Management of Hypertension in Prison Populations

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1. Purpose

The Federal Bureau of Prisons Clinical Practice Guidelines for the *Management of Hypertension* provide recommendations for the medical management of inmates with hypertension.

2. Diagnosis

Diagnostic Criteria

Hypertension is diagnosed with an accurately measured systolic blood pressure (SBP) of 140 mm Hg or greater *or* a diastolic blood pressure (DBP) of 90 mm Hg or greater. A lower diagnostic threshold for intervention is indicated for persons with diabetes and/or renal disease: SBP of 130 mm Hg or greater *or* a DBP of 80 mm Hg or greater.

Methodology

Hypertension detection begins with the proper measurement of blood pressure. Measurements are optimally taken with a mercury sphygmomanometer; otherwise, a recently calibrated aneroid manometer or validated electronic device can be used. Diagnostic measurements of blood pressure should not be taken when inmates are acutely ill or taking antihypertensive drugs, following the recent consumption of caffeine or use of nicotine, or during other situations in which the reading may be falsely elevated or depressed from baseline. Blood pressure should be measured using the following guidelines:

- **Inmates should be seated in a chair with their backs supported and their arms bared and supported at heart level.** Ideally the inmate should sit quietly in this position for at least five minutes before blood pressure is measured. Inmates ideally should refrain from smoking, eating, or ingesting caffeine during the 30 minutes prior to the measurement.
- **Under certain circumstances, measuring blood pressure in the supine and standing positions may be helpful diagnostically**, eg, with older persons or with persons who have coexisting cardiovascular disease, congestive heart failure, peripheral arterial disease, or diabetes**.**
- **The appropriate cuff size must be used to ensure accurate measurement:** 12–14 cm wide for an average adult, 15 cm wide on an obese arm. The bladder within the cuff should be about 80% of the circumference of the arm, almost long enough to encircle the arm. Cuffs that are too short or too narrow may give falsely high readings. The recommended blood pressure cuff size is determined by arm circumference, as recommended by the American Heart Association.
- **The blood pressure should at first be estimated by palpation**, by obtaining the radial artery pulse and rapidly inflating the cuff until the radial pulse disappears. The estimated pressure plus 30 mm Hg should be the target for inflation and should prevent discomfort from an unnecessarily high cuff pressure. After inflating the cuff, the cuff should be deflated rapidly to the targeted pressure, then deflated slowly at a rate of 2–3 mm Hg per second. The first detected sound is used to define SBP. The disappearance of sound is used to define DBP.

- **The blood pressure should be taken in both arms at least once.** The normal difference in blood pressure between arms is 5 mm Hg or less, and sometimes as much as 10 mm Hg. Subsequent readings should be measured on the arm with the higher pressure. A pressure difference of more than 10–15 mm Hg between arms suggests arterial compression or obstruction on the side with the lower pressure and warrants further evaluation.

Screening

Inmates should be screened for hypertension by BOP health care providers during intake and periodic physical examinations, evaluations during sick call, and chronic-care clinic evaluations. Elevated readings should be reconfirmed on repeat visits as discussed below.

Diagnostic Monitoring

Inmates diagnosed with hypertension should be monitored through individualized follow-up evaluations with a frequency dependent on the inmate's medical history, cardiovascular risk factors, symptoms, and degree of hypertension detected. The following guidelines should be considered for monitoring inmates' blood pressure:

- **If SBP is <120 mm Hg *and* DBP is <80 mm Hg:** Inmates in this range should have their blood pressure *rechecked at their next periodic physical examination*.
- **If SBP is 120–139 mm Hg *or* DBP is 80–89 mm Hg:**
  - **Inmates in this range who do not have cardiovascular disease or risk factors** should be given information and education about lifestyle modification, and should have their blood pressure *rechecked in 1 year*.
  - **Inmates in this range who do have cardiovascular risk factors** should be reevaluated with *repeated blood pressure measurements during the next 6 months*; if elevated blood pressure is confirmed by these readings, the inmate should be referred to a clinician for classification and baseline evaluation.
  - **All inmates** whose blood pressure is in this range or higher should also be *screened for diabetes*.
- **If SBP is 140–159 mm Hg *or* DBP is 90–99 mm Hg:** Inmates in this range should have their blood pressure *rechecked within 2 months;* if hypertension is confirmed, they should be referred to a clinician for classification and baseline evaluation.
- **If SBP is ≥160 mm Hg *or* DBP is ≥100 mm Hg:** Inmates in this range should have their blood pressure *rechecked within 1 month or as soon as medically indicated*; if hypertension is confirmed, they should be referred to a clinician for classification and baseline evaluation.
- **If SBP is ≥180 mm Hg *or* DBP is ≥110 mm Hg:** Inmates in this range should be *evaluated for signs or symptoms of acute target organ damage* (see Hypertensive Crises in *Section 5* below). Symptomatic inmates should be managed as a hypertensive emergency case or hypertensive urgency case. If the inmate is asymptomatic, he/she should be referred to a clinician immediately for confirmation of blood pressure elevation and initiation of antihypertensive therapy (usually with two drugs—a thiazide, plus either a beta blocker or an ACE inhibitor as first choices.)

3. Classification

Blood pressure measurements in adults are classified into the following four categories:

Normal	SBP <120	***and***	DBP <80
Prehypertension	SBP 120–139	***or***	DBP 80–89
Stage 1 Hypertension	SBP 140–159	***or***	DBP 90–99
Stage 2 Hypertension	SBP ≥160	***or***	DBP ≥100

- Classifying hypertension should be based on at least 2 or more appropriately measured readings after initially measuring a high blood pressure reading.
- When systolic and diastolic blood pressures fall into different categories, the higher stage should be used to classify blood pressure status.
- In addition to classifying stages of hypertension on the basis of average blood pressure levels, clinicians should specify the presence or absence of target organ disease and cardiovascular risk factors, since these factors are important for classification and treatment purposes.

4. Baseline Evaluation

Objectives

The evaluation of persons with documented hypertension has 3 major objectives:

1) To identify known causes of high blood pressure.

2) To assess the presence or absence of target organ damage and cardiovascular disease, the extent of the disease, and the response to therapy.

3) To identify other cardiovascular risk factors, concomitant disorders, or lifestyle concerns that may define prognosis and guide treatment.

Data for evaluation are acquired through medical history, physical examination, laboratory tests, and—as needed—other diagnostic procedures. In general, the initial history, physical examination, and limited testing provide sufficient data to screen for secondary causes of hypertension. Further diagnostic testing should be undertaken only when clinically indicated—when signs or symptoms of secondary hypertension are suggested by the medical history or physical examination, or when blood pressure control is not achieved with more than two appropriate medications.

