# Hypertension in 2026

What's New, What's Changed, What Primary Care Needs to Know

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# Objectives

At the end of this session, participants will be able to:

- Describe key updates in the 2025 ACC/AHA hypertension guideline compared to 2017
- Apply risk-based treatment decisions using the PREVENT risk calculator
- Implement updated recommendations for diagnosis, treatment and follow-up

CLINICAL PRACTICE GUIDELINE

# 2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ACPM/AGS/AMA/ASPC/NMA/PCNA/SGIM 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 Joint Committee on Clinical Practice Guidelines

Developed in Collaboration With and Endorsed by American Academy of Physician Associates; American Association of Nurse Practitioners; American College of Clinical Pharmacy; American College of Preventive Medicine; American Geriatrics Society; American Medical Association; American Society of Preventive Cardiology; Association of Black Cardiologists; National Medical Association; Preventive Cardiovascular Nurses Association; and the Society of General Internal Medicine.

## Class (Strength) of Recommendation

| Class | Interpretation | Benefit vs Risk | Suggested Wording |
|---|---|---|---|
| **Class 1** | Strong recommendation | **Benefit >>> Risk** | • Recommended / indicated • Should be performed • Clear benefit |
| **Class 2a** | Moderate recommendation | **Benefit >> Risk** | • Reasonable to perform • Likely beneficial • Preferred option |
| **Class 2b** | Weak recommendation | **Benefit ≥ Risk** | • May be considered • Benefit uncertain • Evidence less established |
| **Class 3 (No Benefit)** | Not useful | **Benefit = Risk** | • Not recommended • No proven benefit • Should not be performed |
| **Class 3 (Harm)** | Harmful intervention | **Risk > Benefit** | • Harmful • Causes morbidity/mortality • Should not be performed |

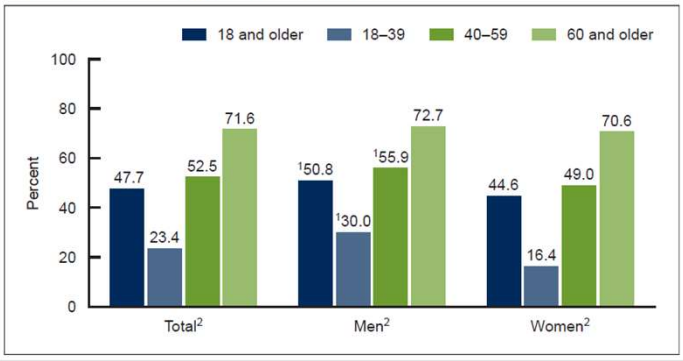
## Level (Quality) of Evidence

| Level | Source of Evidence | Evidence Quality | Key Description |
|---|---|---|---|
| **Level A** | Multiple RCTs / Meta-analyses | High | • Data from >1 randomized controlled trial • High-quality meta-analyses • Consistent, well-validated findings |
| **Level B-R** | Randomized studies | Moderate | • Evidence from ≥1 RCT • Moderate-quality meta-analyses |
| **Level B-NR** | Nonrandomized studies | Moderate | • Well-designed observational or registry studies • Nonrandomized data with consistent results |
| **Level C-LD** | Limited data | Low | • Studies with design or execution limitations • Small or heterogeneous datasets |
| **Level C-EO** | Expert opinion | Very low | • Consensus based on clinical experience |

# Why care about hypertension?

- Hypertension is the most prevalent modifiable CVD risk factor
- Leading cause of death and disability worldwide

**Figure 1. Prevalence of hypertension in adults age 18 and older, by sex and age: United States, August 2021–August 2023**

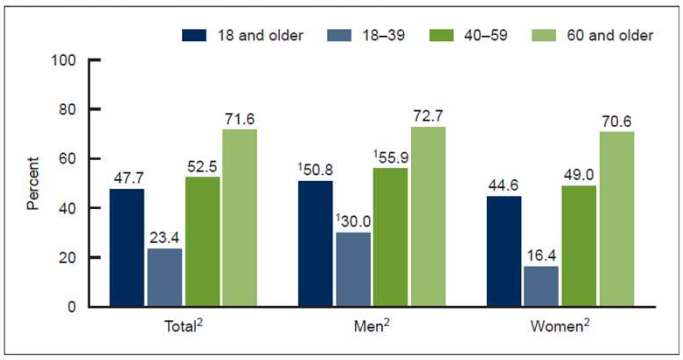



SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, August 2021–August 2023.

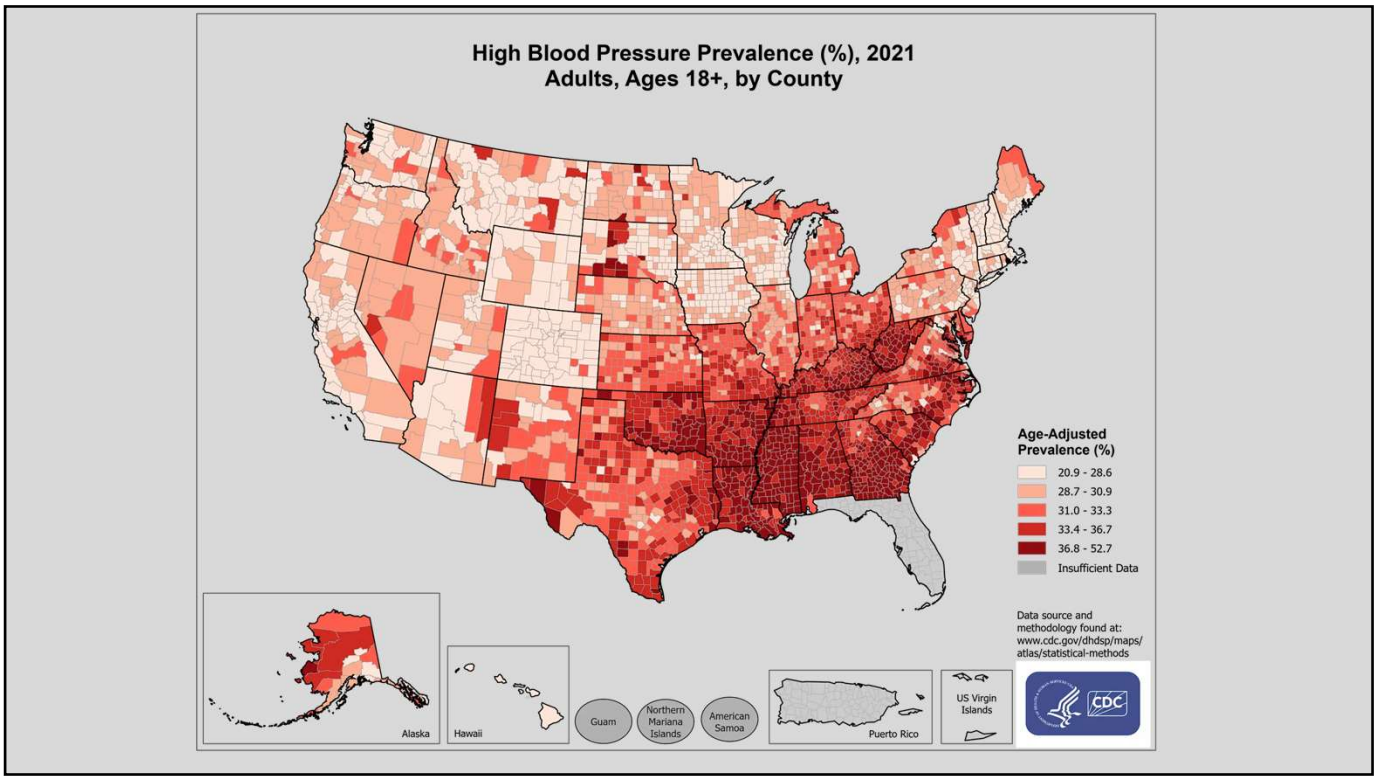
# Why care about hypertension?

