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# Hypertension: The Role of the Pharmacy Technician

By Sherrie Hertz, BSc.Pharm., RPh



## Statement of objectives

Upon completion of this lesson, the pharmacy technician will understand:

1. The prevalence of hypertension and the importance of treatment.
2. The role of both lifestyle and medication management in the treatment of hypertension.
3. The role of the pharmacy technician in supporting hypertension management.

## Introduction

High blood pressure, or hypertension, is a very common chronic disease that brings people back to the pharmacy time and again. Twenty-five percent of Canadians have hypertension, with the prevalence increasing to 50% in people over 65 years of age.<sup>1</sup> The majority of people with hypertension do not have their blood pressure controlled to target levels.<sup>2</sup>

One in five Canadians has “high normal” blood pressure, and of overweight individuals with high normal blood pressure, 40% will develop hypertension within two years and 60% will develop it within four years.<sup>1</sup> Prevention of hypertension is therefore an equally important concern; however, a complete discussion of prevention is beyond the scope of this lesson.

This lesson will discuss several aspects of blood pressure control, including risk factors, lifestyle changes, medication use and home blood pressure monitoring.

## What is hypertension?

A diagnosis of hypertension is made when the patient's blood pressure is above a defined target value. Blood pressure is expressed by two num-

bers, in units of millimeters of mercury (mm Hg). The higher number (systolic blood pressure) represents the force exerted on the walls of the arteries by the blood flowing through them when the heart is pumping. The lower number (diastolic blood pressure) represents this same force when the heart is at rest. A blood pressure reading of 140 mm Hg / 90 mm Hg (“140 over 90”), or less, is recommended for most people. For people with diabetes or chronic kidney disease a more aggressive target of 130 mm Hg / 80 mm Hg is the goal.

There are usually no symptoms related to hypertension, and as a result 43% of people with hypertension are not even aware that they have it.<sup>3</sup> There are a number of risk factors for hypertension (see Table 1). In a small proportion of cases, hypertension may be caused by physical factors, such as hormone imbalance, kidney disease, or as a side effect of medication use (see Table 2). However, most of the time there is no identifiable cause for the hypertension.

Treating hypertension is essential to good health care. Uncontrolled hypertension can cause damage to the heart, blood vessels and body organs. This increases the risk of heart attack,

stroke, kidney disease and death. Most patients with hypertension will also have other risk factors for heart disease, such as diabetes and/or high cholesterol, which will need additional treatment. Explaining the risk factors in a frank, honest, but non-alarmist fashion can help patients understand the importance of reaching target blood pressure values.

### Measuring Blood Pressure

The body works to constantly adjust blood pressure to ensure the blood, which carries oxygen and other essential nutrients, is getting to all parts of the body, particularly the heart and brain. Blood pressure changes with activity throughout the day and from day to day. To ensure an accurate diagnosis of high blood pressure, several readings should be taken over a period of time. To take a proper blood pressure measurement, the patient should be relaxed, not talking, and seated for a few minutes with legs uncrossed and feet flat on the floor. Advise patients to avoid caffeine, smoking, eating and drinking alcohol for 30 to 60 minutes before checking their blood pressure.

Some physicians will want their patients to measure their own blood pressure at home. This sometimes provides more accurate readings of daily blood pressures than when taken in a clinic setting as the patient is unhurried and more relaxed in their home environment. Patients with diabetes, chronic kidney disease, suspected non-adherence, experiencing “white coat” effect (where blood pressure is elevated only in the presence of the clinician), or masked hypertension (where blood pressure is controlled while at the clinic, but uncontrolled while at home) may benefit from this.

Pharmacies selling blood pressure monitors should be aware of the different types and be able to recommend a product best suited to the patient’s needs. A mercury sphygmomanometer requires some skill, and is not usually the best choice for home use. Electronic devices are semi or fully automated and are much simpler for the patient. Price varies depending on the level of automation, memory capacity and any additional features. The pharmacy should only carry monitors that are approved by the Association for the Advancement in Medical Instrumentation, the British Hypertension Society or the International Protocol for the Validation of Automated Blood Pressure Measuring Devices.<sup>6</sup> For

