

Adult Hypertension

Clinician Guide

November 2016

Introduction This Clinician Guide is based on the 2016 KP National Hypertension Guideline. It was developed to assist primary care physicians and other health care professionals in the outpatient treatment of hypertension (HTN) in non-pregnant adults aged ≥ 18 years. The KP National Hypertension Guideline adopted the 2015 U.S. Preventive Services Task Force (USPSTF) recommendations for Screening for High Blood Pressure and the 2014 Evidence-Based Guideline for the Management of High Blood Pressure in Adults: Report from the Panel Members Appointed to the Eighth Joint National Committee (JNC 8), with minor modifications to the latter. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners.

Definitions ▶ The KP National Hypertension Guideline uses the JNC 7 classification of hypertension.

DEFINITION OF HYPERTENSION (JNC 7)		
The JNC 7 report defines blood pressure (BP) as:	Systolic Blood Pressure (SBP) mmHg	Diastolic Blood Pressure (DBP) mmHg
Normal	< 120	< 80
Pre-hypertension	120 – 139	80 – 89
Stage I hypertension	140 – 159	90 – 99
Stage II hypertension	≥ 160	≥ 100

Key Points

- ▶ Hypertension is an important and modifiable risk factor for atherosclerotic cardiovascular disease (ASCVD).
- ▶ For all adults, encourage a heart-healthy lifestyle to reduce the risk of ASCVD. This includes regular physical activity, weight reduction and maintenance, smoking cessation, and controlling blood pressure, cholesterol, and diabetes.
- ▶ For adults aged ≥ 60 without diabetes, treat to a goal systolic blood pressure (SBP) < 150 mmHg and goal diastolic blood pressure (DBP) < 90 mmHg.
- ▶ For all adults aged < 60 and those aged ≥ 60 with diabetes, treat to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.
- ▶ For all adults aged ≥ 60 with chronic kidney disease (CKD), consider treating to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.