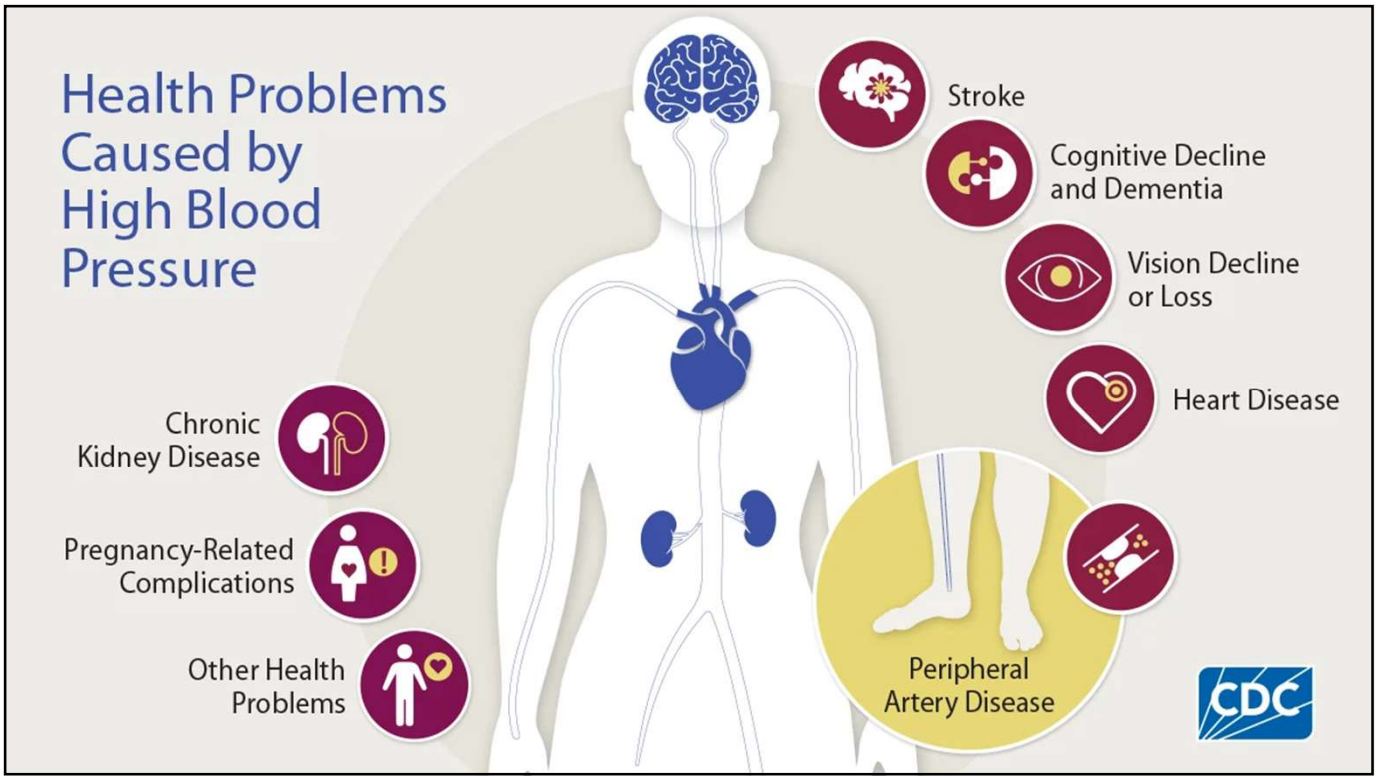
- Prevalence of HTN is increasing
- Nearly half of all American adults will develop HTN

**Figure 1. Prevalence of hypertension in adults age 18 and older, by sex and age: United States, August 2021–August 2023**



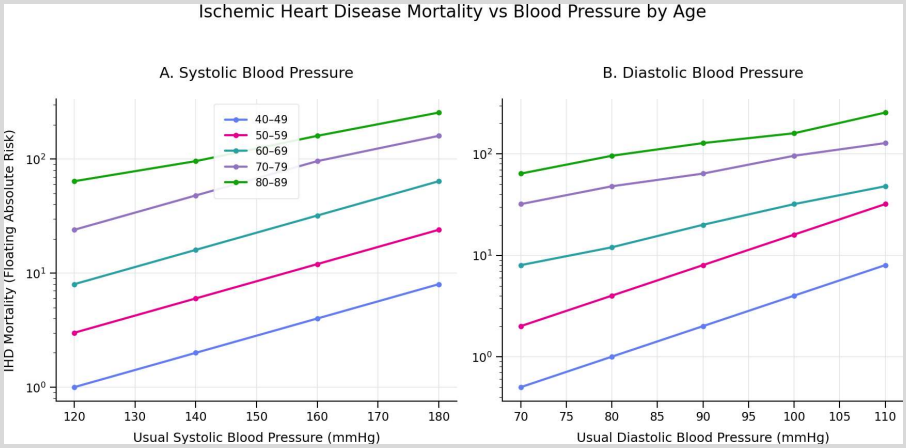

SOURCE: National Center for Health Statistics, National Health and Nutrition Examination Survey, August 2021–August 2023.


