GUIDELINES & PROTOCOLS
ADVISORY COMMITTEE

Hypertension – Detection, Diagnosis and Management

Effective Date: February 15, 2008

Scope

This guideline focuses on the detection, diagnosis and management of hypertension (HT) in non-pregnant adults (age 19 years and older). Hypertension in each category is defined by an elevation of the systolic or diastolic threshold or both.

Part I: Detection and Diagnosis

Blood Pressure Assessment

A baseline blood pressure (BP) should be established in all adults and reassessed periodically, commensurate with age and the presence of other risk factors.[1]

Details of proper technique and equipment are included in Appendix A. Blood pressure monitoring should be rigorous in those patients who:

- Have known or newly detected elevated BP
- Have cardiovascular target organ damage *
- Have other risk factors
- Are receiving antihypertensive therapy

* *Target organ damage includes: cerebrovascular disease, coronary heart disease (CHD), left ventricular hypertrophy (LVH), chronic kidney disease (CKD), peripheral vascular disease and hypertensive retinopathy.*

Algorithm for the Detection and Diagnosis of Hypertension (see Algorithm 1)

Investigations and Risk Assessment

- Urinalysis
- Blood chemistry (potassium, sodium, creatinine/estimated glomerular filtration rate [eGFR])
- Fasting blood glucose
- Fasting total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, triglycerides
- Standard 12 lead electrocardiogram (ECG)
- Microalbuminuria** (albumin/creatinine ratio [ACR])[2,3]
- Framingham risk assessment (10-year CHD risk) (Appendix B) or UKPDS risk assessment if Type II Diabetes (DM). See *Diabetes Care* at www.BCGuidelines.ca

** *Detection of microalbuminuria as an indicator of kidney damage may be helpful when choosing a management strategy for hypertension. Currently, there is some evidence showing that angiotensin converting enzyme inhibitors (ACEI) do improve cardiovascular outcomes for patients with microalbuminuria.*[3]

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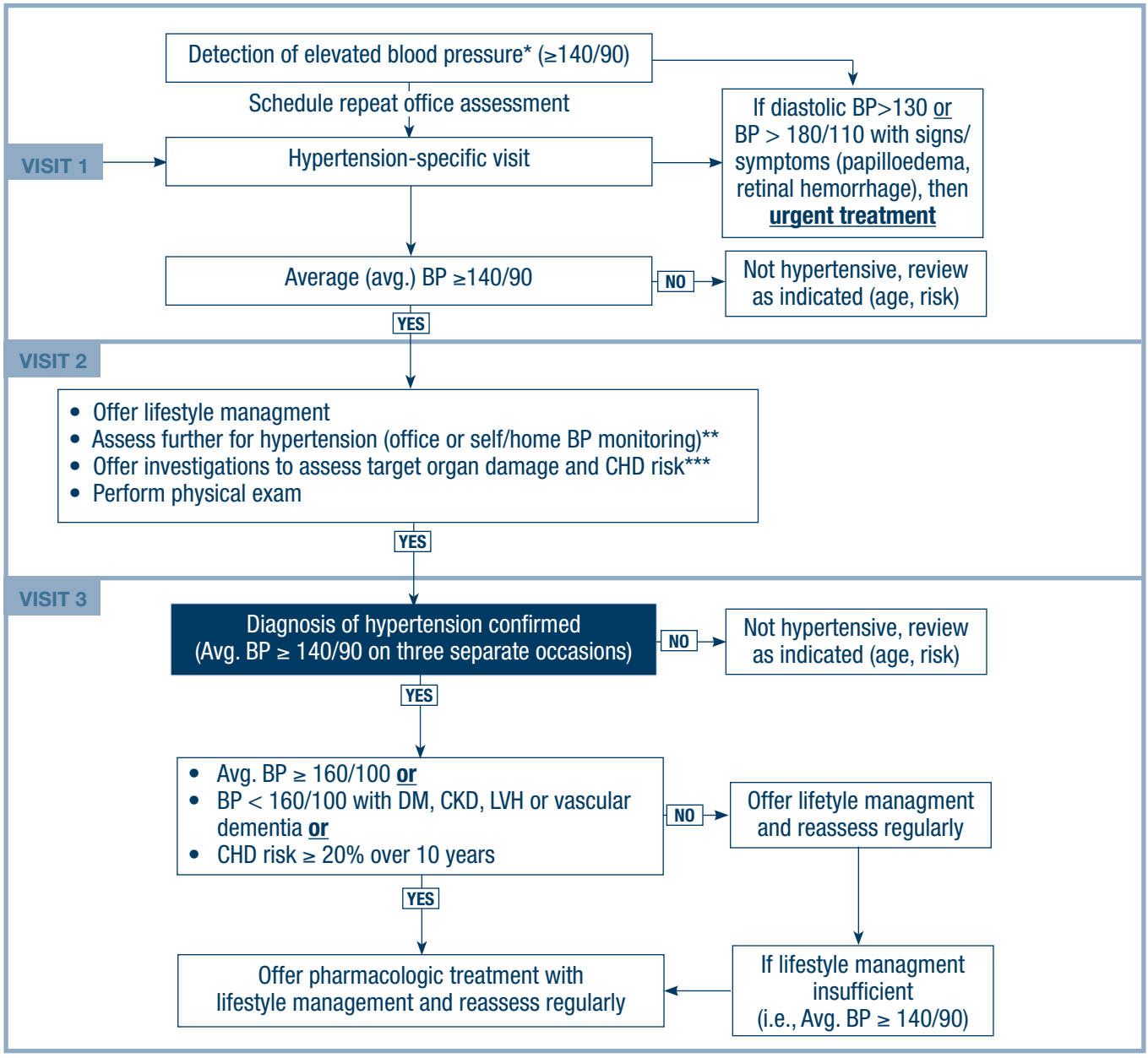
Algorithm 1: Detection and diagnosis of hypertension



* **Rule out exogenous factors**, for example: NSAIDS, steroids, oral contraceptives, decongestants, alcohol, stimulants, salt, sleep apnea

** **Assess BP for the diagnosis of hypertension:**
- Office BP assessment: Avg. BP ≥ 140/90 over 3 visits (See Appendix A for technique)
- 1 week home/self BP measurement (if available): Avg. BP ≥ 140/90 (See Appendix C for worksheet)

*** **Investigations and risk assessment:**
Urinalysis; blood chemistry (potassium, sodium, creatinine/estimated glomerular filtration rate); fasting blood glucose; fasting total cholesterol; high-density lipoprotein; low-density lipoprotein; triglycerides; standard 12 lead electrocardiogram; microalbuminuria (albumin/creatinine ratio); Framingham risk assessment (10-year CHD risk) or UKPDS risk assessment if Type II Diabetes.

Note: 24-hour ambulatory blood pressure measurement may provide information on white-coat hypertension and may also be helpful in assessing patients with apparent drug resistance, hypotensive symptoms with antihypertensive medications, episodic hypertension and autonomic dysfunction.[4]

Part II: Management

A flow sheet is included in this guideline (Appendix D) to help facilitate care for your hypertensive patients.

The Framingham Risk Assessment Chart (Appendix B) is designed to estimate 10-year coronary heart disease (CHD) risk in adults who do not have heart disease or diabetes. For the purpose of this guideline, CHD risk is used as a proxy for cardiovascular disease risk. The risk of stroke is approximately 25% of CHD risk.[5] The risk factors included in the Framingham calculation are: gender, age, total cholesterol, HDL cholesterol, systolic blood pressure, treatment for hypertension and cigarette smoking.

