My Phenotyping Evaluation Hypertension

Yves Greatti

Requirements

In order to create this computational phenotyping algorithm and accomplish this task you will:

- Test two or more individual data types
- Apply two or more manipulations of individual data types
- Create two or more combinations of data types
- Provide 2x2 tables and evaluation metrics (sensitivity/specificity/PPV/NPV) for all algorithms tested.
- Choose and justify the selection of a final computational phenotyping algorithm

Training data

Data is from table course3_data.hypertension_goldstandard

Data Types – Testing for hypertension Clinical criteria

- Systolic BP >= 140 mmHg on more than two occasions

Any event from table mimic3_demo.CHARTEVENTS containing the word “systolic” for which VALUE >=140, and event count > 2

- Diastolic BP>= 90 mmHg on more than two occasions

Any event from table mimic3_demo.CHARTEVENTS containing the word “diastolic” for which VALUE >=90, and event count > 2

Data Types – Testing for hypertension
ICD-9 diagnosis codes

- 401.0 Malignant
- 401.1 Benign
- 401.9 Unspecified

- ICD-9 codes from mimic3_demo.DIAGNOSES_ICD in (4010, or 4011, 4019)

Data Types – Testing for hypertension Medications

- blood pressure lowering drugs available in

  Table course3_data.D_ANTIHYPERTENSIVES.

Clinical criteria Alone

		Manual Review Hypertension	
		+	-
BP EVENTS	+	14	8
	-	49	28

Sensitivity: 22.2%

Specificity: 77.7%

PPV: 63.6%

NPV: 36.3%

ICD-9 Codes Alone (401.0, 401.1, 401.09)

		Manual Review Hypertension	
		+	-
ICD-9 CODES	+	35	3
	-	63	36

Sensitivity: 35.7%
Specificity: 92.3%
PPV: 92.1%
NPV: 36.3%

Medication Alone

		Manual Review Hypertension	
		+	-
MEDICATIONS	+	52	24
	-	11	12

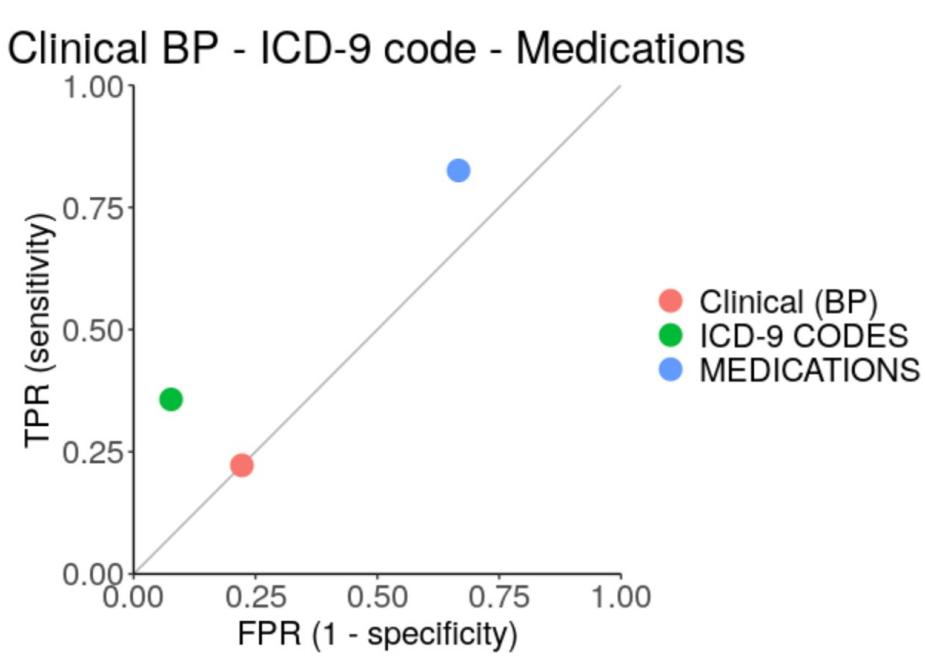
Sensitivity: 82.5%

Specificity: 33.3%

PPV: 68.4%

NPV: 52.1%

Algorithm Performances



High Specificity Algorithm: ICD-9 Codes
High Sensitivity Algorithm: Medications
Clinical BP is not better than a random algorithm

Clinical criteria OR ICD-9 codes

		Manual Review Hypertension	
		+	-
COMBINATION	+	39	9
	-	24	27

Sensitivity: 61.9%

Specificity: 75%

PPV: 81.2%

NPV: 52.9%

Clinical criteria OR MEDICATIONS

		Manual Review Hypertension	
		+	-
COMBINATION	+	54	24
	-	9	12

Sensitivity: 85.7%

Specificity: 33.33%

PPV: 69.2%

NPV: 57.1%

(Clinical criteria AND MEDICATIONS) OR ICD-9

		Manual Review Hypertension	
		+	-
COMBINATION	+	40	8
	-	23	28

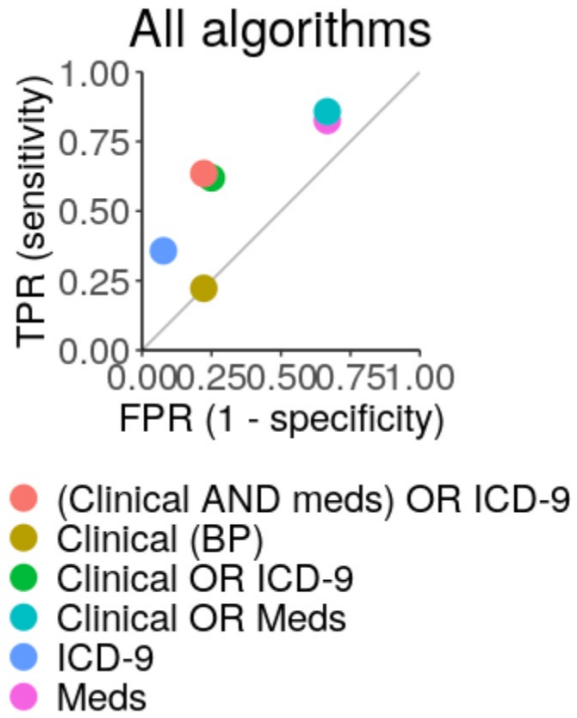
Sensitivity: 63.4%

Specificity: 77.7%

PPV: 83.3%

NPV: 54.9%

The best algorithm is



- Clinical And Meds) or ICD-9
- Because it has a good balance of sensitivity (63.4%) and specificity (77.7%0
- However it is rather complex by mixing different data types
- Portability is in question since there are different data types so data availability and consistency might be an issue