Reframing Goal BP to Align Patients and Providers on the Target

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Disclosure

I have no financial interests or relationships to disclose.

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Reframing Goal BP to Align Patients and Providers on the Target

Learning Objectives:

1. Recall turn of the century history on therapeutic inertia and impact on blood pressure (BP) control
2. List potential explanations for therapeutic inertia and the potential value of targeting mean SBP to optimize heart (ischemia, failure) and brain (stroke, cognition) outcomes
3. Summarize the value of the M.A.P. framework, which includes single-pill combinations, for improving Rx intensification and BP control

   What you can do to improve hypertension control !!!

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ARS Question #1

What Is the Greatest Single Barrier to BP Control?

A. Adherence: On average, patients only take about 60% of prescribed anti-hypertensive medication
B. Follow-up frequency: After a visit with uncontrolled BP, patients have a follow-up encounter an average of 3 months later
C. Loss to follow-up: Patients with uncontrolled hypertension are more likely to drop out of care for a year or more
D. Treatment intensification: On average, it takes about 2 years to increase the dose or a BP med or add a new BP med for uncontrolled BP

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Objective #1. Recall the History of Therapeutic Inertia and Its Impact on BP Control

History

- In a 1998 report, Rx intensification (RxINT) occurred on 6.7% of visits with uncontrolled BP.[1]
- In reports from 2006 and 2013, RxINT occurred on ~14% of visits with uncontrolled BP.[2,3]
- In a 2021 publication, half of adults with uncontrolled BP were on monotherapy after 8 years.[4]

Impact on hypertension control

- Increasing RxINT for uncontrolled HTN from 13% to 33% of visits could raise HTN control from 46% to 66%.[2]
- Increasing RxINT for uncontrolled HTN from 13% to ≥62% of visits could raise HTN control from 46% to ≥80%. Therapeutic inertia was identified as the major barrier to BP control.[3]

Bottom line: TI is a major contributor to uncontrolled hypertension

References: 1. Berlowitz DR, et al. NEJM. 1998;339:1957-63. 2. Okonofua E, et al. *Hypertension*. 2006;47:1–7. 3. Bellows BK, et al. C*irc Card Qual Outc.* 2019;12:e005624. 4. De Backer T, et al. PLoS One. 2021;16:e0248471

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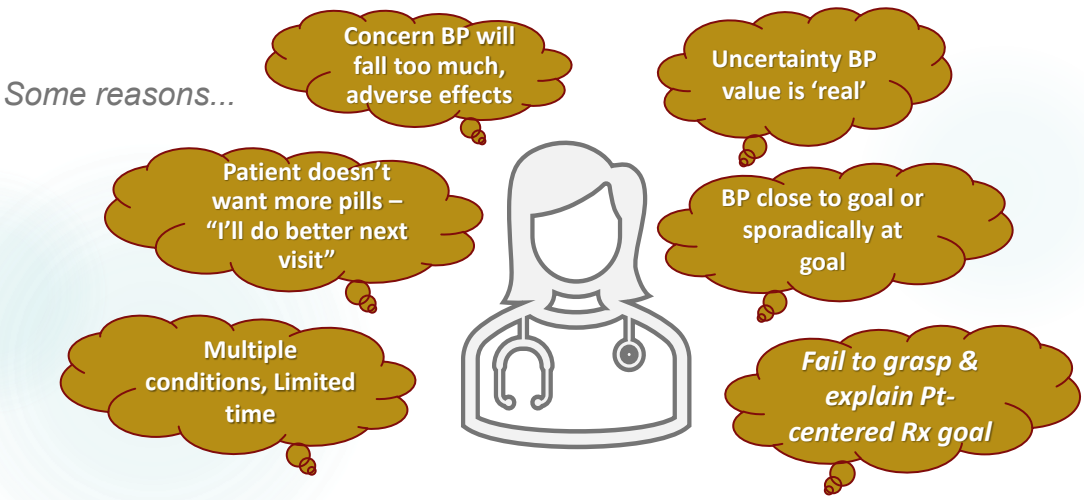
Objective #2. List Potential Explanations for Therapeutic Inertia



Ogedegbe G. *J Clin Hypertens*. 2008;10:644-646.
Egan BM, et al. *BMJ Open*. 2025;15:e090440.

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ARS Question #2

Which of the Following Statements Is False?

A. When systolic BP is <140 mmHg, the diastolic BP is <90 mmHg in about 95% of patients?
B. Mean systolic BP at the clinician level (patient panel) accounts for 80% of the difference between clinicians in BP control to <140/<90 mmHg
C. Most clinicians that control BP to <140/<90 in 80% or more of their patients have attained a mean SBP <130 mmHg for their patient panel
D. Lowering mean systolic BP from 130–134 to 120–124 mmHg reduces the relative risk for cardiovascular events about 10%?

BP Will Fall Too Much – Reports From Studies on Single-Pill Combinations Raise Some Safety Concerns

TRIUMPH: RCT Triple Combo vs. Usual Care* (700 patients, Sri Lanka)

- ΔBP: 29/14 vs. 20/9 (net 9/5); control at 6 mo 70% vs 55%.
- Adverse Events (AEs) 38.1% triple combo vs 34.8% usual care.
- Musculoskeletal pain: 6.0% vs 8.0%, dizziness, presyncope or syncope: 5.2% vs. 2.8%.
- Withdrawal due to AEs: 6.6% vs. 6.8%. Serious Adverse Events: 27 vs. 21 patients.