The Framingham Risk Assessment Chart is a useful tool for estimating CHD risk in hypertensive patients, and may help inform your treatment decisions.

Blood Pressure Readings and the Management of Hypertension

The management of essential hypertension requires patient lifestyle management and/or therapeutic intervention to work towards the following blood pressure readings:

Table 1: Desirable blood pressure readings* † ‡

BP READING	INDICATION
< 140/90 [1,4]	No co-morbid conditions
≤ 130/80 [1,4,6]	Diabetes, renal disease or other target organ damage
< 160 systolic [1]	Isolated systolic hypertension

* *The benefits of initiating antihypertensive therapy when mild to moderate hypertension is first diagnosed after the age of 80 years are still uncertain.[7] Treatment can be continued with caution in previously treated patients after the age of 80 years.*

† *The risk of a systolic blood pressure in the range of 140 to 160 and/or a diastolic blood pressure in the range of 90 to 100, in the absence of target organ damage or other risk factors, is small and may not outweigh the potential harms of pharmacologic treatment in all patients.*

‡ *Exercise caution in patients who have a diastolic BP close to 60, and regardless of BP, reassess the need for treatment if hypotensive symptoms exist.*

Review patient at monthly intervals until BP is in the desired range for two consecutive visits. Then review every 3-6 months (as long as the patient remains stable).

At each visit:
- Measure blood pressure
- Reinforce benefits of a healthy lifestyle
- Confirm that medications are taken appropriately
- Review the patient's knowledge of their condition and their treatment
- Establish the minimum dose of medication required to achieve the desired BP

At least annually:
- Consider risk factors
- Re-check co-morbidities
- Examine for evidence of target organ damage
- Check creatinine/ eGFR

Lifestyle Management [1,4]

As a diagnosis is being established, provide adequate explanation and support to patients so that they clearly understand the nature and significance of this condition, and that they have the primary responsibility for the management of their blood pressure. Provide patients with information on available community support, such as those offered by the Heart and Stroke Foundation, including self-management courses (see Hypertension Patient Guide).

Offer and review the following lifestyle recommendations at each visit:

- **Smoking cessation**: Complete cessation of smoking and avoidance of exposure to second hand smoke is recommended. For assistance to quit, refer patients to QuitNow Services at 1 877 455-2233 (toll-free in BC; available 24/7/365) and at www.quitnow.ca to obtain self-help materials.

- **Physical activity**: All people should be prescribed 30-60 minutes of moderate intensity dynamic activity 4-7 days per week (dynamic activity includes: walking 3 km [2 miles] in 30 minutes once per day or walking 1.5 km [1 mile] in 15 minutes two times per day, jogging, cycling or swimming). Recommend getting a pedometer for immediate positive feedback.

- **Weight reduction**: Maintenance of a healthy body weight (body mass index [BMI] 18.5-24.9 kg/m^2, waist circumference < 102 cm [40"] for men and < 88 cm [35"] for women) is recommended for everyone. All overweight hypertensive individuals should be advised to lose weight. Weight loss strategies should be long-term and employ a multidisciplinary approach that includes dietary education, increased physical activity and behavioural intervention.

- **Dietary recommendations**: Hypertensive individuals and normotensive individuals at increased risk of developing hypertension should consume a diet that emphasizes fruits, vegetables, low-fat dairy products, fibre, whole grains, and protein sources that are reduced in saturated fats and cholesterol (Dietary Approaches to Stop Hypertension [DASH] diet) (see Appendix E). In addition, reduced consumption of trans-fats and increased consumption of fish high in omega 3 fatty acids reduces cardiovascular risk.

- **Reduce salt intake**: In addition to a well-balanced diet, a reduced dietary sodium intake of ≤ 1,500 milligrams per day (approximately 1 tsp of table salt) is recommended for individuals with hypertension. Advise patients about the "hidden" salt content of processed foods, such as lunchmeat, canned soups and pasta.

- **Alcohol consumption**: Alcohol consumption should be limited to two drinks or less per day and consumption should not exceed 14 standard drinks per week for men and 9 standard drinks per week for women. A standard drink is defined as:

  • 1 can (341 mL) of 5% beer or
  • 1 glass (150 mL) of 12% wine or
  • 1.5 oz (45 mL) of 40% spirits

- **Potassium, calcium and magnesium intake**: Supplementation of potassium, calcium and magnesium is not recommended for the prevention or treatment of hypertension.

Pharmacologic Treatment

An effective, individualized plan for the management of hypertension requires that benefits are considered along with potential harms. Periodically, consideration may be given to discontinuing or reducing antihypertensive medications to assess the appropriate level of pharmacologic management.

1. Indications for drug therapy in uncomplicated hypertension[1]

The benefits of pharmacologic treatment in people with mild hypertension (an average blood pressure between 140/90 and 160/100), and a 10-year CHD risk of less than 20% are unclear (Table 2). Use clinical judgement when recommending therapy for this patient group.

Pharmacologic treatment in addition to lifestyle modification is recommended for patients with an average blood pressure ≥ 160/100, even in the absence of other major cardiovascular risk factors.

Table 2: Benefits of blood pressure lowering with medication in patients with mild hypertension[8]

	CHD RISK/10 YEARS	MI PREVENTED/5 YEARS	NNT/5 YEARS
Male: age 55, non-smoker, SBP 140-159	12%	1.2/100 patients	83
Male: age 55, smoker, SBP 140-159	25%	2.5/100 patients	40
Female: age 55, non-smoker, SBP 140-159	4%	0.4/100 patients	250
Female: age 55, smoker, SBP 140-159	8%	0.8/100 patients	125

Abbreviations: CHD, coronary heart disease; MI, myocardial infarction; NNT, number needed to treat; SBP, systolic blood pressure.

2. Treatment of uncomplicated hypertension

Consider monotherapy with a low-dose thiazide diuretic as first-line treatment.

If blood pressure is not adequately controlled, use combination therapy by adding one or more of the following agents:

- Angiotensin converting enzyme inhibitor (ACEI)
- Angiotensin II receptor blocker (ARB) if ACEI intolerant
- Long-acting dihydropyridine calcium channel blocker (DHP-CCB)

Note: - Beta-blockers may no longer be a first-line treatment option (with some exceptions)[9,10]
- Long-acting DHP-CCBs are a preferred second-line treatment option for patients at risk for, or with a history of, stroke
- Alpha-blockers are not a first-line treatment option

Consideration should also be given to the addition of low-dose ASA therapy in hypertensive patients with a Framingham risk score of ≥ 20% who are between 50 and 70 years-of-age. Avoid using ASA in patients with a history of hemorrhagic stroke. Blood pressure must be well controlled.[11,12]

3. First-line treatment for hypertension complicated by co-morbid conditions[1]

It is important to control co-morbid conditions optimally when managing hypertension. Pharmacologic treatment must be chosen with even more care in these individuals. The following table lists recommended medications for consideration when individualizing antihypertensive drug therapy. See Appendix F for a list of commonly prescribed antihypertensive medications in each class.

