
**STANDARD
NURSE PROTOCOL
FOR
PRIMARY HYPERTENSION
IN ADULTS**

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2015 HYPERTENSION CLINICAL REVIEW TEAM

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STANDARD NURSE PROTOCOL FOR PRIMARY HYPERTENSION IN ADULTS

DEFINITION

Primary (Essential) Hypertension is defined as systolic blood pressure equal to or greater than 140 mmHg or diastolic blood pressure equal to or greater than 90 mmHg on at least two subsequent occasions, or taking antihypertensive medication with goal of maintaining a normal blood pressure. **Secondary hypertension is a type of hypertension with an underlying, potentially correctable cause.**

The three objectives for evaluation of **patients** with documented hypertension are to:

1. **Assess lifestyle and identify other cardiovascular risk factors or concomitant disorders that may contribute to hypertension and may affect prognosis and can guide treatment.**
2. **Assess for the presence or absence of target organ damage and cardiovascular disease, the extent of disease, and the response to therapy.**
3. **Identify known underlying causes of secondary hypertension, such as chronic kidney disease, coarctation of the aorta, cushing's syndrome, drug-induced drug-related, obstructive uropathy, pheochromocytoma, primary aldosteronism, renovascular hypertension, sleep apnea, or thyroid or parathyroid disease.**

ETIOLOGY

1. Primary hypertension/high blood pressure (HBP) appears to be a multi-factorial disease/disorder in which several genes interact with each other and with the environment.
2. **Contributing Risk Factors for Hypertension include:**
 - a. Family history of premature cardiovascular disease (men aged less than 55 and women aged less than 65).
 - b. **Age**
 - d. Race **or ethnicity** (African American)
 - e. **Overweight/obesity-BMI greater than 24.5**
 - f. **Habitual high salt intake**
 - g. **Sedentary lifestyle-little to no moderate to vigorous activity in the past 30 days**

- h. **Alcohol intake greater than moderate drinking (more than one drink per day for women and more than 2 drinks per day for men)**
 - i. **Any tobacco or nicotine use**
 - j. Diabetes mellitus
 - k. Microalbuminuria
 - l. Renal disease
3. **Contributing Risk Factors for Cardiovascular Disease include:**
- a. **Hypertension**
 - b. **Abnormal lipids (Total cholesterol 200 mg/dl or greater; HDL less than 40 mg/dl; LDL greater than 100 mg/dl; triglyceride greater than 150 mg/dl)**
 - c. **Diabetes and prediabetes**
 - d. **Any tobacco or nicotine use**
 - e. **Obesity or overweight-Body Mass Index greater than 24.5**
 - f. **Physical inactivity-little to no moderate to vigorous activity in the past 30 days**
 - g. **Family history of premature cardiovascular disease (men aged less than 55 and women aged less than 65)**
 - h. **History of preeclampsia during pregnancy**
 - i. **Age**
 - j. **Alcohol intake Alcohol intake greater than moderate drinking (more than one drink per day for women and more than 2 drinks per day for men)**

SUBJECTIVE

- 1. Normally no symptoms. (Headaches, dizziness, or nosebleeds do not occur any more often in persons with hypertension.)
- 2. May or may not have personal or family history of hypertension.
- 3. The following medical history **should be elicited:**
 - a. Known duration/levels of elevated blood pressure.
 - b. Past or current symptoms of coronary heart disease, heart failure, cerebrovascular disease, peripheral vascular disease, renal disease, diabetes mellitus, dyslipidemia, sleep apnea or sexual dysfunction.
 - c. **History of symptoms of gout.**
 - d. Recent changes in weight, leisure-time activity, smoking or other tobacco use, or recreational drug use.
 - e. Results and adverse effects of:

- 1) Previous antihypertensive therapy.
 - 2) Other prescription and/or OTC medications.
 - 3) Alternative therapies (e.g., herbal).
 - 4) Homeopathies.
- f. Family history of hypertension, cardiovascular disease, diabetes and/or dyslipidemia **or causes of secondary hypertension.**
- g. Results of previous medical assessments of possible causes of hypertension (e.g., labile hypertension or paroxysms of hypertension accompanied by headache, palpitations, pallor and perspiration; abdominal bruits or abdominal or flank masses; delayed or absent femoral artery pulses or decreased blood pressure in the lower extremities; hypokalemia; hypercalcemia; elevated creatinine).
- h. Diet history, including intake of sodium **chloride**, alcohol, saturated fat and caffeine.
- i. Psychosocial and environmental factors (e.g., family situation, employment status, working conditions, educational level).
4. May have one or more of the following symptoms **suggestive of target organ damage and/or clinical cardiovascular disease** (e.g., left ventricular hypertrophy [LVH], angina, prior myocardial infarction [MI] or coronary revascularization, heart failure, stroke or transient ischemic attack [TIA], neuropathy, peripheral arterial disease, chronic kidney disease, retinopathy):
- a. Visual disturbances.
 - b. Chest pain.
 - c. Shortness of breath.
 - d. Edema.
 - e. Dizziness.
 - f. Headache.
 - g. Confusion or other neurological symptoms (e.g., difficulty with speech or movement, facial or one-sided numbness).
 - h. Nocturia, urinary frequency, urinary incontinence.

