

Advantages of Clinical Categorical Models for Risk Adjustment

MS VI: RISK ADJUSTMENT IN MIPS AND APMS & MIPS AND APMS QUALITY MEASURES

JUNE 18TH 2019

RICHARD L FULLER ; ECONOMIST

3M HIS CLINICAL AND ECONOMIC RESEARCH

What I am covering today

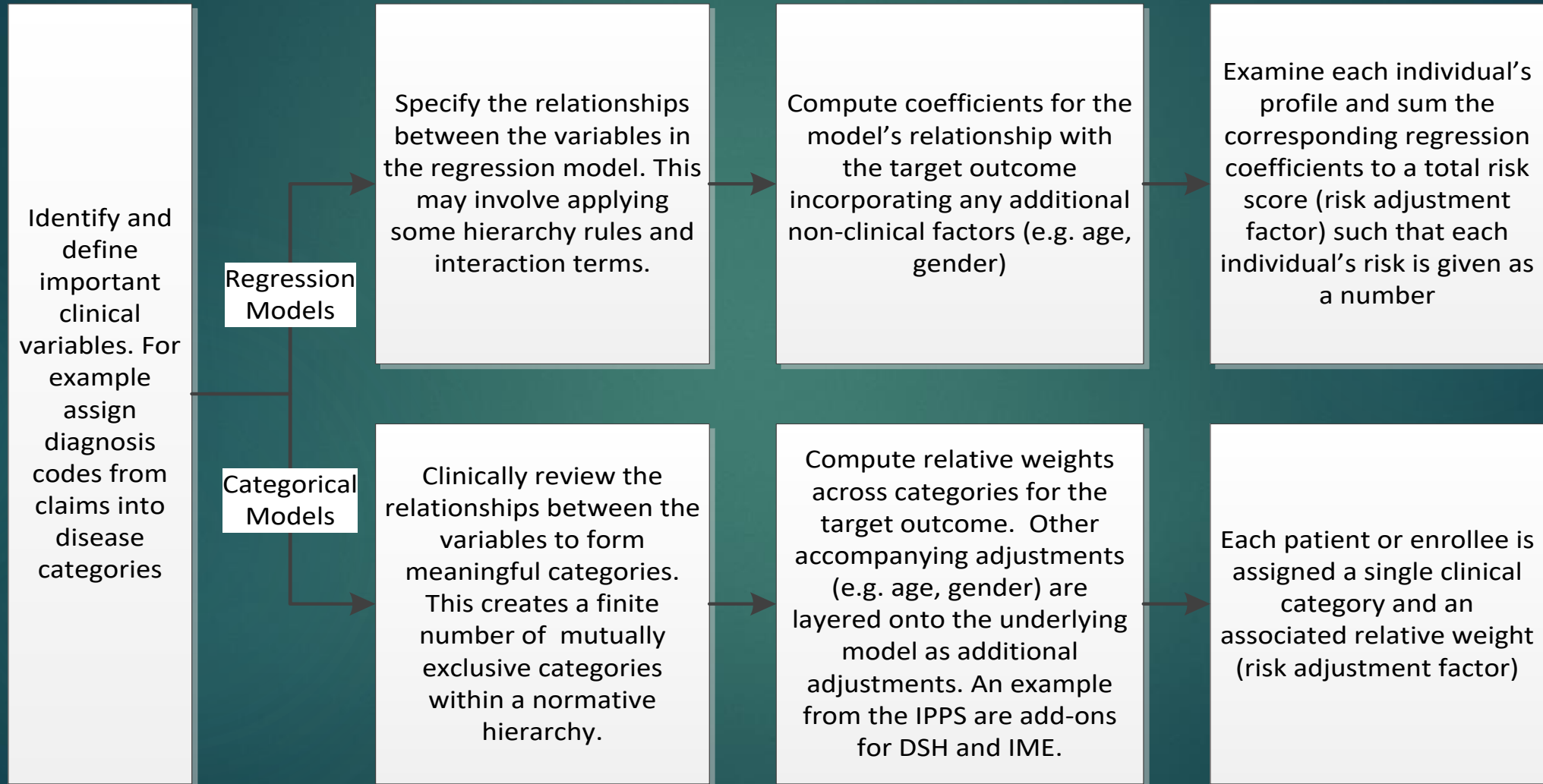
- ▶ Why understanding risk adjustment is important in MIPS and APMs
- ▶ Regression based models compared to clinical categorical models
- ▶ Design issues for risk adjustment models
- ▶ Layering other factors onto the risk adjustment model
- ▶ Moving to outcomes beyond cost

HCCs are integral to the QPP and MIPS



- ▶ In 2019 15% of the final MIPS score (increasing to 30% in 2022) is determined by cost performance
- ▶ Total Per Capita Cost (TPCC) standardizes using HCC risk adjustment factors ; MSPB and episodes of care are based upon HCC definitions ; The Complex Patient Bonus uses HCC scores ; Alternative Payment Models measure cost adjusted by CMS-HCC risk scores
- ▶ Risk adjustment throughout CMS programs (including MIPS) has become synonymous with HCCs – this is an administrative decision, not a statutory requirement

