Hypertension (HTN)
Quick Reference Guide

Measurement

- Technique used for blood pressure monitoring should adhere to national guidelines[1,2]
- Home blood pressure monitoring (HBPM) important to identify "White Coat" Hypertension (and "Masked Hypertension"– normal reading in office, elevated reading at home)

According to the American Heart Association, follow the below guidelines to ensure an accurate blood pressure reading:

- Quiet room at a comfortable temperature
- No smoking, coffee, or exercise for 30 minutes
- Empty bladder
- Relax for 3-5 minutes
- Back supported and feet flat on the floor
- Arm bare and resting, mid-arm at the heart level
- Cuff selected to fit arm size (small, usual, large)
- Validated electronic upper-arm cuff[5] or manual auscultatory[4]
- Take 3 measurements at 1 minute intervals
  - No talking during and between measurements
  - Use the average of the last 2 measurements

Diagnosis

- Hypertension can be diagnosed when office-based BP ≥140/90 repetitively over 2-3 office visits, at 1-4 week intervals, however diagnosis should be confirmed with out-of-office measurements
- Diagnosis can be made on a single visit, if BP is ≥ 180/110.

Category	Office BP		HBPM
	SBP	DBP	
Normal BP	<120	<80	<120/80
Elevated BP also called "elevated blood pressure"	120-129	80-89	≥120-129 and/or <80
Stage 1 hypertension	130-139	80-89	≥130-139 and/or ≥80-89
Stage 2 hypertension	≥140	≥90	≥135 and/or ≥85

Note: Home BP of 135/85 is equivalent to office BP of 140/90

ASCVD risk calculator:

EPIC dotphrase .ASCVDRISK
https://tools.acc.org/ASCVD-Risk-Estimator-Plus/#!/calculate/estimate/

Initial Evaluation

- Confirm diagnosis with out-of-office measurement stage of hypertension
- Laboratory testing should include: basic metabolic panel, lipids, U/A, and EKG, with additional testing, as warranted, to detect/confirm HTN mediated organ damage (i.e. retinal imaging)
- Consider evaluation for secondary causes of HTN (primary aldosteronism, renovascular, drugs/meds, sleep apnea, CKD, and others), if indicated
- Calculate 10-yr risk of a first ASCVD event (Note: CKD patients are high risk patients)
- Assess other relevant comorbid conditions and complications of HTN

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Medication Initiation Threshold

Blood Pressure	Risk profiles and Comorbid Disorders
≥ 140/90	Any ACSVD
≥ 130/80	ACSVD risk ≥10% Known CAD, prior stroke or TIA HFpEF HFrEF and achieved maximally tolerated doses of GDMT Diabetes mellitus Chronic kidney disease Chronic obstructive pulmonary disease

Pharmacologic Initiation Threshold

- Includes lifestyle modification promoting a healthy diet, limited alcohol and caffeine consumption, weight reduction, tobacco cessation, regular exercise, stress management, and avoiding medications/drugs that increase BP
- Patients with BP between 130-139/80-89 and 10-yr risk for ASCVD risk <10% can be managed with non-pharmacologic therapy, while those with risk >10% should also receive medication
- A BP decrease of 20/10 mmHg associated with a 50% decrease in cardiovascular risk
- Single-pill combinations should be used as the first line of pharmacological treatment whenever available as they are associated with better adherence and persistence than multi-pill regimens
- Use once-daily regimens providing 24-hour blood pressure control, whenever possible.
- Recognize/address behavioral health disorders and social determinants of health. Screen with PHQ 2/9 annually.
- Often both office-based and HBPM results are useful to guide treatment (see link for home devices https://www.validatebp.org/)[3]
- Evaluate/promote medication adherence at each visit, prior to escalation of treatment
  - Prescribe 90-day fills if appropriate
- Both video and telephone-only visits can be effectively utilized for HTN management
  - Have patients secure readings leading up to appointment
  - Providers should appropriately document in EMR (may be utilized for quality measurement).

Resistant Hypertension

Resistant hypertension is defined as persistent, appropriately measured, BP ≥140/90 mmHg in a patient treated with three or more antihypertensive medications, including a diuretic, on optimal (or maximally tolerated) doses OR controlled BP on 4 agents.

- **Treatment**
  - Optimize lifestyle modification and medication adherence
  - Reassess possible secondary causes of hypertension
  - If GFR <30 or volume overloaded, use a loop diuretic
  - Add a low dose of spironolactone if K <4.5 mmol/L and GFR >45 ml/min. If contraindicated/not tolerated, use eplerenone or potassium-sparing diuretic (assess renin/aldo level)
  - Other additional treatments include doxazosin, clonidine, hydralazine, beta-blockers or other available antihypertensive class not already in use
  - Giving one antihypertensive medication in the evening may address end-of-dose effect

Diagnosis

Single office BP measurement

- Normal BP level: (120/80 mmHg) or Elevated BP: (120-129/ <80)
  - Remeasure after 3 years (1 year in those with other risk factors)
- Stage 1 Hypertension BP level: (130-139/80 mmHg)
- Stage 2 Hypertension BP level: (≥140/90 mmHg)

Take 2 more readings. Use the average of the second and third.

