2008 Canadian Hypertension Education Program Recommendations:
The Short Clinical Summary - An Annual Update

On behalf of the Canadian Hypertension Education Program

Acknowledgement: This manuscript was written by Dr. N. Campbell with the assistance of the CHEP Executive, Dr D.W. McKay and Dr. G. Tremblay.

A version of the hypertension recommendations designed for patient and public education has been developed to assist health care practitioners manage hypertension. The summary is available electronically at www.hypertension.ca and www.heartandstroke.ca. Bulk orders of 25 or more copies can be obtained by contacting hyperten@ucalgary.ca. A free, confidential web-based tool for patients is available at www.heartandstroke.ca/BP. Developed by the Heart and Stroke Foundation, the Blood Pressure Action Plan enables patients to get a personalized action plan tailored to their risk profile, promote self-management and help patients to make lifestyle changes, monitor their blood pressure and print reports to take to their healthcare provider.
2008 marks the ninth consecutive year that the Canadian Hypertension Education Program (CHEP) has updated recommendations for the management of hypertension. This year CHEP focused on health care professional’s role in encouraging appropriate patients to measure their blood pressure at home properly.

The 2008 CHEP theme is: Home measurement of blood pressure

- Measuring blood pressure at home has a stronger association with cardiovascular prognosis than office based readings. Home measurement can confirm the diagnosis of hypertension, improve blood pressure control, reduce the need for medications in some, help identify white coat and masked hypertension and improve medication adherence in non adherent patients. Health care professionals can encourage appropriate patients to assess their blood pressure properly at home. Brief patient instructions designed to be removed and copied are in Table 1 and the Figure. Patient instructions for purchasing and using home blood pressure measurement can be found at www.hypertension.ca and www.heartandstroke.ca/BP. The latter site’s e-health tool, the Blood Pressure Action Plan (BPAP) has an interactive self management portal (“My Health on Track”) that provides a mechanism for recording and monitoring the blood pressures, medications and lifestyle changes and encourages positive steps towards better blood pressure management. General sources for patient information on hypertension can be found in Table 2.

Other important recommendations for the management of the patient with hypertension:

- All Canadian adults need to have blood pressure assessed at all appropriate clinical visits. Blood pressure increases with age such that 50% of Canadians over age 65 have hypertension. For those with normal blood pressure at age 55, over 90% will develop hypertension within an average lifespan. To identify those with hypertension all adults require ongoing assessment of blood pressure throughout their lives and those with high normal blood pressure require annual assessment.

- Optimum management requires assessment for other cardiovascular risks (smoking, dyslipidemia, diabetes, sedentary behaviour and unhealthy eating). Over 90% of Canadians with hypertension have other cardiovascular risks. Identifying and managing risk factors beyond hypertension can reduce the overall risk of cardiovascular disease by over 60% and can alter the blood pressure target (Table 3) and specific classes of antihypertensive medications recommended (Table 4 - Considerations in the Individualization of Antihypertensive Therapy).

- Lifestyle modifications are effective in reducing blood pressure and cardiovascular risk. Hypertension can be prevented, blood pressure can be reduced and other cardiovascular risks are favorably impacted by a healthy diet, regular physical activity, moderation in alcohol, reductions in dietary sodium and in some, stress reduction (Table 5). Table 6 provides tips that can be used to advise patients on how to reduce dietary sodium. Simple and brief health care professional interventions markedly increase the probability of a patient adhering to lifestyle changes. A section of the Heart and Stroke Foundation website (www.heartandstroke.ca/BP) has been designed to assess hypertensive patient’s lifestyles and provides individualized approaches and monitoring to assist lifestyle changes.

- Treat patients to the recommended targets to achieve optimum cardiovascular risk reduction. Greater reduction in cardiovascular disease is achieved by lowering the blood pressure to the stated targets (Table 3).

- Combinations of therapies (both drug and lifestyle) are generally necessary to achieve target blood pressures. Most patients require more than one antihypertensive drug and lifestyle changes to achieve recommended blood pressure targets. When using two drugs to lower blood pressure combinations of a beta blocker, ACE inhibitor or angiotensin receptor blocker produce
less than additive hypotensive effect. If blood pressure is \( \geq 20/10 \) mmHg above target initiating therapy with a combination of two ‘first line’ antihypertensive drugs is a first line option.

