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AN INTRODUCTION TO DIAGNOSTIC COST GROUPS (DCGS)

The term “Diagnostic Cost Groups” or DCGs refers to a family of risk adjustment methodologies developed by a team of researchers at Health Economics Research, Inc., Boston University, and Harvard University under contract from the Health Care Financing Administration (HCFA). HCFA evaluated a number of different risk adjustment systems for use in conjunction with Medicare risk-contracting, now known as *Medicare+Choice*. It selected a version of DCGs, the Principal In-Patient Diagnostic Cost Group (PIP-DCG) Model, to risk-adjust payments to *Medicare+Choice* plans beginning January 1, 2000.

DCGs use clinical information, primarily ICD-9-CM diagnosis codes, from claims data to categorize patients based on their expected annual health expenditures. One DCG category might contain all people with expected expenditures of less than \$2,000 in the coming year. Another, all people with expected expenditures between \$10,000 and \$12,000.

The original DCG development effort involved a variety of models that used this same generic approach but differed in terms of the diagnoses used to categorize patients and the extent to which other data, including the use of selected procedures, were included in the system. For example, the Principal In-Patient Diagnostic Cost Group (PIP-DCG) Model uses only principal diagnoses to categorize patients, while the All Diagnosis DCG (ADDCG) Model uses all hospital diagnoses (inpatient and outpatient), as well as diagnoses from physician claims. The Expanded DCG (EDCG) Model maintains a distinction between inpatient diagnoses and other diagnoses in assigning patients to cost groups, which has an effect that is similar to incorporating an indicator of hospitalization into the ADDCG version of DCGs. A fourth model extends the EDCG approach by including seven procedure groups in the system.¹

In spite of the similarity in name and acronym, DCGs and Diagnosis Related Groups (DRGs) should not be confused. They represent fundamentally different methodologies. DCGs are a new methodology designed for risk-adjusting capitation rates. They are derived almost exclusively from diagnosis codes and are intended to explain differences across beneficiaries in total Medicare expenditures (Parts A and B) per year. In contrast, Medicare adopted DRGs in 1983 as the basis for reimbursing hospitals for inpatient services. In addition to diagnoses, DRGs use procedures, discharge status, and age as significant classification variables. DRGs are designed to explain differences in hospital (Part A) costs across Medicare discharges.

¹ For further information about the DCG development effort, see Randall P. Ellis, and others, *Diagnostic Cost Group (DCG) and Hierarchical Coexisting Conditions (HCC) Models for Medicare Risk Adjustment*, Final Report on HCFA Contract No. 500-92-0020, April 26, 1996. Copies of this report are available from the National Technical Information Service.

RISK ADJUSTMENT IN THE MEDICARE PROGRAM

Since 1985, Medicare has paid Health Maintenance Organizations (HMOs) a capitation rate for Medicare risk enrollees based on an actuarial estimate of the per capita annual cost that Medicare incurs in paying claims on a fee-for-service (FFS) basis in the county of residence for that enrollee. County estimates were adjusted for four demographic factors: age, gender, Medicaid eligibility, and institutional status. This methodology has been known as the "Adjusted Average Per Capita Cost" (AAPCC) system. Medicare HMOs were paid on this basis from 1985 through 1997.

When it created the *Medicare+Choice* program by enacting the Balanced Budget Act of 1997, the Congress also called for a new method of determining premiums or capitation rates to be paid to *Medicare+Choice* plans. Rather than base payments on actual, county-level per capita costs, base premiums will be determined by the largest of three specific amounts:

- A minimum monthly rate of \$367 per enrollee in 1998
- A 2 percent increase of the prior year's rates
- A blended amount that combines county-specific payments with national data and other adjustments

Base premiums calculated in this manner continue to be adjusted by basic demographic characteristics. By law, this new payment applies to Medicare HMOs in 1998 and to *Medicare+Choice* plans beginning in 1999.

In addition, the Balanced Budget Act of 1997 requires HCFA to develop and implement a new risk adjustment methodology by January 1, 2000. This methodology will adjust premiums to reflect the relative health status and expected resource use of each enrollee. The intent is to align Medicare capitation rates more closely with expected resource use, to reduce incentives to "cherry-pick" or focus marketing efforts on Medicare beneficiaries deemed to be relatively low risks, and to increase incentives to offer managed care Medicare options to poor insurance risks.

OTHER USES FOR DCG RISK ADJUSTMENT METHODS

The value of the DCG system is not limited to establishing premiums and capitation rates for Medicare beneficiaries. The DCG system is actually a generalized approach to adjusting expectations about resource use for differences in measurable health status. As such, DCGs can be used to risk-adjust premiums and capitation rates for employment-based groups, Medicaid recipients, and other insured populations.

DCGs also have applications in performance evaluation, incentive compensation, administrative reporting, and other instances where it is appropriate to adjust expectations based upon differences in health status. For example, if a managed care plan wants to capitate primary care providers, risk adjustment would help the plan to calibrate capitation rates based on the health status of enrollees managed by those primary care physicians (PCPs). Similarly, administrative efforts to evaluate specialty referrals or hospital usage in a managed care context ought to take into account the types of conditions and health status of individual enrollees. Risk adjustment offers a systematic approach to take these factors into account.

