

Dietary fat & Heart-healthy eating





Position statement

This position statement summarises contemporary evidence and makes recommendations on the consumption of dietary fat and cardiovascular health. Several key evidence reviews¹⁻³ inform the Heart Foundation's position on dietary fats for heart health outlined here, and the Heart Foundation's broader position on heart-healthy eating patterns.⁴ This position statement is complementary to the Heart Foundation's existing food and nutrition position statements.

The Heart Foundation's position on food and nutrition recognises that healthy eating patterns do not rely on one type of food or nutrient to promote heart health.⁴ Eating a combination of foods, chosen regularly over time, is the key to heart-healthy eating patterns. This optimal combination is outlined in the Heart Foundation's heart-healthy eating principles, which encourage people to eat:

1. Plenty of vegetables, fruits and wholegrains.
2. A variety of healthy protein sources especially fish and seafood, legumes (such as beans and lentils), nuts and seeds. Other proteins, such as eggs and lean poultry can also be included in a heart healthy diet. If eating red meat, make sure the meat is lean and limit to consuming 1-3 times a week.
3. Unflavoured milk, yoghurt and cheese. People with high blood cholesterol should choose reduced fat varieties.
4. Healthy fat choices, including nuts, seeds, avocados, olives and their oils for cooking.
5. Herbs and spices added to flavour foods, instead of using salt.

This style of eating is naturally low in saturated and trans fats, salt and added sugar and rich in unsaturated fats (MUFA, omega-3 PUFA, and omega-6 PUFA), along with wholegrains, fibre, and antioxidants. Eating this way can help to improve the heart health of all Australians by reducing CVD risk factors, such as high blood pressure and blood lipids and decreasing the risk of CVD events and mortality.

Summary

Replacing energy intake from saturated fat with energy from polyunsaturated fat (PUFA), mono-unsaturated fat (MUFA) and wholegrains is associated with a lower risk of a heart disease. A greater risk reduction is observed when saturated fat is replaced with PUFA (including omega-3 and omega-6 PUFA), followed by MUFA, and to a lesser extent wholegrains. Replacing energy from saturated fat with non-wholegrain carbohydrates (i.e. refined carbohydrates including sugar) does not lower cardiovascular risk, and in some studies is associated with a greater risk. Both industrially produced and naturally occurring (ruminant) trans fat increase cardiovascular risk.

The evidence review supports the existing Heart Foundation targets for dietary fats. These targets should be met through the promotion of dietary patterns and food-based messages to improve current eating patterns.

Background

Australians need to significantly change their current eating patterns to improve heart health. Discretionary food and drinks are estimated to account for 35% of the average Australian adult daily energy intake.⁵ These foods are the leading contributors to intakes of saturated fat and trans fat, free sugar, sodium and alcohol intake.^{5,6} Discretionary foods and drinks dominate current eating patterns and occupy space where health-promoting foods should be prominent. This dietary imbalance means current Australian eating patterns are a leading risk factor for death and disability.⁷

The role of dietary fat, and its impacts on cardiovascular health, is a topic of interest to the community, health professionals and researchers. Most Australians do not consume enough linoleic acid (LA), long chain omega-3 PUFA (LC omega-3 PUFA) and alpha-linolenic acid (ALA) in their diets. For most Australians, the intake of combined saturated and trans fat is above recommended targets.^{8,9}

For Australian adults (aged 19 years and over), current eating patterns contribute, on average, 31% of energy from total fat, 12% from saturated and trans fat combined, 12% from MUFA, 4% from linoleic acid (an omega-6 PUFA) and <1% from alpha-linolenic acid (an omega-3 PUFA).⁵ Mean intake of LC omega-3 PUFA (includes combined eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)) is 260 mg/day for men and 180-240 mg/day for women.¹⁰

The majority of Australian adults achieve the WHO guidelines of <1% energy intake from trans fat, with a small proportion, around 1 in 10, exceeding this level.^{11,12} This is lower than other countries such as Brazil, Canada, Iran, Netherlands, United Kingdom (UK) and the United States.

