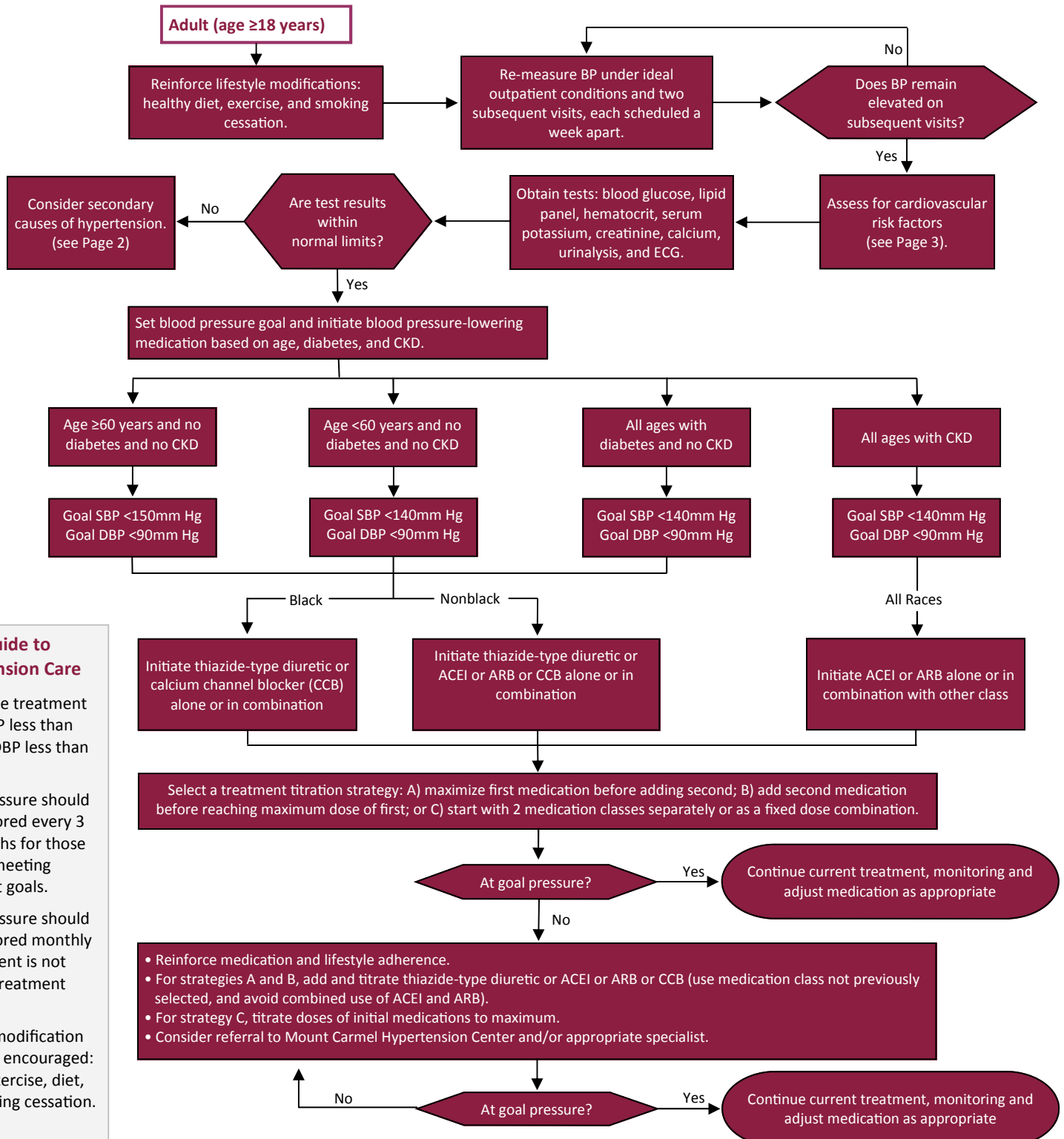


Hypertension Clinical Guideline

Definition: Hypertension (HTN) or high blood pressure (HBP) is a chronic medical condition in which the systemic arterial blood pressure is elevated. HTN is classified as either primary (essential) or secondary. About 90–95% of cases are termed “primary HTN,” which refers to high blood pressure for which no medical cause can be found. The remaining 5–10% of cases (secondary HTN) are caused by other conditions that affect the kidneys, arteries, heart, or endocrine system.

