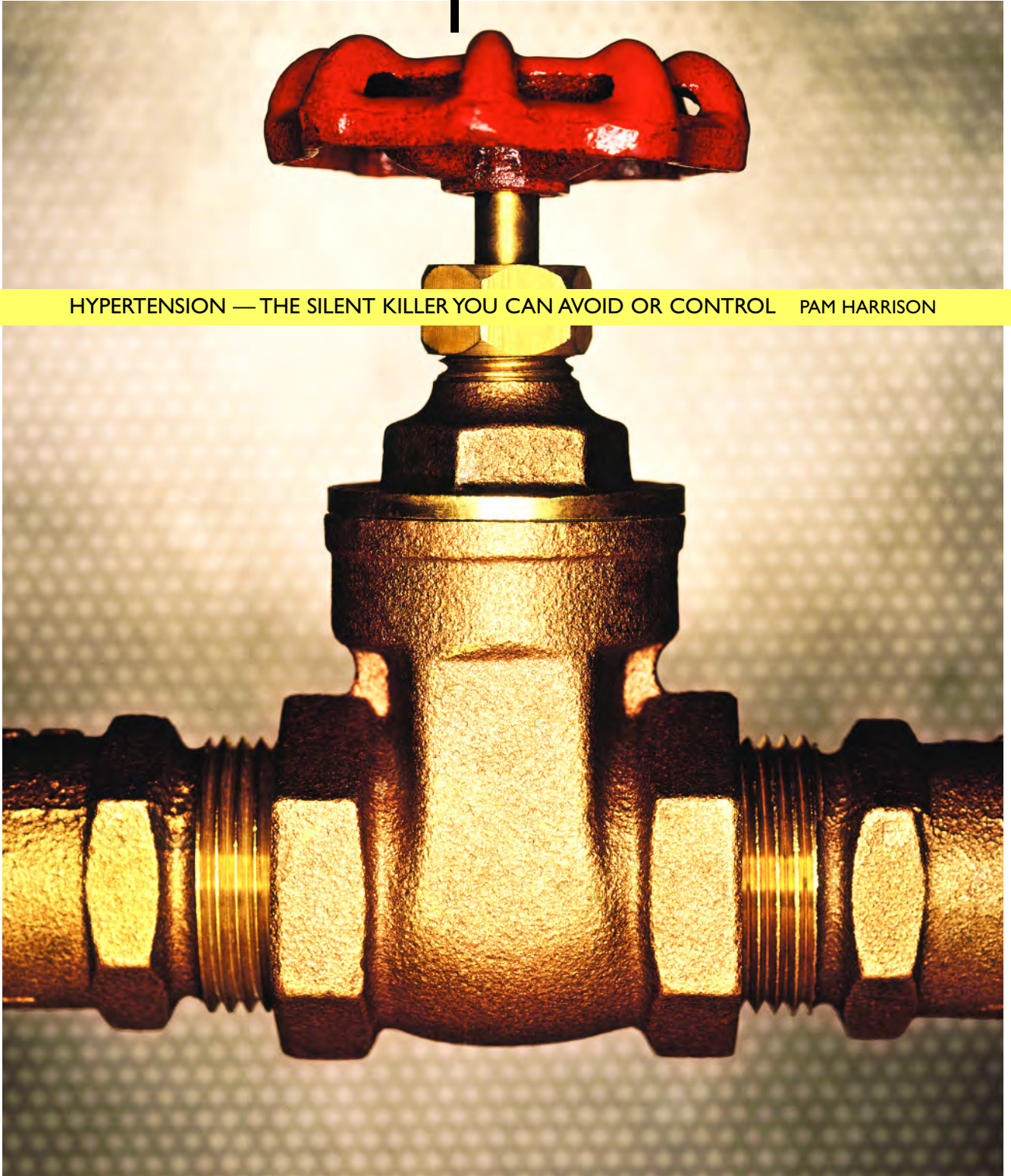


# KEEP TABS ON YOUR blood pressure

HYPERTENSION — THE SILENT KILLER YOU CAN AVOID OR CONTROL PAM HARRISON



DAVID MUIR/MASTERFILE

**P**ublisher Helen Leask was attending a medical convention in 2003 when, just for fun, she decided to have her blood pressure (BP) taken at a booth featuring a new high-tech BP-monitoring device. When it spat out her numbers — 170/115 millimetres of mercury (mmHg) — the then 42-year-old Torontonian knew the reading was dangerously high. “I was surrounded by cardiologists, and and they were all looking at me as if to say, ‘You need to get some medical attention right away,’” she recalls.