Unfortunately, a socio-economic gradient exists for trans fat consumption in Australia.^{11,12} This means more people from low income and education backgrounds do not meet the WHO guideline: with around 1 in 7 exceeding recommended intakes for trans fat. This pattern of inequity is similar to that found in other countries, including the UK.¹³

Aboriginal and Torres Strait Islander Peoples reported eating patterns with similar total dietary fat intakes as the rest of the population, but with slightly higher intakes of saturated fat and lower intakes of LA.¹⁴

The Heart Foundation has commissioned, or led, several reviews relating to the intake of dietary fat and heart health. These inform the recommendations outlined in this position statement and include; *Evidence Review: Dietary Fats and Cardiovascular Disease* (Clifton & Keogh 2017)¹; *Rapid Review: Levels of trans fats in the food supply and consumption in Australia* (Wu et al 2016)² and *Indications for Omega-3 Long Chain Polyunsaturated Fatty Acid in the Prevention and Treatment of Cardiovascular Disease* (Nestel et al 2015).³

Evidence for dietary fats and heart health

Available evidence relating to the link between dietary fat intake and cardiovascular health outcomes comes mainly from prospective cohort studies, and systematic reviews and meta-analyses of these studies. There are also a limited number of intervention trials investigating cardiovascular risk factors, primarily changes in serum lipid profiles.

Clifton and Keogh (2017) evaluated information on dietary fats and cardiovascular health from systematic reviews and meta-analyses of observational cohorts and randomised controlled trials, including individual studies not included in the most recent meta-analyses, published between January 2010 and August 2016.¹ Wu et al (2016) assessed the evidence for reducing trans fat in the Australian food supply, modeled the absolute and proportional burden of coronary heart disease (CHD) mortality attributable to industrially-produced trans fat intake in Australia and assessed the effectiveness of policies to reduce trans fat intake.² Nestel et al (2015) assessed the evidence for omega-3 long-chain polyunsaturated fatty acid (omega-3 LCPUFA) consumption and cardiovascular health published between 2007 and 2013 in relation to fish consumption and omega-3 LCPUFA supplementation.³ This built on a previous review (Colquhoun et al. 2008), which assessed evidence up to 2007.¹⁵ The Evidence Review by Clifton & Keogh (2017) did not find any additional evidence to change the existing conclusions from Nestel et al (2015).¹ These reviews can be accessed for a full list and discussion of the available evidence.

Clifton & Keogh (2017) and Nestel et al (2015) both separately assessed the evidence for people with and people without existing cardiovascular disease (CVD). Both prospective cohort studies and intervention trials are available for studies in people with existing CVD, albeit a lower number and quality than for populations without existing CVD. There appeared to be no differences between dietary fat changes and risk of CVD in people with or without existing CVD, except for the findings outlined by Nestel et al (2015) for omega-3 LCPUFA supplementation in heart failure and hypertriglyceridaemia.



Dietary Fats and cardiovascular disease

The evidence review *Dietary Fats and Cardiovascular Disease* found that, when considering changes to dietary fat intake, proportional energy change is important.¹ Replacing energy intake from saturated fat with energy from PUFA and MUFA is associated with a lower risk of a CHD event and total mortality, with a greater risk reduction observed for PUFA (including linoleic acid and omega-3 LCPUFA), and to a lesser extent wholegrains. Replacing energy intake from saturated fat with energy from wholegrains is associated with a lower risk of CHD events, while replacing with energy from non-wholegrain carbohydrates (i.e. refined carbohydrates including sugar) was associated with an increased risk. This demonstrates poor quality carbohydrates (i.e. refined carbohydrates including sugar) may confer a similar amount of cardiovascular risk as saturated fat. This finding explains the 'neutral' or 'no' associations seen in reviews relating to the relationship between saturated fat and cardiovascular health when replacement with unsaturated fat has not been considered.