Table 3: First-line treatment of hypertension complicated by co-morbid conditions

	INITIAL THERAPY	SECOND LINE THERAPY	NOTES AND/OR CAUTIONS
Cardiovascular Disease			
Coronary heart disease	ACEI (for most patients); beta-blockers (for patients with stable angina)	Long-acting CCB	Avoid short-acting nifedipine
Myocardial infarction	ACEI + beta-blocker	ARB if ACEI intolerant and LV dysfunction is present; long-acting CCB if beta-blocker contraindicated or ineffective	Avoid non-DHP CCB if heart failure present
Left ventricular hypertrophy	Thiazide diuretic; ACEI; long-acting CCB	ARB if ACEI intolerant	Avoid direct arterial vasodilators such as hydralazine and minoxidil
Heart failure	ACEI + beta-blocker; aldosterone antagonist (in selected patients)	ARB if ACE intolerant; hydralazine /isosorbide dinitrate if ACEI and ARB intolerant; if BP not controlled, an ARB may be added to ACEI; thiazide or loop diuretics as additive therapy; long-acting DHP-CCB as additive therapy	If combining ACEI + ARB, monitor for potential adverse events including hypotension, hyperkalemia and worsening of renal function; if bradycardia is also present, avoid use of beta-blockers
Cerebrovascular disease	ACEI + thiazide diuretic	Long-acting DHP-CCB	Caution is indicated in deciding whether to lower BP in the acute stroke situation; pharmacologic agents and routes of administration should be chosen to avoid precipitous falls in BP
Non-Diabetic Chronic Kidney Disease			
Non-diabetic chronic kidney disease	ACEI (for patients with proteinuria*)	ARB if ACEI intolerant; thiazide diuretic as additive anti-hypertensive therapy; loop diuretics for volume overload	Avoid ACEI and ARB if bilateral renal artery stenosis or unilateral disease with solitary kidney
Renovascular disease	Thiazide diuretic; ACEI; long-acting CCB	ARB if ACEI intolerant; combination of first-line medications	Avoid ACEI and ARB if bilateral renal artery stenosis or unilateral disease with solitary kidney
Diabetes Mellitus			
Diabetes mellitus with albuminuria	ACEI	ARB if ACEI intolerant; additional hypertensive agents should be used to achieve target BP	
Diabetes mellitus without albuminuria**	Thiazide diuretic; ACEI; DHP-CCB	ARB if ACEI intolerant; if these drugs are not tolerated, a non-DHP CCB may be used	

Table adapted from CHEP 2007[1]

* *Proteinuria is defined as urinary protein >500 mg/24hr or albumin-creatinine ratio (ACR) >30*

** *Albuminuria is defined as persistent ACR >2.0 mg/mmol in men and >2.8 mg/mmol in women*

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker; CCB, calcium channel blocker; DHP-CCB, dihydropyridine calcium channel blocker.

4. Contraindications to antihypertensive medications

Table 4: Contraindications to antihypertensive medications

CONTRAINDICATIONS	
Asthma	Beta-blockers
2° or 3° heart block	Beta-blockers; non-DHP CCB

RELATIVE CONTRAINDICATIONS	
COPD	Beta-blockers
Gout	Thiazide diuretics
Heart failure	Non-DHP CCB; alpha-blockers
Renal insufficiency	Potassium-sparing agents
Depression	Beta-blockers; central alpha agonists; Reserpine

Abbreviations: COPD, chronic obstructive pulmonary disease; DHP-CCB, dihydropyridine calcium channel blocker.

The investigation and management of secondary causes of hypertension is beyond the scope of this guideline. Please consult current medical texts for investigation and management advice, or consider referral to an appropriate specialist. For some examples of secondary causes of hypertension, refer to Appendix G.

Rationale

The following subsections include a brief overview of the literature used to generate recommendations for this guideline. The final subsection provides the methodology used for obtaining evidence and describes the types of evidence used throughout this guideline.

Hypertension (HT) remains a major public health issue in Canada. Although the diagnosis and treatment of HT appears simple, this disease remains poorly managed; for example, it is estimated that only 50% of Canadians with hypertension are aware of their diagnosis and that only 16% of Canadians with hypertension have adequate BP control.[1]

Combined, heart disease and stroke are the leading cause of death, accounting for one in three deaths in BC.[13] Hypertension is a significant and controllable risk factor for heart disease, stroke, heart failure, renal disease and recurrent cardiovascular events.[6] Hypertension is also the most common indication in Canada for visits by adults to physicians.[14]

The benefits of lowering blood pressure in certain settings with lifestyle changes and certain drugs have been well documented. Reductions in mortality,[6,8,15] cardiovascular events,[4,8,15,16] left ventricular hypertrophy,[4] stroke and myocardial infarction,[8,15,17] dementia,[18,19] deterioration of renal function,[4,15,20] renal failure[20] and incidence of diabetes[15] have all been associated with successful treatment of hypertension.

Evidence: Evidence was obtained through a systematic review of peer-reviewed literature (up to May, 2007) using the databases MEDLINE, PubMed, EBSCO, Ovid, and the Cochrane Collaboration's Database for Systematic Reviews. Clinical practice guidelines from other jurisdictions for the prevention and management of hypertension, diabetes, chronic kidney disease, dyslipidemia, congestive heart failure, cerebrovascular disease and overweight/obesity were also reviewed (up to May 2007). Recommendations are based on large, randomized controlled trials (RCTs) wherever possible. Lifestyle recommendations are based on large, prospective cohort trials.

References

1. Canadian Hypertension Education Program. 2007 CHEP recommendations for the management of hypertension. 2007. www.hypertension.ca/chep/
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Resources

The **Guidelines and Protocols Web site** has more detailed information about the management of diseases such as hypertension and diabetes. Web site: *www.BCGuidelines.ca*

The **BC HealthGuide Online** provides detailed information on managing hypertension.
Web site: *www.bchealthguide.org* (search word: high blood pressure)

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 public recommendations for the control of high blood pressure, the Blood Pressure Action Plan™ (an online e-tool to help you control your blood pressure), a body mass index calculator, a risk factor calculator and specific dietary information. Web site: *www.heartandstroke.ca.* Telephone: 1 888 473-4636 (Toll free) (BC/Yukon division office)

The Canadian Hypertension Society has more detailed information regarding hypertension and blood pressure. Web site: *www.hypertension.ca.*

Dial-A-Dietitian provides accessible, quality information to the public and health information providers throughout British Columbia about nutrition. Registered dietitians provide nutrition consultation by phone. Web site: *www.dialadietitian.org.* Telephone 1 800 667-3438 (Toll free) or 604 732-9191 (Greater Vancouver)

American Heart Association
Web site: *www.americanheart.org* (search word: high blood pressure)

Mayo Clinic
Web site: *www.mayoclinic.com* (search word: high blood pressure)

Healthy Heart Society of BC
Web site: *http://www.heartbc.ca/public/BP.htm*

Contact Information

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This guideline was developed by the Guidelines and Protocols Advisory Committee, approved by the British Columbia Medical Association and adopted by the Medical Services Commission.

The principles of the Guidelines and Protocols Advisory Committee are to:

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

Appendices

Appendix E Dietary Approaches to Stop Hypertension (DASH)
Appendix F Antihypertensive Drugs
Appendix G Examples of Secondary Causes of Hypertension

Associated Document

Hypertension Patient Guide

Appendix A - Recommended Technique for Measuring Blood Pressure [1]

I Measurements should be taken with a sphygmomanometer known to be accurate. A recently calibrated aneroid or a validated and recently calibrated electronic device can also be used. Aneroid devices or mercury columns need to be clearly visible at eye level.

II Choose a cuff with an appropriate bladder size matched to the size of the arm. For measurements taken by auscultation, bladder width should be close to 40% of arm circumference and bladder length should cover 80-100% of arm circumference. When using an automated device, select the cuff size as recommended by its manufacturer.

III Place the lower edge of the cuff 3 cm above the elbow crease and the bladder 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, as a lower position will result in erroneously higher SBP and DBP. There should be no talking, and the patient's legs should not be crossed. At least three measurements should be taken in the same arm with the patient in the same position. The first reading should be discarded and the latter two averaged. Blood pressure also should be assessed after two minutes standing (with arm supported) and at times when patients report symptoms suggestive of postural hypotension. Supine BP measurements may also be helpful in the assessment of elderly and diabetic patients.

