HYPERTENSION

What is blood pressure?

Blood pressure is the force required to circulate blood throughout the body. As the heart contracts, the pressure within the blood vessels rises to a maximum or top blood pressure. This is called the systolic blood pressure. When the heart relaxes the blood pressure falls to a minimum or bottom blood pressure. This is called the diastolic blood pressure. The normal systolic blood pressure is about 120 mm Hg (millimeters of mercury) and the average diastolic blood pressure is about 80 mm Hg. This is reported as 120/80 or 120 over 80 mm Hg. Elevation of blood pressure is present when the systolic blood pressure is above 140 mm Hg or the diastolic blood pressure is above 90 mm Hg. The condition of having elevated blood pressure is called hypertension. In the majority of patients with hypertension the cause cannot be found. Genetics and heredity may play a role. In 5 to 10 % of patients a reversible cause for hypertension may be identified. Environmental factors such, as excess salt intake will raise someone's blood pressure. Other modifiable causes of hypertension include excessive calorie intake, obesity, inactivity, excessive alcohol consumption, low potassium intake, smoking and stress. In fact eliminating fast food from the diet will lower your blood pressure significantly.

Hypertension is common and present in about 10% of the adult population or about 2 million people in Canada. For the most part patients with hypertension are under diagnosed and under treated. The Canadian Heart Health Survey has shown that only 42% of patients are aware that they have hypertension, 19% are not treated and not controlled, 23% are treated and not controlled and only 16% of hypertensive patients are treated and controlled.

What are the risks of high blood pressure?

Excessive elevation of blood pressure can have long term effects. High blood pressure will lead to thickening of the heart's muscle. This condition is called hypertrophy and is a risk factor for a heart attack. Elevated blood pressure can also lead to stroke, vascular damage, and kidney failure. For the most part high blood pressure has no associated symptoms unless complications develop. Hypertension has been called the silent killer.

If blood pressure is quite high patients may experience headaches, fatigue, and shortness of breath or dizziness. High blood pressure is particularly dangerous in those patients with other cardiac conditions such as coronary artery disease or leaking heart valves. In conditions such as diabetes it is especially important to normalize blood pressure to prevent progressive kidney and organ damage. Elevated systolic blood pressure in the elderly population is one of the major risk factors for stroke.

Can high blood pressure be treated?

Yes. In addition to modifying diet, exercise and lifestyle there are many medications that can be used to control blood pressure. Often small doses of a diuretic or another medication are sufficient. In some patients combination therapy is required and in other patients certain agents are used for special or specific reasons such as angiotensin converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARB's) in diabetic patients with protein in their urine (evidence of kidney damage), and calcium channel blocking agents in the elderly with systolic hypertension. Medical evidence shows that aggressive treatment of blood pressure will reduce the risk of stroke and cardiovascular events considerably.

For more details regarding specific medications that control blood pressure, see our medication information sheets on www.cvtoolbox.com. If you have further questions please discuss them with your physician.

HYPERTENSION

HOP TO ITT BLOOD PRESSURE CALENDAR

HOP to ITT BP Calendar may be downloaded as a PDF or interactive EXCEL spreadsheet from www.cvtoolbox.com/downloads

1) Monitor BP in AM before arising and 2-3 times a day after 5 minute rest.
2) Average daily and weekly systolic and diastolic readings.
3) Normal BP is Systolic ≤135/Diastolic ≤ 85 for home BP monitoring. *

Condition	BP Treatment Targets
Treatment threshold if no risk factors, target organ damage or clinical CVD	160/ or/100
Treatment target & initiation threshold for office BP measurements	< 140/90
Treatment target for Ambulatory BP or Home BP measurement	< 135/85
Treatment target for Type 2 diabetics ± nephropathy or non-diabetic nephropathy	< 130/80
Pre-hypertension (JNC-7)	120-139/80-89
Normal BP	< 120/70

VALIDATED HOME BP DEVICES: OMRON: HEM-705CP, HEM-711AC, HEM-712C, HEM-739AC, HEM 757-CAN
AND LIFESOURCE: (AND) UA-767 CN, UA-767 Plus, UA-774 AC, UA-779, UA 787 AC

Sys/Dias	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
WEEK 1	Monitor BP 4 times daily, every day for the first week.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 2	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 3	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 4	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/

* Reference Values For Self Recorded Blood Pressure - A Meta-analysis of Summary Data. Thijs et al. Arch Int Med. 1998; 158:481-488

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Sys/Dias	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
WEEK 5	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 6	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 7	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 8	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 9	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 10	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/

HOP to ITT BP Calendar may be downloaded as a PDF or interactive EXCEL spreadsheet from www.cvtoolbox.com/downloads

