CCHCS Care Guide: Hypertension

GOAL

BLOOD PRESSURE	< 140/90 mmHg < 130/80 mmHg in diabetic nephropathy with proteinuria

ALERTS

BLOOD PRESSURE
180/110

DIAGNOSTIC CRITERIA/EVALUATION

PREHYPERTENSION *Except for DM or CKD pts. -(see above goal)	SBP 120-139 mmHg	DBP 80-89 mmHg
STAGE 1	SBP 140-159 mmHg	DBP 90-99 mmHg
STAGE 2	SBP ≥ 160 mmHg	DBP ≥100 mmHg

- History: review all medications including OTC, illicit drug history should be recorded on problem list, personal or CHD, FHx of HTN, DM, CKD, PVD, or other CHD equivalent. Obtain symptom history specific to target organ damage and/or related to known CVD comorbid states, if clinically indicated.
- Physical: Usual PE plus verify BP on contralateral arm (take higher reading), pulses, bruits
- Confirm Diagnosis and Rule Out Secondary Causes (see page 2)
- Assess Cardiovascular (CV) Risk & Presence of Target Organ Damage (TOD)
- Obtain Initial Lab Work-up UA, CBC, Chem 10, Fasting Lipid Panel (for CV risk), TSH & ECG (Baseline)

TREATMENT OPTIONS

- Therapeutic lifestyle changes for all. (Low Salt Diet, Cardiovascular Exercise, Weight Loss if BMI ≥ 25)
- When medication indicated choose based on compelling indications (see chart page 3).
- Use a diuretic if no compelling contraindications HCTz 25 mg.
- Often 2 or more medications are needed to achieve BP goal. (Start 2 medications if stage 2 HTN diagnosis)
- Diuretics should usually be included in any regimen of 2 or more drugs.
- If non-adherence identified, ensure pt education is documented , “informed refusal” is signed, and placed in the UHR.
- If BP not controlled with 3 medications, evaluate for causes of secondary HTN and consider referral to a specialist.
- For symptomatic patients with BP> 180/110, notify primary physician (or on call physician) for further evaluation and/ or intervention instructions, if any.
- Patients with elevated BP & symptoms of or ACS, send immediately to TTA for evaluation by onsite physician or to be sent out to community emergency department.

MONITORING

- Check BP’s generally at every visit. Check weekly until at least stage 1 achieved; check monthly until goal achieved: if at goal, not necessary to check routinely outside of scheduled visits.
- Nurse visit blood pressure can be done but provider must review and act as clinically indicated.
- If patient has achieved treatment goals and is clinically stable on a least 2 consecutive encounters, the patient may be reevaluated every 180 days unless the PCP determines the patient needs more frequent monitoring.

