

**HIGH BLOOD PRESSURE**

**IF IT'S TOO HIGH...**

**IT WILL TAKE YOU DOWN**

Presented by  
Nutritionist

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# What is Blood Pressure?

Blood pressure is the combined result of two factors: how much blood is flowing and how hard the blood vessel walls are pushing in against the blood flow.

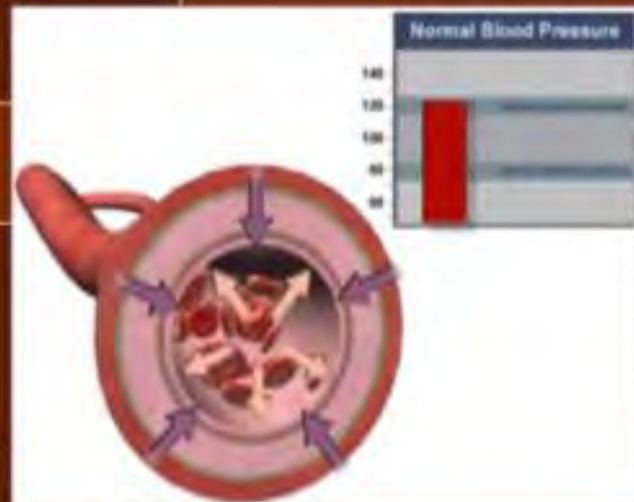
**High Blood Pressure (HBP) or Hypertension:**

Condition in which BP is consistently elevated above the normal ranges

Blood pressure is the measurement of force applied to artery walls.



ADAM



# BLOOD PRESSURE RANGES

## Conventional Blood Pressure Treatment Recommendations

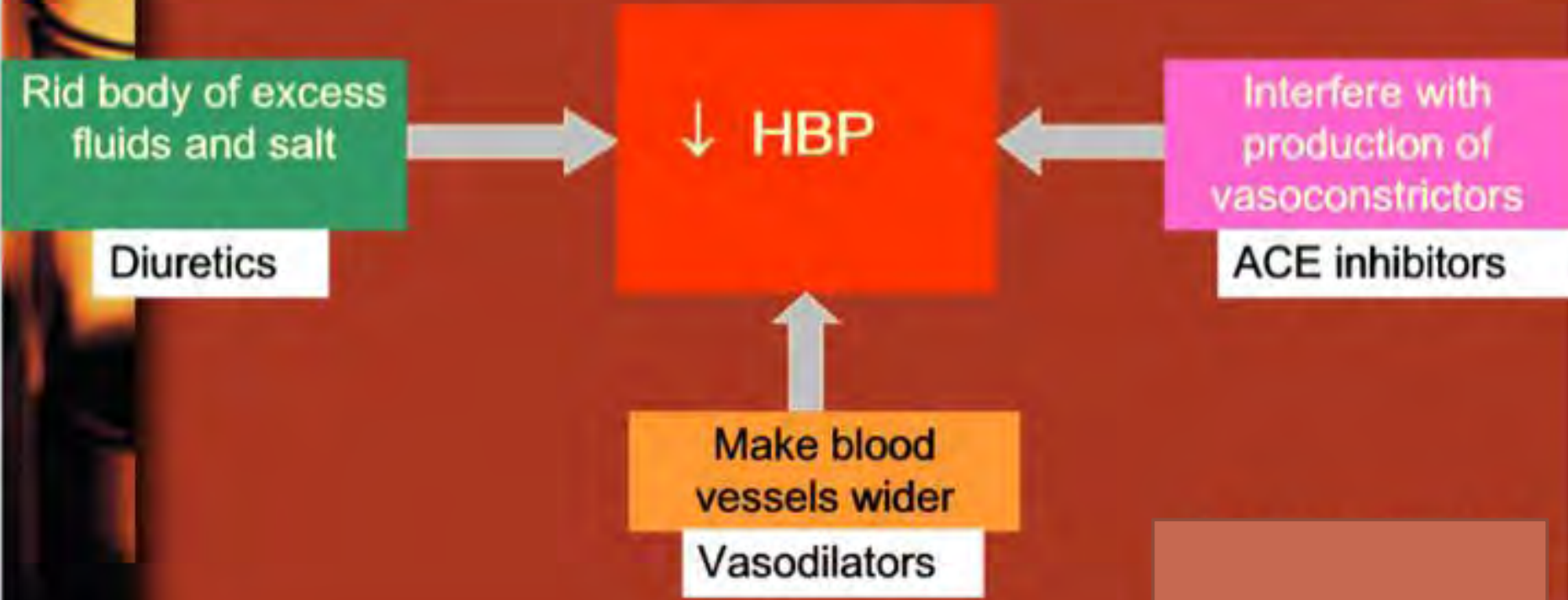
Category	SBP	DBP	Lifestyle Changes	Initial Drug Therapy
Optimal	<120	<80	Encourage	No antihypertensive drug indicated.
Pre-HTN	120-139	80-89	Yes	Antihypertensive drug indicated only if compelling indications present.*
Stage I	140-159	90-99	Yes	One antihypertensive drug; May consider multiple drugs.
Stage II	160 or >	100 or >	Yes	Two antihypertensive drugs for most patients.