Quartet: RCT 4-BP Med SPC vs. Monotherapy† (591 patients, Australia)

- SBP 6.9 mmHg lower and control higher (76% vs 58%) at 3 mo
- Dizziness: 31.0% vs. 25.4%, p=0.07
- AE withdrawals at 12 weeks: 4.0% vs 2.4**%,** p=0.27, extended follow-up: 7.3% vs. 3.8%, p=0.07
- SAEs: 7 vs. 3 patients

*TRIUMPH: chlorthalidone 12.5, telmisartan 20, amlodipine 2.5 vs. usual care. *JAMA*. 2018;320:566-79.

†QUARTET: irbesartan 37.5, amlodipine 1.25, indapamide 1.25, bisoprolol 2.5 vs. amlodipine 5. *Lancet*. 2021;398:1043-52.

Uncertainty BP Value Is 'Real': Some Supporting Data *But Addressing the Issue Has Had Limited Impact on RxInt*

Measurement Error	BP Effect (mm Hg)
1. Back unsupported	5–10
2. Arm not supported heart level	5–10
3. BP Cuff over sweatshirt	10–40
4. Legs crossed	2–8
5. Bladder full	10–15
6. Feet not flat on floor	5–10
7. Patient talking	10–15
8. Patient listening	

- In usual clinical care, <5% of BP measurements are obtained as recommended.[1]
- Staff cite several issues adversely impacting BP accuracy but barriers limit improvement.[2]
- Training staff on BP measurement and AOBP improve RxINT but RxINT remains low.[3]
- Specialty clinics typically get higher BPs, which average ~4 mmHg on SBP and BPs

AOBP, automated office BP

References. 1. Hypertension. 2019;73:e35-366. 2. J Prim Car & Comm Health 2018;9:1-7.
3. *Hypertension*. 2025;82:1129-1136. 4. J Clin Hypertension. 2018;20:1253-59.

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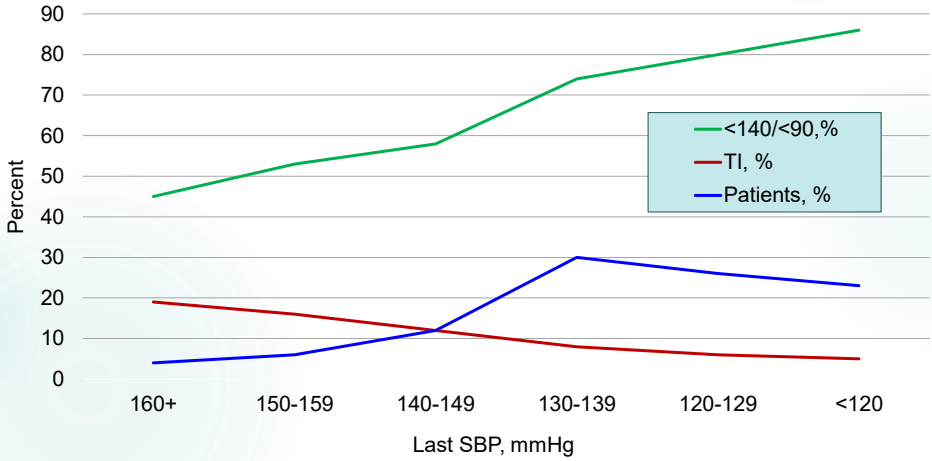
BP Close to Goal or Sporadically at Goal



The rate of RxINT (**red line**) falls as last clinic BP falls.
The percentage of visits <140/<90 in the past 2 years (green line) rises as the last clinic SBP falls.
The proportion of patients in each SBP band is indicated by the **blue line.**

MAP HTN unpublished clinical data

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Patient Doesn't Want More Medications: *Pill Count Is Often the Issue !!!*

Why Use Single-Pill Combinations (SPC)?

Better Adherence	Better BP Control
Similar to Fewer Adverse Effects	Better Clinical Outcomes

Feldman RD, et al. *Hypertension*. 2009;53:646-53. Rea F, et al. *Eur Heart J*. 2018;39(40):3654-3661. Williams B, Mancia G, et al. 2018 ESC/ESH Guidelines. *J Hypertens*. 2018;36:1953-2041. Whelton PK, Carey RM, et al. 2017 ACC/AHA high BP guideline. *Hypertension*. 2018;71:e13–e115.

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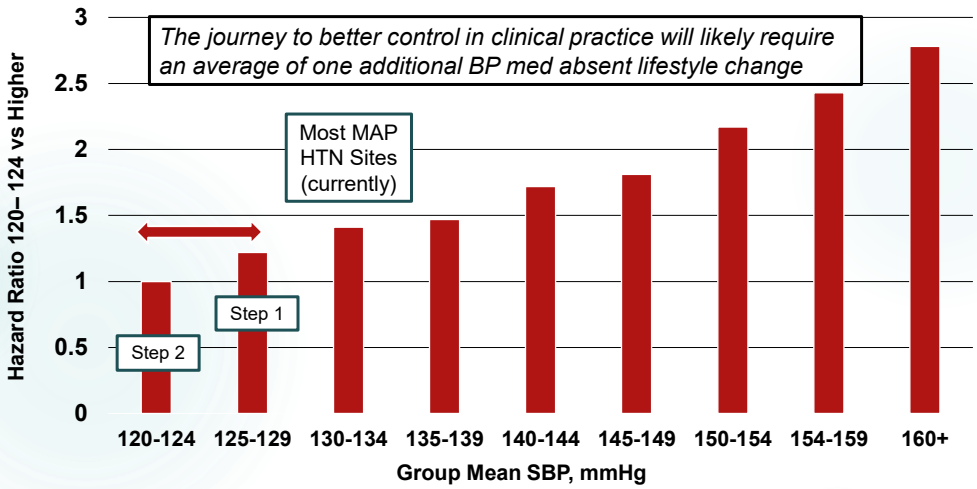
Grasping and Conveying the Treatment Goal: CV Outcomes in Randomized Trials of Anti-HTN Rx are Better When Mean SBP is <130 than Higher Values



Bundy JD *et al. JAMA Cardiol.* 2017;2:775–781.

