The CMS-HCC Model

What you need to know

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Disclosures

None
Learning Objectives

1. To appreciate the role of the CMS-HCC model as a risk adjustment tool within value-based purchasing models
2. To understand how HCC’s and risk adjustment generally will increasingly affect health care providers
3. To provide specific recommendations for providers around documentation and coding to ensure accurate risk adjustment

Agenda

The CMS-HCC Model
Calculating a Risk Score
Modelling Missed Opportunities
Specific Recommendations for Providers
### A Couple Walk into Your Office

<table>
<thead>
<tr>
<th>78yo female</th>
<th>80yo male</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTN, CKD, Afib on Coumadin, RA</td>
<td>HTN, DM, COPD, CHF</td>
</tr>
<tr>
<td>No recent hospitalizations</td>
<td>Hospitalized last year for Severe CAP</td>
</tr>
<tr>
<td>12 medications</td>
<td>16 medications</td>
</tr>
<tr>
<td>No alcohol or smoking</td>
<td>Former smoker</td>
</tr>
</tbody>
</table>

Who is sicker?

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### Who is sicker?

**Perspective of the Primary Care Physician**

**Perspective of a Payer**

How would you stratify their health risks and anticipate their health care resource use?
An actuarial method of predicting health care costs
Estimates financial outlay for a group of patients
Allows us to account for severity over time
Allows us to set and monitor performance targets
They are ubiquitous and used across all types of payers, both governmental and commercial

The CMS-HCC is Medicare’s risk adjustment model for Medicare Advantage (MA) and the Medicare Shared Savings Program (MSSP)

Agenda

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The CMS-HCC Model

- CMS = Centers for Medicare and Medicaid Services
- HCC = Hierarchical Condition Category
- A prospective risk adjustment model that uses retrospective demographic data and medical diagnoses to calculate a risk score that predicts future health expenditures
- The model provides for higher payments for sicker patients and lower payments for healthier patients

A Brief History

- Developed with CMS funding by RTI International, Boston University, and Harvard in the early 2000’s and implemented in 2004
- Originally used to adjust capitation payments to Medicare Advantage plans
- Now being applied more broadly within Medicare, including demonstration projects such as ACO’s
The Basics of the Model

- A regression model
- Incorporates risk adjustment factors (RAF’s) that independently predict higher expenditures
  - HCC’s
  - Interaction terms
  - Demographic terms

The model predicts only 12% of individual variation in annual health care expenditures (the $R^2$), so it is more accurate at predicting expenditure at the population level.

How HCC’s are Assigned (CMS Version)

- An ICD-10-CM code maps to exactly one Diagnostic Group (DXG)
- DXG’s are then aggregated into Condition Categories (CC’s)
- CC’s are then grouped hierarchically based on severity
- The result is 79 CMS-HCC’s

How HCC’s are Assigned (My Version)

ICD-10 “Universe”
≈ 70,000 codes

Not all ICD-10 codes map to an HCC

ICD-10 Subset
≈ 10,000 codes (14%)
Historically correlate with health care expenditures

A single ICD-10 code maps to only one HCC
Multiple ICD-10 codes may map to one HCC

Hierarchical Condition Categories (HCC’s)
79 total

HCC’s are Hierarchical

- Example: Diabetes
- 3 related HCC’s are arranged in order of descending severity and cost
- A patient is assigned only the HCC corresponding to the most severe manifestation of their disease
- A patient with an ICD-10-CM code that maps to CC 17 is excluded from CC 18 and CC 19
- A patient with ICD-10-CM codes that map to both CC 18 and CC 19 would be assigned CC 18 and excluded from CC 19 since CC 18 is the more severe manifestation
For unrelated diseases (i.e. diseases mapping to different condition categories), HCC’s are additive.

Example: 77 year old male with congestive heart failure, prostate cancer, and diabetes mellitus.