≥ 130/85 mmHg

Remeasure in 2-3 office visits. If possible confirm with home BP monitoring.

Repeated office BP ≥130/80 mmHg indicates hypertension

* Use a validated upper arm cuff device with appropriate cuff size for the individual patient

Evaluation

History & Physical Exam
- Exclude drug-induced hypertension
- Evaluate for organ damage
- Assess total CV risk
- Search for symptoms/signs of secondary hypertension

Lab Tests
- Serum sodium, potassium, & creatinine
- Lipid profile & glucose
- Urine dipstick
- 12 lead ECG

Additional Tests
If necessary for suspected organ damage or secondary hypertension

Treatment

LIFESTYLE INTERVENTIONS
- Stop smoking
- Regular exercise
- Lose weight
- Salt reduction
- Healthy diet and drinks
- Lower alcohol intake

Stage 1 Hypertension: ≥ 130/80 mmHg

Stage 2 Hypertension: ≥ 140/90 mmHg

Drug Therapy Steps
- Preferred medications for Stage 1: thiazide diuretic, ACE/ARB, or CCB
- Preferred medications for Stage 2: single pill combination ACE/ARB + thiazide or ACE/ARB + CCB
- Consider monotherapy in low-risk grade 1 hypertension and in patients aged >80 years or frail.
- Simplify regimen with once daily dosing and single pill combinations.

Monitoring

Target
- Reduce BP by at least 20/10 mmHg, ideally to <140/90 mmHg
- Individualize for elderly based on frailty

Monitor
- BP control (achieve target within 3 months)
- Adverse effects
- Long-term adherence

Referral
- If BP still uncontrolled, or other issue, refer to care provider with hypertension expertise

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Common Indications for Specialty Referral

- **Nephrology**
  - Resistant hypertension
  - To clarify the cause and treatment of co-morbid CKD and management of related complications
- **Endocrinology**
  - Evaluation and treatment of endocrine causes of secondary hypertension
  - Treatment of other poorly controlled endocrine disorders that impact HTN care (DM, hyper/hypothyroidism, hypogonadism)
- **Cardiology**
  - For treatment of concomitant cardiac disease (CAD, HF, Afib)
  - Assessment/treatment of renovascular hypertension

MSHS Disease Management Services to Support Patients with Hypertension

Clinical Pharmacists: Available in several primary care and specialist offices where they play a central role in management of common chronic illnesses (HTN, DM, HF, COPD) through therapeutic optimization and clinical coaching

Remote Patient Monitoring: Mount Sinai Health Partners Condition Management Program is available live at over 30+ primary care and specialty practices across the system for patients with uncontrolled hypertension, depending on patient insurance. Patients receive Bluetooth-connected blood pressure cuffs and are managed by a team of clinical pharmacists and dietitians in collaboration with referring physicians. Patients can be referred using the "Referral to Condition Management Department" order in Epic and depends on patient insurance.

Cost Sharing for Services

- **Traditional Medicare:** 80/20 coinsurance split
- **Medicare + Secondary:** 20% coinsurance is typically offset by secondary
- **Healthfirst Medicaid is covered, as is UMR**

Certified Diabetes Educators (CDE/Wellness Coaches): Embedded in many primary care offices to assist in patient self management for patients with Diabetes and HTN

Care Management: Available to assist all primary care providers in management of patients with poorly controlled HTN due to medication non-adherence, missed appts, psychosocial issues, financial constraints, and/or poor access to community-based programs. Patients can be referred in Epic by ordering a "Referral to Care Management", via email (**mshpcmreferral@mountsinai.org**), or via phone 212-241-7228

Behavioral Health: Patients diagnosed with depression/other BH disorders should be treated, either locally or referred for psychiatric services

References

1. Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. Hypertension. 2020;75:1334–1357.
2. Whelton PK, Carey, RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCMA 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:e127-248.
3. American Medical Association (AMA) convened an Independent Review Committee, composed of members who are experts in the hypertension field, to assess whether a BP measurement device satisfied the Validated Device Listing Critera, 2021
4. For manual auscultatory devices the inflatable bladder of the cuff must cover 75-100% of the individual's arm circumference. For electronic devices, use cuffs according to device instructions.
5. See validated electronic devices lists at www.stridebp.org or validatebp.org.