

Episode 135 – Hypertension June 27, 2025

Introduction

Hypertension is the most common modifiable risk factor for cardiovascular disease[1] and death, affecting approximately one in four adults in Canada. The lifetime incidence of developing hypertension is estimated to be 90%. [1] [2]

Globally, an estimated 1.28 billion adults aged 30-79 have hypertension, with 46% unaware they have the condition. Less than half of adults (42%) with hypertension are diagnosed and treated, and only one in five (21%) have it under control. Hypertension is a significant cause of premature death worldwide, responsible for an estimated 10.4 million deaths annually. [3] [4]

Blood pressure

Blood pressure is a measure of the pressure or force of blood against artery walls. Systolic (top number) is the measure of the pressure when the ventricles contract and push blood through the arteries. Diastolic (bottom number) is the measure of the pressure when the heart relaxes between contractions. Blood pressure is measured using millimetres of mercury (mmHg). Blood pressure changes throughout the day based on the person's activities. Blood pressure usually is lowest at night and rises sharply upon waking. [5] [6] [7]

Hypotension

Hypotension occurs when the force of the blood against the artery walls is too low. Hypotension may be considered normal pressure for some individuals who consistently have low blood pressure and are asymptomatic. Hypotension is only a concern if it causes symptoms or is linked to a medical condition, such as heart disease, anemia, blood loss, severe infection, etc.

Possible symptoms of hypotension [7] [8] [9]

• Dizziness • Lightheadedness • Fainting • Fatigue • Blurred vision • Trouble concentrating	• Confusion • Nausea • Headache • Heart palpitations • Rapid breathing • Cold, clammy skin

[1] Refer to Episodes 79, 80, and 81 to learn more about cardiovascular diseases and oral health.

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Hypertension

Hypertension occurs when there is too much pressure in blood vessels, which can damage blood vessels and cause serious health problems. The higher the blood pressure and the longer it stays high, the greater the potential damage to the vessels. Anyone can develop hypertension, but it becomes more common as people age. [6]

Symptoms of hypertension

Most people with hypertension have no symptoms, so they are unaware they have it. However, some people with severe hypertension may have:

- Headaches
- Shortness of breath
- Dizziness
- Vision problems
- Nosebleeds
- Nausea and vomiting
- Fatigue [10] [11] [12]

Types of hypertension

Hypertension can be classified as primary or secondary.

Primary or essential hypertension accounts for 90% of cases of hypertension in adults. For most adults, there is no identifiable cause of hypertension. It tends to develop gradually over many years. Atherosclerosis increases risk of hypertension. [10] [13]

Secondary hypertension accounts for the remaining 10% of cases. It is caused by an underlying medical condition, tends to appear suddenly, and cause higher blood pressure than primary hypertension. Proper treatment of secondary hypertension can often control both the high blood pressure and the condition causing it. Effective treatment reduces the risk of serious complications. [13] [14]

Causes of secondary hypertension may include:

- Adrenal gland tumours.
- Congenital heart disease, such as coarctation of the aorta (narrowing of the aorta).
- Various drugs, such as decongestants, nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin or ibuprofen, antidepressants, birth control pills, herbal supplements (e.g., ginseng, licorice, ephedra [ma-huang]), steroids, cocaine, amphetamines.
- Kidney disease, such are diabetic nephropathy resulting from damage from diabetes, polycystic kidney disease, glomerular disease, and renovascular hypertension.
- Thyroid conditions, both hypothyroidism and hyperthyroidism can cause hypertension.
- Hyperparathyroidism.
- Cushing syndrome, often due to a tumour in the pituitary gland that causes overproduction of the stress hormone cortisol.
- Aldosteronism, an adrenal gland disorder that raises blood pressure.

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- Pheochromocytoma, a tumour in the adrenal gland that produces too much epinephrine and/or other hormones that raise blood pressure.
- Pregnancy, which can make existing hypertension worse or cause hypertension to develop (i.e., preeclampsia).[2]
- Sleep apnea.
- Obesity.[3] [10] [13] [14] [15]

Signs of secondary hypertension may include:
- Hypertension that does not respond to blood pressure medications (i.e., resistant hypertension)
- Very high blood pressure (i.e., systolic blood pressure over 180 mmHg or diastolic blood pressure over 120 mmHg)
- Hypertension that no longer responds to medication that previously controlled the blood pressure
- Sudden-onset hypertension before age 30 or after age 55
- No family history of hypertension
- No obesity [14]

Resistant hypertension
Resistant hypertension is blood pressure that remains elevated above the target goal despite the concurrent use of three antihypertensive medications of different classes at optimal doses. These commonly include taking a:
- Diuretic,
- Calcium channel blocker, and
- Angiotensin-converting enzyme (ACE) inhibitor or angiotensin II receptor blocker (ARB).

