KAISER PERMANENTE®
NATIONAL CLINICAL PRACTICE GUIDELINES

Hypertension

Clinical Practice Guidelines

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Hypertension Guidelines

Assessment of 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.**

Definition of Hypertension

The Hypertension Guidelines Project Management Team used the definition of hypertension to be a blood pressure at or above 140 / 90 mm Hg. The guidelines pertain to uncomplicated hypertension, which is defined as hypertension in nonpregnant adults who do not have diabetes, heart failure, renal insufficiency, or known coronary heart disease.

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 1 hypertension	140 – 159	90 – 99
Stage 2 hypertension	≥ 160	≥ 100

When to Screen for Hypertension

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

Methodology: Evidence-based: (A)

How Often to Screen for Hypertension

Blood pressure screening every two years is recommended.

Methodology: Consensus-based

Treatment of Hypertension

When to Begin Pharmacotherapy for Hypertension

In addition to lifestyle interventions, the following are recommended:

1. 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:

   A. If there is documentation of elevated blood pressure (≥ 140 mm Hg systolic, OR ≥ 90 mm Hg diastolic) for ≥ 2 to 3 months prior to the current measurement, then initiate pharmacotherapy.

   B. If this is the first elevated measurement, wait approximately ≥ 2 to 3 months. After ≥ 2 to 3 months, if blood pressure is ≥ 140 mm Hg systolic, OR ≥ 90 mm Hg diastolic, then initiate pharmacotherapy.

2. 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, then:

   A. If there is documentation of elevated blood pressure (≥ 140 mm Hg systolic, OR ≥ 90 mm Hg diastolic) for one or more months prior to the current measurement, then initiate pharmacotherapy.

   B. If this is the first elevated measurement, wait approximately one month. After one month, if blood pressure is ≥ 140 mm Hg systolic, OR ≥ 90 mm Hg diastolic, then initiate pharmacotherapy.

3. If an individual has blood pressure ≥ 180 mm Hg systolic, OR ≥ 110 mm Hg diastolic, then initiate pharmacotherapy.

Methodology: Recommendations 1,2,3 – Consensus

Appropriate Office-Based Target Blood Pressure*

1. When treating an individual with hypertension, the target office blood pressure is ≤ 139 / ≤ 89 mm Hg.

2. When treating an individual with a prior diagnosis of stroke (excluding subarachnoid hemorrhage, subdural hematoma, and post-traumatic stroke), the target office blood pressure is ≤ 129 / ≤ 79 mm Hg for hypertension and ≤ 119 / ≤ 79 mm Hg for prehypertension.

Methodology: Recommendations 1,2 – Consensus

Home Blood Pressure Monitoring for Diagnosis and Management

1. **It is recommended that the diagnosis of hypertension be established in the medical office.**

2. **Home self-measurement of blood pressure is recommended 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 ≤ 134 / 84 mm Hg but have office blood pressure levels ≥ 140 / ≥ 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.

* In nonpregnant adults who do not have diabetes, heart failure, chronic kidney disease, or known coronary heart disease.

3. **The following quality standards are recommended 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 ≤ 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 ≤ 129 / 79 mm Hg.

Methodology: Recommendations 1,2,3 – Consensus

First-Line Treatment of Hypertension

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

Methodology: Evidence-based: (A)

Initial Combination Treatment of Hypertension*

1. Combination therapy consisting of a thiazide diuretic plus an ACEI (or a thiazide diuretic plus other medication if the patient is ACEI-intolerant) 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).

2. Combination therapy of a thiazide diuretic plus an ACEI (or a thiazide diuretic plus other medication if ACEI-intolerant) is recommended for Stage 2 hypertension (systolic blood pressure > 160 mm Hg, OR diastolic blood pressure > 100 mm Hg).

Methodology: Recommendations 1,2 – Consensus

Step-Care Therapy For Hypertension

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

1. **For two drugs:**
   If blood pressure is not controlled on a thiazide-type diuretic alone, then a thiazide-type diuretic + ACEI is recommended.