IV Increase the pressure rapidly to 30 mm Hg above the level at which the radial pulse is extinguished (to exclude the possibility of systolic auscultatory gap).

V Place the bell or diaphragm of the stethoscope gently and steadily over the brachial artery.

VI Open the control valve so that the deflation rate of the cuff is approximately 2 mm Hg per heart beat. A cuff deflation rate of 2 mm Hg per beat is necessary for accurate systolic and diastolic estimation.

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). Continue to auscultate at least 10 mm Hg below phase V to exclude a diastolic auscultatory gap. Record the blood pressure to the closest 2 mm Hg on the manometer (or 1 mm Hg on electronic devices), as well as the arm used and whether the patient was supine, sitting or standing. Record the heart rate. The seated blood pressure is used to determine and monitor treatment decisions. The standing blood pressure is used to examine for postural hypotension, if present, which may modify the treatment.

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 In the case of arrhythmia, additional readings may be required to estimate the average systolic and diastolic pressure. Isolated extra beats should be ignored. Note the rhythm and pulse rate.

X Leaving the cuff partially inflated for too long will fill the venous system and make the sound difficult to hear. To avoid venous congestion, it is recommended that at least one minute should elapse between readings.

XI Blood pressure should be taken in both arms on at least one visit and if one arm has a consistently higher pressure then that arm should be clearly noted and subsequently used for blood pressure measurement and interpretation.

Reference

1. Canadian Hypertension Education Program. 2007 CHEP recommendations for the management of hypertension. 2007. www.hypertension.ca/chep/

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FRAMINGHAM
Ten-Year Coronary Heart Disease Risk (%)

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INSTRUCTIONS

Colour charts are provided to assess the risk of total coronary heart disease events (per 100 patients in 10 years). The colour charts are based on the Framingham study and more recent adaptations to include untreated blood pressure and blood pressure after treatment. The numbers in the charts are consistent with the National Cholesterol Education Point (NCEP) system used in the US and also used in Canada. The colour coding represents **zones of risk** with an increasing benefit to harm ratio according to increasing risk of coronary heart disease.

GREEN ZONE <10%	YELLOW ZONE 10 - 19%	RED ZONE ≥20%
Evidence that the benefit of pharmacologic treatment exceeds harm is poor in the green zone. Lifestyle approaches would be more suitable.	Benefit does not clearly exceed harm due to adverse events, but there is increasing probability of net benefit with increasing risk of CHD.	Benefit to harm ratio is best in this zone and pharmacologic treatment with blood pressure lowering medication and/or low dose statins is more appropriate in this risk zone.

Benefit per 100 patients/5 years can be estimated as 10% of the value in the Framingham risk chart.

Note: This assumes a 20% risk reduction of CHD based on average outcomes for appropriately used blood pressure lowering medications and statin medications.

For example ➠

MALE	FEMALE
55 yrs, non-smoker, systolic BP 150 Framingham risk = 12% Benefit (absolute) = 1.2%/5 yrs.	55 yrs, non-smoker, systolic BP 150 Framingham = 4% Benefit (absolute) = 0.4%/5 yrs.

Absolute benefit of treatment should be derived from the risk charts using Untreated Blood Pressure. Use the risk in the charts labelled Blood Pressure after Treatment for initial assessment only when a patient's blood pressure before treatment is unknown. Risk comparison between the untreated and treated blood pressure charts for the same patient may not be valid because the charts are derived from large statistical aggregates.

Adverse events are difficult to quantify and poorly reported in clinical trials with low to moderate risk populations.

CAUTION: The charts are based on a population-based approach assessed in a predominantly white, North American population. Individual risk may vary a great deal from the population mean for any particular cluster of risk factors. Risks may be different for non-Caucasian populations.

For complete Guideline information, visit www.bcguidelines.ca

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FRAMINGHAM
Ten-Year Coronary Heart Disease Risk (%)
UNTREATED BLOOD PRESSURE

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LOW RISK
MODERATE RISK
HIGH RISK

WOMEN: Non-Smoking

BP (systolic)	TC/HDL*	AGE (years)					
		50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	1	2	2	4	5	6
	5	2	2	3	5	6	8
	6	2	3	4	6	8	11
130-139	4	2	2	3	5	6	8
	5	2	3	4	6	8	11
	6	3	4	5	8	11	14
140-159	4	2	3	4	6	8	11
	5	3	4	5	8	11	14
	6	4	5	6	11	14	17
≥160	4	3	4	5	8	11	14
	5	4	5	6	11	14	17
	6	5	6	8	14	17	22

MEN: Non-Smoking

BP (systolic)	TC/HDL	AGE (years)							
		40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	1	3	5	8	10	12	12	16
	5	3	5	8	10	12	16	16	16
	6	4	6	10	12	16	20	20	20
130-139	4	2	4	6	10	12	16	16	20
	5	4	6	10	12	16	20	20	20
	6	5	8	12	16	20	25	25	25
140-159	4	2	4	6	10	12	16	16	20
	5	4	6	10	12	16	20	20	20
	6	5	8	12	16	20	25	25	25
≥160	4	2	5	8	12	16	20	20	25
	5	5	8	12	16	20	25	25	25
	6	6	10	16	20	25	≥30	≥30	≥30

WOMEN: Smoking

BP (systolic)	TC/HDL	AGE (years)					
		50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	5	5	5	6	6	8
	5	6	6	6	8	8	11
	6	8	8	8	11	11	14
130-139	4	6	6	6	8	8	11
	5	8	8	8	11	11	14
	6	11	11	11	14	14	17
140-159	4	8	8	8	11	11	14
	5	11	11	11	14	14	17
	6	14	14	14	17	17	22
≥160	4	11	11	11	14	14	17
	5	14	14	14	17	17	22
	6	17	17	17	22	22	27

MEN: Smoking

BP (systolic)	TC/HDL	AGE (years)							
		40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	6	10	12	16	16	16	16	20
	5	12	16	20	20	20	20	20	20
	6	16	20	25	25	25	25	25	25
130-139	4	8	12	16	20	20	20	20	25
	5	16	20	25	25	25	25	25	25
	6	20	25	≥30	≥30	≥30	≥30	≥30	≥30
140-159	4	8	12	16	20	20	20	20	25
	5	16	20	25	25	25	25	25	25
	6	20	25	≥30	≥30	≥30	≥30	≥30	≥30
≥160	4	10	16	20	25	25	25	25	≥30
	5	20	25	≥30	≥30	≥30	≥30	≥30	≥30
	6	25	≥30	≥30	≥30	≥30	≥30	≥30	≥30

TC/HDL – total cholesterol to high-density lipoprotein ratio

McPherson R et al. Canadian Cardiovascular Society position statement- Recommendations for the diagnosis and treatment of dyslipidemia and prevention of cardiovascular disease. Can J Cardiol 2006; 22:913-927.