From a designer suit in the morning to a green hospital gown that evening, Helen was treated at a local hospital for a medical emergency. Her BP was reduced to normal levels with medication, which she remains on today. Helen then got down to some serious lifestyle changes. Although she was already slim, she wasn’t as fit as she felt she should be to keep her BP in check. “That’s when I started doing ballroom and Latin dancing three times a week,” she says. “It’s good for a hundred different things, but mostly it’s really good exercise.”

## What is blood pressure?

According to Dr. Norman Campbell, chair of the Canadian Hypertensive Education Program (CHEP) and a professor of medicine at the University of Calgary, BP refers to the force that blood exerts on the walls of the arteries as it makes its way around the body. High BP is present when a person’s usual BP is elevated. Think of a garden hose. As you turn on the tap, water comes out of the hose, and as you open the tap to full capacity, the water pressure in the hose increases in response. Add a nozzle to stop up the end of the hose and the pressure increases significantly — even more so if there’s any blockage inside the hose. “The tap is really the heart,” notes Campbell, “and the hose is the blood vessel.”

The top number, or systolic BP, is the highest pressure that occurs each time the heart beats, and the bottom number, or diastolic BP, is the lowest pressure that occurs when the heart relaxes between beats. Even if only one of the two numbers is elevated, a person is considered to have high blood pressure. “Elevations in either systolic or diastolic blood pressure should be treated,” says Dr. Nadia Khan, an assistant professor of medicine at the Centre for Health Evaluation and Outcome Sciences at the University of British Columbia in Vancouver.

When an otherwise healthy person has BP that is consistently over 140/90 mmHg, he has high BP. If either diabetes or kidney disease is present, BP is deemed high if it normally registers 130/80 mmHg or more. Also called hypertension, high BP is a widespread health problem. One in five Canadians already has it and more than 90% will get it. “The fact that at least 90% of us will develop hypertension suggests that we are all genetically programmed to get hypertension, but it’s not our fate, it’s something we do to ourselves,” Campbell insists.

Even in younger individuals, the heart can sometimes pump out too much blood, leading to high BP. But as we age, hypertension is almost always related to the constriction and narrowing of blood vessels, says Campbell. Reacting to persistent high pressure, blood vessels become thickened and fibrous, and the lumina (openings) through which the blood

### BLOOD PRESSURE FACTS

One in five Canadians already has high BP and nine out of 10 will develop it.

High BP is the leading cause of death worldwide.

A decrease in BP of 10/5 mmHg reduces the risk of developing heart failure by 50%, stroke by approximately 40%, heart attack by 15 and death by 10%.

Most heart failure in women is caused by hypertension, while most heart failure in men is caused by heart attack.

High BP is considered a contributing factor to dementia, Alzheimer’s disease and erectile dysfunction. It is a possible risk factor for the eye disease glaucoma, involving elevated fluid pressure in the eye.

## RISK FACTORS

### Factors you can't control

**FAMILY BACKGROUND** 35% to 65% of high BP is inherited, and having even one parent with it significantly increases your risk.

**AGE/GENDER** Through early middle age, high BP is more common in men. Women are more likely to develop it after menopause.

**RACE** High BP is more common people of African ancestry, and this group often develops it at an earlier age than Caucasians do.

### Factors you can control

**EXCESS WEIGHT** The greater the body mass, the more blood is needed and the greater the pressure on the blood vessel walls.

**INACTIVITY** Sedentary people have higher heart rates, and the higher the heart rate, the harder the heart has to pump. Inactive people are also more likely to be overweight.

**SMOKING** Smoking damages the lining of the blood vessels and contributes to their narrowing.

**EXCESS SODIUM** Too much sodium causes fluid retention and produces a higher load of blood to be pumped.

**EXCESS ALCOHOL** Chronic heavy drinking is thought to raise BP in several ways, one of which is making certain BP-monitoring receptors in the arteries less sensitive. That can interfere with the body's natural regulation of arterial contraction and relaxation.

**CHRONIC STRESS** Jobs identified as having high stress and little control over decision making (think waiting on tables and air-traffic controlling) can raise BP.

flows becomes narrow. This starves organs of the oxygen they need and sets the stage for ischemic (oxygen-deprived) events, including heart attacks. Damage caused by high BP inside the vessel itself also contributes to the buildup of fatty plaques — a process known as atherosclerosis. When a piece of plaque ruptures, blood clots form and may end up blocking an artery to the heart, causing a heart attack, or blocking an artery to the brain, causing a stroke. Under increased pressure, a blood vessel can rupture and leak blood, causing a hemorrhagic stroke if it bleeds into the brain, or rapid kidney damage if it bleeds into the kidneys. Women, for reasons that are not clear, are more likely than men to suffer hemorrhagic strokes.

