Multifaceted Challenges in Managing Hypertension: Disparities, Medication Adherence, and Therapeutic Inertia
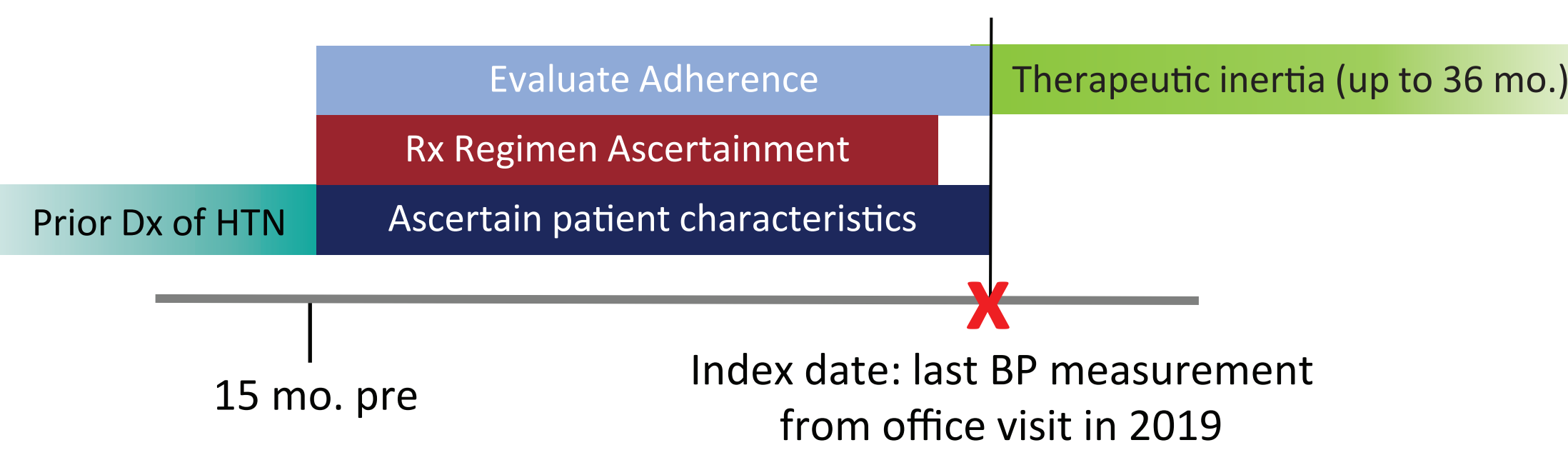
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Background

