

**Introduction**

The following evidence-based guideline was developed to assist Primary Care physicians and other health care professional in the outpatient treatment of uncomplicated hypertension in non-pregnant adults aged 18 and older who do not have diabetes, heart failure, renal insufficiency, or known coronary heart disease (CHD). The guidelines also address treatment of two discrete populations: women of childbearing potential and post-stroke patients; and address home monitoring of hypertension, aspirin as adjunctive therapy, and antilipemic therapy in hypertensive patients.

The guideline was developed by the KP National Hypertension Guideline Team, with additional input from the TPMG Regional Hypertension Guideline Team. The recommendations are based on evidence from randomized, controlled trials and meta-analyses. When high-quality evidence is not available, recommendations are made on the basis of consensus reached after literature review.

**Definition**

The national Hypertension Guidelines Team uses the JNC7 classification of hypertension, which is based on the mean of two or more properly measured seated BP readings on each of two or more office visits. The table below is modified from JNC7:

**TABLE 1. Definition of Hypertension (Adapted from JNC7)**

The JNC7 Report defines blood pressure as:	Systolic Blood Pressure (SBP) mm Hg	Diastolic Blood Pressure (DBP) mm Hg
Normal	<120	<80
Prehypertension	120 – 139	80 – 89
Stage I Hypertension	140 – 159	90 – 99
Stage II Hypertension	≥160	≥100

**The Importance of Hypertension Control in Kaiser Permanente**

Controlling hypertension is a very effective way of decreasing the incidence of strokes (CVAs) and myocardial infarctions (MIs) in KP. This is reflected in the numbers needed to treat (**NNTs**) of **63 for CVAs and 86 for MIs**, for all adults. The **NNT is 36** for the combined end-point of CVA plus MI for all adults.

A 2% improvement in identification, and a 5% improvement in initiation of treatment and maintenance of long term control of the Northern California (NCal) and Southern California (SCal) KP adult members with hypertension **can prevent 1324 strokes (CVAs) and 970 myocardial infarctions (MIs)** over the next 5 years. Improving control by 5% in the other KP Regions prevents another 437 CVAs and 320 MIs.

**WHEN TO SCREEN FOR HYPERTENSION**

The U.S. Preventive Services Task Force (USPSTF) strongly recommends that clinicians screen all adults aged 18 and older for hypertension.

**HOW OFTEN TO SCREEN FOR HYPERTENSION**

**Screen adults with normal blood pressure (<120/<80) every two years.**

**Screen adults with pre-hypertension or cardiovascular risk factors annually.**

## Treatment of Hypertension

### WHEN TO BEGIN PHARMACOTHERAPY FOR HYPERTENSION

In addition to lifestyle interventions:

- ▶ **If an individual has blood pressure of 140 to 159 mm Hg systolic, OR 90 to 99 mm Hg diastolic (Stage 1), and does not have target organ damage or diabetes mellitus, then initiate drug therapy as follows:**
  - If there is documentation of elevated blood pressure ( $\geq 140$  mm Hg systolic, **OR**  $\geq 90$  mm Hg diastolic) for  $\geq 2$  to 3 months prior to the current measurement, initiate pharmacotherapy.
  - If this is the first elevated measurement, wait approximately  $\geq 2$  to 3 months. After  $\geq 2$  to 3 months, if blood pressure is  $\geq 140$  mm Hg systolic, **OR**  $\geq 90$  mm Hg diastolic, initiate pharmacotherapy.
- ▶ **If an individual has blood pressure of 160 to 179 mm Hg systolic, OR 100 to 109 mm Hg diastolic (Stage 2), and does not have target organ damage or diabetes mellitus, initiate pharmacotherapy:**
  - If there is documentation of elevated blood pressure ( $\geq 140$  mm Hg systolic, **OR**  $\geq 90$  mm Hg diastolic) for one or more months prior to the current measurement.
  - If this is the first elevated measurement, wait approximately one month. After one month, if blood pressure is  $\geq 140$  mm Hg systolic, **OR**  $\geq 90$  mm Hg diastolic, then initiate pharmacotherapy.
- ▶ **If an individual has blood pressure  $\geq 180$  mm Hg systolic, OR  $\geq 110$  mm Hg diastolic, initiate pharmacotherapy.**