- **Monitor patients whose blood pressure is above target at least every 2 months.** To achieve blood pressure control, follow-up at short intervals is required to both improve patient adherence and increase the intensity of treatment.
- **Focus on adherence.** Non-adherence to therapy is one of the most important challenges to improving blood pressure control. Adherence to therapy should be assessed at each visit and specific interventions can improve adherence to therapy (Table 7).

**Comments from the CHEP executive**

CHEP is a program run by over 100 volunteers to improve the management of hypertension with the goal of preventing cardiovascular disease. CHEP is overseen by a steering committee including the Canadian Council of Cardiovascular Nurses, the Canadian Pharmacy Association, the College of Family Physicians of Canada, the Public Health Agency of Canada, the Canadian Hypertension Society, Blood Pressure Canada and the Heart and Stroke Foundation of Canada. The program has based on a rigorous systematic evidenced based approach to annually update therapeutic recommendations. The program is unique in having a specific implementation task force with subgroups of family physicians, nurses, pharmacists and medical specialists to oversee translation of the recommendations into education material suited to their disciplines. CHEP also has a task force to evaluate whether the process is improving hypertension management in Canada.

Recently, there have been large increases in diagnosis and treatment of hypertension in Canada and a population blood pressure survey in Ontario (presented at the Canadian Cardiovascular Congress in Oct 2007) reported the highest rate of treatment and control of hypertension in the world. While encouraging, the results of a national survey on hypertension treatment and control available in 2009 are awaited. 2007 also was marked by Health Canada approving the first drug in a decade from a new class of antihypertensive drugs (renin inhibitors). The CHEP will be awaiting the results of large outcome clinical trials to determine the role of the new class in clinical practice. Lastly in 2007, the development of a national strategy to prevent and control cardiovascular disease in Canada was initiated. The strategy will provide further guidance for optimum prevention and control of hypertension in the context of reducing cardiovascular disease.
Table 1: Patient instructions to prepare for home blood pressure measurement

Purchasing Equipment

- Buy an approved machine marked by the logo
- Make sure the device has a cuff size that is correct for you. Ask for help if you are unsure.
- Read and follow the manufacturer’s directions
- Check the accuracy of the machine with a health care provider to make sure it is accurate

To measure blood pressure -

- Follow the directions that come with the device.
- Only measure and record blood pressure if you have time to do it correctly.
- It is very important to rest and relax for 5 minutes in a quiet comfortable place with no distractions (e.g. TV or talking) before measuring your blood pressure.
- Wait for at least two hours after a big meal and at least half an hour after drinking coffee or smoking.
- Empty your bladder or bowels if it is uncomfortable before taking a reading.
- Put the cuff on a bare arm.
- Do not measure blood pressure when you are uncomfortable, cold, anxious, stressed or in pain.
- Sit in a chair that supports your back and beside a table that can support your arm. If required put a pillow or towel under your arm so that it rests at heart level (see Figure). Do not cross your legs.
- Measure blood pressure in the morning before medications and eating and in the evening before going to bed, bathing or taking medications.
- Take at least two readings and record them with the date and time.

Figure
<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 Public Hypertension</td>
<td>• General information on prevention and treatment of hypertension</td>
<td><a href="http://www.hypertension.ca">www.hypertension.ca</a></td>
</tr>
<tr>
<td>Recommendations</td>
<td>• Create a personalized action plan for healthy living</td>
<td><a href="http://www.heartandstroke.ca">www.heartandstroke.ca</a></td>
</tr>
<tr>
<td>On-line, personalized blood</td>
<td></td>
<td></td>
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<tr>
<td>pressure plan</td>
<td></td>
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<tr>
<td>DASH diet</td>
<td>• The DASH diet and healthy eating to improve blood pressure control</td>
<td><a href="http://www.nhlbi.nih.gov/hbp/prevent/h_eating/h_eating.htm">www.nhlbi.nih.gov/hbp/prevent/h_eating/h_eating.htm</a></td>
</tr>
<tr>
<td>Canada’s Food Guide</td>
<td>• Canada’s official guide to healthy eating and lifestyle choices. Personalize your own food guide!</td>
<td><a href="http://www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html">www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html</a></td>
</tr>
<tr>
<td>Dietitians of Canada</td>
<td>• Tips for eating well and living well</td>
<td><a href="http://www.dietitians.ca">www.dietitians.ca</a></td>
</tr>
<tr>
<td>On-line health and fitness</td>
<td>• Learn about your risk factors using different tools to calculate your personal factors</td>
<td><a href="http://www.healthtoolsonline.com/health-fit.html">www.healthtoolsonline.com/health-fit.html</a></td>
</tr>
<tr>
<td>calculators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes &amp; Hypertension Heart</td>
<td>• Information on hypertension for people with diabetes</td>
<td><a href="http://www.diabetes.ca">www.diabetes.ca</a></td>
</tr>
<tr>
<td>Disease &amp; Stroke</td>
<td>• Controlling your blood pressure can reduce your chance of developing heart disease or having a stroke</td>
<td><a href="http://www.heartandstroke.ca">www.heartandstroke.ca</a></td>
</tr>
</tbody>
</table>