Screening and Diagnosis of High Blood Pressure

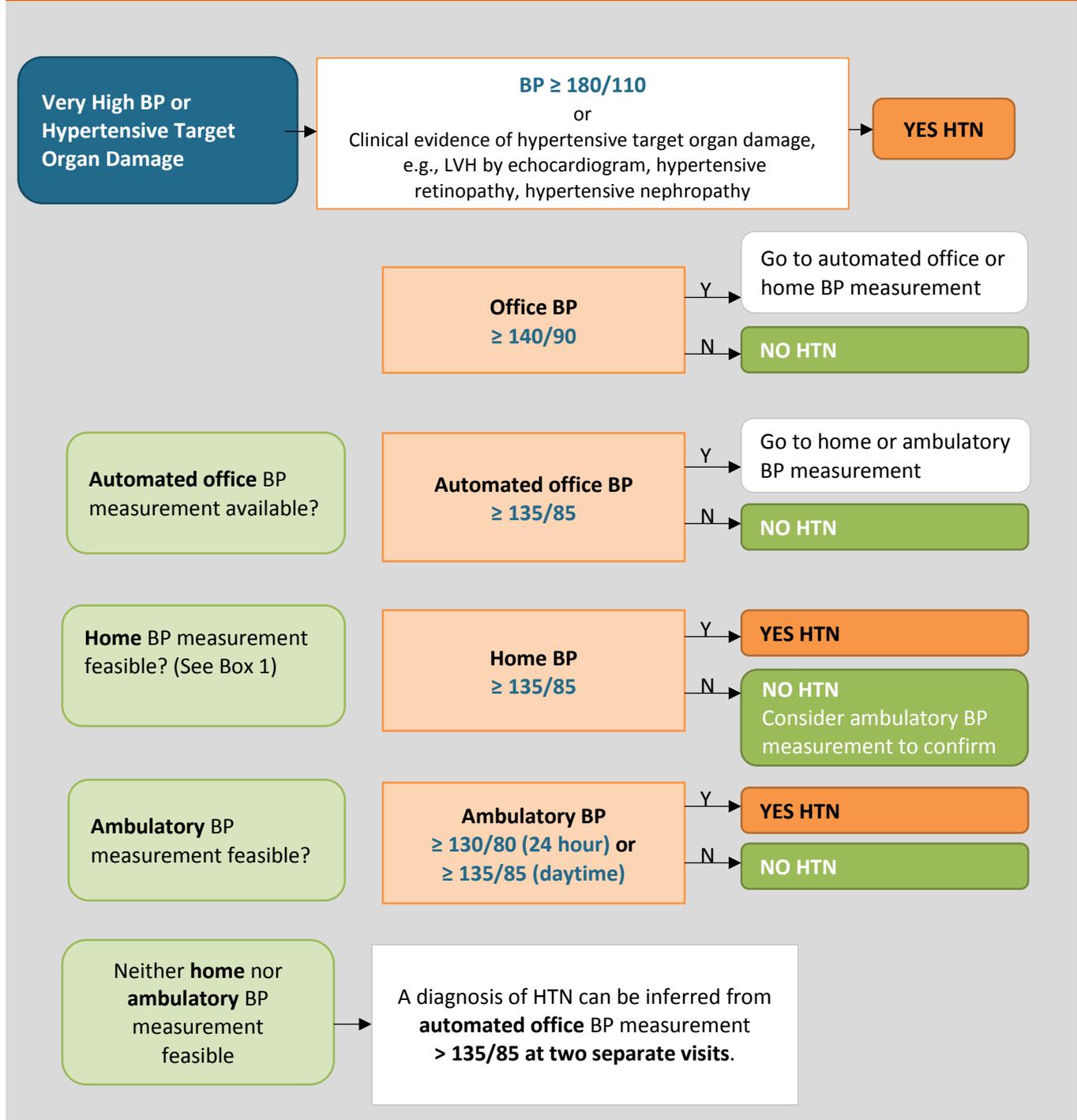
Screening

- ▶ Screen all adults aged ≥ 18 for hypertension.
 - For adults aged 18-39 years with normal blood pressure (< 130/85 mm Hg) without other risk factors, screen every 3 to 5 years.
 - For adults aged ≥ 40 years and those at increased risk of high blood pressure, screen annually. Persons at increased risk include those who have high-normal blood pressure (130-139 / 85-89 mm Hg), who are overweight or obese, and African Americans.

Diagnosis

- Obtain measurements outside of the clinical setting for diagnostic confirmation before starting treatment.

FIGURE 1: CONFIRMATION OF DIAGNOSIS OF HYPERTENSION



Definitions

Office BP measurement: Taken in the clinic setting using an oscillometric or aneroid device but not including automated office BP measurement.

Automated office BP measurement: Taken in the clinic setting using a commercially available device that allows for measurements to be taken with patient unobserved.

Home BP measurement: Taken by the patient at home.

Ambulatory BP measurement: Taken at regular intervals by a device worn by the patient.