However, before true resistant hypertension is diagnosed, nonadherence to antihypertensive medications, secondary hypertension, and white coat hypertension should be ruled out. Nonadherence to antihypertensive medications is common with rates between 30%-50%. [16] [17] [18]

White coat hypertension
White coat hypertension is blood pressure that is elevated from the anxiety of a clinical visit and is lower or not elevated with normal activities. Its prevalence is estimated to be between 9% and 30% and is more common in females, older adults, nonsmokers, people with mildly elevated office blood pressure, pregnant individuals, and those without target organ damage. Individuals with white coat hypertension have been shown to have an overall cardiovascular risk that approximates that of normotensive individuals. Therefore, at present, there is no evidence to support pharmacologic treatment of those with white coat hypertension. Thus, it is important to identify people with white coat hypertension to avoid overtreatment. Out-of-office measurements are essential to rule out white coat hypertension in people with elevated blood pressure in clinical settings. [12] [16] [19]

[2] Refer to Episodes 108, 109, and 110 for discussion on pregnancy and oral health.
[3] Refer to Episodes 120, 121, and 122 for additional information on obesity and oral health.

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Masked hypertension
Masked hypertension is a condition where an individual's blood pressure appears normal during office visits, but is elevated when measured outside the office or clinic (e.g., at home or work). Masked hypertension is common in untreated adults, with a prevalence of approximately 20%. [19]

When normal blood pressure readings occur in the office, masked hypertension should be suspected in older adults, males, current smokers, individuals who consume excess alcohol[4] as well as individuals with obesity, diabetes,[5] other traditional cardiovascular risk factors, left ventricular hypertrophy,[6] or high-normal systolic and diastolic office blood pressure. Masked hypertension can be ruled out by performing out-of-office measurements. [19]

Hypertensive crisis
A hypertensive crisis is when blood pressure rises quickly and severely with readings of 180/120 or greater and may be accompanied by symptoms, such as headache, chest pain, nausea, vomiting, or dizziness. There are two types of hypertensive crises (hypertensive urgency and hypertensive emergency), both require immediate attention as early evaluation of organ function is critical to determine an appropriate course of action. [20]

- Hypertensive urgency: blood pressure is 180/120 or greater without any other associated symptoms of target organ damage (e.g., chest pain, shortness of breath, back pain, numbness, weakness, change in vision, or difficulty speaking). Requires immediate medical attention. Refer for immediate medical attention. Treatment often includes adjusting or adding medications, but rarely requires hospitalization.

- Hypertensive emergency: blood pressure reading is 180/120 or greater and is accompanied by other associated symptoms of target organ damage (e.g., chest pain, shortness of breath, back pain, numbness, weakness, change in vision, difficulty speaking, confusion, dizziness, vomiting). Call 911. [20] [21]

Complications of hypertension
Hypertension occurs when blood exerts excessive pressure against artery walls. This increased force can damage the delicate inner lining of the artery walls. When this lining is damaged, fat and calcium can accumulate, leading to the formation of plaque. Over time, this process, known as atherosclerosis or 'hardening of the arteries,' causes the arteries to become narrower and less elastic. This narrowing can restrict blood flow, further raising blood pressure.

As the arteries become stiffer, the heart must work harder, which can cause the heart muscle to thicken and weaken, decreasing its ability to pump blood. When hypertension

[4] Refer to Episodes 104 and 105 for additional information on alcohol and substance use.
[5] Refer to Episodes 91, 93, and 94 for discussion on diabetes and oral health.
[6] Left ventricular hypertrophy is the thickening of the walls of the lower left heart chamber often caused by uncontrolled high blood pressure. [71]

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damages the arteries, they are unable to supply sufficient blood to the organs, resulting in organ damage. [22] [23] [24]

Hypertension increases risk of:

- Angina
- Myocardial infarction
- Atrial fibrillation
- Heart failure
- Coronary artery disease
- Aneurysm
- Atherosclerosis
- Retinal disease
- Peripheral arterial disease
- Kidney disease or failure
- Aortic aneurysm
- Sexual dysfunction (hypertension can lead to erectile dysfunction in males and may contribute to lower libido in females)
- Cerebrovascular disease
- Metabolic syndrome
- Vascular dementia [14] [21] [25]

Risk categories for developing complications [5] [26]

Risk level	Systolic / diastolic*	Additional information
Low risk	Less than 120 / 80	
Medium (moderate) risk	121-134 / 80-84	May be refer to as high-normal blood pressure or prehypertension
High (elevated) risk	135+ / 85+	130/80 is considered high for individuals with diabetes
These blood pressure targets are for adults <80 years. Consult a medical provider for targets for children, youth, or adults >80 years.		

Hypertension risk factors[7] [5] [10] [27] [28] [29] [30] [31] [32]

Risk factor	Description
Age	Risk increases with age as blood vessels naturally thicken and stiffen over time. Risk of hypertension is increasing in children and youth, possibly due to overweight or obesity from unhealthy diets and lack of exercise.
Sex	Males are more likely to develop hypertension throughout middle age. After 65, females are more likely to develop hypertension. Females who have hypertension during pregnancy are more likely to have hypertension later in life.

