

Position statement

Antioxidants in food, drinks and supplements for cardiovascular health

This position statement provides recommendations for the consumption of antioxidant-rich food, drinks and supplements to reduce the risk of cardiovascular disease (CVD) and maintain cardiovascular health (CVH).

Our position on antioxidants determines our recommendations for:

- healthy eating for all Australians
- best practice advice to health professionals
- government policies and practices to improve the food supply
- food product innovation and reformulation by the food industry.

In 2009 the Heart Foundation, along with an expert working group, reviewed the latest scientific evidence relating to fruit and vegetables; tea; coffee; cocoa and chocolate; red wine; and vitamin supplements. This review determined if these foods, drinks and supplements are effective in reducing the risk of CVD and maintaining CVH. We acknowledge that there are other whole foods that contribute to daily antioxidant intake that are not included in this review.



Recommendations

The Heart Foundation recommends that all Australians follow a healthy balanced diet that includes a wide variety of healthy foods. This can be achieved by following our healthy eating and drinking tips, which promote CVH and healthy weight. You can access our healthy eating and drinking tips at www.heartfoundation.org.au/sites/healthyeating.

Our position on antioxidants was developed from our *Summary of evidence. Antioxidants in food, drinks and supplements for cardiovascular health*,¹ and based on the levels of evidence aims to improve the CVH of all Australians. It supersedes the 2002 *Position statement. The use of antioxidant supplements in heart disease*.²

The antioxidant components thought to play a role in CVH are vitamins E and C, carotenoids and flavonoids.

Antioxidants are agents that reduce oxidative damage by directly reacting with, or scavenging, oxidants that otherwise react with biological molecules, including lipids and proteins.

Oxidative damage has the potential to contribute to various processes leading to atherosclerosis.

The Heart Foundation makes the following recommendations for antioxidant intake.

All Australians adults

The Heart Foundation encourages all Australian adults to do the following.

1. Consume at least two serves of fruit and five serves of vegetables every day.
2. As part of a healthy balanced diet, drink*:
 - black or green tea[†]
 - cocoa made from raw cocoa powder.[‡]

The Heart Foundation **does not** recommend the following.

1. Consuming milk chocolate or dark chocolate for the prevention or treatment of CVD. Due to processing to remove the bitter taste, most chocolate is a poor source of antioxidants and contains saturated and trans fats.
2. Drinking coffee for the prevention or treatment of CVD. If consuming coffee, drink only paper-filtered, percolated, café-style (espresso) or instant (regular and decaffeinated), in preference to boiled (such as Turkish-style) or plunger coffee. Consume less than five cups per day.[§]
3. Drinking red wine or other types of alcoholic drinks for the prevention or treatment of CVD. The Heart Foundation supports the National Health and Medical Research Council (NHMRC) recommendation for healthy Australians who already drink alcohol to have no more than two standard alcoholic drinks per day for men and women.³
4. Using antioxidant supplements, such as vitamins E and C, carotenoids and other antioxidants or combinations, for the prevention or treatment of CVD. There is some concern that high doses (> 800 IU/day) of vitamin E supplements may increase the risk of CVD.

The Heart Foundation supports the *Nutrient Reference Values for Australia and New Zealand*,⁴ which recommends that people consume a diet that would provide these nutrients at levels currently equating to the 90th centile of intake in the population.

*Adding milk and sugar to beverages may contribute substantially to energy intake depending on the number of cups consumed. Use reduced, low or no fat milk where possible.

[†]This does not include iced tea. Caffeine consumed in large amounts may cause restlessness and disturb sleep in some people.

[‡]Raw cocoa powder contains high levels of polyphenols. This does not include drinking chocolate/milk modifiers.

[§]Caffeine consumed in large amounts may cause restlessness and disturb sleep in some people.

Health professionals

Health professionals should advise adult Australians to follow the above recommendations for all Australians in addition to the below.

