



Lowering Blood Pressure

High blood pressure is a serious condition, which often has no symptoms. Once high blood pressure occurs, it usually lasts a lifetime. But by taking action, you can prevent and control it.

This fact sheet will tell you what high blood pressure is, and how to prevent or control it.

WHAT IS HIGH BLOOD PRESSURE?

Blood pressure is the force of blood against the walls of arteries. Blood pressure rises and falls throughout the day. But when the pressure stays elevated over time, then it's called high blood pressure.

The medical term for high blood pressure is hypertension. High blood pressure is dangerous because it makes the heart work too hard and contributes to atherosclerosis (hardening of the arteries). It increases the risk of heart disease (see Box 1) and stroke, the first- and third-leading causes of death among Americans. High blood pressure also can result in other conditions, such as congestive heart failure, kidney disease, and blindness.

High blood pressure affects about 50 million—or one in four—American adults. Some people are more likely to develop it than others. It is especially common among African Americans, who tend to develop it earlier and more often than whites. Also, many Americans tend to develop high

blood pressure as they get older, but hypertension is *not* a part of healthy aging. About 60 percent of all Americans age 60 and older have high blood pressure.

BOX 1

RISK FACTORS FOR HEART DISEASE

Risk factors are conditions or behaviors that increase your likelihood of developing a disease. When you have more than one for heart disease, your risk greatly multiplies. So if you have high blood pressure, you need to take action. Fortunately, most of the heart disease risk factors are largely within your control.

Risk factors under your control are:

- High blood pressure
- High blood cholesterol
- Cigarette smoking
- Diabetes
- Overweight
- Physical inactivity

Risk factors beyond your control are:

- Age (45 or older for men; 55 or older for women)
- Family history of early heart disease (having a mother or sister who has been diagnosed with heart disease before age 65, or a father or brother diagnosed before age 55)



Others at high risk of developing hypertension are the overweight, those with a family history of high blood pressure, and those with a high-normal blood pressure (see Box 2). High blood pressure also is more common in the southeastern United States.

How Is Blood Pressure Checked?

Blood pressure usually is measured in millimeters of mercury (mm Hg) and recorded as two numbers—systolic pressure (as the heart beats) “over” diastolic pressure (as the heart relaxes between beats)—for example, 130/80 mm Hg. Both numbers are important, although for some Americans systolic blood pressure is especially important (see Box 3).

The test to measure blood pressure is simple, quick, and painless. Typically, a blood pressure cuff called a sphygmomanometer (pronounced sfīg’-mo-ma-nom-e-ter) is used. The cuff is placed around the upper arm and inflated with air until blood flow stops. Then, the cuff is slowly deflated, letting blood flow start again.

As the cuff is deflated, a stethoscope is used to listen to the blood flow in



BOX 2

BLOOD PRESSURE LEVELS FOR ADULTS^a

Category	Systolic ^b (in mm Hg) ^c	Diastolic ^b (in mm Hg) ^c	Result
Optimal	less than 120	and less than 80	<i>Good for you!</i>
Normal	less than 130	and less than 85	<i>Keep an eye on it.</i>
High-Normal	130-139	or 85-89	<i>Your blood pressure could be a problem. Make needed changes in what you eat and drink, get physical activity, and lose extra weight. If you also have diabetes, see the doctor.</i>
Hypertension			<i>All stages—You have high blood pressure.</i>
Stage 1	140-159	or 90-99	<i>Ask your doctor or nurse how to control it.</i>
Stage 2	160-179	or 100-109	
Stage 3	180 or higher	or 110 or higher	

^a For adults 18 and older who are not on medicine for high blood pressure and do not have a short-term serious illness. Source: *The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*, National High Blood Pressure Education Program, November 1997.

^b If systolic and diastolic pressures fall into different categories, overall status is the higher category.

^c Millimeters of mercury



an artery at the inner elbow. The first thumping sound heard gives the blood pressure as the heart contracts—this is the systolic pressure. When the thumping sound is no longer heard, the blood pressure is between heartbeats—this is the diastolic pressure.

Because blood pressure changes and is affected by many factors, the test will be repeated on different days to confirm a reading of high blood pressure.

A systolic blood pressure of less than 120 and a diastolic blood pressure of less than 80 mm Hg are optimal. Systolic blood pressures of 140 or higher, or diastolic blood pressures of 90 or higher mm Hg are high. If systolic and diastolic pressures fall into different categories, go by the higher category. Even levels slightly above optimal can increase the risk of heart disease and other problems.

WATCH THAT SYSTOLIC

Both numbers in a blood pressure test are important but, for some, the systolic is especially meaningful. That's because, for those middle aged and older, the systolic pressure gives the most accurate diagnosis of high blood pressure.

Systolic blood pressure is the top number in a blood pressure reading (see page 2). It is high if it is 140 mm Hg or above.