OBJECTIVE

1. Systolic BP (SBP) equal to or greater than 140 mmHg **AND/OR** diastolic BP (DBP) equal to or greater than 90 mmHg (based on the average of at least two measurements (separated by 2 minutes). **Have patient sit quietly for at least 5 minutes before checking the blood pressure and should have avoided caffeinated beverages and smoking for at least 30**

minutes before obtaining measurement. With the patient seated, feet flat on the floor and the arm supported at heart level, measure the blood pressure (BP) in each arm, unless contraindicated in one arm, using the correct blood pressure cuff size. The length of the cuff bladder should encircle at least 80% of the arm and wide enough to encircle 40% of the arm at midpoint. Cuffs that are too large may result in readings that are too low, if cuff is too small, may result in readings that are too high. See Appendix B on page 6.23 for Proper Blood Pressure Measurement.

Recommended cuff sizes:

Arm Circumference	Adult Cuff Size
22 to 26 cm	Small adult (12x22 cm)
27 to 34 cm	Adult (16x30 cm)
35 to 44 cm	Large adult (16x30 cm)
45 to 52 cm	Adult thigh (16x42 cm)

Indicate in the patient's record the arm with the higher reading. The arm with the higher reading is to be used for ongoing evaluation on subsequent visits.

- Systolic BP (SBP) 120-139 mmHg or diastolic BP (DBP) 80-89 mmHg is classified as Prehypertension. Pharmacologic treatment should be initiated in the general population aged 60 years and older to lower blood pressure at SBP equal to or greater than 150 mmHg or DBP equal to or greater than 90 mmHg and treat to goal SBP less than 150 mmHg and DBP less than 90 mmHg. In the general population less than 60 years of age, initiate pharmacologic therapy to lower BP to a DBP goal less than 90 mmHg and to lower BP to a SBP goal less than 140 mmHg. In the population aged 18 years or older with CKD spell out chronic kidney/renal disease and/or diabetes, initiate pharmacologic treatment to lower BP at SBP greater than 140 mmHg or DBP greater than 90 mmHg and treat to goal of SBP less than 140 mmHg and goal DBP less than 90 mmHg. See Figure 1 – Elevated Blood Pressure Chart on page 6.27.**

3. When HBP is identified early before target organ damage occurs, the physical examination usually is normal for the patient's age and sex.
4. If the BP has been elevated long enough, or if the elevation has been high enough to cause damage or complications, physical examination findings may include:
 - a. Optic Fundi - Narrowing, copper-wiring, or A.V. nicking; hemorrhages, exudates or papilledema.
 - b. Chest & Lungs - Rales or congestion.
 - c. Heart - Left ventricular hypertrophy (LVH), premature ventricular contractions (PVCs), a gallop, **unequal blood pressure in both arms**, and/or a displaced point of maximal impulse.
 - d. Arterial Pulses – Bruits auscultated over the carotid arteries or abdominal aorta; distended neck veins, femoral arteries and/or renal arteries.
 - f. Extremities – Edema and/or venous pooling, abnormal peripheral arterial pulsations, intermittent claudication.
 - g. Neurologic - One-sided weakness, cranial nerve weakness, or hyperactive reflexes on the side of an old stroke.

ASSESSMENT

Primary (Essential) Hypertension
(Subjective and objective findings do not indicate a cause of the hypertension.)

1. **If secondary hypertension is suspected because subjective and/or objective findings indicate target organ damage (heart, brain, renal disease, peripheral artery disease or retinopathy), coarctation, Cushing's syndrome, or pheochromocytoma, refer the patient to a physician for further evaluation. Symptoms and findings that might suggest a need for further study or referral include:**
 - a. **Bruits in the carotid, abdominal, or femoral areas**
 - b. **Palpable kidneys**
 - c. **Episodes of sweating, tachycardia, and headache**
 - d. **Absence of femoral pulses**
 - e. **Unequal blood pressure in right and left arms**
 - f. **Palpitations and paroxysmal symptoms**
 - g. **Cushingoid-like appearance (i.e., moon face, buffalo hump, truncal obesity, striae)**
 - h. **Hypokalemia/hyperkalemia**
 - i. **Sleep apnea, such as excessive daytime sleepiness**

2. **Consult with Delegating Physician or his/her designee if patient presents with systolic blood pressure equal to or greater than 200 mmHg and/or diastolic blood pressure is equal to or greater than 110 mmHg.**
3. **Call 911 if patient presents with complaints of chest pain, shortness of breath, severe headache, sudden numbness or weakness of face, arm, or leg on one side, visual disturbances, trouble speaking or understanding, dizziness, loss of balance or coordination.**
4. **Document all referrals, consultations, and actions taken.**

PLAN

DIAGNOSTIC STUDIES

If the hypertension is identified early, diagnostic studies should be within normal limits. They may be abnormal if the BP has been elevated **for a long time or is high to the point that it can cause target organ damage.**

For baseline evaluation:

1. Complete Blood Count (CBC)
2. Serum Potassium
3. Serum Creatinine
4. **Fasting Blood Glucose or Hemoglobin A1c (if diabetes mellitus is known or suspected)**
5. Serum Sodium
6. **Fasting** Total Cholesterol and Lipid Profile
7. Calcium
8. Urinalysis-initial screen may be by dipstick; full urinalysis by laboratory for any positive results
9. ECG
10. Microalbumin by dipstick

THERAPEUTIC

The goal of therapy for hypertension is to minimize end-organ damage by lowering blood pressure. This may be accomplished with only lifestyle modification, or a combination of lifestyle changes and medications.