High Blood Pressure Prevalence (%), 2021
Adults, Ages 18+, by County
Age-Adjusted Prevalence (%)
20.9 - 28.6
28.7 - 30.9
31.0 - 33.3
33.4 - 36.7
36.8 - 52.7
Insufficient Data
Data source and methodology found at: www.cdc.gov/dhdsp/maps/atlas/statistical-methods
Alaska
Hawaii
Guam
Northern Mariana Islands
American Samoa
Puerto Rico
US Virgin Islands
CDC


Health Problems Caused by High Blood Pressure
Stroke
Cognitive Decline and Dementia
Vision Decline or Loss
Heart Disease
Peripheral Artery Disease
Chronic Kidney Disease
Pregnancy-Related Complications
Other Health Problems
CDC

# Why care about hypertension?

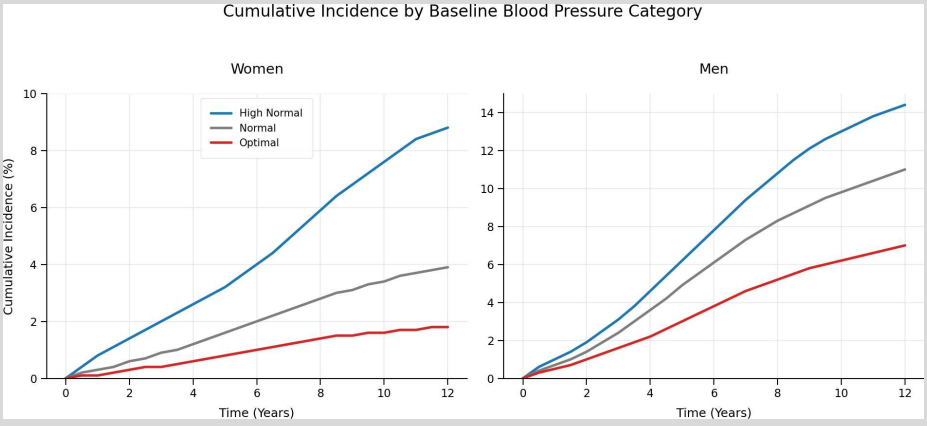
- Cardiovascular disease
- Stroke
- Kidney disease
- Dementia




Illustrative re-creation of published ischemic heart disease mortality–blood pressure relationships; values digitized and approximated from original figures for presentation purposes

Lewington S, et al. Age-specific relevance of usual blood pressure to vascular mortality: A meta-analysis of individual data for one million adults in 61 prospective studies. (The Lancet 2002:360:1903–13).

# Cumulative Cardiovascular Risk over Time




Illustrative re-creation of published cumulative incidence curves; values digitized and approximated from original figures for presentation purposes

*Vasan RS, et al. Impact of high-normal blood pressure on risk of cardiovascular disease.* N Engl J Med *2001;345:1291–7.*

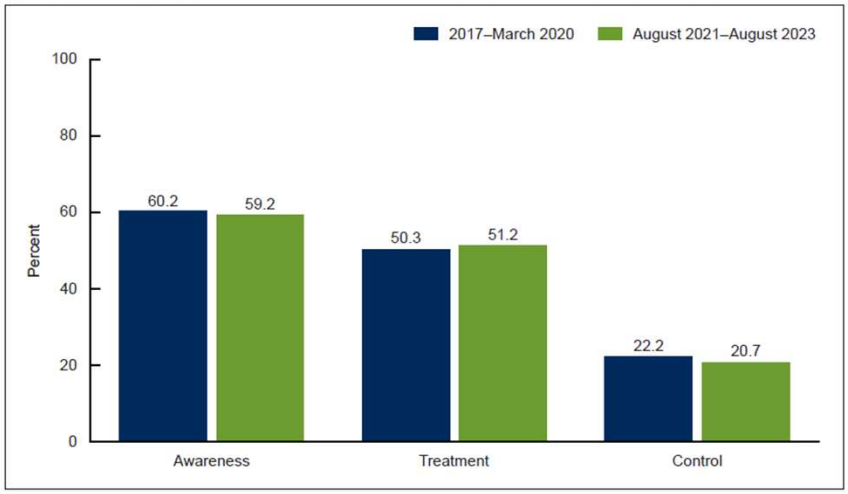
# Why care about hypertension?

**$131 Billion**

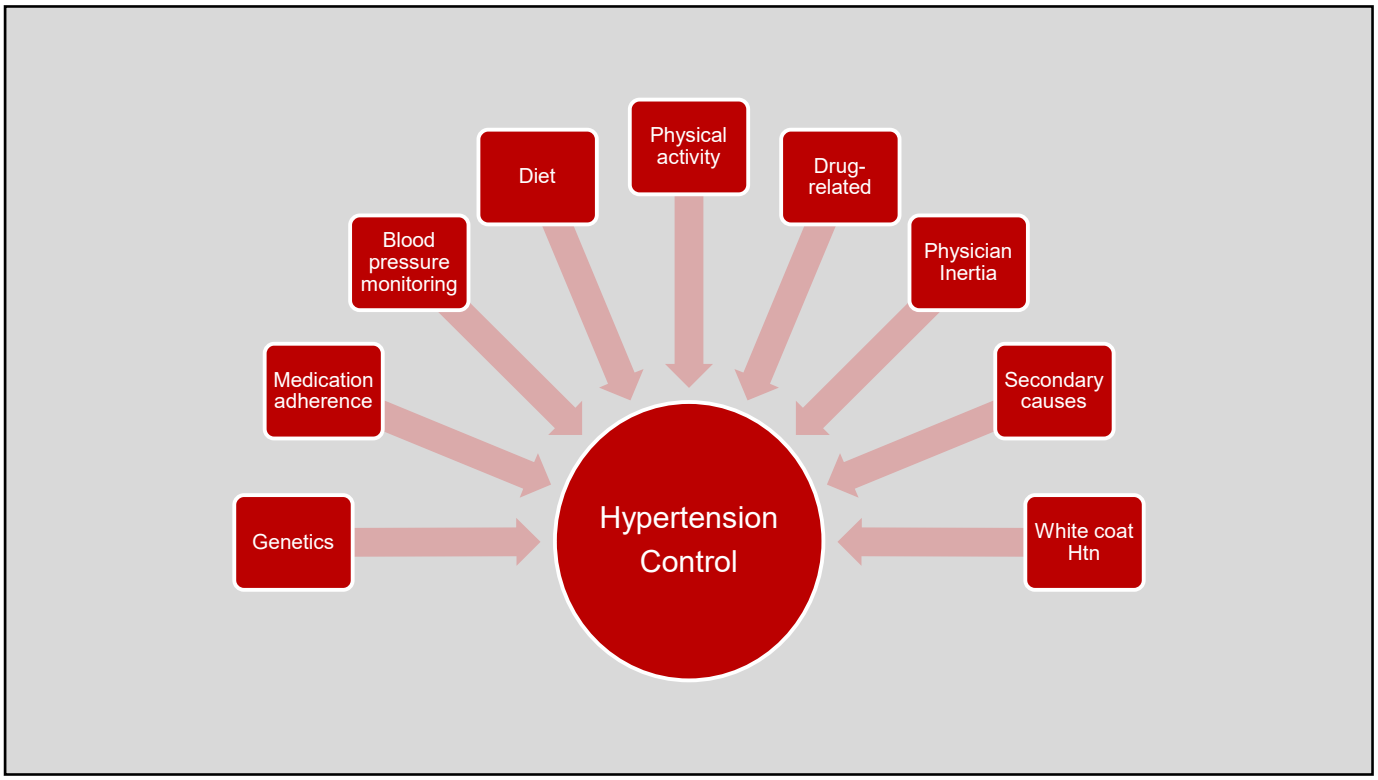
Annual cost to U.S. healthcare spending

# Hypertension treatment and control

**Figure 5. Prevalence of hypertension awareness, treatment, and control among adults age 18 and older with hypertension: United States, 2017–March 2020 and August 2021–August 2023**




