

Nutrition Therapy in Prevention and Treatment of Heart Failure

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Introduction



A growing body of scientific research is beginning to provide important clues about how diet choices affect health. In some areas, the relationship between specific foods or dietary supplements and particular health outcomes is fairly clear; in other cases, more research is needed.

Although the vast majority of research studies have focused on individual nutrients and foods, it is well recognised that multiple dietary factors influence the risk of developing cardiovascular disease (CVD).¹



American Heart Association 2006 diet and lifestyle goals for cardiovascular disease risk reduction:¹

- Consume an overall healthy diet.
- Aim for a healthy body weight. Obesity is an independent risk factor for CVD.
 - A healthy body weight is currently defined as a body mass index (BMI) of 18.5 to 24.9 kg/m². Overweight is a BMI between 25 and 29.9 kg/m², and obesity is a BMI greater than 30 kg/m².
- Aim for recommended levels of low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides.
- Aim for a normal blood pressure.
 - A normal blood pressure is a systolic BP less than 120 mm Hg and a diastolic BP less than **80 mm Hg**. **BP is a strong** risk factor for cardiovascular-renal disease.
- Aim for a normal blood glucose level.

- A normal fasting glucose level is 5-7 mmol/l, whereas diabetes is defined by a fasting glucose level of greater than 7 mmol/l. Hyperglycaemia and the often-associated insulin resistance are related to numerous cardiovascular complications, including coronary heart disease, stroke, peripheral vascular disease, cardiomyopathy, and heart failure.
- Be physically active.
- Avoid use of and exposure to tobacco products.
- Balance energy intake and physical activity to achieve or maintain a healthy body weight.
- Consume a diet rich in vegetables and fruit.





Fruits and vegetables – A number of studies have demonstrated the health benefits of eating fruits and vegetables. These foods decrease the risk of cardiovascular diseases, including coronary heart disease (CHD) and stroke; intake of up to six servings a day appears to provide the most benefit. Cruciferous vegetables (broccoli, cabbage, cauliflower, brussels sprouts), green leafy vegetables, citrus fruits, and vitamin C-rich fruit and vegetables may lower the risk of cardiovascular disease to the greatest extent.



Fibre – A high fibre intake is associated with a 40-50% reduction in the risk of coronary heart disease and stroke compared with low intake. Cereal fibres in particular are most strongly associated with a decreased risk of heart attack. Eating fibre also protects against type 2 diabetes, and eating soluble fibre (such as that found in vegetables, fruits, and especially legumes) may help people who already have diabetes to control their blood sugar.

The recommended amount of dietary fibre is 20-35g a day. Many breakfast cereals are excellent sources of dietary fibre. By reading the product information panel on the side of the package, it is possible to determine the number of grams of fibre in a serving.

Fish – Eat fish, especially oily fish, at least twice a week. It is rich in the very long-chain omega-3 polyunsaturated fatty acids EPA and DHA. The consumption of two servings a week of fish high in EPA and DHA is associated with a reduced risk of both sudden death and death from CHD in adults.



Fat – Limit your intake of saturated and trans fat and cholesterol. Blood cholesterol levels have been clearly linked to an increased risk of coronary heart disease. Eating foods lower in certain types of fat, in addition to cutting back on foods that contain cholesterol, can lower cholesterol levels and reduce the risk of coronary heart disease.

The type of fat consumed appears to be more important than the amount of total fat. In particular, saturated fats and trans fats must be avoided. Trans fats are those that are solid at room temperature, and are found in many margarines and in other fats labelled “par-

tially hydrogenated”. Another major source is oils that are maintained at high temperature for a long period, such as those in fast food restaurants. Saturated fats come mainly from animal products, such as cheese, butter, and red meat.

When considering a low-fat diet, it is important not to simply replace fat with carbohydrates, a common practice of low-fat food manufacturers. Increases in carbohydrate intake may lower levels of high density lipoprotein (HDL) cholesterol (good cholesterol), and actually increases the risk of coronary heart disease.

Limit your intake of saturated fat to less than 7% of energy, trans fat to less than 1% and cholesterol to less than 300mg a day. These goals can be achieved by:

- Choosing lean meats and vegetable alternatives;
- Selecting fat-free (skim), 1%-fat, and low-fat dairy products; and
- Minimising intake of partially hydrogenated fats.