For American adults, the systolic pressure increases sharply with age, while the diastolic increases until about age 55 and then declines. Thus, many older Americans have only a high systolic pressure—a condition known as “isolated systolic hypertension,” or ISH.

A high systolic pressure causes blood vessels to stiffen and can lead to cardiovascular disease and damage kidneys and other organs.

Clinical studies have proven that treating a high systolic pressure saves lives and greatly reduces illness. Yet, most Americans do not have their high systolic pressure under control.

Blood pressure must be controlled to under 140/90 mm Hg. The treatment is the same for ISH as for other forms of high blood pressure. So talk with your doctor. Ask about your blood pressure level—and especially your systolic blood pressure. If your blood pressure is too high, ask about adjusting your drug and making lifestyle changes to bring it to less than 140/90 mm Hg.

HOW CAN YOU PREVENT OR CONTROL HIGH BLOOD PRESSURE?

Everyone can take steps to prevent high blood pressure or, for those who already have it, to keep it under control. The steps are:

- Maintain a healthy weight.
- Be physically active.
- Follow a healthy eating plan, which includes foods lower in salt and sodium.
- If you drink alcoholic beverages, do so in moderation.
- If you have high blood pressure and are prescribed medication, take it as directed.

Each of these steps is discussed more fully.

✓ Maintain a Healthy Weight

Overweight increases your risk of developing high blood pressure. In fact, blood pressure rises as body weight increases. Losing even 10 pounds can lower blood pressure—and it has the biggest effect in those who are overweight and already have hypertension.

Overweight also is a risk factor for heart disease. And it increases your chance of developing high blood cholesterol and diabetes—two more risk factors for heart disease.

Two key measures are used to determine if someone is overweight. These are the body mass index, or BMI, and waist circumference.

BMI relates weight to height. It gives an approximation of total

body fat—and that's what increases the risk of obesity-related diseases.

To find your BMI, use the formula in Box 4, or check the chart in Box 5 for an approximate value. Box 6 gives the BMI categories for men and women. Overweight is defined as a BMI of 25 to 29.9; obesity is defined as a BMI equal to or more than 30.



But BMI alone does not determine risk. For example, in someone who is very muscular or who has swelling from fluid retention (called edema), the BMI may overestimate body fat. BMI also may not accurately estimate total body fat in older persons or those losing muscle.

That's why waist measurement is often checked as well. Another reason is that too much body fat in the abdomen (or stomach area) also increases disease risk. A waist measurement of more than 35 inches in women and more than 40 inches in men is considered high.



CALCULATE YOUR BMI

The formula for calculating BMI is:

$$BMI = \frac{\text{your weight in pounds}^*}{(\text{your height in inches})^2} \times 703$$

Or, try this simple 3-step method:

For example: If you are 5' 7" tall (or 67") and weigh 170 pounds, you would:

1) Multiply your weight in pounds* by 703

$$170 \times 703 = 119,510$$

2) Divide the answer by your height (in inches)

$$119,510/67 = 1,785$$

3) Divide the answer again by your height (in inches) to get your BMI

$$1,785/67 = 26.6$$

$$BMI = 26.6$$

This BMI falls in the overweight category.

* Weight is measured with underwear but no shoes.

The Box on page 5 offers guidelines on how to interpret BMI and waist measurements. It tells if you are at increased risk for disease and if you need to lose weight. If you fall in the obese range, you should lose weight. You also should lose weight if you are overweight or have a high waist measurement and two or more heart disease risk factors (see Box 1). If you fall in the normal weight range or are overweight but do need to lose pounds, you still should be careful not to gain weight.

If you have to lose weight, it's important to do so slowly. Lose no more than 1/2 to 2 pounds a week. Begin with a goal of losing 10 percent of your current weight. This is the healthiest way to lose weight and—importantly—it offers the best chance of long-term success.

There's no magic formula for weight loss. You have to eat fewer calories than you burn. Just how many calories you burn daily depends on factors such as your body size and how physically active you are (see Box 7).

One pound equals 3,500 calories. So, to lose 1 pound a week, you would need to eat 500 calories a day less or burn 500 calories a day more than you usually do. It's best to work out some combination of

both eating less and being more physically active.

And remember to be careful of serving sizes. It's not only what you eat that adds calories, but also how much.

As you lose, be sure to eat a healthy diet, with a variety of foods. A good plan to follow is the one given on page 12. Box 15 offers some tips to make the plan lower in calories.



Be Physically Active

Being physically active is one of the most important steps you can take to prevent or control high blood pressure. It also helps to reduce your risk of heart disease.

It doesn't take a lot of effort to become physically active. All you need to do is 30 minutes of moderate-level activity

BODY MASS INDEX

Here is a chart for men and women that gives the body mass index (BMI) for various heights and weights*.