NON-PHARMACOLOGIC MEASURES

Review the following lifestyle modifications with all **patients**, as applicable:

1. Counsel regarding the Dietary Approaches to Stop Hypertension (DASH), Reduced Sodium Diet. For specific recommendations:
<http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/index.htm>
.
2. Achieve/maintain desirable body weight or Body Mass Index of 18.5-24.9 Kg/m².
3. **Reduce daily sodium intake to less than 2,300 milligrams (mg). Reduce intake to 1,500 mg among persons who are 51 or older, African American or have hypertension, diabetes, or chronic kidney disease.**
4. Reduction of dietary fats and cholesterol to meet DASH recommendations.
5. Moderation of alcohol intake (less than one ounce [30mL] ethanol/day for men and less than 0.5 oz. [15mL] for women). One ounce of ethanol equals 24 oz. beer, 10 oz. wine, or 3 oz. 80-proof whiskey.
6. Adequate dietary potassium intake (if renal function is normal and not taking drugs known to raise potassium, such as ACE Inhibitors) of 4700 mg/day. **Foods that are high in potassium include bananas, potatoes, beans and yogurt.**
7. Adequate intake of calcium, 1000-1500 mg/day based on age.
8. Choose foods that provide more potassium for patients who are not hyperkalemic, dietary fiber, calcium, and vitamin D. These foods include vegetables, fruits, whole grains, and **skim or low-fat** milk and milk products.
9. Regular aerobic physical activity at least 30 minutes per day, most days of the week.
10. Smokers and tobacco users should receive cessation counseling and be referred to the Georgia Quit Line 1-877-270-STOP (7867).

NOTE: Refer to the **latest** Dietary Guidelines for Americans 2010, Appendices 12 and 14 for foods rich in potassium and calcium at <http://www.cnpp.usda.gov/DGAs2010-PolicyDocument.htm> until the **Dietary Guidelines for Americans 2015** are released.

NOTE: Refer to Appendix A on page 14.21 for Definitions and Recommendations for Lifestyle Modifications

PHARMACOLOGIC

The general principles of drug therapy in the treatment of primary hypertension are **based on 2014 Joint National Committee Recommendations.**

- 1. Initiate drug therapy for hypertensive persons aged 60 years or older to a blood pressure goal of less than 150/90 mmHg and hypertensive persons 30-59 years of age to a systolic goal of less than 140 mmHg and diastolic goal of less than 90 mmHg. The same thresholds and goals (less than 140/90) are recommended for hypertensive adults with diabetes or nondiabetic chronic kidney disease as for the general hypertensive population younger than 60 years.**
- 2. Start one drug, titrate to a maximum dose. If BP goal is not achieved with the initial drug at maximum dose, add a second drug from another class (thiazide-type diuretic, CCB, ACEI, or ARB) and titrate to maximum dose. If BP goal is not achieved with maximum dose of 2 drugs, select a third drug from the list (thiazide-type diuretic, CCB, ACEI, or ARB), avoiding the combined use of ACEI and ARB. Titrate the third drug up to maximum recommended dose to achieve goal BP. If goal BP cannot be reached using the drugs included in this protocol or due to any contraindication or the need to use more than 3 drugs to reach goal BP, referral to a physician may be indicated.**
- 3. 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).**
- 4. In the general black population, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or calcium channel blocker (CCB).**
- 5. Patients with diabetes mellitus most likely will require a 2 drug regimen.**
- 6. Be familiar with local discount drug programs and keep an up-to-date list. To the extent possible, order medications from these lists. Consult with the delegating physician as appropriate.**

7. It is essential to assess patient medication adherence and lifestyle modifications.
8. To improve medication adherence, order once per day dosing as appropriate.
9. This protocol is for Primary Hypertension and does not include treatment for patients with impaired kidney function or Chronic Kidney Disease, heart failure or other complicated factors.
10. Patients who are pregnant, planning to become pregnant, or breast-feeding must be referred to an obstetrician for management of hypertension.
11. Thiazide-type Diuretics

NOTES:

- a. Do not give to patients with a known sensitivity to the drug, any component of the formulation or sulfonamide-derived drugs or anuria.
- b. Thiazide-type Diuretics may cause (not all-inclusive list, refer to package insert):
 1. A change in glucose control in patients with prediabetes or diabetes mellitus.
 2. In patients with a history of gout, may precipitate gout event.
 3. In patients with moderate or high cholesterol concentrations, may increase cholesterol concentrations.
 4. Patients may experience fluid or electrolyte imbalances.

Hydrochlorothiazide (HCTZ) tablets

Initial dose: 12.5 mg - 25 mg PO once daily. For older patients, consider starting with a lower initial dose of 12.5 mg and titrating to response.
Usual dose: 25 mg to 50 mg PO once daily in 1-2 divided doses.

OR

Indapamide

Hypertension

Initial dose 1.25 mg PO once daily but if inadequate, dosage may increase to 2.5 mg PO daily.

Usual dose: 1.25 mg to 2.5 mg PO daily

Note: Indapamide has not been shown to adversely affect lipids.