Sugar – Minimise your intake of beverages and foods with added sugar.

Salt – Choose and prepare foods with little or no salt. An achievable recommendation for sodium (salt) is 2-3g a day.



Alcohol – If you consume alcohol, do so in moderation.

Moderate alcohol intake is associated with reduced heart disease, including a reduced risk of death from cardiovascular causes. However, it is not clear what amount of alcohol is best. There are some risks associated with alcohol use, including breast cancer in women; cancers of the mouth, oesophagus, throat, larynx, and liver; other illnesses such as cirrhosis and alcoholism; and injuries and other trauma-related problems, particularly in men.

Dietary guidelines recommend alcohol intake in moderation, if at all. This means no more than one drink a day for women and up to two drinks a day for men. Drinking is discouraged for those under 40 years who are at low risk of cardiovascular disease because the risks are likely to outweigh the benefits in this group.

Fluids – Watch your fluid intake. For severe heart failure you may need to limit the fluids (liquids) you drink throughout the day. If your doctor advises you to limit your fluid intake, you will need to watch how much fluid is in the foods that you consume (water, tea, coffee,

soup, jelly, fruit juice, etc). Your doctor will tell you how much fluid you are allowed.

Practical hints to control fluid intake:

- Divide fluid allowance evenly throughout the day.
- Avoid drinking sugary fluids.
- Take medication with a meal (unless instructed not to). Some tablets require little or no fluid to swallow if taken with food.
- Rinse your mouth with water and gargle if necessary, but do not swallow.
- Stimulate the production of saliva by sucking a lemon wedge or sweets like sherbet or chewing gum.
- Cool off by wiping your face, neck and underarms with a wet towel.

Weight – Weigh yourself on the same scale each morning, after urinating and before eating.

Write down your weight every day in a diary. Bring this with you to your doctor's visit. Call your doctor sooner if you gain 1kg in one day or 2.5kg in one week. Remember, one litre of fluid weighs one kilogram.

Dietary factors with unproven or uncertain effects on CVD risk

Folate – Folate is a type of B vitamin that is important in the production of red blood cells. Low levels of folate in pregnant women have been linked to a group of birth defects called neural tube defects. Vitamins containing folate and breakfast cereals fortified with folate are recommended as the best

ways to ensure adequate folate intake.

However, supplements containing folate (called folic acid) are no longer recommended to reduce the risk of colon cancer or heart disease.

Antioxidants – The antioxidant vitamins include vitamins A, C, E, and beta carotene. Many other foods, especially fruits and vegetables, also have antioxidant properties. A number of studies have examined the theory that antioxidants prevent cancer and cardiovascular disease by helping the body dispose of substances called “toxic free radicals”. The results of these studies are mixed. Studies have not clearly shown that antioxidant vitamins prevent cancer, and some studies show they may actually cause harm.

No recommendations can yet be made regarding the use of vitamin C to prevent coronary heart disease (CHD). Vitamin E supplements, either alone or in combination with other antioxidant vitamins, are of no benefit in the prevention of CHD. Studies have also failed to show that supplements of vitamins E and C decrease the risk of stroke.

Soy protein – Evidence of a direct cardiovascular health benefit from consuming soy protein products instead of dairy or other proteins or of isoflavone supplements is minimal. No meaningful benefit of soy consumption is evident with regard to HDL cholesterol, triglycerides, or lipoprotein (a).

Consumption of foods rich in soy protein may indirectly reduce CVD risk if they replace

animal and dairy products that contain saturated fat and cholesterol.¹

Phytochemicals – Flavonoids and sulphur-containing compounds are classes of compounds found in fruits and vegetables that may be important in reducing the risk of atherosclerosis.¹

A diet consistent with the AHA recommendations will provide sufficient amounts of macro- and micronutrients, as well as associated bioactive compounds, until further research.