**Source:** NHANES 2017–2020 and August 2021–August 2023; NCHS Data Brief No. 511 (CDC)




# Definition of Hypertension

Unchanged from 2017 guidelines

| | Systolic BP | | Diastolic BP |
|---|---|---|---|
| **Normal BP** | <120 mmHg | And | <80 mmHg |
| **Elevated BP** | 120-129 mmHg | And | <80 mmHg |
| **Hypertension** | | | |
| **Stage 1** | 130-139 mmHg | Or | 80-89 mmHg |
| **Stage 2** | ≥140 mmHg | Or | ≥90 mmHg |

BP is based on **average of ≥2 careful readings** obtained on **≥2 occasions**

# Diagnosis

- Accurate office BP remains important
- Out-of-office BP confirmation is emphasized

| | |
|---|---|
| Class 1 | When diagnosing and managing high BP in adults, standardized methods are recommended for the accurate measurement |
| Class 2a | When measuring in-office BP, it is reasonable to use an automated device over the auscultatory method |
| Class 1 | Out-of-office BP measurements by either APBM or HBPM are recommended to confirm hypertension |
| Class 1 | HBPM is recommended for monitoring the titration of BP-lowering medication |


# White-coat and Masked Hypertension

| | Healthcare setting BP | Home BP |
|---|---|---|
| **Normotensive** | No hypertension | No hypertension |
| **Sustained hypertension** | Hypertension | Hypertension |
| **White coat hypertension** | Hypertension | No hypertension |
| **Masked hypertension** | No hypertension | Hypertension |

- Still important to assess for white-coat and masked htn
- White coat HTN has no significant increased risk of CVD
- White coat effect is NOT associated with increased CVD event and mortality.

# White-coat and Masked Hypertension

| | |
|---|---|
| Class 2a | In adults with untreated office SBP ≥130 mmHg or DBP ≥80 mmHg, and without office SBP ≥160 mmHg or DBP ≥100 mmHg, it is reasonable to exclude white-coat hypertension using out-of-office BP monitoring before a diagnosis of hypertension is made. |
| Class 2a | In adults with white-coat hypertension or masked hypertension, out-of-office BP monitoring is reasonable to exclude transition to a diagnosis of sustained hypertension |
| Class 2a | In adults with apparent treatment resistant hypertension on office BP, it is reasonable to exclude white-coat effect using out-of-office BP monitoring |
| Class 2a | In adults on BP medications with SBP ≥130 mmHg or DBP ≥80 mmHg and without office SBP ≥160 mmHg or DBP ≥100 mmHg, it is reasonable to exclude white-coat effect using out-of-office BP monitoring |

# Proper Home Blood Pressure Monitoring

- Use a device that has been validated for accuracy (www.validatebp.org)
- Use the correct cuff size for arm
- Avoid smoking, caffeine, or exercise within 30 minutes before BP measurement
- Place cuff on a bare arm above bend of elbow
- Arm supported at level of heart
- Sit in chair with feet on floor, legs uncrossed, back supported for at least 5 minutes
- Do not talk, use phone, or watch TV while measuring
- Take 2 readings 1 minute apart twice a day (total of 4 readings): 2 readings in the morning after emptying bladder and before medication and 2 readings at bedtime

| | Effect on SBP |
|---|---|
| Acute alcohol use | -24 to +24 mmHg |
| Acute caffeine use | +3 to +14 mmHg |
| Acute nicotine use | +3 to +25 mmHg |
| Bladder distension | +4 to +33 mmHg |
| Legs crossed | +2 to +15 mmHg |
| Small BP cuff | +2 to +11 mmHg |
| No resting period | +4 to +11 mmHg |
| Talking while measuring | +4 to +19 mmHg |
| Unsupported arm or cuff too low | +4 to +23 mmHg |

*Kallioinen et. al. Sources of inaccuracy in the measurement of adult patients' resting blood pressure in clinical settings: a systematic review. Journal of Hypertension 2017, 35:421-441.*

# Cuffless BP Monitors

- Numerous new personal and wearable devices for **estimating** BP
- Rings, bracelets, watches, smartphones, smart glasses, chest patches, and toilet seat!
- Several have FDA clearance
- Cardiac sensor (ECG, impedance cardiogram) and pulsatility sensor (photoplethysmography, tonometry)
- Requires periodic calibration with cuff BP measurement or demographic data
- Lack of standardized validation process for wide variety of devices

| | Recommendation for Cuffless BP Devices |
|---|---|
| Class 3 (no benefit) | In adults, the use of cuffless BP devices is not recommended for the diagnosis or management of high BP |

New

# Evaluation

| | |
|---|---|
| Class 1 | For adults who are diagnosed with hypertension, laboratory tests (CBC, chemistry, lipid, A1c, TSH, UA, UACr) and 12-lead ECG should be performed to optimize management |
| Class 1 | In adults with hypertension, screening for specific forms of secondary hypertension is recommended when clinical suspicion is present to increase rates of detection, diagnosis, and specific targeted therapy |
| Class 1 | In adults with resistant hypertension, screening for primary aldosteronism is recommended regardless of whether hypokalemia is present to increase rates of detection, diagnosis, and specific targeted therapy. |
| Class 2a | In adults who have a positive screening test for a form of secondary hypertension, referral to a clinician who has expertise in that form of hypertension is reasonable for diagnostic confirmation and treatment |

New

Upgraded from 2b

# Secondary causes of hypertension

- Can be sole cause or contributing cause
- Estimated in 5-25% of all hypertension, higher in resistant hypertension.

| Common causes | Uncommon causes |
|---|---|
| **Renal parenchymal disease** (CKD, urinary obstruction): 14% | Pheochromocytoma: <0.6% in all HTN, up to 4% in RH |
| **Renovascular disease** (atherosclerosis, FMD): 0.1-5% | Cushing's syndrome: <0.1% |
| **Primary aldosteronism**: 5-25% | Hypo and hyperthyroidism: <1% |
| **OSA**: 25-50% | Aortic coarctation: 0.1% |
| **Drug or alcohol induced**: 2-20% | Hyperparathyroidism, acromegaly, congenital adrenal hyperplasia: rare |