Regression and Categorical Models



Overview of HCCs

- ▶ Hierarchical condition categories (HCC) are 79 groups of diagnosis codes
- ▶ HCCs have a disease hierarchy to ensure that more severe and costly forms of a condition are recognized. No credit is given for more than one related condition in the hierarchy.
- ▶ Each HCC contributes towards a patient's total resource adjustment factor (RAF) where total scores may be adjusted for non-clinical characteristics
- ▶ With the exception of a handful of disease interaction terms HCC coefficients are summed to yield a single total RAF from a trillion potential combinations of HCCs

HCC Scoring

				Score
Male 75 years old; Community; Non Dual; Non Disabled; Non ESRD				0.379
ICD-10	Description	HCC	HCC Desc	
I2720	Pulmonary hypertension, unspecified	85	Congestive Heart Failure	0.323
			RAF	0.702
Clinical Risk Group		51791	Congestive Heart Failure Level - 1	
Female 75 years old; Community; Non Dual; Non Disabled; Non ESRD				0.374
ICD-10	Description	HCC	HCC Desc	
J449	Chronic obstructive pulmonary disease, unspecified	111	Chronic Obstructive Pulmonary Disease	0.328
			RAF	0.702
Clinical Risk Group		51331	Chronic Obstructive Pulmonary Disease and Bronchiectasis Level - 1	

HCC risk scores are designed to differentiate between patient costs not patient types

Overview of Clinical Risk Groups (CRG)

- ▶ CRGs are a categorical clinical model which use standard claims data to assign each enrollee in a population to a single mutually exclusive risk category.
- ▶ CRGs assign diagnosis codes to discrete clinical groupings (947 Diagnosis Sub Groups) which are then assessed within a rules driven framework to identify and rank reported chronic conditions in terms of their severity.
- ▶ The interaction of chronic conditions in conjunction with their severity ranking is used to generate a single mutually exclusive classification - a CRG.
- ▶ Each CRG (1,400+) has a relative weight determined by its costliness relative to other CRGs within the CRG hierarchy. The CRG relative weight may be additionally adjusted for non-clinical characteristics while the clinical framework is held constant.

Regression model: HCCs

Male 75 years old; Community; Non Dual; Non Disabled; Non ESRD				0.466
ICD-10	Description	HCC	HCC Desc	Score
F320	Major depressive disorder, single episode, mild	58	Major Depressive, Bipolar, and Paranoid Disorders	0.395
E113392	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye	18	Diabetes with Chronic Complications	0.318
I5020	Unspecified systolic (congestive) heart failure	85	Congestive Heart Failure	0.323
I200	Unstable angina	87	Unstable Angina and Other Acute Ischemic Heart Disease	0.218
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	111	Chronic Obstructive Pulmonary Disease	0.328
			RAF	2.048

Categorical Model : Clinical Risk Groups

ICD-10	Description	EDC	Desc	Type	SOI
F320	Major depressive disorder, single episode, mild	752	Major Depression	MC	1
E113392	Type 2 diabetes mellitus with moderate nonproliferative diabetic retinopathy without macular edema, left eye	424	Diabetes	DC	2
I5020	Unspecified systolic (congestive) heart failure	179	Congestive Heart Failure	DC	3
I200	Unstable angina	183	Angina and Ischemic Heart Disease	MC	1
J441	Chronic obstructive pulmonary disease with (acute) exacerbation	133	Chronic Obstructive Pulmonary Disease	DC	1
		CRG	Description		
		70601	Congestive Heart Failure - Diabetes - Chronic Obstructive Pulmonary Disease Level - 2		

Regression based Vs. Categorical models



- ▶ In regression models disease interaction is treated as the sum of individual disease costs. In categorical models the incremental cost of treating additional diseases is not pre-determined to be additive.
- ▶ In categorical models the hierarchy of sicker/more costly patients is explicit and subject to clinical review. In regression models the equivalent review is performed by review of the statistical significance (t/p value) of the coefficient rather than the credibility of the relative magnitudes of individual coefficients.
- ▶ Categorical models factor into their design clinician knowledge of which services the patient should receive rather than how well the model predicts current levels of overuse
- ▶ Separation of clinical model from its multiple uses enables us to retain the same clinical model when considering different populations and target outcomes