\* Heart failure, postmyocardial infarction, high coronary disease risk, diabetes, chronic kidney disease, recurrent stroke

# Potential Mechanisms & Drugs for HBP Management



HBP is a complex disease with several potential underlying mechanisms



# Reversing Chronic Disease Simple Questions?

What causes chronic disease?

What is the cure for chronic disease?



# EXCESS LEAD AT LOW LEVELS CONTRIBUTES TO CARDIOVASCULAR DISEASE

## Lead and CVD Circulation 2006;114:138-1399

### Epidemiology

#### Blood Lead Below 0.48 $\mu\text{mol/L}$ (10 $\mu\text{g/dL}$ ) and Mortality Among US Adults

Andy Mittle, MPH, Paul Mattson, PhD, Vividit Bateman, MD, Ellen K. Silbergeld, PhD, Elaine Gaziano, MD, DPH

**Background**—Blood lead levels above 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ) in adults have been associated with increased risk of cardiovascular, cancer, and all-cause mortality. The objective of the present study was to determine the association between blood lead levels below 0.48  $\mu\text{mol/L}$  and mortality in the general US population.

**Methods and Results**—Blood lead levels were measured in a nationally representative sample of 10 940 adult participants of the Third National Health and Nutrition Examination Survey conducted in 1988 to 1994 and followed up for up to 12 years for all-cause and cause-specific mortality. The geometric mean blood lead level in study participants was 0.32  $\mu\text{mol/L}$  (7.26  $\mu\text{g/dL}$ ). After multivariable adjustment, the hazard ratios (95% CIs) for comparisons of participants in the highest quartile of blood lead (0.37–0.48  $\mu\text{mol/L}$ ) with those in the lowest quartile (0.00–0.09  $\mu\text{mol/L}$ ) were 1.23 (1.08 to 1.39),  $P_{\text{trend}}$  across quartiles (0.001) for all-cause mortality and 1.19 (1.04 to 1.26),  $P_{\text{trend}}$  across quartiles (0.005) for cardiovascular mortality. Blood lead level was significantly associated with both myocardial infarction and stroke mortality, and the association was evident at levels  $\geq 0.10$   $\mu\text{mol/L}$  (0.2  $\mu\text{g/dL}$ ). There was no association between blood lead and cancer mortality in this stage of exposure.

**Conclusions**—The association between blood lead levels and increased all-cause and cardiovascular mortality was observed at substantially lower blood lead levels than previously reported. Despite the marked decrease in blood lead levels over the past 3 decades, environmental lead exposures remain a significant determinant of cardiovascular mortality in the general population, constituting a major public health problem. (Circulation. 2006;114:1388–1394.)

**Key Words:** lead • toxicity • cardiovascular disease • myocardial infarction • stroke

**B**lood lead levels above 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ) have been associated with increased risks of cardiovascular, cancer, and all-cause mortality in several occupational cohorts in the general population. Landrigan and Schecter<sup>1</sup> also reported significant relationships between blood lead levels above 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ) and cardiovascular, cancer, and all-cause mortality.

**Editorial p 1347**  
**Clinical Perspective p 1394**

Environmental lead exposures in the United States have generally declined since the mid 1970s, largely because of the phase-out of lead in gasoline, which was finalized in 1996. In addition, lead-based paints were restricted in use, and a voluntary program removed lead solder from lead cans.<sup>2</sup> Among US adults, the geometric mean blood lead level decreased from 0.60  $\mu\text{mol/L}$  (12.1  $\mu\text{g/dL}$ ) in 1976 to 0.30  $\mu\text{mol/L}$  (6.0  $\mu\text{g/dL}$ ) in 1994 to 0.28  $\mu\text{mol/L}$  (5.6  $\mu\text{g/dL}$ ) in 1999 to 2002. Exposure, 99% of US adults have blood lead levels below 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ).<sup>3</sup> To the best of our knowledge, the association of

blood lead levels below 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ) with mortality and public health has never been investigated.