	21	22	23	24	25	26	27	28	29	30	31
4' 10"	100	105	110	115	119	124	129	134	138	143	148
5' 0"	107	112	118	123	128	133	138	143	148	153	158
5' 1"	111	116	122	127	132	137	143	148	153	158	164
5' 3"	118	124	130	135	141	146	152	158	163	169	175
5' 5"	126	132	138	144	150	156	162	168	174	180	186
5' 7"	134	140	146	153	159	166	172	178	185	191	198
5' 9"	142	149	155	162	169	176	182	189	196	203	209
6' 0"	150	157	165	172	179	186	193	200	208	215	222
6' 1"	159	166	174	182	189	197	204	212	219	227	235
6' 3"	168	176	184	192	200	208	216	224	232	240	248

* Weight is measured with underwear but no shoes.

WHAT DOES YOUR BMI MEAN?

Category	BMI	Result
Normal weight	18.5-24.9	<i>Good for you! Try not to gain weight.</i>
Overweight	25-29.9	<i>Do not gain any weight, especially if your waist measurement is high. You need to lose weight if you have two or more risk factors for heart disease (see page 1) and: *Are overweight, or *Have a high waist measurement.</i>
Obese	30 or greater	<i>You need to lose weight. Lose weight slowly—about 1/2-2 pounds a week. See your doctor or a nutritionist if you need help.</i>

Source: *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*, National Heart, Lung, and Blood Institute, in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, June 1998.



on most, and preferably all, days of the week. Examples of moderate-level activity are brisk walking, bicycling, raking leaves, and gardening. For more examples, see Box 7.

You can even divide the 30 minutes into shorter periods of at least 10 minutes each. For instance: Use stairs instead of an elevator; get off a bus one or two stops early; or park your car at the far end of the lot at work. If you already engage in 30 minutes a day, you can get added benefits by doing more. Do a moderate-level activity for a longer period each day or engage in a more vigorous activity.

Most people don't need to see a doctor before they start a moderate-level physical activity. You should check first with a doctor if you have heart trouble or have had a heart attack, if you are over age 50 and are not used to doing a moderate-level activity, if you have a family history of heart disease at an early age, or if you have any other serious health problem.

To help get you started, a sample walking program is given on page 16.

✓ Follow A Healthy Eating Plan, Which Includes Foods Lower In Salt and Sodium

Research has shown that what you eat affects the development of high blood pressure. A healthy eating plan can both reduce the risk of developing high blood



pressure and lower an already elevated blood pressure.

A key ingredient of healthy eating is choosing foods lower in salt (sodium chloride) and other forms of sodium. A recent study showed just how important lowering sodium is in keeping blood pressure at a healthy level (see Box 19 on page 15).

Most Americans eat more salt and sodium than they need. Some people, such as African Americans and the elderly, are especially sensitive to salt and sodium and may need to be particularly careful about how much they consume.

Most Americans should consume no more than 2.4 grams (2,400 milligrams) of sodium a day. That equals 6 grams (about 1 teaspoon)

of table salt a day. For someone with high blood pressure, the doctor may advise less.

The 6 grams includes ALL salt and sodium consumed, including that used in cooking and at the table. Boxes 8 and 9 offer tips on how to choose and prepare foods lower in salt and sodium.

Sodium is found naturally in many foods. *But processed foods account for most of the salt and sodium Americans consume.* Processed foods with high amounts of salt include regular canned vegetables and soups, frozen dinners, lunch meats, instant and ready-to-eat cereals, and salty chips and other snacks. You should use food labels to choose products lower in sodium. Boxes 10, 11, and 12 can help you



BE PHYSICALLY ACTIVE

Engage in at least 30 minutes of moderate-level activity on most, and preferably all, days of the week. Examples of moderate-level activity are:

- Walking briskly (3-4 miles per hour)
- Conditioning or general calisthenics
- Home care and general cleaning
- Home repair, such as painting
- Mowing the lawn (with power mower)
- Gardening
- Dancing
- Racket sports, such as table tennis
- Golf (walking the course)
- Fishing (standing and casting, walking, or wading)
- Swimming (with moderate effort)
- Cycling (at a moderate speed of 10 miles per hour or less)
- Canoeing or rowing (at a speed of about 2-3.9 miles per hour)

Source: Adapted from Pate, et al., *Journal of the American Medical Association*, 1995, Vol. 273, page 404.



learn how to read and compare food labels.

Sodium also is found in many foods that may surprise you, such as baking soda, soy sauce, monosodium glutamate (MSG), seasoned salts, and some antacids—the range is wide.

Before trying salt substitutes, you should check with your doctor, especially if you have high blood pressure. These contain potassium chloride and may be harmful for those with certain medical conditions.

