

# GUIDELINES & PROTOCOLS

## ADVISORY COMMITTEE

### Part I: Detection and Diagnosis of Hypertension

#### Scope

This guideline applies to the detection and diagnosis of hypertension (HT) in non-pregnant adults (aged 19 years and older). This guideline is to be used with “Part II: Treatment of Essential Hypertension”. Hypertension in each category is defined by an elevation of the systolic or diastolic threshold or both.

#### RECOMMENDATION 1: Recommended technique

Details of proper technique and equipment are included on page 2. Blood pressure (BP) measurement should be rigorous in those patients who:

- have known or newly detected elevated BP;
- have cardiovascular target organ damage;\*
- have other risk factors; or
- are receiving antihypertensive therapy.

#### RECOMMENDATION 2: Follow a plan

	Blood pressure is noted to be > 140/90	Exceptions
Visit 1	<ul style="list-style-type: none"><li>• take at least two readings during the visit</li><li>• schedule five further monthly visits to confirm average blood pressure</li><li>• begin search for target organ damage; risk factors; modifiable causes by questioning the patient and reviewing the record.</li><li>• <b>provide lifestyle reminders (ie. smoking cessation, increased exercise, weight reduction) at each visit</b></li></ul>	<ul style="list-style-type: none"><li>• If BP&gt;200/130 or hypertensive urgency (see table) then immediate treatment;</li><li>• If BP&gt;180/110 then second visit should be no more than one week after the first visit.</li></ul>
Visit 2	<ul style="list-style-type: none"><li>• measure blood pressure, if still elevated, then:</li><li>• continue search with further history and physical examination</li><li>• arrange for diagnostic tests before visit three</li></ul>	
Visit 3	<ul style="list-style-type: none"><li>• measure blood pressure</li><li>• Review diagnostic test results</li><li>• If target organ damage and BP&gt;140/90 then diagnosis is confirmed, move to <b>Part II, Treatment of Essential Hypertension</b></li><li>• If no target organ damage but BP&gt;180/105 then diagnosis confirmed, move to <b>Part II, Treatment of Essential Hypertension;</b></li></ul>	<ul style="list-style-type: none"><li>• Pursue indications of modifiable causes.</li><li>• If diabetes or renal disease present then change threshold to 130/80.</li><li>• If proteinuria&gt; 1g/day then change threshold to 125/75.</li></ul>
Visit 4	<ul style="list-style-type: none"><li>• Measure blood pressure</li><li>• Reinforce lifestyle advice</li></ul>	
Visit 5	<ul style="list-style-type: none"><li>• measure blood pressure</li><li>• if BP&gt;140/90 then diagnosis is confirmed, move to Part II: Treatment of Essential Hypertension</li><li>• if BP&lt;140/90 and no target organ damage then review yearly</li></ul>	

**\*Note:** Target organ damage includes: arteriosclerotic heart disease (ASHD), left ventricular hypertrophy (LVH), congestive heart failure (CHF), transient ischemic attack (TIA), cerebrovascular accident (CVA), nephropathy, peripheral vascular disease, and retinopathy.

**Table 1: Recommended technique for measuring blood pressure<sup>1</sup>:**

- I Take measurements with a mercury manometer. Alternatively a recently calibrated aneroid manometer or a validated and recently calibrated electronic device can be used. Aneroid devices and mercury columns need to be clearly visible at eye level.
  - II Choose a cuff so that the bladder inside the cuff encircles 80% of the arm.
  - III Place the cuff so that the lower edge is 3 cm above the elbow crease and the bladder is centred over the brachial artery. The patient should be resting comfortably for 5 minutes in a seated position with back support. The arm should be bare and supported with the antecubital fossa at heart level. There should be no talking, and the patient's legs should not be crossed.
  - IV Increase the pressure rapidly to 30 mm Hg above the level at which the radial pulse is extinguished (to exclude the possibility of auscultatory gap).
  - V Place the stethoscope gently but firmly over the brachial artery.
  - VI Open the control valve so that the rate of drop in the vicinity of the systolic and diastolic level is 2 mm Hg per beat.
  - VII Read the systolic level – the first appearance of a clear tapping sound (phase I Korotkoff) – and the diastolic level – the point at which the sounds disappear (phase V Korotkoff). Record the blood pressure to the closest 2 mm Hg on the manometer (or 1 mm Hg on electronic devices), the arm used and whether the patient was supine, sitting or standing. Record the heart rate and rhythm
  - VIII If Korotkoff sounds persist as the level approaches 0 mm Hg, then the point of muffling of the sound is used (phase IV) to indicate the diastolic pressure.
  - IX To avoid venous congestion, let at least one minute elapse between readings.
  - X Blood pressure should be taken at least once in both arms. If one arm has a consistently higher pressure, use that arm subsequently.
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**Table 2 Hypertensive urgencies and emergencies**