Risk Factors: HTN is the result of a number of factors: diabetes mellitus, chronic kidney disease (CKD), advancing age, family history, a sedentary lifestyle, stress, obesity (over 85% of cases occur in those with a BMI greater than 25), sodium sensitivity, tobacco use, alcohol intake, potassium deficiency (hypokalemia), and vitamin D deficiency all increase the risk of developing HTN. Timely achievement of blood pressure targets within 6 weeks is an important factor of minimizing the risk of adverse cardiovascular outcomes.



Quick Guide to Hypertension Care

A desirable treatment goal is SBP less than 140 and DBP less than 90.

Blood pressure should be monitored every 3 to 6 months for those patients meeting treatment goals.

Blood pressure should be monitored monthly if the patient is not meeting treatment goals.

Lifestyle modification should be encouraged: regular exercise, diet, and smoking cessation.

Diagnosis

Hypertension is generally diagnosed on the basis of a persistently high blood pressure. Usually this requires three separate sphygmomanometer measurements at least one week apart. Initial assessment should include a complete history and physical exam. If the elevation is extreme, however, or if symptoms of organ damage are present, then the diagnosis may be given and treatment should start immediately.

- Normal: SBP less than 140mm Hg and DBP less than 90mm HG

Secondary Causes of Hypertension

- Primary renal disease
- Primary aldosteronism
- Pheochromocytoma
- Cushing's syndrome
- Sleep apnea syndrome
- Coarctation of the aorta
- Hypothyroidism and Hyperthyroidism
- Primary Hyperparathyroidism
- Stimulants (e.g., cocaine, methylphenidate) /Alcohol Induced

Resistant Hypertension is the failure to reach the goal blood pressure in patients adhering to full doses of an appropriate three-drug regimen that includes a diuretic.

Causes (non-pharmacological)

- improper blood pressure measurement
- excess sodium intake
- identifiable causes of hypertension
- excess alcohol intake
- poor adherence to lifestyle and dietary recommendation
- poor adherence to blood pressure medications
- "white coat" resistance

Causes (pharmacological)

- inadequate doses
- inadequate diuretic therapy
- interfering substances
- chronic use of NSAIDs
- over the counter medications
- corticosteroids
- sympathomimetics
- Combined oral contraceptives
- herbal supplement

Evaluation

- Conduct a complete history and physical.
- Assess risk factors, comorbidities, and identifiable causes of hypertension such as kidney disease, sleep apnea, and renovascular disease.
- Obtain tests: urinalysis, blood glucose, hematocrit, lipid panel, serum potassium, creatinine, calcium, and EKG.
- Additional studies for patients with resistant or difficult to treat hypertension:
 - Repeat measurement of home and ambulatory blood pressure
 - Echocardiography
- Consider tests for causes of secondary hypertension.
- Consider referral to Mount Carmel Hypertension Center, especially if there is a failure of three antihypertension medications including a diuretic.

Treatment (for adults 18 years or older)

Timely achievement of blood pressure targets within 6 weeks with aggressive follow-up monitoring and medication adjustment is an important factor in minimizing the risk of adverse cardiovascular outcomes.

Treatment should begin by making therapeutic lifestyle changes including weight reduction, diet modification by reducing animal products and sodium while increasing intake of plant products, reduce alcohol consumption, cessation of tobacco use, and increased physical activity.

- Review patient self-check results and reinforce lifestyle modification.
- Assess adherence to drug therapy.
- Review lab results: lipid panel, blood glucose, urine, albumin/creatinine ratio.

Recommendations

1. In the general population age 60 years or older, initiate pharmacologic treatment to lower BP to a goal of SBP lower than 150mm Hg and DBP lower than 90mm Hg.

Corollary Recommendation:

In the general population age 60 years or older, if pharmacologic treatment for high BP results in lower achieved SBP (for example <140mm Hg) and treatment is not associated with adverse effects on health or quality of life, treatment does not need to be adjusted.

