Validation of a Coding Algorithm to Define Hypertension using Administrative Data: Variation due to Geographic Region and Time Period

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Hypertension

- Prevalent
- An important modifiable risk factor for cardiovascular disease and mortality
- Hypertension is commonly unrecognized and under-treated
- Population based hypertension surveillance is a critical tool for evaluating hypertension prevention and treatment programs

Surveillance Program

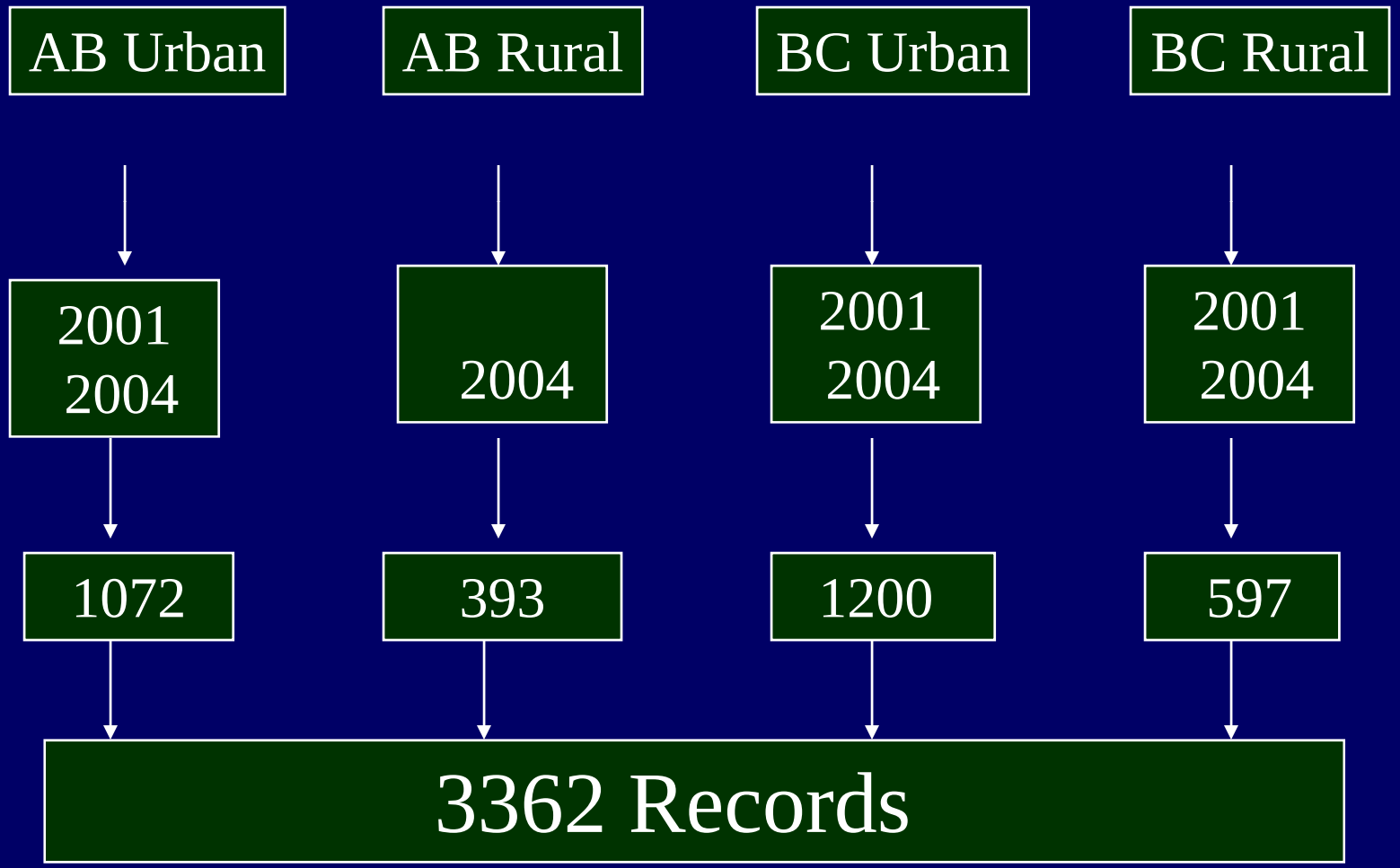
- National self-report survey: CCHS
- Physical measurement
- Administrative data