**TABLE 1** Risk factors for the development of Hypertension<sup>1</sup>

<b>Non-Modifiable Risk Factors</b>	<ul style="list-style-type: none"> <li>• age</li> <li>• male gender</li> <li>• family history of early heart disease (prior to age 55 in men, prior to age 65 in women)</li> </ul>
<b>Modifiable Risk Factors</b>	<ul style="list-style-type: none"> <li>• sedentary lifestyle</li> <li>• poor diet (high in salt, fat; low in fruit, vegetables)</li> <li>• abdominal obesity</li> <li>• diabetes</li> <li>• smoking</li> <li>• high cholesterol</li> <li>• stress</li> </ul>

**TABLE 2** Some medications that may increase blood pressure, or reduce the effectiveness of anti-hypertensive medications<sup>4,5</sup>

Medication Class	Example
Nonsteroidal anti-inflammatory drugs (NSAIDs)	<ul style="list-style-type: none"> <li>• indomethacin</li> <li>• ibuprofen</li> <li>• celecoxib</li> </ul>
Corticosteroids	<ul style="list-style-type: none"> <li>• prednisone</li> </ul>
Estrogens	<ul style="list-style-type: none"> <li>• oral contraceptives</li> <li>• conjugated estrogens</li> </ul>
Monoamine oxidase inhibitors (MAOIs)	<ul style="list-style-type: none"> <li>• phenelzine</li> <li>• tranylcypromine</li> </ul>
Decongestants	<ul style="list-style-type: none"> <li>• pseudoephedrine hydrochloride</li> <li>• phenylephrine hydrochloride</li> </ul>
Drugs of abuse	<ul style="list-style-type: none"> <li>• cocaine</li> <li>• amphetamines</li> </ul>

a selection of suitable products, visit the Canadian Hypertension Society website, [www.hypertension.ca](http://www.hypertension.ca). Ensure the patient knows how to properly use the machine and record and understand the results; they should have their home blood pressure monitors calibrated regularly.<sup>4</sup>

Twenty-four-hour ambulatory blood pressure monitoring is useful for patients whose blood pressure is not controlled despite appropriate therapy. In this situation, the patient wears a measuring device to gather blood pressure readings every 20 to 30 minutes over a 24-hour period in order to provide a good picture of the average daily blood pressure.<sup>7</sup>

### Lifestyle Modification

Lifestyle modification is fundamental to controlling blood pressure in all patients with hypertension. Weight reduction (if overweight), limiting alcohol consumption and stopping smoking can all be beneficial. Regular exercise is also helpful. Small improvements can make a difference. A weight loss of 4.5 kg (about 10 lb) can reduce blood pressure by 7.2 mm Hg / 5.9 mm Hg. As abdominal obesity is a risk factor for hypertension, a waist circumference of less than 102 cm (40 inches) in men and less than 88 cm (35 inches) in women is

recommended. Moderate exercise, such as walking for a total of 30 to 60 minutes over the course of the day, on most days of the week, is enough to make a difference.<sup>1</sup>

A diet high in fruits, vegetables and dietary fibre, and low in saturated fats and cholesterol is ideal. Salt intake should be limited to less than 2,300 mg of sodium per day. Limit alcohol to not more than two drinks per day, with not more than 14 drinks per week for men and nine per week for women.<sup>1</sup>

Daily stress should be kept to a minimum. Maintaining a work/life balance and effective relaxation techniques should both be considered as healthy lifestyle essentials.<sup>1</sup>

### Pharmacotherapy

Despite the benefits that can be attained with lifestyle modifications, most patients will require medication to bring their blood pressure to target. With no additional risk factors, an average blood pressure reading of over 160 mm Hg systolic, or over 100 mm Hg diastolic, indicates the need for medication.<sup>6</sup> Medication will be indicated at lower levels (greater than 140 mm Hg systolic, or greater than 90 mm Hg diastolic) if the patient already has kidney, eye or heart damage.<sup>6</sup>

