

Evaluating the Reliability of Electronic Health Record Data for Chronic Diseases

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Background

Medical coding such as ICD codes are powerful tools for both clinical decision making and epidemiological research

ICD codes, captured in the HER, are not able to capture patient voices and may not accurately represent patient's perceived diagnosis, especially for chronic diseases

Objectives

Evaluate how well EHR data captures patient's perceived chronic disease diagnosis in a Colorado-based primary care clinic

Determine if there are individual characteristics that modify the relationship between patient self-reported and provider-reported disease

Data

248 patients from a Colorado primary care clinic filled out the chronic condition checklist (CCC)

The CCC contains 15 high frequency chronic conditions and ask patients to indicate if they have a diagnosis for each condition

Active ICD codes were collected for the sample

Methods

ICD codes were mapped to chronic conditions using three commonly used tools, PheCodes, Charlson comorbidities, and Elixhauser comorbidities.

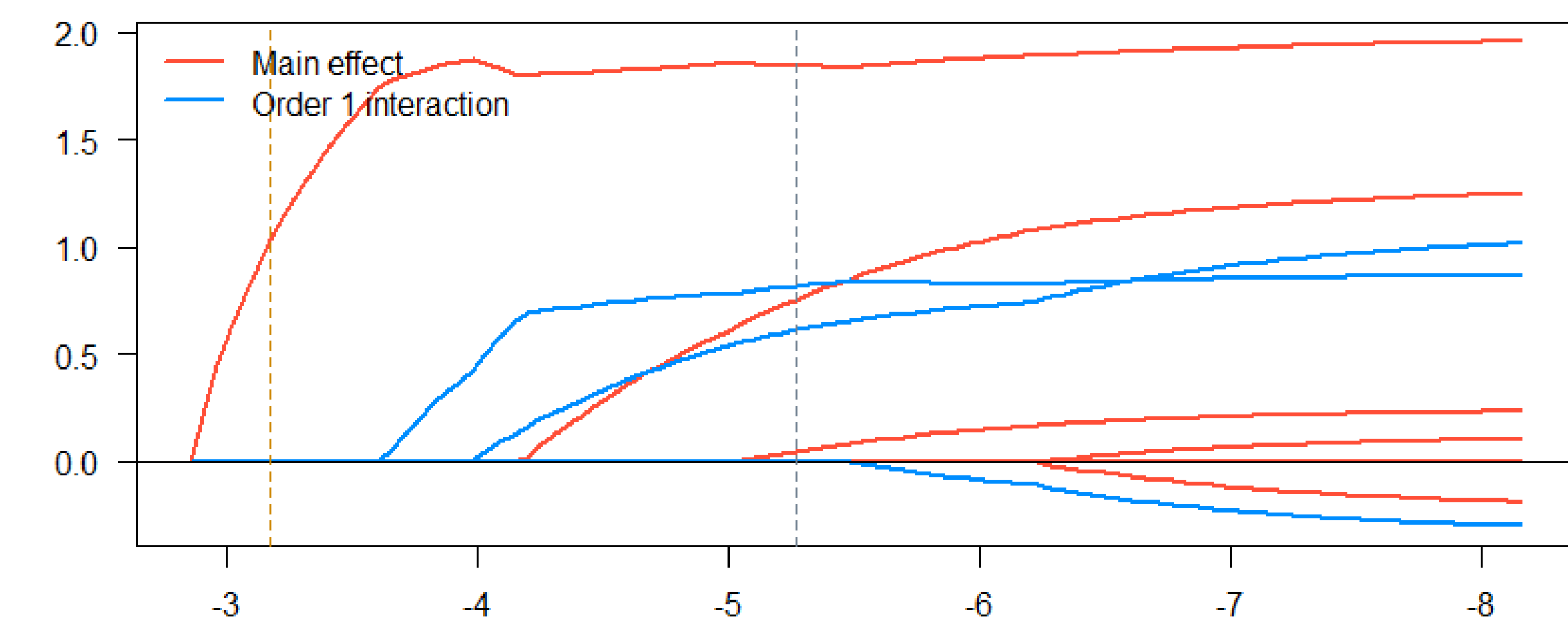
Concordance between patient self-reported chronic conditions and EHR-based indicators was measured using a diagnostic odds ratio for conditions with at 10% (n=24) positive cases.

We searched for potential interactions between EHR indicators and individual characteristics (age, gender, etc.) using a novel technique, the sparsity-ranked LASSO

Condition	N CCC (%)	N PheCode	N Charlson	N Elixhauser
Hypertension	55 (22.2%)	64 (25.8%)	--	75 (30.2%)
Coronary Artery Disease	8 (3.2%)	5 (2.0%)	--	--
Congestive Heart Failure	2 (0.8%)	5 (2.0%)	6 (2.4%)	6 (2.4%)
Myocardial Infarction	9 (3.6%)	1 (0.4%)	2 (0.8%)	--
Other Heart Condition	19 (7.6%)	5 (2.0%)	--	--
Stroke	4 (1.6%)	2 (0.8%)	--	--
Respiratory Illness	24 (9.7%)	26 (10.4%)	29 (11.7%)	29 (11.7%)
Osteoarthritis	64 (25.8%)	34 (13.7%)	--	--
Osteoporosis	9 (3.6%)	11(4.4%)	--	--
Sciatica	31 (12.5%)	0	--	--
Diabetes	16 (6.5%)	18 (7.3%)	22 (8.9%)	28 (11.3%)
Depression	58 (23.4%)	58 (23.4%)	--	81 (32.7%)
Cancer	16 (6.5%)	22 (8.9%)	16 (6.5%)	15 (6.0%)
Ulcerative Colitis	13 (5.2%)	0	--	--

Results

Condition	Phecode Concordance	Charlson Concordance	Elixhauser Concordance
Hypertension	12.64 Increases with age	--	12.93
Chronic Respiratory Illness	19.18 Increases with age. Lower in males	19.51 Increases with age. Lower in males	19.51 Increases with age. Lower in males
Osteoarthritis	5.52	--	--
Depression	13.17 Decreases with age. Higher for males	--	10.50 Higher for males



Conclusion

When measuring patient's perceived chronic disease, the reliability of ICD codes varies by condition and patient demographics.