Medical History

The baseline medical history for inmates diagnosed with hypertension should be conducted by a clinician and include the following:

- **Documentation of age, sex, and race**, since end organ damage is much more common in the elderly, males, and African-Americans

- **Identification of associated cardiovascular risk factors:**
  - Cigarette smoking
  - Dyslipidemia
  - Diabetes mellitus
  - Obesity (body mass index ≥30; see *Calculation of BMI* under *Physical Examination*)
  - Family history of premature cardiovascular disease (<age 55 in men, <age 65 in women)
  - Microalbuminuria or estimated GFR <60 ml/min
- **Review of initial diagnosis and treatment of hypertension,** if previously detected:
  - Age at onset, stage of hypertension when initially detected, course of development and progression (sudden vs. gradual change), reliability of documentation, and associated symptoms
  - Treatment history, including medications, dosages, responses to therapies, and drug side effects
- **Review of family history** for hypertension, coronary artery disease, diabetes mellitus, renal disease, dyslipidemia, and diseases related to secondary causes of high blood pressure, such as pheochromocytoma, MEN syndrome type II (medullary carcinoma of the thyroid and multiple endocrine neoplasia syndrome), neurofibromatosis, renal disease (eg, polycystic kidney disease)
- **Review of medication history and habits**, including use of prescribed and over-the-counter medications (eg, oral contraceptives, decongestants, diet pills)
- **Degree of alcohol intake**
- **Dietary habits**, with attention to excessive salt intake
- **Use of illicit drugs**, such as cocaine, that may affect blood pressure
- **Attention to relevant portions of the social history:**
  - Factors that may affect the inmate's ability to understand or participate in treatment recommendations, such as educational level, language barriers, and disabilities
  - Potential family or institutional stressors that may affect inmate health, such as relationships with family members and other inmates, work environment, and recent or anticipated court appearances
- **Review of systems,** with emphasis on the following:
  - **Cardiovascular system:** presence or absence of symptoms of angina, myocardial infarction, prior history of coronary revascularization, congestive heart failure, claudication, stroke, or transient ischemic attacks
  - **Pulmonary system:** presence or absence of symptoms of bronchospasm, asthma, or COPD
  - **Genitourinary system:** presence or absence of symptoms of renal disease (eg, hematuria, prior calculi, nocturia, abnormal urinalysis, edema) and history of previous evaluations such as IVP studies or ultrasonography
  - **Endocrine system:** presence or absence of symptoms of pheochromocytoma ("spells" with hypertension and symptoms of headache, tachycardia, and sweating), hyperthyroidism, hypothyroidism, hyperparathyroidism, Cushing's syndrome

Physical Examination

The baseline physical examination should include a focused evaluation for evidence of target organ damage such as left ventricular hypertrophy, arterial bruits, absent pulses, retinopathy, and focal neurologic deficits. The examination should include the following:

- **Two or more blood pressure measurements separated by 2 minutes** should be obtained: one either supine or seated, and another after standing for at least 2 minutes. A fall in SBP of 20 mm Hg or more from the supine to standing position, especially when accompanied by symptoms, indicates orthostatic (postural) hypotension and warrants further evaluation. **The 2 readings should be averaged.** If the 2 readings differ by more than 5 mm Hg, additional readings should be obtained and averaged.
- **Two measurements of leg pulses and pressures** should be made at least once with every hypertensive inmate. Absent, delayed, or diminished pulses in the femoral artery with low or unobtainable arterial pressures in the lower extremities, associated with hypertension in the upper extremities, suggests coarctation of the aorta and warrants further evaluation.
- **Height and weight**
- **Calculation of body mass index (BMI):** *weight (lbs) x 703 ÷ height (inches) squared (in^2)*
  - Normal BMI = 18.5–24.9; obesity = BMI $\geq$30
  - Link to a downloadable version: *http://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm*
- **Funduscopic exam** for evidence of retinopathy (A-V nicking, hemorrhages, or exudates with or without papilledema)
- **Examination of the neck** for carotid bruits, distended veins, and thyroid palpation
- **Heart examination** of rate and rhythm, precordial heave, clicks, murmurs, gallops, and assessment for cardiomegaly
- **Pulmonary exam** for evidence of rales or wheezing
- **Examination of the abdomen** for bruits, enlarged kidneys, masses, abnormal aortic pulsation
- **Examination of the extremities** for diminished or absent peripheral arterial pulsations, femoral bruits, or edema
- **Screening neurological exam**
- **Careful examination of the skin** for café au lait spots, xanthomas, and stigmata of Cushing's syndrome

Diagnostic Evaluations—Routine

The following baseline laboratory tests should be obtained:

- BUN and creatinine
- Serum electrolytes
- Fasting blood glucose
- Fasting lipoprotein analysis
- Complete blood count (CBC) or hematocrit
- Urinalysis
- Electrocardiogram (ECG)

Diagnostic Evaluations—Supplemental

Other studies or procedures may be indicated to investigate potential secondary causes of hypertension, particularly in inmates with the following conditions:

- Age, medical history, physical exam, severity of hypertension, or initial laboratory findings suggesting such secondary causes
- Blood pressures responding poorly to drug therapy
- Well-controlled hypertension with unexpected increase in blood pressures
- Stage 2 hypertension
- Sudden unexpected onset of hypertension
- Specific clinical presentations that suggest possible renovascular hypertension such as:
  - Onset prior to 30 years of age
  - Abdominal bruit, particularly if lateralized
  - Hypertension resistant to treatment
  - Recurrent pulmonary edema
  - Renal failure of unknown cause, often with normal urine sediment
  - Diffuse atherosclerosis in an inmate who smokes
  - Acute renal failure precipitated by antihypertensive therapy, particularly ACE inhibitors

Dental Considerations

Dentists should review the inmate's medical chart prior to beginning the dental encounter, looking for any diagnostic history of hypertension and the current status of the inmate's condition. It is recommended that inmates have their blood pressure monitored at each dental treatment encounter. *At a minimum, inmates should have their blood pressure monitored prior to and during invasive dental procedures*.

Inmates with 2 elevated blood pressure readings (SBP ≥140 or DBP ≥90), separated by at least 2 minutes, in the dental clinic should be referred to health services for diagnostic confirmation and treatment management. Elevated readings may suggest the detection of new hypertension or the need for medical treatment adjustments to regain therapeutic control of the patient's ongoing hypertension.

5. Treatment

The ultimate goal of preventing and effectively controlling hypertension is to reduce morbidity and mortality by the least intrusive means possible. *The primary focus of treatment should be achieving the target systolic blood pressure*. Most hypertensive individuals, especially those older than age 50, will reach the DBP goal once the SBP goal is achieved.

Blood pressures less than 140/90 are associated with a decrease in cardiovascular complications. Treatment to lower levels may be useful, particularly to prevent stroke, preserve renal function, and prevent or slow heart failure progression. The targeted blood pressure should be <140/80 mm Hg for patients with diabetes (lower systolic targets, eg, 130, may be appropriate for certain individuals, eg, younger patients; renal benefits; or risk of stroke, if they can be

tolerated and achieved without undue treatment burden), and <125/75 mm Hg for patients with renal insufficiency and proteinuria >1 gram/24 hours.

Primary Prevention

Blood pressure control is achieved by lifestyle modifications and, as necessary, pharmacologic treatment. All inmates should be advised during intake and periodic examinations to adopt lifestyle changes that will reduce their risk factors for cardiovascular disease, regardless of their current blood pressure.

