

## Supplementary Online Content

Patel KK, Young L, Howell EH, et al. Characteristics and outcomes of patients presenting with hypertensive urgency in the office setting. *JAMA Intern Med*. Published online June 13, 2016. doi:10.1001/jamainternmed.2016.1509.

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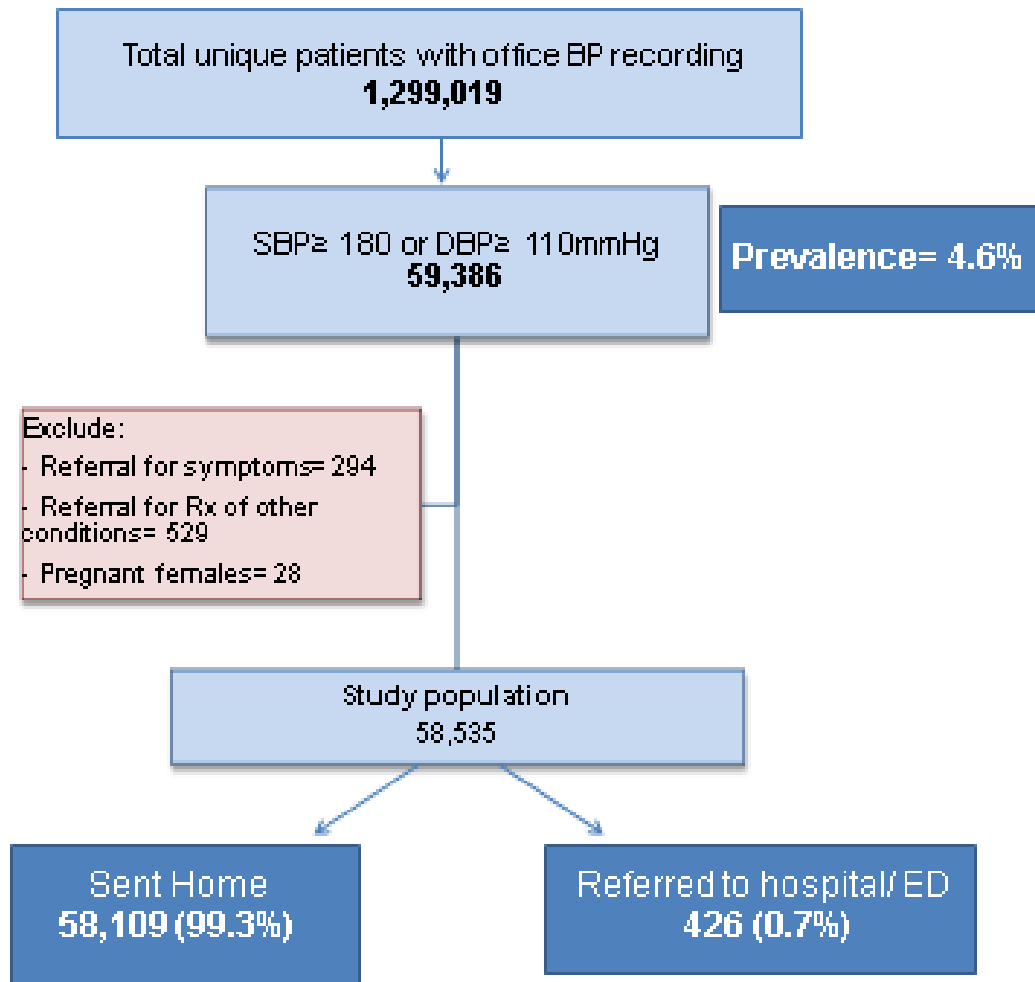
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This supplementary material has been provided by the authors to give readers additional information about their work.

