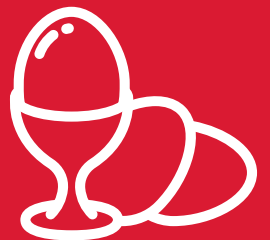


# Eggs & heart-healthy eating



## Position statement

This position statement summarises contemporary evidence for egg consumption and cardiovascular health. The Heart Foundation's *Summary of Evidence for Eggs and Cardiovascular Health*<sup>1</sup> informs the Heart Foundation position on eggs outlined here and the Heart Foundation's broader position on heart healthy eating patterns.<sup>2</sup> This position statement is complementary to the Heart Foundation's suite of 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 one type of nutrient to promote heart health.<sup>2</sup> Heart healthy eating patterns are based on a combination of foods, chosen regularly, over time. This optimal combination is outlined in the Heart Foundation's heart-healthy eating principles which encourage people to eat:

1. Plenty of fruit, vegetables and wholegrains.
2. A variety of healthy protein sources including 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 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 to flavour foods, instead of adding salt.

This style of eating is naturally low in saturated and trans fats, salt and added sugar and rich in wholegrains, fibre, antioxidants and unsaturated fats (omega-3 and omega-6). 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

Eggs can be consumed as part of a heart healthy eating pattern that includes vegetables, fruits, legumes, wholegrains, fish, olives, seeds, nuts and oils made from them.

Based on current evidence, the relationship between egg consumption and risk of cardiovascular disease is mixed. The evidence suggests that eggs have a neutral relationship with heart health, neither remarkably increasing or decreasing risk in the general population. For example, eggs do not make healthy diets healthier compared to foods that decrease risk, including fruits, vegetables and wholegrains. However, eggs can be a healthy snack option, contribute to healthy meals and are preferred over discretionary foods.

**There is evidence of risk for cardiovascular disease in people with type 2 diabetes mellitus; therefore, a maximum of 7 eggs per week is recommended.**

## Background

Eggs are a complete source of protein, containing all 11 essential amino acids, along with vitamin A, E and B12, selenium, choline and iron.<sup>3,4</sup> Eggs contain around 6 g protein per 60 g egg, and are also a source of saturated fat (3 g/100 g), mono-unsaturated fat (5 g/100 g) and polyunsaturated fat (1.6 g/100 g), including omega-3 (170 mg/100 g), primarily DHA and ALA.<sup>4,5</sup> Egg yolks are high in cholesterol (approximately 200 mg per egg yolk) and are a major source of dietary cholesterol in Australia.<sup>6</sup>

Eggs and their impact on cardiovascular health have been a topic of interest for some time, with the evidence base and international recommendations shifting in recent decades.

Given the relationship between elevated plasma cholesterol and cardiovascular disease, global dietary guidelines and recommendations have previously recommended limiting food sources of cholesterol, including eggs. However, the relationship between plasma cholesterol and dietary cholesterol has not always been well understood. Dietary cholesterol increases blood cholesterol concentrations, although the rise in most people is minimal.<sup>7</sup> Foods high in saturated and trans-fat are responsible for the greatest impact on plasma cholesterol levels.<sup>8,9</sup> In recognition of this, the Heart Foundation does not set a limit on dietary cholesterol intake.<sup>10</sup> Furthermore, cardiovascular disease risk is more than raised plasma cholesterol, and eggs contribute more to the body than dietary cholesterol.

Egg consumption can be measured by comparing the median intake of eggs alone as well as egg products and dishes based on results from the 1995 National Nutrition Survey (NNS) and 2011-2012 National Nutrition and Physical Activity Survey (NNPAS).

### Median intake of eggs (grams/day)

	Males	Females
1995 National Nutrition Survey <sup>11</sup>	55.5	49.0
2011-2012 National Nutrition and Physical Activity Survey <sup>12</sup>	56.0	49.0

Though there was a slight increase in consumption of eggs amongst males, there was no change in females' consumption from the two National survey time points. These results are consistent with the 2016 Analysis of the CSIRO Healthy Diet Score, which found that, on average, Australian adults consume 0.82 eggs (49.2 grams) per day.<sup>13</sup>

As eggs can be a major component of dishes (i.e. frittatas, omelettes, souffles), it is important to look at overall egg consumption, inclusive of these dishes.

### Median intake of egg products and dishes (grams/day)

	Males	Females
1995 National Nutrition Survey <sup>11</sup>	72.0	50.0
2011-2012 National Nutrition and Physical Activity Survey <sup>12</sup>	78.0	68.0

Results from the latest 2011-2012 NNPAS revealed that the median intake of eggs (inclusive of dishes where eggs are the major component) had increased by 6.0g/day for males and 18.0g/day for females. Therefore, these results indicate that egg consumption has increased over the years.

The Heart Foundation's *Summary of Evidence for Eggs and Cardiovascular Health*<sup>1</sup> reviewed the evidence for egg consumption and cardiovascular health outcomes. This evidence informs the Heart Foundation's position on eggs, and the Heart Foundation's broader position on heart-healthy eating patterns.

