Medicare Risk Adjustment Score Use Case

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Agenda

1. Introduction
2. Medicare Risk Adjustment Concept
3. Sample Case Studies
4. Impact of Appropriate HCC Coding on Payment
5. HCC Scoring & Patient Risk Adjustment: Example
6. Real-World Case Study

John Snow Labs

is the team behind Spark NLP

100+ Million

Downloads on PyPI.
“Most widely used NLP library in the enterprise”

PePy.Tech

59% share

of Healthcare NLP teams use Spark NLP

Gradient Flow

#1 Accuracy

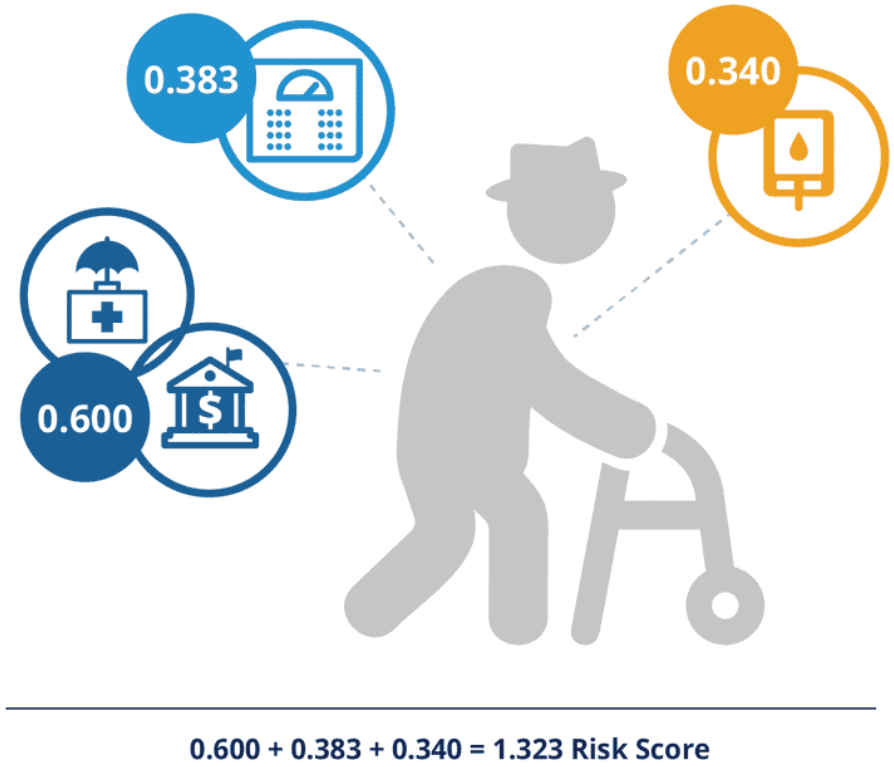
on 25+ benchmarks in peer-reviewed papers

Papers with Code

Medicare Risk Adjustment

- In the US, the Centers for Medicare & Medicaid Services adjusts reimbursement rates for private Medicare plan sponsors based on an assessed risk of their members

- The **CMS Hierarchical Condition Category (HCC)** model assigns a Risk Adjustment Factor (RAF) score to each Medicare patient, used to estimate future expenditures



Medicare Risk Adjustment Case Studies

[Accelerating Clinical Risk Adjustment Through Natural Language Processing]

[Automated Extraction of Medical Risk Factors for Life Insurance Underwriting]

Impact of Appropriate HCC Coding on Payment

Female, age 76. Not: originally disabled, Medicaid, ERSD, or institutionalized.
Demographic RAF score = .448

Option 1	HCC Risk Score
Obesity	0
Type 2 diabetes, exudative retinopathy	.104, 0
Major depression disorder, single episode, unspecified	0
CHF	.323
Asthma	0
Pressure ulcer of right heel, unspecified	0
CHF*DM	.154