**eFigure.** Study Flowchart



**eTable 1. Comparison of baseline characteristics between patients referred to the hospital and propensity matched sample from patients sent home.**

<b>Characteristic</b>	<b>Referred to hospital (ED/inpatient) (n=426) Mean ± S.D or N(%)</b>	<b>Matched sample from patients sent home (n=852) Mean ± S.D or N(%)</b>	<b>p-value<sup>a</sup></b>
Age (years)	58.66 ± 16.16	58.1 ± 15.05	0.55
Female gender	266 (62.4)	527 (61.9)	0.84
Race, White	255 (59.9)	485 (56.9)	0.59
Race, Black	157 (36.9)	335 (39.3)	
Race, Other	14 (3.3)	32 (3.8)	
Systolic BP (mmHg)	198.41 ± 22.09	198.08 ± 24.15	0.81
Diastolic BP (mmHg)	107.37 ± 17.39	108.12 ± 17.96	0.48
Hypertension	403 (94.6)	802 (94.1)	0.73
Diabetes	121 (28.4)	251 (29.5)	0.7
Smoking	230 (54)	445 (52.2)	0.55
Coronary Artery Disease	77 (18.1)	142 (16.7)	0.53
Hyperlipidemia	186 (43.7)	335 (39.3)	0.14
Chronic Kidney Disease	71 (16.7)	130 (15.3)	0.51
Dialysis	19 (4.5)	44 (5.2)	0.58
Stroke/TIA	24 (5.6)	41 (4.8)	0.53
Number of medications	2.01 ± 1.74	2.02 ± 1.58	0.87
BP follow-up	368 (86.4)	691 (81.1)	0.02

BP: blood pressure; TIA: transient ischemic attack

<sup>a</sup> Calculated using unpaired t-test for continuous variables and Pearson's chi-square test for categorical variables (all 2-tailed)

**eTable2. Comparison of baseline characteristics between patients with and without follow-up between patients referred to the hospital (2a) and the propensity-matched sample from patients sent home (2b)**

**Table 2a. Comparison of baseline characteristics of patients followed and lost to follow-up (Total number of patients referred to the hospital, N= 426)**

<b>Characteristic</b>	<b>Patients with follow-up (n=368) Mean ± S.D. or N(%)</b>	<b>Patients without follow-up (n=58) Mean ± S.D. or N (%)</b>	<b>p-value<sup>a</sup></b>
Age (years)	58.4 ± 15.9	60.31 ± 17.5	0.44
Female gender	235 (63.9)	31 (53.4)	0.13
Race, White	218 (59.2)	37 (63.8)	0.79
Race, Black	138 (37.5)	19 (32.8)	
Race, Other	12 (3.3%)	2 (3.4)	
Systolic BP (mmHg)	198.3 ± 22.4	199.4 ± 20.1	0.70
Diastolic BP (mmHg)	107.3 ± 17.4	108.1 ± 17.3	0.75
Hypertension	347 (94.3)	56 (96.6)	0.48
Diabetes	111 (30.2)	10 (17.2)	0.04
Smoking	201 (54.6)	29 (50)	0.51
Coronary Artery Disease	65 (17.7)	12 (20.7)	0.58
Hyperlipidemia	170 (46.2)	16 (27.6)	0.01
Chronic Kidney Disease	65 (17.7)	6 (10.3)	0.17
Dialysis	17 (4.6)	2 (3.4)	0.69
Stroke/TIA	22 (6)	2 (3.4)	0.44
Number of BP medications	2.01 ± 1.8	1.97 ± 1.7	0.85
Body mass index (kg/m <sup>2</sup> )	31.5 ± 9.0	30.2 ± 7.5	0.34

BP: blood pressure, TIA: transient ischemic attack

<sup>a</sup> Calculated using unpaired t-test for continuous variables and Pearson's chi-square test for categorical variables (all 2-tailed)

**Table 2b. Comparison of baseline characteristics of patients followed and lost to follow-up (Total number of patients sent home in the propensity matched, N=852)**