For an overall eating plan, consider the DASH diet. DASH stands for “Dietary Approaches to Stop Hypertension.” DASH was a clinical study that tested the effects on blood pressure of nutrients as they occur together in food. It found that blood pressures were reduced by an eating plan low in saturated fat, total fat, and cholesterol, and rich in fruits, vegetables, and lowfat dairy foods. The DASH diet includes whole grains, poultry, fish, and nuts, and has reduced amounts of fats, red meats, sweets, and sugared beverages. It also is rich in potassium, calcium, and magnesium, as well as protein and fiber.

A second study, called DASH-Sodium, found that even when using the DASH diet, lowering salt and sodium is important—blood pressure was lowest when both lifestyles were followed. See Box 19 for more on the findings from DASH-Sodium about the effects of lowering salt.

Box 13 gives the servings and food groups for the DASH diet. The number of servings you require may vary, depending on your caloric need.

You should be aware that the DASH diet has more daily servings of fruits, vegetables, and grains than you may be used to eating. The servings make it high in fiber, which may temporarily cause bloating and diarrhea. To get used to the DASH diet, gradually increase your servings of fruits, vegetables, and grains. Box 18 offers some tips on how to adopt the DASH diet.

A good way to change to the DASH diet is to keep a diary of your current eating habits. Write down what you eat, how much, when, and why. Note whether or not you snack on high fat foods while watching television, or if you skip breakfast and eat a big lunch. Do this for several days. You'll be able to see where you can start making changes.



If you are trying to lose weight, you should choose an eating plan lower in calories. You can still use the DASH diet, but follow it at a lower calorie level (see Box 14). Again, a food diary can be helpful. It can tell you if there are certain times you eat but aren't really hungry, or when you can substitute lower-calorie foods for higher-calorie items.

✓ If You Drink Alcoholic Beverages, Do So In Moderation

Drinking too much alcohol can raise blood pressure. It also can harm the liver, brain, and heart. Furthermore, alcoholic drinks contain calories, which matter if you are trying to lose weight.

If you drink alcoholic beverages, have only a moderate amount—one drink a day for women; two drinks a day for men.

What counts as a drink?

- 12 ounces of beer (regular or light, 150 calories),
- 5 ounces of wine (100 calories), or
- 1 1/2 ounces of 80-proof whiskey (100 calories)

✓ If You Have High Blood Pressure And Are Prescribed Medication, Take It As Directed

If you have high blood pressure, the lifestyle habits noted above may not lower your blood pressure enough. If they don't, you will need to take medication.

TIPS TO REDUCE SALT AND SODIUM

- Buy fresh, plain frozen, or canned “with no salt added” vegetables.
- Use fresh poultry, fish, and lean meat, rather than canned or processed types.
- Use herbs, spices, and salt-free seasoning blends in cooking and at the table—see Box 9 on ways to spice up food.
- Cook rice, pasta, and hot cereals without salt. Cut back on instant or flavored rice, pasta, and cereal mixes, which usually have added salt.
- Choose “convenience” foods that are lower in sodium. Cut back on frozen dinners, mixed dishes such as pizza, packaged mixes, canned soups or broths, and salad dressings—these often have a lot of sodium.
- Rinse canned foods, such as tuna, to remove some sodium.
- When available, buy low- or reduced-sodium, or no-salt-added versions of foods—see Boxes 10, 11, and 12 on how to use food labels for guidance.
- Choose ready-to-eat breakfast cereals that are lower in sodium.



However, even if you do need medication, you still must follow the lifestyle changes. Doing so will help your medication work better and may reduce how much of it you need.

There are many drugs available to lower high blood pressure. They work in various ways. *Often, two or more drugs work better than one.*

Here's a rundown on the main types of drugs and how they work:

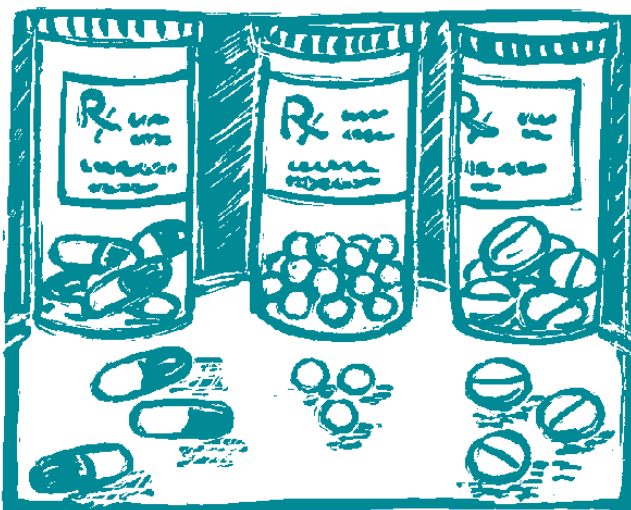
Diuretics—These are sometimes called “water pills” because they work in the kidney and flush excess water and sodium from the body through urine. This reduces the amount of fluid in the blood. And, since sodium is flushed out of blood vessel walls, the ves-

sels open wider. Pressure goes down. There are different types of diuretics. They are often used with other high blood pressure drugs.