- ICD-10 Code: I5022 Chronic systolic (congestive) heart failure → HCC 85
- ICD-10 Code: C61 Malignant neoplasm of prostate → HCC 12
- ICD-10 Code: E08621 Diabetes mellitus ... with foot ulcer → HCC 18

The model also incorporates adjustments to account for disease interactions that predict higher expenditures:
- CHF and DM
- Sepsis and Pressure Ulcer
- Schizophrenia and CHF

The model incorporates demographic terms:
- Age/sex pairs (e.g. male 75-79yo)
- Eligibility (dual, aged, disabled)
- Sub model (PACE, ESRD)
The ICD-10 codes used to assign HCC’s are obtained by review of Medicare claims from the prior year.

CMS does not distinguish preferentially among sources.

HCC’s are re-assigned each year, so applicable diagnoses must be coded at least once each year.

There must be sufficient documentation in the patient’s chart to support coding.

- CMS periodically performs RADV (Risk Adjustment Data Validation) audits.

Sources of ICD-10-CM Codes (Cont’d)

<table>
<thead>
<tr>
<th>Eligible Sources</th>
<th>Ineligible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Settings:</strong></td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td></td>
</tr>
<tr>
<td>Short term (General, Specialty)</td>
<td></td>
</tr>
<tr>
<td>Critical Access</td>
<td></td>
</tr>
<tr>
<td>Children’s</td>
<td></td>
</tr>
<tr>
<td>Long term</td>
<td></td>
</tr>
<tr>
<td>Rehab</td>
<td></td>
</tr>
<tr>
<td>Psychiatric</td>
<td></td>
</tr>
<tr>
<td>Health Centers</td>
<td></td>
</tr>
<tr>
<td>Community Health Centers</td>
<td></td>
</tr>
<tr>
<td>Federally Qualified Health Centers</td>
<td></td>
</tr>
<tr>
<td>Rural Health Clinics</td>
<td></td>
</tr>
</tbody>
</table>

| **Services:** | |
|--------------| |
| Ambulance    | |
| Lab          | |
| Radiology    | |
| DME          | |
| Prosthetics  | |
| Orthotics    | |

| **Types of Providers:** | |
|-------------------------| |
| MD, DO, OD, DC, DDS, DPM| |
| NP’s, CRNA’s, Certified Nurse Specialists | |
| PA’s                     | |
| Therapists: PT/OT, Speech | |
| LCSW or CSW              | |
| Wound or Ostomy Nurse    | |

| **Settings:** | |
|----------------| |
| Inpatient swing beds | |
| Free standing ambulatory surgery centers | |
| Skilled Nursing Facilities | |
| Intermediate Care Facilities | |
| Respite Care | |
| Hospice | |
| Home Health Care | |
| Free standing dialysis centers | |
Some of the finer points

- The model is calibrated on the Medicare Fee for Service (FFS) population
  - The FFS population submits complete claims data, unlike in the MA population

- There is a separate model with different weightings for institutionalized patients
  - The “community model” over predicts expenditures for these patients
  - Increasing focus on dual eligibles in 2017

- The CMS-HCC Model excludes:
  - Vague/non-diagnostic diagnoses (ex: abdominal pain)
  - Insignificant diagnoses (ex: ankle sprain)
  - Definitively treated diagnoses (ex: acute appendicitis)

CMS HCC ≠ HHS HCC

- HHS-HCC is a more recently (2014) developed model created to risk adjust populations purchasing health insurance on the ACA public health exchanges

- Key differences from the CMS-HCC Model:
  - Prediction year is the current year, not prior year (concurrent model, not a prospective model)
  - Includes pregnant women, children, infants
  - Focused on medical + drug spend, not just medical spend
  - Mechanism for redistributing premium, not calculating benchmarks or paying MA plans
  - More HCC’s (127 vs 79 in the CMS-HCC)
The CMS-HCC Model

Calculating a Risk Score

Modelling Missed Opportunities

Specific Recommendations for Providers

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Calculating a Risk Score

- Example: 76 year old male with multiple chronic medical conditions

- In the base year he was assigned eight ICD codes which group into seven DXG’s:
  1. acute myocardial infarction (AMI)
  2. angina pectoris
  3. emphysema / chronic bronchitis
  4. chronic renal failure
  5. renal failure unspecified
  6. chest pain
  7. sprain