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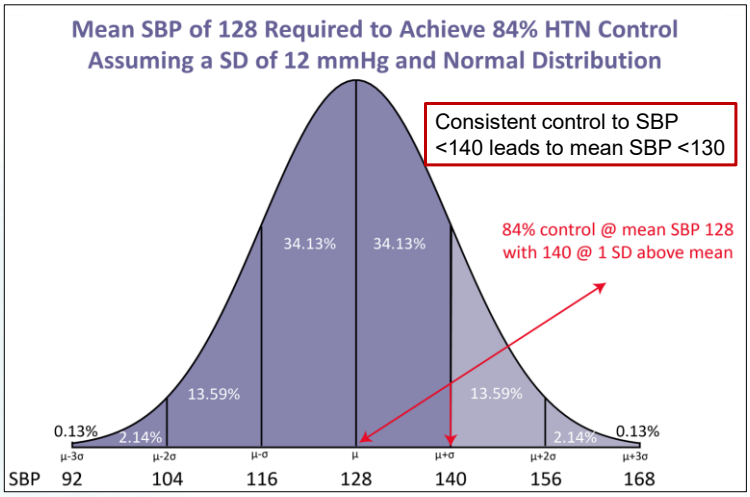
Failure to Grasp and Communicate Patient-Centered Treatment Goal in Setting and Conveying SBP Targets



Rosner B. Continuous probability distributions, ch. 5. In: Fundamentals of Biostatistics, 8th ed. Cengage Learning. Boston, MA, 2015.

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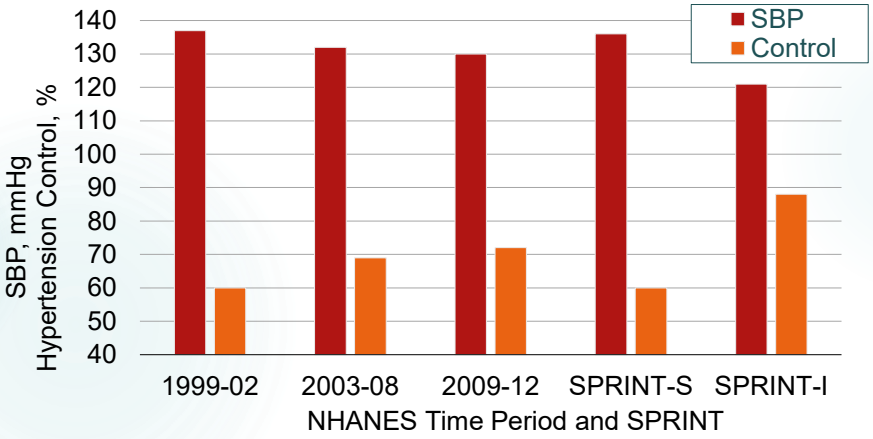
BP Control Rises as Mean SPB Falls in NHANES and SPRINT 1999-2002 and SPRINT Standard Rx Is Comparable at Similar Mean SBP



In NHANES 1999-2002 and SPRINT Standard Rx mean SBP values and hypertension control rates were similar.

Egan BM. Li J, Wagner CS. *Hypertension J*. 2017;3:12-19.

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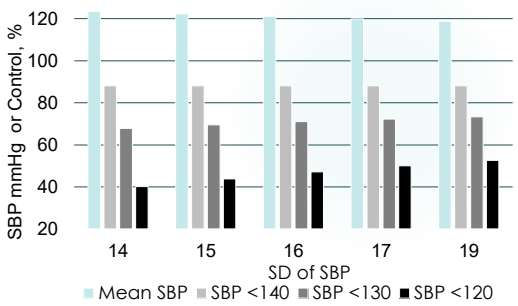
Achieving 2020 Healthy People 2020 BP Control Goal (88% of Rx Pts): Effect of Mean SBP and Standard Deviation (SD)

SBP SD	14	15	16	17	19
Mean SBP, mmHg	123.5	122.3	121.1	119.9	118.8
SBP <140, %	88.1	88.1	88.1	88.1	88.1
SBP <130, %	67.9	69.6	71.1	72.3	73.4
SBP <120, %	40.2	43.9	47.2	50.1	52.7



As the SD of SBP increases, the mean SBP required to attain 88% control declines

Egan BM, Li J, Wagner CS. Systolic blood pressure intervention trial (SPRINT) and target systolic blood pressure in future hypertension guidelines. *Hypertension*. 2016;68:318–323.

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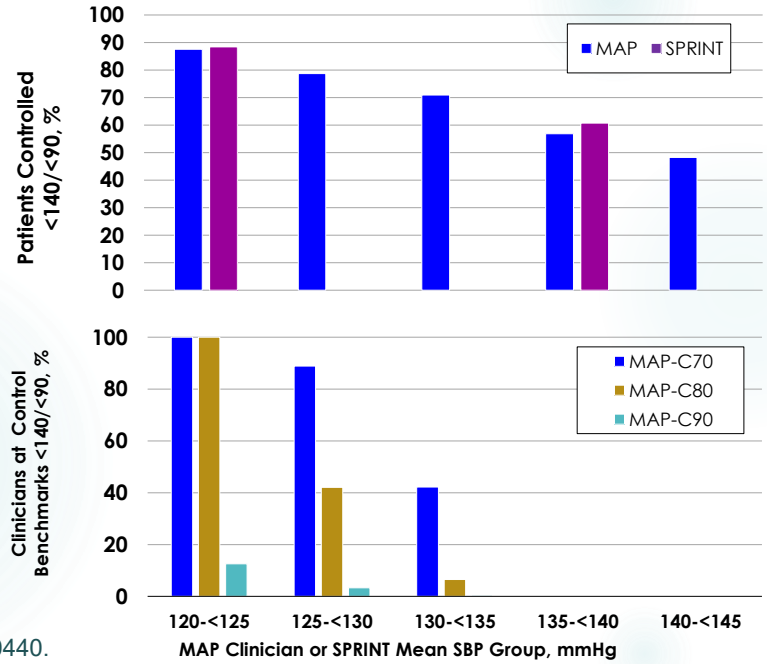
BP Control at MAP Sites