BOX 1: ACCEPTABLE HOME READING PROTOCOL

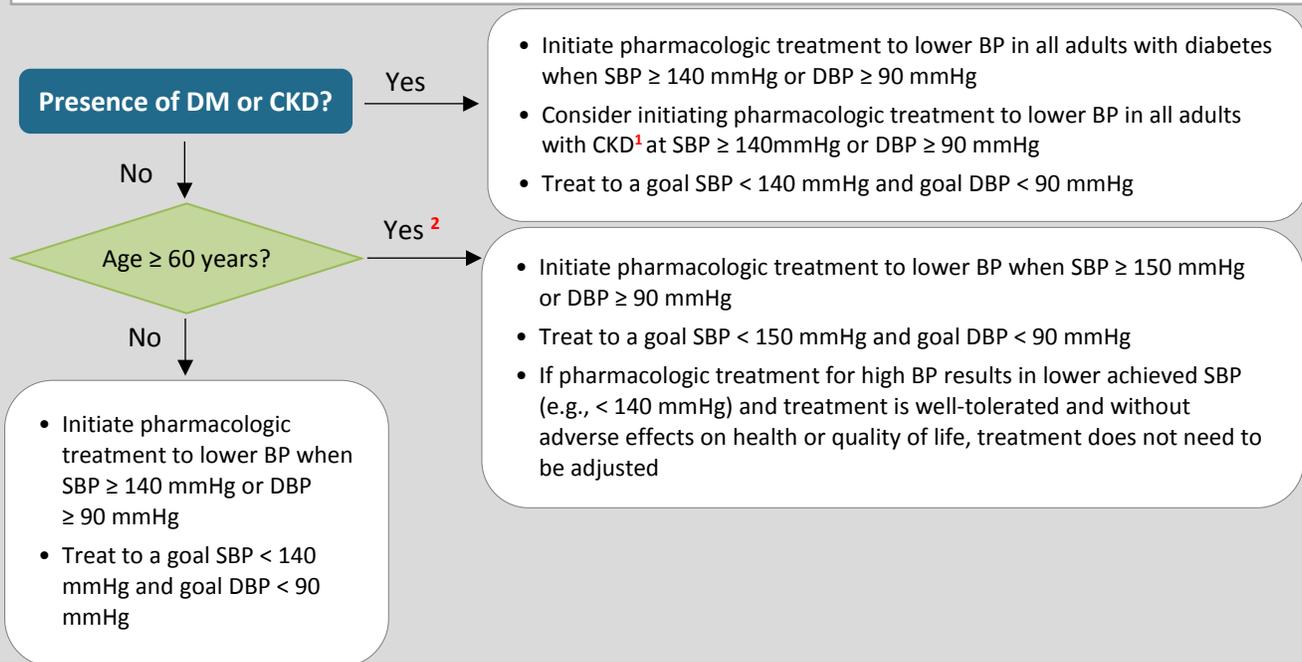
An acceptable protocol for home BP measurement is for the patient to measure two sets of readings each day: one set in the morning and one set in the evening. Each set consists of 2-3 readings, with the first reading taken after 5 minutes of rest, and additional readings at 1-minute intervals. Average the lowest readings from each day's AM and PM set to determine control or lack of control. Encourage patients to validate their home devices by comparing measurements to an office device annually. Member education resources with additional instructions for home BP measurement may be available for your region in HealthConnect, on [Clinical Library](#), or see the [SCAL](#) or [NCAL](#) versions.

Treatment Initiation and Blood Pressure Targets

FIGURE 2: TREATMENT INITIATION

LIFESTYLE MODIFICATIONS:

- Consume a diet that is moderately low-sodium, low-fat with a high intake of fruits and vegetables (DASH diet).
- Weight reduction for patients with a BMI ≥ 25 kg/m².
- Limit alcohol consumption.
- Exercise at a moderate pace to achieve 150 min./week (e.g., 30 min./5 days/week).
- Stop smoking or use of tobacco products.
- Assist patients to achieve medication and lifestyle adherence by means of a vigorous stepped-care approach to therapy and an organized system of regular medical follow-up and review.
- Prescribe once-daily medication and combination therapy, whenever possible.
- Address depression/anxiety issues to maximize patient adherence.
- Use patient education in conjunction with other strategies, particularly in the context of team care utilizing nurses and pharmacists.
- Educate patients about their goal blood pressure.



General Population

- ▶ Aged ≥ 60 years without diabetes:
 - Initiate pharmacologic treatment to lower blood pressure (BP) at systolic blood pressure (SBP) ≥ 150 mmHg or diastolic blood pressure (DBP) ≥ 90 mmHg. Treat to a goal SBP < 150 mmHg and goal DBP < 90 mmHg.
 - Consider not adjusting treatment if pharmacologic treatment for high BP results in lower achieved SBP (e.g., < 140mmHg) and treatment is well tolerated and without adverse effects on health or quality of life.
- ▶ Aged < 60 years and aged ≥ 60 with diabetes:
 - Initiate pharmacologic treatment to lower BP when SBP ≥ 140 or DBP ≥ 90 mmHg. Treat to a goal SBP < 140 mmHg and goal DBP < 90 mmHg.