<b>Characteristic</b>	<b>Patients with follow-up (n= 691) Mean ± (S.D) or N(%)</b>	<b>Patients without follow-up (n=161) Mean ± (S.D) or N (%)</b>	<b>p-value<sup>a</sup></b>
Age (years)	57.6 ± 14.7	60.3 ± 16.3	0.06
Female gender	434 (62.8)	93 (57.8)	0.24
Race, White	385 (55.7)	100 (62.1)	0.03
Race, Black	284 (41.1)	51 (31.7)	
Race, Other	22 (3.2)	10 (6.2)	
Systolic BP (mmHg)	197.9 ± 24.8	198.9 ± 21.0	0.6
Diastolic BP (mmHg)	108.5 ± 17.6	106.6 ± 19.5	0.25
Hypertension	657 (95.1)	145 (90.1)	0.02
Diabetes	219 (31.7)	32 (19.9)	0.003
Smoking	371 (53.7)	74 (46)	0.08
Coronary Artery Disease	115 (16.6)	27 (16.8)	0.97
Hyperlipidemia	278 (40.2)	57 (35.4)	0.26
Chronic Kidney Disease	115 (16.6)	15 (9.3)	0.02
Dialysis	41 (5.9)	3 (1.9)	0.04
Stroke/TIA	35 (5.1)	6 (3.7)	0.48
Number of BP medications	2.1 ± 1.6	1.7 ± 1.5	0.008
Body mass index (kg/m <sup>2</sup> )	32.8 ± 9.1	32.07 ± 8.2	0.44

BP: blood pressure, TIA: transient ischemic attack

<sup>a</sup> Calculated using unpaired t-test for continuous variables and Pearson's chi-square test for categorical variables (all 2-tailed)

**eTables 3a-d. Sensitivity analyses for the outcomes of Patients with follow-up defined as patients with at least 1 repeat blood pressure measurement within 6 months of baseline visit.**

**eTable 3a. Unadjusted outcomes of patients with hypertensive urgency (restricted to patients with follow-up)<sup>#</sup>.**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=368) N(%)</b>	<b>Sent Home (N=45556) N(%)</b>	<b>p-value<sup>a</sup></b>
7 day MACE event	2 (0.5)	60 (0.1)	<b>0.03</b>
8-30 day MACE event	2 (0.5)	117 (0.3)	0.28
1-6 month MACE event	4 (1.1)	491 (1.1)	0.99
Uncontrolled hypertension at 1 month*	291 (79.1)	36767 (80.7)	0.43
Uncontrolled hypertension at 6 months**	213 (66.6)	24819 (60.2)	<b>0.02</b>
All-cause 7 day hospital admission	33 (9)	2068 (4.5)	<b>&lt;0.001</b>
All-cause 8-30 day hospital admission	48 (13)	3717 (8.2)	<b>0.001</b>

<sup>#</sup>Patients with follow-up defined as patients with at least one repeat blood pressure measurements within 6 months of baseline visit.

\*Last blood pressure within 1 month  $\geq$  140/90mmHg. \*\* Last blood pressure within 6 months  $\geq$ 140/90mmHg.

MACE: major adverse cardiovascular events: includes Acute coronary syndromes, Stroke/Transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions

<sup>a</sup> Calculated using Pearson's chi-square test

**eTable 3b. Outcomes of asymptomatic patients sent to the ED/inpatient compared to propensity matched patients sent home (restricted to patients with follow-up)<sup>#</sup>.**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=368)</b>	<b>Sent home (N=691)</b>	<b>p-value <sup>a</sup></b>
7 day MACE event	2 (0.5)	0 (0)	0.12 <sup>^</sup>
8-30 day MACE event	2 (0.5)	0 (0)	0.12 <sup>^</sup>
1-6 month MACE event	4 (1.1%)	8 (1.2)	0.92
Uncontrolled hypertension at 1 month*	291 (79.1)	574 (86.1)	0.11
Uncontrolled hypertension at 6 months**	213 (66.6)	393 (64.6)	0.56
All-cause 7 day hospital admission	33 (9)	38 (5.5)	<b>0.03</b>
All-cause 30 day hospital admission	48 (13)	56 (8.1)	<b>0.01</b>

<sup>#</sup>Patients with follow-up defined as patients with at least one repeat blood pressure measurements within 6 months of baseline visit.

\*Last blood pressure within 1 month  $\geq$  140/90mmHg. \*\* Last blood pressure within 6 months  $\geq$ 140/90mmHg.