Is Strongly Related to Mean SBP

at the Patient (Upper Panel) and Provider (Lower) Level

and Coincides with SPRINT (Upper Panel)



BMJ Open. 2025;15:e090440.

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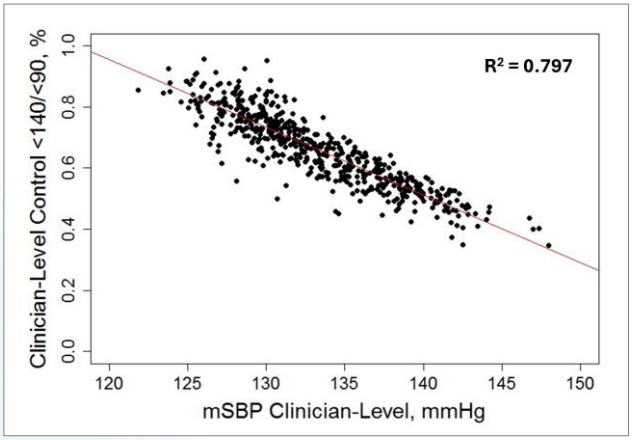
Clinician-Level Mean SBP Explained 80% of Variance Between Clinicians in Control of their Patients to <140/<90



The SD of SBP was the 2nd most important variable in BP control to <140/<90, which with DBP and SD DBP raised variance explained to 87%

When SBP was <140, DBP was <90 in ~95% of patients

Egan BM, Sutherland SE, Martin B, Riesser BC, Moran AE, Rodgers A, Rakotz MK. Does mean systolic blood pressure less than 130 mmHg ensure high rates of control to <140/<90 mmHg? Cross-sectional analysis of two cohorts. *BMJ Open*. 2025;15:e090440.

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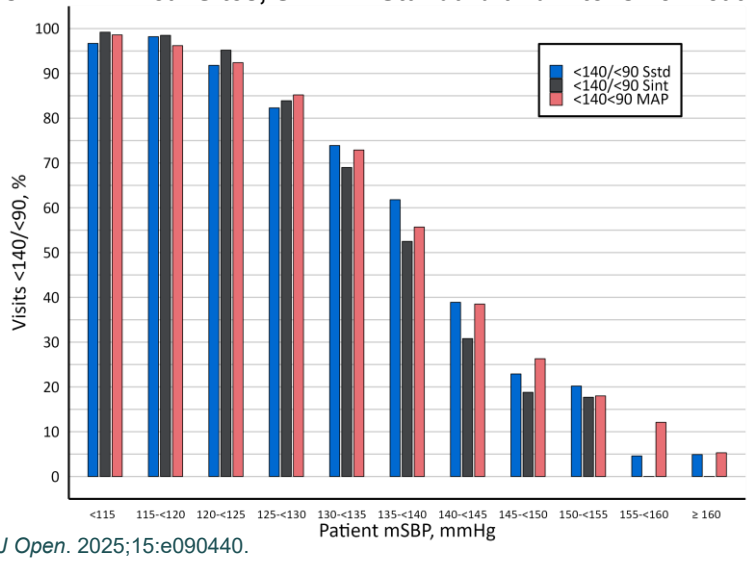
Patient-Level Mean SBP Strongly Related to % of Visits with BP <140/<90: Data Similar Across MAP Clinical Sites, SPRINT Standard and Intensive Treatment



Egan BM, et a; *BMJ Open*. 2025;15:e090440.

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Learning Objectives:

1. Recall turn of the century history on therapeutic inertia and impact on blood pressure (BP) control
2. List potential explanations for therapeutic inertia and the potential value of aiming for mean SBP to optimize heart (ischemic, failure) and brain (stroke, cognition) outcomes
3. ***Summarize the value of the M.A.P. framework, which includes single-pill combinations for improving therapeutic intensification and BP control (WHAT YOU CAN DO TO IMPROVE HTN CONTROL !!!)***

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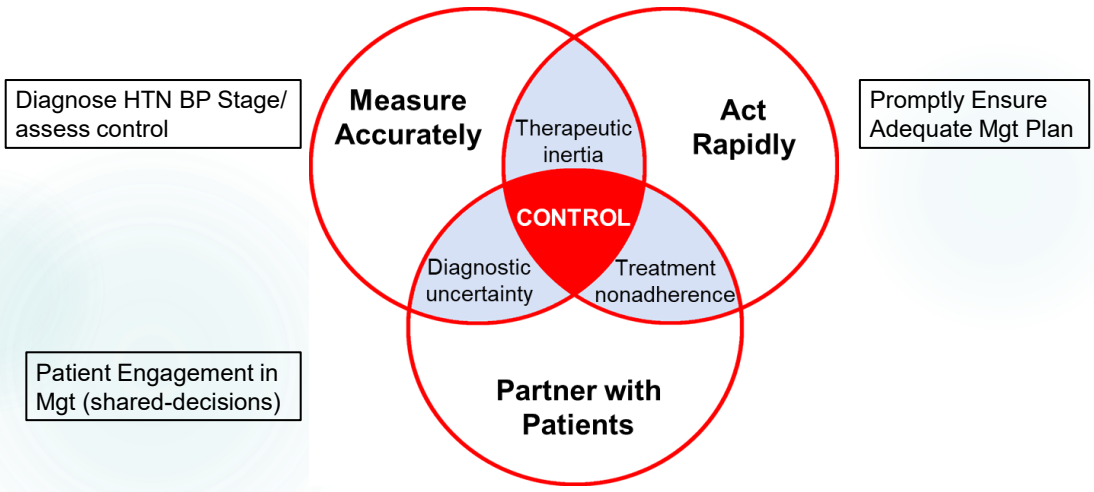
MAP Framework Basic: Measure, Act and Partner