Asymptomatic diastolic blood pressure higher than 130 mm Hg or systolic >200 mm Hg

Accelerated malignant hypertension with papilloedema

**Cerebrovascular:**

- Hypertensive encephalopathy
- Atheroembolic brain infarction with severe hypertension
- Intracerebral hemorrhage
- Subarachnoid hemorrhage

**Cardiac**

- Acute aortic dissection
- Acute refractory left ventricular failure
- Acute myocardial ischemia or infarction with persistent ischemic pain
- Marked rise in blood pressure soon after coronary bypass surgery

**Renal**

- Acute glomerulonephritis
- Renal crises from collagen vascular diseases
- Severe hypertension following renal transplantation

**Excessive circulating catecholamine**

- Pheochromocytoma
- Tyramine-containing foods or drug interactions with monamine oxidase inhibitors
- Sympathomimetic drug use (eg, cocaine use)
- Rebound hypertension after cessation of antihypertensive drugs (eg, clonidine or guanabenz)
- Toxemia of pregnancy: eclampsia

**Surgical**

- Severe hypertension in patients requiring emergency surgery
- Postoperative hypertension
- Postoperative bleeding from vascular suture lines

**Following severe body burns**

- Severe epistaxis

### RECOMMENDATION 3: Investigations

Laboratory tests for patients with hypertension (unless recent investigations are normal):

- Urinalysis
- Blood chemistry (potassium, sodium and creatinine)
- Fasting glucose
- Fasting total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, triglycerides
- Standard 12 lead ECG

### Rationale

**Hypertension remains a major public health issue in Canada. Although the diagnosis and treatment of HT appears simple, this disease remains poorly managed (e.g.) only 50% of Canadians are aware of their diagnosis and only 16% of Canadians with hypertension have adequate BP control.<sup>1</sup>**

Heart disease and stroke are the second and third leading causes of death in BC accounting for 1/3 of all deaths.<sup>2</sup> Hypertension is a significant and controllable risk factor for heart disease, stroke, heart failure, renal disease and recurrent cardiovascular events.<sup>3</sup> Hypertension is also the most common indication in Canada for visits by adults to doctors.<sup>4</sup>

The benefits of lowering blood pressure, in certain settings with certain drugs have been well documented. Reductions in mortality,<sup>5</sup> cardiovascular events,<sup>6, 7</sup> left ventricular hypertrophy,<sup>8</sup> stroke and myocardial infarction,<sup>9</sup> stroke recurrence,<sup>10</sup> Alzheimer's dementia,<sup>11</sup> renal complications,<sup>1</sup> deterioration of renal function,<sup>12</sup> renal failure,<sup>13</sup> and incidence of diabetes<sup>7</sup> have all been associated with successful treatment of hypertension.

Management of hypertension may create illness and serious medical complications such as hypotensive syncope (resulting in falls), renal failure and even death. An effective individualized plan for diagnosis and management of hypertension requires that benefits are considered along with potential harms and costs.