- Failure to control blood pressure (BP) despite multiple prescribed antihypertensive medications (resistant hypertension) is widespread and leads to worse clinical outcomes[1]
- Medication non-adherence (not taking medications as prescribed) and therapeutic inertia (not escalating treatment when indicated) are two avenues that contribute to BP control failure[2]
- In 2017, guidelines[3] from the AHA/ACC and others were updated to recommend a target BP of <130/80
- This study evaluates the state of BP control in patients already receiving **3 or more antihypertensives** under these new guidelines as well as the associated patient and provider factors
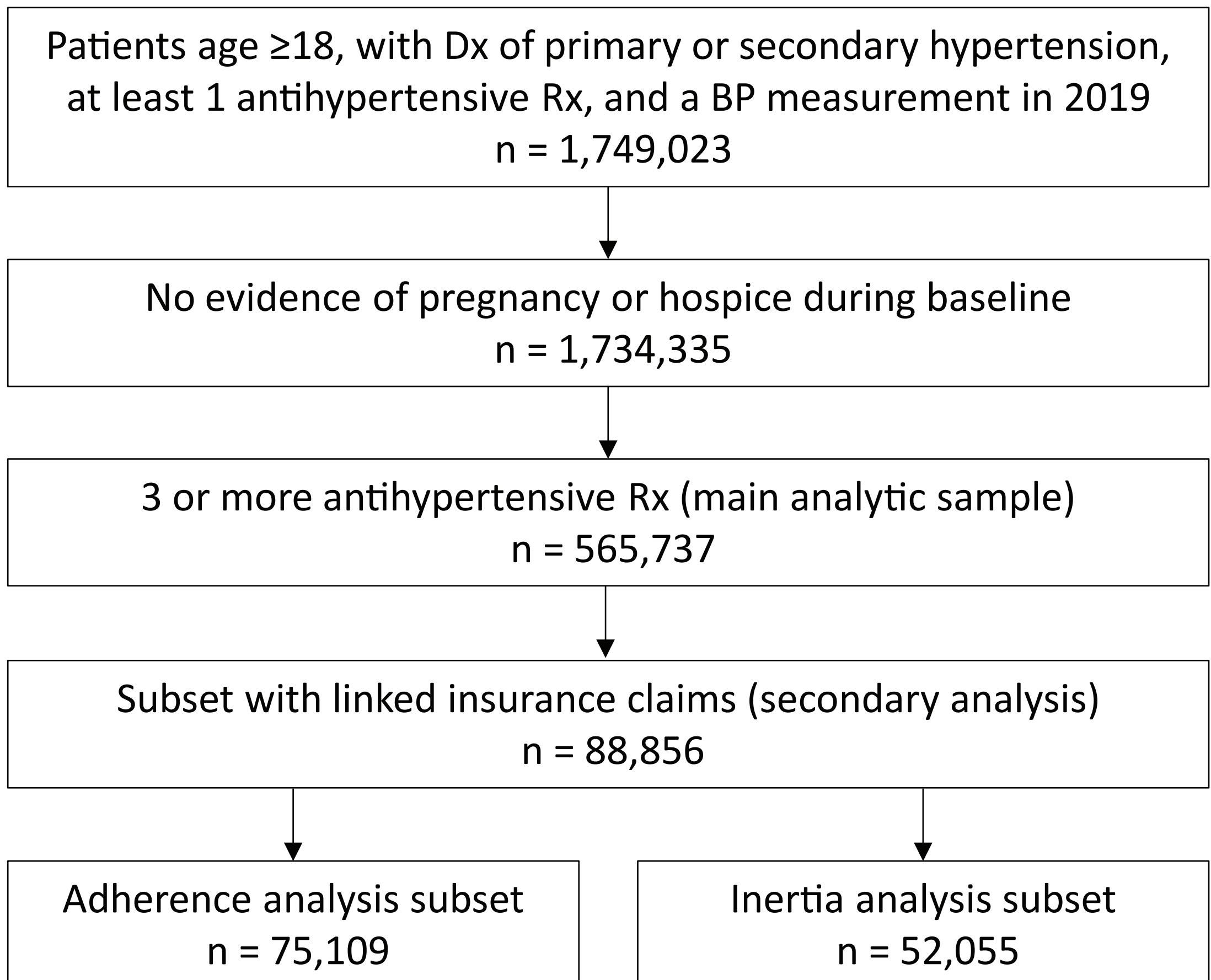
Methods

Evaluate Adherence
Therapeutic inertia (up to 36 mo.)
Rx Regimen Ascertainment
Prior Dx of HTN | Ascertain patient characteristics

15 mo. pre
Index date: last BP measurement from office visit in 2019

Study Population

565,737 adults with established hypertension prescribed a minimum of 3 antihypertensive medication classes at the index date (primary analysis)