The purpose of the present analysis was to evaluate the association of blood lead levels below 0.48  $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ) with all-cause and cause-specific mortality in the general US population. To do so, we analyzed data from the Third National Health and Nutrition Examination Survey (NHANES III) Mortality Study, a cohort study based on a nationally representative sample of US adults in which blood lead was measured in 1988 to 1994, with participants followed up for up to 12 years.

#### Methods

##### Study Population

NHANES III was a stratified, multistage probability survey designed to allow a representative sample of the civilian, noninstitutionalized US population.<sup>4</sup> Overall, 28 000 adults 18 years of age and older completed the NHANES III exposure and questionnaire between 1988 and 1994, after the exclusion of 2402 participants who were missing data for blood lead, 107 participants with blood lead  $\geq 0.48$   $\mu\text{mol/L}$  (10  $\mu\text{g/dL}$ ), and 1486 participants who were missing other

- Low level exposure blood lead > 2 ug/dl
- 55% increase CVD
- 89% increase in MI
- 151% increase stroke
- Affects 39% population

# MAYO CLINIC ENDORSES D.A.S.H. DIET



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Healthy Recipes

## DASH diet recipes

Products and services

The DASH diet has been proved to reduce blood pressure, which can help you live a longer and healthier life. Try these delicious recipes.

**#1**  
**Hospital**  
in the Nation



The Mayo Clinic Diet

What is your  
weight-loss goal?

5-10 lbs »

11-25 lbs »

25+ lbs »

### Appetizer recipes

- Apples with dip
- Artichoke dip
- Avocado dip
- Baba ghanoush
- Chipotle spiced shrimp
- Cranberry spritzer
- Crispy potato skins
- Eggplant with toasted spices
- Fresh fruit kebabs
- Fresh tomato crostini
- Fruit salsa 'n' sweet chips
- Ginger-marinated grilled portobello mushrooms
- Grilled pineapple
- Hummus
- Marinated portobello mushrooms with provolone
- Pickled asparagus
- Pizza margherita
- Shrimp marinated in lime juice and Dijon mustard
- Southwestern potato skins
- Sweet and spicy snack mix
- Tomato basil bruschetta
- White bean dip
- Whole-wheat pretzel

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Home > Health Information for the Public > Health Topics > **DASH Eating Plan**

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## Explore DASH Eating Plan

WHAT IS... | BENEFITS | FOLLOWING DASH | HEALTHY LIFESTYLE | GETTING STARTED | LINKS

### What Is the DASH Eating Plan?

Dietary Approaches to Stop Hypertension (DASH) is a flexible and balanced eating plan that is based on research studies sponsored by the National Heart, Lung, and Blood Institute (NHLBI). These studies showed that DASH lowers high blood pressure and improves levels of blood lipids (fats in the bloodstream), which reduces the risk of developing cardiovascular disease.

DASH requires no special foods and it includes easy-to-follow recipes (for example, browse the [Delicious Heart Healthy Recipes](#) from the NHLBI).

The DASH eating plan:

- Emphasizes vegetables, fruits, and fat-free or low-fat dairy products
- Includes whole grains, fish, poultry, beans, seeds, nuts, and vegetable oils
- Limits sodium, sweets, sugary beverages, and red meats

In terms of nutrition content, DASH is:

- Low in saturated and trans fats
- Rich in potassium, calcium, magnesium, fiber, and protein

The DASH eating plan is lower in sodium (mostly from salt) than the typical American diet. The DASH research showed that an eating plan containing 2,300 milligrams (mg) of sodium per day lowered blood pressure. An eating plan containing only 1,500 mg of sodium per day even further lowered blood pressure.

### DASH Eating Plan Clinical Trials

Clinical trials are research studies that explore whether a medical strategy, treatment, or device is safe and effective for humans.

#### Related Topics

- [Atherosclerosis](#)
- [Coronary Heart Disease](#)
- [High Blood Pressure](#)
- [Overweight and](#)

# D.A.S.H. DIET – NIH APPROVED

THE  
**DASH**  
**DIET**  
Action Plan

Ranked #1  
Best Diet Overall  
by U.S. News &  
World Report



PROVEN TO LOWER  
BLOOD PRESSURE  
AND CHOLESTEROL  
*WITHOUT MEDICATION*

Marla Heller, MS, RD



# FIBER, MAGNESIUM, POTASSIUM, CALCIUM AND HEALTHY FATS

## COUNT THE NUTRIENTS

The DASH "Combination Diet" is low in cholesterol, high in fiber, potassium, calcium, and magnesium, and moderately high in protein. Here's how it compares with the DASH "Control Diet," which is closer to what the typical American eats. (Both diets supply 2,000 calories a day.)