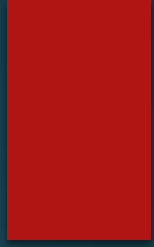
Comparison of properties

Design Attribute	Clinical Categorical	Regression-Based
Development method	Clinical model developed by clinicians with formal classification rules governing assignment available for review	Statistical model with variables chosen based on ability to predict total spending in future
Structure of model	Clinically meaningful categories of enrollees subdivided into explicit severity of illness levels	Additive mathematical formula that computes a score
Communication value to providers	Creates a language understood by physicians	Numeric score that has minimal communication value
Calculation and replication of payment amounts	Arithmetic average which is easily calculated independent of developers	Requires regression analysis which can be difficult to perform independent of developers
Update process	Selective clinical areas can be refined without affecting entire clinical model	Regression models assume consistent additive effects of treatment cost. They require respecification/reestimation of the model and coefficients in response to cost changes.
Response to changing practice patterns or technology	Clinical model stable but payment weights will change	
Carve outs	Clinical model stable but payment weights will change	

The benefits of categorical risk adjustment models

- ▶ Building a model of discrete patient types fosters clinical communication
- ▶ More straightforward to layer non-clinical factors onto risk models and understand their individual impacts in the face of highly complex interactions with disease, age and socioeconomic status.
- ▶ Avoid needlessly defining relative patient complexity as something varying by payer and the payer specific costs of care that are the basis for regression coefficients that are summed to RAFs. Instead categorical models establish consistent relationships across payers based upon common patient characteristics through clinical judgment available for review.

Other considerations (not specific to HCCs)



- ▶ The CMS-HCC risk score is “**prospective**” not concurrent
- ▶ Patient treatment costs fluctuate more year on year due to conditions being revealed (e.g. cancer) or resolved (e.g. acute trauma) than variation in treatment patterns.
- ▶ The model places physicians at risk for “total cost” rather than “targeted cost” specific to that which is expected of a physician to control.
- ▶ These design choices make for noisy measures and noisy measures give poor incentives they rapidly lose credibility!

Summary



- ▶ If nothing else know that risk adjustment, in particular HCCs, is going to have a large impact on physician pay in years to come
- ▶ Understand that risk adjustment should be treated as something more than simply estimating costs
- ▶ Critically appraise both the risk models and design choices – no model is perfect but some are less perfect than others

References

▶ References

- ▶ 1. Centers for Medicare & Medicaid Services. MIPS Cost requirements PY2019. Quality Payment Program. <https://app.cms.gov/mips/cost>. Published 2019.
- ▶ 2. Centers for Medicare & Medicaid Services. *Quality Payment Program : Merit-Based Incentive Payment System (MIPS): Cost Measure Field Test Reports Fact Sheet.*; 2018. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/2018-cost-measure-field-test-fact-sheet.pdf>.
- ▶ 3. Centers for Medicare & Medicaid Services. *P59770 Federal Register Vol 83, No 226. Medicare Program; Revisions to Payment Policies Under the Physician Fee Schedule and Other Revisions to Part B for CY 2019;*; 2019. <https://www.federalregister.gov/documents/2018/11/23/2018-24170/medicare-program-revisions-to-payment-policies-under-the-physician-fee-schedule-and-other-revisions>.
- ▶ 4. Centers for Medicare & Medicaid Services. *P67824. Federal Register Vol 83 No 249 Medicare Program; Medicare Shared Savings Program; Accountable Care Organizations—Pathways to Success and Extreme and Uncontrollable Circumstances Policies for Performance Year 2017.*; 2018. <https://www.govinfo.gov/content/pkg/FR-2018-12-31/pdf/FR-2018-12-31.pdf>.
- ▶ 5. Fuller RL, Averill RF, Muldoon JH, Hughes JS. Comparison of the Properties of Regression and Categorical Risk-Adjustment Models. *J Ambul Care Manage.* 2016;39(2):157-165. doi:10.1097/JAC.000000000000135.
- ▶ 6. Centers for Medicare & Medicaid Services. Announcements and Documents. Medicare Advantage Rates & Statistics. <https://www.cms.gov/medicare/health-plans/medicareadvtspecratestats/risk-adjustors.html>. Published 2019.
- ▶ 7. Rose S, McGuire TG. *Statistical Fit and Algorithmic Fairness in Risk Adjustment for Health Policy.*; 2018. <https://arxiv.org/abs/1803.05513>.
- ▶ 8. Fuller RL, Hughes JS, Goldfield NI. Adjusting Population Risk for Functional Health Status. *Popul Health Manag.* 2016;19(2):136-144. doi:10.1089/pop.2015.0043.
- ▶ 9. Centers for Medicare & Medicaid Services. *Merit-Based Incentive Payment System (MIPS): Total Per Capita Costs.*; 2019. <https://app.cms.gov/mips/explore-measures/cost>.

For more information and continued discussion

Richard Fuller | Economist
Clinical and Economic Research
3M Health Information Systems
410-710-8488
rfuller@mmm.com

<https://www.3mhisinsideangle.com/topic/clinical-economic-research/>

<https://orcid.org/0000-0002-1270-3198>

https://www.researchgate.net/profile/Richard_Fuller4