The following considerations underscore the importance of interrupting or preventing the development of hypertension and its complications:

- A significant portion of cardiovascular disease occurs in persons with blood pressures above normal (120/80 mm Hg), but not high enough to be diagnosed or treated as hypertension (140/90 mm Hg). The risk of cardiovascular disease beginning at 115/75 mm Hg doubles with each increment of 20/10 mm Hg.
- Drug treatment of established hypertension has potential adverse effects on the patient.
- Most persons with established hypertension do not make sufficient lifestyle changes or consistently take their medications to achieve adequate control.
- Even if blood pressure is adequately treated to less than 140/90 mm Hg, these individuals are still at higher risk for complications compared with persons with normal blood pressure.

Lifestyle Modifications

Once the diagnosis of hypertension is confirmed, nonpharmacological treatment with weight reduction, sodium restriction, and increased aerobic exercise is recommended. Many persons can meet blood pressure reduction goals without prescription medications.

➔ Lifestyle modifications should be the initial treatment for inmates with prehypertension, unless they have diabetes mellitus, multiple cardiovascular risk factors, cardiovascular disease, or evidence of target organ damage.

➔ The implementation of lifestyle modifications, however, should not delay the initiation of antihypertensive drug therapy when medically indicated, as outlined in *Appendix 1*, *Hypertension: Classification and Management With Lifestyle Modifications and Drug Therapy*.

Lifestyle modifications include the following:

- **Dietary Management**
  - **Sodium restriction** results in volume contraction and lowers blood pressure in some persons. The relative importance of sodium restriction for treating hypertension is uncertain, but is probably most important in sodium-sensitive populations such as the elderly and African Americans. A sodium reduction to a level of no more than 3–4 grams per day is a realistic goal for most inmates at non-MRCs. Inmates with hypertension and comorbid conditions who are at MRCs should ordinarily be prescribed a diet with no more than 2,400 mg/day of sodium.

➔ See also the BOP *Guidelines for Medical Diets*, which provide recommendations for the management of federal inmates with special dietary needs.

- **Caloric restriction** should be encouraged for inmates who are overweight. Normal BMI is 18.5–24.9. Systolic BP can be lowered 5–20 mm Hg for every 10 kg of weight loss.
- **Restricting cholesterol and saturated fat intake** is recommended.
- **Daily requirements of dietary potassium and calcium** should be maintained. A diet high in fruits, vegetables, and low-fat dairy products will assure adequate intake of these minerals.
- **Caffeine** may raise blood pressure transiently; however, tolerance to the pressor effect of caffeine develops rapidly, and no definitive relationship between caffeine intake and hypertension has been demonstrated.

- **Exercise:** Regular aerobic exercise within the limits of the inmate's cardiovascular status should be encouraged. Not only is exercise helpful in controlling weight, but there is also evidence that physical conditioning may lower arterial pressure. Isotonic exercise (eg, jogging) is better than isometric exercises (eg, weight lifting) because the latter, if anything, may raise arterial pressure.
- **Smoking Cessation:** Cigarette smoking is a powerful risk factor for cardiovascular disease and its multiple complications. Inmates who smoke should be counseled repeatedly and unambiguously to stop smoking.
- **Limit Use of Alcohol and Illicit Drugs:** Alcohol and illicit drugs such as cocaine can exacerbate hypertension and dangerously interact with antihypertensive medications. Inmates with hypertension should be counseled about the deleterious health effects of using illicit drugs and consuming alcohol.

Pharmacologic Treatment

Drug therapy should be initiated if blood pressure is not adequately lowered by lifestyle modifications, or if an inmate is classified with a more advanced stage of hypertension. More than 100 medications are available for the treatment of hypertension. Specific criteria should be considered when selecting an initial therapy, including the demographic characteristics of the inmate, concomitant diseases that may be affected—beneficially or adversely—by a specific antihypertensive agent, BOP formulary status, and potential drug side effects and interactions.

For most inmates, drug therapy should begin with the lowest dose of medication to prevent adverse reactions from too great or too abrupt a reduction in blood pressure, and then titrated gradually to the desired goal. *In general, wait 2 to 3 weeks before increasing the dose or adding a new drug*.

There is a general de-emphasis in the JNC 8 recommendations regarding choice of agent for compelling indications; the recommendations focus on blood pressure control using 4 medication classes, based on the outcome evidence from randomized control trials. These medication classes include thiazide diuretics, calcium channel blockers (CCBs), angiotensin converting enzyme inhibitors (ACEIs), and angiotensin II receptor blockers (ARBs).

➔ ***It is a general recommendation not co-administer ACEIs and ARBs, or only in consultation with a cardiologist or nephrologist.*** *No additional benefit has been seen with co-administration, but increased risk of adverse effects has been noted.*

➔ See *Appendix 2*, *Stepwise Treatment of Hypertension in the BOP*, for an algorithm to be followed in treating hypertension in inmates with and without comorbidities. *Special Treatment Considerations* are discussed in more detail below.

➔ See *Appendix 3*, *Antihypertensive Drug Treatment Considerations for Less Common Comorbidities*.

Special Treatment Considerations

Ischemic Heart Disease

Inmates with both hypertension and stable angina pectoris should ordinarily be taking a beta blocker as part of their medication regimen; alternatively, a *long-acting* CCB can be used. Inmates with unstable angina or recent or remote myocardial infarction (MI) should be treated initially with a beta blocker, and an ACEI or ARB.

- Beta blockers should be prescribed to most post-MI inmates, since they reduce the risk for reinfarction and sudden death (beta blockers without intrinsic sympathomimetic activity should be prescribed).
- The CCBs are also effective in the post-MI setting; however, these agents can aggravate angina and *immediate-release forms of the medication should not be prescribed*.
- Intensive lipid management and aspirin therapy are also indicated.

➔ For more information, see the BOP Clinical Practice Guidelines for *Diagnosis and Management of Stable Ischemic Heart Disease*.

Heart Failure

The ACEIs, ARBs, and beta blockers are first-line agents for treating hypertension complicated by heart failure. If systolic blood pressure is >20 mm Hg above goal range or if diastolic blood pressure is >10 mm Hg above goal range, consideration may be given to initiating with 2 agents: a beta blocker *and* either an ACEI *or* an ARB (*not both*). Symptomatic left ventricular dysfunction may also require the addition of an aldosterone antagonist and/or a loop diuretic.

Diabetes

Two or more medications are often required in diabetic hypertensive inmates to reduce blood pressure to less than 140/80. Lower systolic targets, eg, 130, may be appropriate for certain individuals, eg, younger patients; renal benefits; or risk of stroke, if they can be tolerated and achieved without undue treatment burden.

- The ACEIs or ARBs are preferred since they delay progression of nephropathy. In addition, thiazides, beta blockers, and long-acting CCBs can decrease morbidity from heart disease and stroke in diabetics.