RAF score: 1.029
Sample Medicare Advantage member payment, annual: $9K

Option 2	HCC Risk Score
Morbid obesity, BMI 42	.273
Type 2 diabetes w/ diabetic retinopathy	.318
Major depressive disorder, single episode, mild	.395
CHF, class 3	.323
COPD	.328
Pressure ulcer of right heel, stage 3	1.204
CHF*DM; CHF*COPD	.154, .19

RAF score: 3.633
Sample Medicare Advantage member payment, annual: $32K

https://www.healthcatalyst.com/insights/5-ways-improve-hcc-coding-accuracy-risk-adjustment

HCC Scoring & Patient Risk Adjustment: Example

PROCEDURES DURING HOSPITALIZATION:1. Cycle six of CIVI-CAD (Cytoxan, Adriamycin, and DTIC) from 07/22/2008 to 07/29/2008.2. CTA, chest PE study showing no evidence for pulmonary embolism. 3. Head CT showing no evidence of acute intracranial abnormalities.4. Sinus CT, normal mini-CT of the paranasal sinuses. HOSPITAL COURSE:1. Leiomyosarcoma, the patient was admitted to Hem/Onco B Service under attending Dr. XYZ for cycle six of continuous IV infusion Cytoxan, Adriamycin, and DTIC, which she tolerated well.2. History of pulmonary embolism. Upon admission, the patient reported an approximate two-week history of dyspnea on exertion and some mild chest pain. She underwent a CTA, which showed no evidence of pulmonary embolism and the patient was started on prophylactic doses of Lovenox at 40 mg a day. She had no further complaints throughout the hospitalization with any shortness of breath or chest pain.3. History of subdural hematoma, also on admission the patient noted some mild intermittent headaches that were fleeting in nature, several a day that would resolve on their own. Her headaches were not responding to pain medication and so on 07/24/2008, we obtained a head CT that showed no evidence of acute intracranial abnormalities. The patient also had a history of sinusitis and so a sinus CT scan was obtained, which was normal.4. Pancytopenia. On admission, the patient's white blood count was 3.4, hemoglobin 11.3, platelet count 82, and ANC of 2400. The patient's counts were followed throughout admission 5. History of pneumonia. During admission, the patient did not exhibit any signs or symptoms of pneumonia.

HCC Scoring & Patient Risk Adjustment: Example

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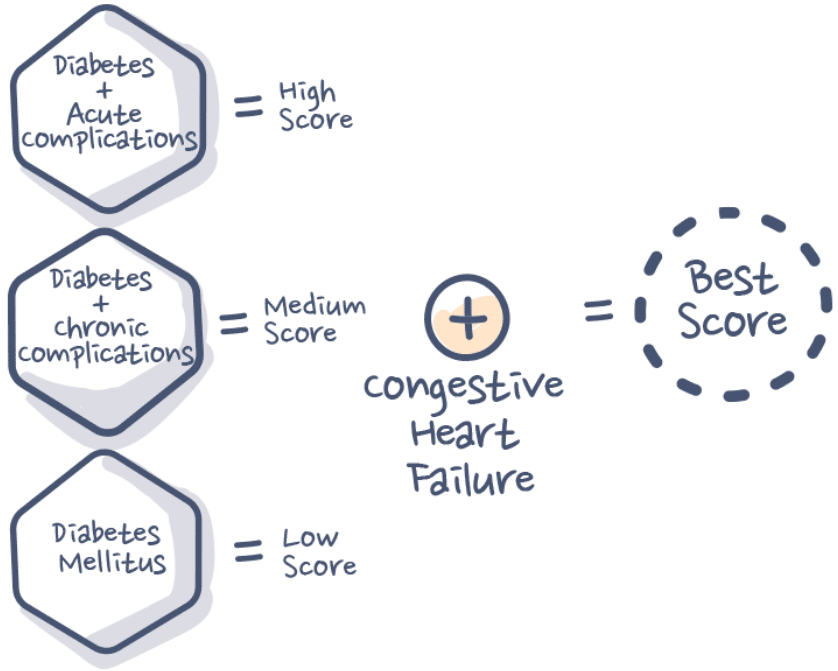
HCC Scoring & Patient Risk Adjustment: Example