Chronic Kidney Disease (CKD)

- ▶ Aged ≥ 60 years with chronic kidney disease (CKD):
 - Consider initiating pharmacologic treatment at SBP ≥ 140mmHg or DBP ≥ 90 mmHg and treat to goal SBP < 140mmHg and goal DBP < 90mmHg.

NOTE: When weighing the risks and benefits of a lower BP goal for people aged ≥ 70 years with estimated GFR < 60 mL/min/1.73 m², antihypertensive treatment should be individualized, taking into consideration factors such as frailty, comorbidities, albuminuria, and estimation of non-age-related eGFR decline (e.g., if eGFR + (age/2) is < 85).

TABLE 1: eGFR CALCULATOR	
Men	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-0.203}$
Women	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-0.74}$
African-American	$eGFR \left(\frac{\text{ml/min}}{173 \text{ m}^2} \right) = 186 \times SCr^{-1.154} \times Age^{-1.21}$

Risk of Postural Hypotension in the Elderly

- ▶ Because elderly patients are at higher risk of side effects of treatment, including postural hypotension, check standing blood pressures to guide treatment decisions.

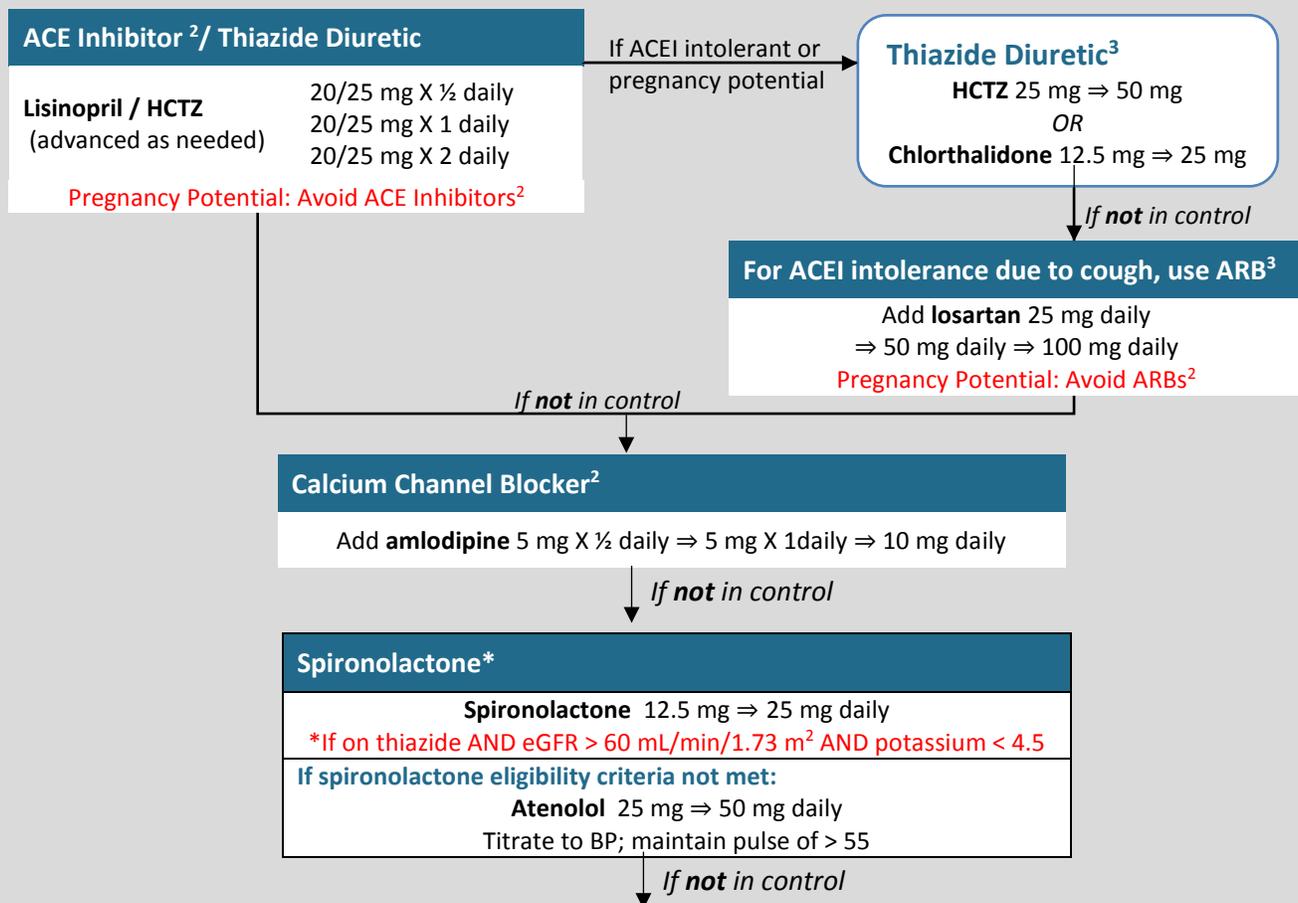
Drug Treatment for Confirmed Diagnosis of Hypertension