### References

1. Zarnke KB, McAlister FA, Campbell NRC, Levine M, Schiffrin EL, Grover S, et al. The 2001 Canadian recommendations for the management of hypertension: Part one-Assessment for diagnosis, cardiovascular risk, causes and lifestyle modification. *Can J Cardiol* 18:604-624.
2. British Columbia Vital Statistics Agency. Selected vital statistics and health status indicators. One hundred twenty-eighth annual report 1999. Victoria (BC): BC Ministry of Health and Ministry Responsible for Seniors; 1999.
3. 1999 World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension. Guidelines Subcommittee. *J Hypertens* 1999;17(2):151-83.
4. Kaplan NM. Guidelines for the management of hypertension. *Can J Cardiol* 2000;16(9):1147-52.
5. Pitt B, Zannad F, Remme WJ, Cody R, Castaigne A, Perez A, et al. The effect of spironolactone on morbidity and mortality in patients with severe heart failure. Randomized Aldactone Evaluation Study Investigators. *N Engl J Med* 1999;341(10):709-17.
6. Ogilvie RI, Burgess ED, Cusson JR, Feldman RD, Leiter LA, Myers MG. Report of the Canadian Hypertension Society Consensus Conference: 3. Pharmacologic treatment of essential hypertension. *CMAJ* 1993;149(5):575-84.
7. Hansson L, Lindholm LH, Niskanen L, Lanke J, Hedner T, Niklason A, et al. Effect of angiotensin-converting-enzyme inhibition compared with conventional therapy on cardiovascular morbidity and mortality in hypertension: the Captopril Prevention Project (CAPPP) randomised trial. *Lancet* 1999;353(9153):611-6.

8. Schmieder RE, Martus P, Klingbeil A. Reversal of left ventricular hypertrophy in essential hypertension. A meta-analysis of randomized double-blind studies. *JAMA* 1996; 275(19):1507-13.
9. Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension. Final results of the Systolic Hypertension in the Elderly Program (SHEP). SHEP Cooperative Research Group. *JAMA* 1991;265(24):3255-64.
10. Gueyffier F, Boissel JP, Boutitie F, Pocock S, Coope J, Cutler J, et al. Effect of antihypertensive treatment in patients having already suffered from stroke. Gathering the evidence. The INDANA (INdividual Data ANalysis of Antihypertensive intervention trials) Project Collaborators. *Stroke* 1997;28(12):2557-62.
11. Forette F, Seux ML, Staessen JA, Thijs L, Birkenhager WH, Baberskiene MR et al. Prevention of dementia in randomised double-blind placebo-controlled Systolic Hypertension in Europe (Syst-Eur) trial. *Lancet* 1998 24;352(9137):1347-51.
12. Peterson JC, Adler S, Burkart JM, Greene T, Hebert LA, Hunsicker LG et al. Blood pressure control, proteinuria, and the progression of renal disease. The Modification of Diet in Renal Disease Study. *Ann Intern Med* 1995;123(10):754-62.
13. Randomised placebo-controlled trial of effect of ramipril on decline in glomerular filtration rate and risk of terminal renal failure in proteinuric, non-diabetic nephropathy. The GISEN Group. *Lancet* 1997;349(9069):1857-63.

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- to encourage appropriate responses to common medical situations
- to recommend actions that are sufficient and efficient, neither excessive nor deficient
- to permit exceptions when justified by clinical circumstances.

## What is Hypertension?

Hypertension is the medical term for high blood pressure. Blood pressure refers to the force of blood against the blood vessel walls. Normally a person's blood pressure rises and falls during the day. However, when blood pressure constantly stays higher than normal (140/90 mm Hg or higher), a person is considered to have hypertension.

## What Causes Hypertension?

For about 90-95% of people with mildly elevated blood pressure, sedentary lifestyle, smoking, excess abdominal weight, a fatty diet, alcohol consumption and stress contribute to the condition. For the other 5-10% of people, there may be a serious underlying cause of high blood pressure that requires urgent medical attention.

Risk factors for developing hypertension that you cannot change are:

- family history of hypertension or cardiovascular disease
- age of 45 or older (men) or 55 or older for women.

Risk factors for developing hypertension that you can control include lifestyle choices such as:

- smoking
- excessive alcohol consumption
- physical inactivity
- excess weight and high fat diet

## How do I know if I have high blood pressure?

Unfortunately, a person with high blood pressure usually sees or feels no clearly identifiable symptoms of hypertension. That is why you should have your blood pressure measured by your physician, using a blood pressure measuring device. Hypertension is confirmed if blood pressure falls in the following 3 stages of severity.