Nutrient	DASH Combination Diet	DASH Control Diet
Fat (% of cal.)	27	37
Saturated Fat (% of cal.)	6	16
Monounsaturated Fat (% of cal.)	13	13
Polyunsaturated Fat (% of cal.)	8	8
Carbohydrates (% of cal.)	55	48
Protein (% of cal.)	18	15
Cholesterol (mg per day)	150	300
Fiber (grams per day) ← →	31	9
Potassium (mg per day) ← →	4,700	1,700
Magnesium (mg per day) ← →	500	165
Calcium (mg per day) ← →	1,240	450
Sodium (mg per day)	3,000	3,000

**SOURCE: DASH clinical study**

# LOW SODIUM HIGH POTASSIUM FOODS

**How many servings of these low-sodium foods do you eat in a week?**

- Baked potato or sweet potato
- Barley cooked without added salt
- Bread products with little or no added salt (preferably whole grain)
- Fresh fruit
- Fresh vegetables or frozen plain vegetables
- Fresh-cooked chicken
- Fresh-cooked fish
- Fresh-cooked lean meat
- Home-cooked beans or chili (with very little added salt)
- Natural peanut butter with no added salt

# ↓ FAT, ↓ SAT FAT, ↓ CHOLESTEROL, ↓ SODIUM

## COUNT THE NUTRIENTS

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**SOURCE: DASH clinical study**

# HIGH SODIUM FOODS

- \_\_\_ Frozen prepared meals
- \_\_\_ Hot dogs
- \_\_\_ Imitation seafood, veggie burgers
- \_\_\_ Pasta sauce
- \_\_\_ Peanut butter (with salt)
- \_\_\_ Pickles, relish, canned olives
- \_\_\_ Salad dressing
- \_\_\_ Side dish or entrée from a can
- \_\_\_ Breakfast in a restaurant
- \_\_\_ Lunch in a restaurant
- \_\_\_ Dinner in a restaurant

**99% OF  
FAST  
FOOD**

# TOTAL SODIUM RX: 2.3 G (2300MG)

## SALT CONTENT IN FAST FOODS



# Magnesium & Folate

## Most Researched Ingredients for the Heart

[Lipid metabolism and magnesium]

[Article in Japanese]

Inoue I.

Department of Endocrinology and Diabetes, Satama Medical School.

According to the Vital Statistics Report published by the Japanese Ministry of Health and Welfare, heart disease and cerebrovascular disease are the main causes of death in Japan. The main pathological finding in these diseases is atherosclerosis and the main risk factors, besides the

### Magnesium

- Supports healthy endothelial cells
- Alleviates arrhythmias and heart palpitations
- Essential for proper heart muscle function
- Lowers triglycerides
- Raises HDL
- Lowers cholesterol

5-methyltetrahydrofolate rapidly improves endothelial function and decreases superoxide production in human vessels: effects on vascular tetrahydrobiopterin availability and endothelial nitric oxide synthase coupling.

Antoni  
Lee J  
Refsu

5-Methyltetrahydrofolate and tetrahydrobiopterin can modulate electronically mediated endothelium-dependent vascular relaxation.

Depart  
Redcliff

Gr

Impaired NO-dependent vasodilation in patients with Type II (non-insulin-dependent) diabetes mellitus is restored by acute administration of folate.

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### 5-MTHF

- Improves nitric oxide status
- Lowers blood levels of homocysteine
- Crucial for methylation
- Reduces risk of heart disease
- Influences endothelial function

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stimulator of endothelium-independent vasodilation were infused. RESULTS: Serotonin-induced vasodilation was



# MAGNESIUM RICH FOODS

Source: National Institutes of Health



Wheat Bran



Almonds



Spinach



Cashews



Soybeans (organic)



