Position statement on the relationships between carbohydrates, dietary fibre, glycaemic index/load and cardiovascular disease

This Executive Summary was developed to help the public and health professionals better understand the role that carbohydrate may have in relation to cardiovascular disease and its risk factors.

Findings

Despite the current lack of evidence implicating total carbohydrate intake in cardiovascular disease, the source or type of the carbohydrate consumed does impact on the risk of developing coronary heart disease and risk factors for cardiovascular disease.

Based on the evidence discussed in the full review paper, the Heart Foundation’s position on the relationship between dietary carbohydrate and cardiovascular disease is:

Total carbohydrate
- There is no evidence to support any significant association between total carbohydrate intake and cardiovascular disease.

Glycaemic Index/Glycaemic Load
- There is some evidence that dietary patterns high in refined carbohydrate and of high dietary glycaemic load are associated with an increased risk of coronary heart disease. This effect may be due to increases in body mass index (BMI) rather than by the effects on blood glucose (sugar) levels.

Dietary fibre
- There is moderate evidence that dietary patterns high in dietary fibre from cereals and fruit are associated with a lower risk of coronary heart disease and that wholegrains, apart from the dietary fibre content, also appear to be protective.

Triglycerides
- There is good evidence that dietary patterns high in glycaemic load raise serum triglyceride levels, particularly in those with existing elevated triglycerides and a high BMI.

Total and LDL cholesterol
- There is good evidence that soluble fibre lowers plasma low density lipoprotein (LDL) cholesterol which lowers the risk of cardiovascular disease.

Insulin resistance- Metabolic syndrome and type 2 diabetes
- There is no evidence that total carbohydrate intake significantly affects insulin sensitivity or the risk of developing type 2 diabetes.
- There is moderate evidence that eating patterns low in refined carbohydrate, lower in sucrose (a sugar), or higher in cereal fibre are associated with a lower risk of type 2 diabetes and have beneficial effects on blood glucose (sugar) levels following eating.

Obesity
- There is moderate evidence that high carbohydrate eating patterns, particularly those high in sucrose or fructose, may increase the risk of excessive energy (kilojoules) intake. This may impact directly on the development of overweight and obesity, and indirectly on the risk of developing type 2 diabetes and cardiovascular disease.
Recommendations

The following recommendations are made to improve the health of all Australians and reduce the current level of cardiovascular disease.

The National Heart Foundation of Australia recommends that:

**Australians**

1. Choose carbohydrate foods that are mainly non-refined and rich in dietary fibre, vitamins and minerals. These include foods like wholegrain rice, pasta, bread, breakfast cereals, fruit, vegetables and legumes i.e. dried peas (e.g. split peas), dried beans (e.g. haricot beans, kidney beans), canned beans (e.g. baked beans, three bean mix) and lentils.

2. Include adequate dietary fibre in their meals and snacks:
   - Enjoy meals based around a variety of vegetables and fruit, high fibre or wholegrain foods such as breakfast cereals, bread, pasta, noodles and rice;
   - Incorporate dried peas (e.g. split peas), dried beans (e.g. haricot beans, kidney beans), canned beans (e.g. baked beans, three bean mix) or lentils into two meals a week;
   - Try to limit refined carbohydrate foods like confectionery, high sugar drinks, cakes, biscuits and pastries as they contain a lot of energy (kilojoules) and frequently do not contain wholegrain fibre; and
   - Try to limit cakes, pastries and biscuits to once a week.

3. Consume at least 6 grams of wholegrain fibre per day as part of your total dietary fibre intake.
   - In food terms this is equivalent to one serve of a high fibre cereal and two slices of wholegrain bread. This means bread that is made from whole or kibbled grains, wholemeal or stone-ground flour or rye flour.
   - Choose the wholegrain options for cereal-based foods such as wholegrain or wholemeal bread, wholegrain or high fibre breakfast cereal, rolled oats or porridge, wholegrain crispbreads, wholegrain rice cakes, brown rice and wholemeal pasta.

4. Discuss healthy eating and concerns about nutrition with a doctor or an Accredited Practicing Dietitian.

5. Visit the Heart Foundation’s Heartsite at www.heartfoundation.com.au, or contact Heartline on 1300 36 27 87 (local call cost) or heartline@heartfoundation.com.au for further healthy eating information.
Recommendations

Health professionals
When advising patients or clients with health concerns, include the nutrition recommendations above with specific emphasis on the following, and where appropriate also refer the patient to an Accredited Practising Dietitian.

1. High risk or existing cardiovascular disease: Patients should follow an eating pattern high in dietary fibre from cereals, particularly wholegrains, and fruit as it is associated with a lower risk of coronary heart disease.

2. Elevated triglycerides: Patients should follow an eating pattern that is low in glycaemic load to assist in reducing serum triglyceride levels, particularly in those with a high BMI. This means eating less of foods like confectionery, cakes, biscuits, pastries and limiting high sugar drinks.

3. Elevated total and LDL cholesterol: Patients should follow an eating pattern that contains soluble fibre as it helps to lower plasma LDL cholesterol. These foods include fruits, legumes (e.g. chickpeas, lentils, soybeans) and wholegrain cereals (e.g. oats and barley).

4. High BMI: Patients should follow an eating pattern that is low in refined carbohydrate and low in glycaemic load. Highly refined carbohydrate foods, particularly those containing sucrose and fructose, may increase the risk of excessive energy (kilojoules) intake, impacting on the development of overweight and obesity and thus on the risk of type 2 diabetes and cardiovascular disease. This means eating fewer foods like confectionery, cakes, biscuits, pastries and limiting high sugar drinks. (Many of these foods are also often high in saturated fat). Patients should focus on choosing more of the unrefined carbohydrate foods.