If **patient** does not gain control of BP, or BP does not steadily decrease after 3-4 weeks, increase dosage.

If BP is still uncontrolled, add a second drug from another appropriate class.

Thiazide-type diuretics are often available in combination products.

NOTE: If a diuretic is the initial drug, the second drug may be from any other drug class that fits with the **patient** assessment. However, if a drug from another class besides a diuretic was chosen initially, then the second drug should almost always be a diuretic.

AND/OR

(up to a total of 3 drugs, each from a different class)

12. Angiotensin Converting Enzyme Inhibitor (ACEI) and Angiotensin Receptor Blockers (ARBs):

Notes:

- a. **Do not give the following ACEI or ARB to patients with a known hypersensitivity to the drug or any component of the formulation. For patients who are diabetic and are also taking an ACEI or ARB, they should not take aliskiren if GFR is estimated to be below 60 mL/min (mild loss of kidney function) because the combination may enhance the nephrotoxic effect of the ACEI or ARB. Other patients should be monitored for serum potassium, serum creatinine, and blood pressure periodically.**
- b. **Do not use an ACEI and ARB as concomitant therapy in a patient.**

- c. **Black patients have a smaller response to monotherapy of ACEI and ARBs.**
- d. **Angiotensin Converting Enzyme Inhibitor (ACEI) and Angiotensin Receptor Blockers (ARBs) may cause (not all inclusive list, refer to package insert):**
 - 1) **Angioedema, with the highest frequency within the first 3 months of therapy but may occur with the first dose (less likely with ARB)**
 - 2) **Dry, hacking, nonproductive cough, usually occurs within the first few months of treatment and generally resolves within 1-4 weeks after discontinuation (less likely with ARB).**
 - 3) **Hyperkalemia, potassium should be monitored appropriately.**

12. A. Angiotensin Converting Enzyme Inhibitor (ACEI)

- 1. **For those drugs listed with once or twice daily dosing, the antihypertensive effect may diminish toward the end of the dosing interval especially with the lower dosing. An increased dosing may aid in extending the duration of antihypertensive effect or the need to divide the dose for twice-daily dosing should be assessed by monitoring peak and trough responses.**

Lisinopril tablet 10-40 mg PO daily

Initial Dose: 10 mg PO once daily, not maintained on a diuretic or 5 mg PO once daily, maintained on a diuretic or volume depleted. For older patients, consider starting with a lower initial dose and titrating to response.

Usual dose: 10 mg to 40 mg PO once daily.

OR

Enalapril Maleate

Initial Dose: 5 mg PO once daily, not maintained on a diuretic or 2.5 mg PO once daily, maintained on a diuretic or volume depleted. For older patients, consider starting with a lower initial dose and titrating to response.

Usual dose: 10-20 mg PO daily in 1 or 2 divided doses

OR

Benazepril HCL

Initial Dose: 5 mg PO once daily, if maintained on a diuretic or volume depleted and 10 mg PO once daily if not maintained on a diuretic. For older patients, consider starting with a lower initial dose and titrating to response.

Usual dose: 10 mg to 40 mg PO daily in 1 or 2 divided doses

If patient is compliant after 2-3 weeks but BP is not decreasing, increase dosage until control is gained, side effects become intolerable, or maximum dosage is reached.

OR

12. B. Angiotensin Receptor Blockers (ARBs)

Losartan Potassium

Initial dose: 25 mg PO once daily, if maintained on a diuretic or volume depleted or 50 mg PO daily if not maintained on a diuretic.

Usual dose: 50-100 mg PO daily in 1 or 2 divided doses

OR

Valsartan

Initial dose: 40 mg PO once daily, if maintained on a diuretic or volume depleted or 80 mg PO daily in patients who are not maintained on a diuretic or used as monotherapy. Dose may be increased to achieve desired effect.

Usual dose: 80-320 mg PO daily

OR

Irbesartan

Initial dose: 75 mg PO once daily, if maintained on a diuretic or volume depleted and 150 mg PO once daily, if not maintained on a diuretic.

Usual dose: 150 mg-300 mg PO daily

If patient is compliant after 2-3 weeks but BP is not decreasing, increase dosage until control is gained, side effects become intolerable, or maximum dosage is reached.

AND/OR

(up to a total of 3 drugs, each from a different class)

13. Calcium Channel Blocker

Notes:

- a. **Non-dihydropyridine calcium channel blockers (e.g., diltiazem, verapamil) offer a small protective effect on proteinuria in diabetic nephropathy beyond their antihypertensive action. There is a small additional benefit on proteinuria from addition of nondihydropyridine CCBs to angiotensin-converting enzyme inhibitors.**
- b. **Calcium Channel Blockers may cause (not all inclusive list, refer to package insert):**
 - 1) **Constipation**
 - 2) **Interaction with grapefruit products**
 - 3) **Swelling in the feet or hands**
 - 4) **Gingival hyperplasia**
- d. **Concomitant use of nondihydropyridine calcium channel agents (e.g., verapamil, diltiazem) and β -adrenergic blocking agents can have additive negative effects on myocardium contractility, heart rate, and AV conduction and they may inhibit the metabolism of certain beta-blockers.**

**Dihydropyridine
Amlodipine Besylate**

Initial Dose: 2.5 mg PO once daily may be used when adding amlodipine to other antihypertensive therapy. If used as monotherapy, can initiate at 5 mg PO once daily. Older patients should be initiated at 2.5 mg. In general, titrate in 2.5 mg increments, wait 7 to 14 days between titration steps.