Many of the resources can be downloaded and printed or hard copies ordered for patients who do not use the internet. With permission of Blood Pressure Canada
**Table 3: Target Values for Blood Pressure**

<table>
<thead>
<tr>
<th>Setting</th>
<th>Target (SBP/DBP mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home:</strong></td>
<td></td>
</tr>
<tr>
<td>Home blood pressure and daytime ABPM*</td>
<td>&lt;135/85</td>
</tr>
<tr>
<td><strong>Office:</strong></td>
<td></td>
</tr>
<tr>
<td>Diastolic ± systolic hypertension</td>
<td>&lt;140/90</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>&lt;140</td>
</tr>
<tr>
<td>Diabetes</td>
<td>&lt;130/80</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>&lt;130/80</td>
</tr>
</tbody>
</table>

* The target value readings taken by home measurement and ABPM in those with diabetes or chronic kidney disease have not been established.

With permission of the Canadian Hypertension Education Program
<table>
<thead>
<tr>
<th>Hypertension</th>
<th>Initial therapy</th>
<th>Second-line therapy</th>
<th>Notes and/or Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diastolic+/- Systolic Hypertension</td>
<td>Thiazide diuretics, beta blockers, ACE-inhibitors, ARBs, or long-acting calcium channel blockers (consider ASA and statins in selected patients). Consider initiating therapy with a combination of two first line drugs if the blood pressure is &gt;20 mmHg systolic or &gt;10 mmHg diastolic above target.</td>
<td>Combinations of first-line drugs</td>
<td>Beta-blockers are not recommended as initial therapy in those over 60 years of age. Hypokalemia should be avoided by using potassium-sparing agents in those who are prescribed diuretics as monotherapy. ACE inhibitors are not recommended in blacks. ACE inhibitors and ARBs are teratogenic and caution is required if prescribing to women of childbearing potential.</td>
</tr>
<tr>
<td>Isolated systolic hypertension without other compelling indications</td>
<td>Thiazide diuretics, ARBs or long-acting dihydropyridine calcium channel blockers.</td>
<td>Combinations of first-line drugs</td>
<td>Same as diastolic+/- systolic Hypertension</td>
</tr>
<tr>
<td>Diabetes mellitus with nephropathy</td>
<td>ACE inhibitors or ARBs</td>
<td>Addition of thiazide diuretics, cardioselective beta-blockers, long-acting calcium channel blockers or use an ARB/ACE inhibitor combination</td>
<td>If the serum creatinine level is &gt;150 μmol/L, a loop diuretic should be used as a replacement for low-dose thiazide diuretics if volume control is required.</td>
</tr>
<tr>
<td>Diabetes mellitus without nephropathy</td>
<td>ACE inhibitors, ARBs, dihydropyridine CCBs or thiazide diuretics</td>
<td>Combination of first-line drugs or if first line agents are not tolerated addition of cardioselective beta-blockers and/or long-acting non dihydropyridine calcium channel blockers</td>
<td>Normal albumin to creatinine ratio [ACR] &lt; 2.0 mg/mmol in men and &lt; 2.8 mg/mmol in women</td>
</tr>
</tbody>
</table>

**Cardiovascular and Cerebrovascular Disease**

- **Angina**
  - Beta-blockers and ACE inhibitors except in low risk patients
  - Long-acting calcium channel blockers
  - Avoid short-acting nifedipine

- **Prior myocardial infarction**
  - Beta-blockers and ACE inhibitors (ARBs if ACEI-intolerant)
  - Long-acting calcium channel blockers

- **Heart failure**
  - ACE inhibitors (ARBs if ACEI-intolerant) and beta-blockers.
  - Spironolactone in patients with NYHA class III or IV symptoms.
  - ARBs or hydralazine/isosorbide dinitrate (thiazide or loop diuretics, as additive therapy)
  - Titrates doses of ACEI and ARB to those used in clinical trials. Avoid nondihydropyridine calcium channel blockers (diltiazem, verapamil). Monitor potassium and renal function if combining and ACE inhibitor and ARB.