## What brings on high blood pressure?

Because the heart has to work harder to push the blood through thickened arteries, the muscular walls of the heart “pump up,” getting thicker and becoming less efficient at pumping. This sets the stage for heart failure. Hypertension's collective toxic effects make it the No.1 culprit in deaths worldwide.

While Campbell and others maintain that high blood pressure is largely a disease of poor lifestyle choices such as excess salt and alcohol, lack of exercise and excess weight, other factors can cause it, too, says Khan. Sleep apnea, kidney disease and certain hormonal diseases can bring on hypertension, though these causes are less common. Certain medications increase BP, including oral contraceptives and non-steroidal anti-inflammatory drugs, such as ibuprofen and naproxen. Interestingly, women who take hormone replacement therapy tend to have smaller increases in systolic, though not diastolic, BP than those who do not.

High BP related to genetics, physiology and lifestyle (90% to 95% of cases) is called primary hypertension. If high BP results from pregnancy, drugs, tumours or diseases, it's called secondary hypertension.

## Can you tell if you have it?

As Helen learned, most people are unaware they are hypertensive until they have their BP measured — typically at the doctors' office. Physicians measure BP with a sphygmomanometer — taking it sometimes as many as five times to make sure a patient is truly hypertensive. Increasingly, however, physicians recommend that patients regularly measure their own BP at home, using one of the approved BP monitoring devices available at most pharmacies. (A list of approved monitors is accessible under “Devices Endorsed by CHS” at <http://hypertension.ca/chs>.)

A home BP reading of 135 mmHg or higher for the top number or 85 mmHg or higher for the bottom number (five less than the cut-offs at the doctor's office) may mean you are hypertensive, as BP taken at home is not artificially driven up by the anxiety many people feel when being examined by a doctor. This phenomenon is called white-coat hypertension.

## Treatments

When patients have only slightly elevated blood pressure, physicians often suggest trying to lower it with lifestyle changes, such as cutting back on salt and alcohol, losing weight and getting more exercise. If these measures fail, doctors have plenty of choice in deciding on the right drug regimen for an individual patient (see “Antihypertensive Drugs,” p. 34). “These drugs



## MEDICATION IS IMPORTANT, BUT EQUALLY IMPORTANT IS MAINTAINING A HEALTHY LIFESTYLE

have different costs as well as side effects,” says Campbell, “but, in general, the major drug classes have similar benefits.” That said, most doctors try to tailor treatment to match other potential problems. If, for example, a patient suffers from migraine, a good first choice would be a beta blocker such as bisoprolol, since beta blockers help prevent migraine.

Some of the calcium channel blockers such as verapamil are associated with constipation, a desirable feature if a patient has chronic diarrhea. Those with diabetes or kidney disease will usually receive an angiotensin-converting enzyme (ACE) inhibitor such as ramipril, or an angiotensin receptor blocker (ARB) such as losartan, because both slow the progression of kidney disease, a complication of diabetes.

“Most of the benefits of BP-lowering drugs occur at moderate doses, and most of the adverse events occur at higher doses. So we frequently use two and sometimes three or four different drugs at moderate doses to produce fairly large reductions in BP without causing any side effects,” says Campbell.

### Can you get off medication?

Medication is important, but equally important is maintaining a healthy lifestyle, and in some cases that can lessen the need for drugs. Khan has had many patients who were able to come off BP-lowering drugs altogether or decrease their doses because of lifestyle changes. Predictably, the key to non-drug BP control remains a healthy diet and lots of exercise. According to CHEP, exercising four or more times per week for more than 30 minutes a session can reduce BP by 5 mmHg to 15 mmHg. Losing 10 pounds (4.5 kg) can reduce both systolic and diastolic BP by about seven mmHg.

### Food, salt and alcohol

CHEP also recommends that hypertensive patients follow the Dietary Approaches to Stop Hypertension (DASH) Diet, which emphasizes fresh vegetables and fruits, lean meats and meat alternatives such as legumes, low-fat dairy products and alternatives, whole grains and salt restriction (go to <http://dashdiet.org>). This regimen can reduce systolic BP by more than 11 mmHg and diastolic BP by more than 5 mmHg. Keep in mind, though, that it is the combination of physical activity and a healthy diet that makes a difference in BP. “People can develop high blood pressure even if they aren’t overweight, so while weight is part of the issue, diet and physical inactivity are very important in their own right,” stresses Campbell.