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Ministry of Health Services

FRAMINGHAM
Ten-Year Coronary Heart Disease Risk (%)
BLOOD PRESSURE AFTER TREATMENT

Guidelines & Protocols Advisory Committee

BRITISH COLUMBIA MEDICAL ASSOCIATION

LOW RISK
MODERATE RISK
HIGH RISK

WOMEN: Non-Smoking

BP (systolic)	TC/HDL	AGE (years)					
		50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	2	3	4	6	8	11
	5	3	4	5	8	11	14
	6	4	5	6	11	14	17
130-139	4	3	4	5	8	11	14
	5	4	5	6	11	14	17
	6	5	6	8	14	17	22
140-159	4	4	5	6	11	14	17
	5	5	6	8	14	17	22
	6	6	8	11	17	22	27
≥160	4	5	6	8	14	17	22
	5	6	8	11	17	22	27
	6	8	11	14	22	27	≥30

MEN: Non-Smoking

BP (systolic)	TC/HDL	AGE (years)							
		40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	2	4	6	10	12	16	16	20
	5	4	6	10	12	16	20	20	20
	6	5	8	12	16	20	25	25	25
130-139	4	2	5	8	12	16	20	20	25
	5	5	8	12	16	20	25	25	25
	6	6	10	16	20	25	≥30	≥30	≥30
140-159	4	2	5	8	12	16	20	20	25
	5	5	8	12	16	20	25	25	25
	6	6	10	16	20	25	≥30	≥30	≥30
≥160	4	3	6	10	16	20	25	25	≥30
	5	6	10	16	20	25	≥30	≥30	≥30
	6	8	12	20	25	≥30	≥30	≥30	≥30

WOMEN: Smoking

BP (systolic)	TC/HDL	AGE (years)					
		50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	8	8	8	11	11	14
	5	11	11	11	14	14	17
	6	14	14	14	17	17	22
130-139	4	11	11	11	14	14	17
	5	14	14	14	17	17	22
	6	17	17	17	22	22	27
140-159	4	14	14	14	17	17	22
	5	17	17	17	22	22	27
	6	22	22	22	27	27	≥30
≥160	4	17	17	17	22	22	27
	5	22	22	22	27	27	≥30
	6	27	27	27	≥30	≥30	≥30

MEN: Smoking

BP (systolic)	TC/HDL	AGE (years)							
		40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
120-129	4	8	12	16	20	20	20	20	25
	5	16	20	25	25	25	25	25	25
	6	20	25	≥30	≥30	≥30	≥30	≥30	≥30
130-139	4	10	16	20	25	25	25	25	≥30
	5	20	25	≥30	≥30	≥30	≥30	≥30	≥30
	6	25	≥30	≥30	≥30	≥30	≥30	≥30	≥30
140-159	4	10	16	20	25	25	25	25	≥30
	5	20	25	≥30	≥30	≥30	≥30	≥30	≥30
	6	25	≥30	≥30	≥30	≥30	≥30	≥30	≥30
≥160	4	12	20	25	≥30	≥30	≥30	≥30	≥30
	5	25	≥30	≥30	≥30	≥30	≥30	≥30	≥30
	6	≥30	≥30	≥30	≥30	≥30	≥30	≥30	≥30

Absolute benefit of treatment should be derived from the risk charts using untreated blood pressure. Use the risk in the blood pressure after treatment charts for initial assessment only when a patient's blood pressure before treatment is unknown. Risk comparison between the untreated and treated blood pressure charts for the same patient may not be valid because the charts are derived from large statistical aggregates.

Home Blood Pressure Monitoring Worksheet*

NAME

MEDICATION LIST		
NAME OF DRUG	**STRENGTH**	**FREQUENCY**

BLOOD PRESSURE MONITORING								
DAY	**MORNING**		**MID-DAY**		**SUPPER**		**BEDTIME**	
	SBP / DBP	**PULSE**	**SBP / DBP**	**PULSE**	**SBP / DBP**	**PULSE**	**SBP / DBP**	**PULSE**
WEEKLY AVERAGE								

6010

Abbreviations: SBP: systolic blood pressure; DBP: diastolic blood pressure

Blood pressure is not constant. Many factors will cause your blood pressure to vary significantly over the course of the day, such as exertion, stress and medications. Since most people tend to have higher blood pressure in the doctor's office, using only office readings may overestimate both your overall blood pressure and your need for medication.

Checking your blood pressure outside of the doctor's office will greatly assist your doctor in determining if a problem truly exists and to evaluate the effectiveness of any medication, should that prove necessary. When using the home blood pressure monitor you should be comfortably sitting upright, with back support, and with the muscles of your arms and legs relaxed.

Once you have applied the cuff to your arm, distract yourself by watching TV or reading, for a couple of minutes, before you activate it. Write the blood pressure and pulse (heart rate) into the chart above. If you have the time and the inclination, average out the data you have collected e.g. 144/92, 153/88. 137/77 and 150/95 in the morning column give a morning average of 146/88 since (144+153+137+150)/4=146 and since (92+88+77+95)/4=88.

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HYPERTENSION CARE FLOW SHEET

This Flow Sheet is based on the Hypertension Guideline
Web site: http://www.bcguidelines.ca

BRITISH COLUMBIA MEDICAL ASSOCIATION

Guidelines & Protocols Advisory Committee

NAME OF PATIENT	SEX ☐ M ☐ F	DATE OF BIRTH	AGE AT DIAGNOSIS

CARE OBJECTIVES

RISK FACTORS AND CO-MORBID CONDITIONS (NOTE: if patient also has DM and/or CHF, use respective flowsheet instead)

☐ Obesity

HEIGHT (cm)

DATE	BMI (kg/m²)	TARGET
		Normal: 18.5-24.9 Overwt: 25-30 Obese: ≥30

DATE	WAIST CIRC.	
		Male (cm) Caucasian ≤ 102 Asian ≤ 90 Female (cm) Caucasian ≤ 88 Asian ≤ 80

☐ CVD _____
☐ Dyslipidemia
☐ Kidney
☐ Review BP:
  ☐ <140/90 no co-morbid condtions
  ☐ ≤130/80 DM, renal disease or end organ damage

☐ Smoker
☐ Alcohol (assess/discuss)
☐ Gout
☐ Asthma
☐ Allergy: (e.g. ASA)

☐ Other: _____

SELF MANAGEMENT (Discuss with patient)

☐ Explain the consequences of hypertension
☐ Review meds & adverse effects
☐ Smoking cessation: *Quit Now*
Phone toll free in BC: 1 877 455-2233
☐ Refer to guideline & patient guide
☐ Set goals with patient (See reverse):
- Promote weight loss & exercise
- Avoid excessive alcohol
- Reduce salt intake & improve diet

☐ Copy of Flow Sheet to patient if appropriate

☐ Other: _____

VISITS (3 TO 6 MONTHS)

DATE	BP	WEIGHT Lbs | Kg	NOTES (REVIEW RISK FACTORS, GOALS, & CLINICAL STATUS.)	BP MEDICATION NOTES
				BASELINE (Note allergies, side effects & contraindications) *Consider low dose ASA if age 50-70 & ≥ 20% CHD risk
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE
				☐ NO CHANGE

REMINDERS: 1) CONSIDER END ORGAN DAMAGE: EYES, HEART, CIRCULATION, KIDNEYS
2) SEE REVERSE FOR LIFESTYLE MANAGEMENT & TREATMENT RECOMMENDATIONS

ANNUALLY (UNLESS NOT CLINICALLY INDICATED)

LIPIDS				FRAMINGHAM 10-YR RISK
DATE	TC	LDL	TC/HDL	%
DESIRABLE		< 3.5	<5.0	MOD 10-19%
		< 2.5	<4.0	HIGH ≥ 20%

KIDNEY		
DATE	ACR	eGFR
TARGETS	M: < 2.0 F: < 2.8	> 60

CONSIDER TESTING EVERY SECOND YEAR IF LESS THAN 10% CHD RISK

VACCINATIONS (If ≥ age 65 or has other risk factors)

Annual Flu: DATE _____ DATE _____

Pneumovax: DATE _____

HLTH/BCMA (REV 07/07)

BILLING CODE: 14052 DIAGNOSTIC CODE: 401 BILLING: DATE _____ DATE _____

Lifestyle Management for Patients with Hypertension

Suggestions for the following lifestyle changes should be offered and reviewed at each visit:

Smoking cessation
Recommend complete cessation of smoking and exposure to second hand smoke.
QuitNow Services: 1 877 455-2233 (toll-free in BC; available 24/7/365) www.quitnow.ca

Physical activity
Prescribe 30-60 minutes of moderate intensity dynamic activity (such as walking 3 km [2 miles] in 30 minutes once per day, or 1.5 km [1 mile] in 15 minutes two times per day, jogging, cycling or swimming) 4-7 days per week. Recommend getting a pedometer for immediate positive feedback.