## Evidence for eggs and cardiovascular health

The evidence base mainly consists of observational studies and some randomised controlled trials (RCTs) investigating blood cholesterol. A review of meta-analyses of cohorts and RCTs published between January 2009 and August 2018 was completed. The Heart Foundation's *Summary of Evidence for Eggs and Cardiovascular Health* provides a detailed overview of this evidence.<sup>1</sup>

### Eggs and cardiovascular risk factors and outcomes

There is mixed evidence on the association between egg consumption and the risk of CVD, with the majority of systematic reviews and meta-analyses observing no association,<sup>14-17</sup> a small number observing an increased risk,<sup>18,19</sup> and recent cohort studies reporting no or inverse associations.<sup>20,21</sup> In recent reviews, egg consumption was not associated with risk of stroke.<sup>14,15,17</sup>

In two meta analyses an inverse association was observed between egg consumption and hypertension. Both of these were conducted with a small number of studies, and therefore these results should be interpreted with caution.<sup>22,23</sup> In the one meta-analysis identified, high consumption of egg, as compared to low consumption, was associated with an increased risk of heart failure.<sup>17</sup>

Despite cohort data observing no strong association with CVD outcomes, an analysis of RCTs found that dietary cholesterol (as found in eggs) does increase LDL cholesterol, along with HDL cholesterol and the LDL to HDL cholesterol ratio, but does not increase triglycerides.<sup>7</sup> It is important to note that CVD risk encompasses more than elevated LDL cholesterol, and these recent meta-analyses have not observed a consistent relationship between egg consumption and elevated CVD risk or mortality in populations without existing CVD or diabetes.



## Eggs, diabetes and cardiovascular risk

Type 2 diabetes (T2D) is a preventable risk factor for heart disease. Adults with diabetes are two to four times more likely to die from heart disease than adults without diabetes.<sup>24</sup>

There is mixed evidence on the relationship between egg consumption and the risk of developing T2D, although more research is needed in this area as many confounders exist in this relationship.<sup>15,18,19</sup> In populations with diabetes, a growing evidence base is reporting an increased risk of cardiovascular disease associated with increasing intake of eggs.<sup>14,15,18</sup> In a meta-analysis of prospective cohort studies, the consumption of more than 7 eggs per week was associated with a 69% increase in CVD events.<sup>15</sup> Similar relationships were observed in two other meta-analyses published in the same year, which both undertook a dose-response analysis and found statistically significant elevated risk of CHD in diabetic populations.<sup>14,18</sup>

## Limitations to the evidence base

Studying the relationship between a food or nutrient and health outcomes is complex. Further, the evidence base is mainly observational studies, which bring inherent limitations to understanding the relationships between a food and health outcomes.<sup>25</sup> A food cannot be studied in isolation, without considering the effect of the food replacing it. Observational studies are not able to determine causation and, although most observational studies reviewed for this work adjusted for confounders, this inherent limitation is acknowledged. As such, only the observed relationship can be reported on for these studies. The available intervention studies are of short duration and unlikely to reflect average eating patterns of the Australian population, therefore their findings require careful consideration.

## Conclusions

**The combined evidence suggests that improving the entire eating pattern, not altering one nutrient (i.e. cholesterol) or one food (i.e. eggs) in isolation, contributes to cardiovascular health. Eggs can be consumed as part of a heart healthy eating pattern that includes vegetables, fruits, legumes, wholegrains, fish, olives, seeds, nuts and oils made from them.**

The available evidence suggests the consumption of eggs in the context of a dietary pattern rich in vegetables, fruit, legumes, nuts, seeds, wholegrains, healthy fats and low in discretionary food and drinks (i.e. sugary drinks, alcohol and heavily processed foods), doesn't appear to significantly affect cardiovascular risk in the general population (i.e. no strong relationship with risk or benefit). This prevents a maximum limit for egg consumption in this population, but it should not be interpreted that eggs are uniquely beneficial for heart health. Eggs can be included as one of a variety of healthy protein foods chosen across the week, including fish and seafood, legumes, nuts and seeds.

Based on the data for increased risk for cardiovascular disease in people with type 2 diabetes, consumption should be limited to less than 7 eggs per week. Considering the data that egg consumption raises LDL-C, it is prudent to limit consumption to around 7 eggs per week for people who require LDL-C lowering therapies.

In summary, this evidence suggests that eggs can be included but are not a defining feature of a heart-healthy eating pattern.

## Recommendations

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

1. Rather than focusing on individual nutrients or foods, 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 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 to flavour foods, instead of adding salt.
2. Eggs can be included as part of a heart-healthy eating pattern, and can be chosen as one of a variety of protein foods, including fish and seafood, legumes, nuts and seeds, and poultry, in preference to unprocessed red meat.
3. Eggs are a healthy snack option in preference to discretionary foods and can contribute to healthy meals when eaten with vegetables, wholegrains, and poached or prepared with healthy oils.
4. 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.
5. 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.



## Related documents

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Heart Foundation (2019) Eating for Heart Health: Position Statement. NHFA: Melbourne

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## Acknowledgements

The Heart Foundation would like to acknowledge the following people who played an instrumental role in the development of this position statement:

- Members of the Expert Reference Group on Animal Proteins of the National Heart Foundation of Australia: Dr Jason Wu, Professor Sarah McNaughton, Professor Peter Clifton, Dr Tim Crowe, Professor Trevor Mori, Professor Garry Jennings
- Members of the Heart Health Advisory Committee of the National Heart Foundation of Australia (2019)
- Members of the Heart Foundation's Nutrition Technical Expert Group



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