DIAGNOSTIC COST GROUPS AS A RISK ADJUSTMENT SYSTEM

The DCG methodology begins with a classification system in which all ICD-9-CM diagnosis codes are mapped into an exhaustive and mutually exclusive set of DxGroups. (Depending upon the application, the number of DxGroups can range from just over 100 to nearly 500.) DxGroups represent clinically coherent sets of contiguous ICD-9-CM codes. Each DxGroup is large enough to ensure reliable statistical estimation. If patients have multiple diagnoses that need to be included in a DCG system, each of their diagnoses is initially assigned to an appropriate DxGroup.

DxGroups are then sorted into payment groups or DCGs using a sorting algorithm that ranks DxGroups based on the average total expenditures associated with each enrollee assigned to the various DxGroups. Once enrollees with the high expenditures are assigned to a DCG, they are removed from the analytic database along with the expenditures with which they are associated. DxGroups are then re-ranked and the next highest DCG is created. This process is repeated until each enrollee and his or her expenditures are assigned to a DCG group. Each person can only be assigned to one DCG, the highest category for which they are eligible.

DCGs are not intended to be clinically coherent. They represent collections of DxGroups with similar expectations about resource use, regardless of underlying clinical condition or health status. However, to ensure the clinical appropriateness of assignments in a payment model, a clinical panel reviewed the placement of DxGroups into DCGs. Based on this review, some DxGroups were reassigned to ensure clinical plausibility, sensible incentives, and statistical meaningfulness. Finally, standard statistical methods were used to quantify the average relative costliness of patients assigned to different DCGs and to develop precise risk adjustment parameters.

PROSPECTIVE VS. CONCURRENT RISK ADJUSTMENT

DCG-based risk adjustment can either be applied prospectively or concurrently. The prospective approach uses diagnoses from one time period to adjust expectations about resource use in a later period. For example, HCFA is proposing to use calendar year 1999 claims data to risk-adjust the *Medicare+Choice* capitation rates that will be paid during calendar year 2000. A concurrent system uses diagnoses from a given time period to adjust expectations about resource use during that same time period. That is, concurrent risk adjustment seeks to explain differences that **have occurred**, while prospective risk adjustment seeks to predict differences that **will occur**.

DCG models significantly improve upon the current AAPCC methodology that relies on age and gender alone. However, none of these models are especially successful in explaining variations in health expenditures on a prospective basis. According to the research team that developed these methods, AAPCCs explain about 1 percent of this variation, whereas PIP-DCGs explain about 6 percent. Of the four DCG methods, EDCGPs achieve the highest level of explanatory power -- 8.1 percent. DCGs models explain a much larger fraction of variation in resource use on a concurrent or retrospective basis. The explanatory power of PIP-DCGs is slightly more than 43 percent in this context. However, the benefits of prospective risk adjustment for payment purposes are generally viewed as exceeding the cost of less explanatory power. Unlike concurrent risk adjustment, prospective methods provide a predictable revenue stream to health plans, relatively little incentive to up-code, and transfer risk from payer to health plan.

HIERARCHICAL COEXISTING CONDITIONS (HCC) MODELS

The researchers responsible for the design of the DCG risk adjustment system subsequently developed an alternative approach based on what they have labeled as Hierarchical Coexisting Conditions (HCCs). One conceptual problem with DCGs is that they classify a person based on the single, highest cost diagnosis with which he or she is associated. One diagnosis does not provide an especially complete description of a person's health status, particularly among the elderly who often have multiple, simultaneous health problems.

The HCC methodology circumvents the limitation of one diagnosis by describing a person's health status in terms of a set of medical conditions. The HCC Model combines DxGroups into a collection of about 100 Coexisting Conditions. Coexisting conditions, in turn, are organized by hierarchies that generally correspond to body systems or disease types (e.g., Neoplasms, Gastrointestinal, Urinary, and Diabetes). Given their diagnoses, people be characterized by none, one, or many Coexisting Conditions but they can only be assigned to one Coexisting Condition within a hierarchy (the most expensive).

HCCs are more successful than DCGs in explaining variations in resource use, both prospectively and concurrently, because they provide a more complete characterization of a person's health status. HCFA selected PIP-DCGs as the basis for Medicare risk adjustment beginning on January 1, 2000, because PIP-DCGs are the only model developed to run solely on inpatient data. However, the Balanced Budget Act of 1997 gives HCFA the authority to expand its data collection from *Medicare+Choice* plans, beginning on October 1, 1999 to include physician, outpatient hospital, SNF and home health services. HCFA has indicated that it plans to abandon PIP-DCGs and adopt a more comprehensive risk adjustment system about three years after expanding its data collection requirements. Given more complete data, HCFA is likely to consider implementing an HCC-type methodology system at that time.

HSS PRODUCT DEVELOPMENT RELATING TO DCGs

HSS is currently developing software that will enable users to assign DCGs to individuals represented in claims data. Our EASYGroup™ DCG Grouper should be available early in 1999. The HSS Consulting Group is also prepared to assist clients implement DCG-based risk adjustment in payment systems or administrative reporting.

If you have any questions about Diagnostic Cost Groups, HCFA's proposed risk adjustment methodology, or the HSS Consulting Group, please contact our Client Services Department via the Internet at support@hss-info.com or contact us at 1-800-999-DRGS (3747). You can also submit questions or comments by visiting our web site (www.hssweb.com) and selecting the "Ask the Experts" feature.