- People with hypertension to consume no more than two standard drinks per day for men and one standard drink for women.⁵
- People with chronic heart failure who have alcohol-related cardiomyopathy to abstain from alcohol.⁶
- Other people with chronic heart failure to limit their alcohol intake to no more than 10 to 20 g (one to two standard drinks) per day.⁶

Due to the range of effects of alcohol, health professionals should exercise caution when advising people with chronic heart failure and hepatic dysfunction.⁶

Health professionals **should not** advise people to use chocolate, coffee, red wine or antioxidant supplements for the prevention and treatment of CVD.

Governments

The Heart Foundation encourages governments to do the following.

1. Commit to collecting Australian population data on:
 - dietary intake, through a national nutrition survey conducted every five years
 - determinants of fruit and vegetable access and consumption, particularly for socially and geographically disadvantaged Australians.⁷
2. Support and fund recommendations from the National Preventative Health Taskforce,⁸ specifically to:
 - commission a review of economic policies and taxation systems; and develop methods for using taxation, grants, pricing, incentives, and/or subsidies to promote the production and consumption of healthier foods
 - examine and develop systems and subsidies that increase the availability of high-quality fresh food for regional and remote areas, focusing on regional and remote transport and increasing the production of high-quality, locally grown fresh foods that are available to the local community.
3. Provide ongoing, adequate funding to implement a comprehensive, sustained social marketing strategy, such as the Go for 2&5® campaign, that encourages fruit and vegetable consumption.
4. Support non-financial incentive schemes, such as awards, training and accreditation, that increase access to and promotion of fruit and vegetables by distributors, suppliers, foodservice and the retail industry.⁹

The food industry

The Heart Foundation encourages the food industry to do the following.

1. Reformulate foods to increase the serves of fruit and vegetables, including branded and private label products and foodservice products.
2. Consider discounts, specials and price promotions to increase consumer purchases of fruit and vegetables.
3. Work with the Heart Foundation Tick to achieve high nutritional standards in the retail and foodservice areas.

Summary of evidence

An expert working group reviewed scientific evidence up to September 2009. The NHMRC levels of evidence were attributed to the recommendations where appropriate, and the associated studies were listed.¹⁰ Where the evidence is considered to be insufficient or inconclusive, the level of evidence is not applicable (n/a).

Evidence	Level
Fruit and vegetables	
Consuming a diet rich in fruit and vegetables causes a modest fall in systolic blood pressure in normotensive and hypertensive individuals. ¹¹⁻¹³	II
Increasing fruit and vegetable consumption is associated with: <ul style="list-style-type: none"> • a reduction in CVD mortality • reduced risk of stroke • a lower risk of coronary heart disease (CHD).¹⁴⁻²⁴ 	III-2
Tea	
Drinking tea or consuming tea flavonoids improves endothelial function. ²⁵⁻³⁴	II
There is limited evidence that drinking green tea or consuming tea flavonoids reduces visceral fat. ³⁵⁻³⁹	II
Regular tea drinking is associated with a reduced risk of CVD. ⁴⁰⁻⁴⁵	III-2
There is conflicting evidence regarding the effect of regular tea drinking on blood pressure. ^{31,46-53}	n/a**
There is little evidence that drinking tea improves the lipid profile.	n/a**

**Where the evidence is considered to be insufficient or inconclusive, the level of evidence is not applicable (n/a).

Evidence	Level
Cocoa Acute intake of high polyphenol cocoa and/or chocolate increases endothelial function. ^{54,55}	I
Consuming high polyphenol (≥ 500 mg) cocoa and/or up to 100 g/day of high polyphenol (≥ 500 mg) chocolate can modestly reduce systolic blood pressure. ^{53,54,56,57}	II
Cocoa and/or chocolate intake reduces platelet reactivity. ⁵⁸⁻⁶²	II
Coffee Consuming approximately five cups per day of coffee causes a small elevation in systolic blood pressure. ^{63,64}	I
Boiled coffee increases low-density lipoprotein (LDL-C) and total cholesterol (TC) levels. Filtered and instant coffee has very little effect on LDL-C and TC levels. ⁶⁵⁻⁶⁸	I
Coffee consumption has little impact on the risk of CHD. ⁶⁹⁻⁷³	III-2
Coffee consumption is not associated with an increased rate of heart failure hospitalisation or mortality, or cardiovascular mortality. ⁷⁴⁻⁷⁶	III-2
The role of coffee intake in the development of hypertension is unclear from epidemiological studies. ⁷⁷	III-2
Regular coffee consumption is associated with a lower risk of type 2 diabetes. ⁷⁸	III-2
Red wine Conflicting and insufficient evidence exists regarding the CVH benefits of polyphenols in red wine.	n/a**
Vitamin supplements Consuming vitamin E supplements does not decrease all-cause mortality, cardiovascular mortality or prevent cardiovascular events. ⁷⁹⁻⁸²	I
Consuming β-carotene supplements has a small effect on increasing cardiovascular mortality and all-cause mortality in smokers. ⁸¹	II
There is no evidence for the effectiveness of combination antioxidant supplements for the prevention of CVD. ^{79,80,82}	II
There is conflicting evidence regarding the effect of supplemental vitamin C intake and the risk of CHD. ^{83,84}	III-2