In all studies reviewed, trans fat intake was associated with an increased risk, incidence and mortality from heart disease.¹ There is not strong or consistent evidence that ruminant trans fat and industrially-produced trans fat affect cardiovascular risk differently,^{1, 16, 17} although in most countries, industrially-produced trans fat is consumed at a higher volume than ruminant trans fat. Using the methods employed by the Global Burden of Disease study,¹⁸ Wu et al (2017) estimated close to 500 deaths per year from CHD could be averted if industrially-produced trans fat intake was reduced to zero in Australia.^{2,11}

Nestel et al (2015) concluded there appeared to be a threshold of effect between 250-500mg combined EPA and DHA per day and reduced cardiovascular risk.³ Higher fish intake was associated with lower incident rates of heart failure, in addition to lower sudden cardiac death, stroke and myocardial infarction.³ In contrast, studies of LC omega-3 PUFA supplements did not find a clear benefit for reducing the cardiovascular disease in people with or without existing heart disease.³ However, evidence suggested that LC omega-3 PUFA supplements with 1g combined EPA and DHA can play a beneficial role in the treatment of patients with high triglyceride levels and in patients with heart failure.³

These above recommendations align with international guidelines, including the European Society of Cardiology, the National Institute of Clinical Excellence, the American Heart Association and the American College of Cardiology.

Higher intake of ALA was associated with reduced risk of CHD death in the setting of primary prevention.^{1,3} The evidence supports including sources of ALA in the diet, but not for supplementation.³ High ALA intake likely reflects intake of soybean oil, canola oil and walnuts, so other components of these foods beside ALA may also confer benefit.³

In studies specific to linoleic acid (LA), a type of omega-6 PUFA, replacing energy from saturated fat or carbohydrate with energy from LA was associated with a lower risk of CHD events and death.¹ In a meta-analysis of cohort studies, high (median intake 7.7%) compared to low (median intake 1.1%) of energy from LA was associated with a 15% lower risk of CHD (pooled RR, 0.85; 95% CIs: 0.78–0.92) and 21% lower risk of CHD mortality (RR, 0.79; 95% CI, 0.71–0.89).¹⁹ A Cochrane systematic review of 13 interventions found if saturated fat was replaced by PUFA, there was a 27% reduction in cardiovascular events.²⁰

These findings demonstrate a relationship between the replacement of energy from saturated fat with omega-6 PUFA and a lower risk of heart disease.¹ This supports the findings of the American Heart Association's scientific statement on omega-6, which found that omega-6 fats are associated with a reduced risk of heart disease and, when consumed within existing guidelines (4-10%), are not pro-inflammatory.²¹

Dietary fats and serum cholesterol and lipoproteins

The impact of saturated and trans fat intake in short-term interventions has been recently reviewed by the World Health Organisation.^{16,22} These reviews found that replacing 1% energy from saturated fat with energy from PUFA lowered low density lipoprotein (LDL-C) (-0.055 (-0.061 to -0.051)), followed by MUFA (-0.042 (-0.047 to -0.037)), then carbohydrate -0.033 mmol/L (95%CI -0.039 to -0.027)).²² Similar changes were found when replacing trans fat.¹⁶ When industrial trans was replaced by MUFA, LDL-C was lowered by -0.034 (-0.042 to -0.17), while replacement of ruminant trans by cis-MUFA lowered LDL-C by -0.052 (-0.097 to -0.006) for each 1% of energy exchange.¹⁶ Clifton & Keogh (2017) found no evidence that elevating high density lipoprotein (HDL) cholesterol by dietary means is related to CHD outcomes.¹

The LDL-C-lowering effect of both plant sterols and stanols continues to increase up to intakes of approximately 3 g/day to an average effect of 12%.²³ The intake of naturally occurring plant sterols in the diet is on average 200-400 mg daily.²⁴ The balance of evidence indicates that, when eaten at the recommended amount, between 2 and 3 grams a day, plant sterols can reduce LDL-C levels. This should be in addition to a heart healthy eating pattern and relevant medications, not a substitute for.