- ▶ The main objective of hypertension treatment is to attain and maintain goal BP. If goal BP is not reached within a month of treatment, consider increasing the dose of the initial drug or adding a second drug from one of the thiazide-type diuretic, CCB, ACEI, or ARB classes in JNC 8 recommendation six. The clinician should consider continued assessment of BP and adjust the treatment regimen until goal BP is reached. If goal BP cannot be reached with two drugs, consider adding and titrating a third drug from the indicated classes. Consider avoiding combined use of an ACEI and an ARB. If goal BP cannot be reached using only the drugs in these classes because of contraindications or the need for more than three drugs to reach goal BP, antihypertensive drugs from other classes can be considered. Consider referral to a hypertension specialist for patients in whom goal BP cannot be attained using the above strategy or for the management of complicated patients for whom additional clinical consultation is needed.

FIGURE 3: MANAGEMENT OF ADULT HYPERTENSION

BLOOD PRESSURE (BP) GOALS

- ≤ 139/89 mmHg: Aged 18-59 and aged ≥ 60 with chronic kidney disease (CKD)¹ or diabetes
- ≤ 149/89 mmHg: Aged ≥ 60 in the absence of chronic kidney disease (CKD)¹ or diabetes



- Consider medication non-adherence.
- Consider interfering agents (e.g., NSAIDs, excess alcohol).
- Consider white-coat effect. Consider BP checks by medical assistant (e.g., two checks with 2 readings each, 1 week apart).
- Consider discontinuing lisinopril/HCTZ and changing to chlorthalidone 25 mg plus lisinopril 40 mg daily.
- Consider additional agents (hydralazine, terazosin, minoxidil).
- Consider stopping atenolol and adding diltiazem to amlodipine, maintaining heart rate > 55.
- Avoid using clonidine, verapamil, or diltiazem with a beta-blocker. These heart rate-slowing drug combinations may cause symptomatic bradycardia over time.
- Consider secondary etiologies.
- Consider consultation with a hypertension specialist.