**Where the evidence is considered to be insufficient or inconclusive, the level of evidence is not applicable (n/a).



Glossary

Antioxidants: naturally occurring agents or compounds in foods that reduce oxidative damage by directly reacting with, or scavenging, oxidants. They include vitamins A, C and E; carotenoids such as beta-carotene; some minerals; phenolic compounds; and other naturally occurring chemicals with antioxidant properties.

Atherosclerosis: the narrowing and clogging of arteries with fatty material called 'atheroma' or 'plaque'.

Carotenoids: there are over 600 known carotenoids. In humans, four carotenoids – beta-carotene, alpha-carotene, gamma-carotene and beta-cryptoxanthin – have vitamin A activity. These and other carotenoids can also act as antioxidants. The most well-known carotenoid is carotene, found in carrots and apricots. It gives them their bright orange colour.

Flavonoids: polyphenolic compounds that are widespread in nature and categorised according to chemical structure into flavonols, flavones, flavanones, isoflavones, catechins, anthocyanidins and chalcones. Over 4,000 flavonoids have been identified, many of which occur in fruits, vegetables and common beverages.

Oxidant: a substance that oxidises something, especially chemically.

Oxidation: the loss of electrons or an increase in oxidation state by a molecule, atom or ion.

Polyphenols: the most abundant antioxidants in the diet. They are a group of chemical substances found in plants and are characterised by the presence of more than one phenol unit or building block per molecule.

Rating of the evidence

Evidence is graded according to the NHMRC guidelines.¹⁰

Levels of evidence for clinical interventions

Level of evidence	Study design
I	Evidence obtained from a systematic review of all relevant randomised controlled trials (RCT).
II	Evidence obtained from at least one properly designed RCT.
III-1	Evidence obtained from well-designed pseudo-RCT (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test



For heart health information
1300 36 27 87
www.heartfoundation.org.au

Visit www.heartfoundation.org.au/Professional_Information/Lifestyle_Risk/Nutrition for:

- The full reference list for this position statement
- *Summary of evidence. Antioxidants in food, drinks and supplements for cardiovascular health*
- Q&As about antioxidants.

© 2010 National Heart Foundation of Australia ABN 98 008 419 761
ISBN: 978-1-921226-88-5
PRO-106

Disclaimer: This document has been produced by the National Heart Foundation of Australia for the information of health professionals. The statements and recommendations it contains are, unless labelled as 'expert opinion', based on independent review of the available evidence. Interpretation of this document by those without appropriate medical and/or clinical training is not recommended, other than at the request of, or in consultation with, a relevant health professional.

While care has been taken in preparing the content of this material, the National Heart Foundation of Australia and its employees cannot accept any liability, including for any loss or damage, resulting from the reliance on the content, or for its accuracy, currency and completeness.

This material may be found in third parties' programs or materials (including but not limited to show bags or advertising kits). This does not imply an endorsement or recommendation by the National Heart Foundation of Australia for such third parties' organisations, products or services, including these parties' materials or information.

Any use of National Heart Foundation of Australia material by another person or organisation is done so at the user's own risk.

The entire contents of this material are subject to copyright protection.

The information contained in this position statement is current as of September 2009.