Sys/Dias	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
WEEK 11	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 12	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 13	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 14	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 15	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/
WEEK 16	Monitor BP 4 times daily, two days/week–choosing one weekday and one weekend day.						
AM	/	/	/	/	/	/	/
NOON	/	/	/	/	/	/	/
PM	/	/	/	/	/	/	/
BED	/	/	/	/	/	/	/
Average	/	/	/	/	/	/	/

GUIDE FOR COMPREHENSIVE RISK REDUCTION

<table>
<tr><th>Rx ✓</th><th>Intervention</th><th>Recommendations</th></tr>
<tr><td></td><td>Smoking: Goal
-Complete cessation</td><td>Strongly encourage patient and family to stop smoking. Provide counselling, nicotine replacement, and formal cessation programs as appropriate.</td></tr>
<tr><td></td><td>Lipid Management:
Primary goal *
LDL < 2.0 (1.8) mmol/L</td><td>Start hypolipidemic diet in all patients: ≤ 30% fat,< 7% saturated fat,< 200mg/day cholesterol. 10% LDL↓achievable with diet. Assess fasting lipid profile. Baseline lipid profile < 24 hrs. after acute event. In post-MI patients, lipid profile may take 4 to 6 weeks to stabilize.
Add drug therapy according to the following guide:</td></tr>
<tr><td></td><td>Secondary goal *
TC/HDL< 4
Tertiary goal *
Metabolic Syndrome
TG < 1.7 mmol/l
HDL 1.0mmol/l(men)/ 1.3mmol/l (women)
CCS Recommendations for the Dx &Tx Dyslipidemia-2006

(NCEP ATP III Revision 2004)</td><td>
<table>
<tr><th>Lipid Profile</th><th>1st Line Therapy</th><th>2nd Line Therapy</th></tr>
<tr><td>LDL ↑</td><td>Statin</td><td>Resin</td></tr>
<tr><td>LDL ↑↑ & TG</td><td>Statin</td><td>Niacin or Fibrate</td></tr>
<tr><td>LDL ↑& TG ↑↑</td><td>Fibrate or Niacin/Niaspan®</td><td>Combination Therapy</td></tr>
<tr><td>TG ↑ & HDL ↓</td><td>Fibrate or Niacin/Niaspan®</td><td>Combination Therapy</td></tr>
</table>
* Primary goal: For patients CHD Risk equivalent: any of CAD, TIA, CVA, AAA, PVD/bruits, DM with one additional categorical risk factor or for patients with very high 10-year risk for hard CV events (20%).
• Target initial Rx medication dose required to achieve target LDL <2.0 (1.8) mmol/L. Min. 50% LDL ↓
• For 10 yr CV risk for hard endpoints 10-20%, LDL Rx threshold is 3.5 mmol/L. Minimum 40% LDL ↓
• For 10 yr CV risk for hard endpoints < 10%, LDL Rx threshold is 5.0 mmol/L. Minimum 40% LDL ↓
• Initiate lipid lowering early in high-risk patients (in conjunction with dietary modification).
For specific medications and dosing strategy see Lipid Optimization Tool
</td></tr>
<tr><td></td><td>Hypertension Goal
< 140/90 (Office BP)
< 135/80 (Home BP)
< 130/80 (DM)

2006 CHS
www.hypertension.ca
Earlier Dx is key
BP control —
focus on adherence:
long acting Rx/fixed dose combinations</td><td>• Assess BP at all visits. Assess global CV risk. Lifestyle modifications are cornerstone of anti-hypertensive and anti-atherosclerotic therapy.
• Initiate Rx immediately if hypertensive urgency. Dx HTN on second visit if : target organ damage, DM, chronic kidney disease (CKD) or BP > 180/110.Dx HTN on 3rd visit if BP ≥ 160 or ≥ 100
• Validate hypertension with: 1) Office BP(<140/90), ambulatory BP(< 135/85 daytime average/ or 130/80-24 hr average) or home/self BP(<135/85). Target < 140/90 office BP or < 130/80 DM or CKD.
• Initial Rx for systolic/diastolic HTN in absence of compelling indication: Low dose thiazide; ß-blocker if age < 60 yr; ACE-I § in non-black pts; long-acting CCB and ARB. ISH: LDD/ DHP-CCB/ARB
• Consider Rx ASA (once BP controlled) and statin in HTN patients if ≥ 3 CV risks.
• CHF&HTN-Rx ß-blocker †; ACE-I (ARB if ACE-I intolerant) & aldosterone antagonist (Class III/IV HF)
• CKD or Type 2 DM § with micro-albuminuria, proteinuria or nephropathy ACE-I/ARB are 1st line Rx</td></tr>
<tr><td></td><td>Diabetes
2003 CDA
Guidelines Released Dec. 2003</td><td>• Dx DM: FBG ≥ 7.0 mmol/L or 2 hr PC Glucose ≥ 11.1 mmol/L. (Normal: A1C ≤ 6; FBG 4-6 mmol/L; 2 hr PC Glucose 5-8 mmol/L.) Dx Impaired Fasting Glucose: 6.1-6.9 mmol/L. Dx Impaired Glucose Tolerance: 2 hr PC Glucose 7.8-11 mmol/L.
• Target euglycemia ASAP. Initiate diet to achieve weight loss (5-10%), diabetes education & exercise program. Target A1C ≤ 7; FBG 4-7 mmol/L; 2 hr PC Glucose 5-10 mmol/L. Rx oral hypoglycemic for FBG ≥ 7.0 mmol/L & A1C 7-9.Consider initial combination Rx for A1C ≥ 9.
• Aggressive BP control. Target <130/80 Rx ACE-i, ARB, cardio-selective ß-blocker, thiazide diuretic, long acting CCB. BP target 125/75 for diabetic nephropathy removed.</td></tr>
</table>