- Beta blockers may be problematic in persons taking insulin, because they blunt the symptomatic response to hypoglycemia, such as tachycardia and diaphoresis.
  - ➔ ***Caution:*** *Beta blockers should be used cautiously in diabetic inmates and only when clearly indicated (eg, coronary artery disease).*
- *For special considerations in African American diabetics, see discussion below under Demographic Factors.*

Chronic Kidney Disease

JNC 8 uses the conventional definition of chronic kidney disease as a GFR below 60 ml/min, or a creatinine >1.5 mg/ml in men or >1.3 mg/ml in women. Most of these individuals will become hypertensive and should be treated aggressively to less than 130/80.

- As with diabetics, the ACEIs or ARBs are the preferred agents, although 2 or more drugs may be needed to reach target BP. Thiazides or CCBs are recommended second agents.
- *Serum creatinine and potassium should be monitored with the initiation of ACEI therapy*. Sustained elevations of BP with treatment suggest possible renal artery stenosis that warrants further diagnostic evaluation and cessation of ACEI therapy. Thiazides should be used if the creatinine is less than 2–2.5 mg/ml, whereas inmates with creatinine levels above this range should be switched to a loop diuretic. Potassium-sparing diuretics should be avoided in persons with renal insufficiency.
  - ➔ *Consider a referral to Nephrology for inmates with serum creatinine of 1.5mg/ml or higher*.

Cerebrovascular Disease

A combination of an ACEI or ARB (not both) *plus* a thiazide *and/or* a CCB is indicated when treating hypertension complicated with cerebrovascular disease.

Demographic Factors

Note: *Age and gender do not markedly affect responsiveness to antihypertensive medications*.

The prevalence of hypertension in African Americans is among the highest in the world. Compared with white Americans, African Americans develop hypertension earlier in life and have higher rates of stage 2 hypertension, which causes a greater burden of complications: an 80% higher stroke mortality rate, a 50% higher heart disease mortality rate, and a 320% greater rate of end-stage renal disease. Because of the high prevalence of cardiovascular risk factors in African Americans—such as obesity, cigarette smoking, and type 2 diabetes—as well as increased responsiveness to reduced salt intake, lifestyle modifications are particularly critical interventions for this group.

African Americans respond less well than whites to monotherapy with an ACEI or a beta blocker; however, when combined with adequate doses of a thiazide, these differential responses are minimized. *It should be noted, however, that ACEI-induced angioedema occurs 2 to 4 times more frequently in African Americans than in other groups*.

Initial Antihypertensive Treatment:

- *For African American inmates*, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic or CCB.
- *For non-African American inmates*, including those with diabetes, initial antihypertensive treatment should include a thiazide-type diuretic, a CCB, an ACEI, or an ARB.

Geriatrics

More than two-thirds of individuals older than age 65 have hypertension. The goals for treating older individuals should be the same as for younger persons, although lower initial medication doses may be required to avoid intolerable side effects. Standard doses of multiple drugs are usually required in older individuals in order to achieve target blood pressures.

Asthma/Chronic Obstructive Pulmonary Disease (COPD)

Non-selective beta blockers (eg, propranolol) should not be prescribed to inmates with hypertension who also suffer from asthma or COPD, except in unique situations; these agents may cause bronchospasm and exacerbate pulmonary disease.

Pregnancy

Methyldopa, beta blockers, and vasodilators are the preferred drugs for hypertension in pregnancy. Methyldopa has been evaluated most extensively and is therefore recommended for women whose hypertension is first diagnosed during pregnancy. The ACEIs and ARBs should not be used during pregnancy, or in women who may become pregnant, due to potential teratogenicity.

➔ *Prior to prescribing any medication for a pregnant woman, please consult the FDA pregnancy categories, which indicate the potential of a drug to cause birth defects*.

Hormone Replacement Therapy and Oral Contraceptives

The presence of hypertension is not a contraindication to postmenopausal estrogen replacement therapy. Oral contraceptives containing both estrogen and a progestin may increase blood pressure. Female inmates treated with oral contraceptives for menstrual disorders should have their blood pressure monitored more frequently once such therapy is instituted.

Treatment Failure

Clinicians should investigate the causes for treatment failure for inmates with poorly controlled hypertension, as outlined in *Appendix 4*, *Causes of Treatment Failure ("Resistant Hypertension")*, and consider the following questions:

- *Is the inmate adhering to the antihypertensive regimen?*
- *Should directly observed therapy ("pill line") be considered for a limited time to assess compliance?*
- *Does the inmate understand the importance of taking medications?*
- *Is the inmate limited by language barriers or disabilities that require specific educational efforts?*
- *Is the inmate taking other medications that may elevate blood pressure?*
- *Does the inmate have any medical conditions that may result in secondary hypertension?*

- *Is there any evidence of illicit drug use, such as cocaine, that may exacerbate hypertension?*
- *Is the drug regimen appropriate for this inmate?*
- *Can blood pressure control be anticipated with upward titration of the dosage of the drug?*
- *Should the current drug be replaced with another drug from a different class that has a different mechanism of action?*
- *Should combination drug therapy be considered?*

➔ Inmates with poorly controlled hypertension should be referred for personal or group education provided by a qualified health care provider. If blood pressure remains poorly controlled, secondary causes of hypertension should be investigated. Consultation with a physician with expertise in treating hypertension should be considered.

Dental Treatment Considerations

Dental management considerations include the recognition that endogenous catecholamines are released with anxiety and during stressful procedures. Existing evidence indicates that the modest use (less than 2 carpules) of 2% lidocaine with 1:100,000 epinephrine carries little clinical risk to hypertensive patients, while providing more profound anesthesia. Care should be exercised in its administration, with slow release during the injection and the assurance that the vessels are avoided.

Any patient presenting with a **SBP ≥160 or DBP ≥100** should have nonurgent dental care deferred until medical clearance. Urgent care may be provided only with intraoperative monitoring. No care should be provided and the inmate should be immediately referred to medical staff when an inmate's blood pressure is **SBP ≥180 or DBP ≥110.**

Other considerations include:

- Cardiovascular effect of the local anesthetics containing vasoconstrictors could be potentiated with the use of non-selective beta-blockers.
- Rapid changes in chair position should be avoided because inmates on antihypertensives are prone to orthostatic hypotension.
- CCBs and other vasodilators can cause gingival hypertrophy, while other antihypertensives can cause side effects such as zerostomia, lichenoid reactions, and altered taste.
- Good oral hygiene should be stressed.

Hypertensive Crises

The initial goal of therapy in hypertensive crises is to reduce mean arterial pressure by no more than 25% within minutes to 2 hours, then toward 160/100 mm Hg within 2–6 hours, avoiding excessive falls in pressure that may precipitate renal, cerebral, or coronary ischemia. Blood pressure should be monitored over a 15–30 minute interval; if it remains greater than 180/120 mm Hg, one of the previously mentioned oral agents may be considered. If the inmate's hypertension does not respond to oral agents, or if signs of a hypertensive emergency develop, the inmate should be transferred to a hospital for emergency care.

➔ ***Caution:*** *Avoid single doses of orally administered clonidine*.