Beta-blockers—These reduce nerve impulses to the heart and blood vessels. This makes the heart beat less often and with less force. Blood pressure drops and the heart works less hard.

Angiotensin converting enzyme (ACE) inhibitors—These prevent the formation of a hormone called angiotensin II, which normally causes vessels to narrow. The blood vessels relax and pressure goes down.

Angiotensin antagonists—These are a new type of high blood pressure drug. They shield blood vessels from angiotensin II. As a result, the vessels are wider and pressure lowers.



SPICE IT UP

Make foods tasty without using salt. Try these flavorings, spices, and herbs:

For Meat, Poultry, and Fish—

Beef . . . . .	.Bay leaf, marjoram, nutmeg, onion, pepper, sage, thyme
Lamb . . . . .	.Curry powder, garlic, rosemary, mint
Pork . . . . .	.Garlic, onion, sage, pepper, oregano
Veal . . . . .	.Bay leaf, curry powder, ginger, marjoram, oregano
Chicken . . . . .	.Ginger, marjoram, oregano, paprika, poultry seasoning, rosemary, sage, tarragon, thyme
Fish . . . . .	.Curry powder, dill, dry mustard, lemon juice, marjoram, paprika, pepper

For Vegetables—

Carrots . . . . .	.Cinnamon, cloves, marjoram, nutmeg, rosemary, sage
Corn . . . . .	.Cumin, curry powder, onion, paprika, parsley
Green beans . . . . .	.Dill, curry powder, lemon juice, marjoram, oregano, tarragon, thyme
Greens . . . . .	.Onion, pepper
Peas . . . . .	.Ginger, marjoram, onion, parsley, sage
Potatoes . . . . .	.Dill, garlic, onion, paprika, parsley, sage
Summer squash . . . . .	.Cloves, curry powder, marjoram, nutmeg, rosemary, sage
Winter squash . . . . .	.Cinnamon, ginger, nutmeg, onion
Tomatoes . . . . .	.Basil, bay leaf, dill, marjoram, onion, oregano, parsley, pepper

Calcium channel blockers

(CCBs)—These keep calcium from entering the muscle cells of the heart and blood vessels. Blood vessels relax and pressure goes down.

One short-acting type of CCB has been found to increase the chance of having another heart attack. Short-acting CCBs are taken several times a day. If you are on such a drug, you should talk with your doctor about other medication choices.



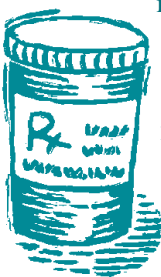
The finding does not apply to the longer-acting types of CCB, which are taken once a day.

Alpha blockers—These reduce nerve impulses to blood vessels,

which allows blood to pass more easily.

Results from a clinical study indicate that an alpha blocker may not be the best choice for an initial treatment for high blood pressure. If you now take an alpha blocker drug for high blood pressure, consult with your doctor about whether or not your treatment should be modified.

Alpha-beta blockers—These work the same way as alpha blockers but also slow the heartbeat, as beta-blockers do. As a result, less blood



is pumped through the vessels.

Nervous system inhibitors—These relax blood vessels by controlling nerve impulses.

Vasodilators—These directly open blood vessels by relaxing the muscle in the vessel walls.

When you start on a medication, work with your doctor to get the right drug and dose level for you. If you have side effects, tell your doctor so the medication can be adjusted. If you're worried about cost, tell your doctor or pharmacist—there may be a less expensive drug or a generic form that can be used instead.

It's important that you take the medication as prescribed, including in the right amount. That can prevent a heart attack, stroke, and congestive heart failure, a serious condition in which the heart cannot pump enough blood for the body's needs.

BOX 10

LABEL LANGUAGE

Food labels can help you choose items lower in sodium. Look for labels on cans, boxes, bottles, bags, and other products that say:

- Sodium free
- Very low sodium
- Low sodium
- Light in sodium
- Reduced or less sodium
- Unsalted or no salt added

BOX 11

USE THE FOOD LABEL

Frozen Peas:

Nutrition Facts

Serving Size 1/2 cup
Servings Per Container about 3

Amount Per Serving	
Calories 60 Calories from Fat 0	
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g 0%	
Cholesterol 0mg	0%
Sodium 125mg	5%
Total Carbohydrate 11g	4%
Dietary Fiber 6g 22%	
Sugars 5g	
Protein 5g	
Vitamin A 15%	Vitamin C 30%
Calcium 0%	Iron 6%

* Percent Daily Values are based on a 2,000 calorie diet.