Weight reduction
All overweight patients with hypertension should be advised to lose weight. Weight loss strategies should be long-term and employ a multidisciplinary approach that includes dietary education, increased physical activity, and behavioural intervention. Target: body mass index (BMI) 18.5-24.9 kg/m^2, waist circumference <102 cm [40"] for men and <88 cm [35"] for women.

Dietary recommendations
Advise a diet high in fruits, vegetables, low-fat dairy products, fibre, whole grains and protein sources reduced in saturated fats and cholesterol (Dietary Approaches to Stop Hypertension [DASH) diet]. Reduce consumption of trans-fats and increase intake of fish high in omega 3 fatty acids.

Reduce salt intake
Recommend reduced dietary sodium intake of ≤ 1,500 milligrams per day (approximately 1 tsp of table salt).

Alcohol consumption
Limit to two drinks or less per day, and consumption should not exceed 14 standard drinks per week for men and 9 standard drinks per week for women.

Potassium, calcium and magnesium intake
Supplementation of potassium, calcium and magnesium is not recommended for the prevention or treatment of hypertension.

Pharmacologic Treatment without Co-morbid Conditions

The benefits of pharmacologic treatment in people with mild hypertension (average BP between 140/90 and 160/100), and a 10-year coronary heart disease risk of less than 20%, are unclear. Use clinical judgment when recommending therapy for this patient group.

Pharmacologic treatment, in addition to lifestyle modification is recommended for patients with an average BP ≥ 160/100, even in the absence of other major cardiovascular risk factors.

Consider monotherapy with a low-dose thiazide diuretic as first-line treatment.

If BP is not controlled, use combination therapy by adding 1 or more of:
- ACEI or ARB if ACEI intolerant
- Long-acting dihydropyridine calcium channel blockers (DHP-CCB)

Note:
- Long-acting DHP-CCB are preferred 2nd line treatment for patients at risk for, or with a history of, stroke
- Beta blockers may no longer be a first line treatment option, with some exceptions
- Alpha blockers are not a 1st line treatment option

Consider addition of low-dose ASA therapy if Framingham risk score is ≥ 20% and patient is between 50 to 70 years-of-age. Avoid using ASA in patients with a history of hemorrhagic stroke. Blood pressure must be well controlled.

See hypertension guideline for pharmacologic management if co-morbid conditions exist.

Appendix E - Dietary Approaches to Stop Hypertension (DASH)

The DASH diet is an eating plan that is low in fat and rich in low-fat dairy foods, fruits and vegetables. DASH recommends eating whole grains, fish, poultry and nuts as part of a balanced diet. Following the DASH diet may lower blood pressure.[1-3]

Studies have shown that lowering sodium intake while on DASH will lower blood pressure even further than just DASH alone.[4-6]

The following table, adapted from the Canadian Hypertension Education Program[7], provides an overview of the DASH diet.

Further information can be found on the National Heart, Lung and Blood Institute's Web site at www.nhlbi.nih.gov.

FOOD GROUP	DAILY SERVING	EXAMPLES AND NOTES
Grains	7-8	Whole wheat bread, oatmeal, popcorn
Vegetables	4-5	Potatoes, carrots, beans, peas, squash, spinach, broccoli
Fruits	4-5	Bananas, apples, apricots, oranges, tomatoes, melons
Low-fat dairy products	2-3	Fat-free/low-fat milk (e.g. skim or 1%), fat-free/low fat yoghurt, fat-free/low-fat cheese
Meats, poultry, fish	≤ 2	Select only lean meats. Trim away fats. Broil, roast or boil. No Frying. Remove skin from poultry.
Nuts, seeds, dry beans	4-5/week	Almonds, peanuts, walnuts, sunflower seeds, soybeans, lentils
Fats and oils	2-3	Soft margarines, low-fat mayonnaise, vegetable oil (olive corn, canola, safflower)
Sweets	5/week	Maple syrup, sugar, jelly, jam, hard candy, sorbet

References

1. Appel LJ, Moore TJ, Obarzanek E, et al. A clinical trial of the effects of dietary patterns on blood pressure. N Engl J Med 1997;336(1):1117-1124.
2. Karanja NM, Obarzanek E. Descriptive characteristics of the dietary patterns used in the Dietary Approaches to Stop Hypertension. J Am Diet Assoc 1999;99:S19.
3. Svetkey LP, Simons-Morton D. Effects of dietary patterns on blood pressure. Arch Intern Med 1999;159:285.
4. Sacks FM, Svetkey LP, Vollmer WM, et al. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) Diet. N Engl J Med 2001;344:3.
5. Vollmer WM, Sacks FM, Ard J, et al. Effects of diet and sodium intake on blood pressure: subgroup analysis of the DASH-sodium trial. Ann Intern Med 2001;135(1):1019-1028.
6. Svetkey LP, Sacks FM. The DASH Diet, sodium intake and blood pressure trial (DASH-Sodium): Rationale and design. J Am Diet Assoc 1999;99:S96.
7. Canadian Hypertension Education Program. 2007 CHEP recommendations for the management of hypertension. 2007. www.hypertension.ca/chep/

Appendix F - Commonly Used Antihypertensive Drugs in BC (not all inclusive)

NAME	AVAILABLE DOSE	DRUG NAMES	PHARMACARE COVERAGE STATUS	
Thiazide diuretic				
hydrochlorothiazide	12.5mg, 25mg, 50mg	Generic only	regular benefit	LCA
indapamide	1.25mg, 2.5mg	Lozide® Generic available	limited coverage	LCA
Angiotensin-converting enzyme inhibitor (ACEI)				
quinapril	5mg, 10mg, 20mg, 40mg	Accupril®	regular benefit	RDP Reference Drug
ramipril	1.25mg, 2.5mg, 5mg, 10mg	Altace® Generic available	regular benefit	LCA, RDP Reference Drug
captopril	6.25mg, 12.5mg, 25mg, 50mg, 100mg	Capoten® Generic available	regular benefit	LCA, RDP Reference Drug
cilazapril	1mg, 2.5mg, 5.0mg	Inhibace® Generic available	regular benefit	LCA, RDP Reference Drug
trandolapril	1mg, 2mg, 4mg	Mavik®	regular benefit	RDP Reference Drug
enalapril	2.5mg, 5mg, 10mg, 20mg	Vasotec®	partial coverage	RDP
lisinopril	5mg, 10mg, 20mg	Prinivil®, Zestril®	partial coverage	RDP
perindopril	2mg, 4mg, 8mg	Coversyl® Generic available for 8mg only	partial coverage	RDP LCA (8mg only)
Angiotensin II receptor blocker (ARB)				
candesartan cilexetil	8mg, 16mg	Atacand®	limited coverage	
irbesartan	75mg, 150mg, 300mg	Avapro®	limited coverage	
losartan potassium	25mg, 50mg, 100mg	Cozaar®	limited coverage	
valsartan	80mg, 160mg	Diovan®	limited coverage	