Oatmeal



Peanuts



Baked potato with skin



Black-eyed peas



Brown rice

**ALL BEANS- SOUPS, SPREADS, ADDED TO SALADS, COOKED WITH VEGGIES**





**BEETS- RICH IN ARGININE  
EAT THEM ROASTED, JUICED, SHREDDED**



# BANANAS- RICH IN POTASSIUM AND FIBER

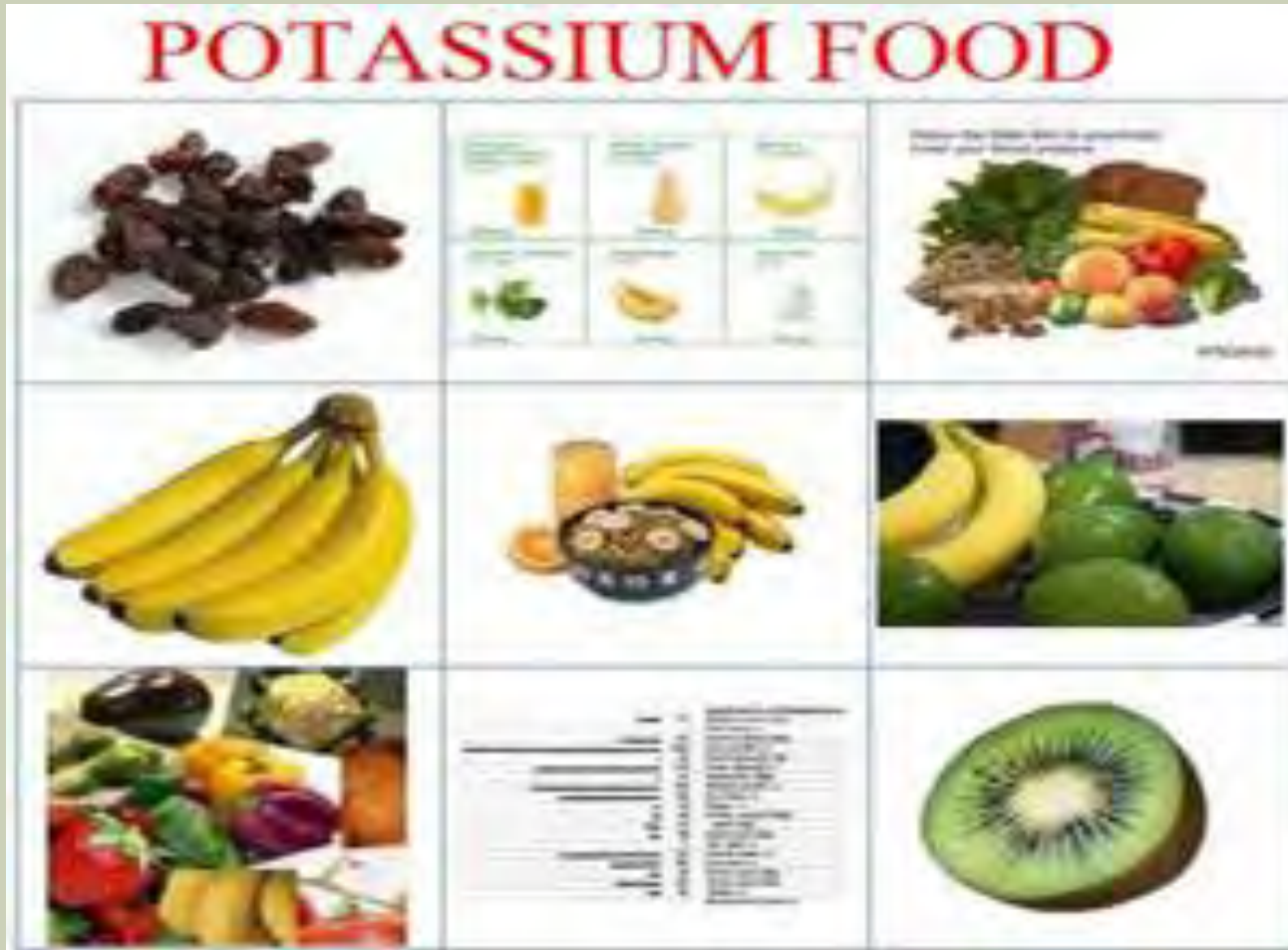


- Add to a smoothie
- Have as a snack
- Add to your Oatmeal
- Chop with other fruit