- AMI and angina pectoris map to different HCC’s but no adjustment for angina pectoris since AMI is the more severe manifestation

- Chronic renal failure and renal failure unspecified map to same HCC

- No adjustment for chest pain (nonspecific) or sprain (minor)

• Assigned HCC’s each with a risk adjustment:*  
  – CC 81 AMI  
  – CC 108 COPD  
  – CC 131 Renal Failure  

• Chest pain and sprain are excluded  

• Patient would also receive a risk adjustment for his age-sex category (male aged 75-79)  


* These HCC’s have subsequently been remapped in 2014. Acute MI is now HCC 86, COPD is now HCC 111, and Renal Failure is either acute (HCC 135) or Stage IV (HCC 137) or Stage V (HCC 136). This example is for demonstration purposes only.  

Calculating a Risk Score (cont’d)  

• Each HCC carries a Risk Adjustment Factor (RAF)  

• RAF 1 + RAF 2 + RAF 3 + ……  

• The mean risk score for the national FFS population is 1, and are renormalized each year  
  – RAF = 1 (average resources)  
  – RAF < 1 (fewer)  
  – RAF > 1 (greater)  

• To calculate the expected annual health care expenditure, multiply the risk score x the denominator ($9050/beneficiary in 2014)
Calculating a Risk Score (cont’d)

<table>
<thead>
<tr>
<th>Risk Adjustment Factor (RAF)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male 75-79yo</td>
<td>1.062</td>
</tr>
<tr>
<td>HCC 86: Acute MI</td>
<td>0.282</td>
</tr>
<tr>
<td>HCC 111: COPD</td>
<td>0.355</td>
</tr>
<tr>
<td>HCC 137: Renal Failure Stage IV</td>
<td>0.230</td>
</tr>
<tr>
<td><strong>Risk Score</strong></td>
<td><strong>1.929</strong></td>
</tr>
<tr>
<td>Denominator</td>
<td>$ 9,050</td>
</tr>
<tr>
<td>Expected annual expenditure</td>
<td>$ 17,457</td>
</tr>
</tbody>
</table>

Risk Scores over Time within ACO’s

- For *continuously* assigned beneficiaries, risk scores are updated annually to reflect predominantly demographic changes. If a beneficiary appears “healthier” as a result of fewer HCC’s being attributed, the attributed risk score may decrease.

- For *newly* assigned beneficiaries, a CMS-HCC risk score is calculated in the year of attribution and both the demographic and risk components are used to adjust the benchmark in that performance year.
For continuously assigned beneficiaries, the specificity and completeness of coding and documentation must remain at least as specific and complete as it was during the pre-attribution period in order to prevent the HCC risk score, and thus the benchmark, from falling.

Each past and current patient condition must be coded for and documented on an annual basis in order that it be incorporated by CMS during annual risk score updates.

Per Member Per Month (PMPM) payments to MA plans are risk adjusted using the CMS-HCC model.

Plans have an incentive to code aggressively to enhance payments.

Each past and current patient condition must be coded for and documented on an annual basis in order that it be incorporated by CMS during annual risk score updates.

CMS imposes a coding intensity adjustment annually on MA plans to offset patients looking sicker through enhance (typically around -5%).
The CMS-HCC Model
Calculating a Risk Score

**Modelling Missed Opportunities**

Specific Recommendations for Providers

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**Why Coding Specificity Matters**

Example of a Missed Opportunity

- Diabetes with any related complications (Acute, HCC 17 or Chronic, HCC 18) carries an RAF of 0.378

- Diabetes without complication (HCC 19) carries an RAF of 0.121

- Based on these RAF’s, and using the 2014 denominator of $9050, the difference in marginal predicted annual expense between HCC 19 and either HCC 17 or 18 for an individual beneficiary is:

\[
(0.378 - 0.121) \times 9050 = 2325
\]
Modelling the Loss of Attributed Risk

- Let’s say you’re in an ACO and your benchmark was set by CMS at $8,722 per beneficiary