[7] Cardiovascular risk calculators to calculator your risk:

- My health checkup https://myhealthcheckup.com/
- EPI·R_xISK™ cardiovascular risk calculator https://www.epicore.ualberta.ca/epirxisk/

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Risk factor	Description
Ethnicity	People of Indigenous, South Asian, and African heritage are more likely to develop hypertension.
Family history	More likely to develop hypertension if a parent or sibling has the condition.
High body mass index (BMI)	Excess weight causes changes in blood vessels, kidneys, and other parts of the body, which can increase blood pressure.
Lack of exercise	Can increase weight gain, which increases risk of hypertension.
Tobacco use[8] or vaping[9]	Smoking, chewing tobacco, or vaping immediately raises blood pressure for a short while. Tobacco smoking injures blood vessel walls increasing risk of atherosclerosis.
Excess sodium	Excess sodium (salt) can lead to fluid retention increasing blood pressure.
Low potassium levels	Potassium helps increase sodium excretion through urine and relax blood vessels, decreasing blood pressure. Low potassium levels may be due to a lack of potassium in the diet or certain health conditions, including dehydration.
Excess alcohol use	Alcohol use has been linked with increased blood pressure, particularly in males.
Drugs	Drugs, such as birth control pills, decongestants, amphetamines, some antidepressants, steroids, some NSAIDs (e.g., aspirin, ibuprofen), antidepressants, herbal supplements (e.g., ginseng, licorice, ephedra), cocaine.
Stress	High levels of stress can lead to a temporary increase in blood pressure. Stress-related habits such as eating more, using tobacco, or drinking alcohol can further increase blood pressure.
Chronic conditions	Chronic conditions, such as kidney disease, diabetes, thyroid problems, sleep apnea, and metabolic syndrome.
Social and economic factors	Factors such as income, education, where a person lives, and type of job may contribute to risk of hypertension. Working early or late shifts is a social factor that can raise risk. Experiencing danger, harm, or trauma as a child is associated with higher risk of developing hypertension.

Diagnosis

A hypertension diagnosis is usually based on the mean (average) of several readings taken on separate occasions. It takes several readings because blood pressure varies depending on activities and time of the day. For example, physical activity and exercise can cause blood pressure to temporarily increase. Stress and caffeine can cause short-term spikes in blood pressure. [11] [33]

Blood pressure also has a daily pattern. Blood pressure typically rises a few hours before waking up, continues to rise and peaks in midday, and then drops in the late afternoon and evening, reaching its lowest point at night while sleeping (i.e., nocturnal dip). This pattern is considered normal for most individuals. [34]

Assessing blood pressure

There various methods for assessing blood pressure, including:

[8] Refer to Episode 101 for discussion on tobacco use and cessation.
[9] Refer to Episode 19 for additional information on e-cigarettes and vaping.

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- Automated office blood pressure
- Office blood pressure measurement
- Ambulatory blood pressure monitoring
- Home blood pressure monitoring

Automated office blood pressure
Automated office blood pressure (AOBP) is the preferred method of in-office measurement. It is performed using an automated device that takes a series of measurements without the provider or others present. The person is left unattended in a private area while three to six consecutive readings are taken and recorded at one-to-two-minute intervals. The mean blood pressure is also calculated.[10] [11] [35]

As per the Hypertension Canada Guidelines:
- AOBP threshold to diagnose hypertension is a mean systolic blood pressure (SBP) ≥135 mmHg or diastolic blood pressure (DBP) ≥85 mmHg. [16]

Office blood pressure measurement
Office blood pressure measurement (OBPM) is performed using an upper arm device with the provider in the room. Oscillometric or electronic devices are preferred when using this method. Auscultatory (mercury or aneroid) devices are an alternative if an electronic device is not available. [16]

As per the Hypertension Canada Guidelines:
- OBPM threshold to diagnose hypertension is a mean SBP ≥140 mmHg and/or DBP ≥90 mmHg.
- Threshold to diagnose hypertension in diabetes is a mean SBP ≥130 mmHg and/or DBP ≥80 mmHg. [16]

Ambulatory blood pressure monitoring
Ambulatory blood pressure monitoring (ABPM) uses a portable blood pressure device to record blood pressure readings and heart rate, usually every 20 to 30 minutes over 24 hours to capture normal everyday activity. The monitor consists of a blood pressure arm cuff attached to a light-weight monitor, which sits in a pouch held by a waist belt or shoulder strap.

ABPM is the preferred out-of-office method to diagnose hypertension. It can also be used to:
- Monitor hypertension.
- Rule out white coat hypertension.
- Detect masked hypertension.
- Detect sustained hypertension (i.e., persistently high blood pressure).
- Show the effect of medications on blood pressure control throughout the day.
- Monitor episodes of hypotension or syncope.

[10] Normally blood pressure is taking with the person seated. Blood pressure taken while the person is standing is used to assess for postural hypotension, which may modify hypertension treatment. [16]

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- Reveal irregular blood pressure patterns, such as an increase in blood pressure at night or during sleep or a less than 10% drop in blood pressure overnight (i.e., nondipping blood pressure). [16] [34] [35] [36]

Irregular blood pressure patterns may indicate:
- Poorly controlled high blood pressure
- Obstructive sleep apnea
- Kidney disease
- Diabetes
- Thyroid disease

Lifestyle factors that can affect blood pressure pattern, include:
- Night-shift work
- Smoking
- Overweight or obesity
- Stress and anxiety
- Nonadherence with antihypertensive medications or ineffective treatment
- Nonadherence with sleep apnea therapy or ineffective treatment [34]

As per Hypertension Canada Guidelines:
- ABPM threshold to diagnose hypertension is a mean 24-hour SBP ≥130 mmHg and/or DBP ≥80 mmHg or a mean daytime SBP ≥135 mmHg and/or DBP ≥85 mmHg. [16]