QUINOA

# POTASSIUM RICH FOODS



# CALCIUM RICH FOODS



**BROCCOLI**

**AVOCADO**

**NUTS & SEEDS**

**YOGURT**

**MILK &**

**CHEESE**

**BUY DAIRY  
PRODUCTS  
THAT ARE LOW  
FAT OR PART  
SKIM**

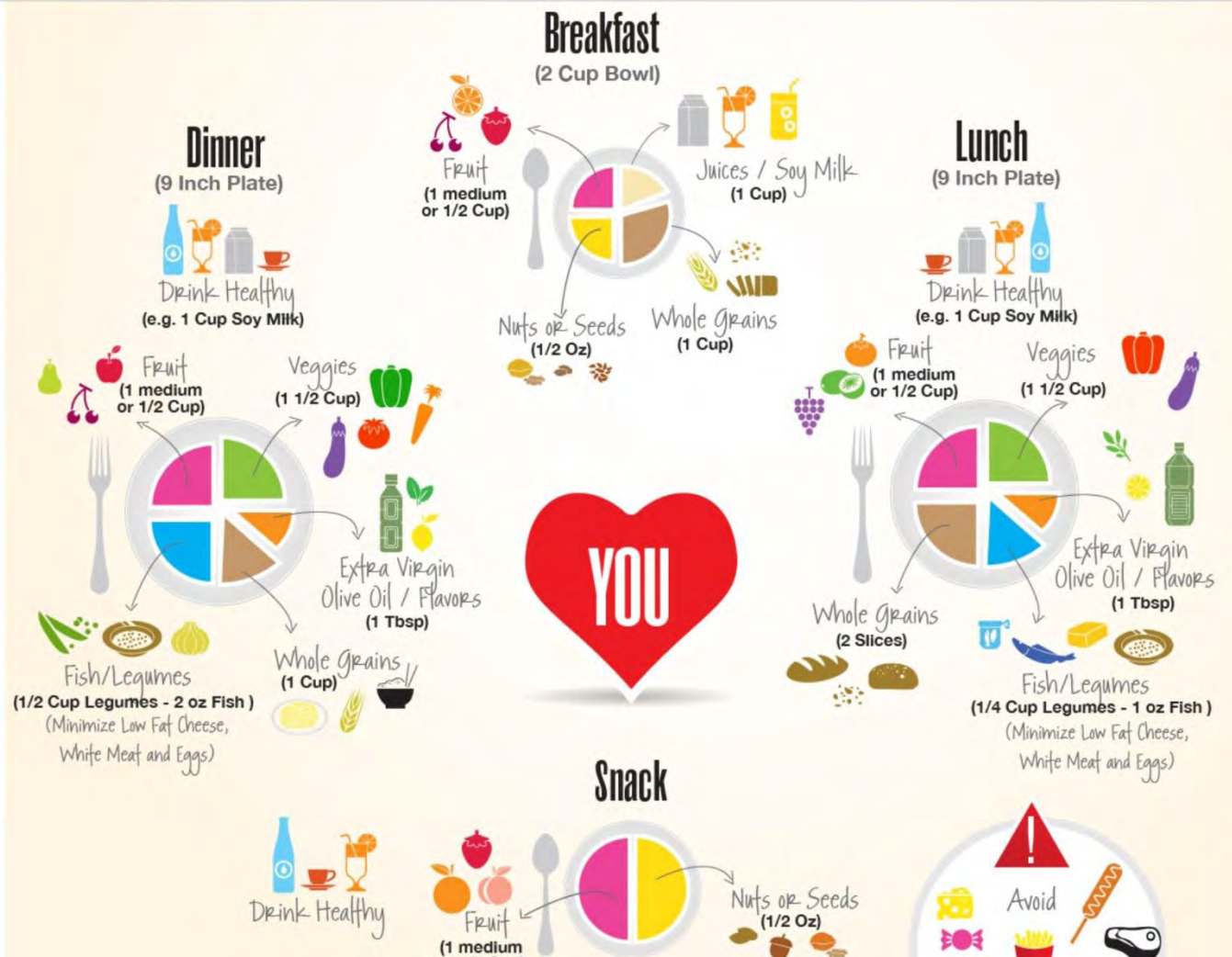


# SALMON- RICH IN EFA'S (ESSENTIAL FATTY ACIDS)

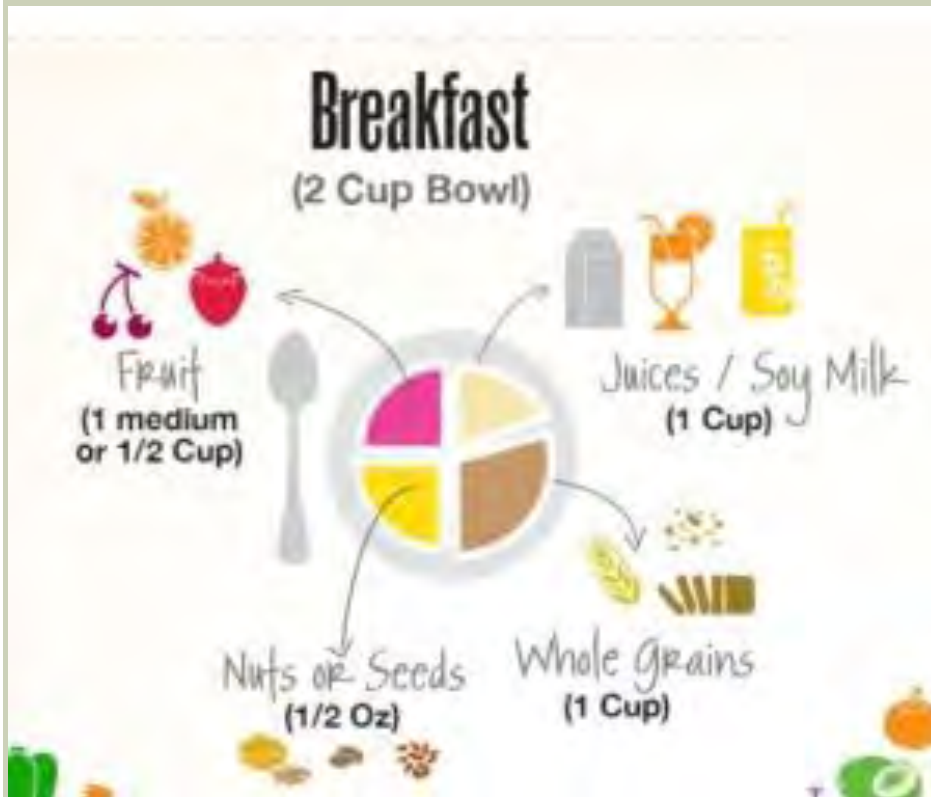


- ADD TO SALADS
- MAKE INTO BURGERS
- ADD TO WRAPS WITH VEGGIES

# WHAT TO EAT TO LOWER BLOOD PRESSURE



# BREAKFASTS



- OATMEAL WITH FRUIT & NUTS
- SMOOTHIE WITH PEA OR WHEY PROTEIN, FRUITS, FLAX, MILK: COW, SOY, ALMOND
- WHOLE GRAIN CEREAL WITH FRUITS, NUTS, AND MILK

# LUNCHES/DINNERS



- Whole grain choice: Whole wheat bread, Quinoa, brown rice, millet, kasha
- One fruit
- Veggies-1.5 cups
- Milk- soy, almond,
- Healthy fat: olive oil, raw nuts
- Beans or fish-
- Less chicken, cheese, meat, eggs

# SNACKS

- Fruits with almonds, cashews, sunflower seeds, walnuts
- Yogurt with granola, fresh fruit
- Hummus with veggies, whole crackers
- Fresh fruit and yogurt smoothies
- Fruit and veggie smoothies
- Baked kale or veggies chips
- Whole grain pretzels- low salt or salt free

# DECAF COFFEE, GREEN TEAS, KIWI FRUIT

## Switch your caffeinated coffee to decaf



This has been a long debate amongst scientists. Some researchers have demonstrated that caffeine has no effect, but one study from Duke University Medical Center found that consuming three 8 oz. cups of coffee increased blood pressure by four mmHg and that effect lasted until bedtime.

## Take up tea

Per scientists, the flowers of the hibiscus could gently lower your blood pressure. That's why hibiscus tea is known as: "The tea that can bring your blood pressure down".

All thanks to their ability to eliminate excess water and block the compound that causes blood vessels to constrict (Called ACE).

Tea can calm you and reduce your high blood pressure.