- Index date was the last BP measurement from an office visit in 2019
- A subset of patients with both EHR data and claims were used to evaluate therapeutic inertia (n = 75,109) or adherence (n = 52,055)
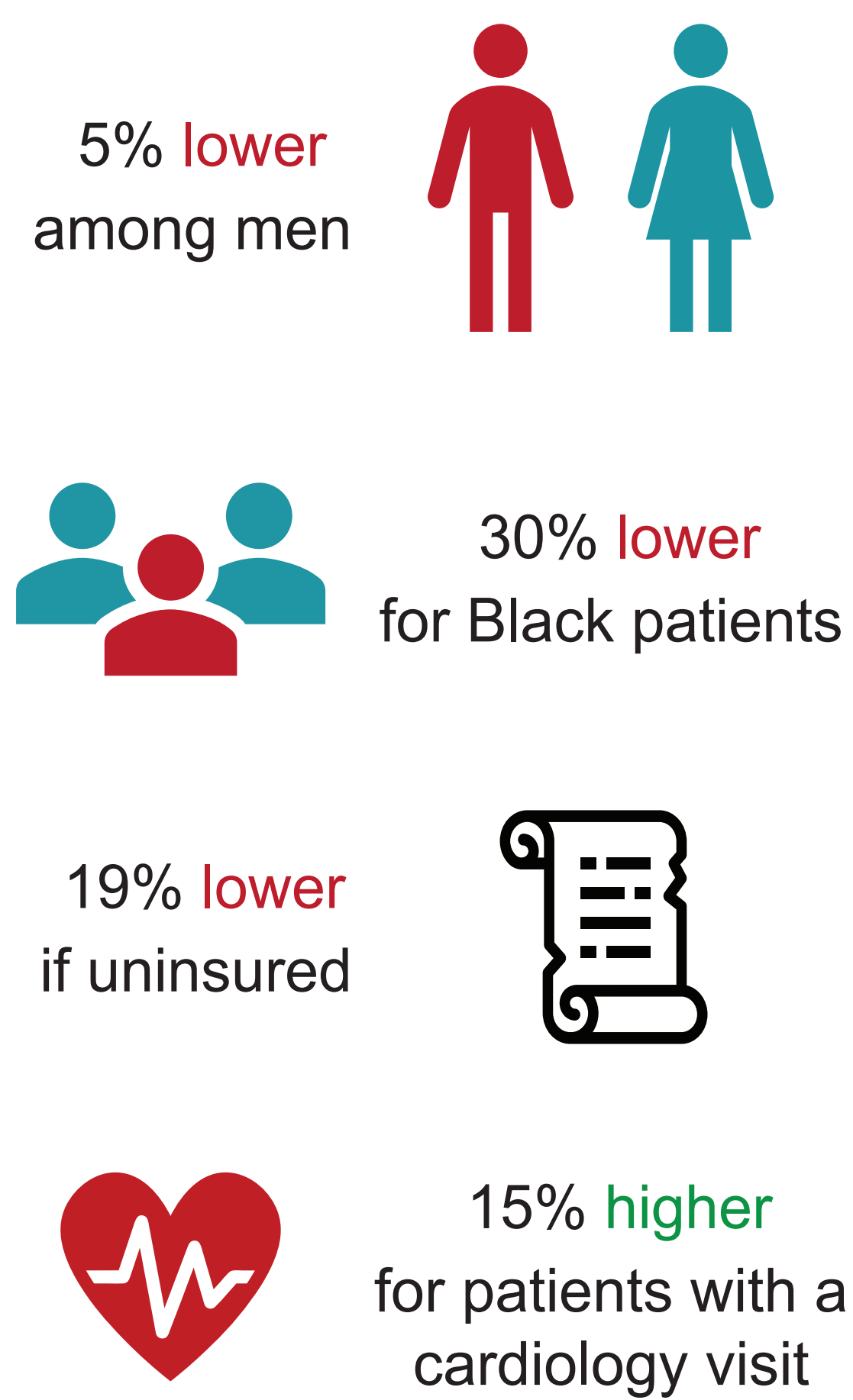
Patients age ≥18, with Dx of primary or secondary hypertension, at least 1 antihypertensive Rx, and a BP measurement in 2019
n = 1,749,023

↓

No evidence of pregnancy or hospice during baseline
n = 1,734,335

↓

3 or more antihypertensive Rx (main analytic sample)
n = 565,737

↓

Subset with linked insurance claims (secondary analysis)
n = 88,856

↓

Adherence analysis subset
n = 75,109

Inertia analysis subset
n = 52,055

References
1. Daugherty SL, Powers JD, Magid DJ, et al. Incidence and prognosis of resistant hypertension in hypertensive patients. Circulation. 2012;125(13). doi:10.1161/CIRCULATIONAHA.111.068064
2. Elliott WJ. What factors contribute to the inadequate control of elevated blood pressure? J Clin Hypertens (Greenwich). 2008;10(1 Suppl 1):20-26. doi:10.1111/j.1524-6175.2007.08028.x
3. Casey DE, Karen Collins FahaJ, Cheryl Dennison Himmelfarb Mba, et al. 2017 ACC/AHA/AAPA/ABC/ACP-M/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. J Am Coll Cardiol. 2018;71(19):e127-e248. doi:10.1016/J.JACC.2017.11.006

Rates of Treatment Resistant Hypertension

Among patients receiving 3 or more antihypertensive medication classes, only 37.7% met BP control targets

Adjusted odds of meeting BP control were:

5% lower among men

30% lower for Black patients

19% lower if uninsured

15% higher for patients with a cardiology visit

In addition to the listed patient factors, odds are also adjusted for BMI and comorbid conditions including ASCVD, heart failure, type 2 diabetes, CKD, and Charlson score