5. Insulin resistance, metabolic syndrome and type 2 diabetes: Patients should follow an eating pattern that is low in refined carbohydrate foods, including sucrose and higher in cereal fibre as it is associated with a lower risk of type 2 diabetes and has beneficial effects on post-prandial glucose profiles.

Governments
Incorporate recommendations for wholegrain fibre within revised dietary fibre Nutrient Reference Values for Australia and New Zealand (still being finalised at the time of publication).

Industry
1. Develop or reformulate foods that:
   • have a greater proportion of whole grains or are high in dietary fibre; and
   • reduce the glycaemic load of meals.
2. Increase the percentage of healthier choices within their product range.

Future research
1. Include detailed studies to clarify the mechanisms by which whole grains exert protective effects on cardiovascular disease risk.
2. Incorporate the influence of carbohydrate type and amount on novel and emerging markers of cardiovascular risk as well as harder endpoints in subjects who have the metabolic syndrome phenotype.
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Background information

Carbohydrate and unsaturated fatty acids have been recommended as suitable replacements for dietary saturated fatty acid intake in order to lower blood cholesterol and thus reduce the risk of cardiovascular disease (NHFA, 1999). However, the rise in obesity rates has favoured the use of carbohydrates as the replacement (NHMRC, 1997), which leads to diets lower in total fat as well as saturated fat. Several reviews and studies have highlighted that low fat, high carbohydrate eating patterns may not be beneficial for lowering cardiovascular risk (NHFA, 2003; Katan et al. 1997). Randomised controlled clinical trials are considered to be the best method to assess the impact of any intervention or treatment (NHMRC, 1999). However, in the area of dietary intervention and cardiovascular disease, there are few randomised controlled trials and so the criteria used to appraise the scientific evidence was based on consistency across a range of study designs, the quality of the study and consideration of measurement bias, the size of the effect and the demonstration of a biologically plausible mechanism. The terms ‘good’, ‘moderate’ and ‘some’ evidence were used to assess the strength of the scientific evidence. In light of the complexity and controversies regarding definitions of carbohydrates, the Heart Foundation’s evidence-based review did not rely on one classification of carbohydrates. Rather, it considered key studies that sought to answer questions about whether the amount and source of carbohydrates and their physiological effects influence the risk of cardiovascular disease.

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<tr>
<th>Conclusions and assessment of evidence</th>
<th>Key studies</th>
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<tr>
<td>The source or type of the carbohydrate impacts on the risk of developing coronary heart disease (CHD) and risk factors for CVD. (good evidence)</td>
<td>Stratton et al. 2000; Pereira et al. 2004.</td>
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<td>Eating patterns high in refined carbohydrate and high in glycaemic load are associated with an increased risk of CHD and CVD risk factors including obesity (moderate evidence), elevated LDL-cholesterol and triglyceride levels (good evidence) and type 2 diabetes (moderate evidence).</td>
<td>Schulze et al. 2004; Foster et al. 2003; Salmeron et al. 1997a; Samaha et al. 2003; Stevens et al. 2002; Liu et al. 2001; Liu et al. 2003; Garg et al. 1994.</td>
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<td>Wholegrain cereals lower the risk of CHD and appear beneficial apart from the fibre content itself. Emphasis should be on the consumption of wholegrain cereals products as well as fibre from fruit, legumes and vegetables. (moderate evidence)</td>
<td>Mozaffarian et al. 2003; Jacobs et al. 1999; Jacobs et al. 2000; Bazzano et al. 2003.</td>
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<td>Eating patterns high in glycaemic load and low in cereal fibre are associated with excess weight gain and increased risk of developing type 2 diabetes. (moderate evidence)</td>
<td>Schulze et al. 2004; Fung et al. 2002; Stevens et al. 2002.</td>
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<td>An intake of at least 6 grams/day fibre from wholegrains may contribute significantly to a lowering of CVD risk. (moderate evidence)</td>
<td>Mozaffarian et al. 2003; Bazzano et al. 2003.</td>
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References


For the detailed discussion of the evidence supporting these recommendations, please refer to the full paper ‘Position statement on the relationships between carbohydrates, dietary fibre, glycaemic index/load and cardiovascular disease’ on Heartsite at www.heartfoundation.com.au.

Separate Q and A documents for health professionals and the general population can also be obtained from Heartsite at www.heartfoundation.com.au, or Heartline on 1300 36 2787 (local call cost) or heartline@heartfoundation.com.au.

The information contained in this Executive Summary is current as of October 2005.
About the Heart Foundation

The National Heart Foundation of Australia is the leading organisation in the fight against cardiovascular disease (heart, stroke and blood vessel disease) in Australia. As a charity, the Heart Foundation relies almost entirely on donations and gifts in wills to continue our lifesaving research and health promotion work.

Cardiovascular disease claims the lives of more than one in three Australians. We aim to reduce cardiovascular-related death and disability by funding world class medical and scientific research, through informing and educating the public, by promoting lifestyles that improve cardiovascular health, by developing guidelines for health professionals, and by assisting people who have suffered from cardiovascular disease by promoting treatment and rehabilitation.

Heartsite
The Heart Foundation’s website www.heartfoundation.com.au provides you with access to all our latest heart health information and cookbooks, as well as policies and guidelines for health professionals.

Heartline
Heartline is the Heart Foundation’s national telephone information service, staffed by trained health professionals experienced in heart health. Call 1300 36 27 87 (local call cost) during business hours for information on heart health issues such as heart disease and stroke, healthy eating, controlling blood pressure, cholesterol, smoking cessation, physical activity and heart surgery. Please note Heartline is not an emergency, diagnostic or counselling service.