Usual dose: range 5 mg to 10 mg PO once daily

OR

Non-dihydropyridines

Diltiazem Extended Release

**Initial Dose: 120 mg to 180 mg PO once daily
For older patients, consider starting with 120 mg as an initial dose and titrating to response.**

Usual dose: 240 mg to 360 mg PO once daily

Antihypertensive effects usually are evident within the first week. If patient is compliant after 2 weeks but BP is not decreasing, increase dosage until control is gained, side effects become intolerable, or maximum dose is reached (360 mg/day).

OR

Verapamil HCL Sustained-Release (SR)

Note: Please see individual manufacturer insert to determine if the sustained-release form can be safely broken in half. Base on therapeutic efficacy and safety, evaluate weekly and approximately 24 hours after the previous dose. Usually the first antihypertensive effects are evident within the first week of therapy.

Initial Dose: 180 mg PO given in the morning. Lower initial dosages of 120 mg/day may be warranted in

patients who may have an increased response (e.g., elderly patients, patients of small stature.)

If adequate response is not obtained with 180 mg, the dosage may be titrated upward in the following manner at weekly intervals to appropriate response:
240 mg each morning
THEN if needed, titrate up with either 180 mg each morning, plus 180 mg each evening

OR

240 mg each morning plus 120 mg each evening

Usual dose: 240 mg to 360 mg daily
120 mg sustained-release (SR) up to 360 mg/day

Dosage should be adjusted according to patient's blood pressure response.

If BP still is uncontrolled, add a diuretic, if appropriate, or another appropriate drug from a different class, OR, substitute another appropriate drug from a different class.

PATIENT EDUCATION/COUNSELING

1. **Treatment Regimen-Emphasize the importance of adherence with all aspects of the treatment plan: diet, lifestyle changes, medications and importance of keeping follow-up appointments. See Appendix C – Educational Resources on page 6.26.**
 - a. **Establish blood pressure goals and review readings on each visit.**
 - b. **Ask patient what he/she has been doing since the last visit to control their blood pressure.**
 - c. **Ask patient specifically what he/she would like to work on to improve his/her blood pressure.**
 - d. **Ask patient what he/she thinks would make it easier to control his/her blood pressure**
 - e. **Ask patient to tell you how he/she has been taking his/her medication(s).**
 - f. **Ask if patient sometimes forgets to take his/her medication(s)**

- sudden trouble walking, dizziness, loss of balance or coordination; sudden severe headache with no known cause
 - b. Signs and symptoms of heart attack may include:
uncomfortable pressure, fullness, squeezing or pain in the center of the chest lasting more than a few minutes; pain spreading to the shoulders, neck or arms; chest discomfort with lightheadedness, **increased sweating**, profound weakness, fainting, nausea or shortness of breath.
- 5. Assess and administer vaccines indicated according to the current Advisory Committee on Immunization Practices (ACIP) childhood or adult immunization schedule (i.e., those recommended for persons with chronic medical conditions). See the Georgia Immunization Program Manual, Recommended Schedule and Guidelines, for current ACIP schedules and administration guidelines for each vaccine. The Georgia Immunization Manual may be accessed on line at <http://dph.georgia.gov/immunization-publications>

FOLLOW-UP

- 1. Clinic Appointments
 - a. **When beginning antihypertensive therapy, see patients about every 2-4 weeks until blood pressure goal is achieved.**
 - b. **After blood pressure goal is reached and maintained for 3-4 visits, may move to 4-6 week intervals if the patient has reached blood pressure goals and is adjusting to the treatment regimen.**
 - c. **When the patient has reached and maintains blood pressure goals, less frequent (3-6 month) appointment intervals may be sufficient.**

NOTE: Some patients need and/or want closer supervision. Keeping them on a 4-week appointment interval may be necessary.

- 2. Triage assessment of the patient is performed at each visit and includes the information components listed below:

NOTE: Any part of the assessment performed by staff other than the PHN ordering and dispensing medication must be verified by the PHN ordering and dispensing the medication.

- a. Chief complaint.
- b. Physical examination includes:
 - 1) Weight, Body Mass Index, and waist circumference.