For evidence on the longer-term impact of improving blood cholesterol and lipoproteins in reducing total and LDL cholesterol compared to control diets, *Dietary Patterns and Cardiovascular Health*²⁵ found good evidence for dietary patterns, including the Portfolio diet (Level B, secondary prevention), DASH and low fat diets (Level B, primary and secondary prevention), the Mediterranean diet (Level C, primary prevention) and low GI, Mediterranean, Nordic and high protein diets (Level C, primary and secondary prevention).²⁵



Translating evidence for dietary fats into practice

Dietary fats within a healthy eating pattern

The Heart Foundation’s heart-healthy eating principles promote the key features of various dietary patterns, including Mediterranean and DASH diets. The heart-healthy eating principles translate the conclusions and recommendations from the Heart Foundation’s evidence summaries,^{1,3,15} and relevant nutrient targets from the National Health & Medical Research Council,⁸ the World Health Organisation^{16,17,22}, and the American Heart Association^{21,26}, which recommend the shift from saturated to unsaturated fat within a healthy dietary pattern.

Changes to dietary fat intake will influence serum cholesterol profiles and cardiovascular risk, but these changes need to be considered (and indeed promoted) as part of a wider eating pattern.

There is no evidence to suggest changes are required to existing nutrient targets. However, there is a need to promote heart healthy dietary patterns and food-based messages to shift current eating patterns. Doing this will help to shift diets towards eating patterns that are more beneficial for cardiovascular health. The Heart Foundation supports the following nutrient targets, which can be achieved through adopting the Heart Foundation’s healthy eating principles:

Nutrient	Target	Source
Saturated fat	<10% of total energy, on average	NHMRC, ⁸ WHO ^{17,22}
Omega-3 polyunsaturated fat		NHMRC, ⁸ Heart Foundation ^{1,3,15}
Combined EPA/DHA	250-500 mg per day	
ALA	1 gram per day	
Omega-6 polyunsaturated fat	4-10% of total energy, on average	NHMRC, ⁸ American Heart Association, ^{21,33} WHO ¹⁷
Total trans fat	<1% of total energy, on average	WHO ^{16,17}

Dietary fats and food-based recommendations

The Heart Foundation has reviewed the evidence relating to key foods, which are sources of dietary fat, and cardiovascular health. These are outlined in relevant position statements, summaries of evidence and other key reports. The following is a brief summary of the evidence and recommendations.

DAIRY

There is mixed evidence, but on balance it appears that milk, yoghurt and cheese have a neutral relationship with cardiovascular health. As a result, less processed milk, yoghurt and cheese products (i.e. no added sugar, limited sodium) can be included in a healthy eating pattern.^{27,28} Replacing saturated fat from dairy with unsaturated fat (PUFA and MUFA) is associated with a reduced risk of heart disease,¹ however given the inconsistencies in the evidence for fat modified dairy products in the observational data, there is not enough evidence to recommend fat modification (i.e. full fat over reduced fat products, or reduced fat over full fat products) for the general population.^{27,28}

There is evidence that dairy fat from cheese and yoghurt does not raise LDL-C in the same way that dairy fat from butter does; and evidence that LDL-C response to dairy fat is higher for those with elevated LDL-C.²⁷ This suggests caution around the consumption of butter, and higher fat dairy products, for people who would benefit from LDL-C lowering dietary interventions.²⁸

In summary, the Heart Foundation recommends unflavoured milk, yoghurt and cheese as part of a heart healthy eating pattern for the general population. For people who would benefit from LDL-C lowering dietary interventions, reduced-fat versions of milk, yoghurt and cheese are recommended. There is no evidence for products such as cream, ice-cream, dairy-based desserts and butter to be included in a heart-healthy eating pattern.²⁸