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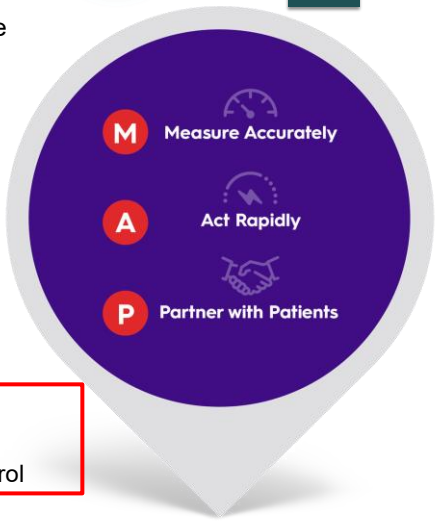
MAP Framework Basic: Measure, Act and Partner

MAP QI framework by AMA, AHA and 2025 High BP Guideline

- **Measure Accurately**
  Obtain actionable data to diagnose HTN & assess control
- **Act Rapidly**
  To ensure an adequate treatment plan
- **Partner with Patients**
  An accurate diagnosis and great treatment plan benefit engaged patients



Why MAP? Clinicians would spend ~27 hours daily implementing evidence-based guidelines (9+ with effective team-based care)[1]

Answer: MAP focuses on 3 efficient processes that drive BP control

1. Porter J, et al. Revisiting the time needed to provide adults primary care. *J Gen Intern Med*. 2023;38:147–55.

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The Time Challenge of Managing One Chronic Condition Is Compounded in Patients with Multiple Chronic Conditions

- Adults with HTN average of 9 chronic conditions with >900 pages of clinical guidelines[1]
- Clinicians would spend ~27 hours daily implementing the guidelines (9+ with team-based care)[2]
- There are ~115 million adults with HTN and another 27 million with elevated BP[3]
- ***Primary care physicians, advanced practice nurses, clinical pharmacists, & physician assistants would spend >30% of their time providing 2 hours of care annually for each person with HTN[4]***

References:

1. AMA IHO unpublished data.
2. *J Gen Intern Med*. 2023;38:147–155.
3. *Hypertension*. 2023;80:1311–1320.
4. KFF. Professionally active primary care physicians. March 2018; AANP NP Fact Sheet, Updated August 2016. NCCPA 2017. 2016 Profile of Certified PAs. August 2016. NCCPA 2017. 2016 Profile of Certified PAs.

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Time Limits and the Clinical Burden of Chronic Disease Management: The Hypertension (HTN) Example

U.S. Primary Care Workforce	
Primary Clinician Type	Number
Internal Medicine	192,907
Family Med / Gen Practice	135,873
Geriatrics	1,335
Advanced Nurse Practitioners	192,944
Physician Assistants	28,811
Clinical Pharmacists	~37,000
Total Primary Care X 0.70	**412,209**

BP Category	# of Adults
Stage 1 / 2 HTN	115 million
Elevated BP	27 million
Total	**142 million**

~344 adults per FTE clinician require evaluation & mgt for BP-related risk

2 hrs/yr of care/Pt would require 688 hrs/yr (>30% of primary care time)!!

References: KFF. Professionally active primary care physicians. March 2018
AANP NP Fact Sheet, Updated August 2016. NCCPA 2017. 2016 Profile of Certified PAs.

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Act Rapidly What Can Be Done to Improve Rx Intensification?

MAP Action Steps

- Repeat (confirm) uncontrolled BP*
- Use evidence-based Rx algorithm
- Combination therapy with single-pill combos
- Team-based care, decision support
- Patient engagement tactics
- *SBP <130 for consistent control to <140/<90*

- Monthly visits (improves RxInt, time to control)
- *Continuity of primary provider*
- *Balance benefit & risk*
- Process data feedback
- Practice champions and facilitators
- *Communicate importance consistent control* !!

* Repeat BP same visit increased probability of Rx intensification but explained only ~1% of variance in TI

Barrett RB, Riesser B, Martin B, Sachdev N, Rakotz MK, Sutherland SE, Egan BM. Treatment in the first month after hypertension diagnosis improves blood pressure control. *Hypertension*. 2025;82:1129-1136.

Martin B, Sutherland S, Rakotz M, Egan B. BP measures and clinical decision-making around antihypertensive RxInt. Hypertension Council 2023; (poster).

Martin B, Sutherland S, Rakotz M, Egan B. Clinician continuity and confirmatory BP measurement lead to higher rates of antihypertensive RxInt. Hypertension Council. 2023;(poster).

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MAP

Measure Accurately

to Insure an Accurate and Representative BP Value

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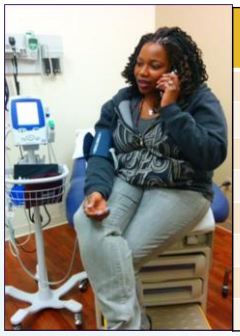
Measure Accurately: Uncertainty BP Value Is 'Real':

Addressing the Issue Has Had Limited Impact on RxInt



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- Specialty clinics typically get higher BPs averaging ~4 mmHg on SBP and BPs

References. 1. Hypertension. 2019;73:e35-366. 2. J Prim Car & Comm Health 2018;9:1-7.
3. *Hypertension*. 2025;82:1129-1136. 4. J Clin Hypertension. 2018;20:1253-59.