Tufts University researchers studied participants who drank 3 cups of [hibiscus tea](#) every day and saw that within 6 weeks they were able to lower their systolic (top number) blood pressure by 7 points. This result was similar with the results of many drugs.

Those participants who received a placebo improved their numbers by 1 point. Hibiscus contains phytochemicals which are responsible for the large drop in blood pressure, says the research authors.

A lot of herbal teas on the market contain hibiscus. Look for the blends that list it near the beginning or the top of the ingredient list-this often indicates a high concentration per serving.



## Kiwi Fruit



These tiny green wonder fruit aren't just for fruit salads, they are also excellent source of dietary fiber, your power minerals and even vitamin C. One kiwi fruit provides 7% of the magnesium, 9% of the potassium and 2% of the calcium you need every day.

## Peaches



# PEACHES, BANANAS, NECTARINES, RED PEPPER

## Peaches



Peaches aren't just known for their fuzzy roundness they are also known for their ability to supply you with 3% of the magnesium, 8% of the potassium and 1% of the calcium, you need every day. FYI the juice from a peach makes a wonderful moisturizer.

## Bananas



The average American consumes 26.2 pounds of bananas a year. This makes banana the most consumed fruit. That's even above the consumption of apples and oranges combined! One medium banana can provide you with 8% of the magnesium, 12% of the potassium and 1% of the calcium you need every day.

## Nectarines



Nectarines are a close relative to the peach, which is probably why they have the same power mineral percentages, however if you don't like peaches you may like nectarines. The taste is different and there's no fuzz. One nectarine can provide you with 3% of the magnesium, 8% of the potassium and 1% of the calcium you need every day.