# When to consider secondary causes?

- Resistant hypertension
- Abrupt onset hypertension
- Exacerbation of previously controlled hypertension
- Onset of hypertension at <30 yo
- End organ damage disproportionate to htn duration/severity
- Accelerated/malignant hypertension
- Onset of diastolic hypertension in older adults (>65yo)
- Signs or symptoms suggestive of a specific cause
  - Unprovoked or excessive hypokalemia
  - Insomnia or daytime sleepiness
  - Concomitant adrenal nodule

| | Signs and symptoms | Screening tests | Additional tests |
|---|---|---|---|
| **Renovascular** | Abrupt onset or worsening htn; labile htn; flash pulm edema | Renal duplex, MRA, CTA | Renal artery angiography |
| **Aldosteronism** | Hypokalemia | Plasma aldosterone/renin ratio | Sodium loading test, adrenal CT, adrenal vein sampling |
| **OSA** | Snoring, daytime fatigue | Overnight oximetery, Epworth score | Polysomnography |
| **Pheochromocytoma** | Labile BP, “spells” | 24hr urine metanephrines (low suspicion), plasma metanephrines (high suspicion) | CT or MRI of abdomen/pelvis |
| **Cushing’s** | Rapid weight gain, cushinoid features, prox muscle weakness | Overnight dexamethasone suppression test | 24hr urinary cortisol, midnight salivary cortisol |
| **Coarctation** | Htn in <30yo | Echo | CT or MRA |

# Medications and Substances that Elevate BP

| Nonprescription drugs/substances | Prescription drugs |
|---|---|
| • Alcohol<br>• Caffeine<br>• NSAIDs<br>• Decongestants (phenylephrine, pseudoephedrine)<br>• Herbal supplements (Ma Huang, ephedra, St. John's wort)<br>• Black licorice<br>• Recreational drugs (bath salts, cocaine, methamphetamine) | • Amphetamines<br>• Antidepressants (SNRIs, TCAs, MAOIs)<br>• Atypical antipsychotics (risperidone, olanzapine)<br>• Immunosuppressants (cyclosporine)<br>• Oral contraceptives (estrogen containing)<br>• Systemic corticosteroids<br>• Angiogenesis inhibitor (bevacizumab)<br>• Tyrosine kinase inhibitors<br>• Withdrawal of central-acting sympatholytic drugs (clonidine, tizanidine) |

# Primary Aldosteronism

- Inappropriate production of aldosterone
  - Intravascular volume expansion
  - Sodium retention
  - Potassium excretion
- Hypokalemia present in 9-37% of cases
- 2/3 due to bilateral adrenal hyperplasia and 1/3 due to unilateral aldosterone production
- 5-10% of patients with stage 1 Htn and 11-22% with stage 2 Htn
- PA is associated with increased risk of end organ damage (HF, stroke, CAD, AF, CKD) compared with primary hypertension
- Treated with MRA (spironolactone or eplerenone) or adrenalectomy

## Primary Aldosteronism

| | |
|---|---|
| Class 1 | In adults with hypertension, screening for primary aldosteronism is recommended in the presence of any of the following conditions: resistant hypertension (regardless of whether hypokalemia is present), hypokalemia (spontaneous or diuretic induced), OSA, incidental adrenal mass, family history of early-onset hypertension, or stroke at young age (<40y) |
| Class 2b | In adults with stage 2 hypertension, screening for primary aldosteronism may be considered to increase rates of detection, diagnosis, and specific targeted therapy. |
| Class 1 | Use of plasma aldosterone, renin activity, and the plasma aldosterone to renin activity ratio is recommended for initial screening. |
| Class 1 | In adults with positive screening test or continued suspicion for PA based on suppressed renin, referral to hypertension specialist or endocrinologist is recommended for further evaluation and treatment |

New

1. Suppressed renin
2. PAC >10 ng/dL
3. Aldosterone renin ratio >30 (using ng/dL for PAC and ng/mL/h for PRA)

## Primary Aldosteronism

| | |
|---|---|
| Class 1 | In adults with an indication for screening for primary aldosteronism, it is recommended to continue most antihypertensive medications (other than MRAs) prior to initial screening to minimize barriers to or delays in screening. |

New

| | EFFECT ON ALDOSTERONE | EFFECT ON RENIN | EFFECT ON ARR |
|---|---|---|---|
| β-adrenergic blockers | ↓ | ↓↓ | ↑ (FP) |
| Central $\alpha_2$-agonists | ↓ | ↓↓ | ↑ (FP) |
| NSAIDs | ↓ | ↓↓ | ↑ (FP) |
| $K^+$-wasting diuretics | ↓ / ↑ | ↑↑ | ↓ (FN) |
| $K^+$-sparing diuretics | ↑ | ↑↑ | ↓ (FN) |
| ACE inhibitors | ↓ | ↑↑ | ↓ (FN) |
| ARBs | ↓ | ↑↑ | ↓ (FN) |
| Dihydropyridine CCB | → or ↓ | ↑ | ↓ (FN) |
| Renin inhibitors | ↓ | ↓ | ↑ (FP) |

## BP Management: Lifestyle and Psychosocial

- Weight
- Diet and nutrients
- Alcohol
- Physical activity
- Stress reduction

## Weight

| | |
|---|---|
| Class 1 | In adults who have overweight or obesity, weight loss is recommended with a goal of **at least 5% of body weight reduction** to prevent or treat elevated BP and hypertension. |

- BP reduction occurs with weight loss, regardless of mechanism (lifestyle, cognitive behavioral therapy, medication, surgery)
- Expect 1mmHg reduction in BP for every 1 kg of weight loss

# Weight

| | |
|---|---|
| Class 2b | In adults with hypertension who also have overweight or obesity with a BMI ≥27 kg/m$^2$, incretin mimetics **(e.g. GLP-1 receptor agonists**) when used for weight management may be effective as an adjunct to lower BP. |
| Class 2b | In adults with hypertension who also have obesity with a BMI ≥35 kg/m$^2$, bariatric surgery (when considered for weight loss) in combination with behavioral interventions and antihypertensive therapies may be effective at lowering BP. |

New

New

- Use of GLP-1 receptor agonists reduce BP in patients with excess weight and without diabetes.
- Roux-en-Y gastric bypass is effective at improving BP