Beta-blocker				
atenolol	25mg, 50mg, 100mg	Tenormin® Generic available	regular benefit	LCA
metoprolol	25mg, 50mg, 100mg	Lopressor®, Betaloc® Generic available	regular benefit	LCA
propranolol	10mg, 20mg, 40mg, 80mg, 120mg	Generic only	regular benefit	LCA
Dihydropyridine calcium channel blocker (DHP-CCB)				
felodipine	2.5mg, 5mg, 10mg	Renedil® Generic available	regular benefit	RDP Reference Drug
nifedipine	30mg, 60mg	Adalat® XL	regular benefit	RDP LCA
amlodipine	5mg, 10mg	Norvasc®	partial coverage	RDP
Non-dihydropyridine calcium channel blocker (non-DHP CCB)				
diltiazem	30mg, 60mg, 180mg	Cardizem®, Tiazac® Generic available	Regular benefit	RDP

Abbreviations: LCA: low cost alternative; RDP: reference drug program

REGULAR BENEFITS are covered 100% within drug price limits set by PharmaCare and are subject to the patient's PharmaCare plan rules and deductibles. Regular Benefits do not require Special Authority approval for coverage. Regular Benefits may receive full or partial coverage, depending on the place of the drug within the Low Cost Alternative (LCA) or Reference Drug Program (RDP).

RDP: When a number of products contain different active ingredients but are in the same therapeutic class, PharmaCare promotes the use of the most cost-effective treatment through the Reference Drug Program (RDP). If a drug is included in the RDP, then patients receive full coverage for the drug that is designated as the Reference Drug. Other drugs in the same RDP category are covered up to the price of the Reference Drug.

LCA: When multiple medications contain the same active ingredient, PharmaCare promotes the use of the most cost-effective treatment through the Low Cost Alternative (LCA) Program. If a drug is included in the LCA program, then patients receive full coverage based on the lowest average PharmaNet claimed price of those drugs with identical active ingredients.

LIMITED COVERAGE DRUGS are drugs not normally regarded as first-line therapies or are drugs for which a more cost-effective alternative exists. Limited Coverage drugs are PharmaCare benefits only for patients who meet certain Special Authority criteria. The criteria usually relate to their medical diagnosis and status, or to the outcome of previous treatments.

Please note that the listing status of a drug is subject to change. The PharmaCare Newsletter provides regular updates to formulary changes.

Appendix G - Examples of Secondary Causes of Hypertension

DISORDER	SUGGESTIVE HISTORY / FINDINGS / INVESTIGATION
General	• Severe or refractory hypertension • An acute rise over previously stable values • Age < 30 years without family history • No nocturnal fall in BP on 24-hour monitor
Renovascular Disease (1-2%)*	• ↑ creatinine after introducing ACEI or ARB • Hypertension with diffuse atherosclerosis or a unilateral small kidney • Episodes of flash pulmonary edema • Abdominal bruit (not very sensitive) • **Initial investigation**: captopril renogram (if safe, stop diuretics for 2 days, and ACEI/ARBs for 5 days, before exam); alternatively duplex Doppler ultrasonography or spiral CT angiography or MR angiography
Primary Kidney Disease (2-3%)	• ↓eGFR and /or abnormal urinalysis • **Initial investigation**: renal ultrasound, complete blood count, calcium, phosphates, electrolytes, urine analysis
Primary Aldosteronism (0.3%)	• Spontaneous hypokalemia (though more than one-half of patients are normokalemic) • Profound diuretic-induced hypokalemia (<3.0 mmol/L) • Hypertension refractory to treatment with 3 or more drugs • Incidental adrenal adenoma • **Initial investigation**: plasma renin activity and plasma aldosterone concentration • **Note**: Ideally measured before 10 am after 1 hr of ambulation if possible. Patient should be on an unrestricted-salt diet. Certain medications affect aldosterone and renin. Where safe, suggested drug-free periods prior to testing are, beta-blockers: 1 wk; ACE, ARB, diuretics, NSAIDs: 2 wks; spironolactone*, estrogen*, high-dose amiloride*: 6 wks. * drug free period is mandatory
Cushing's Syndrome (<0.1%)	• Cushingoid facies, central obesity, proximal muscle weakness, and ecchymoses • **Initial investigation**: overnight 1 mg dexamethasone suppression test, or 24-hour urine cortisol
Pheochromocytoma (<0.1%)	• Paroxysmal elevations in BP • Headache, palpitations, and sweating • **Initial investigation**: 24-hour urine for catecholamines and metanephrines • **Note**: False positives can be caused by tricyclic antidepressants, antipsychotics, levodopa, decongestants, labetalol, sotalol, buspirone, ethanol, acetaminophen, phenoxybenzamine, withdrawal from clonidine (and other drug withdrawal) and major physical stress (e.g. surgery, stroke, sleep apnea)

DISORDER	SUGGESTIVE HISTORY / FINDINGS / INVESTIGATION
Oral Contraceptives (0.5-1%)	• New elevation temporally related to oral contraceptive use
Sleep Apnea	• Primarily obese men who snore loudly • Daytime somnolence and fatigue • **Initial investigation**: overnight oximetry
Coarctation of the Aorta	• ↑ BP in right arm with diminished or delayed femoral pulses, and low BP in the legs • **Initial investigation**: echocardiogram (most occur just distal to the left subclavian origin)
Hypo/Hyperthyroidism	• ↑/↓ TSH
Primary Hyperparathyroidism	• Elevated serum calcium • **Initial investigation**: PTH / ionized calcium/ phosphate

Abbreviations: *BP, Blood Pressure; ACEI, Angiotensin Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blocker; CT, Computer Tomography; MR, Magnetic Resonance; eGFR, Estimated Glomerular Filtration Rate; TSH, Thyroid Stimulating Hormone; PTH, Parathyroid Hormone*

* Frequency estimates were obtained from Harrison's Internal Medicine Online on May 28th, 2007. Web site: www.accessmedicine.com

The investigation and management of secondary causes of hypertension is beyond the scope of this guideline. Please consult current medical texts for investigation and management advice, or consider referral to an appropriate specialist.

Hypertension – Detection, Diagnosis and Management

A Guide for Patients

Effective Date: February 15, 2008

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, inactive 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 can control include lifestyle choices such as:

- Smoking
- Physical inactivity
- Excess weight (esp. around the waist)
- High-fat diet
- Excessive salt intake
- Excessive alcohol consumption

Risk factors for developing hypertension that you cannot change are:

- Family history of hypertension, heart disease or stroke
- Age 45 years or older for men; 55 years or older for women
- Ethnicity (high blood pressure is more common in individuals of South Asian, First Nations/ Aboriginal, Inuit or African descent)

How do I know if I have high blood pressure?

Unfortunately, a person with high blood pressure usually does not see or feel any obvious symptoms of hypertension. That is why you should have your blood pressure checked by a health care professional. Hypertension is confirmed if blood pressure falls within the following 3 stages of severity:

	Systolic Blood Pressure	Diastolic Blood Pressure
Mild	140 to 159 mm Hg	90 to 99 mm Hg
Moderate	160 to 179 mm Hg	100 to 109 mm Hg
Severe	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.
- Stroke: Hypertension is the leading risk factor for stroke. Very high blood pressure can cause a weakened blood vessel to rupture and bleed into the brain. A blood clot blocking a narrowed artery can also cause a stroke.
- Chronic kidney disease (CKD): Hypertension is the second leading cause of kidney disease (diabetes is its leading cause) and kidney failure requiring dialysis or transplant.
- Retinopathy (eye damage): Hypertension can cause small blood vessels in the eye to burst or bleed. This can lead to blurred vision or even blindness.
- Peripheral vascular disease (PVD): Hypertension is an important risk factor for PVD, which is a narrowing and hardening of arteries that leads to restricted blood flow to the legs, arms, stomach or kidneys.
- Impotence or erectile dysfunction: Hypertension is a common cause of erectile dysfunction. Hypertension can lead to changes in the blood vessels that may prevent blood from filling the penis or from remaining there long enough to maintain an erection.