2. **For three drugs:**
   If blood pressure is not controlled on a thiazide-type diuretic + ACEI, then a thiazide-type diuretic + ACEI + beta-blocker is recommended.

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

Methodology: Recommendations 1,2,3 – Consensus

* In nonpregnant adults who do not have diabetes, heart failure, chronic kidney disease, or known coronary heart disease.

Discrete Populations – Hypertension Treatment for Women of Childbearing Potential*

1. ACEIs are contraindicated in pregnancy.

2. ACEIs are not recommended for women of childbearing potential who are not practicing highly effective contraceptive measures (IUD or sustained hormone delivery systems).

3. 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.

Methodology: Recommendations 1,2,3 – Consensus

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.

Methodology: Evidence-based: (B)

* See the Treatment of Hypertension in Women of Childbearing Potential Practice Resource for additional details. ACEIs are contraindicated in pregnancy and not recommended in most child-bearing aged women. http://cl.kp.org/pkc/national/cmi/programs/hypertension/practice_resource/htn_pregnancy_practice_resource.pdf

† Compelling indications for ACEIs include heart failure with systolic dysfunction, diabetes mellitus with microalbuminuria, diabetes mellitus with nephropathy, and nondiabetic proteinuria.

‡ 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

The GDT elected not to update this recommendation for the 2007 update.

1. A moderately low-sodium, low-fat diet with a high intake of fruits and vegetables (DASH diet) is recommended to supplement pharmacotherapy for patients with hypertension.

2. Weight reduction is recommended for patients with a BMI $\geq$ 25 kg/m^2 on antihypertensive medications.

3. It is recommended that hypertension patients who consume alcohol have no more than one alcoholic drink (for women) or two alcoholic drinks (for men) daily.

4. Physical activity (at least 30 minutes of walking or equivalent at least three times per week) is recommended for patients with hypertension who are on medications.

Methodology: Recommendations 1,2,3,4 – Consensus

Behavioral Change – Adherence to Medications and Lifestyle Modifications

The following are recommended:

1. 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.

Methodology: Evidence-based: (B)

2. Once-daily medication and combination therapy whenever possible.

Methodology: Evidence-based: (B)

3. Address issues of depression and anxiety issues in order to maximize patient adherence.

Methodology: Consensus

4. Use patient education in conjunction with other strategies, particularly in the context of team care utilizing nurses and pharmacists.

Methodology: Evidence-based: (B)

5. Educate patients about their goal pressure because patients who are knowledgeable about their goal blood pressure are more likely to achieve it.

Methodology: Consensus

Use of Aspirin in Hypertensive Patients Receiving Antihypertensive Medications

For primary CVD prophylaxis:

- In the absence of known CAD, 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.

Methodology: Evidence-based: (B)

  - 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.

Methodology: Evidence-based: (C)

  - 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.

Methodology: Evidence-based: (D)

- Aspirin is not recommended for patients with uncontrolled hypertension.

Methodology: Evidence-based: (D)

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* A validated risk calculator such as Framingham should be applied. Using the ATP III Framingham 10-year Hard CHD risk calculator(1,2) : low risk is < 10%, intermediate risk is 10 to 20%, and high risk is > 20%. Using the SCAL/NW Dyslipidemia Guideline CAD Risk Tables (based on Framingham 1991) 10-year Total CHD risk calculator: low risk is < 12.5%, intermediate risk is 12.5 to 25%, and high risk is > 25%.

1 National Heart Lung and Blood Institute's ATP III Framingham CHD risk calculator- http://hp2010.nhlbihin.net/atpiii/calculator.asp?usertype=prof

2 1991 Framingham Risk Calculator based on Anderson KM, et al. An Updated Coronary Risk Profile: A Statement for Health Professionals. Circulation 1991; 83(1): 356-362 .

† 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

1. No recommendation for or against the use of antilipemic therapy in hypertensive patients in the absence of other significant risk factors.

Methodology: Evidence-based: (I)

2. Patients with hypertension should be treated for hyperlipidemia according to their total cardiovascular risk profile.

Methodology: Consensus