- **Left ventricular hypertrophy**
  - ACE inhibitors, ARBs, dihydropyridine calcium channel blockers, diuretics, (beta-blockers for patients under 55 years)
  - Avoid hydralazine and minoxidil

- **Past cerebrovascular accident or TIA**
  - ACE inhibitor/diuretic combinations
  - This does not apply to acute stroke. Blood pressure reduction reduces recurrent cerebrovascular events in patients with stable past cerebrovascular disease. Blood pressure lowering should be considered in those with normal blood pressure who have had a stroke

**Non Diabetic Chronic Kidney Disease**

- **Non diabetic chronic kidney disease with proteinuria**
  - ACE inhibitors (ARBs if ACEI-intolerant) diuretics as additive therapy
  - Combinations of additional agents
  - Avoid ACE inhibitors or ARB if bilateral renal artery stenosis or unilateral disease with solitary kidney. Patients placed on an ACE inhibitor or an ARB should have their serum creatinine and potassium carefully monitored.

- **Renovascular disease**
  - Similar to diastolic+/- systolic hypertension without compelling indications for other medications
  - Avoid ACE inhibitors or ARB if bilateral renal artery stenosis or unilateral disease with solitary kidney.

**Other Conditions**

- **Peripheral arterial disease**
  - Does not affect initial treatment recommendations
  - Does not affect initial treatment recommendations
  - Avoid beta-blockers with severe disease

- **Dyslipidemia**
  - Does not affect initial treatment recommendations
  - Does not affect initial treatment recommendations
  - Caution should be exercised with the ASA recommendation if blood pressure is not controlled.

- **Global vascular protection**
  - Statin therapy for patients with 3 or more cardiovascular risk factors or with atherosclerotic disease
  - Low dose ASA in patients with controlled blood pressure
Table 5: Lifestyle therapy to reduce the possibility of becoming hypertensive and to reduce blood pressure and to reduce the risk of blood pressure-related cardiovascular complications in hypertensive patients

1. Healthy diet: high in fresh fruits, vegetables low fat dairy products, dietary and soluble fibre, whole grains and protein from plant sources, low in saturated fat, cholesterol and salt in accordance with Canada's Guide to Healthy Eating

2. Regular physical activity: accumulation of 30-60 minutes of moderate intensity dynamic exercise 4-7 days per week in addition to daily activities.

3. Low risk alcohol consumption (≤2 standard drinks/day and less than 14/week for men and less than 9/week for women)

4. Attaining and maintaining ideal body weight (BMI 18.5-24.9 kg/m²)

5. A waist circumference
   < 102 cm for men
   < 88 cm for women

6. Reduction in sodium intake to less than 2300 mg/day

7. A smoke free environment

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Table 6: Advice for Patients to Assist them to Reduce Dietary Sodium

DO
• Buy and eat more fresh foods especially fruit and vegetables
• Buy and eat processed foods with low salt labels or brands with the lowest percentage of sodium on the food label
• Wash canned foods or other salty foods in water before eating or cooking
• Use unsalted spices to make foods taste better
• Eat less food at restaurants and ask for less salt to be added in your food orders
• Use less sauces on your food
• Eat foods with less than 100 mg of sodium per serving

DON’T
• Buy or eat heavily salted foods (e.g. pickled foods, salted crackers or chips, processed meats, etc).
• Add salt in cooking and at the table
• Eat foods with more than 400 mg of sodium per serving

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Table 7: Strategies to Improve Adherence

Adherence can be improved by a multi-pronged approach:
1. Adherence to pharmacological and nonpharmacological therapy should be assessed at every visit
2. Simplify medication regimens using once daily dosing of long acting medications, combination tablets and utilizing medication compliance aids
3. Tailor pill-taking to fit patients’ daily habits
4. Encourage greater patient responsibility by encouraging monitoring home blood pressure
5. Coordinate with chronic disease management programs (if available) to improve monitoring of adherence with pharmacological and lifestyle modification prescriptions
6. Educate patients and patients’ families about hypertension and its treatment

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