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MAP

Act Rapidly

to Promptly Insure

Adequate Treatment

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Use an Evidence-Based Treatment Algorithm† Get Buy-In from ALL CLINICIANS

Step	Regimen – 1 3 pills; 3 meds	Regimen – 2 1 pill; 2 – 3 meds	⁋Regimen 2 pills; 4 meds
1	CCB: Amlodipine 5	Valsartan / Amlodipine 160 / 5	CCB / RASB: Olmesartan / Amlodipine 20 / 5
2	RASB: Lisinopril 20 or Valsartan 160	Valsartan / Amlodipine / HCTZ 160 / 5 / 25	Thiazide / Aldo Antagϕ: HCTZ / Aldactone 25 / 25
3	Diuretic: HCTZ 25 or Chlorthalidone 12.5		

†Rx algorithm consistent with AHA/ACC High BP Guideline Treatment Recommendations

All med doses shown are standard dose or half the recommended maximum dose

* Race, age neutral

⁋ If uncontrolled on 3 BP meds

ϕ Good candidates for aldosterone antagonists have eGFR >50 and serum K+ <4.5

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ARS Question #3

Which of the Following Statements on Single-Pill Combinations (SPCs) of BP Meds Is False?

A. Initial therapy with 2 BP meds in a SPC is recommended as initial treatment for adults with SBP ≥140 mmHg
B. Adding a BP med at half maximum recommended dose lowers BP 3-5 times as much as doubling the dose a current BP med
C. SPCs improve adherence, BP control, and clinical outcomes compared to equivalent free-pill combinations
D. Most patients who are eligible for SPCs are receiving them

AHA/ACC 2025 High BP Guideline Recommendation on Single-Pill Anti-Hypertensive Medication Combinations

Recommendations for Choice of Initial Monotherapy Versus Initial Combination Drug Therapy		
COR	**LOE**	**Recommendations**
I	B-R	In adults with stage 2 hypertension (SBP ≥140 or DBP ≥90), initiation of anti-hypertensive drug therapy with 2 first-line agents of different classes, ideally in a single-pill combination (SPC), is recommended to improve BP control and adherence.1–6

Jones DW, et al. 2025 AHA/ACC High BP Guideline. JACC. 2025;86:1567-1678.

1. Parati G, et al. *Hypertension*. 2021;77:692–705.
2. Wald DS, et al. *Am J Med*. 2009;122:290–300.
3. Wang N, et al. *JAMA Cardiol*. 2023;8:606–611.
4. Schmieder RE, et al. *Hypertens*. 2023;80:1127–35.
5. Verma AA, et al *PLoS Med*. 2018;15:e1002584.
6. Webster R, et al. *JAMA*. 2018;320:566–579.

Why Use Combination Therapy?

- Adding a BP medication at standard dose has ~3x the BP-lowering effect of doubling the dose of an existing medication

Remember 7/9/11 (BP fall with ½, full & double standard dose)

- Most patients with uncontrolled HTN need >1 medication class to reach goal BP

Law MR, Morris JK, Wald NJ. *BMJ.* 2009;338:b1665.
Wang N, Salam A, et al. Lancet. 2025;406:915-925.

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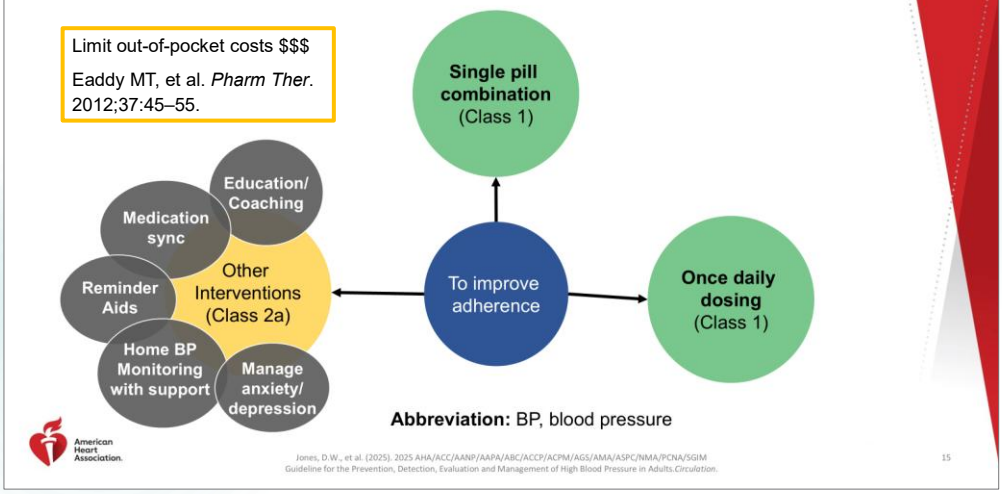
Antihypertension Medication Adherence Strategies

Limit out-of-pocket costs $$$

Eaddy MT, et al. *Pharm Ther.* 2012;37:45–55.