2. In the general population younger than 60 years, initiate pharmacologic treatment to lower BP to a goal DBP of lower than 90mm Hg.
3. In the general population younger than 60 years, initiate pharmacologic treatment to lower BP to a goal SBP of lower than 140mm Hg.
4. In the population age 18 or older with CKD, initiate pharmacologic treatment to lower BP to goal SBP of lower than 140 mm Hg and goal DBP lower than 90mm Hg.
5. In the population age 18 years or older with diabetes, initiate pharmacologic treatment to lower BP to a goal SBP of lower than 140mm Hg and goal DBP lower than 90mm Hg.
6. In the general nonblack population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, calcium channel blocker (CCB), angiotensin-converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB).
7. In the general black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB.
8. In the population age 18 or older with CKD and hypertension, initial (or add-on) antihypertensive treatment should include an ACEI or ARB to improve kidney outcomes. This applies to all CKD patients with hypertension regardless of race or diabetes status.
9. The main objective of hypertension treatment is to attain and maintain a goal BP. If the goal BP is not reached within a month of treatment, increase the dose of the initial drug or add a second drug from one of the classes in #6 above (thiazide-type diuretic, CCB, ACEI, or ARB). The clinician should continue to assess the BP and adjust the treatment regimen until the goal BP is reached. If the goal BP cannot be reached with 2 drugs, add and titrate a third drug from the list provided.

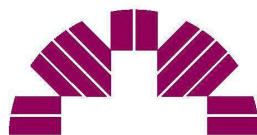
Do not use an ACEI and an ARB together in the same patient. If goal BP cannot be reached using the drugs in #6 above because of a contraindication or the need to use more than 3 drugs to reach the goal BP, antihypertensive drugs from other classes can be used. Referral to a hypertension specialist may be indicated for patients in whom the goal BP cannot be attained using the above strategy or for the management of complicated patients from whom additional clinical consultation is needed.

Follow-up and Monitoring

A plan of ongoing care and treatment assessment once BP targets are achieved should take place every 6 months or less depending on classification and patient comorbidities. Reinforce the need for lifestyle modification as needed.

- Weight reduction: maintain normal body weight (BMI 18.5-25 kg/m²)
- Nutrition: suggest Dietary Approaches to Stop Hypertension (DASH) eating plan with daily intake of 8-10 servings of fruits and vegetables, 2-3 servings of low-fat dairy products, diet low in saturated fat and cholesterol, high potassium intake of 4.7g for those patients with no impaired potassium excretion.
- Dietary sodium: Reduction to less than 2.3 g sodium per day.
- Exercise: recommend regular aerobic activity such as brisk walking (30-35 minutes per day or most days) adapted according to patient's physical capacity
- Counseling:
 - limit alcohol consumption
 - limit caffeine consumption
 - smoking cessation and stress impact smoking has on hypertension
 - reduce stressors
- Perform an assessment of **risk factors for cardiovascular disease every 12 months** or more frequently as needed:
 - family history of hypertension
 - family history of premature CVD
 - dyslipidemia
 - diabetes mellitus
 - obesity (BMI >30)
 - age
 - microalbuminuria (GMR <60mL/min)
 - smoking
 - physical inactivity
 - other factors: PCOS (polycystic ovarian syndrome), HELLP Syndrome (hemolysis, elevated liver enzymes, low platelet count), preeclampsia
- For the rapidly growing population of hypertensive individuals over age 65 years with isolated systolic hypertension (e.g. a diastolic blood pressure below 90 mm Hg), caution is needed not to reduce the diastolic blood pressure too aggressively (to below 55 to 60 mm Hg), since such low diastolic pressures have been associated with an increased risk for cardiovascular event.
- American Geriatrics Society BEERS Criteria recommendation to avoid alpha1 blockers in the elderly. Alpha1 blockers for routine treatment of hypertension is considered potentially inappropriate due to high risk for orthostatic hypotension.

Frequency	Criteria
Monthly visits	Until blood pressure goal is reached
Every 3-6 months	When blood pressure is at goal and stable
More frequent visits	Comorbid condition and the need for regular labs
Every 5-12 months	Labs--serum potassium and creatinine



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This clinical guideline outlines the recommendations of Mount Carmel Health Partners for this medical condition and is based upon the referenced best practices. It is not intended to serve as a substitute for professional medical judgment in the diagnosis and treatment of a particular patient. Decisions regarding care are subject to individual consideration and should be made by the patient and treating physician in concert.