- 2) Sitting and standing BP (particularly for patients with diabetes or complaints suggestive of orthostatic hypotension, the elderly and patients taking diuretics). A drop in BP without an increase in pulse rate is suggestive of autonomic neuropathy in patients with diabetes, and of volume depletion in patients taking diuretics.
 - 3) Temperature and pulse rate.
 - 4) Heart and lung sounds.
 - 5) Assessment of extremities.
 - 6) Assess, advise and refer tobacco and nicotine users.**
- c. Adherence to the treatment regimen, including lifestyle modifications and pharmacologic treatment. Note any side effects to medications. **See Patient Education/Counseling section for assessment components.**
 - d. ER/Hospital visits **or change in medical history** since the last visit.
3. Do routine follow-up lab studies to determine the effect of therapy, or when there are symptoms or complaints of problems.
 - a. 3 months after beginning diuretic therapy: potassium and sodium.
 - b. 6 to 12 months: potassium and sodium.
 - c. Obtain baseline serum creatinine and repeat one month after initiation of ACEI/ARB therapy. If serum creatinine elevates to 1.4 mg/dL or greater for women or 1.5 mg/dL or greater for men, consult with **physician** for recommendation of continued therapy and refer patient to the **physician** for treatment and evaluation for renal artery stenosis, hyperaldosteronism.
 - d. Yearly: total cholesterol and lipid profile, hemoglobin/hematocrit, glucose, uric acid, creatinine, calcium, HgbA_{1c} (if has diabetes), and urinalysis by dipstick, by laboratory if any positive results, annual dipstick microalbumin.
 - e. A repeat ECG is indicated if the patient develops new signs and/or symptoms of heart disease (e.g., chest pain or abnormal heartbeats) or evidence of congestive heart failure (e.g., peripheral edema, shortness of breath); otherwise, once every 5 years is acceptable.

REFERRAL/CONSULTATION

1. All **patients** should have, at minimum, a nutritional evaluation and development of an appropriate meal plan by a Registered Dietitian or Public Health Nutritionist, if available.

2. **Assess, advise and refer tobacco and nicotine users.**
3. Allied health professionals - Where available, refer to a pharmacist and/or health educator, as needed, for education and counseling.
4. Medical Consultation - In addition to periodic review by a **physician**, special consultation is indicated if:
 - a. Initial systolic pressure is 180 mmHg or greater (see NOTE, Assessment, p. 6.4).
 - b. Initial diastolic pressure is 110 mmHg or greater (see NOTE, Assessment, p. 6.4).
 - c. Lab results are abnormal, total cholesterol is 200 mg or higher, LDL is 130 mg/dL or greater than 100 mg/dL in persons with diabetes, HDL equal to or less than 40 mg/dL, triglyceride is 200 mg/dL or greater unless person has diabetes and triglyceride is greater than 150 mg/dL, serum creatinine of 1.4 mg/dL or greater for women or 1.5 mg/dL for men or greater, serum potassium of 3.5 mEq or less or 5.5 mEq or greater, or positive microalbuminuria. Refer for abnormal lipids and initiation of pharmacological intervention by the patient's primary care provider. Refer for elevated serum creatinine and microalbuminuria for evaluation for renal disease.
 - d. **For patients with diabetes or persons with unknown diabetes, refer to patient's primary care provider for diagnosis or diabetes management if fasting plasma glucose is equal to or greater than 126 mg/dL or Hemoglobin A1c is greater than 6.5%.**
 - e. Extreme complications/side effects of therapy occur.
 - e. Patient does not respond to therapy.
 - f. Patient is less than 18 years old.
 - g. Patient is pregnant.
 - h. Patient has premature ventricular contractions (PVCs) equal to or greater than 6 per minute, couplets (bigeminy), multifocal PVCs, or irregular heart rate (other than premature atrial contractions).
 - i. Patient has bradycardia (heart rate equal to or less than 56 and is not taking a beta-blocker) or tachycardia (heart rate equal to or greater than 100). Follow district protocol guidelines for management/referral or exceptions or specific instructions documented in writing in the patient's record by the referring physician.
 - j. ECG is abnormal.

5. Document all referrals and the results, including any communication with the provider regarding actions taken. Also document patient refusal and the reason for the refusal to follow up on referrals.

REFERENCES

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Appendix A

Definitions and Recommendations for Lifestyle Modifications

Hypertension

14.22

Definition	Recommendation(s)
<p><u>Overweight/Obesity</u> CDC defines overweight as an adult who has a BMI between 25 and 29.9 and obese as adult who has a BMI of 30 or higher</p>	<p>Weight reduction to maintain a normal body weight (BMI 18.5-24.9)</p>
<p><u>Alcohol Usage</u> According to the Dietary Guidelines for Americans, moderate drinking is up to 1 drink per day for women and up to 2 drinks per day for men. National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines binge drinking as a pattern of drinking that brings blood alcohol concentration (BAC) levels to 0.08 g/dL. This typically occurs after 4 drinks for women and 5 drinks for men—in about 2 hours. The Substance Abuse and Mental Health Services Administration (SAMHSA), which conducts the annual National Survey on Drug Use and Health (NSDUH), defines binge drinking as drinking 5 or more alcoholic drinks on the same occasion on at least 1 day in the past 30 days. SAMHSA defines heavy drinking as drinking 5 or more drinks on the same occasion on each of 5 or more days in the past 30 days.</p>	<p>If alcohol is consumed, it should be limited to 1 drink per day for women and up to 2 drinks per day for men.</p> <p>One drink is defined as 12 fluid ounces of regular beer (5% alcohol), 5 fluid ounces of wine (12% alcohol), or 1.5 fluid ounces of 80 proof (40% alcohol) distilled spirits. One drink contains 0.6 fluid ounces of alcohol.</p>
<p>High Salt Intake Average daily consumption of dietary sodium is 3500 mg/day</p>	<p>2010 Dietary Guidelines recommend reduction of sodium intake to less than 2,300 mg per day and further reduction to 1,500 mg per day in persons who are 51 and older, those of any age who are African American, or have hypertension, diabetes, or chronic kidney disease.</p>
<p>Physical Inactivity Little to no moderate to vigorous activity in the past 30 days. BRFSS defines sedentary lifestyle as no reported activity or any physical activity or pair of activities done for less than 20 minutes or less than three times per week.</p>	<p>2008 Physical Activity Guidelines for Americans published by the U.S. Department of Health and Human Services.</p> <p>Adults (aged 18–64)</p> <ul style="list-style-type: none"> •Adults should do 2 hours and 30 minutes a week of moderate-intensity, or 1 hour and 15 minutes (75 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic physical activity. Aerobic activity should be performed in episodes of at least 10 minutes, preferably spread throughout the week. •Additional health benefits are provided by increasing to 5 hours (300 minutes) a week of moderate-intensity aerobic physical activity, or 2 hours and 30 minutes a week of vigorous-intensity physical activity, or an equivalent combination of both.