Hypertensive Emergencies

Hypertensive emergencies consist of acute blood pressure elevation associated with signs or symptoms of target organ damage such as hypertensive encephalopathy, intracranial hemorrhage, unstable angina pectoris, acute MI, acute left ventricular failure with pulmonary edema, dissecting aortic aneurysm, or eclampsia. ***Hypertensive emergencies in BOP inmates require that the inmate be immediately transferred to a hospital setting for emergency evaluation and treatment.*** Treatment of hypertensive emergencies with a parenteral agent prior to inmate transfer to the hospital should be prescribed *only* by BOP physicians experienced in treating hypertensive crises or who have consulted with a physician expert in the community.

Hypertensive Urgencies

Hypertensive urgencies are those situations in which it is desirable to reduce blood pressure within a few hours (not necessarily to normal ranges) to prevent or limit target organ damage. Examples include upper levels of stage 2 hypertension, hypertension with optic disc edema, progressive target organ complications, and severe perioperative hypertension. *Elevated blood pressure alone, in the absence of symptoms or new or progressive target organ damage, rarely requires hospitalization*. Hypertensive urgencies can be managed with oral doses of drugs with a relatively fast onset of action. Typically, 2 complementary medications, such as a diuretic plus a beta blocker or an ACEI, are indicated in this setting. The choices include loop diuretics, beta blockers, ACEIs, alpha-2 agonists, or calcium antagonists. *Inmates with hypertensive urgencies should be immediately referred to a BOP physician for evaluation and treatment*.

6. Periodic Evaluations

Most inmates with hypertension should be seen by a clinician within 1–2 weeks of initiation of therapy to assess adherence to drug therapy, the efficacy of treatment, and potential adverse reactions that are likely to affect compliance. More frequent monitoring may be necessary for inmates with stage 2 hypertension. Counseling about building a tolerance to side effects, such as fatigue and impotence, after several weeks of treatment may reassure the inmate that continuation of the medication is acceptable.

If the initial follow-up visit identifies no significant concerns related to drug compliance, the next visit should be in 1–2 months to assess the adequacy of hypertension control. Once blood pressure is stabilized, follow-up should occur during periodic clinician evaluations, depending on the severity of hypertension and its complications.

Routine Chronic Care Evaluations

Routine chronic-care clinic evaluations for hypertension should include the following:

- **Medical history:** The patient history should target the following—
  - Review of adherence to recommended lifestyle modifications
  - Review of adherence to any prescribed drug regimen and assessment of side effects
- **Physical examination:** The examination should include the following elements—
  - Measurement of vital signs, including blood pressure, pulse, and respiration rate
  - Evaluation of heart, lungs, pulses, and extremities

  - Palpation and auscultation of the abdomen for evidence of an aortic aneurysm
  - Funduscopic exam at least annually and whenever clinically indicated
- **Laboratory evaluations:** High dosages of thiazide diuretics (e.g., greater than 100 mg of hydrochlorothiazide or equivalent) may be associated with an increased risk of side effects probably related to hypokalemia, including cardiac arrest. Inmates receiving diuretics should be monitored for hypokalemia, and prescribed potassium-sparing diuretics and/or potassium supplementation as necessary to maintain serum potassium levels.
- **Inmate education:** Inmates should be counseled by health care providers about the natural history of untreated hypertension, the benefits of lifestyle modifications, specific treatment recommendations, and drug side effects. More intensive personal or group educational efforts should be considered for inmates with poorly controlled hypertension. Educational handouts for inmates on hypertension and reducing dietary sodium are in *Appendix 6*, *Inmate Education Materials on Hypertension*.

Documentation

Clinician evaluations and treatment of inmates with hypertension should be documented in the inmate's medical record.

7. Resources for Health Care Staff

Hypertension-related resources that are available on the Internet for health care staff are listed in *Appendix 5*, *Resources for Hypertension Management*.

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Appendix 1. Hypertension: Classification and Management With Lifestyle Modifications and Drug Therapy

BP Classification[1]	Without Compelling Indication	Compelling Indications[2]
Normal **SBP <120** ***and*** **DBP <80**	Encourage lifestyle modifications where appropriate	Encourage lifestyle modifications where appropriate
Prehypertension **SBP = 120–139** ***or*** **DBP = 80–89**	Lifestyle modifications[3] No antihypertensive medications indicated without compelling condition	Lifestyle modifications[3] See *Appendix 2*.
Stage 1 Hypertension **SBP = 140–159** ***or*** **DBP = 90–99**	Lifestyle modifications[3] Thiazide, CCB, ACEI, or ARB	Lifestyle modifications[3] See *Appendix 2*.
Stage 2 Hypertension **SBP ≥160** ***or*** **DBP ≥100**	Lifestyle modifications[3] 2-drug combination required for most inmates: thiazide, CCB, ACEI, or ARB	Lifestyle modifications[3] See *Appendix 2*.

SBP = systolic blood pressure, **DBP** = diastolic blood pressure

ACEI = angiotensin converting enzyme inhibitor, **ARB** = angiotensin receptor blocker, **CCB** = calcium channel blocker