Table 1: Association Between Patient Factors and BP Control

	Stratification by BP control (<130/80 target)		Adjusted association with BP control	
	Uncontrolled	Controlled	OR	95% CI
n (% of total)	352424 (62.3)	213313 (37.7)		
Age (mean (SD))	66.2 (12.5)	68.9 (11.8)	**1.01**	**1.01, 1.01**
Sex = Male (%)	171608 (48.7)	103086 (48.3)	**0.95**	**0.94, 0.97**
Race (%)				
White	267410 (75.9)	173574 (81.4)	(ref)	(ref)
Black	65541 (18.6)	28266 (13.3)	**0.70**	**0.68, 0.71**
Asian	4316 (1.2)	2963 (1.4)	1.04	0.99, 1.09
Other/Unknown	15157 (4.3)	8510 (4.0)	**0.93**	**0.90, 0.96**
Ethnicity (%)				
Hispanic	11336 (3.2)	6298 (3.0)	(ref)	(ref)
Not Hispanic	316037 (89.7)	192087 (90.0)	**1.10**	**1.07, 1.14**
Unknown	25051 (7.1)	14928 (7.0)	**1.07**	**1.03, 1.11**
Insurance Type (%)				
Commercial	214806 (61.0)	117616 (55.1)	(ref)	(ref)
Medicaid	17040 (4.8)	9864 (4.6)	**1.08**	**1.05, 1.11**
Medicare	112138 (31.8)	81705 (38.3)	**1.10**	**1.08, 1.11**
Other Payor Type	2764 (0.8)	1501 (0.7)	1.07	1.00, 1.14
Uninsured	3316 (0.9)	1339 (0.6)	**0.81**	**0.76, 0.86**
Unknown	2360 (0.7)	1288 (0.6)	0.97	0.90, 1.03
Has baseline visit with (%)				
PCPs only	195909 (55.6)	101197 (47.4)	(ref)	(ref)
Cardiology	133645 (37.9)	99660 (46.7)	**1.16**	**1.15, 1.18**
Endocrinology	16478 (4.7)	9188 (4.3)	**1.09**	**1.06, 1.12**
Nephrology	6392 (1.8)	3268 (1.5)	**0.92**	**0.88, 0.97**