Food labels can help you choose foods lower in sodium, as well as calories, saturated fat, total fat, and cholesterol. The label tells you:

Amount per Serving: Nutrient amounts are given for one serving. If you eat more or less than a serving, add or subtract amounts. For example, if you eat 1 cup of peas, you need to double the nutrient amounts on the label.

Nutrients: You'll find the milligrams of sodium in one serving.

Number of Servings: The serving size is 1/2 cup. The package contains about 3 servings.

Percent Daily Value: Percent Daily Value helps you compare products and tells you if the food is high or low in sodium. Choose products with the lowest Percent Daily Value for sodium.

COMPARE LABELS

Which of these two items is lower in sodium? To tell, check the Percent Daily Value. The answer is given below.

Frozen Peas:

Nutrition Facts	
Serving Size 1/2 cup	
Servings Per Container about 3	
Amount Per Serving	
Calories 60	Calories from Fat 0
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 125mg	5%
Total Carbohydrate 11g	4%
Dietary Fiber 6g	22%
Sugars 5g	
Protein 5g	
Vitamin A 15% • Vitamin C 30%	
Calcium 0% • Iron 6%	
* Percent Daily Values are based on a 2,000 calorie diet.	

Canned Peas:

Nutrition Facts	
Serving Size 1/2 cup	
Servings Per Container about 3	
Amount Per Serving	
Calories 60	Calories from Fat 0
% Daily Value*	
Total Fat 0g	0%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 380mg	16%
Total Carbohydrate 12g	4%
Dietary Fiber 3g	14%
Sugars 4g	
Protein 4g	
Vitamin A 6% • Vitamin C 10%	
Calcium 2% • Iron 8%	
* Percent Daily Values are based on a 2,000 calorie diet.	

ANSWER: The frozen peas. The canned peas have three times more sodium than the frozen peas.

But you can be taking medication and still not have your blood pressure under control. Everyone—and older Americans in particular—must be careful to control their blood pressure to below 140/90 mm Hg. If your blood pressure is higher than that, talk with your doctor about adjusting your medication or making any needed lifestyle changes to bring your blood pressure down.

WHAT ELSE AFFECTS BLOOD PRESSURE?

Other factors have been reported to affect blood pressure. Here’s a review of the latest findings:

- **Potassium.** Potassium helps to prevent and control blood pressure.
- **Calcium and Magnesium.** These nutrients may help prevent high blood pressure, and are important nutrients for other reasons too.

A note: The DASH eating plan is rich in potassium as well as calcium and magnesium. In fact, it has about two to three times the amounts that most Americans normally get in their diets—see Box 16.

You should try to get these nutrients from foods. So far, research on nutritional supplements has given inconclusive results. Box 17 gives sources for each nutrient.



THE DASH EATING PLAN

The DASH plan shown below is based on **2,000 calories a day**. The number of daily servings in a food group may vary from those listed depending on your caloric needs. (See Box 14 for more.)

FOOD GROUP	DAILY SERVINGS (except as noted)	SERVING SIZES
Grains & grain products	7-8	1 slice bread 1 cup ready-to-eat cereal* 1/2 cup cooked rice, pasta, or cereal
Vegetables	4-5	1 cup raw leafy vegetable 1/2 cup cooked vegetable 6 ounces vegetable juice
Fruits	4-5	1 medium fruit 1/4 cup dried fruit 1/2 cup fresh, frozen, or canned fruit 6 ounces fruit juice
Lowfat or fat free dairy foods	2-3	8 ounces milk 1 cup yogurt 1 1/2 ounces cheese
Lean meats, poultry, and fish	2 or less	3 ounces cooked lean meats, skinless poultry, or fish
Nuts, seeds, and dry beans	4-5 per week	1/3 cup or 1 1/2 ounces nuts 1 tablespoon or 1/2 ounce seeds 1/2 cup cooked dry beans
Fats & oils**	2-3	1 teaspoon soft margarine 1 tablespoon lowfat mayonnaise 2 tablespoons light salad dressing 1 teaspoon vegetable oil
Sweets	5 per week	1 tablespoon sugar 1 tablespoon jelly or jam 1/2 ounce jelly beans 8 ounces lemonade

*Serving sizes vary between 1/2-1 1/4 cups. Check the product's nutrition label.

**Fat content changes serving counts for fats and oils: For example, 1 tablespoon of regular salad dressing equals 1 serving; 1 tablespoon of a lowfat dressing equals 1/2 serving; 1 tablespoon of a fat free dressing equals 0 servings.