**TABLE 3** Examples of Medications Used to Control High Blood Pressure<sup>1,5</sup>

Class/Mechanism of Action	Examples
<b>Diuretics</b> Also known as water pills, reduce blood volume	<b>Thiazides</b> <ul style="list-style-type: none"> <li>• hydrochlorothiazide</li> <li>• indapamide</li> <li>• chlorthalidone</li> <li>• metolazone</li> </ul>
	<b>Loop</b> <ul style="list-style-type: none"> <li>• furosemide</li> </ul>
	<b>Potassium Sparing</b> <ul style="list-style-type: none"> <li>• amiloride hydrochloride</li> <li>• spironolactone</li> <li>• triamterene/hydrochlorothiazide</li> </ul>
<b>Angiotensin-Converting Enzyme Inhibitors (ACEIs)</b> Relax blood vessels by interfering with enzyme that causes constriction	<ul style="list-style-type: none"> <li>• benazepril</li> <li>• captopril</li> <li>• cilazapril</li> <li>• enalapril maleate</li> <li>• fosinopril sodium</li> <li>• lisinopril</li> <li>• perindopril erbumine</li> <li>• quinapril hydrochloride</li> <li>• ramipril</li> <li>•trandolapril</li> </ul>
<b>Angiotension II Receptor Blockers (ARBs)</b> Relax blood vessels by blocking enzyme that causes constriction	<ul style="list-style-type: none"> <li>• candesartan cilexetil</li> <li>• eprosartan</li> <li>• irbesartan</li> <li>• losartan potassium</li> <li>• telmisartan</li> <li>• valsartan</li> </ul>
<b>Calcium Channel Blockers (CCBs)</b> Block calcium from entering blood vessel walls, resulting in relaxation	<b>Dihydropyridine</b> <ul style="list-style-type: none"> <li>• amlodipine besylate</li> <li>• felodipine</li> <li>• nifedipine</li> </ul>
	<b>Non-dihydropyridine</b> <ul style="list-style-type: none"> <li>• diltiazem hydrochloride</li> <li>• verapamil hydrochloride</li> </ul>
<b>Beta-Blocker (BBs)</b> Reduce heart rate and blood flowing from the heart into blood vessels	<b>Nonselective</b> <ul style="list-style-type: none"> <li>• nadolol</li> <li>• oxprenolol hydrochloride</li> <li>• propranolol hydrochloride</li> </ul>
	<b>Selective</b> <ul style="list-style-type: none"> <li>• acebutolol hydrochloride</li> <li>• atenolol</li> <li>• bisoprolol fumarate</li> <li>• metoprolol tartrate</li> </ul>

There are many different classes of medications that can be used to control blood pressure (see Table 3) and a complete explanation of their mechanism and adverse effects is beyond the scope of this lesson. More information can be found on the Heart and Stroke Foundation website, [www.heartandstroke.ca](http://www.heartandstroke.ca). Different drug classes work via different mechanisms and they are often combined to achieve greater benefit than can be seen with one agent alone.

Drug therapy is often begun with a single agent. The following are suitable choices for initial monotherapy in most patients: thiazide diuretics; angiotensin-converting enzyme inhibitors (ACEIs);

long-acting calcium channel blockers (CCBs); angiotensin receptor blockers (ARBs) or beta-blockers (BBs), but BBs are not recommended as initial therapy in patients older than 60 years, as elderly patients may be more sensitive to the adverse effects of BBs. Diuretics (water pills) are inexpensive and often the first choice. Additional medications, from a different class, would be added as needed and appropriate. Most patients will require more than one medication to control hypertension, with one-third of patients needing three drugs or more.<sup>1</sup>

Medication selection will also depend on individual patient needs, taking into consideration the patient's additional

medical conditions, general health and experience with adverse effects. For example, in addition to controlling blood pressure, ACEIs and ARBs can protect the kidney from damage and are usually recommended first-line for patients with diabetes.<sup>4</sup>

Some common side effects of anti-hypertensives include dizziness or light-headedness, especially with the first few doses as the body adjusts to the lower pressure. Patients should be advised to sit and stand up slowly. Many antihypertensives will either increase or decrease potassium levels and many patients will need this monitored. ACEIs, and less frequently ARBs, may induce a nonproductive cough.

Additional medications are often used in patients with hypertension. Statins (e.g., atorvastatin) are used to control cholesterol and reduce overall cardiovascular risk.<sup>8</sup> Low-dose acetylsalicylic acid (ASA) may also be recommended to prevent heart attack and stroke. Potassium supplements may be required, since some antihypertensive therapies cause potassium depletion.

Because patients being treated for hypertension are often using multiple medications, the risk of drug interactions is increased. Special attention should be paid to assessing each patient's full medication profile for potential interactions with other prescription and nonprescription products.