Medication

MEDICATION CLASS	MEDICATION	SIDE EFFECT	CONTRAINDICATIONS
DIURETICS	Thiazide- Hydrochlorothiazide	Orthostatic hypotension, hypotension, Photosensitivity, Hypokalemia, hypochloremic alkalosis, hyponatremia, gout precipitation	Hypersensitivity to Thiazides or sulfonamide-derived drugs, anuria, renal decompensation, pregnancy
	Loop- Furosemide, Metolazone, Bumetanide	Excessive fluid/electrolyte loss, gout precipitation, ototoxicity, photosensitivity,	Hypersensitivity to Furosemide or sulfonamide-derived drugs, anuria.
	Mineralocorticoid- Spironolactone	Excessive fluid/electrolyte loss, gynecomastia, tumorigenic (breast cancer), hyperkalemia, hyponatremia, drowsiness, headache, drug fever	Anuria; acute renal insufficiency; significant impairment of renal excretory function; hyperkalemia
DIURETIC- COMBINED	Hydrochlorothiazide/Triamterene	Bradycardia, CHF, edema, hypotension, dizziness, fatigue, headache, constipation, nausea, rash, dyspnea, may cause changes in glucose management	Hypersensitivity to HCTZ, Triamterene, or sulfonamide-derived drugs, anuria, acute and chronic renal insufficiency or significant renal impairment, use with other K+ sparing drugs or K+ supplements, or preexisting hyperkalemia.
BETA BLOCKERS	B1 Selective- Atenolol, Metoprolol	Hypotension, sinus bradycardia, dizziness, increased airway resistance, facilitation of hypoglycemia, hyperkalemia, depression, fatigue, sexual dysfunction	Hypersensitivity to any beta-blocker
	Nonselective- Labetalol, Propranolol, Carvedilol	Hypotension, sinus bradycardia, dizziness, increased airway resistance, facilitation of hypoglycemia, hyperkalemia, depression, fatigue, sexual dysfunction	
ACE-INHIBITORS	Lisinopril, Enalapril	Hypotension, Acute Renal Failure, Hyperkalemia, Cough, Angioedema and anaphylactoid reactions, diarrhea, headache, dizziness	Hypersensitivity to any ACE-Inhibitor, Pregnancy, Patients with idiopathic or hereditary angioedema
CALCIUM CHANNEL BLOCKERS	Dihydropyridines- amlodipine, felodipine, nifedipine	Constipation, headache, dizziness, flushing, peripheral edema, hypotension, palpitation, nausea, heartburn	Hypersensitivity to the specific drug, Immediate Release preparation for treatment of urgent/ emergent hypertension, acute MI.
	Non-dihydropyridines- Verapamil, Diltiazem	gingival hyperplasia (verapamil), constipation, peripheral edema, hypotension, flu-like syndrome, headache, fatigue	Hypersensitivity to specific drug, sick sinus syndrome, 2nd or 3rd degree heart block, severe hypotension, acute MI
ANGIOTENSIN RECEPTOR BLOCKER	Losartan (now formulary) *Candesartan NF*	Renal function deterioration, hyperkalemia, hyperglycemia, angina, hypotension, dizziness, headache, angioedema,	Hypersensitivity to specific drug, severe hepatic impairment and/or cholestasis, pregnancy, breast-feeding
ALDOSTERONE INHIBITORS	Spironolactone	Excessive fluid/electrolyte loss, gynecomastia, tumorigenic (breast cancer), hyperkalemia, hyponatremia, drowsiness, headache, drug fever	Anuria; acute renal insufficiency; significant impairment of renal excretory function; hyperkalemia
PERIPHERAL VASODILATORS	Hydralazine	Tachycardia, angina, paradoxical hypertension, peripheral edema, flushing, anxiety, depression, disorientation, difficulty in micturtion, impotence, drug-induced lupus-like syndrome	Hypersensitivity to specific drug, mitral valve rheumatic heart disease
	Minoxidil	ECG changes (T wave changes), tachycardia peripheral edema, pericardial effusion, angina, hypertrichosis, menstrual changes, diarrhea, nausea	Hypersensitivity to minoxidil, pheochromocytoma
ALPHA ADRENERGIC AGONISTS	Clonidine, Guanfacine	Orthostatic hypotension, drowsiness, dizziness, dry mouth, weakness, skin reactions (transdermal), headache, sedation, fatigue, sexual dysfunction, nausea, vomiting, constipation,	Hypersensitivity to clonidine
ALPHA ADRENERGIC-BLOCKERS	Terazosin,	Dizziness, muscle weakness, peripheral edema, orthostatic hypotension, palpitation, somnolence, nausea,	Hypersensitivity to terazosin
	Doxazosin	Headache, dizziness, orthostatic hypotension, fatigue, edema, somnolence,	Hypersensitivity to quinazolines (prazosin, terazosin) or doxazosin

CAUSE OF SECONDARY/ IDENTIFIABLE HYPERTENSION	CLINICAL FEATURES	EVALUATION FOR THE CAUSE
GENERAL CONSIDERATIONS WHEN TO CONSIDER SECONDARY CAUSES OF HYPERTENSION	• Severe or refractory hypertension • An acute rise in BP over a previously stable value • Proven age of onset before puberty • Age less than 30 years with no family history of hypertension and no obesity	As indicated based on history
CHRONIC KIDNEY DISEASE	Poorly controlled BP, anemia, Abnormal urinalysis	Serum Creatinine, GFR, Renal Ultrasound
RENOVASCULAR DISEASE	• An acute elevation in serum creatinine after administration of ACE inhibitor or angiotensin II receptor blocker • Moderate to severe hypertension in a patient with diffuse atherosclerosis or a unilateral small kidney • Repeated episodes of flash pulmonary edema • Systolic-diastolic bruit (not very sensitive)	Renal arteriogram gold standard but is an invasive test. Only screen if you would recommend corrective procedure for the patient. • Magnetic resonance angiography • Computed tomographic angiography • Duplex Doppler ultrasonography
PRIMARY ALDOSTERONISM	Unexplained hypokalemia with urinary potassium wasting; however, more than one-half of patients are normokalemic	Ratio of plasma aldosterone to plasma renin activity
SLEEP APNEA	Primarily seen in obese men who snore loudly while asleep Daytime somnolence and fatigue and morning confusion	Sleep study
DRUG INDUCED/RELATED	Taking a medication associated with elevating BP	Trial off drug, if possible
THYROID DISEASE / PRIMARY HYPERPARATHYROIDISM	Symptoms of hypothyroidism	TSH/Serum calcium, parathyroid hormone levels
CUSHINGS SYNDROME OR STEROID THERAPY	Cushingoid facies, central obesity, proximal muscle weakness, and ec-chymoses	Dexamethasone-suppression test
PHEOCHROMOCYTOMA	• Paroxysmal elevations in blood pressure • Triad of headache, palpitations, and sweating	24-hour urine catecholamines and metanephrines (Can do serum if needed)
COARCTATION OF THE AORTA	Hypertension in the arms with diminished or delayed femoral pulses, and low or unobtainable blood pressures in the legs	Doppler or CT imaging of aorta

