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"– reading lower than usual in office).

Diagnosis

- Hypertension is diagnosed when office-based BP ≥140/90 repetitively over 2-3 office visits, at 1-4 week intervals
- Diagnosis can be made on a single visit, if BP is ≥ 180/110 with evidence of CVD.
- Isolated Systolic Hypertension is defined as SBP ≥140 with a normal DBP

Category	Office BP		HBPM
	SBP	DBP	
Normal BP	<130	<85	<135 and/or <85
High-normal BP	130-139	85-89	≥135 and/or ≥85
Stage 1 hypertension	140-159	90-99	≥135 and/or ≥85
Stage 2 hypertension	≥ 160	≥ 100	≥135 and/or ≥85

ASCVD risk calculator:

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

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)[4]
- Validated electronic upper-arm cuff[5] or manual auscultatory
- Take 3 measurements at 1 minute intervals
  - No talking during and between measurements
  - Use the average of the last 2 measurements

Initial Evaluation

- Confirm diagnosis and 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
- Evaluate 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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BP Measurement Plan According to Office Blood Pressure Levels		
<130/85	130-169/85-99	>160/100
Remeasure within 3 years (1 year in those with other risk factors)	If possible, confirm with out-of-office blood pressure measurements (assessing for white coat HTN, improper office measurement). Alternatively confirm with repeated office visits	Confirm within a few days or weeks

Treatment Targets

- Achieve patient specific treatment targets, taking into account co-morbidities, estimated longevity, risk of hypotension, adherence, and cost.

Target BP	Risk profiles and Comorbid Disorders
<140/90	ACSVD risk <10%
<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

Treatment Recommendations

- Includes lifestyle modification promoting a healthy diet, limited alcohol and caffeine consumption, weight reduction, cessation of tobacco use, regular exercise, stress management, and avoiding medications/drugs that increase BP
- Patients with High-Normal BP 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
- First-line treatment should include single pill, combination pill, or multiple pills using a CCB + ARB/ACE or in Black patients, a thiazide-like diuretic + CCB or CCB + ARB.
- ARBs (not ACE) should be used in Black patients as angioedema is ~3X more common with ACE inhibitors in these patients
- 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
- Both video and telephone-only visits can be effectively utilized for HTN management
  - Have patients secure readings that day
  - Providers should appropriately document in EMR (may be utilized for quality measurement).

Diagnosis

Single office BP measurement

- Normal BP level: (<130/85 mmHg)
  - Remeasure after 3 years (1 year in those with other risk factors)
- High-normal BP level: (130-139/85-89 mmHg)
- 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 ≥140/90 mmHg indicates hypertension, particularly if home BP ≥135/85 mmHg.

* 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

Grade 1 Hypertension: 140-159/90-99 mmHg
1. Start lifestyle interventions
2. Start drug treatment in:
   – High risk patients (CVD, CKD, diabetes, organ damage, or aged 50-80 years)
   – All others with persistent BP elevation after 3-6 months of lifestyle intervention

Grade 1 Hypertension: ≥160/100 mmHg
1. Start drug treatment immediately
2. Start lifestyle intervention

Drug Therapy Steps
- Use any drugs available and include as many of those below as possible.
- 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.

Non-Black Patients
1. Low dose ACEI/ARB + DHP-CCB
2. Increase to full dose
3. Add thiazide/thiazide-like diuretic
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplenerone, clonidine or beta-blocker

Black Patients
1. Low dose ARB + DHP-CCB or DHP-CCB + thiazide/thiazide-like diuretic
2. Increase to full dose
3. Add diuretic or ARB/ACEI
4. Add spironolactone or, if not tolerated or contraindicated, amiloride, doxazosin, eplenerone, cloonidine, or beta-blocker

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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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

- **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
  - 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

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. 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.

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.