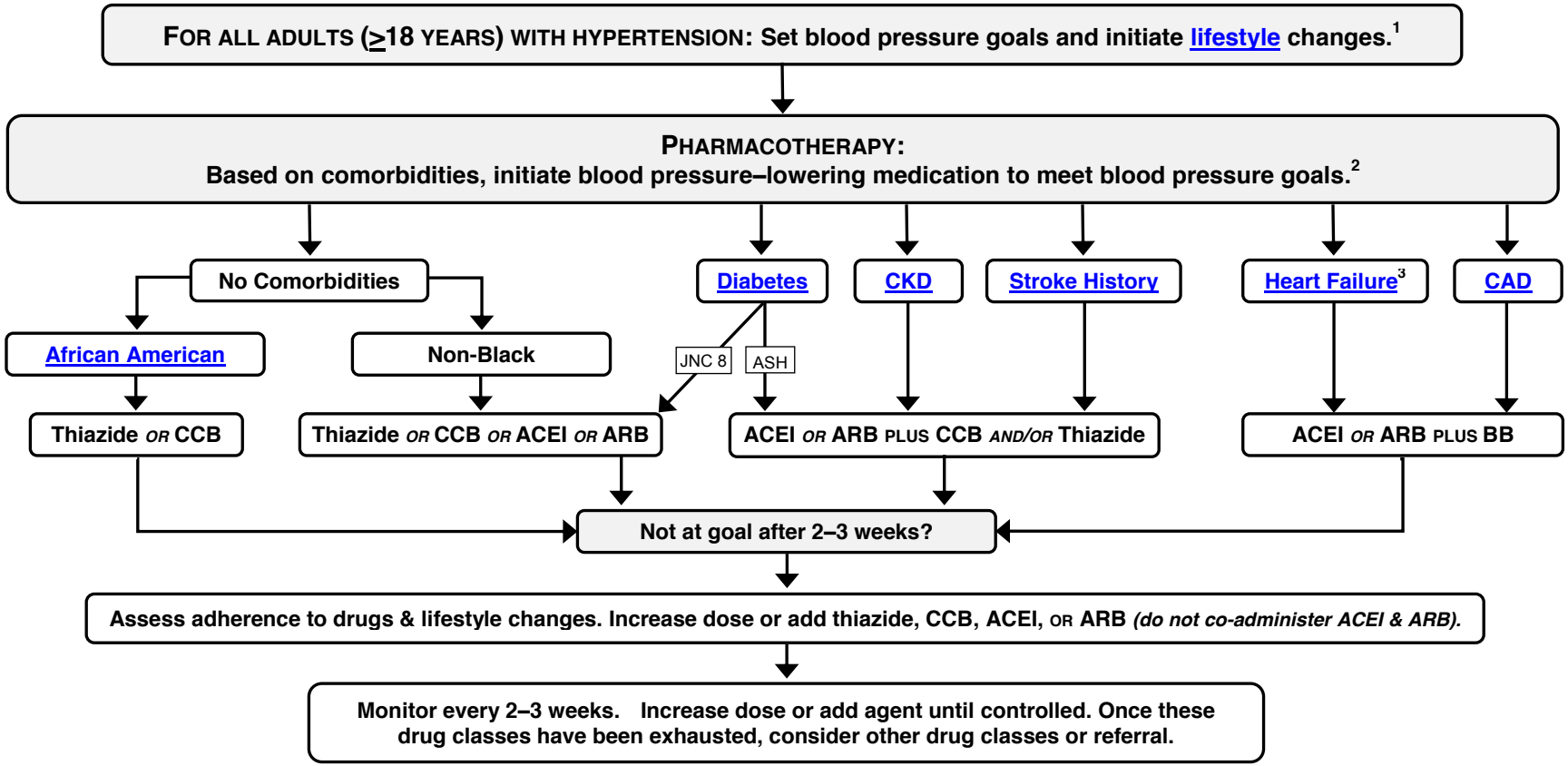
[1] Classification is determined by the highest category, eg, if SBP is 130, but DBP is 95, this is stage 1 hypertension.

[2] Compelling indications are heart failure, recent MI, presence of greater than 2 risk factors for coronary disease, prior stroke, diabetes, or chronic kidney disease *(see Appendix 2).*

[3] Lifestyle modification should be adjunctive therapy for all inmates recommended for pharmacologic therapy. See *Lifestyle Modifications* under *Section 5*, *Treatment*, in these guidelines.

Adapted from JNC 7 and JNC 8 reports. See *References* page.

Appendix 2. Stepwise Treatment of Hypertension in the BOP*



* ***For more detailed discussion on determining appropriate lifestyle changes and medication, please see Section 5, Treatment, in these guidelines.***

ABBREVIATIONS: **ACEI** = angiotensin converting enzyme inhibitor, **ARB** = angiotensin receptor blocker, **ASH** = American Society of Hypertension, **BB** = beta blocker, **CAD** = coronary artery disease, **CCB** = calcium channel blocker, **CKD** = chronic kidney disease, **HTN** = hypertension, **JNC 8** = Eighth Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

[1] Use clinical judgment; consider risk/benefit of treating for each individual when setting BP goal.

[2] Can start with 2 agents, especially if systolic >20 mm Hg above goal or diastolic >10 mm Hg above goal (JNC 8). In patients with uncomplicated stage 1 HTN (without cardiovascular abnormalities or risk factors), consider 6–12 months of lifestyle changes alone before pharmacotherapy (ASH).

[3] Patients with heart failure symptoms should usually receive a diuretic & an aldosterone antagonist (ASH). Amlodipine can be added for additional BP control (ASH).

Adapted from: Stepwise treatment of hypertension. PL Detail-Document #300201. *Pharmacist's Letter*. Published February 2014.

Appendix 3. Antihypertensive Drug Treatment Considerations for Less Common Comorbidities

Inmate Characteristics	Preferred Drugs	Not Preferred (may have adverse effects)
Asthma		Beta blocker
Bradycardia, **Sick sinus syndrome**		Beta blocker Diltiazem Verapamil
Cerebrovascular disease		Alpha-2 receptor agonist
Collagen disease	ACEI CCB	Methyldopa Hydralazine
Dyslipidemia	Alpha blocker	Diuretics (high dose) Beta blocker (non-ISA)
Gout		Diuretic
History of depression		Alpha-2 receptor agonist Reserpine Beta blocker
Migraine	Beta blocker	
Osteoporosis	Diuretic	
Peripheral vascular disease	ACEI CCB Alpha blocker	Beta blocker
Renal insufficiency	Loop diuretic Minoxidil ACEI	Thiazide diuretic Potassium-sparing agent
Supraventricular tachyarrhythmias	Verapamil Beta blocker	

Appendix 4. Causes of Treatment Failure ("Resistant Hypertension")

1. Nonadherence to Therapy
• Inmate concerned about confidentiality • Inadequate inmate education • Lack of involvement of the inmate in the treatment plan • Adverse effects of medication • Organic brain syndrome
2. Pseudo-resistance
• "White-coat hypertension" or clinic elevations • Incorrect blood pressure cuff size (eg, use of regular cuff on large arm)
3. Drug-related causes
• Doses too low • Wrong type of drug • Inappropriate combinations • Drug interactions and actions including: NSAIDs; COX-2 inhibitors; oral contraceptives; sympathomimetics (amphetamines, including appetite suppressants; decongestants); antidepressants; adrenal steroids; licorice (may be found in chewing tobacco); dietary supplements containing ephedra, ma huang, or bitter orange; cocaine; cyclosporine; tacrolimus; and erythropoietin
4. Associated Conditions
• Smoking • Increased obesity • Excessive alcohol use
5. Volume Overload
• Excessive salt intake • Renal insufficiency • Inadequate diuretic therapy (eg, using a thiazide instead of a loop diuretic where creatinine is >2) • Fluid retention from reduction of blood pressure
6. Secondary Hypertension
• Renovascular hypertension • Pheochromocytoma • Primary aldosteronism

Appendix 5. Resources for Hypertension Management

American College of Cardiology

http://www.cardiosource.org/

American Heart Association

http://www.heart.org/HEARTORG/

National Institutes of Health (National Heart, Lung, and Blood Institute)

Body mass index (BMI) calculator for use on iPhone.
http://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm.

Facts about the DASH eating plan. NIH Publication No. 06-4082.

The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. NIH Publication No. 04-5230. www.nhlbi.nih.gov/guidelines/hypertension/jnc7full.htm. Published 2004. Accessed March 9, 2015.

"This complete version of the updated (2004) guidelines for hypertension is written for the health care professional who wants to understand the science behind the new recommendations on high blood pressure. The JNC 8 Complete Report focuses on the new evidence, including a revised treatment algorithm, drug tables, and more."