Home blood pressure monitoring
Home blood pressure monitoring (HBPM) is a self-monitoring method, which requires the person to measure their blood pressure twice in the morning and evening for 7 days. HBPM can be used to help diagnosis hypertension and monitor individuals with:
- Hypertension
- Inadequately controlled hypertension
- Diabetes
- Chronic kidney disease
- Suspected nonadherence to antihypertensive therapy
- Demonstrated or suspected white coat hypertension
- Masked hypertension

If white coat or masked hypertension is suggested by HBPM, it should be confirmed by repeating HBPM or ABPM before treatment decisions are made. [16]

As per the Hypertension Canada Guidelines:
- HBPM threshold to diagnose hypertension is SBP ≥135 mmHg or DBP ≥85 mmHg as these should be considered elevated and associated with increased overall mortality risk. [16]

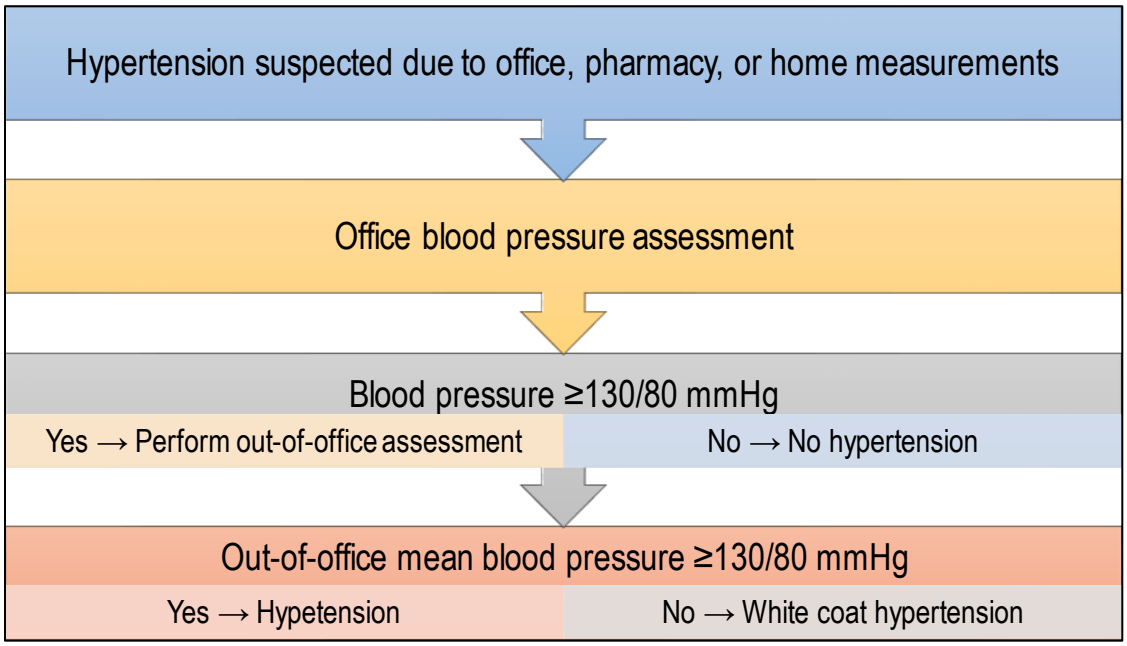
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Monitoring blood pressure at home[11]

The subsequent steps should be followed to monitor blood pressure correctly at home:

- Use a monitor with the correct size cuff. A cuff that is too small will give a high reading and a cuff that is too large will give a low reading.
- Empty bladder or bowel, if necessary.
- Rest for 5 minutes before taking the blood pressure.
- Wait at least 30 minutes after drinking any beverages containing caffeine (e.g., coffee, tea, cola, energy drinks, some sport drinks) or smoking.
- Remove bulky or tight clothing from the arm completely. Pushing up a sleeve to take a measurement will affect blood pressure readings.
- Wrap the cuff snugly around bare upper arm (two fingers should fit between the arm and the blood pressure cuff). The edge of the cuff must be 3 cm above the elbow.
- Sit with feet flat on the floor, back supported, and arm resting on a table at heart level i.e., the cuff should be at the level of the heart.
- Take the first blood pressure reading. Wait at least one minute to take the second reading.
- Do not talk, eat, watch television, or play with the phone while taking blood pressure.
- Record the reading, including the date and time.
- Blood pressure should be measured in both arms to make sure the readings are the same. If one arm has higher readings, that arm should be used for future readings.
- Take blood pressure readings twice a day (i.e., morning and evening) with two reading each time for one week to get an average blood pressure. [5] [12] [26] [37]

Hypertension diagnosis algorithm [1]



[11] Recommended devices for home blood pressure monitoring: https://hypertension.ca/public/recommended-devices
Fillable form for recording blood pressure readings taken at home: https://hypertension.ca/wp-content/uploads/2024/07/Blood-Pressure-Log-Fillable_2024.pdf

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Additional tests for hypertension
Tests used to help diagnose and determine the cause of hypertension may include:

- Blood tests to measure levels of potassium, sodium, creatinine, blood glucose, total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL), non-HDL cholesterol, and triglycerides.
- Urinalysis (urine test) to detect blood, glucose, or protein in the urine.
- Ultrasound of the kidneys. Many kidney conditions are linked to secondary hypertension.
- Electrocardiogram (ECG) to help determine whether a heart condition might be causing secondary hypertension.
- Echocardiogram (ultrasound of the heart) to assess the heart's structure and function, including pumping strength, changes in heart size (e.g., left ventricular hypertrophy), heart damage, and congenital heart disease. [12] [35] [38]

Hypertension treatment
Hypertension is the most common modifiable risk factor for cardiovascular disease. Treatment involves use of antihypertensive medications and lifestyle changes.