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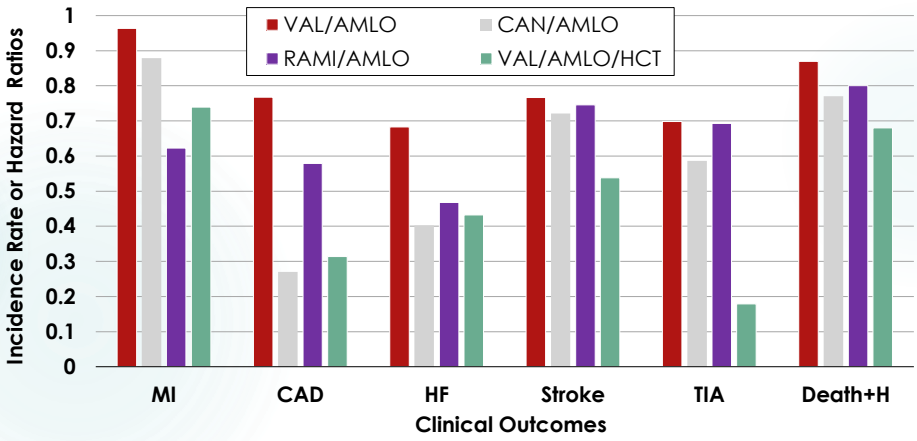
Clinical Outcomes Better When BP Meds Are Filled as Single-Pill than Free Combinations



Schmeider RE, et al. START Study. *Hypertension*. 2023;80:1127–1135.

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Team-Based Care for Adults with Hypertension*

Recommendations for Plan of Care for Hypertension		
COR	LOE	Recommendation
Team-Based Care		
I	A	For adults with uncontrolled hypertension, a team-based care approach is recommended to achieve and maintain BP control.[1-4]

The Kaiser Model and MAP Framework were recommended for improving hypertension control.[6-10]

1. Ogungbe O, et al. *EClinicalMedicine*. 2022;47:101388.
2. He J, et al. *JAMA*. 2017;318:1016–1025.
3. Santschi V, et al. J Am *Heart Assoc*. 2014;3:e000718.
4. Victor RG, et al. *N Engl J Med*. 2018;378:1291–1301.
5. Abdalla M, et al. *Hypertension*. 2023;80:e143-e157.
6. Fontil V, et al. *Circ Cardiovasc Qual Outcomes*. 2018;11:e004386.
7. Jaffe MG, et al. *JAMA*. 2013;310:699–705.
8. Hanlin RB, et al. *J Clin Hypertens (Greenwich)* 2018;20:79–87.
9. Behling EM, et al. *Health Equity*. 2023;7:1,89–99
10. Egan BM, et al. *Hypertension*. 2018;72:1320–1327.

Jones DW, et al. 2025 AHA/ACC High BP Guideline. *JACC*. 2025;86:1567-1678.

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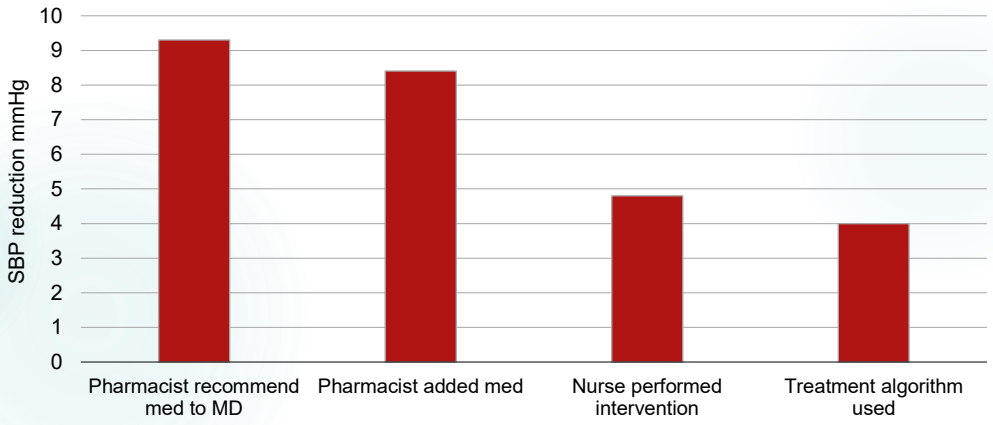
Team-Based Care Can Improve Treatment Intensification and Lower BP



Carter BL, Rogers M, Daly J, Zheng S, James PA. The potency of team-based care interventions for hypertension: a meta-analysis. Arch Intern Med. 2009 Oct 26;169(19):1748-55.

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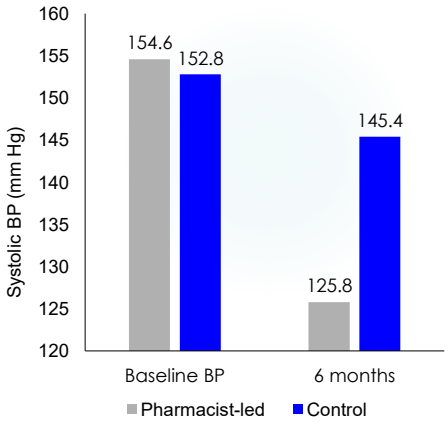
BP Reduction in LA Black Barbershop Study – Pharmacist Led

- Background: uncontrolled HTN common in black men
- Goal: Assess if pharmacist-led intervention providing CMM in black-owned barbershops improved HTN control
- Methods
  - Cluster-randomized trial
  - 319 black males in 52 black-owned barbershops
  - SBP ≥140 mm Hg
- Randomization:
  - Pharmacist-led CMM intervention, monthly f/u(n=132)
  - Active control (n=171)



CMM, Comprehensive Medication Management
BP Rx: CCB/ARB, TLD, Mineralocorticoid antagonist, β-dilator

Victor RG, et al. *N Engl J Med.* 2018;378:1291-1301.