Practical dietary guidelines to prevent and manage heart disease



Eat more:

- Fruit and vegetables: five portions a day – apples, pears, bananas, oranges, pumpkin, spinach, tomatoes, cabbage, carrots, beetroot, green beans
- Wholegrain starches and high-fibre foods – oats, malta-bella, All Bran, samp & beans, brown rice, brown or whole-wheat bread, lentils, dried beans, split peas, etc
- Meat and chicken (no fat, no skin) – grilled, roast, boiled, steamed

- Fish – grilled or steamed, especially sardines and pilchards (in tomato sauce)
- Dairy – low-fat milk, yoghurt, cheese
- In moderation: mono-unsaturated fats and oils: olive oil, canola oil (for stir-fry, salad dressings, etc), nuts, peanut butter
- In moderation: poly-unsaturated fats and oils: sunflower oil and soft tub margarine
- Herbs and spices instead of salt to flavour food
- Drink more water – at least one or two litres a day!



Eat less:

- Fried food – deep-fried potato chips, chicken, pizza, hamburgers, pies
- Processed food – sausages, russians, polony, viennas, bacon
- Salted snacks – potato crisps, salted peanuts, savoury biscuits, biltong
- Soya sauce, Worcester sauce, stock cubes, packet soup, Aromat
- Don't add extra salt to food after food has been cooked
- Food with added sugar – cakes, biscuits, sweets, chocolate
- Drink less cooldrink (sweetened)
- Drink less alcohol

Eat less fat

- Keep overall fat intake low (1-2 teaspoons a day of margarine or olive or canola oil)
- Avoid animal fats (also avoid coconut and palm kernel oil)
- Keep intake of foods high in cholesterol minimal, i.e. use a maximum of 2-3 eggs a week and have shellfish and organ meats no more than once a month
- Use small quantities of mono-unsaturated fats daily (avocado, olive or canola oil, olives, small quantities of nuts – not cashews or brazils)
- Use essential fatty acids (like salmon omega-3: 1 000mg a day)
- Avoid trans fatty acids, often found in “hydrogenated” or “partially hydrogenated” oils (like hard brick margarines) and in commercial bakery products (to enhance the stability and shelf-life of these products)

Tips for reducing overall fat intake:

- Buy lean cuts of meat and chicken (skinless) – trim off any visible fat before cooking
- Read food labels – check the fat content: less than 5g fat per portion or serving
- Fat-free cooking methods: grill, stew, roast, boil, stir-fry (one teaspoon oil or cooking spray)
- Avoid take-aways (hamburgers, pies, pizza etc) most of the time (keep some frozen meals on standby for days when you're rushed for time or don't feel like cooking)
- Avoid chocolates and crisps (use fat-free sweets, eg wine gums, jelly tots, marshmallows – in small amounts, when necessary)

- When eating out: choose grilled fish or chicken (no basting sauce), salad (no dressing), vegetables (sauces to be served separately), pasta (tomato-based sauce), fruit salad or sorbet

To limit saturated fats and trans fat and cholesterol (bad fat) altogether:

- Use skim milk, preferably (or mix it with 2% fat milk)
- Use low-fat cheeses and fat-free cottage cheese
- Use fat-free yoghurt
- Use soft, tub margarines (Floro Lite, Ole, canola)
- Avoid tropical oils (coconut and palm kernel oil, used in coffee creamers and in commercially baked cakes and pastries) – these are extremely high in saturated fats
- Avoid products whose labels read “hydrogenated” (hard, brick margarines)
- Avoid fatty red meat – remove all visible fat before cooking
- Use red meat no more than three times a week, and small portions (about 60-90g cooked)
- Grill meat, fish and poultry – at least to the point where it is “medium done”
- Avoid frying foods
- Avoid processed meats (vienas, sausages, bacon etc)
- Eat plenty of fish (giving you the good type of fatty acids)

Eat more fibre

Some good sources of soluble fibre:

- Oat bran
- Bokomo, NNB, Woolworths oats porridge
- High fibre bran cereal
- High fibre breads, eg heavy rye bread, seed loaf, “health” bread

- High fibre grains, such as brown rice, pearl barley, durum wheat or wholewheat pasta
- Legumes: beans, lentils and split peas
- Potato with the skin on, sweet potato
- Fresh fruit and vegetables

Extra notes on legumes, including beans and lentils:

Legumes include beans of every variety (green beans, baked beans, kidney beans, pinto beans, butter beans, sugar beans); also chickpeas, lentils and split peas.

Legumes are:

- Rich in protein, and are therefore ideal in vegetarian dishes
- Rich in fibre
- Very low in fat
- Contain some B vitamins, copper and zinc
- Cheap!