GUIDE FOR COMPREHENSIVE RISK REDUCTION

Rx ✓	Intervention	Recommendations
	Physical activity: Minimum goal 30 minutes 3 to 5 times/week ***HR guided***	• Assess risk, preferably with exercise test, to guide prescription. • Encourage minimum of 30-40 minutes of moderate intensity activity 3 to 5 times weekly (walking, jogging, cycling or other aerobic activity) supplemented by an increase in daily lifestyle activities (e.g., walking breaks at work, using stairs, gardening, household work) • Max benefits 5 to 6 hours per week. Medically supervised programs for moderate to high-risk patients.
	Obesity/weight management:	Start intensive diet and appropriate physical activity intervention, as outlined above, in patients >120% of ideal weight for height. Particularly emphasise need for weight loss in patients with hypertension, elevated triglycerides or elevated glucose levels. Ideal body weight BMI < 25
	Antiplatelet agents/ anticoagulants:	Start aspirin 81-325 mg per day if not contraindicated. Consider clopidogrel 75mg OD post MI, post CABG, CVA, PVD in ASA intolerant or allergic patients (CAPRIE Trial). Consider clopidogrel 75mg OD + ASA for ACS: unstable angina/non-ST elevation MI (***CURE Trial***: duration of therapy 9-12 months). No chronic benefit of ASA+ clopidogrel (*CHARISMA*). Consider warfarin for post MI patients unable to take aspirin (maintain INR 2-3).
	ACE INHIBITORS/ ARBs Post-MI/LV Dysfunction:	Start early post-MI in stable high risk patients (anterior MI, previous MI, Killip class II (S3 gallop, rales, radiographic CHF). Continue indefinitely for all with LV dysfunction (EF<40%) or symptoms of CHF. Use as needed to manage HPT or symptoms in all other patients. Valsartan in ACE intolerant patients *VALIANT*
	ACE inhibitors § Vascular Disease / Diabetes	Rx ACE inhibitors in **all patients** >55 yrs with evidence of **vascular disease or DM** and one other risk factor: *HOPE Trial* - Ramipril 2.5 → 10 mg OD or **all CAD patients** >18 yrs *EUROPA Trial* -Perindopril 4 → 8 mg OD. If LVF preserved, patient non diabetic and other risk factors optimized may not need ACE inhibitor *(PEACE)*.
	Beta-blockers: Post-MI	Start acutely or within a few days of event in all post-MI patients (unless contra-indication). Continue indefinitely if residual ischemia, heart failure LV dysfunction or severe co-morbidity. Continue indefinitely in low risk patients (IIa). Rx as needed to manage angina, arrhythmia or HPT.
	Beta-blockers: CHF †	Rx Add Beta-blocker to ACE-inhibitor/diuretic/+/- digoxin in stable Class II-IV CHF/LVEF ≤ 40% Bisoprolol 1.25 → 10 mg OD, carvedilol 3.125 mg BID → 25 mg BID (50 mg BID if weight > 85 kg) or metoprolol 12.5 mg → 75-100 mg BID
	Omega-3 fatty acids **HOMOCYST(E)INE**	**Rx: Omega-3 fatty acids 1-3 gm/day.** No identifiable benefit in lowering elevated homocysteine with vitamin supplements combining folic acid, B6 and B12 in patients with CVD, DM or post MI. *HOPE 2*/*NORVIT*.
	Estrogens	HRT not recommended for 1° or 2° prevention. Stop HRT in ACS, MI, PTCA, CABG, CHF, other surgery.

Prepared by Dr. J. Niznick