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. See Figure 1 for the relative importance of these measures.

✓ **Stop smoking**
Smoking is a key risk factor for hypertension, heart attack and stroke. Call QuitNow Services at 1 877 455-2233 (toll-free in BC, 24/7/365) for assistance to quit, or obtain self-help materials from their Web site at www.quitnow.ca.

✓ **Exercise regularly**
Exercise is one of the best things you can do for your health and blood pressure. 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. Work towards incorporating at least 30-60 minutes of moderate activity 4-7 days per week (moderate activity includes: walking 3 km [2 miles] in 30 minutes once per day, or 1.5 km [1 mile] in 15 minutes two times per day, jogging, cycling or swimming). The Web site www.actnowbc.ca contains advice on how to increase your physical activity and reduce your weight.

✓ **Maintain a healthy body weight**
A body-mass index (BMI) greater than 27 or a waist circumference greater than 102 cm (40 inches) for men and 88 cm (35 inches) for women, is associated with an increased risk of cardiovascular disease. To accurately measure your waist, place the tape measure between your hip bone and rib cage (near the belly button). Losing weight through a combination of a healthful diet and increased physical activity will help lower your blood pressure and lower your risk of a heart attack, stroke, kidney disease and type II diabetes.

✓ **Eat a well balanced diet**
Eat foods that are low in saturated fat, trans-fat and cholesterol (< 300 mg/day) and high in fibre. Recent studies also show a major benefit from consuming vegetables, fruits, fish (> 2 servings per week) and low-fat dairy products, as well as limiting salt intake.

The DASH diet (Web site: www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf) and Mediterranean diet have been shown to lower blood pressure and reduce cardiovascular risk. 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. For more information, call Dial-a-Dietitian toll free at 1 800 667-3438 or visit www.dialadietitian.org.

✓ **Reduce salt intake**

Reducing salt intake can prevent hypertension and lower elevated blood pressure. In addition to a well balanced diet, a reduced dietary sodium intake of 1500 milligrams per day (approximately 1 tsp of table salt) is recommended for people with hypertension. Call Dial-a-Dietitian at 1 800 667-3438 or visit www.dialadietitian.org to learn about how to manage your diet and reduce your salt intake to control hypertension. Information on reducing salt intake can also be found on the Heart and Stroke Foundation's Web site at www.heartandstroke.ca/bp/.

✓ **Limit alcohol consumption**

Moderate alcohol consumption for most adults is no more than 1-2 standard drinks per day to a weekly maximum of 14 drinks for men and 9 drinks for women. A standard drink is defined as:

- 1 can (341 mL) of 5% beer or
- 1 glass (150 mL) of 12% wine or
- 1.5 oz (45 mL) of 40% spirits

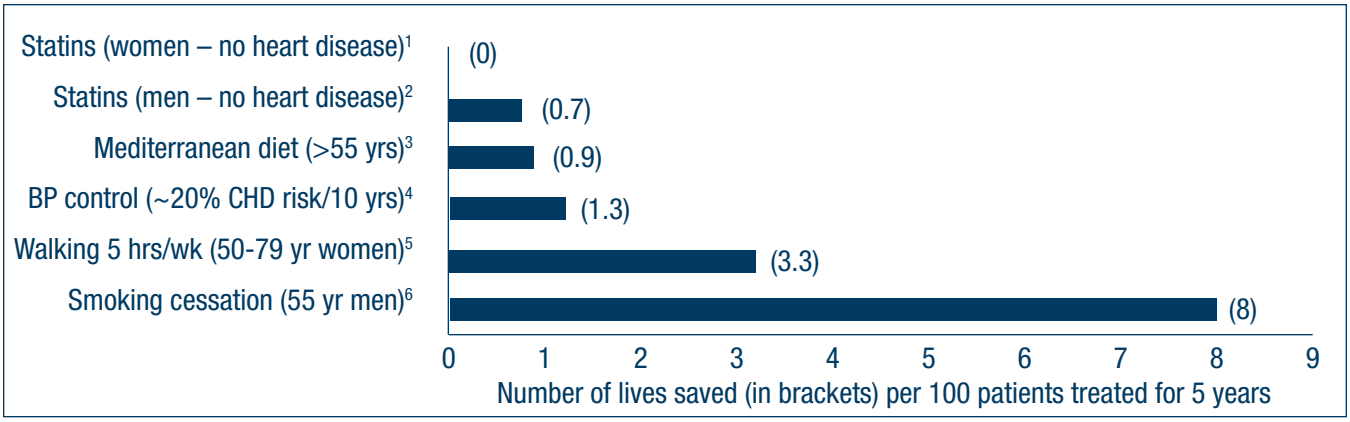
✓ **Medications**

Medications can be very effective in keeping your hypertension under control. Discuss the benefits and risks of taking medications for your hypertension with your doctor. Take medications only as prescribed and at approximately the same time of day each day. If you are on antihypertensive medication(s), avoid getting up quickly from a seated or lying position, as this can cause dizziness and lead to falls.

Additional lifestyle management information, specifically on healthy eating, physical activity and smoking cessation, may be found at www.actnowbc.ca. ActNowBC recommends **0/5/30** as follows:

0	**Smoking: Complete avoidance of tobacco smoke**
5	**Servings of fruits and vegetables per day (minimum)**
30	**Minutes of moderate-intensity activity per day (minimum)**

Figure 1: Mortality benefits of lifestyle modification (smoking cessation, walking, Mediterranean diet) compared to prescription medication management (BP control, statins) for patients without heart disease.



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Internet Resources

The **Guidelines and Protocols** Web site (www.BCGuidelines.ca) has more detailed information about the management of diseases such as hypertension and diabetes.

The BC HealthGuide Online (Web site: www.bchealthguide.org search word: high blood pressure) provides detailed information on managing hypertension.

The Heart and Stroke Foundation of Canada (Web site: www.heartandstroke.ca) offers excellent materials for the control of lifestyle factors that contribute to hypertension, heart disease, stroke and kidney disease. This includes public recommendations for the control of high blood pressure, the Blood Pressure Action Plan™ (an online e-tool to help you control your blood pressure), a body mass index calculator, a risk factor calculator and specific dietary information. Telephone: 1 888 473-4636 (Toll free) (BC/Yukon division office)

The Canadian Hypertension Society (Web site: www.hypertension.ca) has more detailed information regarding hypertension and blood pressure.

Dial-A-Dietitian (Web site: www.dialadietitian.org) provides accessible, quality information to the public and health information providers throughout British Columbia about nutrition. Registered dietitians provide nutrition consultation by phone. Telephone: 1 800 667-3438 (Toll free) or 604 732-9191 (Greater Vancouver)

American Heart Association (Web site: www.americanheart.org, search word: high blood pressure)

Mayo Clinic (Web site: www.mayoclinic.com, search word: high blood pressure)

Healthy Heart Society of BC (Web site: http://www.heartbc.ca/public/BP.htm)