HOW TO TAKE A PROPER BLOOD PRESSURE MEASUREMENT

THE FOLLOWING PROCEDURES ARE RECOMMENDED FOR THE DETECTION AND CONFIRMATION OF HYPERTENSION:

- Patients should be seated in a chair with their backs supported:
  - Arms bared and supported at heart level.
  - Patients should have refrained from smoking or ingesting caffeine during the 30 minutes prior to the reading.
- BP measurement should begin after the patient has been at rest for at least 5 minutes.
- Appropriate cuff size must be used to ensure accurate readings.
  - The bladder within the cuff should encircle at least 80% of the arm.
  - A large adult cuff should be kept in all clinics.
  - At times a thigh cuff is needed to get an accurate BP on a very large arm
- Measurement of BP with a mercury sphygmomanometer is the preferred method. However, a recently calibrated aneroid manometer or a validated electronic device can be used.
- SBP and DBP should be recorded.
- Two or more readings separated by 2 minutes should be obtained and averaged for proper confirmation. If these two readings differ by more than 5 mm Hg, additional readings should be obtained two weeks apart.

CCHCS Care Guide: Hypertension

SUMMARY | **DECISION SUPPORT** | **PATIENT EDUCATION/SELF MANAGEMENT**

This pathway does not replace sound clinical judgement or apply to all patients

HYPERTENSION

1. History: current and past meds including OTC & illicit, personal or FHx of HTN, DM, CKD, PVD, or other CHD Equivalent
2. Physical: Usual PE plus verify BP on contralateral arm (take higher reading), pulses, bruits
3. Confirm Diagnosis and Rule Out Secondary Causes (see page 2)
4. Assess Cardiovascular (CV) Risk & Presence of Target Organ Damage (TOD)
5. Obtain Initial Lab Work-up UA, CBC, Chem 10, Fasting Lipid Panel (for CV risk), TSH & ECG (Baseline)

Goal BP < 140/90 mmHg (Diabetics & CKD <130/80 mmHg)

Prehypertension
SBP 120-139 mmHg
DBP 80-89 mmHg
*No DM or CKD

No CV risk factors
- Encourage lifestyle Δ's
- Nurse BP check once every 3 months*
- PCP Follow annually

≥ 1 CV risk factor
- Modify risk factors
- Nurse BP check up to once/month*
- PCP Follow up to 180 days

Stage 1
SBP 140-159 mmHg
DBP 90-99 mmHg
(DM or CKD >130/80 mmHg)

≤ 1 CV Risk Factor and no DM, CKD, or TOD

Modify risk factor. Lifestyle modifications
Nurse BP checks* q month
PCP Follow-up 3-to 180 days

Controlled?
- Yes → Continue Modifications. Nurse BP check * q 3 mos PCP Follow-up to 180 days.
- No → Lifestyle Modifications and Drug Therapy based on compelling indications. (If no compelling indication start Hydrochlorothiazide 25mg daily)

Nurse BP checks* q week- report at huddle
PCP Follow-up 1-2 mos.

If at goal, continue lifestyle modifications and drug therapy.
Nurse BP check monthly- report at huddle if > 140/90
PCP Follow-up to 180 days

Not at goal, optimize dose or add 2nd drug class.
If no compelling indication start B-blker, ACE-I, or CCB)
Nurse BP check* weekly
PCP Follow-up 1 mon

> 1 CV Risk Factor and/or DM, CKD, or TOD

Lifestyle Modifications and Drug Therapy based on compelling indications. (If no compelling indication start Hydrochlorothiazide 25mg daily)

Nurse BP checks* q week- report at huddle
PCP Follow-up 1-2 mos.