Severity of Hypertension	Systolic Pressure	Diastolic Pressure
Stage 1	140 to 159 mm Hg	90 to 99 mm Hg
Stage 2	160 to 179 mm Hg	100 to 109 mm Hg
Stage 3	180 mm Hg or higher	110 mm Hg or higher

## What are the Complications of Hypertension?

Hypertension can lead to a number of potentially life-threatening conditions if it is not controlled or treated. The higher your blood pressure, the greater your risk of developing the following problems:

- **Heart Disease:** Hypertension is a major risk factor for heart attack, and the number one risk factor for congestive heart failure (CHF).
- **Stroke:** Hypertension is the leading risk factor for stroke. Very high blood pressure can make a weakened blood vessel rupture and bleed into the brain causing a stroke. A blood clot blocking a narrowed artery can also cause a stroke.
- **Chronic Kidney Disease (CKD):** Hypertension is the second leading cause of chronic kidney disease (diabetes is its leading cause). Hypertension not only causes kidney disease, but it also speeds the deterioration of kidney function to the point where life-saving measures such as dialysis or kidney transplant are needed.
- **Retinopathy (eye damage):** Hypertension can cause small blood vessels to burst or bleed. This can lead to impairments such as blurred vision, or even blindness.

## **How Can I Control my Blood Pressure?**

You can reduce your blood pressure and control hypertension. The following lifestyle choices can help you prevent and control hypertension:

### **✓ *Maintain a healthy body weight***

Excess abdominal fat can lead to hypertension. It is also a major cause of diabetes. Waist circumference should be less than 102 cm for men and less than 88 cm for women. Body-mass index can also be used to assess risk, but this measure is not as good as waist circumference for assessing the risk of developing complications of hypertension. Body-mass index (BMI) can be determined by dividing your weight in kilograms by the square of your height in metres. For example,  $61 \text{ kg} / 1.5\text{m} \times 1.5 \text{ m} = 27$ . The best way to control weight is through diet and exercise.

### **✓ *Exercise regularly***

Exercise is one of the best things you can do for your health. Exercise at least 20 minutes per day. Build physical activity into your daily routine by walking wherever and whenever you can, stretching and moving around frequently, taking the stairs instead of the elevator, and participating in activities that you enjoy. Canada's Physical Activity Web Site contains advice on how to increase your physical activity and reduce your weight.

### **✓ *Eat a well balanced diet***

Eat a healthy diet low in saturated fat, cholesterol and salt. Eating well doesn't have to mean giving up the foods you love. It simply means choosing wisely from a variety of foods and choosing lower fat and less salty foods more often. Call Dial-a-Dietitian at their toll free line 1-800-667-3438 or visit their web site at: <http://www.dialadietitian.org/index.html>.

### **✓ *Reduce salt intake***

The average daily salt intake in North America is about 8.7 grams per day. Salt intake should be 4 grams per day or less. Reducing salt intake can prevent hypertension and lower elevated blood pressure. Dial-a-dietitian has a toll free line 1-800-667-3438 and a web site with information on managing your diet and reducing salt intake to control hypertension. <http://www.dialadietitian.org/rdownloads/resources/handouts/low-na-3.pdf>

### **✓ *Stop smoking***

Smoking is a key risk factor for hypertension, heart attack and stroke. Call BC Smokers Helpline: 1 877 455-2233 (toll-free in B.C.) 10 AM to 6PM

### **✓ *Limit alcohol consumption***

Talk to your doctor about your alcohol intake. Moderate alcohol consumption for most adults is no more than 1 drink a day and no more than 7 drinks a week. More than 4 drinks on any one occasion or more than 14 drinks in a week are considered a risk to your health and safety (taken from Health Canada).

### **✓ *Medications***

Medications can be very effective in keeping your hypertension under control. Discuss the benefits and risks of taking medication for your hypertension with your doctor .

## **British Columbia Internet Resources:**

**The BC Ministry of Health Chronic Disease Management web site** has more detailed information about the management of diseases such as hypertension and diabetes: <http://www.hlth.gov.bc.ca/cdm/patients/index.html>

**The BC HealthGuide Online** provides detailed information on managing hypertension: <http://bchealthguide.org/kbaltindex.asp>

**The Heart and Stroke Foundation of Canada** offers excellent materials for the control of lifestyle factors that contribute to hypertension, heart disease, stroke and kidney disease. This includes a body mass index calculator, a risk factor calculator and specific dietary information: <http://www.heartandstroke.ca/>  
BC/Yukon division office call Toll free 1-888 473-4636.