- You’re concerned because this seems low, and will make it harder to earn shared savings

- You look through your HCC frequencies provided by CMS and note that for several conditions your HCC frequency is lower than average

<table>
<thead>
<tr>
<th>HCC: Description (pre-2014)</th>
<th>2014 Weight</th>
<th>Attributed Risk (Δ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCC 15: Diabetes with Renal or Peripheral Circulatory Manifestation</td>
<td>-1.7% 0.376</td>
<td>$2,012,528</td>
</tr>
<tr>
<td>HCC 16: Diabetes with Neurologic or Other Specified Manifestation</td>
<td>-0.9% 0.378</td>
<td>$1,272,575</td>
</tr>
<tr>
<td>HCC 19: Diabetes without Complication</td>
<td>2.4% 0.121</td>
<td>($1,054,389)</td>
</tr>
<tr>
<td>HCC71: Polyneuropathy*</td>
<td>-1.0% 0.418</td>
<td>$1,513,160</td>
</tr>
<tr>
<td>HCC 80: Congestive Heart Failure</td>
<td>-1.5% 0.377</td>
<td>$2,088,052</td>
</tr>
<tr>
<td>HCC 82: Specified Heart Arrhythmias</td>
<td>-1.7% 0.302</td>
<td>$1,847,576</td>
</tr>
<tr>
<td>HCC 105: Vascular Disease</td>
<td>-4.9% 0.306</td>
<td>$5,394,596</td>
</tr>
<tr>
<td>HCC 108: Chronic Obstructive Pulmonary Disease</td>
<td>-2.9% 0.355</td>
<td>$3,701,088</td>
</tr>
<tr>
<td>Total Δ in Attributed Risk (Predicted Annual Expenditure)</td>
<td></td>
<td>$17,065,187</td>
</tr>
<tr>
<td>Δ Per beneficiary</td>
<td></td>
<td>$427</td>
</tr>
</tbody>
</table>

Assumptions: 40,000 beneficiaries, $9050 denominator

* HCC 71 Polyneuropathy disappeared with v22 in 2014. Now maps to HCC 75 with weight of 0.418

Benchmark = $8,722 + $427 = $9,149 per beneficiary
What about beneficiaries without any HCC?

<table>
<thead>
<tr>
<th>HCC: HCC Description</th>
<th>Rate per 10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Your ACO</td>
</tr>
<tr>
<td>No HCC Assigned</td>
<td>3,058</td>
</tr>
</tbody>
</table>

Are your patients really that much healthier?

- What if we closed that gap?
  - Use a median HCC weight (or RAF) of 0.42

<table>
<thead>
<tr>
<th>HCC: HCC Description</th>
<th>% Diff</th>
<th>Weight</th>
<th>Attributed Risk (Δ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No HCC Assigned</td>
<td>1.9%</td>
<td>0.42</td>
<td>$2,903,964</td>
</tr>
<tr>
<td>Per Beneficiary</td>
<td></td>
<td>$</td>
<td>$72.60</td>
</tr>
</tbody>
</table>

Assumes 40,000 beneficiaries, $9050 denominator

- Loss of $2.9m ($72.60/beneficiary) of attributed risk

Benchmark now = $8,722 + $427 + $72 = $9,221 per beneficiary
Example: Pressure ulcers

<table>
<thead>
<tr>
<th>HCC: HCC Description</th>
<th>Rate per 10,000</th>
<th>Your ACO</th>
<th>All ACOs</th>
<th>% Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCC148: Decubitus Ulcer of Skin</td>
<td>59</td>
<td>108</td>
<td>-0.5%</td>
<td></td>
</tr>
<tr>
<td>HCC149: Chronic Ulcer of Skin, Except Decubitus</td>
<td>179</td>
<td>209</td>
<td>-0.3%</td>
<td></td>
</tr>
</tbody>
</table>