<sup>^</sup> p-values derived using the Fisher's exact test

MACE: major adverse cardiovascular events: includes Acute coronary syndromes, Stroke/Transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions

<sup>a</sup> Unless otherwise indicated, calculated using Pearson's chi-square test

**eTable 3c. Unadjusted outcomes of patients with hypertensive urgency (restricted to patients with primary care providers in our system with follow-up)<sup>#</sup>.**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=163) N(%)</b>	<b>Sent Home (N=22648) N(%)</b>	<b>p-value<sup>a</sup></b>
7 day MACE event	2 (1.2)	21 (0.1)	<b>0.01<sup>^</sup></b>
8-30 day MACE event	1 (0.6)	53 (0.2)	0.32 <sup>^</sup>
1-6 month MACE event	1 (0.6)	240 (1.1)	1.00 <sup>^</sup>
Uncontrolled hypertension at 1 month*	116 (71.2)	17810 (78.6)	<b>0.02</b>
Uncontrolled hypertension at 6 months**	91 (61.1)55.8	11581 (55.2)	0.15
All-cause 7 day hospital admission	14 (8.6)	718 (3.2)	<b>&lt;0.001</b>
All-cause 8-30 day hospital admission	18 (11)	1411 (6.2)	<b>0.01</b>

<sup>#</sup>Patients with follow-up defined as patients with at least one repeat blood pressure measurements within 6 months of baseline visit.

A total of 25,997 patients (44.2%) had a primary care provider in our system.

\*Last blood pressure within 1 month  $\geq$  140/90mmHg. \*\* Last blood pressure within 6 months  $\geq$ 140/90mmHg.

<sup>^</sup>p-values derived using the Fisher's exact test

MACE: major adverse cardiovascular events: includes Acute coronary syndromes, Stroke/Transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions

<sup>a</sup>Unless otherwise indicated, calculated using Pearson's chi-square test



**eTable 3d. Outcomes of asymptomatic patients sent to the ED/inpatient compared to propensity-matched patients sent home (restricted to patients with primary care providers in our system with follow-up)<sup>#</sup>.**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=163)</b>	<b>Sent home (N=350)</b>	<b>p-value <sup>a</sup></b>
7 day MACE event	2 (1)	0 (0)	0.10 <sup>^</sup>
8-30 day MACE event	1 (1)	0 (0)	0.32 <sup>^</sup>
1-6 month MACE event	1 (1)	7 (2)	0.45 <sup>^</sup>
Uncontrolled hypertension at 1 month*	116 (71.2)	286 (81.7)	<b>0.01</b>
Uncontrolled hypertension at 6 months**	91 (61.1)	182 (57.4)	0.45
All-cause 7 day hospital admission	14 (8.6)	15 (4.3)	<b>0.049</b>
All-cause 30 day hospital admission	18 (11)	20 (5.7)	<b>0.03</b>

<sup>#</sup>Patients with follow-up defined as patients with at least one repeat blood pressure measurements within 6 months of baseline visit.

\*Last blood pressure within 1 month  $\geq 140/90$ mmHg. \*\* Last blood pressure within 6 months  $\geq 140/90$ mmHg.

<sup>^</sup> p-values derived using the Fisher's exact test

MACE: major adverse cardiovascular events: includes Acute coronary syndromes, Stroke/Transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions

<sup>a</sup> Unless otherwise indicated, calculated using Pearson's chi-square test

**eTable 4. Baseline characteristics of patients presenting with hypertensive urgency to the office (Systolic BP  $\geq$  200 mmHg)**

