Comprehensive Risk Adjustment

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Comprehensive Risk Adjustment Schedule

- **NO DECISIONS ON A COMPREHENSIVE MODEL HAVE BEEN MADE**
- HCFA is in the process of updating and evaluating a number of possible comprehensive models
- Decision on final model by the fall of 2001
- Calibration of final model Jan-Jun 2002 using 1999 and 2000 fee-for-service data
- Final methodology announced January 15, 2003
- Implementation on January 1, 2004

Elements of Comprehensive Models

- **Prospective**
  - inpatient, physician and outpatient diagnoses from a base year are used to assign person-specific risk factors for the next year
- **Clinical classification algorithms** are used; some more elaborate than others.
- Models are generally **"additive"**
  - more diagnoses that have predictive power mean higher risk factors, and higher payments
- Models include **demographic factors**

Comprehensive Models

- **Hierarchical Coexisting Conditions (HCCs)**
  - Pope, Ash, and Ellis (and others) at Health Economics Research (HER) and Boston University (BU).
- **Ambulatory Diagnostic Group - Hospital Dominant (ADG-HOSDOM)**
  - Weiner (and others) Johns Hopkins University
- **Chronic Illness and Disability Payment System (CDPS)**
  - Kronick at UCSD
- **Clinically Detailed Risk Information System for Costs (CD-RISC)**
  - Carter (and others) at RAND
- **Clinical Risk Groups (CRGs)**
  - Averill, Goldfield (and others) at 3M

Comprehensive Risk Adjustment Features and Benefits

- Site-of-service neutral
  - incentives to hospitalize are minimized
- Health status conveys most of the dollars
  - less weight is applied to demographic factors
- Payment accuracy and fairness is improved
    - overall explained variability
    - predictive ratios for biased groups

Percent of Beneficiaries with Health Status Factors

- Beneficiaries Hospitalized 18.6%
  - % with health status $ (PIP) 12.2%
- Beneficiaries with a Physician, Outpatient or Inpatient claim 89.0%
  - % with health status $
    - (HCC) 57.1%
    - (ADG-HOSDOM) 77.5%

Predictive Ratios (Predicted/Actual)

Groups	AAPCC-like	PIP-DCG	HCC
• Beneficiaries ranked by cost			
– lowest 20%	2.49	1.92	1.21
– middle 20%	1.31	1.01	1.11
– highest 20%	.48	.85	.88
• Disease Groups			
– Diabetes w/o complications	.63	.75	1.02
– Diabetes with complications	.45	.69	.96
– Breast cancer	.68	.78	1.07
– Hip Fracture	.59	.85	.99

Hierarchical Co-Existing Conditions (HCC's)

- Diagnoses are grouped into 543 DxGroups
- DxGroups are then sorted using cost and clinical criteria into 134 HCC groups based on ICD-9 codes
- 75 HCCs are used
- Hierarchical; e.g., 8 levels of cancer, 3 levels of diabetes
- Additive across types of diseases: A person may be "assigned" to multiple groups

Hierarchical Coexisting Conditions (HCCs)

(based on 1996 mean of $5186)

HCC	Payment
Metastastic Cancer	$ 8533
High Cost Cancer	5371
Moderate Cost Cancer	2942
Lower Cost Cancers / Tumors	1242
Carcinoma in Situ	0
Uncertain Neoplasm	0
Skin Cancer, except Melanoma	0
Benign Neoplasm	0

Hierarchical Coexisting Conditions (HCCs)

(based on 1996 mean of $5186)

HCC	Payment
Diabetes with Chronic Complications	$ 4788
Diabetes with Acute Complications	3181
Diabetes with No or Unspec. Complications	1481
Congestive Heart Failure	2733
Acute Myocardial Infarction	2457
Chronic Ischemic Heart Disease	1178
Renal Failure	4195

Ambulatory Diagnosis Groups - Hospital Dominant (ADG-HOSDOM)

- Diagnoses are grouped into 32 ADGs based on:
  - duration of the condition(acute, recurrent, or chronic)
  - severity of the condition (minor/stable vs major/unstable)
  - diagnostic certainty (symptoms vs documented diseases)
  - etiology of the condition (infectious, injury, or other)
  - specialty care involvement (medical, surgical, etc.)
- 13 ADGs were selected for the Medicare model
- HOSDOM marker is comprised of diagnoses that have at least a 50 % probability of leading to a hospitalization.

