



Michigan Quality Improvement Consortium Guideline

Medical Management of Adults with Hypertension

The following guideline recommends diagnostic evaluation, education and pharmacologic treatment that support effective patient self-management.

Eligible Population	Key Components	Recommendation and Level of Evidence
Adult patients ≥ 18 years of age. Not pregnant.	Initial assessment	<ul style="list-style-type: none"> The objectives of the initial evaluation are to assess lifestyle, cardiovascular risk factors, concomitant disorders, reveal identifiable causes of hypertension and check for target organ damage and cardiovascular disease. Physical examination: 2 or more BP measurements on initial visit plus one or more follow-up visits using regularly calibrated equipment with the appropriate sized cuff and separated by at least 2 minutes with the patients seated and standing, verification in contralateral arm, funduscopic exam, neck exam (bruits), heart and lung exam, abdominal exam for bruits or aortic aneurysm, extremity pulses and neurological assessment. [D]¹ Tests prior to initiating therapy: Potassium, creatinine, glucose, hematocrit, calcium, sodium, urinalysis, lipid panel, EKG. [D]
Classification based on mean of 2 or more seated BP readings on each of 2 or more office visits. Normal BP <120/<80 Prehypertension 120-139/80-89 Hypertension: Stage 1 140-159/90-99 Stage 2 $\geq 160/\geq 100$	Patient education and nonpharmacologic interventions	<ul style="list-style-type: none"> Lifestyle modification: weight reduction (BMI goal < 25), reduction of dietary sodium to less than 2.4 gm/day, DASH diet [A] (i.e. diet high in fruits and vegetables, reduced saturated and total fat), aerobic physical activity ≥ 30 minutes most days of the week, tobacco avoidance, increased dietary potassium and calcium, moderation of alcohol consumption². [A] Consider self BP monitoring. Check accuracy of home measurement device regularly. Home readings are often 5 mmHg lower than office.
	Goals of Therapy	<ul style="list-style-type: none"> If no other risk factors: target BP <140/90. Patients with risk factors, including diabetes: target BP <140/80 (<130/80 for patients with kidney disease). [D] Caution: low diastolic or orthostatic symptoms may limit ability to control systolic. Use extreme caution if diastolic is below 60. For diabetics, mortality increases if diastolic is below 70.
	Pharmacologic interventions	<ul style="list-style-type: none"> Hypertension, Stage 1 (140-159/90-99): start with thiazide-type diuretics for most patients. ACE-I, BB, and DHP-CCB³ are first-choice additional agents. Use angiotensin-receptor blockers (ARB) if ACE-I not tolerated. Hypertension, Stage 2 ($\geq 160/\geq 100$): consider two-drug combination (thiazide plus ACE-I or DHP-CCB). In general, diuretics and DHP-CCB appear to be more effective as an initial treatment in African-Americans. ACE-I recommended in patients with diabetes or heart failure. [A] Beta-blockers are recommended in patients with ischemic heart disease or heart failure. Intensify treatment until treatment goals are met; 3 or more drugs may be necessary for some patients to achieve goal BP. Caution: NSAIDs may complicate management of hypertension and worsen renal function.
	Monitoring and adjustment of therapy [D]	<ul style="list-style-type: none"> Prehypertension without other risk factors: annual BP check with lifestyle modification counseling. Hypertension, Stage 1: initiate therapy and recheck within two months until goal is reached. Hypertension, Stage 2: initiate therapy and recheck weekly or more often if indicated. Symptomatic Stage 2 may require hospital monitoring and treatment. Once BP controlled with medication: recheck at each visit, at least annually. Check serum potassium and creatinine at least annually for patients on diuretics/ACE-I/ARB.

¹American Medical Association. Essential Guide to Hypertension: Accurate Blood Pressure Readings (http://mqic.org/pdf/BP_Readings.pdf)

²Moderate alcohol consumption is generally defined as up to two drinks per day for men, one drink per day for women.

³ACE-I = angiotensin converting enzyme inhibitor, BB = beta blocker, DHP-CCB = long-acting dihydropyridine calcium channel blocker (e.g. amlodipine, felodipine)

Levels of Evidence for the most significant recommendations: A = randomized controlled trials; B = controlled trials, no randomization; C = observational studies; D = opinion of expert panel

This guideline represents core management steps. It is based on several sources including: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7), December 2003 (nhlbi.nih.gov/guidelines/hypertension/); and Hypertension Diagnosis and Treatment, Institute for Clinical Systems Improvement, November 2012 (icsi.org). Individual patient considerations and advances in medical science may supersede or modify these recommendations.