Therefore legumes have many health advantages:

- Due to their high fibre content, legumes help prevent or reduce colon-disorder symptoms such as irritable bowel syndrome and constipation
- Legumes also help protect against heart disease
- Legumes help lower fasting levels of blood glucose
- Legumes added to a meal help sustain energy levels after that meal is eaten
- Legumes leave one feeling fuller and more satisfied after a meal (great in weight-reducing diets!)
- Legumes help stimulate the immune system in the colon

Beans and lentils are easy to add to meals:

- Canned beans are fine to use – drain off the brine, rinse, and add to whatever dish you are preparing
- Dried lentils reconstitute very easily – cook up for about 20 minutes in boiling water (like rice) and then add to dishes like mince, soups and stews
- Chickpeas can be used in pasta dishes or added to cous-cous (hot or cold as a salad)
- Don't forget about baked beans on toast!
- Baked beans in tomato sauce can also be pureed and used as a gravy or topping



Add beans or lentils to dishes such as:

- Stews, casseroles, curry dishes
- Mince dishes (lentils or baked beans in tomato sauce)
- Soups
- Stir-fries
- Pasta dishes and risotto

Hints to lower your sodium (salt) intake

- Remove the salt shaker from the table. Instead of using salt, try using garlic, herbs and spices.
- Avoid using salt in cooking.

Start by using half the normal amount, and then cut that in half again. Your taste buds will adjust.

- Use fewer processed foods. Choose items that are labelled “salt free” or “reduced salt” or “low salt”. Foods such as tinned foods and soups, instant pasta or rice dishes, take-away foods, canned meats and snack foods like chips are all high in salt.

- Avoid MSG, often found in Chinese foods.
- Read stomach, cold and headache medication labels, as some of these can be high in sodium.

- In supermarkets buy low-salt and no-added-salt foods:

1. Look for the per 100g column
2. Look for sodium
3. Buy it if sodium is not more than 120mg/100g

- One teaspoon of salt = 2 000 mg sodium



General recommendations

The following are general recommendations for a prudent diet.

Eat a lot of vegetables, fruits, whole grains, and a limited amount of red meat. Eat at least five servings a day of fruits and vegetables. More is even better.

- Make fruits and vegetables part of every meal. Frozen or

canned products can be used when fresh products are not convenient or are unavailable.

- Add fruit to cereal.
- Eat vegetables as snacks.
- Leave a bowl of fruit out all the time for adults and children to eat as snacks.

Trans fatty acids and saturated fats should be avoided. Monounsaturated and polyunsaturated fats should be used instead.

- Choose chicken, fish, or beans instead of red meat and cheese.
- Cook with oils that contain a lot of polyunsaturated and monounsaturated fats, like olive and canola oil.
- Choose margarines that do not have partially hydrogenated oils. Soft margarines have less trans fatty acids than brick margarines.
- Eat fewer store-bought baked goods that may contain partially hydrogenated fats, such as crackers, cookies, and cupcakes.
- When eating at fast-food restaurants, choose items like grilled chicken.

Get enough folate every day (400 micrograms a day).

- Take a daily multivitamin containing 400 micrograms of folate. This is especially important for women in the childbearing years.
- Eat breakfast cereal that is fortified with folate.
- Eat fruits and vegetables that are rich in folate, like oranges, orange juice, and green leafy vegetables.

Avoid excessive alcohol intake.

- Choose non-alcoholic beverages, like juices and sodas, at

meals and parties.

- Avoid occasions centred on alcohol.
- Avoid making alcohol an essential part of family gatherings.

Breakfast

To get a good start to the day, breakfast is vital. This meal will give you fuel for the day and kick-start the brain.

Without breakfast, your concentration will dwindle and eventually, by lunchtime, you could struggle to stay awake. Some ideas for healthy breakfasts in the home:

- Wholewheat breakfast cereal, with chopped-up fresh fruit and low-fat yoghurt
- Wholewheat or brown toast and cottage cheese or peanut butter
- Scrambled egg on wholewheat or brown toast with baked beans
- Fruit smoothie made with low-fat yoghurt and fresh fruit, sprinkled with muesli or rolled oats and chopped nuts
- Oats or maltabella cooked porridge with low-fat milk and fresh fruit

Healthy lunch box ideas

- It is preferable to have home-packed food, as convenience and pre-prepared foods are often fairly high in fat and sugar. Here are some suggestions:

- Sandwich, roll, crackers, pasta or pita.
- Use wholewheat or brown bread.
- Some healthy toppings: cottage cheese, tuna, pilchards, mashed-up egg with low-fat mayonnaise, baked beans, peanut butter, avocado pear with lemon juice, lean chicken slices,

fish paste and sliced tomato.