EGGS

The recent evidence surrounding egg consumption and the risk of developing cardiovascular disease is mixed, however the weight of it suggests that eggs have a neutral relationship with heart health, neither remarkably increasing or decreasing risk for the general population.^{29,30} There is emerging evidence to suggest that increasing the intake of eggs is associated with an increased risk of cardiovascular disease in people with type 2 diabetes.^{29,30} There is evidence, indicated in intervention trials, that dietary cholesterol (as found in eggs) increases LDL-C. In summary, the Heart Foundation recommends eggs can be included in a heart-healthy eating pattern for the general population. For people who would benefit from LDL-C lowering dietary interventions and for people with type 2 diabetes, a maximum of 7 eggs is recommended.³⁰

COCONUT OIL

There is no evidence to support the use of coconut oil in a heart-healthy eating pattern.³¹ Coconut fat elevates LDL cholesterol significantly, compared to oils rich in unsaturated fat, although not to the same extent as butter.³² In summary, the Heart Foundation recommends non-tropical plant based oils (i.e. olive oil, canola oil) in a heart healthy eating pattern.

NON-TROPICAL PLANT BASED OILS

Evidence suggests healthier fats or oils are those which promote healthier lipid profiles, and have positive impacts on other cardiovascular risk factors, or feature prominently in traditional or healthy eating patterns.^{1,25} These oils tend to have significant amounts of mono-unsaturated or polyunsaturated fatty acids, compared to saturated/trans fatty acids and include plant-based oils (often referred to as vegetable or seed oils), including olive, canola, soybean, safflower, sunflower, avocado, macadamia and peanut. The Heart Foundation recommends the use of oils which meet our healthier oils criteria of <20 g/100 g saturated fat and <1 g/100g trans fat.³³

FISH AND SEAFOOD

The Heart Foundation recommends an optimal range of between 250-500 mg combined EPA and DHA per day, based on the findings of observational studies demonstrating a 'threshold of effect' in this range.^{3,34} To achieve this target, it is recommended that fish and seafood is included in the diet 2-3 times per week, as outlined in the Heart Foundation's healthy eating principles.³⁴ The scientific evidence supports fish as the best dietary source of omega-3s, and found that higher fish intake was consistently associated with lower rates of heart disease (heart failure and sudden cardiac death) and stroke.³ For people who do not eat fish, supplements will provide some level of marine-sourced omega-3s.

NUTS AND SEEDS

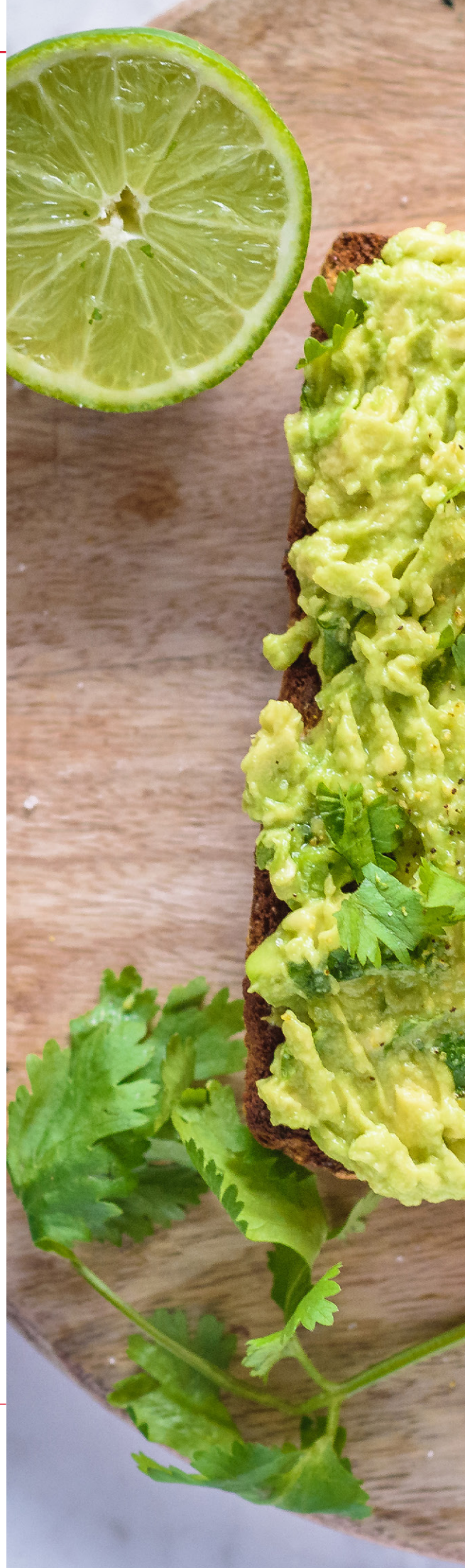
There is consistent evidence that consuming nuts, seeds and their oils lowers cardiovascular risk.³⁵⁻³⁷ The Heart Foundation recommends nuts, seeds and their oils are included regularly in a heart-healthy eating pattern.