# Diet

| | |
|---|---|
| Class I | **In adults with or without hypertension**, a heart-healthy eating pattern, such as DASH eating plan, is recommended to prevent or treat elevated BP and hypertension. |
| Class I | In adults with or without hypertension, reduction of dietary sodium intake is recommended to <2,300 mg/day moving toward an ideal limit of <1,500 mg/day |
| Class 2a | In adults with or without hypertension, potassium-based salt substitutes can be useful to prevent or treat elevated BP and hypertension, particularly for patients in whom salt intake is related mostly to food preparation or flavoring at home, except in the presence of CKD or use of drugs that reduce potassium excretion. |
| Class I | In adults with elevated BP or hypertension, moderate potassium supplementation (<80mEq/day), ideally from dietary sources, is recommended to prevent or treat elevated BP and hypertension, except in the presence of CKD or use of drugs that reduce potassium excretion. |

New

# Alcohol

| | |
|---|---|
| Class 1 | Adults with or without hypertension who currently consume alcohol should be advised to pursue **a recommended goal of abstinence**, or at least to reduce alcohol intake to ≤1 drink/day for women and ≤2 drinks/day for men to prevent and treat elevated BP and hypertension. |

New emphasis on abstinence

Greater BP reduction in those with higher baseline alcohol intake

# Physical Activity

| | |
|---|---|
| Class 1 | In adults with or without hypertension, increasing physical activity, through a structured exercise program that includes aerobic exercise and/or resistance training, is recommended to prevent or treat elevated BP and hypertension. |

- **Aerobic exercise** (endurance activities, jogging, walking): reduces SBP 4-7, more in patients with hypertension
- **Dynamic resistance** (weightlifting): more modest effect on BP vs aerobic exercise, avg SBP reduction 3 mmHg
- **Static/isometric resistance training** (handgrip, planks, wall sit): may have largest effect, avg SBP reduction 8 mmHg.

# Stress Reduction

| | |
|---|---|
| Class 2b | In adults with or without hypertension, stress reduction through transcendental meditation may be reasonable to prevent or treat elevated BP and hypertension, as an adjunct to lifestyle or medication. |
| Class 2b | In adults with or without hypertension, other forms of stress management, such as breathing control techniques or yoga, may be reasonable to prevent or treat elevated BP and hypertension, as an adjunct to lifestyle or medication interventions. |

New

New

- Meditation can lower SBP/DBP by 5/2 mmHg
- Breathing control interventions lower SBP/DBP by 5/3 mmHg

| Intervention | Target / Biomarker | Key Recommendation | SBP Reduction (mm Hg) With Hypertension | SBP Reduction (mm Hg) Without Hypertension |
|---|---|---|---|---|
| **Weight loss** | Body weight or BMI | Aim for sustained **≥5% weight loss**; ~1 mm Hg SBP reduction per kg lost | −6 to −8 | −3 to −5 |
| **Heart-healthy diet (DASH)** | Diet pattern | Fruits, vegetables, whole grains, low-fat dairy; reduced saturated fat | −5 to −8 | −3 to −7 |
| **Reduced sodium intake** | Dietary sodium | Ideal: **<1500 mg/day**; optimal goal: **<2300 mg/day** | −6 to −8 | −1 to −4 |
| **Salt substitute use** | Sodium / potassium balance | Replace regular salt with **potassium-enriched salt** (≈65–75% KCl) | −5 to −7 | −5 |
| **Increased potassium intake** | Dietary potassium | **3500–5000 mg/day** from food (preferably) or supplements | −6 | −3 to −6 |
| **Reduced alcohol intake** | Alcohol consumption | ≤2 drinks/day (men); ≤1 drink/day (women) | −4 to −6 | −3 |
| **Aerobic exercise** | Physical activity | **90–150 min/week** (e.g., brisk walking) | −4 to −8 | −2 to −7 |
| **Dynamic resistance exercise** | Muscle strength | **90–150 min/week**, moderate intensity | −2 to −7 | −2 to −5 |
| **Isometric resistance exercise** | Muscle tension | Handgrip: **4 × 2 min**, 30–40% max effort | −5 to −10 | −4 to −6 |
| **Meditation** | Stress response | Transcendental meditation, **20 min twice daily** | −5 to −7 | −5 |
| **Breathing control** | Respiratory rate | Device-guided slow breathing (**<10 breaths/min, 15 min/day**) | −5 | −5 |

# Pharmacologic Treatment

| | |
|---|---|
| Class 1 | In all adults with hypertension, initiation of medications to lower BP is recommended when **average SBP ≥140 mmHg or DBP ≥90 mmHg** to reduce the risk of cardiovascular events and total mortality. |
| Class 1 | In adults with hypertension and **clinical CVD**, initiation of mediations to lower BP is recommended when **average SBP ≥130 mmHg or DBP ≥80 mmHg** to reduce the risk of cardiovascular events and total mortality. |
| Class 1 | In adults with hypertension **without clinical CVD but with diabetes or CKD or estimated 10yr CVD risk ≥7.5% based on PREVENT**, initiation of mediations to lower BP is recommended when **average SBP ≥130 mmHg or DBP ≥80 mmHg** to reduce the risk of cardiovascular events and total mortality. |
| Class 1 | In adults with hypertension **without clinical CVD and with estimated 10yr risk <7.5%,** initiation of mediations to lower BP is recommended if **average SBP ≥130 mmHg or DBP ≥80 mmHg after a 3-to-6-month trial of lifestyle intervention**. |