- Make a pasta salad with chopped vegetables, lean chicken and some plain yoghurt.
- Left-over food from supper.

Other snacks for the day



- Fresh or dried fruit or fruit salad
- Vegetable sticks with some low-fat cottage cheese as a dip
- Rice cake with peanut butter or jam
- Peanuts and raisins
- Low-fat yoghurt with container of muesli to add
- Fruit or muesli bars
- Home-made oat crunchies
- Home-made popcorn

By planning ahead and buying suitable, healthy, easy-to-pack

foods, you can save yourself the last-minute rush in the morning and avoid having to resort to convenience foods too often.



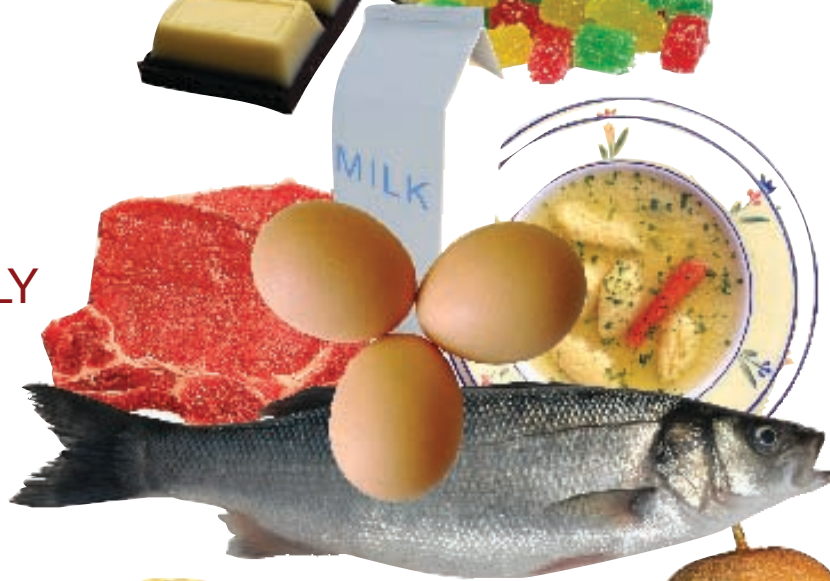
Example of a recommended daily diet and portions per day (AHA-recommended dietary goals at 8 500 kilojoules)

Food group	Portion or serving per day	Serving sizes
Grains	6 – 8 servings	1 slice bread; or ½ cup cereal or cooked porridge; ½ cup cooked rice or pasta
Vegetables	4 – 5 servings	½ cup cut-up raw or cooked vegetables or 1 cup leafy veg/salad
Fruits	4 – 5 servings	1 medium fruit or ½ cup fruit salad or ½ cup fruit juice
Fat-free or low-fat milk and milk products	2 – 3 servings	1 cup milk or yoghurt or 30g cheese
Lean meats, poultry and fish	4 – 5 servings	30-40g meat, fish or chicken
Nuts, seeds and legumes	4 – 5 servings	⅓ cup, 2 tablespoons peanut butter, 2 tablespoons seeds, ½ cup dry beans
Fats and oils	2 – 3 servings	1 teaspoon soft margarine, 1 tablespoon mayonnaise, 2 tablespoons salad dressing, 1 teaspoon vegetable oil
Sweets and added sugars	5 or fewer servings per week	1 tablespoon sugar, 1 tablespoon jelly or jam, ½ cup sorbet and ices, 1 cup lemonade

EAT LEAST



EAT MODERATELY



EAT MOST



References:

1. Lichtenstein A H, Appel L J et al. Diet and Lifestyle Recommendations Revision 2006: A Scientific Statement from the American Heart Association Nutrition Committee. Circulation 2006; 114; 82 – 96.