Purposes

To assess the validity of an International Classification of Disease, 9th and 10th versions (ICD-9/ICD-10) case definition to define hypertension

- Across regions (rural vs urban)
- Time (year 2001 vs 2004)
- Using diagnosis coding fields (1 vs 3)
- Adding emergency room visit data

General Practitioner/Family Physician



Hypertension Definition in Chart

- A diagnosis of hypertension listed in clinic notes and/or consult letters.
- A prescription for an antihypertensive medication in the context of a recorded reading of a blood pressure >140/90 mmHg at the same visit.
- 1 visit with SBP ≥ 200 and/or DBP > 130mmHg or features of hypertensive urgency or emergency
- 2 visits with sustained SBP ≥180 and/or DBP ≥ 110 mmHg, no target organ damage, diabetes or chronic kidney disease

if target organ damage, diabetes or chronic kidney disease

- 3 visits with sustained SBP ≥160 and/or DBP ≥ 100 mmHg
- 5 visits with sustained SBP ≥140 and/or DBP ≥ 90 mmHg
- A daytime ambulatory blood pressure reading or an average of multiple (2 or more) home readings with SBP ≥135 and/or DBP ≥ 85 mmHg.
- A 24 hour ambulatory blood pressure reading with SBP ≥130 and/or DBP ≥ 80 mmHg.

Chart Review Data
2001 and 2004

AB
Hospital Discharge Data
Physician Claims
Emergency Data/Day surgery

BC
Hospital Discharge Data
Physician Claims
Emergency Data/Day surgery

Hypertension Definition in Administrative Data

Conditions	Coding System	Diagnostic Codes	CIHI data	Claims
Hypertension	ICD-9-CM	401.x, 402.x, 403.x, 404.x, 405.x,	Any coding field: Dx 1 – 16	Any coding field: Dx 1- 3
Hypertension	ICD-10-CA	I10x, I11x, I12x, I13x, I15x	Any coding field: Dx 1 -- 25	Any coding field: Dx 1- 3

Year Data	DAD	Claims
1	-	1
1	-	2
1	1	1
1	1	2
2	-	1
2	-	2
2	1	1
2	1	2
3	-	1
3	-	2
3	1	1
3	1	2

Algorithm	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Kappa
3 year					
2 P or 1 H	76	94	81	92	0.72
2 P	73	95	82	91	0.71
1 P or 1 H	84	89	72	94	0.69
1 P	83	90	72	94	0.69
2 year					
2 P or 1 H	75	94	81	92	0.71
2 P	73	95	82	91	0.71
1 P or 1 H	84	89	72	94	0.69
1 P	83	90	72	94	0.69
1 year					
2 P or 1 H	74	95	82	92	0.71
2 P	71	95	83	91	0.69
1 P or 1 H	83	89	71	94	0.68
1 P	82	89	72	94	0.68

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Kappa
Region					
Rural	79	92	78	92	0.70
Urban	73	95	83	92	0.72
Province					
A	74	96	87	92	0.74
B	76	93	77	92	0.69
Year					
2001	77	95	79	94	0.72
2004	74	94	83	92	0.70

Hypertension definition	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	Prevalence (%)
2 P or 1 H when using 1 dx coding field	73.7	96.2	86.7	91.2	21.3
3 dx coding fields	74.4	96.2	86.8	91.2	21.5
2 P or 1 H or 1 ER	75.3	95.9	86.1	92.0	22.1

Conclusions

Defining hypertension using

'2 physician claims or 1 hospitalization within 2 years' in administrative data had substantial validity.

Adding diagnosis coding fields in claims and ER data do not contribute to validity.

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