Antihypertensive medications
The type of medicine used to treat hypertension depends on the individual's overall health and how high their blood pressure is. Two or more blood pressure medications often work better than one. It may also take time to find the medication or combination of medications that work best. [35]

Blood pressure medications should be taken as prescribed, including taking them at the same time every day. A medical provider can help determine the best time. A daily reminder alarm on a watch, cellphone, tablet, or computer can help with adhering to a medication schedule.

People should continue their medication even if their blood pressure readings return to normal. A normal reading indicates the medication is effective. Stopping the medication will cause their blood pressure to increase again. [26]

If a dose is missed, two doses should never be taken at the same time to make up for the missed dose. If it is almost time to take the next dose, skip the missed dose and just take the next scheduled dose. People can check with their medical provider or pharmacist if they are unsure of how to handle a missed dose. [26]

Antihypertensive medications [12] [35] [39] [40] [41] [42]

Type	Mechanism	Examples: Drug name (brand name)
Diuretics (water pills)	Removes excess sodium and water in the body. Often the first medication used to treat hypertension.	• Amiloride and hydrochloride (Moduretic) • Bumetanide (Bumex) • Chlorthalidone (Hygroton, Thalitone) • Ethacrynic acid (Edecrin) • Furosemide (Lasix)

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Type	Mechanism	Examples: Drug name (brand name)
		• Hydrochlorothiazide (HydroDiuril, Microzide) • Indapamide (Lozol) • Metolazone (Mykrox, Zaroxolyn) • Spironolactone (Aldactone) • Torsemide (Demadex Oral) • Triamterene (Dyrenium)
ACE inhibitors	Inhibits blood-vessel constriction by blocking production of angiotensin II, a substance that constricts blood vessels.	• Benazepril (Lotensin) • Captopril (Capoten) • Enalapril (Vasotec) • Fosinopril (Monopril) • Lisinopril (Prinivil, Zestril) • Moexipril (Univasc) • Quinapril (Accupril) • Ramipril (Altace) • Trandolapril (Mavik)
Angiotensin II receptor blockers	Blocks angiotensin's narrowing action on blood vessels.	• Azilsartan (Edarbi) • Candesartan (Atacand) • Eprosartan (Teveten) • Irbesartan (Avapro) • Losartan (Cozaar) • Olmesartan (Benicar) • Telmisartan (Micardis) • Valsartan (Diovan)
Calcium channel blockers	Inhibits blood vessel constriction by blocking calcium from entering heart and blood vessel cells or reduces the force blood is pumped.	• Amlodipine (Norvasc) • Diltiazem (Cardizem) • Felodipine (Plendil) • Isradipine (Dynacirc) • Nicardipine (Cardene) • Nifedipine (Adalat, Nifedical, Procardia) • Nisoldipine (Sular) • Verapamil (Isoptin)
Beta blockers	Blocks effect of adrenaline, thus reducing heart rate and force of heart pumping action.	• Acebutolol (Sectral) • Atenolol (Tenormin) • Betaxolol (Kerlone) • Bisoprolol (Zebeta) • Carvedilol (Coreg) • Labetalol (Normodyne, Trandate) • Metoprolol (Lopressor) • Nadolol (Corgard) • Penbutolol (Levatol) • Propranolol (Inderal) • Timolol (Blocadren)

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Type	Mechanism	Examples: Drug name (brand name)
Vasodilators	Works directly on vessel walls. Generally used only when other medications fail to control blood pressure.	• Hydralazine (Alpresoline, Dralzine) • Minoxidil (Loniten)
Alpha blockers	Relaxes certain muscles and blocks the constricting effect of noradrenaline on blood vessels so blood vessels remain open and relaxed.	• Alfuzosin (Uroxatral) • Doxazosin (Cardura) • Prazosin (Minipress) • Tamsulosin (Flomax) • Terazosin (Hytrin)
Central acting agents	Blocks signals from the brain that increase heart rate and narrow blood vessels.	• Clonidine (Catapres, Kapvay) • Guanfacine (Intuniv, Tenex) • Methyldopa (Aldomet)

Lifestyle changes

Lifestyle changes to treat hypertension include smoking cessation, avoiding second hand smoke, eating a healthy diet, limiting sodium intake, maintaining healthy weight, increasing physical activity, managing stress, limiting alcohol consumption, and getting good quality sleep. [5] [40] [43]

Smoking cessation

Smoking cessation is vital to improve health. Even those who have developed smoking-related health problems can benefit from quitting. Compared to continuing to smoke, people who quit smoking after having a heart attack can reduce their chances of having another heart attack by as much as 50%. [44]