You’re rate of pressure ulcer HCC’s isn’t far below average, but…

Pressure Ulcers have High Weights

Note these are 2014 HCC mappings
2014 HCC’s for pressure ulcers:

<table>
<thead>
<tr>
<th>HCC</th>
<th>Description</th>
<th># Codes</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>157</td>
<td>Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone</td>
<td>1</td>
<td>2.551</td>
</tr>
<tr>
<td>158</td>
<td>Pressure Ulcer of Skin with Full Thickness Skin Loss</td>
<td>2</td>
<td>1.371</td>
</tr>
<tr>
<td>161</td>
<td>Chronic Ulcer of Skin, Except Pressure</td>
<td>9</td>
<td>0.549</td>
</tr>
</tbody>
</table>

Calculate the loss of attributable risk by coding for a Stage III instead of a Stage IV:

\[(2.551 - 1.371) \times 9050 \times 100 \text{ patients} = \text{greater than } \$1.0m \text{ in attributable risk}
\]

OR an \$27 per beneficiary*

Benchmark now = $8,722 + $427 + $72 + $27 = $9,248 per beneficiary

*Assumes 40,000 beneficiaries

**Implications of a Few Missed Ulcers**

**Agenda**

The CMS-HCC Model
Calculating a Risk Score
Modelling Missed Opportunities

**Specific Recommendations for Providers**
Risk Adjustment is Here to Stay

- CMS calculates an HCC score for every beneficiary, even if it doesn’t use them
- Scope of application of the model has broadened since implementation in 2004
- Value based care is slowly supplanting fee for service
- A central tenant of all alternative payment arrangements is risk shifting to providers
- Coding is the currency of risk

Capturing Risk is Essential

- The more accurately providers capture the health of their patients, the more opportunities they will have to be rewarded in value based care
- Resource Use will be a growing component of MIPS, and this will likely be risk-adjusted too
**Code Specifically and Causally**

- Establish causation between diagnoses whenever possible
- Example: **Diabetes and stage II CKD**
  - Coding 250.0x for diabetes and 585.2 for Stage II CKD maps only to HCC 19 with a weight of 0.121
    - Stage II CKD does not map to any HCC
    - 250.0x maps to HCC 19 Diabetes without complication
  - Coding instead with 250.4x *Diabetes with renal manifestations* maps to HCC 18 with a weight of 0.378
    
    \[(0.378 – 0.121) = 0.257 \times $9050 = $2325\text{ difference in risk}\]

**Code Annually**

- Every medical problem should be documented on an annual basis in order to ensure:
  - Your benchmark doesn’t fall if you’re an ACO
  - You PMPM payments don’t fall if you’re an MA plan
  - Your risk adjusted resource use is accurate if you’re participating in MIPS
Perform Audits Regularly

- CMS provides ACO’s quarterly HCC reports
  - Identify HCC’s where you capture above or below average

- Perform periodic audits to understand coding patterns and corroborate with HCC reports
  - And to ensure successful RADV audits

- Implement provider education to correct disparities

MEAT – Make sure it’s well done.

Make sure your clinical documentation supports your coding for each medical problem:

- **Monitor**—signs, symptoms, disease progression, disease regression
- **Evaluate**—test results, medication effectiveness, response to treatment
- **Assess/Address**—ordering tests, discussion, review records, counseling
- **Treat**—medications, therapies, other modalities

You need a minimum of one, but the more the better
Identify opportunities as HCC mappings change

HCC’s: Number of ICD-9-CM Codes vs Weight

Focus on understanding HCC’s with relatively high weights and relatively low number of ICD-9 codes that map

Payer Agnosticism

- Should apply these principles to all patients, regardless of payer
- Most of Medicare will be situated in value based care soon
- Commercial payers are following suite
Questions?

I DON'T ALWAYS GET SUCKED INTO A JET ENGINE

BUT WHEN I DO, I USE

ICD-10 CODE: V97.33XD

Appendix

DukeMedicine
References