For more information for health care professionals:
http://www.nhlbi.nih.gov/health/indexpro.htm

For more publications for patients:
http://www.nhlbi.nih.gov/health/index.htm

Appendix 6. Inmate Education Materials on Hypertension

The following pages include materials that can be copied and given to inmates:

- *FAQs for Inmates: What You Should Know About Hypertension* (5 pages)
- *Inmate Fact Sheet on Hypertension (High Blood Pressure)* (1 page)
- *Inmate Fact Sheet on Reducing Sodium (Salt) in Your Diet* (1 page)

FAQs for Inmates: What You Should Know About …

Hypertension (High Blood Pressure)

What is hypertension?

Hypertension is the medical term for high blood pressure. Most people with hypertension feel fine and may not even know that they have high blood pressure. High blood pressure has been called "the silent killer," because it may be life threatening if left untreated. However, with proper care, hypertension can be adequately treated in most patients. Most people with high blood pressure (about 95%) have essential hypertension, meaning the cause is not known. The other 5 percent have secondary hypertension, which means a specific cause can be identified.

How is blood pressure measured?

Measuring blood pressure means measuring the pressure needed to force blood through the blood vessels—first while the heart is pumping (called *systolic* pressure), and then while the heart is at rest (called *diastolic* pressure). A normal blood pressure reading might be 120/80, said as "120 over 80." The top number is the systolic pressure, and the bottom number is the diastolic pressure.

While the diastolic blood pressure stays at about the same level all the time, the systolic blood pressure changes frequently, depending on day-to-day activities and stress.

How is hypertension diagnosed?

An occasional elevated number may not indicate high blood pressure. It takes several repeatedly elevated pressures to diagnose hypertension. When blood pressure is too high (either systolic or diastolic, or both) and remains high, blood cannot flow freely through the arteries and the heart has to pump harder.

Diagnosis	Systolic (top number)*		Diastolic (bottom number)*
Normal (optimal)	Below 120	***and***	Below 80
Prehypertension	120–139	***or***	80–89
Stage 1 Hypertension	140–159	***or***	90–99
Stage 2 Hypertension	160 or more	***or***	100 or more

* measured in millimeters of mercury (mm Hg)

FAQs for Inmates: What You Should Know About …

Hypertension (High Blood Pressure)

What can happen if hypertension is not controlled?

Left uncontrolled, high blood pressure damages and weakens the arteries, the blood vessels that supply the body with fluid, oxygen, and other essential nutrients. As a result, the arteries are more likely to become blocked or to burst, causing serious complications:

➢ Stroke

A stroke occurs when the arteries in the brain become blocked, or when too much pressure causes the arteries to burst and bleed into the brain. Without a supply of blood, and the oxygen and nutrients it provides, brain tissue dies. The functions controlled by that part of the brain are lost. The effects of a stroke, therefore, cover a wide range: minor disabilities, paralysis on one side of the body, difficulty speaking or managing daily activities, total paralysis or difficulty breathing, or death.

➢ Kidney Failure

Kidney failure occurs when tiny vessels in the kidneys become blocked. Because the kidneys shrink and become irregular, they can no longer cleanse the body of wastes. As kidney failure increases, the body is slowly poisoned, and dialysis or organ transplantation may be necessary.

➢ Congestive Heart Failure

Congestive heart failure (CHF) means that not enough fluid is being eliminated from the body, and excess fluid is ending up in the lungs and around the heart. Because high blood pressure forces the heart to work harder to pump blood to the rest of your body, the heart weakens over time. The heart muscle ultimately works less efficiently, loses its elasticity, and becomes enlarged in an effort to "keep up." A person with CHF becomes short of breath (sometimes with a cough), experiences weakness, and retains fluid around the ankles. Without medical intervention, the heart will stop working.

➢ Heart Attack

A heart attack, also called *myocardial infarction* (MI), occurs when a blood vessel that leads to the heart muscle becomes blocked. Often, the heart gives a warning that something is going wrong by producing angina, or chest pain). Nitroglycerin is taken by mouth to control the chest pain. If chest pain occurs and blood pressure is not controlled, there is a risk of heart attack and death.

FAQs for Inmates: What You Should Know About …

Hypertension (High Blood Pressure)

What can I do to help control hypertension?

Lifestyle changes are the first line of treatment for hypertension:

☑ **Lose weight:** Losing weight may lower your blood pressure to a normal level, or may reduce the amount of blood pressure medication that you need to take. In fact, being overweight can make it more difficult for blood pressure medication to work. Check with a health care provider to determine an ideal body weight.

☑ **Exercise (aerobic) regularly:** Aerobic exercise makes the heart and blood vessels function more effectively and can help you lose weight. Walking or riding a stationary bicycle for at least 30 minutes, 3–5 times a week, are good aerobic choices. Avoid muscle-building exercises such as weight lifting, because they may actually increase blood pressure. Check with a health care provider before starting any exercise program. Begin exercise slowly and increase the level of exercise gradually. Don't overdo it!

☑ **Reduce sodium (salt) in your diet:** Eliminating added salt from your diet is an important way to lower blood pressure. Restrict sodium intake to 3–4 grams per day (about 1½–2 teaspoons of salt), including the salt you add to food and the salt that's already in food. Commercially prepared food (processed meat, flavored rice mixes, instant pasta mixes, and many snacks and crackers) contain a large amount of salt. Check the nutritional information on the back of packages.

☑ **Eat foods with less fat:** Foods high in fat are also high in calories, which can lead to weight gain. In addition, some sources of fat (animal fats, in particular) are also high in cholesterol. A high-cholesterol diet can cause plaque buildup inside blood vessels, which raises blood pressure and leads to other serious conditions.

☑ **Stop smoking:** Smoking damages and constricts blood vessels and is, by itself, a risk factor for stroke and heart disease. In fact, smoking a cigarette within 20 minutes of your blood pressure being taken can actually cause a higher reading.

☑ **Avoid extra caffeine:** Drinking more than 2 or 3 cups of coffee or other caffeinated beverage each day may raise blood pressure. Caffeine can quickly raise blood pressure, but it generally does not keep it elevated. Try substituting decaffeinated coffee, tea, or soda.

Making lifestyle changes like these not only helps lower your blood pressure, but it can be a source of pride as you take charge of your health. Consult with a health care provider on how to plan and proceed with these changes.

FAQs for Inmates: What you should know about …

Hypertension (High Blood Pressure)

What medications can be used to control hypertension?

Your doctor may prescribe medications if lifestyle changes alone do not control your blood pressure, or if your blood pressure is exceptionally high.