ADG-HOSDOM

(based on 1996 mean of $5186)

ADG	Payment
Time limited, major	$1989
Time limited, major, primary infections	$1949
Asthma	$1050
Likely to recur, discrete	$652
Likely to recur, progressive	$2483
Chronic medical, unstable	$1575
Chronic specialty, unstable, orthopedic	$1263

ADG-HOSDOM

(based on 1996 mean of $5186)

ADG	Payment
Injuries/adverse events, major	$1145
Psychiatric, time limited, minor	$748
Psychiatric, persistent or recurrent, stable	$933
Psychiatric, persistent or recurrent, unstable	$1610
Signs/symptoms, major	$1155
Malignancy	$1421

ADG-HOSDOM

(based on 1996 mean of $5186)

- HOSDOM payment weight is $6449
- HOSDOM marker applies to 6.9% of beneficiaries
- 77.5 percent of beneficiaries have at least 1 ADG

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Demographic Factors

(Average Cost in 1996 = $5186)

female	AAPCC-like	PIP-DCG	HCC	ADG-HOSDOM
65-69	$2791	$2310	$1242	$ 339
70-74	3583	2998	1650	767
75-79	4599	3810	2139	1318
80-84	5681	4683	2549	1982
85-89	6807	5589	2814	2775
90-94	7321	5928	2110	3087
95+	7026	5754	1671	3103

HCC model

examples

- Base payment for female, age 75-79: $2,139
- Health status increments
  - Diabetes with no complications: $1,481
    - 250.00 diabetes, simple
  - Moderate cost cancer: $2,942
    - 183.0 malignant neoplasm of ovary
- Total Payment = $ 6562

HCC model

examples

- Base payment for female, age 75-79: $2,139
- Health status increments
  - Diabetes with chronic complications: $4,778
    - 250.41 diabetes with renal manifestations, insulin dependent
  - Chronic Ischemic Heart Disease: $1,178
    - 414.0 coronary artherosclerosis
- Total Payment = $ 8,104

ADG-HOSDOM model

examples

- Base payment for female, age 75-79: $1,318
- Health status increments
  - Chronic medical, unstable: $1,575
    - 250.41 diabetes with renal manifestations, insulin dependent
    - 414.0 coronary artherosclerosis
  - HOSDOM variable: $6,449
    - 250.41 diabetes with renal manifestations, insulin dependent
- Total Payment = $ 9,342

Chronic Illness and Disability Payment System (CDPS)

- The CDPS model includes 20 major categories of diagnoses, grouped by body system or type of clinical diagnosis.
  - Examples of body system categories are: cardiovascular, skeletal and connective, and pulmonary
  - Examples of clinical diagnosis-based categories are diabetes, cancer and infectious disease.
- The 20 major categories are further divided by cost levels (generally high, medium and low cost).
- Individuals can be assigned to multiple categories.

Clinically Detailed Risk Information System for Cost (CD-RISC)

- The CD-RISC model has 173 groupings of conditions, each with up to 3 severity levels .
  - Severity is assigned based on ICD-9 diagnosis codes, in combination with codes for complications or comorbidities.
- The groups are then organized into hierarchies within 16 body systems, e.g. circulatory, digestive, neoplasm, infections, mental.
- Individuals are assigned to the highest level in each body system. The model is additive across body systems.

Clinical Risk Groups (CRGs)

- Diagnoses are assigned to 31 Major Diagnostic Categories (MDCs) corresponding to a single organ system or etiology.
- Each MDC is subdivided into Episode Diagnostic Categories (EDCs).
  - EDCs are classified into 6 levels: Dominant Chronic, Moderate Chronic, Minor Chronic, Chronic Manifestation, Significant Acute, and Minor Acute.
  - Individuals can be assigned multiple EDCs in an MDC. (533 EDCs across the 31 MDCs)

Clinical Risk Groups (CRGs)

- In each MDC, a person's most significant EDC is designated as the Primary Chronic Disease (PCD).
- The PCD in each MDC is assigned a severity level, based on:
  - presence of other chronic EDCs within the same MDC and across other MDCs, presence of acute EDCs from any MDC, and past treatment history.

Clinical Risk Groups (CRGs)

- Combinations of diseases across MDCs are classified into groups called statuses.
- There are 9 statuses, e.g., *Dominant Chronic Diseases in Three or More Organ Systems*.
- The particular combination of a person's PDCs is assigned to a group (base CRG) within a status.
- Each base CRG may have multiple severities
- There are 1083 final CRGs.

Research Issues

- Updating all of the models
- Adding other data to the models
  - home health diagnoses
  - specific therapies
  - skilled nursing facility data
  - specific durable medical equipment
- Adding other factors to account for high cost populations.

Selecting a Comprehensive Model

- Conceptual: Does the model make sense to clinicians, providers, and plans?
- Comparative analytic performance:
  - accuracy in predicting individual expenditures?
  - accuracy in predicting for biased groups?
- Incentives and appropriateness for payment applications: Sensitivity to coding variability?
- Administrative feasibility: Data requirements? Copyright issues?