<b>Factor</b>	<b>Referred to hospital (N=218) Mean (SD) or N (%)</b>	<b>Sent Home (N=5745) Mean (SD) or N (%)</b>	<b>p-value <sup>a</sup></b>
Age (years)	62.19 (15.42)	66.82 (13.87)	<b>&lt;0.001</b>
Female	136 (62.4%)	3578 (62.3%)	0.975
Race			
Caucasian	125 (57.3)	4207 (73.2)	<b>&lt;0.001</b>
African American	84 (38.5)	1265 (22)	
Other	9 (4.1)	273 (4.8)	
Systolic BP (mmHg)	215.56 (14.15)	209.86 (11.27)	<b>&lt;0.001</b>
Diastolic BP (mmHg)	108.7 (18.61)	98.56 (16.67)	<b>&lt;0.001</b>
Body Mass Index (kg/m <sup>2</sup> )	30.81 (8.23)	31.05 (7.6)	0.732
Hypertension	211 (97.2%)	4453 (77.8%)	<b>&lt;0.001</b>
Diabetes	67 (30.7%)	1585 (27.6%)	0.309
Smoking	121 (55.8%)	2713 (47.4%)	<b>0.015</b>
Coronary Artery Disease	44 (20.3%)	1238 (21.6%)	0.636
Hyperlipidemia	99 (45.4%)	2618 (45.6%)	0.964
Chronic Kidney Disease	46 (21.1%)	797 (13.9%)	<b>0.003</b>
Stroke/TIA	18 (8.3%)	380 (6.6%)	0.340
Taking $\geq$ 2 BP medications	139 (63.8%)	3950 (68.8%)	0.119
Taking $\geq$ 3 BP medications	94 (43.1%)	2787 (48.5%)	0.118
Thiazide Diuretic	34 (16.8%)	1145 (20.8%)	0.168
ACE-I/ ARB	83 (41.1%)	2657 (48.3%)	<b>0.043</b>
Beta-blockers	104 (51.5%)	3060 (55.7%)	0.239
Calcium Channel Blockers	60 (29.7%)	1767 (32.2%)	0.464
Hydralazine	16 (7.9%)	411 (7.5%)	0.814

Clonidine	36 (17.8%)	707 (12.9%)	<b>0.040</b>
Potassium Sparing Diuretics	19 (9.4%)	408 (7.4%)	0.293
Loop Diuretic	37 (18.3%)	960 (17.5%)	0.755
Nitrates	17 (8.4%)	514 (9.4%)	0.653
Number of medications			
0	31 (15.3%)	691 (12.6%)	0.577
1	32 (15.8%)	855 (15.6%)	
2	45 (22.3%)	1163 (21.2%)	
≥ 3	94 (46.5%)	2787 (50.7%)	

**BP: blood pressure. ACE-I : Angiotensin Converting Enzyme Inhibitors. ARB: Angiotensin Receptor Blockers TIA: transient ischemic attack**

<sup>a</sup> Calculated using unpaired t-test for continuous variables and Pearson's chi-square test for categorical variables (all 2-tailed)

**Table 5. Unadjusted outcomes of patients presenting with hypertensive urgency to the office (Systolic BP  $\geq$  200 mm Hg)**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=218) N(%)</b>	<b>Sent Home (N=5745) N(%)</b>	<b>p-value <sup>a</sup></b>
<b>7 day MACE event</b>	0 (0%)	13 (0.2%)	1.00 <sup>^</sup>
<b>8-30 day MACE event</b>	2 (0.9%)	17 (0.3%)	0.15 <sup>^</sup>
<b>1-6 month MACE event</b>	1 (0.5%)	63 (1.1%)	0.73 <sup>^</sup>
<b>Uncontrolled hypertension at 1 month*</b>	175 (80.3%)	5010 (87.2%)	<b>0.003</b>
<b>Uncontrolled hypertension at 6 months**</b>	117 (71.3%)	2596 (66.3%)	0.18
<b>All-cause 7 day hospital admission</b>	13 (6%)	264 (4.6%)	0.35
<b>All-cause 8-30 day hospital admission</b>	19 (8.7%)	431 (7.5%)	0.51

\*Last BP within 1month  $\geq$  140/90mmHg. \*\* Last BP within 6 months  $\geq$  140/90mmHg.

MACE: major adverse cardiovascular event: includes acute coronary syndromes, stroke/transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions.

<sup>^</sup> p-values derived using the Fisher's exact test

<sup>a</sup> Unless otherwise indicated, calculated using Pearson's chi-square test

**Table 6. Baseline characteristics of patients presenting with hypertensive urgency to the office (Systolic BP  $\geq$ 220 mm Hg)**