Benefits of smoking cessation [45]

Timeframe	Benefits
Within 20 minutes	Blood pressure and heart rate drops
Within 12 hours	Carbon monoxide level in blood drops to normal
Within 2-12 weeks	Circulation improves and lung function increases
Within 1-9 months	Coughing and shortness of breath decrease
Within 1 year	Risk of coronary heart disease is about half that of a smoker's
Within 5-15 years	Stroke risk is reduced to that of a nonsmoker
Within 10 years	Risk of lung cancer falls to about half that of a smoker and risk of cancer of the mouth, throat, esophagus, bladder, cervix, and pancreas decreases
Within 15 years	Risk of coronary heart disease is that of a nonsmoker

Eating a healthy diet

A healthy diet, such as the Dietary Approach to Stop Hypertension (DASH) diet, which is similar to Canada's Food Guide, and has been shown to improve blood pressure. The DASH Diet is low in saturated fat, sugar, and salt, and emphasizes eating vegetables, fruit, low-fat dairy products, whole grains, lean meats, fish, legumes, and nuts. Following the DASH diet and limiting sodium to 2000 mg each day is the best way to manage blood pressure with food. [24] [41] [46]

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Eating foods rich in potassium helps to manage hypertension and can reduce effects of sodium. High sources of potassium include fresh fruits, vegetables, low-fat dairy foods, beans, and lentils. The DASH diet includes good sources of potassium.

However, too much potassium can be harmful in people with kidney disease, any condition that affects how the body handles potassium, and certain medications that interact with potassium. Medical consultation is advised in these circumstances before increasing potassium intake or using salt substitutes. [1] [30]

DASH diet [24] [46] [47]

DASH food group	Daily serving	Serving size	Examples
Whole grains	6-8	1 slice bread 250 mL (1 cup) ready to eat cereal 125 mL (cup) cooked rice, pasta or cereal	Whole wheat breads, cereal, oatmeal, rice, pasta, quinoa, barley, low-fat, low-sodium crackers
Vegetables	4-5	250 mL (1 cup) raw leafy vegetables 125 mL (½ cup) cooked vegetables	Dark green and orange (fresh or frozen)
Fruits	4-5	1 medium piece of fruit 60 mL (¼ cup) dried fruit 125 mL (½ cup) fresh, frozen or canned fruit	Apricots, bananas, grapes, oranges, grapefruit, melons, peaches, berries, mango
Low-fat or fat-free milk foods, or alternatives	2-3	250 mL (1 cup) milk 250 mL (1 cup) yogurt 50 g (1½ oz) cheese	Skim, 1% milk, fortified soy beverage or yogurt, 6-18% M.F. (milk fat) cheese
Lean meats, poultry, fish	2 or less	3 oz cooked lean meats, skinless poultry, or fish	Lean meats Skinless chicken and turkey Salmon, char, herring, mackerel, sardines, trout Low sodium and low-fat deli meats
Nuts, seeds, legumes	4-5 per week	1/3 cup (1.5 oz.) nuts 30 mL (2 tbsp) peanut butter 2 tbsp (1/2 oz.) seeds 1/2 cup cooked dry beans or peas	Almonds, peanuts, walnuts, sunflower seeds, soybeans, lentils, chick peas, dried peas and beans, tofu
Fats and oils	2-3	5 mL (1 tsp) soft margarine 15mL (1 tbsp) low-fat mayonnaise 30 mL (2 tbsp) light salad dressing 5 mL (1 tsp) vegetable oil	Soft margarines, mayonnaise, vegetable oil (olive, corn, canola, or safflower), salad dressing
Sweets	Less than 5 per week	1 tbsp sugar 1 tbsp jelly or jam 1/2 cup sorbet	Sugar, jelly, jam, hard candy, ice cream, syrups, sorbet, chocolate

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Limiting sodium
Sodium causes the body to retain water. This extra water raises blood pressure. Reducing sodium in the diet is one of the best ways to help reduce blood pressure. Individuals should eat less than 2,300 mg of sodium (about 5 mL or 1 tsp of salt) a day. Individuals with hypertension should eat less than 2,000 mg of sodium per day.

Strategies to reduce sodium in the diet include:
- Limiting consumption of processed foods as these foods tend to have the highest sodium content (e.g., fast food, frozen pizza, canned soup, processed meats, condiments, bottled dressing, salty snacks).
- Buying products that are labelled ≤5% daily value of sodium.[12]
- Limiting the use of salt in cooking and at the table. [5] [41]

Sodium intake guide per serving [41] [46]

Sodium per serving (mg)	% of daily value (DV)	Guidance
0-120	0%-5%	Go ahead
121-360	6%-14%	Caution
>360	≥15%	Too much

Maintaining a healthy weight
Achieving a healthy weight is important to maintaining a healthy blood pressure. Both a healthy balanced diet and regular exercise are essential. For people who are overweight, losing even 5% to 10% of their weight can help reduce blood pressure and decrease chance of having a stroke or heart attack. A registered dietitian can help devise a plan to achieve a healthy weight. [5] [41]

Physical activity[13]
Adults should be physically active for at least 150 minutes per week doing moderate to vigorous aerobic physical activity, in bouts of 10 minutes or more (e.g., taking a brisk 10-minute walk during lunch break). [48]

Managing stress levels
No one can eliminate all stress from their life or prevent stress from happening. The key is to have effective ways to cope with stress to help minimize its effects.[14] [41]

Strategies for managing stress [49]

Strategy	Examples
Identify the problem	Determine, for example, if work, school, relationship, or money issues are causing stress. Identifying the problem, can help determine what to do about it.