Policy changes to the food supply which support healthy eating patterns

To improve population intake of dietary fats, government and the food industry can strengthen implementation of labeling and reformulation programs for commonly consumed processed foods. This action must be accompanied by programs and interventions which also shift eating patterns away from discretionary and highly processed foods*, towards healthy foods^.

Modeling suggests that trans fat from ruminant sources contributes to about 60-75% of total trans fat intake in Australia, in comparison to ranges between 28-79% in other countries.² This indicates industrially-produced trans fat continues to be present in the Australian food supply, albeit it in smaller quantities than other countries. Voluntary reformulation of trans fat in the Australian food supply over the past 30 years has contributed to low average intakes of total trans fat, however surveys indicate industrially-produced trans fat continues to be present in common supermarket items.²

Evidence demonstrates mandatory labeling and/or banning industrially-produced trans fat are more effective policies in eliminating industrially-produced trans fat from the food supply.³⁸ The Heart Foundation recommends continuing efforts to remove industrially-produced trans fat from the Australian food supply. To achieve this, trans fat (both ruminant and industrially-produced) should be labeled on packaged food products, measures should be taken to phase out ingredients with industrially-produced trans fat, and ongoing monitoring, with 3 yearly surveys of the Australian food supply, should be implemented.



* In this document, the term 'processed' refers to highly processed and/or discretionary foods such as chips, biscuits, pastries, take-away style foods, confectionary, and sugary drinks. Please see the FAQs for more information.

^ In this document, the term 'healthy food' refers to foods promoted in the Heart Foundation's Heart Healthy Eating Principles.



Conclusions

The combined evidence suggests that improving the entire eating pattern, not simply altering one nutrient or food, is required to promote cardiovascular health.

Proportional energy change of dietary fats is important in understanding the cardiovascular impact of dietary fats. Replacing energy intake from saturated and trans fat, with energy from PUFA, MUFA and wholegrains, is associated with a lower risk of coronary heart disease (CHD). Replacing energy from saturated fat with non-wholegrain carbohydrates (i.e. refined carbohydrates including sugar) does not lower cardiovascular risk, and in some studies is associated with a greater risk. Consuming naturally occurring and ruminant trans fat increases cardiovascular risk compared to saturated fat, PUFA, MUFA and carbohydrates.

The challenge is translating 'replacement' and 'reduction' nutrient messages into practical advice.

At an individual level, for both primary and secondary prevention of heart disease, the evidence suggests that people should eat less discretionary foods, the leading contributors to saturated fat, trans fat, sodium and free sugar intakes, and replace them with the foods included in the Heart Foundation's heart-healthy eating principles. These foods include a mix of fish and seafood, wholegrains, vegetables, legumes, fruit, nuts and seeds, and healthy oils. Reducing the consumption of discretionary foods would contribute to healthier eating patterns and assist in achieving nutrient targets, particularly for those sub-groups with higher intakes.