If at goal, continue lifestyle modifications and drug therapy.
Nurse BP check monthly- report at huddle if > 140/90
PCP Follow-up to 180 days

Not at goal, optimize dose or add 2nd drug class.
If no compelling indication start B-blker, ACE-I, or CCB)
Nurse BP check* weekly
PCP Follow-up 1 mon

Stage 2
SBP ≥160 mmHg
DBP ≥100 mmHg

Lifestyle Modification and Two-Drug therapy for most. (Usually thiazide diuretic plus second agent based on compelling indications)

Nurse BP check* twice weekly- report at huddle.
PCP Follow-up in 2-4 weeks.
(If BP >160/100 see within 1 week)

If at goal, continue modifications and drug therapy.
Nurse BP check* monthly until control consistent
PCP Follow-up to 180 days.

Not at goal, optimize doses, change drug class or add third drug based on response.
Nurse BP checks* continue twice weekly.
PCP F/u every 2-4 weeks

Considerations:

Diuretics should usually be included in any regimen of 2 or more drugs.

Change regimen to non-KOP to ensure compliance with medication.

If BP not controlled with 3 medications, reconsider secondary causes & referral to specialist

Abbreviations:
ACE-I- Angiotension Converting enzyme inhibitor
ARB- Angiotension Receptor blocker
CCB- Calcium Channel blocker
CKD-Chronic Kidney disease
DHP-Dihydropyridines
MI- Myocardial infarction

Compelling Indications (CI)

Indication	1st Line	2nd Line	3rd Line	4th Line
No CI	Thiazide Diuretic	ACE-I, CCB, B-blocker	ARB	Vasodilator Alpha-blocker
Diabetes	ACE-I or ARB*	Diuretic	B-blocker or CCB	
Heart Failure	Diuretic with ACE-I	B-blocker	Aldosterone-I or ARB	
Post MI	B-Blocker, ACE-I	Aldosterone-I		
CKD	ACE-I and/or ARB*	Diuretic		
Isolated Systolic HTN	Diuretic	ACE-I		
Stroke	Diuretic with ACE-I or ARB*			
Angina	B-blocker or CCB (non-DHP)			

***Nurse BP Checks:**
For symptomatic pts with BP >180/110 , notify primary physician (or on call physician) for further evaluation and/or intervention, if any.
Check BP's at reasonable intervals suggested above.
USE the data- review any high BP's in huddle
STOP BP checks if you are not using the results or decrease frequency if patient at goal.

CDCR Formulary as of March 2011

Diuretics:
Thiazide- HCTZ
Loop- Furosemide
Metolazone
Bumetanide
Mineralocorticoid-
Spironolactone

Beta-Blockers
Atenolol
Metoptolol
Propranolol
Labetolol
Carvedilol

ACE-Inhibitors
Lisinopril
Enalapril

Calcium Channel Blockers
Amlopidine
Felodipine
Nifedipine
Diltiazem
Verapamil

Alpha-Blockers
Terazosin
Doxazosin

Aldosterone-Inhibitor
Aldactone

Vasodilators
Hydralazine
Minoxidil

Alpha-Agonists
Clonidine
Guanfacine

Angiotension Receptor Blocker
Losartan++

++*ARB – should be reserved for patients intolerant to ACE-I

HYPERTENSION: What You Should Know

Q: WHAT IS BLOOD PRESSURE?

A: Blood pressure is a measure of how hard the blood pushes against the walls of your arteries as it moves through your body.

Q: WHAT IS HIGH BLOOD PRESSURE?

A: While it is normal for blood pressure to go up and down throughout the day, if it stays up, you have high blood pressure. Another name for high blood pressure is hypertension.

Q: WHAT IS WRONG WITH HAVING HIGH BLOOD PRESSURE?

A: When blood pressure is high, it starts to damage the blood vessels, heart, kidneys, and eyes. This can lead to heart attacks, strokes, blindness, kidney failure requiring dialysis, and premature death (shorter life span).

Q: HOW WILL I KNOW IF I HAVE HIGH BLOOD PRESSURE?

A: High blood pressure is called a "silent killer," because it doesn't usually cause symptoms while it is causing this damage. You need to have your blood pressure checked by your medical team.