Extracted Resolutions:

icd10_code	icd10_description	assertion
C499	leiomyosarcoma	Present
I26	pulmonary embolism	Past
D6181	pancytopenia	Past
J189	pneumonia	Past
C499	leiomyosarcoma	Possible
D6181	pancytopenia	Present
I26	pulmonary embolism	Absent
C499	leiomyosarcoma	Past
J329	sinusitis	Past
J189	pneumonia	Absent

Present diseases of the patient

icd10_code	icd10_description
C499	leiomyosarcoma
D6181	pancytopenia



Avoiding Duplication with Reasoning

RED

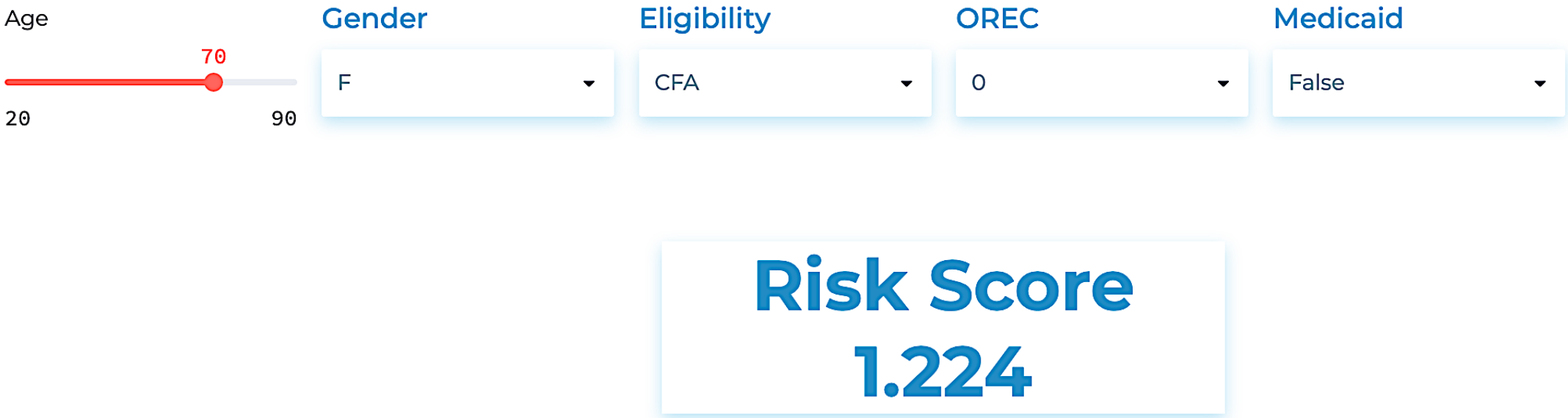
Do not include	Reason
"Upper respiratory infection"	Acute condition
"Encounter for (test, supervision, physical examination, immunization, etc.)"	"Overdue for [item]" might be appropriate, but most EHRs have a better place for this
"Acute gout"	Gout can be a chronic problem, but do not include if specified as acute
"Laceration"	Acute (resolves after healed)
"Multiple melanocytic nevi of trunk"	Too common; does not change treatment
"Abnormal MRI of brain"	Too vague to be useful; use more specific description
"Feared complaint unfounded"	Diagnoses ruled out may be appropriate for inpatient setting, but not outpatient

Taming the Problem List

David M. NewMan, MD, FAAFP and Shan Dhanda, MD
Family Practice Management, 2023; 30(3):5-9.

- Just because a positive diagnosis is found in a visit summary doesn't mean it belongs in the problem list.
- LLMs excel in this kind of reasoning: Given what was found and the current problem list, what would we recommend to update?
- Recommended edits are sent to the EHR, for the doctor to review and click to approve the next time this patient visits.