<b>Factor</b>	<b>Referred to hospital (N=81) Mean <math>\pm</math> S.D. or N (%)</b>	<b>Sent Home (N=977) Mean <math>\pm</math> S.D. or N (%)</b>	<b>p-value <sup>a</sup></b>
Age (years)	61.09 (15.86)	66.09 (13.76)	<b>0.007</b>
Female	46 (56.8%)	620 (63.5%)	0.23
Race			
Caucasian	47 (58%)	713 (73%)	<b>&lt;0.001</b>
African American	30 (37%)	209 (21.4%)	
Other	4 (4.9%)	55 (5.6%)	
Systolic BP (mmHg)	230.62 (11.16)	228.45 (13.39)	0.10
Diastolic BP (mmHg)	111.1 (20.58)	105.46 (18.82)	<b>0.02</b>
Body Mass Index (kg/m <sup>2</sup> )	29.71 (8.01)	30.92 (7.53)	0.3
Hypertension	80 (98.8%)	763 (78.3%)	<b>&lt;0.001</b>
Diabetes	23 (28.4%)	264 (27%)	0.79
Smoking	47 (58%)	444 (45.6%)	<b>0.03</b>
Coronary Artery Disease	21 (25.9%)	201 (20.6%)	0.26
Hyperlipidemia	39 (48.1%)	415 (42.5%)	0.32
Chronic Kidney Disease	19 (23.5%)	141 (14.4%)	<b>0.03</b>
Stroke/TIA	11 (13.6%)	63 (6.4%)	<b>0.02</b>
Taking $\geq$ 2 BP medications	53 (65.4%)	678 (69.4%)	0.46
Taking $\geq$ 3 BP medications	40 (49.4%)	492 (50.4%)	0.87
Thiazide Diuretic	12 (16.2%)	188 (20.4%)	0.39
ACE-I/ ARB	32 (43.2%)	464 (50.4%)	0.24
Beta-blockers	43 (58.1%)	499 (54.2%)	0.51
Calcium Channel Blockers	29 (39.2%)	303 (32.9%)	0.27
Hydralazine	7 (9.5%)	87 (9.4%)	0.1

Clonidine	13 (17.6%)	156 (16.9%)	0.89
Potassium Sparing Diuretics	7 (9.5%)	66 (7.2%)	0.47
Loop Diuretic	12 (16.2%)	164 (17.8%)	0.73
Nitrates	9 (12.2%)	90 (9.8%)	0.51
Number of medications			
0	11 (14.9%)	114 (12.4%)	0.9
1	10 (13.5%)	129 (14%)	
2	13 (17.6%)	186 (20.2%)	
≥ 3	40 (54.1%)	492 (53.4%)	

**BP: blood pressure. ACE-I : Angiotensin Converting Enzyme Inhibitors. ARB: Angiotensin Receptor Blockers TIA: transient ischemic attack**

<sup>a</sup> Calculated using unpaired t-test for continuous variables and Pearson's chi-square test for categorical variables (all 2-tailed)

**Table 7. Unadjusted outcomes of patients presenting with hypertensive urgency to the office (Systolic BP  $\geq$ 220 mm Hg)**

<b>Outcome</b>	<b>Referred to the hospital (ED/inpatient) (N=81) N(%)</b>	<b>Sent Home (N=977) N(%)</b>	<b>p-value <sup>a</sup></b>
<b>7 day MACE event</b>	0 (0%)	2 (0.2%)	1.00 <sup>^</sup>
<b>30 day MACE event</b>	0 (0%)	5 (0.5%)	0.38 <sup>^</sup>
<b>6 month MACE event</b>	0 (0%)	11 (1.1%)	1.00 <sup>^</sup>
<b>Uncontrolled hypertension at 1 month*</b>	18 (22.2%)	120 (12.3%)	<b>0.01</b>
<b>Uncontrolled hypertension at 6 months**</b>	16 (26.7%)	220 (33.3%)	0.29
<b>All-cause 7 day hospital admission</b>	5 (6.2%)	36 (3.7%)	0.27
<b>All-cause 8-30 day hospital admission</b>	8 (9.9%)	59 (6%)	0.17

\*Last BP within 1 month  $\geq$  140/90mmHg. \*\* Last BP within 6 months  $\geq$  140/90mmHg.

MACE: major adverse cardiovascular event: includes acute coronary syndromes, stroke/transient ischemic attack

Hospital admission includes emergency department visits, observation and inpatient hospital admissions.

<sup>^</sup> p-values from the Fisher's exact test

<sup>a</sup> Unless otherwise indicated, calculated using Pearson's chi-square test