Your blood pressure consists of two numbers: **SYSTOLIC AND DIASTOLIC**

NORMAL BLOOD PRESSURE		
CATEGORY	**SYSTOLIC** The systolic number shows how hard the blood pushes when the heart is pumping.	**DIASTOLIC** The systolic number shows how hard the blood pushes when the heart is pumping.
NORMAL	LESS THAN 120	**AND** LESS THAN 80
PRE-HYPERTENSION	120-139	**OR** 80-89
HIGH BLOOD PRESSURE		
STAGE 1 HYPERTENSION	140–159	**OR** 90–99
STAGE 2 HYPERTENSION	EQUAL TO OR MORE THAN 160	**OR** EQUAL TO OR MORE THAN 100

HOW IS HIGH BLOOD PRESSURE TREATED?

REDUCE SALT AND SODIUM IN YOUR DIET- Don't add salt to your food. Try to avoid foods with added salt especially items from the Canteen like salted nuts or chips.

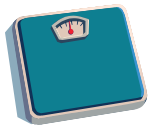
MAINTAIN A HEALTHY WEIGHT-Being overweight increases your risk of developing high blood pressure and makes it harder to treat. Losing even 10 pounds can lower blood pressure.

PHYSICAL ACTIVITY- Being physically active is one of the most important steps you can take to prevent or control high blood pressure.

MEDICATIONS– THERE ARE MANY VARIETIES OF BLOOD PRESSURE-LOWERING MEDICATIONS. THE MOST COMMOM ONES ARE:

- **DIURETICS:** Diuretics are sometimes called "water pills" because they work in the kidney and flush excess water and sodium from the body which lowers the blood pressure. These are among the best medicines and are often used as the first medication.
- **BETA-BLOCKERS**: Beta-blockers reduce nerve impulses to the heart and blood vessels. This makes the heart beat slower and with less force. Blood pressure drops and the heart works less hard.
- **ACE INHIBITORS:** This is often the first choice of blood pressure-lowering medication if you are diabetic. Angiotensin converting enzyme (ACE) inhibitors cause the blood vessels to relax and blood pressure goes down.
- **ANGIOTENSIN ANTAGONISTS:** Angiotensin antagonists also allow the vessels become wider and blood pressure goes down.
- **CALCIUM CHANNEL BLOCKERS (CCBS):**CCBs keep calcium from entering the muscle cells of the heart and blood vessels. This causes the blood vessels to relax and pressure goes down.

HYPERTENSION: What You Should Do

WHAT YOU AND YOUR HEALTHCARE TEAM WILL FOLLOW:	HOW WILL YOU HELP YOURSELF?
 My Blood Pressure:_____/_____ My Blood Pressure Goal:_____/_____ Is my Blood Pressure under control? Yes / No	**TIPS FOR HAVING YOUR BLOOD PRESSURE TAKEN:** ✓ Don't drink coffee or smoke cigarettes 30 minutes before having your blood pressure measured. ✓ Before the test, sit for five minutes with your back supported and your feet flat on the ground. Rest your arm on a table at the level of your heart. ✓ Wear short sleeves so your arm is exposed. ✓ Go to the bathroom prior to the reading. A full bladder can change your blood pressure reading. ✓ Get two readings, taken at least two minutes apart, and average the results. ✓ Ask the doctor or nurse to tell you the blood pressure reading in numbers.
 Weight_____lbs Is this a healthy weight for me? Yes / No	
 Is it safe for me to start doing regular physical activity? Yes / No	
YOUR MEDICATION	**TIPS TO HELP YOU REMEMBER TO TAKE YOUR BLOOD PRESSURE MEDICATIONS**
What is the name of my blood pressure medication?  What are the possible side effects of my medication? Are there any foods, beverages or dietary supplements I should avoid when taking this medicine? What should I do if I forget to take my blood pressure medicine at the recommended time? Should I take it as soon as I remember or should I wait until the next dosage is due?	• Take your medications at the same time every day. Try to link it with something else that you do regularly, like brushing your teeth. If you were told to take your pills with food, try taking them at the same time as you have your meal every day. • Try keeping a chart or calendar to write down when you take your medication., this is especially helpful if you take more than one medication. • Each time you pick up a refill, make a note on your calendar to order and pick up the next refill one week before the medicine is due to run out. Remember to pick up your prescription every month. It will be automatically refilled, as long as the prescription is active.