HCC Scoring & Patient Risk Adjustment: Example



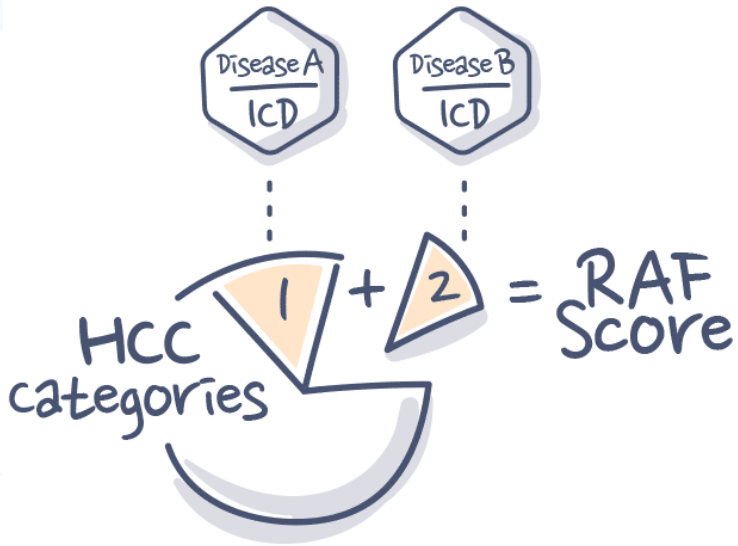
John Snow Labs' Healthcare NLP & LLM library comes with an automated HCC calculator.

The entire process from analyze raw notes to reasoning and code calculation is automated.

Real-World RAF Score Use Case

Streamlined Medicare Risk Adjustment Score Calculation with Healthcare NLP

PROBLEM: An insurance company faces the challenge of accurately calculating medicare risk adjustment scores for their enrollees using patient notes. This manual process involves extracting relevant clinical information, such as clinical conditions, age, gender, from unstructured patient notes, which is time-consuming, error-prone, and labor-intensive. Errors in risk adjustment scores can lead to inaccurate reimbursement and potential financial penalties for insurance companies.



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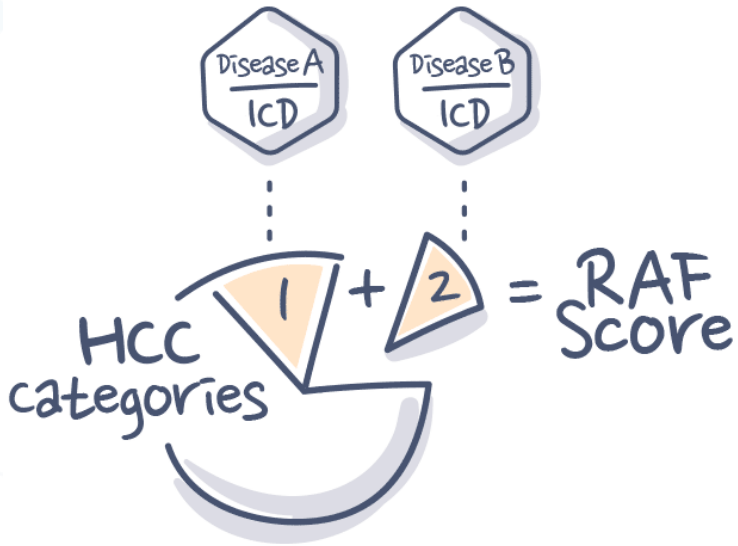

Real-World RAF Score Use Case

John Snow LABS

Solution Steps

Entity Extraction (NER)

Create a robust NER pipeline and extract clinical condition entities.

Assertion Status Detection

Check the assertion status of the detected clinical condition entities.

Code Mapping

Map the entities to their corresponging ICD-10 codes and check their HCC status.

Does QA Model Work?

We will check how to use QA models to do the same steps.

Let’s code!