- ☑ Your health care provider will explain the medication, including the side effects, and will closely monitor how well it controls your blood pressure. **Be sure to ask any questions you might have!**
- ☑ Most people have few, if any, side effects from blood pressure medications. **However, if different or worse symptoms appear after taking the medication, tell a health care provider right away.**
- ☑ High blood pressure medication only works when it's taken as directed. *Never* stop taking a medication without a doctor's consent. Abruptly stopping blood pressure medication can cause a sudden, life-threatening increase in blood pressure**. Follow the instructions and take your medication at the same time every day.**

In selecting an effective blood pressure medication for you, your doctor will consider factors such as race, sex, age, and other medical conditions you might have. There are several major groups of blood pressure medications:

- ➢ **Diuretics,** or "water pills" (such as hydrochlorothiazide), remove excess fluid from the body, which means less work for the heart. Diuretics also remove salts from the body. While it is helpful to remove excess sodium, some diuretics also remove potassium. To avoid losing too much potassium, patients using diuretics should be sure to eat an adequate amount of fruits and vegetables. Diuretics can be extremely effective and are often the first medication used to treat hypertension.
- ➢ **Beta blockers** are also frequently used as early treatment for high blood pressure. Some beta blockers are used to treat high blood pressure when the patient has had a heart attack or has other heart-related problems such as angina, heart beat irregularities, or palpitations. Some beta blockers cannot be used with asthma patients because they may worsen wheezing and breathing problems.
- ➢ **ACEIs** (angiotensin converting enzyme **inhibitors**) are particularly effective for diabetics because they help slow the progression of kidney damage. ACEIs are also used in cases of congestive heart failure and to decrease the development of heart failure.
- ➢ **Calcium Channel Blockers** are often used in patients with angina, rapid heart rate, and erratic heart rate.

FAQs for Inmates: What You Should Know About …

Hypertension (High Blood Pressure)

What medications can raise blood pressure?

Be aware that certain medications can raise blood pressure, and/or interfere with your blood pressure medication:

- Decongestants or cold preparations containing pseudoephedrine or phenylpropanolamine.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) including ibuprofen (Motrin), naproxen (Anaprox), sulindac (Clinoril), piroxicam (Feldene), indomethacin (Indocin), and others. Some cold medicines also contain NSAIDs.
- Steroids, antidepressants, birth control pills, and many illegal drugs such as cocaine, PCP, and all drugs similar to amphetamines.

☑ **If you have high blood pressure, be sure to check with your health care provider before taking other medications.**

Points to Remember …

There are 3 very important concepts to remember about hypertension:

1. **Controlling blood pressure is something that you will need to do for the rest of your life.** You can help control high blood pressure by eating sensibly, exercising regularly, and not smoking.

2. **If you need medication to control your blood pressure, it should be taken every day, and at the same time every day.** Be aware of side effects that might be related to the blood pressure medication you are taking. Remember that certain drugs may interact with blood pressure medication, or may themselves cause blood pressure to go up.

3. **Controlling blood pressure may help you avoid several serious conditions—stroke, heart attack, kidney failure, and blindness.** Seek medical attention immediately if you develop any symptoms of dangerously high blood pressure, such as:
   - severe headache, confusion, or dizziness
   - severe chest or back pain
   - severe shortness of breath
   - weakness or numbness in the arms or legs
   - coughing up blood or nose bleeds
   - visual disturbances.

Inmate Fact Sheet on …

Hypertension (High Blood Pressure)

Hypertension—"the silent killer"

Hypertension is known as "the silent killer" because it can damage your heart, kidneys, blood vessels, and eyes without you even knowing that you have the disease. That's why it's important to live a healthy lifestyle and have your blood pressure checked regularly.

Stages of hypertension

A normal blood pressure might be 120/80, said as "120 over 80." The top number is the systolic pressure, and the bottom number is the diastolic pressure. Below are the stages of hypertension:

Stage	Systolic (top number)*		Diastolic (bottom number)*
Normal (optimal)	Below 120	***and***	Below 80
Prehypertension	120–139	***or***	80–89
Stage 1 Hypertension	140–159	***or***	90–99
Stage 2 Hypertension	160 or more	***or***	100 or more

* measured in millimeters of mercury (mm Hg)

Possible organ damage

- ➤ Stroke
- ➤ Kidney failure
- ➤ Peripheral artery disease (reduced blood flow to the limbs)
- ➤ Eye damage/visual loss
- ➤ Angina (chest pain) and heart attack
- ➤ Congestive heart failure

Risk factors that make hypertension more likely

- ➤ Smoking
- ➤ High cholesterol
- ➤ Diabetes
- ➤ Older than 60
- ➤ Male of any age
- ➤ Women after menopause
- ➤ Family history of heart disease

Ways to help lower high blood pressure

- ☑ Stop smoking
- ☑ Restrict salt intake
- ☑ Exercise/lose weight
- ☑ Avoid extra caffeine
- ☑ Lower cholesterol levels
- ☑ Restrict alcohol use

Drugs to avoid if you have hypertension

- ☑ Anti-inflammatory medications
- ☑ Decongestants
- ☑ Illegal drugs
- ☑ Steroids

Inmate Fact Sheet on …

Reducing Sodium (Salt) in Your Diet

About sodium	➤ Sodium is an essential mineral to have in our diets. Our bodies need a minimum of 500 milligrams (or .5 grams) of sodium per day, equal to about one-fifth of a teaspoon of salt. ➤ A reasonably healthy amount of sodium is 3 to 4 grams daily (1½ to 2 teaspoons of salt). However, most Americans eat 2 to 4 times more sodium than they need, by salting foods and by eating foods high in sodium. ➤ Approximately one-third of our sodium intake comes from the sodium occurring naturally in foods; another one-third comes from sodium in processed food; and the remaining one-third comes from the salt we add at the table. ➤ Most people can significantly reduce their sodium intake by not using the salt shaker! ➤ Reducing dietary sodium is especially beneficial for people with hypertension, congestive heart failure, and renal insufficiency.
Ways to consume less sodium	➤ **Read the labels on the foods sold in the commissary.** The labels list milligrams (mg) of sodium per serving. Considering what you eat in the dining room, and how much you salt your food, your daily intake of sodium from commissary foods should probably not exceed 500 mg. ➤ **Limit how much you eat of the following foods, or avoid them altogether:** ☑ **Meats:** *Avoid* cured meats, bacon, sausage, ham, corned beef, bologna, frankfurters, luncheon meats, sardines, pickled herring, anchovies, and commercially canned or prepared meats. Rinse canned foods such as tuna to remove some of the excess sodium in the packing oil or water. ☑ **Vegetables:** *Avoid* sauerkraut, tomato juice, and V-8 juice. ☑ **Fats:** *Avoid* bacon fat, and gravies (unless prepared with low sodium ingredients). ☑ **Breads and Cereals:** *Avoid* salted crackers and salted snack foods such as potato chips, pretzels, salted nuts, and salted popcorn. *Limit* dry cereal to 3 cups a day. ☑ **Soups:** *Avoid* canned soups and broth, soup mixes, and bouillon. ☑ **Desserts:** *Avoid* commercially prepared pies, cakes, cookies, and pastries. ☑ **Condiments:** *Avoid* salt, seasonings that contain salt (such as celery salt, garlic salt, and onion salt), soy sauce, monosodium glutamate (MSG), meat tenderizers, barbecue sauce, Worcestershire sauce, pickles, relish, and olives. *Limit* salad dressing to 4 tablespoons a day. ☑ **Dairy:** *Limit* milk to 2 cups a day, buttermilk to 1 cup a day, natural cheese to 2 ounces a day, and cottage cheese to a ½ cup a day. *Avoid* processed cheeses altogether.