1. CKD is defined as albuminuria (>30 mg of albumin/g of creatinine) at any age and any level of GFR or an estimated or measured GFR < 60 mL/min/1.73 m² in people aged < 70 years. When weighing the risks and benefits of a lower BP goal for people aged ≥ 70 years with estimated GFR < 60 mL/min/1.73 m², antihypertensive treatment should be individualized, taking into consideration factors such as frailty, comorbidities, albuminuria, and estimation of non-age-related eGFR decline (e.g., if eGFR + (age/2) is < 85).
2. ACE inhibitors and ARBs are contraindicated in pregnancy and not recommended in most women of childbearing age. Calcium channel blockers and spironolactone (Pregnancy Risk Category C), and beta-blockers (Pregnancy Risk Category D) should only be used in pregnancy when clearly needed and benefits outweigh the potential hazard to the fetus. In the general African-American population, including those with diabetes, initial antihypertensive treatment includes a thiazide-type diuretic or CCB.
3. For patients aged 18-75 with CKD, intolerant to ACEI with cough, and no pregnancy potential, losartan should be started before adding thiazide.

Drug Treatment for Confirmed Diagnosis of Hypertension (continued)

- ▶ In the general population, including patients of any race/ethnicity and those with diabetes and/or CKD, consider initial single pill combination therapy with lisinopril-hydrochlorothiazide.
- ▶ For three drugs: If blood pressure is not controlled within a month of treatment on a thiazide-type diuretic plus ACEI, then consider using a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker.
- ▶ For four drugs: If blood pressure is not controlled within a month of treatment on a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker, then consider using a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker plus spironolactone (if on thiazide AND eGFR > 60mL/min/1.73 m² AND potassium < 4.5) or beta blocker.

Lifestyle Modifications

- ▶ Supplement treatment of uncomplicated hypertension with lifestyle modifications:
 - Moderately low-sodium, low-fat diet with a high intake of fruits and vegetables (e.g., DASH diet)
 - Sodium restriction (≤ 2.4 gm sodium daily)
 - Weight reduction for patients with BMI ≥ 25 kg/m²

TABLE 2: BMI CALCULATOR

Metric (kg/m²)	$BMI = \frac{Weight (kg)}{Height\ squared (m^2)}$
Imperial (lbs/in²)	$BMI = \frac{Weight (lbs) \times 703}{Height\ squared (in^2)}$

- Limit daily alcohol consumption to ≤ 1 alcoholic drink (for women) or ≤ 2 alcoholic drinks (for men)
- Exercise at a moderate pace to achieve 150 min./week (i.e., 30 min./5 days/week)
- Stop smoking and use of tobacco products
- ▶ Encourage adherence to medications and lifestyle modifications:
 - Assist patients to achieve medication and lifestyle adherence by means of a vigorous stepped-care approach to therapy and an organized system of regular medical follow-up and review.
 - Prescribe once-daily medication and combination therapy whenever possible.
 - Address depression and anxiety issues to maximize patient adherence. See KP National Depression Guideline at: <http://cl.kp.org/pkc/national/cmi/programs/depression/guideline/index.html>
 - Use patient education in conjunction with other strategies, particularly in the context of team care utilizing nurses and pharmacists.
 - Educate patients about their goal blood pressure because patients who are knowledgeable about their goal BP are more likely to achieve it.

Special Considerations

Hypertension Treatment for Women of Childbearing Potential

- ▶ Half of all pregnancies are unplanned. Do not prescribe medications contraindicated in pregnancy, such as ACEIs/ARBs, to women of childbearing potential, unless there is a compelling indication.
- ▶ For women of childbearing potential taking medications contraindicated in pregnancy, such as ACEIs/ARBs:
 - Discuss potential risks to the fetus should they become pregnant.
 - Discuss practicing contraceptive measures with extremely low failure rates (sterilization, implant, or IUD).
 - Advise women using ACEIs/ARBs to stop these medications and contact their OB/GYN provider immediately if they become pregnant.
 - Advise women using ACEIs/ARBs for heart failure or cardiomyopathy who become pregnant to contact their obstetrician immediately.
 - Their obstetrician, in consultation with cardiology, will substitute a suitable alternative to avoid decompensation.