DASH DIET SERVINGS FOR OTHER CALORIE LEVELS

FOOD GROUP	Servings/Day at 1,600 calories/day	Servings/Day at 3,100 calories/day
Grains & grain products	6	12-13
Vegetables	3-4	6
Fruits	4	6
Lowfat or fat free dairy foods	2-3	3-4
Meats, poultry, and fish	1-2	2-3
Nuts, seeds, and dry beans	3/week	1
Fat & oils	2	4
Sweets	0	2

HOW TO LOWER CALORIES ON THE DASH EATING PLAN

The DASH eating plan was not designed to promote weight loss. But it is rich in lower calorie foods, such as fruits and vegetables. You can make it lower in calories by replacing higher-calorie foods with more fruits and vegetables—and that also will make it easier for you to reach your DASH diet goals. Here are some examples:

To increase fruits—

- Eat a medium apple instead of four shortbread cookies. You'll save 80 calories.
- Eat 1/4 cup of dried apricots instead of a 2-ounce bag of pork rinds. You'll save 230 calories.

To increase vegetables—

- Have a hamburger that's 3 ounces instead of 6 ounces. Add a 1/2 cup serving of carrots and a 1/2 cup serving of spinach. You'll save more than 200 calories.
- Instead of 5 ounces of chicken, have a stir fry with 2 ounces of chicken and 1 1/2 cups of raw vegetables. Use a small amount of vegetable oil. You'll save 50 calories.

To increase lowfat or fat free dairy products—

- Have a 1/2 cup serving of lowfat frozen yogurt instead of a 1 1/2-ounce milk chocolate bar. You'll save about 110 calories.

And don't forget these calorie-saving tips:

- Use lowfat or fat free condiments, such as fat free salad dressings.
- Eat smaller portions—cut back gradually.
- Choose lowfat or fat free dairy products to reduce total fat intake.
- Use food labels to compare fat content in packaged foods. Items marked lowfat or fat free are not always lower in calories than their regular versions. See Boxes 11 and 12 on how to read and compare food labels.
- Limit foods with lots of added sugar, such as pies, flavored yogurts, candy bars, ice cream, sherbet, regular soft drinks, and fruit drinks.
- Eat fruits canned in their own juice.
- Add fruit to plain yogurt.
- Snack on fruit, vegetable sticks, unbuttered and unsalted popcorn, or bread sticks.
- Drink water or club soda.

GET THOSE NUTRIENTS

The DASH eating plan is rich in various nutrients believed to benefit blood pressure and in other factors involved in good health. The amounts of the nutrients vary by how much you eat. If you eat about 2,000 calories a day on the plan, the nutrients you will get include:

4,700	milligrams of potassium
500	milligrams of magnesium
1,240	milligrams of calcium
90	grams of protein
30	grams of fiber



GOOD SOURCES FOR GOOD NUTRIENTS

Where's the potassium, calcium, and magnesium? Read on. (In the dairy products mentioned below, remember to choose lowfat or fat free types.)

Potassium—

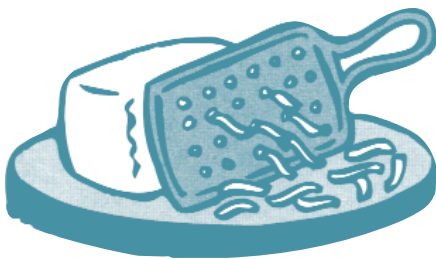
catfish
lean pork
lean veal
cod
flounder
trout
milk
yogurt
dry peas and beans
green beans
apricots
peaches
bananas
prunes and prune juice
orange juice
lima beans
stewed tomatoes
spinach
plantain
sweet potatoes
pumpkin
potatoes
winter squash

Calcium—

cheese
milk
yogurt
tofu (made with calcium sulfate)
broccoli
spinach
turnip greens
mackerel
perch
salmon

Magnesium—

whole wheat bread
whole grain ready-to-eat and
cooked cereals
broccoli
chard
spinach
okra
plantain
oysters
scallops
croaker
mackerel
sea bass
beans
soy milk
tofu
nuts and seeds



• **Fats.** Saturated fats and cholesterol in foods raise blood cholesterol, which increases the risk for heart disease. Foods high in fats also are high in calories, which must be reduced if you need to lose weight.

• **Caffeine.** This may cause blood pressure to rise but only temporarily. Unless you are sensitive to caffeine, you do not have to limit how much you consume in order to prevent or control blood pressure.

• **Garlic or Onions.** These have not been found to affect blood pressure. But, they are tasty substitutes for salty seasonings and can be used often.

• **Stress Management.** Stress too can make blood pressure go up for a while, and it has been thought to contribute to high blood pressure.

TIPS ON MAKING THE SWITCH TO THE DASH EATING PLAN

- Change gradually. Add a vegetable or fruit serving at lunch and dinner.
- Use only half the butter or margarine you do now.
- If you have trouble digesting dairy products, try lactase enzyme pills or drops—they're available at drugstores and groceries. Or buy lactose-free milk or milk with lactase enzyme added to it.
- Get added nutrients such as the B vitamins by choosing whole grain foods, including whole wheat bread or whole grain cereals.
- Spread out the servings. Have two servings of fruits and/or vegetables at each meal, or add fruits as snacks.
- Treat meat as one part of the meal, instead of the focus. Try casseroles, pasta, and stir-fry dishes. Have two or more meatless meals a week.
- Use fruits or lowfat foods as desserts and snacks.