### APPROPRIATE OFFICE-BASED TARGET BLOOD PRESSURE\*

**When treating an individual with hypertension, the target office blood pressure is  $\leq 139$  /  $\leq 89$  mm Hg.**

*\*NOTE: In non-pregnant adults*

### HOME BLOOD PRESSURE MONITORING FOR DIAGNOSIS AND MANAGEMENT

- ▶ **Diagnose hypertension in the medical office.**
- ▶ **Perform home self-measurement of blood pressure to:**
  - Identify a low-risk subpopulation of individuals with “white coat hypertension,” without target organ disease or diabetes, for whom medication may not be necessary. These individuals have home blood pressure levels  $\leq 134$  /  $84$  mm Hg but have office blood pressure levels  $\geq 140$  /  $\geq 90$  mm Hg.
  - Attain control in patients with uncontrolled hypertension ( $>135/85$  mm Hg by home monitoring) according to drug treatment algorithms, and by using telephone/e-mail/fax or other electronic patient communications in conjunction with standard provider-based clinic visits.
  - Monitor controlled hypertension over time.

- ▶ **Recommended quality standards for home self-measurement of blood pressure:**
  - Only devices with documented yearly validation within 5 mm Hg systolic and 5 mm Hg diastolic of a blood pressure measure by a nurse, physician, or trained observer are acceptable, preferably those devices approved by Association for the Advancement of Medical Instrumentation, British Hypertension Society, or European Hypertension Society.
  - Devices with visual or printout memory or using telemonitoring are preferred.
  - Eligible patients should have observation of blood pressure competency, with particular attention to miscuffing and common pitfalls of technique during yearly validation. Only brachial pressures are acceptable.
  - A minimum of six home blood pressures should be used, half of which were obtained in the morning.
  - Control by home blood pressure monitoring is defined as a mean of  $\leq 134 / 84$  mm Hg.
  - Since no home blood pressure equivalency for an office blood pressure of  $< 129 / 79$  mm Hg has been demonstrated in the literature, home blood pressure should not be used exclusively as a surrogate in the care of patients with diabetes or chronic kidney disease with a targeted office blood pressure  $\leq 129 / 79$  mm Hg.

#### FIRST-LINE TREATMENT OF HYPERTENSION

**Thiazide diuretics (either as a single agent or in combination) are strongly recommended as first-line agents for initial therapy in people with hypertension.**

#### INITIAL COMBINATION TREATMENT OF HYPERTENSION\*

- ▶ **Combination therapy consisting of a thiazide diuretic plus an ACEI is an option for initial therapy for Stage 1 hypertension (systolic blood pressure 140 to 159 mm Hg, OR diastolic blood pressure 90 to 99 mm Hg).**
- ▶ **Combination therapy of a thiazide diuretic plus an ACEI is recommended for Stage 2 hypertension (systolic blood pressure  $> 160$  mm Hg, OR diastolic blood pressure  $> 100$  mm Hg).**

\* NOTE: In non-pregnant adults who do not have diabetes, heart failure, chronic kidney disease, or known coronary heart disease.

#### STEP-CARE THERAPY FOR HYPERTENSION

Because most people with hypertension will need more than one drug to control their hypertension effectively:

- ▶ **For two drugs:** If blood pressure is not controlled on a thiazide-type diuretic alone, then a thiazide-type diuretic plus ACEI is recommended.
- ▶ **For three drugs:** If blood pressure is not controlled on a thiazide-type diuretic + ACEI, then a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker is recommended.
- ▶ **For four drugs:** If blood pressure is not controlled on a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker, then a thiazide-type diuretic plus ACEI plus dihydropyridine calcium channel blocker plus beta-blocker is recommended.

**DISCRETE POPULATIONS**  
HYPERTENSION TREATMENT  
FOR WOMEN OF  
CHILDBEARING POTENTIAL

- ▶ **ACEIs are contraindicated in pregnancy.**
- ▶ **ACEIs are not recommended for women of childbearing potential who are not practicing highly effective contraceptive measures (IUD or sustained hormone delivery systems).**
- ▶ **It is recommended that women of childbearing potential with a compelling indication for ACEIs\* be warned of possible fetal risk and instructed to use highly effective contraception while continuing to use the ACEI.**

*\*NOTE: Compelling indications for ACEIs include heart failure with systolic dysfunction, diabetes mellitus with microalbuminuria, diabetes mellitus with nephropathy, and nondiabetic proteinuria*

**DISCRETE POPULATIONS**  
POST-STROKE TREATMENT  
OF HYPERTENSION

**Combination therapy with a thiazide diuretic plus an ACE inhibitor is recommended as initial treatment for patients who are post-stroke or post-TIA\* with hypertension or prehypertension.**