Lipid Therapy in Patients Taking Hypertension Medications

- ▶ Evaluate patients with hypertension for dyslipidemia and initiate or continue statin treatment according to their total cardiovascular risk profile.
- ▶ Refer to the KP National Cardiovascular Risk and Dyslipidemia Guidelines at: <http://cl.kp.org/pkc/national/cmi/programs/dyslipidemia/guideline/index.html>
 - Determine the need to initiate or continue lipid-lowering therapy based on ASCVD risk assessment using a risk calculator, as described in the KP National Cardiovascular Risk and Dyslipidemia Guidelines.

Aspirin Therapy in Patients Taking Hypertension Medications

- ▶ Evaluate patients with hypertension for aspirin use and initiate or continue statin treatment according to their total cardiovascular risk profile and risk of adverse events
- ▶ Refer to the KP National Aspirin Recommendations at: https://clm.kp.org/pkc/national/cmi/programs/aspirin/aspirin_recommendations.html

Recommendations for Patients with ACEI Intolerance Due to Cough

- ▶ HCTZ 25 mg, then 50 mg to achieve BP goal
- ▶ Add losartan 25 mg, then 50 mg, then 100 mg to achieve BP goal
- ▶ Add amlodipine 2.5 mg, then 5 mg, then 10 mg to achieve BP goal

TABLE 3. DOSAGE RANGE FOR SELECTED ANTIHYPERTENSIVE MEDICATIONS*

Selected Antihypertensive Medication		Usual Dosage Range
Thiazide-type Diuretics	Chlorthalidone (Hygroton)	12.5 – 25 mg daily
	Hydrochlorothiazide (HCTZ) (Esidrix)	25 – 50 mg daily
Thiazide-type Diuretic Single Pill Combinations	HCTZ/lisinopril (Prinzide)	10/12.5 mg - 20/25 mg BID
	Spironolactone/HCTZ (Aldactazide)	25/25 mg daily
ACE Inhibitors (ACEI)	Lisinopril (Zestril, Prinivil)	10 – 40 mg daily
	Benazepril (Lotensin)	5 – 40 mg daily
Long-Acting Dihydropyridine Calcium Channel Blockers (CCB)	Amlodipine (Norvasc)	2.5 – 10 mg daily
	Felodipine ER (Plendil)	2.5 – 20 mg daily
Angiotensin II Receptor Blockers (ARB)	Losartan (Cozaar)	25 – 100 mg daily
Aldosterone Receptor Blocker	Spironolactone (Aldactone)	12.5 – 25 mg daily
Beta-Blockers (BB)	Atenolol (Tenormin)	25 – 100 mg total, daily or BID
	Bisoprolol (Zebeta)	5 – 10 mg daily
	Carvedilol (Coreg)	3.125 – 37.5 mg BID
	Metoprolol (Lopressor)	25 – 100 mg BID

*Availability of medications may vary depending on regional formularies.

TERMINOLOGY		
Recommendation Language	Strength*	Action
Start, initiate, prescribe, treat, etc.	Strong affirmative	Provide the intervention. Most individuals should receive the intervention; only a small proportion will not want the intervention.
Consider starting, etc.	Weak affirmative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will want the intervention, but many will not. Different choices will be appropriate for different patients.
Consider stopping, etc.	Weak negative	Assist each patient in making a management decision consistent with personal values and preferences. The majority of individuals in this situation will not want the intervention, but many will. Different choices will be appropriate for different patients.
Stop, do not start, etc.	Strong negative	Do not provide the intervention. Most individuals should not receive the intervention; only a small proportion will want the intervention.

*Refers to the extent to which one can be confident that the desirable effects of an intervention outweigh its undesirable effects.

DISCLAIMER

This guideline is informational only. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners, considering each patient's needs on an individual basis. Guideline recommendations apply to populations of patients. Clinical judgment is necessary to design treatment plans for individual patients.