[12] For more information on reading nutrition labels, click here.
[13] Canadian 24-Hour Movement Guidelines gives advice on physical activity, sedentary behaviour, and sleep. Following the 24-Hour Movement Guidelines is associated with a lower risk of mortality, cardiovascular disease, hypertension, type 2 diabetes, several cancers, anxiety, depression, dementia, weight gain, adverse blood lipid profile and improved bone health, cognition, quality of life, and physical function. https://csepguidelines.ca/
[14] Assess your stress management skills with this 5 minute quiz.

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Strategy	Examples
Solve problems as they arise and determine what to do	Determining what to do, may include asking for help. Once a solution has been decided, divide it into manageable steps, and work on one step at a time. Improving problem-solving skills can help increase feelings of being in control again.
Talk about problems and stress with trusted individuals	Expressing feelings can help and trusted individuals may have ideas to help solve or deal with problems. Talking to a counsellor can help. Medical providers can refer to a counsellor or access counselling services through the workplace, school, or faith community if available.
Simplify life	Stress can arise when there are too many things to do. Try to find ways to make the to-do list more manageable and learn to say no. Learning to say no is a real skill that takes practice.
Learn helpful thinking strategies	The way a person thinks about situations affects the way they respond to them. Unhelpful thoughts, such as believing that everything must be perfect or expecting the worst possible outcome, can make problems seem bigger than they are.
Learn about stress management	For example from books, websites, workshops, courses and counsellors to help cope with stress.
Practise yoga, meditation, mindfulness, prayer, or breathing exercises	Can help quiet the mind and look at problems from a calmer, more balanced point of view. With time, these practices can help manage the stress response.
Get physically active	Can help reduce stress and improve mood, such as walking or taking up a new sport.
Do something enjoyable	Such as hobbies, sports, listening to music, reading, going for a walk, seeing a friend, or watching a favourite movie can give a break and mental space from problems when they cannot be dealt with right away.

Limiting alcohol consumption

Drinking more than moderate amounts of alcohol can raise blood pressure by several points and reduce the effectiveness of blood pressure medications. Reducing alcohol consumption can help reduce blood pressure. Consuming no more than two drinks per day can potentially lower systolic blood pressure by 3.9 mmHg and diastolic blood pressure by 2.4 mmHg. Hypertension Canada recommends consumption should not exceed 14 standard drinks per week for males and 9 standard drinks per week for females. [41]

However, research shows the more an individual drinks, the more they increase their risk of seven types of cancer, most types of cardiovascular diseases, liver disease, and violence. The fact that alcohol is a carcinogen that can cause at least seven types of cancer is often unknown or overlooked. Recent data show alcohol use causes nearly 7,000 cases of cancer deaths each year in Canada, with most cases being breast or colon cancer, followed by cancers of the rectum, oral cavity[15] and throat, liver,

[15] Refer to Episodes 7, 76, 77, and 78 for additional information on oral cancer.

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esophagus, and larynx. Research has shown no amount or kind of alcohol, whether it is wine, beer, cider, or spirits, is good for an individual's health. [50] [51] [52]

Canada's Guidance on Alcohol and Health (2023) supports individuals in making informed health decisions and presents a continuum of risk associated with drinking alcohol, allowing individuals to decide where they are comfortable on the continuum. The guidance states:

- No more than 2 drinks on any day, less is better.
- 1-2 standard drinks per week is low risk.
- 3-6 standard drinks per week is a moderate risk.
- 7 or more standard drinks per week is an increasingly high risk.
- There is no known safe amount of alcohol when pregnant or trying to conceive. [50]

Standard drink [52]

Type	**Beer**	**Cooler, cider, ready-to-drink**	**Wine**	**Spirits** (whisky, vodka, gin, etc.)
Amount	341 ml (12 oz) 5% alcohol	341 ml (12 oz) 5% alcohol	142 ml (5 oz) 12% alcohol	43 ml (1.5 oz) 40% alcohol

Sleep

Getting good quality sleep, approximately 7 to 9 hours, is essential for maintaining healthy blood pressure and cardiovascular health. Research shows getting less than six hours and more than 9 hours of sleep on average increases the risk of hypertension. Additionally, irregular sleep patterns, such as sleeping late or varying bedtimes, increase the risk of hypertension, highlighting the importance of maintaining a regular sleep schedule for optimal cardiovascular health. [53] [54] [55] [56] [57]

Inadequate sleep hygiene can impact sleep. Good sleep hygiene is a combination of sleeping conditions and lifestyle habits that help people get consistent, uninterrupted sleep. [58]

Sleep hygiene [58]

Behaviour and sleeping condition	**Description**
Regular sleep and wake schedule	Bedtime and wake-up time should be the same each day, including weekends.
Bright light exposure while awake	Light exposure during the day can help correct circadian rhythms. However, light exposure too close to bedtime can interfere with sleep.
Avoid bright lights and blue light	Bright lights and blue light (e.g., phones, televisions, computer screens) should be avoided before bedtime and during nocturnal awakenings.
Limit time in bed	Avoid spending excessive time in bed. Limiting time in bed improves sleep continuity. If unable to fall sleep within 20 minutes, get out of bed and return when sleepy.