Updated

Updated

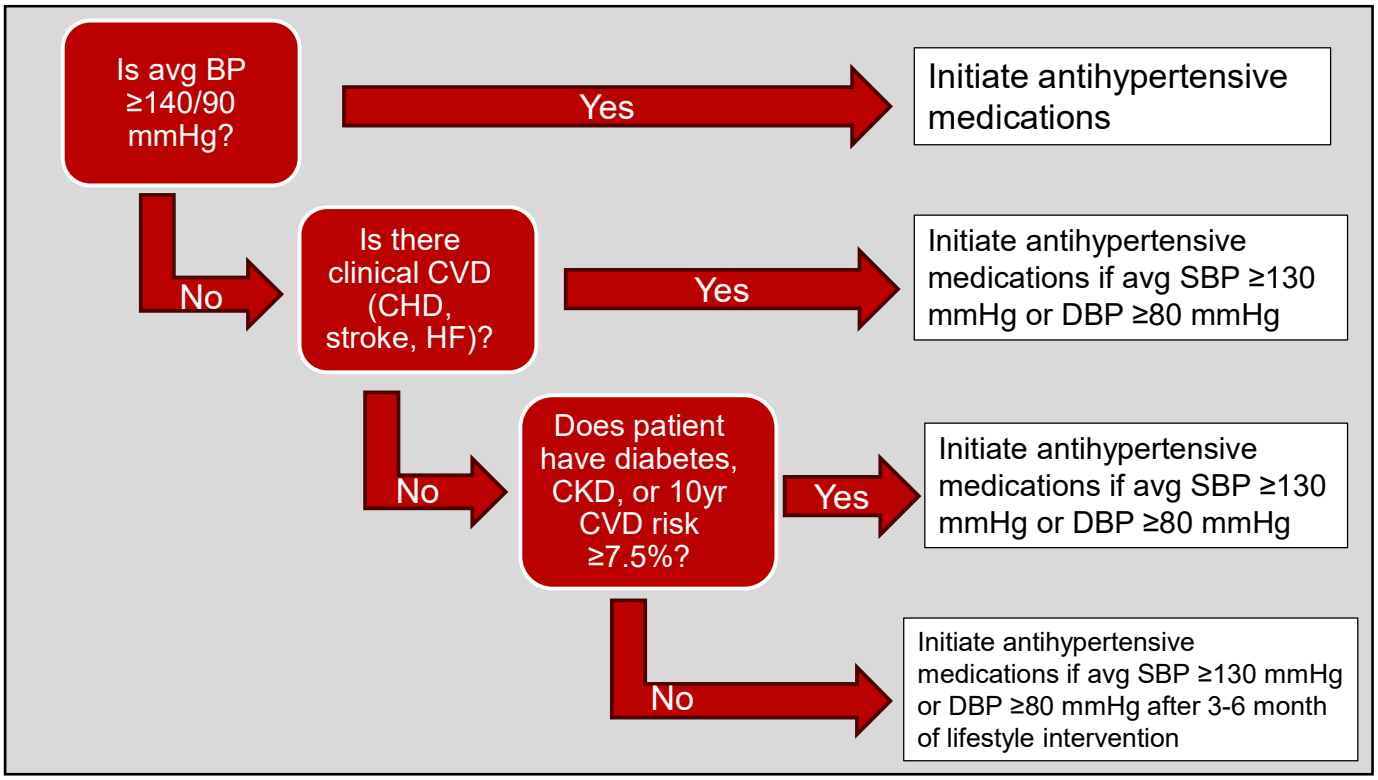
# PREVENT Equations

- **P**redicting **R**isk of CVD E**VENT**s
- Estimates 10yr and 30yr risk of total CVD (MI, stroke, and HF)
- Valid for ages 30-79
- Derived from more contemporary data 6.5 million individuals with more diverse population
- Same parameters as 2013 ASCVD risk calculator: sex, age, SBP, total chol, HDL chol, diabetes, smoking, lipid-lowering medications, anti-hypertensive medications
- New parameters: eGFR, BMI, Urine albumin-creatinine ratio, A1c, Zip code

# PREVENT Equations

| | |
|---|---|
| Class 1 | In adults with hypertension **without clinical CVD but with diabetes or CKD or estimated 10yr CVD risk ≥7.5% based on PREVENT**, initiation of mediations to lower BP is recommended when **average SBP ≥130 mmHg or DBP ≥80 mmHg** to reduce the risk of cardiovascular events and total mortality. |

10yr estimated CVD risk ≥7.5% with PREVENT ≈ 10yr estimated ASCVD risk ≥10% with PCE



# Medication selection

| | First line agents |
|---|---|
| Class 1 | For adults initiating antihypertensive drug therapy**: thiazide diuretics**, **DHP calcium channel blockers**, and **ACE-I or ARB** are recommended as first line agents. |

| Alternative agents | |
|---|---|
| Beta-blockers, combined beta/alpha blockers (carvedilol, labetalol) | Central α2-agonist (clonidine) |
| Non-DHP CCB (diltiazem, verapamil) | Alpha-1 blockers (doxazosin, prazosin) |
| Loop diuretics (furosemide, torsemide, bumetanide) | Direct vasodilators (hydralazine, minoxidil) |
| Potassium sparing diuretics (amiloride, triamterene) | Direct renin inhibitor (aliskiren) |
| MRAs (spironolactone, eplerenone) | Dual endothelin receptor antagonist (aprocitentan) |

# Medication selection

| | Initial combination drug therapy |
|---|---|
| Class 1 | In adults with stage 2 hypertension (SBP ≥140 mmHg or DBP ≥90 mmHg), initiation of antihypertensive 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. |
| Class 2a | In adults with stage 1 hypertension (SBP 130-139 mmHg and DBP 80-90 mmHg), initiation with a single first-line antihypertensive drug is reasonable with dose titration and sequential addition of other agents as needed. |

New

New

- Most patients with hypertension require ≥2 meds
- Combination therapy is more effective in lowering BP than stepwise approach
- Complementary mechanisms
- Lower risk of side effects

# Medication selection

| | Medication adherence strategies |
|---|---|
| Class 1 | The use of SPC to reduce pill burden rather than taking separate pills is effective to improve medication adherence. |
| Class 1 | Choose medications dosed once daily rather than multiple times daily to improve medication adherence. |

New

New

| Antihypertensive Medication SPCs |
|---|
| ACE-I/ARB + thiazide diuretic |
| Potassium-sparing diuretic + thiazide diuretic |
| ACE-I/ARB + CCB |
| MRA + thiazide diuretic |
| ARB + CCB + thiazide diuretic |
| ARB + BB |
| BB + thiazide diuretic |

# BP Goal

| | |
|---|---|
| Class 1 | In adults with hypertension who are at increased risk for CVD (10yr CVD risk ≥7.5% by PREVENT), an SBP goal of <130 mmHg, with encouragement to achieve <120 mmHg, and DBP <80 mmHg is recommended. |
| Class 2b | In adults with hypertension who are not at increased risk for CVD (10yr CVD risk ≥7.5% by PREVENT), an SBP goal of <130 mmHg, with encouragement to achieve <120 mmHg, and DBP <80 mmHg is reasonable. |

New encouragement to SBP <120 mmHg

New encouragement to SBP <120 mmHg

# BP Goal and Comorbidities

| | Comorbidity | BP Goal |
|---|---|---|
| Class I | Diabetes | • SBP <130 mmHg, with encouragement to achieve SBP <120 mmHg<br>• DBP <80 mmHg |
| Class I | CKD (eGFR <60) or albuminuria (≥30 mg albumin/g creatinine) | • SBP <130 mmHg |
| Class I | Heart failure | • SBP <130 mmHg<br>• DBP <80 mmHg |
| Class I | Stroke, TIA, or ICH | • SBP <130 mmHg<br>• DBP <80 mmHg |

# Special populations

| | Diabetes with CKD |
|---|---|
| Class 1 | In adults with diabetes and hypertension, ACEi or ARB are recommended in the presence of CKD (eGFR <60 or albuminuria ≥30 mg/g and should be considered when mild albuminuria (<30 mg/g) is present to delay progression of diabetic kidney disease. |

Upgrade from Class 2b

| | CKD |
|---|---|
| Class 1 | For adults with hypertension and CKD (eGFR <60 with albuminuria ≥30 mg/g), ACEi or ARB is recommended to decrease CVD and delay progression of kidney disease. |