	<ul style="list-style-type: none">•Adults should also do muscle-strengthening activities that involve all major muscle groups performed on 2 or more days per week. <p>Older Adults (aged 65 and older)</p> <ul style="list-style-type: none">•Older adults should follow the adult guidelines. If this is not possible due to limiting chronic conditions, older adults should be as physically active as their abilities allow. They should avoid inactivity. Older adults should do exercises that maintain or improve balance if they are at risk of falling.
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Appendix B

Proper Technique for Blood Pressure Measurement

Hypertension should not be determined on a single measurement nor on initial contact. Elevated readings should be confirmed on at least two (2) subsequent

visits. Because blood pressure is variable and can be affected by many factors, every effort should be made to insure that blood pressure measurements are properly obtained. The approved procedure for blood pressure measurement should be:

Equipment:

1. Inspect blood pressure equipment for cracks, leaks or malfunction. Only properly calibrated equipment should be used.
2. Gather equipment
3. **Cuff Size:** Always use correct cuff size. The use of an incorrect cuff will result in an invalid reading: cuffs that are too large may result in readings that are too low, if cuff is too small, may result in readings that are too high. Several sizes are available: Adult, Large Adult (Obese), and Thigh. The width of the cuff should be equal to approximately two-thirds the distance from the axilla to the antecubital space. The bladder should be long enough to encircle at least 80% of the arm. If the bladder is too short, erroneously high readings may occur and low readings may occur with a bladder that is too wide. Wrap the deflated cuff snugly around the arm approximately one (1) inch (2 fingers width) above the antecubital space.

Recommended cuff sizes:

Arm Circumference	Adult Cuff Size
22 to 26 cm	Small adult (12x22 cm)
27 to 34 cm	Adult (16x30 cm)
35 to 44 cm	Large adult (16x30 cm)
45 to 52 cm	Adult thigh (16x42 cm)

4. **Manometers:** The mercury manometer is the preferred instrument. The mercury column should be read at eye level. Aneroid manometers should be checked regularly, every 3-6 months) to determine accuracy. The dial at the zero mark of an aneroid under no pressure does not mean that the instrument will provide accurate readings.
5. **Stethoscope:** Tubing should be no longer than 38 cm. ear pieces should point forward and the bell portion should be used.

Participant Preparation

1. Patient should avoid exertion, smoking or eating, and ingestion of caffeine for thirty (30) minutes prior to measurement.

2. Allow patient to sit quietly for five (5) minutes before taking blood pressure. Patient should be seated with his/her back fully supported by the chair and legs uncrossed. Ask the participant which arm they prefer to be used. Do not take blood pressure in arm with dialysis fistula, lymph problems, mastectomy or affected side from stroke. Make sure the bare forearm is supported at the level of the heart. Never measure blood pressure over clothing. Ask the participant to roll up the sleeve. If the sleeve is too tight, it may cause an inaccurate reading. If the participant is willing, ask them to slip the arm out of the sleeve. The arm in which the blood pressure is taken should be noted on the results form.
3. Do not talk during measurement.

Procedure

1. Palpate the brachial artery. Apply the appropriate size cuff snugly to bare upper arm with the lower edge of the cuff about 1" above the crease in the elbow. The center of the cuff bladder should be directly over the brachial artery.
2. Palpate the radial pulse and inflate the cuff 20-30 mmHg beyond the reading where the pulse becomes non-palpable. (A person may have an auscultatory gap, a temporary disappearance of the sound after it first appears, which is related to increased arterial stiffness.) Wait 15-30 seconds.
3. Inflate to 30 mm Hg above palpated systolic.
4. Deflate at 2 mm Hg per second
5. Remember the point where the first sound of at least two regular beats (Korotkoff phase 1)
6. Remember point where sound disappears (Korotkoff phase 5 in adults).
7. Record the systolic and diastolic readings. If an auscultatory gap is present, the three numbers should be recorded as __/___/___.
8. Wait 2 minutes. Repeat reading in the same arm. Average the two readings.
9. If readings differ by more than 5 mm Hg, repeat the readings.
10. Do not partially inflate bladder of cuff, release compression and then resume to full inflation of bladder. If full inflation is not achieved initially, release all compression and start over. Stopping inflation of bladder before it is completely filled will result in an inaccurate reading.