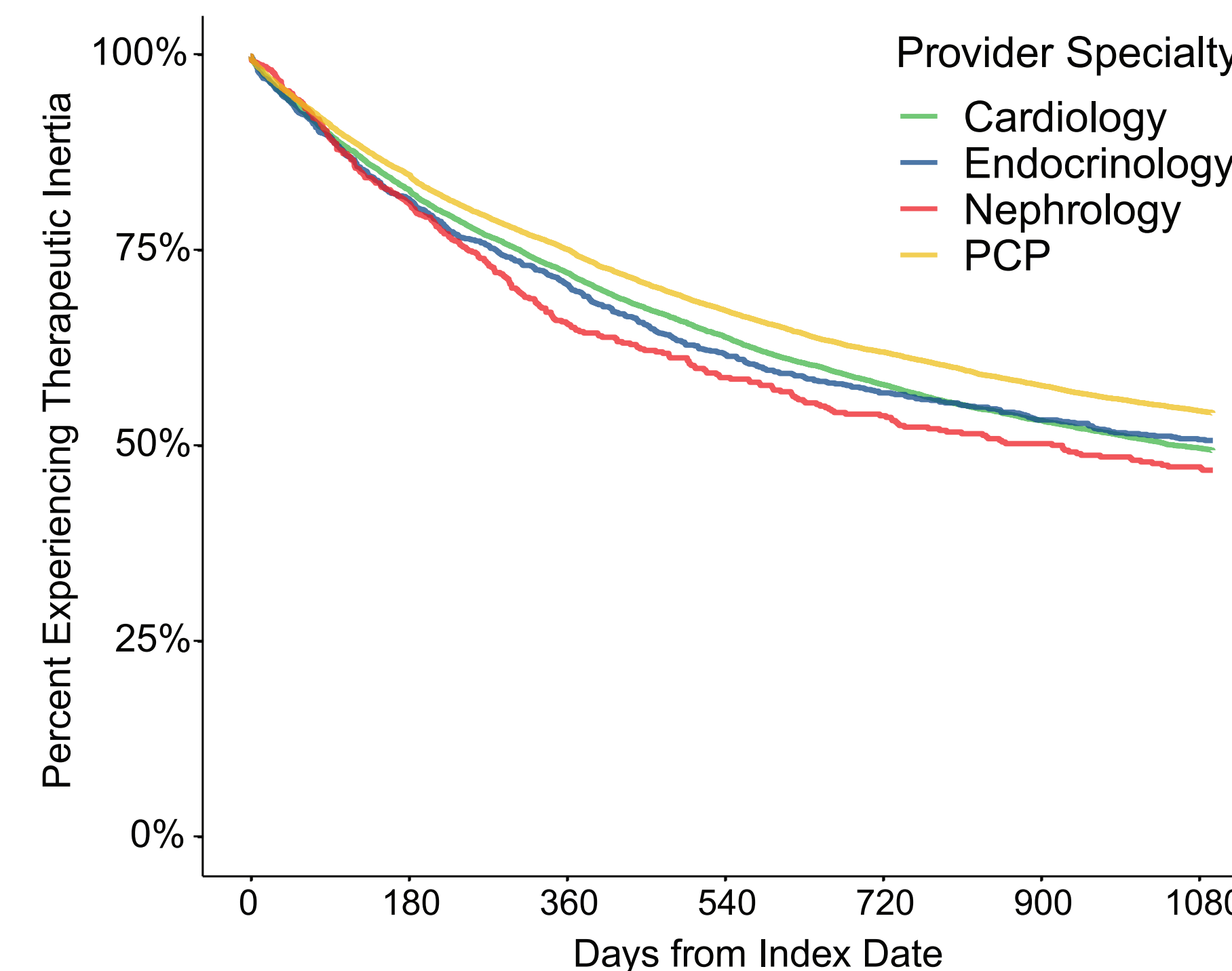PCP: Primary care physician

Therapeutic Inertia

Therapeutic Inertia: Failure to escalate dose or change medications when BP is not controlled

Patients with out-of-control BP at index were followed for up to 3 years

64.5% of out-of-control BP patients had no medication escalation over 18 mo.

Factors associated with inertia
- Patients seeing only a PCP: 13% slower escalation
- High baseline BP (>150 SPB): 46% faster escalation
- Black Patients: 11% faster escalation

Medication Adherence

Adherence: Dispensing medication on the prescribed schedule

In order to be considered adherent, patient must have coverage for at least 80% of days for all 3 (or more) prescribed medications

47.3% of patients were fully adherent to prescribed regimen, though even in this population BP control was only 43%

Table 2: Association Between Patient Factors and Adherence

	Baseline Adherence Status		Adjusted association with adherence	
	Non-adherent	Adherent	OR	95% CI
n (% of total)	39548 (52.7)	35561 (47.3)		
Age (mean (SD))	72.6 (10.5)	73.1 (9.4)	**1.01**	**1.01, 1.01**
Sex = Male (%)	17239 (43.6)	16491 (46.4)	**1.18**	**1.15, 1.22**
Race (%)				
White	31918 (80.7)	30275 (85.1)		(ref)
Black	5704 (14.4)	3786 (10.6)	**0.73**	**0.70, 0.76**
Asian	388 (1.0)	342 (1.0)	0.88	0.76, 1.02
Other/Unknown	1538 (3.9)	1158 (3.3)	**0.82**	**0.76, 0.89**
Ethnicity (%)				
Hispanic	1488 (3.8)	985 (2.8)		(ref)
Not Hispanic	35415 (89.5)	32196 (90.5)	**1.29**	**1.18, 1.41**
Unknown	2645 (6.7)	2380 (6.7)	**1.28**	**1.16, 1.42**
Has baseline visit with (%)				
PCPs only	18216 (46.1)	19774 (55.6)		(ref)
Cardiology	19045 (48.2)	13864 (39.0)	**0.73**	**0.70, 0.75**
Endocrinology	1486 (3.8)	1293 (3.6)	0.93	0.86, 1.00
Nephrology	801 (2.0)	630 (1.8)	**0.86**	**0.77, 0.96**
CCI (mean (SD))	2.31 (2.17)	1.69 (1.86)	**0.86**	**0.86, 0.87**

PCP: Primary care physician; CCI: Charlson comorbidity index

Conclusions

- Over 60% of patients receiving 3 or more antihypertensive medication classes were not meeting <130/80 target BP
- Rates of BP control were lowest among Black and uninsured patient populations
- Both slow medication escalation and lack of adherence were common, likely contributing to longer term failure to achieve BP control

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