But the long-term effects of stress are as yet unclear. Furthermore, stress management techniques do not seem to prevent high blood pressure. However, stress management techniques may help you control over-eating.



LOWER SALT TO LOWER BLOOD PRESSURE

The DASH study occurred in two parts. DASH, the initial study, found that the eating plan given on page 12 reduced blood pressure. DASH-Sodium then examined the relationships between blood pressure, eating patterns, and various sodium intakes.

DASH-Sodium looked at the effect on blood pressure of three sodium levels: a “higher” intake of 3,200 milligrams per day (mg/day), which is similar to how much most Americans now consume, an “intermediate” intake of 2,400 mg/day, which is similar to the upper limit of current recommendations; and a “lower” intake of 1,400 mg/day.

The effect of each sodium level was tested for two diet plans: A “control” diet, typical of what many Americans eat, and the DASH diet.

Here are some key results:

- The less sodium consumed, the lower the blood pressure.
- Blood pressure was lower in the DASH diet than in the control diet at all three sodium levels.
- The lowest blood pressures occurred with the DASH diet at the lower sodium level.
- Sodium level had a bigger effect in the control diet than in the DASH diet.
- The effects of sodium reduction were seen in all study participants—those with and without high blood pressure, men and women, and African Americans and others.

DASH-Sodium shows the importance of lowering sodium intake—whatever your eating plan. But for a true winning combination, follow the DASH diet *and* lower your intake of salt.

HERE’S A RECAP

By preventing or controlling high blood pressure, you will reduce your risk for heart disease and stroke, as well as other conditions. The steps needed will help you feel healthier. Those steps are to:

- *Maintain a healthy weight.*
- *Be physically active.* It only takes 30 minutes of moderate-level physical activity on most, and preferably all, days of the week.
- *Follow a healthy eating plan, which includes foods lower in salt and sodium.* Have no more than 2,400 milligrams of sodium (6 grams of salt) a day. Also, try the DASH eating plan, which is low in saturated fat, total fat, and cholesterol, and rich in fruits, vegetables, and lowfat dairy foods.

The DASH eating plan offers plenty of potassium, as well as calcium, magnesium, fiber, and protein.

- *If you drink alcoholic beverages, do so in moderation.*

- *If you have high blood pressure and are prescribed medication, take it as directed.*



A SAMPLE WALKING PROGRAM

	Warm Up	Activity	Cool Down	Total Time
WEEK 1				
Session A	Walk slowly 5 min.	Then walk briskly 5 min.	Then walk slowly 5 min.	15 min.
Session B	Repeat above pattern			
Session C	Repeat above pattern			
Continue with at least three walking sessions during each week of the program.				
WEEK 2	Walk slowly 5 min.	Walk briskly 7 min.	Walk slowly 5 min.	17 min.
WEEK 3	Walk slowly 5 min.	Walk briskly 9 min.	Walk slowly 5 min.	19 min.
WEEK 4	Walk slowly 5 min.	Walk briskly 11 min.	Walk slowly 5 min.	21 min.
WEEK 5	Walk slowly 5 min.	Walk briskly 13 min.	Walk slowly 5 min.	23 min.
WEEK 6	Walk slowly 5 min.	Walk briskly 15 min.	Walk slowly 5 min.	25 min.
WEEK 7	Walk slowly 5 min.	Walk briskly 18 min.	Walk slowly 5 min.	28 min.
WEEK 8	Walk slowly 5 min.	Walk briskly 20 min.	Walk slowly 5 min.	30 min.
WEEK 9	Walk slowly 5 min.	Walk briskly 23 min.	Walk slowly 5 min.	33 min.
WEEK 10	Walk slowly 5 min.	Walk briskly 26 min.	Walk slowly 5 min.	36 min.
WEEK 11	Walk slowly 5 min.	Walk briskly 28 min.	Walk slowly 5 min.	38 min.
WEEK 12 AND BEYOND	Walk slowly 5 min.	Walk briskly 30 min.	Walk slowly 5 min.	40 min.

WANT TO KNOW MORE?

The National Heart, Lung, and Blood Institute (NHLBI) has more information about high blood pressure, heart disease, the DASH eating plan, and related topics. Some of it is in English and Spanish; much of it is free. Contact the following:

NHLBI Health Information Network
 P.O. Box 30105
 Bethesda, MD 20824-0105
 Phone: 301-592-8573
 Fax: 301-592-8563
 Email: nhlbiinfo@rover.nhlbi.nih.gov

Also check out the NHLBI Web site. You'll find special sites on high blood pressure, achieving a healthy weight, and high blood cholesterol. The Web site is www.nhlbi.nih.gov.



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