### Supporting patient adherence

Hypertension is a chronic illness and blood pressure medications must be taken for the long term. Nonadherence to therapy is one of the most important challenges to improving blood pressure control.<sup>1</sup> People with high blood pressure may not have symptoms due to hypertension but may in fact experience side effects with treatment and so are at particular risk of nonadherence. All healthcare providers should work with patients to support adherence to prescribed medications. Pharmacy staff can work with patients and prescribers to simplify dosage regimens by using combination medications and long-acting products that can be taken less often, which can help support adherence.

Work with patients to identify ways of fitting medication use into daily routines. For example, people may find it easier to remember to take their medication if it is associated with a daily activity, such as brushing teeth, or having

breakfast. Daily or weekly pill reminder boxes, or blister dose packaging (either from the manufacturer or customized in the pharmacy) can help adherence.

### The role of the pharmacy technician

A collaborative approach to treating hypertension is recommended. Along with the provision of medications and supportive counselling, pharmacies can implement screening clinics, educate patients about the risks of high blood pressure and the importance of good control, and support medication adherence in a variety of ways.

Pharmacy technicians have a particularly important role and can assist in several ways:

- Identify patients at risk of non-compliance and alert the pharmacist.
- Detect patients who are late in getting refills and/or not re-ordering all of the blood pressure medications prescribed for them.
- Reinforce messages about the importance of adherence to prescribed therapy and lifestyle modifications.
- Keep the pharmacy's blood pressure monitor in good repair and have the

calibration checked regularly.

- Ensure that the pharmacy carries an assortment of home blood pressure monitors for sale and encourage patients to know their blood pressure and their targets.
- Monitor OTC sales and suggest that patients with hypertension consult with the pharmacist for the most appropriate selection of nonprescription products.
- Support good lifestyle choices by encouraging smoking cessation. Stock self-help smoking cessation materials and refer interested patients to the pharmacist for additional counselling.
- Support prevention of hypertension by stocking products and information on weight loss, exercise and nutrition.
- Encourage patients whose BP is above target to have their pressure checked every 2 months and follow up with their doctor.<sup>1</sup>
- Make patients aware of the resources available from the Canadian Hypertension Education Program (CHEP), available at [www.hypertension.ca](http://www.hypertension.ca). This program provides comprehensive information and support for both healthcare providers and patients dealing with this

chronic disease.

Cardiovascular disease is a leading cause of death and disability in Canada. Pharmacy technicians can play an important role in supporting good blood pressure control and reducing its sometimes devastating consequences.

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## ► QUESTIONS

Please select the best answer for each question or answer online at [www.pharmacygateway.ca](http://www.pharmacygateway.ca) for instant results.

### 1. Blood pressure is best controlled by:

- Lifestyle modification alone
- Medication alone
- Medication and alcohol restriction
- Medication and lifestyle modification

### 2. Most people with hypertension:

- Experience dizziness and fainting
- Have headaches when blood pressure is elevated
- Experience no symptoms related to their high blood pressure
- Are able to achieve target blood pressure levels with one medication alone

### 3. Calcium channel blockers:

- Are used to prevent osteoporosis
- Can be used as initial therapy in a long-acting formulation
- Should be avoided in patients over age 60
- Should not be combined with other antihypertensive medications

### 4. Diuretics are:

- Not useful for patients with congestive heart failure
- Also called water pills
- Reserved for more difficult cases
- Not effective for controlling hypertension

### 5. Antihypertensive medications:

- Increase potassium levels
- Decrease potassium levels
- May increase or decrease potassium levels
- Contain potassium

### 6. Patient adherence to therapy can be improved by:

- Increasing dosing frequency
- Utilizing once-daily dosing formulations
- Avoiding combination drug products
- Focusing on lifestyle modifications

### 7. The target blood pressure for patients with diabetes is:

- 140 mm Hg / 90 mm Hg
- 120 mm Hg / 80 mm Hg
- 160 mm Hg / 90 mm Hg
- 130 mm Hg / 80 mm Hg

### 8. To control hypertension, about one-third of patients will require:

- One medication
- A combination of two medications
- A combination of three medications
- A combination of three or more medications

### 9. Which of the following statements is correct?

- Beta-blockers are not recommended in cases of heart failure.
- ACEIs can protect the kidney from damage.
- Low-dose ASA can help control blood pressure.
- Amlodipine and bisoprolol are long-acting calcium channel blockers.

### 10. Hypertension is:

- Usually caused by hormonal imbalance
- Less common in men
- More common in the elderly
- Improved with a weight loss of at least 10 kg

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