Upgrade from Class 2a

# Dementia

| | |
|---|---|
| Class 1 | In adults with hypertension, a goal of SBP <130 mmHg is recommended to prevent mild cognitive impairment and dementia |

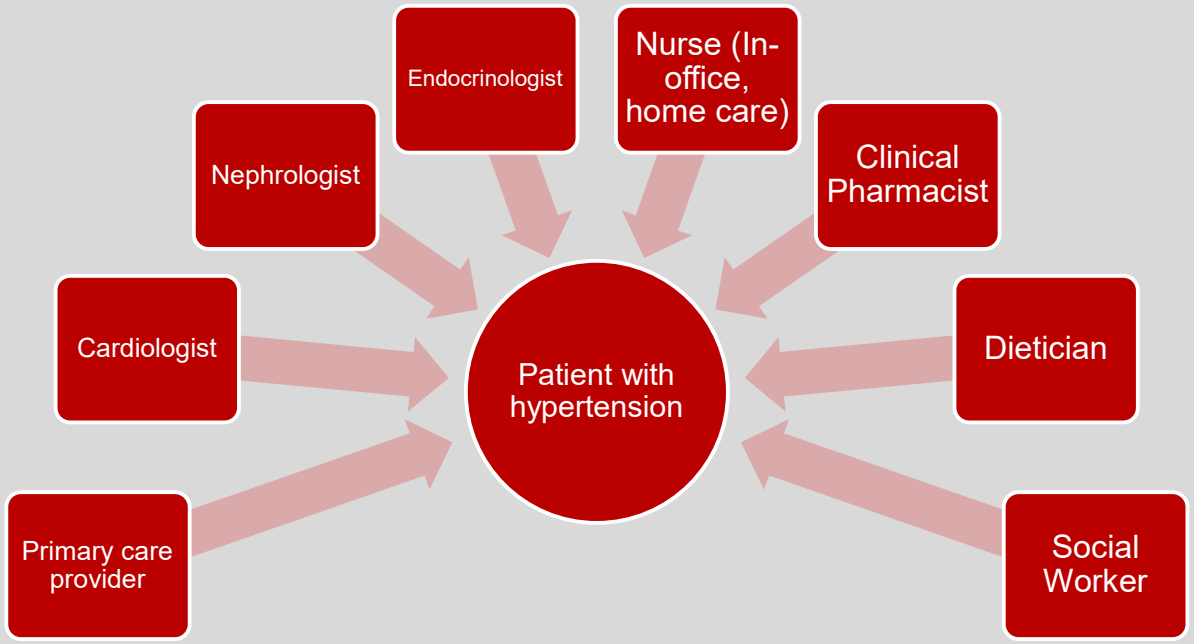
Upgrade from Class 2a

- Hypertension is the primary risk factor for small-vessel ischemic disease and cortical white matter abnormalities
- Often co-exists in patients with Alzheimer's dementia
- BP control helps reduce Alzheimer disease

# Follow-up

- Normal BP (<120/80 mmHg): reassess in 1y (class I)
- Elevated BP (120-129/<80 mmHg): reassess in 3-6 mo (class I)
- Stage 1 or 2 hypertension:
  - Reassess 1 mo after starting or intensifying BP meds (class I)
  - Reassess 3-6 mo after BP goal met (class I)

## Team Based Care




## Resistant Hypertension

- Uncontrolled resistant htn: BP above goal despite treatment with 3 medications, including a diuretic at maximally tolerated doses.
- Controlled resistant htn: BP at goal but requiring ≥4 meds
- 9-20% of adults with htn in US
- Increased risk of MI, stroke, ESRD, cardiovascular death compared to hypertension without resistance

# Resistant Hypertension

| | |
|---|---|
| Class 1 | In adults with resistant hypertension, a more detailed evaluation for secondary causes, to include careful review of all medications and removal of those with interfering effects on BP, is beneficial for lowering BP and simplifying treatment |
| Class 1 | In adults with uncontrolled resistant hypertension despite optimal treatment with first-line agents and with eGFR >45, addition of a MRA is recommended to control BP. |
| Class 2a | In adults with uncontrolled resistant hypertension who cannot tolerate or have contraindications to MRA, the addition of one of the following agents or classes is reasonable to control BP: BBs, alpha-blockers, central sympatholytic drugs, dual endothelin receptor antagonists, direct vasodilators, amiloride. |

New

New

New

Think of secondary causes, contributing meds

Use spironolactone as 4th agent

# Resistant Hypertension

1. Confirm resistant hypertension
2. Optimize 3 first-line drug regimen
3. Exclude pseudoresistance: accurate BP measurement, assess for med adherence, exclude white-coat effect
4. Address lifestyle factors
5. Minimize interfering substances
6. Screen for secondary causes
7. Pharmacologic therapy:
   - Switch thiazide to chlorthalidone (↓SBP 7-8 mmHg)
   - Add spironolactone or eplerenone if eGFR ≥45
   - Add agents with different mechanisms of action

# Renal Denervation

- FDA approval November 2023
- Radiofrequency or ultrasound energy to ablate efferent and afferent renal nerves
- No significant procedural risks beyond typical femoral arterial access risks
- Contraindications: pregnancy, stented renal artery, renal artery aneurysm, significant renal artery stenosis, FMD, kidney tumors
- ~5 mmHg improvement in SBP
- 60-70% of patients experienced meaningful improvement in SBP

# Renal Denervation

| | |
|---|---|
| Class 2b | In carefully selected patents with systolic and diastolic hypertension (SBP ≥140 mmHg and DBP ≥90 mmHg) and eGFR≥40 who have resistant hypertension despite optimal treatment or intolerable side effects to additional antihypertensive drug therapy, renal denervation may be reasonable as an adjunct treatment to BP medications and lifestyle modification to reduce BP. |
| Class 1 | All patients with hypertension who are being considered for RDN should be evaluated by a multidisciplinary team with expertise in resistant hypertension and RDN. |
| Class 1 | For patients with hypertension for whom RDN is contemplated, the benefits of lowering BP with potential procedural risks compared with continuing medical therapy should be discussed as part of a shared decision-making process. |

New

New

New

Patient selection is important

Not meant to be a curative therapy or replacement for meds

## What else?

- Acute intracranial hemorrhage
- Acute stroke
- Hypertension and pregnancy
- Hypertensive emergency and severe hypertension
- Patients scheduled for surgical procedures
- Complications of management (sexual dysfunction, orthostatic hypotension)

## Take-away points

- Screen for primary aldosteronism
- Use PREVENT to estimate CVD risk
- Start 2 antihypertensive agents for stage 2 hypertension
- Use single pill combinations when possible
- BP goal <130/80, with encouragement of SBP <120 mmHg
- Guidelines are just guidelines!