*\*NOTE: Transient ischemic attack (TIA) is defined as evidence of an acute disturbance of focal neurological or monocular function with symptoms lasting less than 24 hours thought to be due to arterioembolic or thrombotic vascular disease.*

**BEHAVIORAL CHANGE**  
SUPPLEMENTARY  
TREATMENT OF  
UNCOMPLICATED  
HYPERTENSION WITH  
LIFESTYLE MODIFICATIONS

- ▶ **Consuming a diet that is moderately low-sodium, low-fat with a high intake of fruits and vegetables** (DASH diet)
- ▶ **Weight reduction** - for patients with a BMI  $\geq 25$  kg/m<sup>2</sup>
- ▶ **Limiting alcohol consumption** - no more than one alcoholic drink (for women) or two alcoholic drinks (for men) daily
- ▶ **Increasing physical activity** - at least 30 minutes of walking or equivalent at least three times per week
- ▶ **Tobacco cessation**

**BEHAVIORAL CHANGE**  
ADHERENCE TO MEDICATIONS  
AND LIFESTYLE  
MODIFICATIONS

The following are recommended:

- ▶ **Assist patients to achieve medication and lifestyle adherence** by means of a vigorous step-care approach to therapy and an organized system of regular medical follow-up and review.
- ▶ **Prescribe once-daily medication and combination therapy** whenever possible.
- ▶ **Address depression and anxiety issues** in order to maximize patient adherence. See Depression Guidelines at: [http://qos.har.ca.kp.org/CPG/cpg\\_guidelines.html](http://qos.har.ca.kp.org/CPG/cpg_guidelines.html)
- ▶ **Use patient education in conjunction with other strategies**, particularly in the context of team care utilizing nurses and pharmacists.
- ▶ **Educate patients about their goal pressure** because patients who are knowledgeable about their goal blood pressure are more likely to achieve it.

### Use of Aspirin in Hypertensive Patients Receiving Antihypertensive Medications

FOR PRIMARY  
CARDIOVASCULAR DISEASE  
PROPHYLAXIS

In the absence of known coronary artery disease, stroke or diabetes mellitus:

- ▶ **When the CHD risk is high, low-dose aspirin (81 mg daily) is recommended.** A shared decision-making approach, with a review of the benefits and harms, is recommended.
- ▶ **For individuals with an intermediate risk of CHD, low-dose aspirin (81 mg daily) is an option.** Use of aspirin should be based on a shared decision-making approach and on each individual's benefit/risk\* status.
- ▶ **When the CHD risk is low, aspirin is not recommended.** For low-risk patients who are already taking aspirin, or who express a desire to begin taking it, a shared decision-making approach, with a review of the benefits and harms, is recommended.
- ▶ **Aspirin is not recommended for patients with uncontrolled hypertension.**

*\*NOTE: The benefit for men is primarily reduction in nonfatal MI and the benefit for women is stroke reduction. Low-dose aspirin increases the risk of GI bleeding and hemorrhagic stroke, and the risk of hemorrhagic stroke may increase with uncontrolled hypertension, particularly Stage 2 hypertension. NNTs to prevent one adverse CV outcome vs NNHs (usually a GI bleed requiring transfusion) for men and women on low-dose aspirin for primary CV prophylaxis for 6.4 years are: women NNT = 333 and NNH = 400; men: NNT = 270 and NNH = 303.*

### Use of Antilipemic Therapy in Hypertensive Patients Taking Antihypertensive Medications

**There is no recommendation for or against the use of antilipemic therapy in hypertensive patients in the absence of other significant risk factors.**

**Patients with hypertension should be treated for hyperlipidemia according to their total cardiovascular risk profile.** Refer to the Adult Cholesterol guideline at: [http://qos.har.ca.kp.org/CPG/cpg\\_guidelines.html](http://qos.har.ca.kp.org/CPG/cpg_guidelines.html)

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### MORE INFORMATION

#### GUIDELINES AND IMPLEMENTATION TOOLS

KPNC Clinical Practice Guidelines and implementation tools are available on the QOS intranet website:  
[qos.har.ca.kp.org/CPG/cpg\\_guidelines.html](http://qos.har.ca.kp.org/CPG/cpg_guidelines.html)

KPNC Clinical Practice Guidelines and implementation tools can also be viewed on-line on the KPNC Clinical Library intranet site at [cl.kp.org](http://cl.kp.org)

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### DISCLAIMER

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