The Heart Foundation recommends that people with and without existing heart disease adopt the heart-healthy eating principles to achieve the right balance of dietary fat intake.

People with existing heart disease, or those at high risk of developing heart disease, are encouraged to follow these specific recommendations:

- For people who would benefit from LDL-C lowering dietary interventions, including those with elevated LDL-C and those with existing coronary heart disease, consuming reduced fat and unflavoured dairy products is the preferred choice due to the LDL-C increasing nature of dairy fat. These people should also limit their intake of added sugar.²⁷
- People with type 2 diabetes mellitus should limit their consumption of eggs to 7 per week, due to the greater risk associated with developing cardiovascular disease. People with cardiovascular disease who require LDL-C lowering interventions should limit their consumption of eggs to 7 per week, due to the LDL-C raising effect of eggs.²⁹
- For people with heart failure, there is modest support for adding 1 gram of omega-3 LCPUFA to their diet (by taking a supplement), in addition to standard therapy.³
- People with hypertriglyceridaemia should consider up to 4,000–5,000 mg of EPA and DHA per day taken either alone, or with a fibrate, for moderately severe hypertriglyceridaemia.³
- For people with high absolute risk of heart disease, and people who require blood cholesterol lowering interventions, eating 2–3 g of plant sterols per day from fortified food products (currently margarine, milk, yoghurt and breakfast cereals) will assist in lowering LDL cholesterol levels.²³

Recommendations

Based on the evidence for dietary patterns and the evidence for dietary fat intake and cardiovascular health outcomes, the Heart Foundation recommends:

1. Rather than focusing on individual nutrients, we encourage Australians to follow the Heart Foundation's heart-healthy eating principles which includes eating:
 1. Plenty of vegetables, fruits and wholegrains.
 2. A variety of healthy protein sources, especially fish and seafood, legumes (such as beans and lentils), nuts and seeds. Smaller amounts of eggs and lean poultry can also be included in a heart healthy diet. If choosing red meat, make sure the meat is lean and limit eating to 1-3 times a week.
 3. Unflavoured milk, yoghurt and cheese. Those with high blood cholesterol should choose reduced-fat varieties.
 4. Healthy fat choices with nuts, seeds, avocados, olives and their oils for cooking.
 5. Herbs and spices added to flavour foods, instead of using salt.
 6. Water as the drink of choice.
2. Due to the demonstrated relationships between specific dietary fats and cardiovascular health outcomes and risk, the Heart Foundation supports existing nutrient targets including trans fat <1% total energy intake, saturated fat <10%, linoleic acid between 4-10%, LC omega-3 (combined EPA and DHA) between 250-500 mg per day, and 1 g ALA per day. These targets should be achieved through adopting a heart healthy eating pattern as outlined in the Heart Foundation's heart-healthy eating principles.
3. For people who would benefit from LDL-C lowering dietary intervention, choosing reduced fat and unflavoured dairy products and eating less than 7 eggs per week is recommended. For people with type 2 diabetes, a maximum of 7 eggs per week is also recommended. Unflavoured reduced fat milks, cheese and yoghurts are also lower in kilojoules.
4. Health professionals can consider supplementing nutrition therapy with LC omega-3 PUFA (combined EPA & DHA) in people with heart failure and people with high triglycerides. Health professionals can also consider recommending consumption of plant sterol enriched foods in people with high absolute risk who required cholesterol lowering therapies.
5. Government and food industry can implement labeling and reformulation programs to assist in improving population intakes of dietary fats, mandatory labeling of trans fat and ongoing monitoring of industrially-produced trans fat in the Australian food supply. This must be accompanied by programs and interventions which also shift eating patterns away from discretionary and highly processed foods.



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