As for cutting salt, CHEP estimates that approximately three out of 10 hypertensive Canadians would have normal BP if they reduced their intake to no more than 1,500 milligrams of sodium a day, the amount in about

### CAN BLOOD PRESSURE BE TOO LOW?

For healthy people, low BP is not usually a cause for concern. “If you’re carrying out your normal daily routines and are feeling well, you shouldn’t be alarmed about low blood pressure because low could be normal for you,” says the University of British Columbia’s Dr. Nadia Khan. Those with low BP who experience dizziness, fatigue or light-headedness should seek medical attention.

Many elderly people experience a sudden fall in BP when they get up out of bed or up from a chair, a condition known as orthostatic hypotension. This can be caused by excessive use of antihypertensive medications (diuretics, for example), dehydration and prolonged bedrest.

But by far the most worrying situation occurs when BP suddenly drops to seriously low levels because of blood loss, surgery, injury or a severe allergic reaction. A decrease of just 20 mmHg can cause dizziness or fainting. Severe hypotension starves the body of oxygen and can result in damage to the heart, brain and other vital organs.



two-thirds of a teaspoon of table salt. Dietary sodium causes more fluid to be retained in vessels, giving the heart more blood to pump blood around the body. Certain people are more sensitive to sodium than others — particularly the overweight and those of African ancestry. As people get older, their sensitivity to salt goes up. Pressure will go up in adults with normal BP and even in children if they consume a high-sodium diet.

Since there's no easy test to identify those who are sensitive to sodium, CHEP recommends that healthy people restrict salt to a maximum of 2,300 milligrams (mg) — about a teaspoon of table salt — a day starting at age nine. Sodium intake should be limited to 1,000 mg a day in children ages one to three and to 1,200 mg a day in kids ages four to eight. For tips on cutting salt, go to [www.canadian-health.ca](http://www.canadian-health.ca), click on Past Issues, then on May/June 2007, then on "Shaking the Salt Habit." In those accustomed to drinking heavily, cutting back to no more than two drinks a day can reduce systolic BP by about 4.6 mmHg and diastolic BP by 2.3 mmHg.

Five years after her diagnosis — and a whole dress size smaller — Helen is thankful her high BP was detected early. "The big issue for me is avoiding a disabling stroke," she says. "If you're dead, you don't know about it, but if you can't drive a car or work or look after your family because of a stroke, it's a nightmare. Stroke can be just horribly, unromantically disabling."

For more information on hypertension, go to [www.hypertension.ca](http://www.hypertension.ca).

## ANTIHYPERTENSIVE DRUGS

Doctors frequently start a patient on a single drug, but recent recommendations suggest using two drugs together if the patient's blood pressure is 20/10 mmHg above target goals.

**DIURETICS** promote the excretion of water and sodium, which in turns reduces blood volume and pressure. Side effects include increased thirst and urination, lower sodium, potassium and magnesium levels in the blood, higher blood sugar levels and erectile dysfunction.

**BETA BLOCKERS** block the effects of the stress-related hormone adrenalin, thus slowing the heart rate. This, in turn, reduces the heart's workload. Side effects include cold hands and feet, fatigue, vivid dreams and erectile dysfunction.

**CALCIUM CHANNEL ANTAGONISTS** dilate blood vessels and ease the pumping action of the heart by reducing the availability of calcium for muscle contraction. Side effects include headache, palpitations, swollen ankles, heartburn and swollen gums.

**ANGIOTENSIN-CONVERTING ENZYME (ACE) INHIBITORS** act on the renin-angiotensin system to prevent the formation of angiotensin, a vessel-constricting hormone. Side effects include dry cough and swelling around the mouth and throat.

**ANGIOTENSIN RECEPTOR BLOCKERS (ARBs)** act similarly to ACE inhibitors, but directly block the receptors by which angiotensin enters the blood vessels. ARBs have very mild, if any, side effects.

**DIRECT RENIN INHIBITORS** block the activity of the vasoconstrictive hormone renin and help control BP in way similar to that of ACE inhibitors and ARBs. Side effects include diarrhea and heartburn.

The future looks even brighter for those with hypertension. Pharmacogenomics is a new science that seeks to identify the genetic basis for individuals' responses to drugs. Once these genetic differences are better understood, physicians may be able to tailor antihypertensive regimens to individual patients to optimize their safety and effectiveness and minimize the potential for adverse effects. 