POTENTIAL SOURCES OF ERRORS IN BLOOD PRESSURE MEASUREMENT IMPROPER TECHNIQUE

1. Cuff misplacement
2. Arm not bare
3. Arm not supported
4. Arm not at heart level
5. Clothing sleeve binding above blood pressure cuff
6. Repeated cuff inflation without complete deflation and rest
7. Missing highest reading because of auscultatory gap
8. Mixing Korotkoff phases 4 & 5 for Diastolic Blood Pressure (DBP)
9. Deflating the cuff too quickly

EQUIPMENT

1. Cuff too small or too large
2. Inaccurate manometer
3. Leaky bulb valve
4. Stethoscope too long
5. Use of diaphragm/flat side of stethoscope

PARTICIPANT

1. Anxiety
2. Recent smoking or caffeine ingestion
3. Cold
4. Talking (by participant or screener)
5. Full urinary bladder
6. Lack of sufficient rest

Appendix C

EDUCATIONAL RESOURCES

Million Hearts Initiative
<http://millionhearts.hhs.gov/>

Million Hearts Resources

<http://millionhearts.hhs.gov/resources.html>

Toolkits for Health Care Professionals and Patients (English and Spanish)

<http://millionhearts.hhs.gov/resources/toolkits.html>

**National Program to lower blood pressure and prevent hypertension through
patient**

pharmacist engagement

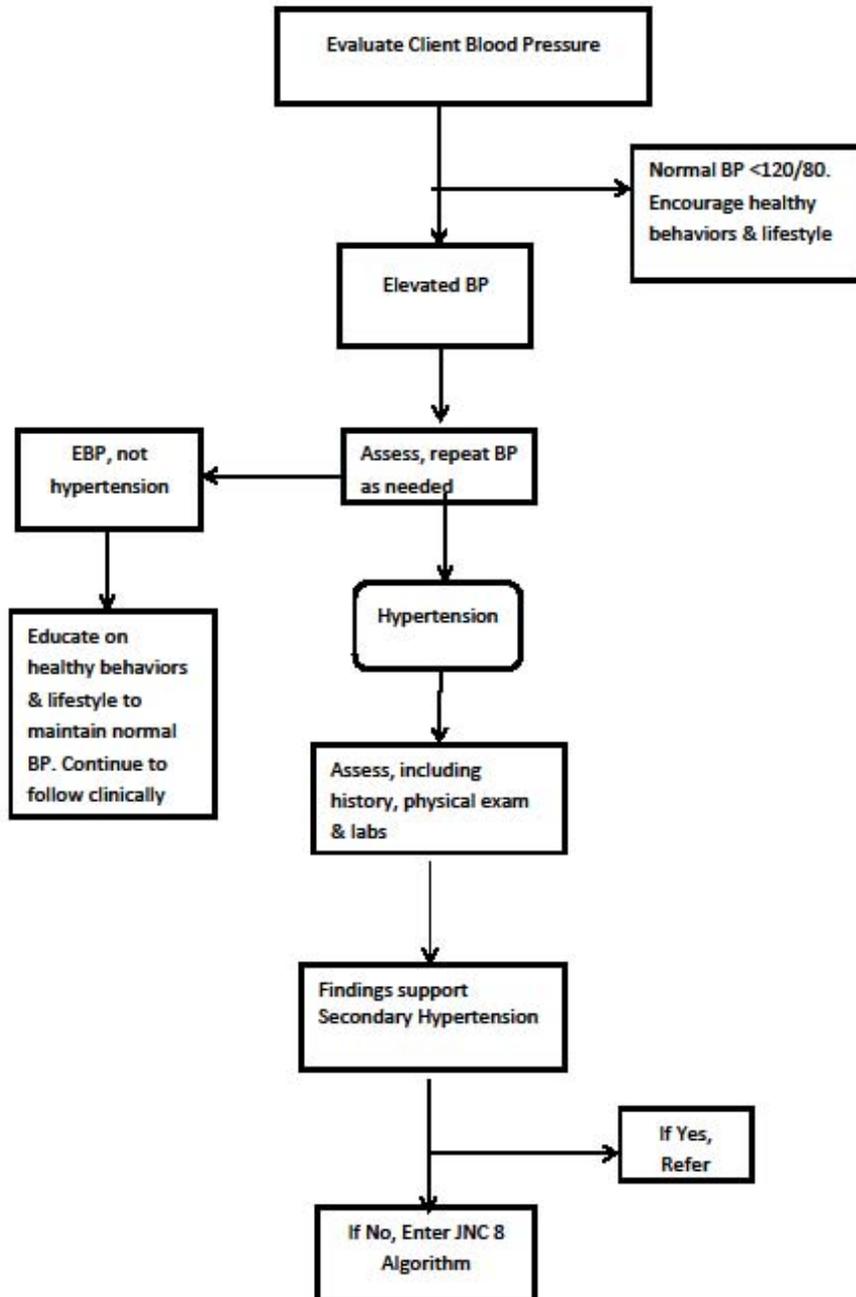
<http://millionhearts.hhs.gov/resources/teamuppressuredown.html>

Your Guide to Lowering Blood Pressure

Your Guide to Lowering Your Blood Pressure with DASH

www.nhlbi.nih.gov

Figure 1 - Elevated Blood Pressure Flowchart



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Figure 2 – Blood Pressure Treatment Algorithm for Adult with No Diabetes or Chronic Kidney Disease