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Behaviour and sleeping condition	Description
Appropriate use of the bed	Bed should only be used for sleep or intimacy and should not be used for reading, eating, watching television, reviewing email, working on a computer, etc.
Avoid daytime naps	Naps should be avoided, except by shift workers and people with narcolepsy. Daytime naps may aggravate sleeplessness in those with insomnia. However, naps improve performance in shift workers and decrease the need for stimulants in individuals with narcolepsy. Naps should be taken at the same time each day and limited to 30 minutes.
Regular routine before bedtime	Regular bedtime routine (e.g., brushing teeth, washing, setting the alarm clock) can set the mood for sleep.
Relaxation	Stress and worry interfere with sleep. Relax by reading or taking a warm bath before bedtime. Avoid watching the clock.
Avoid stimulants and diuretics	Avoid alcohol or caffeinated beverages, smoking, eating caffeinated foods (e.g., chocolate), and taking appetite suppressants or diuretics near bedtime.
Sleep-conducive environment	Bedroom should be dark, quiet, and reasonably cool. Heavy curtains or a sleep mask can eliminate light. Earplugs, fans, or white-noise devices can help eliminate disturbing noises.
Pillows	Pillows between the knees or under the waist can increase comfort.

Obstructive sleep apnea

One of the causes of poor sleep quality is sleep apnea. Obstructive sleep apnea (OSA) is a condition characterized by recurrent episodes of partial or complete upper airway obstruction during sleep. While it is not clear whether there is a causal relationship between sleep apnea and hypertension, the two conditions often coexist.

For example approximately:

- 30-50% of people with hypertension have obstructive sleep apnea (OSA)
- 50% of people with OSA have hypertension
- 80% of people with resistant hypertension have OSA [59]

The high prevalence of this co-occurrence emphasizes the importance of screening for OSA in people with hypertension, especially those with resistant hypertension. OSA can lead to increased blood pressure through various mechanisms, including intermittent drops in oxygen levels and disrupted sleep, which can activate the sympathetic nervous system and elevate blood pressure. [59]

Continuous positive airway pressure (CPAP) therapy is the gold standard therapy for treating OSA but its effects on blood pressure are relatively modest, often requiring combination therapy with antihypertensive medications to achieve optimal blood pressure control. [59]

Take home messages

- Hypertension is considered a ‘silent killer’ because it often has no warning signs or symptoms, and many individuals do not realize they have it.

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- Over time, hypertension causes serious problems, such as heart attack, heart failure, stroke, and kidney damage.
- The only way to detect hypertension is to have blood pressure checked regularly. People should regularly check their blood pressure and have it assessed at least once a year by a healthcare provider. Those with hypertension should have it assessed more often.
- Lifestyle-related factors increase the risk of developing hypertension, including tobacco use, unhealthy diet, excessive salt consumption, physical inactivity, overweight and obesity, and excessive alcohol use.
- Blood pressure tends to rise as people get older. Thus, everyone's risk for hypertension increases with age.
- Hypertension is mainly preventable through early lifestyle modifications.
- Hypertension is treatable through lifestyle modifications and consistent use of antihypertensive medications.

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List of recommended devices for home blood pressure monitoring, Hypertension Canada https://hypertension.ca/public/recommended-devices

Home Blood Pressure Log, Hypertension Canada https://hypertension.ca/wp-content/uploads/2024/07/Blood-Pressure-Log-Fillable_2024.pdf

How do I monitor my blood pressure? Hypertension Canada https://hypertension.ca/how-do-i-monitor-my-bp/

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How do I maintain a healthy blood pressure? Hypertension Canada
https://hypertension.ca/how-do-i-maintain-healthy-bp/

Hypertension Canada Blood Pressure Action Plan
https://hypertension.ca/wp-content/uploads/2023/05/Your-Blood-Pressure-Action-Plan.pdf

Cardiovascular risk calculators:

- My health checkup https://myhealthcheckup.com/
- EPI·R_xISK™ cardiovascular risk calculator https://www.epicore.ualberta.ca/epirxisk/

Canada's Food Guide
https://food-guide.canada.ca/en/

The DASH Diet to lower high blood pressure
https://www.heartandstroke.ca/healthy-living/healthy-eating/dash-diet

Using the Nutrition Facts Table: % Daily Value
https://hypertension.ca/wp-content/uploads/2023/05/Health-Canada-Label-Reading.pdf

Assess your stress management skills, Heart and Stroke Foundation of Canada
https://www.heartandstroke.ca/healthy-living/reduce-stress/stress-test

Manage your stress, Heart and Stroke Foundation of Canada
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Get help to quit smoking, Canadian Cancer Society
https://cancer.ca/en/living-with-cancer/how-we-can-help/get-help-to-quit-smoking

Smokers' helpline
https://www.smokershelpline.ca/

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https://csepguidelines.ca/

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Additional Resources

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