## Red bell pepper



Not only are red bell peppers an excellent source of the three minerals you need but they are also an excellent source of vitamin C, another essential vitamin to help high blood pressure. One cup of raw red bell pepper can provide you with 4% of the magnesium, 9% of the potassium and 1% of the calcium you need every day.

# BLUEBERRIES, POTATOES, CHOCOLATE

## Snack on Blueberries



According to research from the University of Maine, wild blueberries don't just taste good, they may also help blood vessels loosen up in times of stress.

Researchers aren't exactly sure why, but it's thought that antioxidants can help you keep blood pressure under control. Wild blueberries are definitely more abundant in phenolics (antioxidant compounds) than conventional blueberries.

## Pick Potatoes



Loading up on vegetables rich in potassium and iron is an essential piece of any blood pressure-lowering diet. Potatoes are one of the most-versatile vegetables out there.

Just one medium sweet potato is not only delicious, but with the skin provides 4% of the calcium, 8% of the magnesium (7% without the skin), and 15% of the potassium (10% without the skin) you need every day. Sweet potatoes are so sweet they could be a dessert. Here's a sweet tip. They are a great addition to smoothies.

Purple potatoes add a nice pop of color to your plate and a nice drop to your blood pressure. In fact, they can cause a drop of as much as 4.3% to your diastolic and 3.5% to your systolic, according to a report that is shown in the ACS Journal of Agricultural and Food Chemistry.

The study states that purple potatoes are thought to mimic effects in the body similar to the ACE (angiotensin converting enzyme) inhibitor medications, a mainstay for treating high blood pressure, manage blood pressure.

## Snack on dark chocolate



Here's a reason to have that piece of chocolate. Dark chocolate varieties not only taste good, but they contain compounds that make blood vessels more elastic. In fact flavanols, which is a natural plant compound in cocoa, help your blood vessels function better.

The more productive your blood vessels are, the less work your heart has to do to pump blood throughout your body. Then your blood pressure doesn't skyrocket. One study indicated that 18% of patients who ate dark chocolate daily saw their blood pressure decrease.

Just make sure it has 70% cocoa. Have ½ ounce daily and you could see the same results. Opt for hot cocoa at breakfast. There's nothing better than starting your day with your sweet tooth's favorite drink.



# CRANBERRY JUICE, POMEGRANATE, WHITE BEANS

## Cranberry juice



Cranberry juice isn't just for urinary tract infections. Your systolic and diastolic blood pressure can be lowered by 3 points by easily wetting your whistle with a tart and tangy glass of low-calorie unsweetened cranberry juice, according to new research published by the AHA. Scientists aren't sure of the definite link. However, they credit the antioxidants in those tiny little berries with the amazing ability to help temper blood pressure.

## Sprinkle on pomegranates



Pomegranates are packed with vitamin C and antioxidants. Researchers at Penn State Hershey Heart and Vascular Institute say that during exercise pomegranate seeds help your body maintain a healthy blood pressure.

Low levels of antioxidants in your body may trigger a spike in blood pressure. The antioxidants found in those wonderful red pomegranates lessen the increase in blood pressure.

Eating pomegranates can lead to the ability to sustain intense workouts and burn more calories, therefore, lead to a healthier overall workout. In addition, you'll always burn a few calories popping the seeds out of the pomegranate.

## White beans



Not only white beans but also chickpeas, other legumes and lentils can help reduce your risk of heart disease, improve control of blood pressure, and slash your risk for type 2 diabetes.

This all according to a study published by the Archives of Internal Medicine. They say eating one cup not only does all that but also shaved 4.5 points off participants systolic blood pressure numbers and also cut down the chance of heart disease by about 1%.

One cup of white beans also provides 30% of the magnesium, 24% of the potassium and 13% of the calcium you need every day. Make sure you keep a close eye on labels and choose no salt added or rinse your low-sodium canned white beans very well. Cooking dried beans overnight in a slow cooker is also a great option.

# SPINACH AND CHEESE STUFFED SHELLS



# WHOLE WHEAT VEGGIE WRAP



# GRILLED SALMON WITH ASPARAGUS AND GREENS



# GRILLED CHICKEN WITH ROASTED VEGGIES AND PILAF



# PASTA VEGETABLE FETA OR TOFU SALAD



# BROWN RICE PILAF



[foods-that-lowerbloodpressure.com](http://foods-that-lowerbloodpressure.com)

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- [www.nhlbi.nih.gov/health](http://www.nhlbi.nih.gov/health)
- [www.cleandelicious.com](http://www.cleandelicious.com)

“...one third of what we eat keeps us alive.

Two thirds of what we eat keeps doctors alive.”

*Unknown*