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MAP

Partner with Patients

to Optimize

Patient Self-Management

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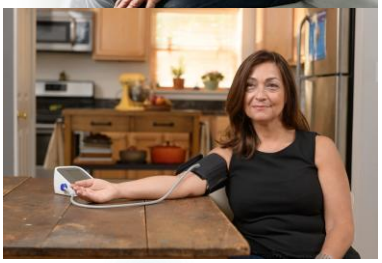
MAP BP: Partner with Patients to Optimize Self-Management

Engaging patients can increase adherence to care plans and improve BP control

- Shared decisions
- Teach Back
- SMBP with relay and support
- Single-pill combinations



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BP Goal for Patients with Hypertension

Recommendations for BP Goal for Patients with Hypertension		
COR	LOE	Recommendation
1	A	In adults with confirmed HTN at increased risk for CVD, an SBP goal of at least <130 mmHg, with encouragement to receive SBP <120 is recommended to reduce the risk of CV event and total mortality.
2b	B-NR	In adults with confirmed hypertension who are not at increased risk* for CVD, an SBP goal of <130 mm Hg, with encouragement to achieve SBP <120 mm Hg, may be reasonable to reduce risk of further elevation of BP.5

Achievement of target BP should be based on an average of ≥2 readings at ≥2 visits, not on an individual BP measurement.

Jones DW, et al. 2025 AHA/ACC High BP Guideline. *JACC*. 2025;86:1567-1678.

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- *Continuity of primary provider*
- *Balance benefit & risk*
- Process data feedback
- Practice champions and facilitators
- *Communicate importance consistent control* !!

* Repeat BP same visit increased probability of Rx intensification but explained only ~1% of variance in TI

Barrett RB, Riesser B, Martin B, Sachdev N, Rakotz MK, Sutherland SE, Egan BM. Treatment in the first month after hypertension diagnosis improves blood pressure control. *Hypertension*. 2025;82:1129-1136.

Martin B, Sutherland S, Rakotz M, Egan B. BP measures and clinical decision-making around antihypertensive RxInt. Hypertension Council 2023; (poster).

Martin B, Sutherland S, Rakotz M, Egan B. Clinician continuity and confirmatory BP measurement lead to higher rates of antihypertensive RxInt. Hypertension Council. 2023;(poster).

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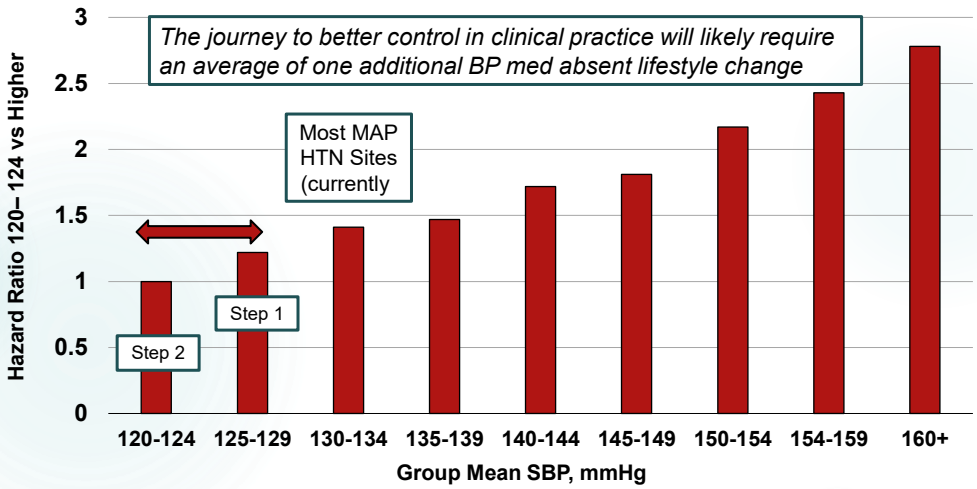
ARS Question #4

Which of the Following Statements About MAP Is False?

A. MAP targets 3 key team-based care processes that drive outcomes including measure accurately, act rapidly, and partner with patients
B. MAP requires a year or more to show clinically relevant improvements in the 3 key processes of care and BP control
C. MAP has improved BP control in resource-limited settings
D. MAP has been endorsed by the AMA, AHA, and is cited in the ACC/AHA 2025 High BP Guideline

Grasping and Conveying the Treatment Goal: CV Outcomes Better When Mean SBP Is <130 than Higher Values



Bundy JD *et al. JAMA Cardiol.* 2017;2:775–781.

Why Use Combination Therapy?

- **Adding a BP med at standard dose has ~3x the BP-lowering effect of doubling the dose of an existing BP med**

Remember 7/9/11 (BP fall with ½, full & double standard dose)

- Most patients with uncontrolled HTN need >1 medication class to reach goal BP

Law MR, Morris JK, Wald NJ. *BMJ.* 2009;338:b1665.
Wang N, Salam A, et al. Lancet. 2025;406:915-925.

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Reframing Goal BP to Align Patients and Providers on the Target

Learning Objectives:

1. Recall turn of the century history on therapeutic inertia and impact on BP control
2. List potential explanations for therapeutic inertia and potential value of targeting mean SBP to optimize heart and brain outcomes
3. Summarize the value of a M.A.P. framework, which includes SPC for improving therapeutic intensification and BP control

What you can do to improve HTN control !!!

Summary:

1. RxINT noted ~1/16 visits in 1999 and ~1/8 in 2008, 2019 & remains too high
2. Understanding that BP control on 80+% visits (mean SBP <130) preserves heart & brain health and can be achieved with fewer pills (SPCs) may help !!
3. (**M**) More accurate & representative BPs reduce RxINT: (**A**) SPCs and team-based care improve RxINT: (**P**) Pt-engagement improves self-mgt.

You can improve HTN control, CV health and healthy aging.

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