ash, Ellis, Pope, Ayanian, Bates, Burstin, Iezzoni, MacKay, and Yu, provides an update of recent refinements in the DCG/HCC family of models. This article focuses on prospective models for Medicare, Medicaid, and privately insured populations. The authors describe the structure of the models and how they vary when applied to populations with differing characteristics. For example, the Medicare model makes some distinctions between the aged and the disabled; the Medicaid model distinguishes among some types of eligibility. Using the authors' table of coefficients one can compare the relative costliness of conditions in each population.

The second article by Kronick, Gilder, Dreyfus, and Lee describes a model developed for the Medicaid population. The Chronic Illness and Disability Payment System (CDPS) is an expansion and refinement of a system developed previously for the disabled Medicaid population. The authors describe the model and examine differences in the populations eligible because of disability and those eligible for Temporary Assistance to Needy

Families. Another aspect of the work is a study of year-to-year persistence of certain chronic diagnosis codes in fee-for-service (FFS) data, and the implications.

The third article by Carter, Bell, Dubois, Goldberg, Keeler, McAlearney, Post, and Rumpel reports on the clinically detailed risk information system for cost (CD-RISC). The CD-RISC system reported in this issue was designed and calibrated for Medicaid and private payers. Data from an indemnity plan and two health maintenance organizations (HMOs) were used for calibration and analysis. Alternative structures are described including purely prospective models and prospective models with selected episodes from the payment year. Comparisons among the payers are made as well as among the models.

POLICY APPLICATIONS OF RISK-ADJUSTMENT SYSTEMS

In our previously mentioned issue devoted to risk adjustment, there was little implementation experience available for policymakers to draw upon when designing risk-adjusted payment systems. At that time, lack of actual managed care data and other operational experience made implementation of risk-adjusted payments something of a leap of faith. Much has changed since 1996. HCFA implemented a form of risk adjustment based on inpatient hospital diagnoses in January 2000. An inpatient system was mandated by the Balanced Budget Act of 1997 (BBA) and had to be implemented within the broader program changes made by the law. Three articles in this issue focus on the implementation of Medicare's principal inpatient diagnostic cost groups (PIPDCG) system.

The PIPDCG model being used is described by Pope, Ellis, Ash, Liu, Ayanian, Bates, Burstin, Iezzoni, and Ingber. The authors describe the development of the model and the decisions that were made for the Medicare version. Ingber, in a companion article, describes the steps HCFA took in transforming the PIPDCG risk-model coefficient estimates into relative risk factors and then, payments to managed care plans.

HMOs submitted their first year of data to HCFA for service year July 1997 through June 1998. Risk factors calculated using the PIPDCG system were estimated for September 1998 HMO enrollees. Greenwald, Levy, and Ingber describe risk factor differences between the FFS and HMO populations in counties with significant numbers of HMO members. Focusing on individual variables in the PIPDCG model, they indicate that demographic differences account for little of the observed differences in risk factors. Direct health status measures are responsible for the observed differences in average risk factors between managed care and FFS beneficiaries.

Under any capitated payment system, there are questions about how appropriately it will pay for specialized populations. One prominent issue in the implementation of risk adjustment for Medicare has been the adequacy of PIPDCG based payments for "frail" beneficiaries. This issue is of particular concern for specialized plans, such as the Program of All-Inclusive Care for the Elderly (PACE) demonstration sites, who seek to enroll and provide care for this vulnerable population. Current risk adjusted-payment systems, like the PIPDCG, result in prospective payments for large, unbiased groups that are extremely accurate, particularly

as compared to the demographic-only based systems fully in place for Medicare prior to this year. But this accuracy derives from paying correctly on average for a typical, unbiased mix of beneficiaries—some sick and some healthy. And while risk-adjustment models like the PIPDCG do improve prospective payment accuracy for biased groups—such as the frail elderly—there may be room for improvement. To the extent that these frail elderly beneficiaries are costly, refining risk-adjustment methods to pay accurately for this group is a focus of current research.

Two articles in this issue address the cost implications for the Medicare program of frail populations. The first article by Riley investigates the ability of the PIPDCG and Hierarchical Coexisting Condition (HCC) diagnosis-based risk adjuster models (Pope et al., 2000; Ash et al. 2000) to predict Medicare costs for populations with functional limitations. Riley uses data from the Medicare Current Beneficiary Survey (MCBS) as the basis for his analyses, and finds that for the non-institutionalized, the models tend to over-predict for the unimpaired populations and underpredict for the impaired populations. Furthermore, this underprediction increases as the number of difficulties with ADLs increases. These models also overpredicted for the institutionalized. But although there was substantial underprediction for the severely impaired community-based population on average, the HCC model slightly overpredicted costs for the majority of severely impaired community-based beneficiaries and substantially underpredicted costs for a minority.

The second article by Robinson and Karon addresses the question of appropriate payment for PACE enrollees. PACE began as a demonstration project. Under the BBA 1997 it became a permanent part of the Medicare program and its payments are to be based on the Medicare+Choice ratebook. It is a voluntary capitated program that coordinates all acute and long-term care services for community-based beneficiaries age 65 or over who are nursing home certifiable. That is, they meet State requirements for eligibility for nursing home care. Historically, these capitated providers were paid 95 percent of county adjusted average per capita cost multiplied by 2.39. This multiplicative factor was used because there was evidence that the population covered by PACE was substantially more expensive than the general Medicare population. In their article, the authors use data from the MCBS and the National Long-Term Care Survey to assess the appropriateness of this single level adjuster. The authors calculate a number of different adjusters that would be appropriate for the variety of potential PACE enrollees and criteria for being nursing home certifiable.

FROM RESEARCH TO IMPLEMENTATION

Clearly, implementation of Medicare's PIPDCG risk-adjustment capitation payment system as of January 1, 2000, was a significant policy milestone. Together with a number of State Medicaid programs, this payment policy change for Medicare suggests that use of some risk-adjustment method beyond basic demographics is a realistic and attainable policy improvement for many capitated payment programs. But there is also much room for improvement and refinement in the risk-adjustment methodologies under development. The next generation of comprehensive models, such as the few described in this issue, use more information in more sophisticated ways to provide

more accurate predictions of costs for more specific groups of beneficiaries. The limiting factor for development and implementation of more powerful models continues, however, to be availability of reliable data.

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